QUNNGIAKNIQ TAIMALU INIGIIKTAUYUT TALVUNA DORIS HAVAATJUTATIGUN INIKHIMAITUQ NUNALAATIGUN HULILUKAGIANGANI NAUNAIRUTAINGIT

INIKHIMAITUT TITIQAT NAITUT NAUNAIRUTIIT ATANIQNIN

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REVIEW AND EVALUATION OF THE DORIS NORTH PROJECT DRAFT ENVIRONMENTAL IMPACT STATEMENT

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NAITUT NAUNAIRUTIIT ATANIQNIN

Tamaat naunairutiit

Talvani tamaat naunairutingni, tamna Inirhimaittumi Nunalaangit Hulilukarutiit Titiqaingit (Inirhimaittumi EISmik) taivaktait tafuminga Doris Northmik taivaktait Havatjutaa nalvaktautjutiqaqtuq naunaitpiaqtumik. Iluani Naunairutiit piqaqtuq ikayugianga uvuna titiqam inighimayut havaktauhimayut taimalu naunairutiqaqtuq taima ikayugiangani iniqtirutaa talvuna INIRHIMAITTUMI EISmik taivaktait taima hulitjutaitigun taimalu qanuq itnialiqaa talvuna. Ilangit ikikliuhimayut naunairutiit nalvaakpaktavut ikayutikun naunairutingni, taimalu naunairutiit havaakvimni naunaiqianik naunairutingnik, taimalu ilangit naunairutiit naunailuangitunik pinikpaktugut taimalu naunairutiit ikayugiangani titiqat inmiqaqtun. Kikliqaqtun tapkuat ilangit naunairutiit naunailuaghimangitut taimalu hulitjutaingit taimalu naunaipkaiyangani hapkuat kiklitjutiit uqaqpaktait.

Tamna INIRHIMAITTUMI EISmik taivaktait piqaluangituq ingilrariangani naunaitumik taimalu naunaitqianik titiqanik akhuknaqtunlu uukturutait taima naunaipkaiyangani hulilukariangani talvuna hulitjutiyangani havatigun talvuna. Tamna Ilautjutiqaqtuq Nunalaatigun Munaginikun Upalungaigutaa naunaipkaihimayuq naunaituq taimalu inirhimaittumi amigiatunik hulilukariangani munginikun. Naunaitqiamik havagiangani munaginikun upalungaigutikun, talvuna ilanga INIRHIMAITTUMI EISmik tavaktait piqaqtuq angmaumayumik tughiknikun havagiangani, havaktaghaingit taimalu naunaitqianik huliyangani taima naunairutiqaqtun talvuna INIRHIMAITTUMI EISmik taivaktait taimalu naunaitqiamik ikayugiangani talvuna hulilukaarut naunairutiit. Talvuna upalungairutikun, naunaitqianik, naunairutingnik havarutikun, taima katitighimayuq talvuna hulilukagiangani naunairutikun taimalu munaginikun havaanga piqaqtughaq.

Havangit Naunairutaa

Tamna havangit naunairutaa hulilukaariangani ihivgiurutaa havaghimaaqniaqtait malruqnik ukiunik. Havaatigun naunairutaingit hulilukagiangani qungiaktauhimayuq taima havanaiqtun malruqnik ukiunik. Taima naunaituq havaghimaaqataqniaqtun nalvaghiutiit umuna havatigun talvani uyaraghiutun havakviani. Naunairutiit ilauhimayut naunairutiqaqtun taimalu kahaktauhimangitun nunait ilauhimayut. Havagut talvuna namayut tuqutigutaingit uyaqan nalvaaghimayaingit taimalu imait hungitun tahigaingitlu talvani uyaraghiuktuni mighani. Taima havagut una havatauhimangman ukiunik malraqnik taimalu akunigalukun, una havaaq qunngiaktauniaqtuq naunaitumik taimalu tuhapkailugit hulilukagiangani havatigun tavungaraaluk.

Nunalaatigun taimalu Uyaqan Hapiqnaqtun Ingilrayut Imakun Naunairutaa

Naunairutaa nunalaatigun naunaituq taimalu naunairutiqangituq nalvaghiunikun talvani naunairutingni Ikpataani talvuna Naunairutingni talvani (Inirhimaittumi EISmik taivaktain, Ikpataa 1.14.1)mi. Nunalaangit taimalu nimniunaituq nunami ilagiirit tapkuninga hunavaluit tigumiaqtaghaingit taimalu hapiqnaqtun imaqnik piniarunaghiuk taimalu naunairutilgit uvani titiqami. Naunairutiit nalvaakhiutingni tapkuninga ARDngit pilualgit allanguktaaqtutlu taimalu ayuknaqtunik naunairutingnik talvuna naunairutingni. Uqaghimayait talvuna INIRHIMAITTUMI EISmi talvuna ARDkun piluaghimayut ikayuktiqaqtun talvuna naunairutikun pilgit. Hadja akhuknaqtumik naunairutiqangituq taima naunaitiaqangitumik taimalu ihuatunik naunairutiqaqtun talvuna ARDmi munaginikun havaktaghaingit. Naunaighimaaqniaqtaingit naunairutikun uyaraghiutuni. Taima imaqlungit naunairutaingit taimalu naunaitkutait tapkuninga ilauhimayut tapkuninga havaktauhimayut imaqluingit ighaingit

naunaitiaghimatun. Naunaitiarutighamnik piqaqtughauyugaluaq taima hapiqnaqman uvuna uyaraghiuktuni. Uqaqtaingit tapkuninga tahinuangit iqaivaktun hunigtunik taimalu hapiqnaqtunik imalgit taimalu naunairutingnik imaqmik pivaktun Bostonmin 50nik ungahiktilaagutingit. Hadja piqangitut naunairutingnik tapkuninga allanin uyaraghiuktunin. Ilangit naunairutiit naunairutiqaqtun taima kuvihimayunik havigalikmikghunikniqmik (arsenicmik taivaktait) talvuna naunairutingnik imait pHmik. Taima uyaraghuiktunik havaghimaaqtun hadja inigiangani taimalu nalvaghiyangani tapkuninga hapiqnaktunik imait taimalu tapkuat nalvaaghinahuaghimayut ilauhimayut nalvaghiunikun taimalu tapkuat hunavaluit munagiyauyughat uyaraghiuqtuni.

Nunap unalu Qaritauyakun qunngiarutaingit Ihumagiyauyut

Pitaaqtut naunaiyarmik takupkaqtuq itinnautinga qiquumayuq nunap ataani atlanguqtiliriuq uvani. Amigaitut initurlit ihuatqiat ihivriurniq Nunamit, nunap ataani unalu qiquumayuq nunap ataani qanuittaaghat ihariagiyauyut ikayuutighamik nipiqaqtumut piliurhimayuq igluqpanik tammaqtailinirlu qiquumayuq nunap ataani. Amigaittuq naunaitiarhimayuq naunaitkut ihariagiyauyuq aviktitauyumit imaqtiliriuq unalu qiqumayut tughuat aktikilaarlugit pitaaqtangit qanuittaghaangalu hivunighat havaktaghainik.

AVIKTITAUYUMIT IMAQTILIRIUQ TAHIRAQ MUNARINIQ

Itqaqtauyut tuluqtinga aviktitauyumit imaqtiliriuq imaqtiliriuq pifaaginnaqturlu piiqtiriuq pitjutinik imarmik itqaqtauyuq aktikulanga hunavaluup imaqtiliriuqtughaq, nipiqaqtumut qaritauyakun qunngiarutaingit havaktaghainik imaqtiliriuq, ilihimayauyurlu ilitquhinga munariyauyuq aviktitauyumit imaqtiliriuq pitjutiliqat. Ublumi havaanga tamaini ukuat kiklinga hakugiiktuq. Ukununalu havigalikmut kuviraniq piyungnarhiuq, tuluqtinga ammonia qaraqtaunimik kuvirangnirmiklu anarvikmit halumairningalu cyanide-mit tahirarmit ihariagiyauyuq amihumik ihuatqiamik ilitarhimaqpiaqtumik ihivriurniq. Akkighaangit namakpan munariniq aviktitauyumit imaqtiliriuq avatanivutmi nakutqianik pitjutinganik ilitariyaulimaittuq, tutlutinga iniqtirutaa umuuna pitjutinga piyauyuq nauyunut, imarmiutatlu huratjatlu ikayuqtaulimaittut.

Uumikyangani Uplalungaigutaa

Tamna ihumatjuta pittiarutaitigun uumikyangani upalungaigutaa tavungaraaluk mighatigun imaqluknirutaingit havagiangani naunaitumik taimalu kuvigaknirutaa imaq qanuritaghaniklu. Naunaighimayuq imaingit talvani Tail Lakemi, taimalu tamna qaritauyakun naunairutiingit nunanik namagiyauhimayut kuralualimaitun (talvunattiaq piumayainik havaktauhimayut qiqumayut tughuangit taimalu allangukpalialikghuni hila) taimalu ayuknavyaghuni imaingit kuvinaitangani tahiit qaqunguqan talvungaraaluk, taimalu aghuknaqtumik ikayutighamnik taimalu havaktauyughauyuq talvani EISmi. Uqaqtauvaktuq taima umiktughamik upalugiagutmik tuhapkaiyughat tavungaraaluk umiktigutikun naunairutighamik (imaanuaq ituq, tamaat umiklugu taimalu qimainaqlugu, munagiyauluni taima havaghimaaqllugu taima munagiyangani nuna talvungaraaluk taimalu havakghimaaqlutik havakviini ikayugiangani uyaraghiuktunik taimalu hulilukaaktunik talvani Hope Bay Beltmi.)

Hila Anighaaqtagvik Qanugitjutaa

Ihivgiugun pihimaittuq hanaqitjuhighainnik NIRB maliquyanginnik. Pingit tingivgalaaqpaktun halumaillguin kanuqlu ihuaghautighain naunaiyattiaqtughauyun qanugitaaghainik. Hilam qanugitjuhia havakvighami pilaqutaunia halumailgunik naunaiyaqyuumiqtughaugaluaq. Haffumani naunaigunmi havaaghauyuq nunap tamaangani Nunavutmilu hila anighaaqtaliqpaqtaq hanaqiyauyaghaugaluaq.

Pitjutingit Imarlu Nakururninga

Ikiklilaarutiqaqtuq imarmik nakururninganik kiklighaa naunaitkutip talvuuna ilangani kiklighangani (nitrogen-mik avughimayuq), tautuktauhimayuq naunaitkut havaanut ihuirutiyauyuq tahiit atlatqigiyaanik atlanut tahiinut ittunni, uukturutinik ihivriurlugulu pitjutinga (uukturutinik atjikurutanik/mikkanuanik aktikulaanik ihivriurniq kiviunut, aturniq atlatqiinik nalunaittunik ihivriurviit). Ilihimaniq qanuittaaghanik ilaungittut ilanganut kiklighaa ihumagiyauyunik (naqittuq mahaktumik anirniq kiklinga) unalu apirhuutiqalik ilanganut kiklighangit (piliurniq kiviunut anirniq ihariagiyauyut). Amigaitumik titirarhimayumik unalu ihivriurniq ihumagiyauyuq imarmut ihuirutauyuq havaanit ikayuutauniaqtuugaluaq. Tunngavia ilihimaningalu kuvitjutaanik naunaitkut imarmut qanuittaaghaanik ihuigutjutaa itqaumaninga naunaitmat. Itqaumalugu unalu titirarhimayut itqaqtangit aviktauhimayuni tahirap imaaghaa tuniyauhimangittut. Ilihimayumik naunaittup kuvinia qanuitaaghaanik, ilihimayumik nakungitqiaq pihimayuq ikayuutauniaqtuugaluaq ikikliliqtiunik havaaghanut.

Imaq nakururninga takuniq aviktauniq tahiraq naunaiqtuq mikiumik angikliqtiqtuq hakugingninga ilanganut hurumaqtut (arsenic, cyanide, mercury hapkuat tuqunnaqtut) ihumagiyauyun ihumaalutit ihumagivlugit uumayunut unalu inuknut anniaqtuliginikut. Ihivriurniq ilaujutikhalik ayughautjutinga angiklilaarhimaniit aulatjutingit (avatqulugu malruuk ukiut) itqarharlugulu avikturhimayut tahiit qanuitaaghaaquality havaaghaa umiktirninga. Qanuittaghaa unalu pitjutinga ihivriurninga cyanide piiqtaunik avikturhimayuq nakuruqtitauniq ilauyughaqlu INIRHIMAITTUMI EI-mi. Amigaittut naunairhimayut unalu ilitarnaqpiaqtut itqarhaqniq ihivriurniq analysis of piiqtirnik imaq qanuitaaghanik unalu piyuq imaup qanuitaghanik ihariagiyauyut ikayuutighat naunairninga taimaatut tuluqtaijutilimaittut pigiami imarmik avikturhimayumik tahirmit kuvirayut.

Ihuirutinga havaap umunga nitrogen-mik iliuraiyuq pitjutinganik imarmik piiqtauyuq umuna uqariikhimayuq ikikliqtirlugit tuluqtuutingit aturluni "nakuutqianik piyughat". Uqautigihaittuq kitu nakuutqiat piyughat itqarhatlu pitjutingit in qanuitaghaangit kuvirarniq qanuitaaghanga unalu ihuirutingit imaarmiitunut . Imaup qanuitaghanik itqarhangit uqaqtauyughaq ammonia-mik hakugingninga umanga cyanide halumainninga, anaqtaut kuvirarninga unalu qaraqtautikut ilakunga.

Inirhimangittuq EIS uqarhimangittuq ihariagiyauyut Havigalit Uyaraghiuqtut Anaqtautiit Kuviraqtangit Maligait unalu katimayut munariniq.

Tahingmiutan Umayun

INIRHIMAITTUMI EIS uqautauhimattun NIRB maliquyain talvuuna ihivgiungniatigun qatitighivallianik angiklivalianiqlu halumailgunik tahamaniitumin nunamun. Qulvani taiyami, ikayuun uqalagunmun hulaqitjutaulimainningmun imangnun tahamaniitunun haquittuq malittiagunlu atugaghanun quviganun pilaqutitiagunnaitpallaktuq qatitighivallianiqmun halumailgunun aulaqtiganun mikigaluaghutik talvaluunin uunaniqpaani kuutigum halumailgunik imangmiutanik uumayunik titiqataqpaktunik halummaghiamun imaligangmun, talvaluaqlu umigiiqtilugu.

"Piyautiqanginikkun hugatjaqaviniitigun" havaktaghaq ilauyuq atughaghanun ituq hulaqutikpan tahingmiutanun atilinmun Tail Lake. Havauhighaq ituq ihumatjuhingmun, hugatjaliqun talvani Tail Lake mi ikinmata.

Nunam nautiangin

Piqangittuq hatja ilittughaqvingnun taquqatayuitanun nauttianun maniqqami. Piqangittuq havagahuaqvik ihivgiuqtauhimayaaghaanik tuqattayuitanun nauttianun. Pinahuqquugun hiuganmun nauvaqtunun ilitughiyauyuk ihuaghautighaalu naunaiqtauyun (kinitiglugin hiuqiqutivakviin). Hanaqitjuthighan amighitjuhighanlu aulaqtigutighanun ihuaghainiqmun naunaittiaqtughaugaluan.

Huraatjat

Nunalaani talvani naunaitkutaingit qunngiakniaqtait tahamani Hope Beltmi Aviktauhimayunik Naunaiyauyangani Hanigaitni (RSA)mi taimalu piqaqtuq qunngiaktaghaingit mikiunik talvuna havatigun taima tunmigakun Nunani Naunairutaingit Hanigaitni (LSA)mi. Nampngit ikakniitlu qunngiaktaingit nunait titiraktauluhimaitun taima akhuknaqtuq talvuna "qunngiaktaungitun" huraatjait naunairutiqangitun.

Naunaitiaghimayut naunaitkutiit havatigun hanigaitni talvani naunairutiqaqtun ikikliunin havatigun taimalu naunairutiqangitun naunaitkutingnik talvuna nunait hanigaitni taimalu huraatjaitlu qanuritaaghanik. Pitqauyauhimayut amigaivyaktun taima qunngiaktiagiangani tamna LSAngat taima ikayugiangani huraatjait hulitjutaingit itqumayut taimalu ingilraviangit upalungairutait (nunait nunauyangit, nunakun qunngiarut, ukiukmi apqut qunngiarutaangit). Ilauhimayutlu nunait nunauyaliughimayut pitquyauhimayut taima imaqmiutat mighatigun akuktauniaqtun talvuna Roberts Baymi taima naunaitiagiangani havaktaghaingit mighagun. Taimalu naunairutiqangituq qupanuat naunairutighaingit taimaluuniit nunait Roberts Bay hanigaitni.

Taima hulitjutaa naunairutiqaqtun aturiangani pitquhiit naunairutiit talvani hulilukaritiit naunairutaingit, paqitjutiqangituq talvuna huraatjat hulilukagutaingit naunairutaingit. Piqaqngituq titiraghimayunik qunngiarutaitigun taima huraatjanik talvuna uyaraghiutun naunaitkutaini; kihimi amigaivyaktunik naunaitkutingnik adtjiliuhimayut uyaraaghiutunin allanin. Naunairutait hapkuninga piqaqtughaugluat ikayugiangani hulilukagiangani naunaitkutingnik talvuna.

Ihivriurniq uqarvigilimaitaa uqagiiktut umunga bioaccumulation-mut umayuni. Uqarvigiyauyuq umayut angmaunaninga hururnaqtut, tamna Tail Lake-mit, ikikliriuniklu aulapkaivlutik havaaniklu umiktirinik ihariagiyauyuq.

Naunaiyaqyuumigutighailliuqtukq pinahuquugutinun tingmiat upluqagviinun, ilaalu qilgaviin upliviinun, LSA mi. Hulaqutjutin nivaluqutinun uqattiaqtauyughaugaluan ihuaghautighaillu hanakiyaulutik (imaatun, pitjutinun halikaaptan tingmilviinun, qulvatilaangin, hunaluqaak)ilayughaulutik hugatjanun hanakitjunmun atugaghamun.

Hugatjanun hankitjun atugaghaq hananingmun aulatjuutighamunlu titigattiaqtauyughaugaluaq ilauluni INIRHIMAITTUMI EIS.

Inilgaaliqinikkun

Nunami ihivgiungniq nattatilik aulaqtighimayumin 2000 ihumaliugunmin hanaqitjuhigham. Atuliqtaq alangatqiamik tumilik, ilaa tiqitagvik apqutighaq piniaghimayaq. Havalihaagaq naunaigutiyuumingniaqquq tatja tumighaa havaagham. Hivuliq ihivgiungniq piituugaluaq talvunga alanguqtigutighainun kihimi ilain havaktaghan

qanitjutaita pilaqutiginiagungnaghiyain aipainun hanakiyanun. Itugiyan nutaangutitiyauyughaugaluin havaaghamun piyaanginni pilakutjutaulaqiyunun atuliqtamun tumimun pinahuquuganun havakvingni (pinguaglugu taihimayamun 500 m hapukuutagiyauyumun).

Inuit ilihimayatuqangit

Una naunaiyaun iniqtiqtauliqtuq hivuagun piutiqaqtuugaluuyumun hailiyauniaghunilu MHBL kunnun. Ilitughiyan haffuma ihivgiungnium naunaitiaqtauniaqtun nalvaqvianai INIRHIMAITTUMI EIS talva/talvaluunin titigattiaqtauhimalutik aipainni naunaittiaghimayuni INIRHIMAITTUMI EIS. Pighailiungniiit uktuutighani Inuit ilihimayatuqangit pitjutighainnilu ilittughainiani iniqtigiangani naunaiyangniq qanugilaqutin aalanun (iqaluit, hugatjan, inilgaaliqinikkun) hanaqiyauyughaugaluaq. Pilaqiniq Inuit ilihimayatuqangit naunaiyangnium ilitugiyainnik ilainun pilaqipqaqtauyunun nunaqaqaaqtun katimayiin takupqaqtauluni aghuughaiyunlu piniaghimalutik aulatjutighainnik katimaqatigiiqaqlutik pilaqutiyauyunun katimayinun titigaqtauhimaluni.

Inuit Piyuumigutaitigun? Ihivgiungniq

Natqaniitunin nalvaagan namaktuugaluin kihimi ihivgiugun namaghiyuumiqtaqtuq piyuumigunmik ilitughihimayanin piyunun Nunavut nunalaanginin pivalaghimaittumik tapkununga NWT/Yellowknife nun. Aghuughaiyun taiyaan havaqtigiigutighaqtik nunalaan piyuumigianginni ihuaqutinigutin mighiyuumigiangnini pilaqutinlu; kihimi ukautauhimaittuq “hanaqiliqyuaqnik talvalu nutqaqaalangnik” pilaqutain naittum havauhium ukaghimayum kanugilaghuutainlu niugiugiyauyum takitkiam havalaghuutim. Uuqtuquyauyauyua aghuughayi himivvaklugu pitkuhighaa titigaghimaya Inirhimaittumi EIS talvanga aulagamin “piyuumitkianahuagamun atughaghaq” talvunga titigattiaghimayumun hanaqiqpiangniangnik havaqtumun ilaqagutiniangnia inuin piyuumigutainun hanaqitiagutinun.

Piyuumigutingnikkun ihivgiugun

Ukautauvaktuk piyuumigutingnikkun kayumigutilik haquilguinni pivalialakutini ihivgiungnium qulvani ukautimi hamani ilauyunilu taiyauyuni ippakuq pilaqutin ihivgiuqtaghaugaluani tamatqiqpallialaqinikkun pilakunmi. Natattia CEA, anginiatigun piksaatigutlu, naunaittiaqtughaq. Taiyami CEA piniaghimayuq havaqatigiiguttimun alanun havaaghanun tahamani. Titigattiaghimayun aalan havan tahamani huqlu ilauniin ilaungitjutiinluunin ihivgiungniqmi ilauyughaugaluaq, pilaqiniagungnaghiyuq havakyuumigun havagunmik talvani atilingmi Doris North haniinilu. Ihumatjun piyuumigutainnik (pinguaq, hila imaqlu halumaigutaitigun ilaniq) havaghaaqqan talvani nunami ukautauyughaugaluan. Ihumatjun piyuumigutinik atuqyuumiyauniatigun nunam taffuma (apqun, milvik, imakkun iqaagvik) hanaqiyautillugu nutaqtitaulgaaqtilugulu ukauttautiaqtughaugaluaq hanaqittiagutighainlu naunaiqtaulutik.

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EXECUTIVE SUMMARY

Overview

In overview, the Draft Environmental Impact Statement (Draft EIS) for the Doris North Project was found to be very general. Content available in the supporting documents was not synthesized and reflected in a way that strongly supported the conclusions drawn in the Draft EIS about the likelihood and significance of impacts. Some deficiencies were found in the supporting information, including a lack of site-specific information, and in some cases ambiguous results and analysis in the supporting documents themselves. Gaps in the available information were not systematically identified nor were programs to address these gaps presented.

The Draft EIS lacks systematic and explicit documentation of mitigation measures to address potential impacts in terms of project design and operation. The Integrated Environmental Management Plan as presented is general and incomplete in many areas of impact management. A well developed management plan, as part of the Draft EIS provides an explicit compilation of construction, operations and decommissioning procedures which can be cross referenced in the Draft EIS and provide concrete support to impact predictions. As part of the plan, a thorough, systematic monitoring program, explicitly linked to identified impact monitoring and management requirements is required.

Project Description and Scope of Assessment

The project description for impact assessment is based on a two-year operating life. It is apparent from the project description that further exploration will take place at the project site with the intention of further development based on results of exploration. Estimates of additional indicated and inferred reserves are provided. The project description indicates that the facilities design can accommodate projected volumes of ore and tailings associated with ongoing mining. Since the project is designed for operation beyond two years, the project assessment should systematically address the impacts of development beyond two years.

Geology and Acid Rock Drainage Potential

The description of geology is general and there is no description of mineralogy as indicated in the Table of Concordance (Draft EIS, Table 1.14.1). The geological and spatial relationships of materials to be handled and their acid generating potential are not well characterized in the available documentation. The results of tests to determine ARD potential are variable and there are some conflicting statements in the analysis of results. Statements made in the Draft EIS concerning ARD potential are not supported by the test results provided. To date there is not a strong indication that there is sufficient understanding and means of discerning the ARD potential of materials to support a sound ARD management program. Further site specific testing is required. The degree to which tailings samples and test results are representative of project tailings characteristics is not well demonstrated. Clarification is required as this is a significant component of mine waste. There does not appear to be tests done on samples from the current quarry sites. Some test results suggest the potential for leaching of metal (arsenic) at neutral pH. Again, further mineralogical work needs to be done to determine sources of arsenic and determine whether tested samples are representative of material that will require management on the site.

Terrain and Geotechnical Matters

Available information indicates that depth to permafrost is variable in this area. More site-specific assessment of terrain, subsurface and permafrost conditions are required to support sound design of facilities and protection of permafrost. More detailed information is required for the tailings impoundment and the thermosyphons to assess the feasibility and adequacy of proposed designs.

Tailings Pond Management

The predictions of impacts of tailings impoundment and seasonal discharge to receiving waters are predicated on the volume of material to be impounded, sound geotechnical design of the impoundment, and the anticipated behaviour of the treated tailings over time. To date the work on all of these parameters is weak. In addition to metal leaching potential, the impact of ammonia from blasting and sewage and the degradation of cyanide in the pond require more explicit and well-documented analysis. The prospect of climate change as it might affect long-term integrity of impoundment structures is not discussed. If the feasibility of managing the tailings in an environmentally acceptable manner cannot be demonstrated, the impact conclusions regarding potential effects on vegetation, aquatic life and wildlife will not be supported.

Closure Plans

The main concern with respect to closure plans is the long-term stability of the tailings impoundment both structurally and in terms of outflow water quality. As noted above predictions of water quality in Tail Lake, and the geotechnical stability of the impoundment (based on the proposed design employing thermosyphons and in the context of climate change) and the ability of the impoundment to maintain desired water levels to cover tailings in the long term, need to be more strongly supported and demonstrated in the EIS. It is suggested that a number of closure plan options be described to address a range of potential closure scenarios (e.g., full closure and abandonment, care and maintenance as required to ensure long term environmental protection, and ongoing maintenance of selected facilities to support ongoing exploration and development activities in the Hope Bay Belt.)

Air Quality

The assessment does not address the NIRB guidelines. The nature of project related air contaminants and specific mitigation measures should be more systematically and explicitly characterized. The nature of climate in project area as it effects dispersion of air contaminants should be more fully characterized. Based on this information the intent of the project in addressing national and Nunavut air quality guidelines should be addressed.

Hydrology and Water Quality

There are some deficiencies in the water quality baseline data in terms of some parameters (nitrogen compounds), focused information on project-affected lakes as opposed to other lake sites in the regions, and sampling and analysis methods (sample replication/particle size analysis for sediments, use of different analytical labs). Interpretation of results was missing for some parameters of interest (low dissolved oxygen levels) and questionable for some parameters (effects of sediment oxygen demand). More detail and analysis focusing on water bodies affected by the project would be helpful. The source and interpretation of flow data for water quality impact predictions is not clear. Assumptions and detailed calculations for the tailings pond water

balance are not provided. Given the variability in flow conditions, a projected worst-case scenario would be informative for mitigation design purposes.

Water quality projections in the tailings pond show steadily increasing concentrations for some contaminants (arsenic, cyanide, mercury), issues of concern with respect to ecological and human health. The assessment should include the effect of extended operations (beyond two years) and project tailing pond quality post closure. Results and methodology for testing of the cyanide detoxification tailing treatment should be provided in the Draft EIS. More detailed and well documented predictive analysis of discharge water quality and receiving water conditions is required to support the assertion that there will be no impact on receiving waters from tailings pond discharges.

The effect of project related nitrogen input to receiving waters is dismissed based on a commitment to mitigate impacts using "best practices". There is no discussion of what these best practices are or the projected outcomes in terms of discharge quality and effects on aquatic productivity. Water quality projections should address ammonia concentrations due to cyanide degradation, sewage disposal and blasting residue. The Draft EIS does not address requirements of the Metal Mining Effluent Regulations and associated monitoring.

Aquatic Life

The Draft EIS does not address the NIRB guideline concerning assessment of bioaccumulation and biomagnification of contaminants in the receiving environment. As noted above, support for the statement that there will be no impact on receiving waters is weak and adherence to discharge quality standards does not rule out bioaccumulation of contaminants discharged at low levels or downstream transfer of contaminants by aquatic life that may come in direct contact with the tailings pond water and sediments, particularly post-closure.

A "no net habitat loss" plan is provided to compensate for impacts on aquatic habitat in Tail Lake. The plan is based on assumptions, as habitat characterization of Tail Lake is limited.

Vegetation

There is no reference to current information sources for rare plants in the tundra. There is no evidence that the project area was examined for occurrence of rare plants. The potential for effects of dust on vegetation is identified and mitigation measures identified (wet down dust generating areas). Criteria and monitoring required for implementing mitigation measures should be defined.

Wildlife

Baseline data focus on the Hope Belt Regional Study Area (RSA) and there appears to be very little focus on the project footprint Local Study Area (LSA). The number and timing of surveys is not clearly documented so that the significance of "no observations" of certain species cannot be determined.

Generalized statements about the project area are based on few samples in the project area and do not acknowledge the natural spatial variability in habitat conditions. There are a number of recommendations for further assessment in the LSA to better support wildlife impact predictions and mitigation planning (habitat

mapping, ground surveys, winter track survey). Additional habitat mapping will be required in affected aquatic habitats in Roberts Bay to characterize project effects. There appears to be no assessment of bird presence or habitat in the Roberts Bay area.

While the methodology indicates use of modeling and traditional knowledge in the impact assessment, there is not evidence that this applied to wildlife impact assessments. There does not appear to be a literature review concerning impacts of mines on wildlife; however there are numerous general references to experience at other mines. Citations for these sources are required to support the impact assessment findings.

The assessment does not address potential for bioaccumulation of contaminants in wildlife. A discussion of wildlife exposure to contaminants, in particular from Tail Lake, and mitigation measures during operation and post closure is required.

Further detail is required on the potential impacts to raptor nesting sites, including peregrine falcon sites, in the LSA. Effects of noise disturbance on wildlife should be described and mitigation measures provided (e.g., pertaining to helicopter flight paths, elevations etc.) for inclusion in the wildlife management plan.

A wildlife management plan for construction and operations should be detailed as part of the Draft EIS.

Archaeology

Field assessment work was based on a 2000 project plan. The current plan has a different footprint, in particular a different access road corridor is proposed. Baseline work should address the current project footprint. The original assessment indicated no direct impacts but it appears that some sites could be indirectly affected by proximity to development activities. The findings should be updated to address direct impacts based on the current project footprint and potential indirect effects on sites (for example within the specified 500 m buffer zone).

Traditional Knowledge

This study is being completed by the previous owner and will be made available to MHBL. The findings of this study should be clearly identified in a specified section of the Draft EIS and/or clearly referenced in other relevant sections of the Draft EIS. Requirements for the application of Traditional Knowledge and its integration into analysis in order to complete the assessment of impacts on other resources (fish, wildlife, archaeology) should be addressed. Endorsement of the traditional knowledge study findings and mitigation measures by representatives of affected aboriginal groups should be demonstrated and the proponents' commitment to implementing measures in consultation with affected groups should be documented.

Socio-Economic Assessment

Baseline data are satisfactory but the assessment could benefit from more focus on information pertaining to the Nunavut community level and less focus on NWT/Yellowknife. The proponent states their intent to work with local communities to optimize project benefits and minimize impacts; however there is no discussion of the "boom and bust" impacts of a short term project as described or the implications of potential longer term

operations. It is recommended that the proponent alter its corporate philosophy as presented in the Draft EIS from one that is founded in a "best efforts approach" to one that defines commitments that the company will include in its socio-economic mitigation measures.

Cumulative Effects Assessment

The discussion of cumulative effects is hampered by weaknesses in the impact assessment noted above and related definition of residual impacts that should be examined in a cumulative effects context. The framework for the CEA, spatially and temporally, needs to be clarified. As presented the CEA tends to focus on potential for interactions with other projects in the area. An explicit listing of other projects in the area and the rationale for including or not including them in the assessment should be provided, including the potential for further development at the Doris North site and nearby sites. The issue of cumulative effects (e.g., air and water contaminant loadings) of extended operations at the site itself should be addressed. The issue of cumulative effects of increased access to the area (road, airstrip, Robert's Bay causeway) during operations and post closure should be clearly addressed and mitigation measures identified.

LIST OF ACRONYMS AND DEFINITIONS

Acronyms and Abbreviations

ABA	Acid base accounting
ANFO	Ammonia-nitrate-fuel oil
ARD	Acid rock drainage
CaNP	Carbonate neutralization potential
CN	Cyanide
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CWS	Canadian Wildlife Service
EIS	Environmental Impact Statement
GN	Government of Nunavut
IUCN	The World Conservation Union
LSA	Local Study Area
m	Metre
mg/L	Milligrams per litre
MMER	Metal Mine Effluent Regulations
NAAQO	National Ambient Air Quality Objectives
NH_3	Ammonia
NPR	Net potential ratio = neutralization potential / Acid potential
NP	Neutralization potential
%S	Percent sulphur
PAG	Potentially acid generating
PM	Particulate matter
ppm	Parts per million
QA/QC	Quality assurance/quality control
RSA	Regional Study Area
SO_2	Sulphur dioxide
SOD	Sediment oxygen demand
TOC	Total organic carbon
TSP	Total suspended particulates
VECs	Valued ecosystem components

Definitions

Albedo:	the ratio of shorwave radiation energy radiated back from a surface, relative to the amount that falls on it. e.g. dark surfaces reflect less energy back and have lower albedo than lighter surfaces
Degradation of permafrost:	a naturally or artificially cause decrease in the thickness and/or areal extent of permafrost.
Ground ice:	ice in pores, voids or other openings on soil or bedrock and includes *massive ice*.
Ice-wedge polygons:	A type of patterned ground consisting of a closed, roughly equidimensional figure bounded by more or less straight sides, which comprise wedges of ice.
Inuit Qaujimajatuqangit:	the Inuit way of doing things: the past, present and future knowledge, experience and values of Inuit society
Massive ice:	a term used to describe large masses of ground ice, including ice wedges, pingo ice, buried ice and large ice lenses.
Overburden:	organic and mineral soils that exist above the bedrock materials; sometimes referred to as unconsolidated material.
Permafrost:	thermal condition in soils and bedrock whereby temperatures persist below 0 degrees C over at least two winters and the intervening summer; moisture in the form of water or ground ice may or may not be frozen.
Permafrost window:	a zone in the continuous permafrost layer with no permafrost eg. beneath a lake.
Phenology:	periodic phenomena in plants, such as time of flowering in relation to climate
Philopatry:	fidelity to a nest or birth site; the tendency to return to the same nest or birth site over successive years
Terrain analysis:	interpretation of the geomorphology and surficial geology of an area based on air photographs, topographic maps and ground reconnaissance. This can assist in predicting the nature of surficial soil deposits and permafrost conditions.
Thermal analysis and modeling:	numerical analysis to predict changes in the thermal regime due to climatic or manmade disturbances.
Thermystor:	temperature measuring sensor, usually installed as a string of sensors in a vertical borehole to provide a profile of ground temperature with depth.
Thermokarst:	slumping in the terrain due to melting of permafrost
Thermosyphon:	(also called thermotubes or heat pipes). A passive heat transfer device installed to remove heat from the ground. It consists of a sealed tube containing a liquid or gas and relies on natural convection. It functions only when the air temperature is lower than the ground temperature.

TABLE OF CONTENTS

1. INTRODUCTION

Item No.: 1-1

References:

1) Draft EIS. Section 1.1, pages 1-3 – 1-4.
2) Supporting Document A – Project Description & Alternatives, Doris North Project, Nunavut

Discussion:

A winter road between the Boston and Doris North sites is included under 'project details' but is not referenced anywhere else in the Draft EIS document. This road is a potential concern for wildlife and other environmental aspects.

Requests:

a) Clarify whether or not this proposed winter road is included in the project footprint addressed by this EIS.

b) Expand discussion of potential impacts of the proposed project to include this winter road.

Item No.: 1-2

References:

1) Draft EIS. Section 1.6, pages 1-6 to 1-7.
2) Supporting Document H – Archaeological Investigations 1995 – 2002 Compiled Report.
3) Inuit Qaujimajatuqangit (IQ) Task Force, August 2002, First Annual Report.

Discussion:

The Draft EIS indicates that a Traditional Knowledge (i.e., *Inuit Qaujimajatuqangit,* as described in the IQ Task Force First Annual Report) Study has been commissioned by BHP and will be provided to MHBL by mid-2003. The Draft EIS also indicates that MHBL has endeavoured to incorporate traditional knowledge on valued ecosystem components into the EIS. A review of the report on archaeological studies indicates that traditional knowledge, specifically regarding the heritage resource sites recorded, was not integrated into the report. Although there is reference to an Elder visit to archaeological sites in 1996, Traditional knowledge data concerning site use and archaeological site values either were not collected or were not incorporated into the report on archaeological investigations. Given the direct ties of the Inuit peoples to the archaeological sites, their perspectives on site values and appropriate treatment/mitigation of these must be incorporated into the assessment and design of mitigative measures.

The Traditional Knowledge Study will also inform other components of EIS and provides a mechanism to ensure traditional knowledge is incorporated in project assessment and design of mitigation measures. It is important to demonstrate that concerns raised in the traditional knowledge study have been systematically addressed and that the study participants and representatives of local traditional land users accept the proposed mitigation measures.

Requests:

a) *Confirm completion of traditional knowledge study and endorsement of the findings and mitigation measures by representatives of the traditional users of the project area lands and resources*
b) *Reference pertinent traditional knowledge throughout the EIS.*
c) *Confirm consultation with Elders regarding archaeological sites.*
d) *Integrate information from the Elders into archaeological site values/descriptions*

Item No.: 1-3

References:

1) Draft EIS. Section 1.9, page 1-11.
2) Government of Canada. 2002. Metal Mine Effluent Regulations. Fisheries Act Report SOR 2002-22

Discussion:

This section addresses issues relating to obtaining a water license from the Nunavut Water Board as well as a fisheries authorization under Section 35 of the Fisheries Act, however, no mention is made of the Metal Mining Effluent Regulations, which would be applicable once the Project is operating.

Requests:

a) Identify and address issues related to the MMER as they apply to the Doris North Project in the above-mentioned section of the EIS.

Item No.: 1-4

References:

1) Draft EIS. Sections 1.13, 3.1.6, 5.3.5.3, 5.6.5, 7.3.
2) Supporting Document C – Biophysical Environmental Baseline Report, Doris North Project, Nunavut. Sections 2.3.3.2. Water Quality, 2.3.4 Sediments, and 2.4.2.9 Fish Tissues.
3) Supporting Document F – Aquatic Baseline Studies Doris Hinge Project 1995 – 2000. Sections 3.0 Physical Limnology and Surface Water Quality, 4.0 Sediment Quality, and 7.3 Fish Tissues.

Discussion:

On page 1-12 it states "The EIS covers in detail the assessment of environmental impacts of the Doris North Project. A number of supporting documents were produced to provide background support in developing the EIS and to address specific issues, such as environmental management, that arise from the impact assessment." The Draft EIS is not sufficiently detailed and constant reference must be made to supporting documents and to their appendices, to assess the validity of generalized statements in the EIS. The main volume of the Draft EIS provides very limited information and interpretation of baseline data available. The organization of the main volume and supporting documents is difficult to follow as information required to adequately review a topic is scattered throughout the supporting documents. As a result, review of all pertinent information with respect to any particular topic is difficult and time consuming. Numerical values in support of

arguments are lacking, so it is not possible to ascertain the validity of the comments. Supporting Document C appears only to reproduce the executive summary provided in Supporting Document F, so it is necessary to refer to F continuously. Further complicating the review is the lack of page numbers on the tables and figures. It would be much easier to locate pertinent information on a particular issue if these were numbered and the page numbers were provided within the lists of tables and figures.

Requests:

a) *Incorporate information provided within Supporting Document C into the main volume, as required. As a result, Supporting Document C may become redundant.*
b) *Provide better reference to relevant sections in supporting documents throughout the main volume to better guide the reader.*
c) *Provide some numbers within the text of the main document when making statements of parameters being high or low etc.*

2. PROJECT ALTERNATIVES

No comments

3. ENVIRONMENTAL BASELINE CONDITIONS

Item No.: 3-1

References:

1) Draft EIS, Section 3.

Discussion:

As a general comment pertaining to Section 3, the boundaries of the LSA and RSA are not defined for all VECs examined. In cases where the LSA has been defined as the "project footprint", it is not clear what is included in the footprint (e.g., does the footprint include Tail Lake, what roads are included (see Item 1-1), what is included in the footprint regarding Roberts Bay facilities etc.). In some cases reference is made to a buffer zone, in other cases not. The rationale for the study areas as they relate to each VEC and project and/or cumulative effects is not provided.

Requests:

a) *Provide a clear definition of, and rationale for, the boundaries of the LSA and RSA for each VEC. Provide maps illustrating the LSA and RSA.*

Item No.: 3-2

References:

1) Draft EIS, Section 3, page 3-1
2) Supporting Document C – Biophysical Environment Baseline Report, Doris North Project, Nunavut.
3) Supporting Document E – Terrestrial Wildlife of Hope Bay, Nunavut (An Integration of Data Collected from 1994 – 2001).

Discussion:

There is a statement on page 3-1 that additional baseline work (e.g., wildlife and raptor studies) has been conducted but has not been included in the Draft EIS (although it would be part of the final EIS). However, this data actually appears to be part of this Draft EIS (see supporting documents). It is not clear what, if any, further baseline work is being conducted, or will be included in the final EIS.

Requests:

a) *Clarify what baseline work on wildlife and raptors is included in the EIS. If there is additional work that was not included in the Draft EIS, this information will need to be integrated into the final EIS.*

3.1 Physical Environment

3.1.1 Climate and Air Quality

Item No.: 3-3

References:

1) Draft EIS. Section 3.1.1, pages 3-1 – 3.2
2) Supporting Document C – Biophysical Environment Baseline Report, Doris North Project, Nunavut. Section 2.3.1, pages C-4 to C-8.
3) Supporting Document D – Meteorology and Hydrology Baseline, Doris North Project, Nunavut. Section 2.1.

Discussion:

The Draft EIS and Supporting Documents C and D both treat 'climate' and 'meteorology' in terms of temperature and precipitation. No mention is made of available measurements of wind speed and direction or the potential for atmospheric inversions or periods of calm winds and their influence on local and regional air quality impacts of emissions from the project. Baseline air quality is not described in any detail.

Requests:

a) *Provide additional information about the expected atmospheric conditions for the RSA that are relevant to air quality.*
b) *Provide a brief summary of the available air quality and meteorological data for Nunavut, relevant areas of the NWT, and similar areas from the references cited in the EIS so that the reader can judge for him/herself whether the values are "typical for other undisturbed sites in North America."*

3.1.2 Geology and Topography

No comments

3.1.3 Topography

No comments

3.1.4 Regional Geology

Item No.: 3-4

References:

1) Draft EIS. Section 3.1.4.1, page 3-2.
2) Supporting Document A – Project Description & Alternatives, Section 2.3.
3) Supporting Document C – Biophysical Environment Baseline Report, Doris North Project, Nunavut, Section 2.3.2.3
4) Supporting Document I- Spyder Lake Area, Terrain Analysis and Surficial Geology
5) Supporting Document J – Boston Gold Project, Surficial Geology and Permafrost Features

Discussion:

The statement relating to overburden thicknesses is based on Supporting Documents I and J which summarize work carried out at the Spyder Lake and Boston areas, some 55 km to the south, i.e., not in the LSA. The only site-specific geotechnical data was obtained at the Tail Lake tailings dam site. This is confirmed in Supporting Document A, (Section 2.3 – Quarries) and Supporting Document C (Section 2.3.2.3 – Surficial Geology and Terrain).

There is a need for site-specific information relating to terrain analysis, subsurface conditions and permafrost conditions.

Requests:

a) *Provide details of the geotechnical field programs that will be carried out in the LSA for final design purposes. It is considered that terrain analysis to identify ground ice features and geotechnical drilling to investigate stratigraphic and permafrost conditions are required. Additional thermystor/ground temperature measuring installations to monitor the depth to the top of permafrost at facilities locations are also recommended.*

Item No.: 3-5

References:

1) Draft EIS. Section 3.1.4.2, page 3-3.
2) Supporting Document G – Integrated ARD Characterization Report.

Discussion:

The Deposit Geology (Section 3.1.4.2) is very general and does not provide a discussion of the geologic relationship and spatial relationship of the rock types used to identify the acid base accounting samples (discussed in Supporting Document G).

Requests:

a) *A discussion of the rock type relationship is necessary to provide context for ARD/ metal leaching assessment. Provide clarification as to the relationship between the various Mafic Volcanic units (i.e. D1, D2, F, P, etc.) Quartz Veins (i.e. Q1,Q2, etc.) and units such as the "unaltered wall rock" and "mineralization". Indicate which rock types will comprise the ore.*

Item No.: 3-6

References:

1) Draft EIS. Section 3.1.4.2, page 3-3.

Discussion:

There was not a discussion of the mineralogy in this section as indicated in the Table of Concordance.

Assessing the mineralogic composition of the material that will be used for mine facility construction will provide an indication of the risk of metal leaching. For example, minerals such as arsenopyrite and/or tetrahedrite are often associated with ore in greenstone belt gold deposits, which may present additional risks if these minerals are present in the construction material.

Requests:

a) *A mineralogic assessment will assist in the interpretation of the ARD test results. A more accurate mineralogic assessment should be presented for the rock types that will be used for construction of the surface mine facilities, such as, roads, pads and dikes. This should include, but not be limited to, carbonate and sulphide minerals.*

Item No.: 3-7

References:

1) Draft EIS. Section 3.1.4.3, page 3-3.
2) Supporting Document A – Project Description & Alternatives, Section 2.5.
3) Supporting Document I - Spyder Lake Area Terrain Analysis and Surficial Geology, Section 4.4.
4) Supporting Document J – Boston Gold Project, Surficial Geology and Permafrost Features.

Discussion:

The Draft EIS indicates an estimated depth to permafrost of 2.0 to 2.6 m below ground surface. However, unfrozen soil was encountered at a depth of 15 m at Tail Lake (Supporting Document A, Section 2.5 – Mill Tailings Containment area and Tailings Management). Supporting Document I (Section 4.4 – Ground Temperature) indicates that larger lakes, such as Spyder Lake, are expected to be windows through the permafrost. It can be seen, therefore, that significant variation in the depth to permafrost could exist, particularly in the vicinity of the lakes.

Requests:

a) *As indicated in Item 3-4 pertaining to Section 3.1.4.1, more information is required on the depth to the top of permafrost. Clarify whether there is additional data on the depth of permafrost at the decline ramp into the mine, particularly close to and under Doris Lake.*

Item No.: 3-8

References:

1) Draft EIS. Section 3.1.4.4, pages 3-3 – 3-4.
2) Supporting Document G – Integrated ARD Characterization Report, Appendix A

Discussion:

The Geochemistry section acknowledges that metals can be released through sulphide oxidation at acidic pH and/or soluble metal release at neutral pH. In greenstone belt gold deposits, high arsenic concentrations are

often observed in pH neutral drainage. This suggests that there is a risk of arsenic leaching from rocks that are not acid generating. Indeed, arsenic concentrations of ~0.9 mg/L were documented in the Altered Basalt humidity cell sample from the Boston Property (Appendix A to Supporting Document G), which had a NPR = 45 but had a solid phase arsenic concentration of 313 ppm (174 X > average crustal abundance). The other humidity cell samples that contained lower solid phase arsenic concentrations had arsenic concentrations in the leachate that were below the detection limit. A method to identify material that has a high metal release potential associated with sulphide oxidation at neutral pH was not provided.

Requests:

a) *Provide a more detailed assessment of the test results to propose criteria to identify material with potential pH neutral metal release in addition to acid generation potential. This should likely include mineralogic examinations to identify the source of arsenic. Solid-phase metal analyses (or other suitable test) on the available ABA samples should also be considered to ensure that the solid phase arsenic concentrations of the humidity cell samples are representative of the arsenic concentrations in the mine area.*

Item No.: 3-9

References:

1) Draft EIS. Section 3.1.4.4, pages 3-3 – 3-4.
2) Supporting Document G – Integrated ARD Characterization Report, Appendix A

Discussion:

The statement "In general, all waste rock extracted from outside the mineralized zone such as from the development of the underground access ramp will have low acid generating potential and will be suitable for use in site construction" may be true. However, this has not been documented for the regulatory agencies in the Draft EIS or any of the supporting documents. The only point established by the Draft EIS, Supporting Document G and Appendix to Supporting Document G is that various rock types have low, uncertain or high acid generating potential. There is a poor indication of the spatial distribution of these rock units or the location of the samples relative to the proposed mine workings. There was no statement on the criteria that will be used to evaluate which materials are and are not suitable for construction.

The statement "All of the rock types classified as having high acid generating potential is ore grade material…" may be true but needs to be documented. If there is material that does not grade associated at the margins of the ore zone, a strategy for this material should be stated.

Requests:

a) *An interpretation of the current and future test results is required to establish criteria to determine which material is suitable for construction purposes.*
   i. *Provide documentation of the spatial relationship of the samples, rock types and proposed mine workings.*
   ii. *Provide a more detailed assessment of the test results to propose criteria to identify material with potential pH neutral metal release in addition to acid generation potential. This should likely*

include kinetic testing in addition to mineralogic examinations and solid phase geochemistry to evaluate the source of arsenic.

Item No.: 3-10

References:

1) Draft EIS. Section 3.1.4.4, page 3-3 – 3-4.
2) Supporting Document G – Integrated ARD Characterization Report

Discussion:

"ABA testing indicates that the mill tailing will have a low acid generating potential." The results of ABA testing on a tailings sample derived from Doris Lake ore were not presented in the Draft EIS or Supporting Document G. The only tailings sample with ARD characterization work presented in this section was from the Boston deposit, which is located approximately 50 km south of the Doris Deposit in a shear hosted deposit. ABA results from a Doris Deposit tailings sample were mentioned in Section 5.3.5.3, however, no detailed assessment was provided. Since the tailings will comprise a significant volume of the waste material produced from the mine, a good understanding of the geochemical composition of this material is necessary.

Requests:

a) *Solid-phase geochemical characterization work conducted on tailings samples produced from Doris Lake ore samples should be referenced and discussed in this section, including a description of how the sample was produced. If the proponent deems that the tailings sample is representative of tailings that will be produced during operation, solid-phase metal and mineralogic analyses should be conducted on the sample.*

Item No.: 3-11

References:

1) Draft EIS. Section 3.1.4.4, page 3-3 – 3-4; Figure 1.1.2.
2) Supporting Document G – Integrated ARD Characterization Report

Discussion:

ABA testing on samples of potential quarry rock indicates that this rock is not likely to be acid generating or a significant source of metal leaching. The quarry sites that have ABA testing presented in Supporting Document G do not appear correspond with the quarry sites identified in Figure 1.1.2 of the Draft EIS.

Requests:

a) *If the proposed quarry sites have been sampled, the results of these samples should be presented in the EIS. If sampling has not been conducted, an initial characterization program of the quarry material that will be conducted prior to disturbance should be proposed in the ARD management plan.*

Item No.: 3-12

References:

1) Draft EIS. Section 3.1.4.4.
2) Supporting Document G – Integrated ARD Characterization Report

Discussion:

Supporting Document G provides three plots that summarize the results of the ABA test results. Figure 3.5 suggests there is a large discrepancy between Carbonate NP and Sobek NP measurements. This discrepancy is often a result of incorrect calculation of Carbonate NP from inorganic carbon content.

Requests:

a) *Recalculate the CaNP values from the ABA data base and reassess the implications on acid generating potential of the discrepancy between NP and CaNP.*

Item No.: 3-13

References:

1) Draft EIS. Section 3.1.4.4.
2) Supporting Document G – Integrated ARD Characterization Report

Discussion:

Supporting Document G summarizes the results of the ABA data using average values. The use of parametric statistics such as an average value often provides misleading results for sample populations that do not have a normal distribution.

Requests:

a) *The data summary and assessment should include non-parametric parameters such as median values to provide a better estimation of the central tendency of the various sample sets.*

Item No.: 3-14

References:

1) Draft EIS. Section 3.1.4.4.
2) Supporting Document G – Integrated ARD Characterization Report

Discussion:

Supporting Document G states that the ABA test results indicate that Mafic Volcanic-D2 and Underground Mafic Volcanic should be classified as having uncertain acid-generating potential (page 20). Making a statement that the mafic volcanics have uncertain acid-generating potential has far reaching implications because mafic volcanics are what define archaen greenstone belts and are likely the overwhelming geologic rock type that underlies the area. However, the Draft EIS states that waste rock derived from outside the mineralized area will have a low acid generating potential, which appears to contradict the statements in the Supporting Document.

Requests:

a) *Provide a more detailed geologic assessment with a consistent nomenclature that defines the rock types and rock-type associations to each other and to the proposed mine workings. The results of the assessment should then be used to present conclusions that are consistent with the supporting data.*

Item No.: 3-15

References:

1) Draft EIS. Section 3.1.4.4.
2) Supporting Document G – Integrated ARD Characterization Report, page 28.

Discussion:

Supporting Document G states that the Gabbro, Mafic Volcanic and Quarz Rock units are predicted to be net acid generating.

Requests:

a) *The proponent should re-evaluate the kinetic test data to ensure that the conclusions presented are valid and not affected significantly by laboratory artifacts or over generalization.*

Item No.: 3-16

References:

1) Draft EIS. Section 3.1.4.5, page 3-4.

Discussion:

Since the depth to the top of permafrost is significantly deeper under the lakes, groundwater does exist in the sediments and fractured bedrock below the lakes.

Requests:

a) *Clarify whether the possibility of encountering groundwater seepage in mining operations near Doris Lake has been investigated. Address the potential for groundwater seepage in the impact assessment.*

3.1.5 Hydrology

No comments.

3.1.6 Water Quality

Item No.: 3-17

References:

1) Draft EIS. Section 3.1.6, page 3-5.
2) Supporting Document F – Aquatic Baseline Studies Doris Hinge Project 1995 – 2000. Section 3.2

Discussion:

There are some deficiencies in the baseline water chemistry data that were collected in the study area. Several key parameters were not measured (e.g., total kjeldahl nitrogen, total nitrogen), some of the data looks suspect (e.g., pH range of 5.9 –7.80 in Doris Lake, p. 27), and the data interpretation could have been more developed (e.g., discussion of nutrient ratios and limiting factors for production, discussion of dissolved oxygen depletion in open-water season).

Requests:

a) Address data deficiencies if additional baseline sampling is conducted

b) Provide QA/QC for in situ measurements and/or evaluation of data quality

c) Provide additional discussion of dissolved oxygen depletion and nutrient status

Item No.: 3-18

References:

1) Draft EIS. Section 3.1.6, page 3-5.
2) Supporting Document F - Aquatic Baseline Studies Doris Hinge Project 1995 – 2000. Table 4.3 Sediment chemistry in Doris Hinge lakes, 1996 and 1997, page 117.
3) Caldwell, J.M. and M.C. Doyle. 1995. Sediment oxygen demand in the lower Willamette River, Oregon, 1994. U.S. Geological Survey Water Survey Investigations Report 95-4196. Prepared in cooperation with Oregon Department of Environmental Quality. 14 p.
4) Rounds, S.A. and M.C. Doyle. 1997. Sediment oxygen demand in the Tualatin River basin, Oregon, 1992-96. U.S. Geological Survey Water-Resources Investigations Report 97-4103. Prepared in cooperation with the Unified Sewerage Agency of Washington County, Oregon.
5) Wood, T.M. 2001. Sediment oxygen demand in upper Klamath and Agency lakes, Oregon, 1999. Water-Resources Investigation Report 01-4080. Prepared in cooperation with the Bureau of Reclamation. 13 p.

Discussion:

It is indicated that the lakes were typically well aerated during the summer, but that depressed near-bottom dissolved oxygen concentrations were recorded during ice conditions and that this dissolved oxygen depression occurred in lakes with relatively high total organic matter content. "This suggested that sediment oxygen demand (SOD) was the underlying cause."

While it is likely true that SOD was the underlying cause of oxygen depletion in the water overlying the sediments, the interpretation of cause with reference to total organic carbon content of sediments is questionable. Firstly, there were not dramatic differences in total organic carbon between most locations, and all levels were relatively low (Table 4.3, Supporting Document F). Secondly, the amount of total organic carbon in sediments is often not correlated to SOD. The lack of a significant correlation between SOD and organic matter, or SOD and particle size, is common (Caldwell and Doyle 1995, Wood 2001). While SOD at the sediment surface is related to the biological decomposition of organic material, SOD in surface sediments is also related to the bacterially facilitated nitrification of ammonia (Rounds and Doyle 1997). Deeper within the sediment, SOD may be dominated by the chemical oxidation of chemical species such as iron, manganese, and sulfide (Rounds

and Doyle 1997). Furthermore it has been hypothesized that it is the availability of the organic carbon in the sediments that is more important to SOD than the actual amount of organic carbon present (Caldwell and Doyle 1995). This would be related to the type of organic matter present (labile and easy to break down or refractory and difficult to break down), the porosity of the sediments, mixing of surficial sediments from invertebrate activity, and the types of bacteria present in the sediments.

Requests:

a) *Remove sentence "With the exception of Ogama Lake, this DO depression occurred in lakes with relatively high total organic (TOC) levels in sediment.*

Item No.: 3-19

References:

1) Draft EIS. Section 3.1.6, page 3-5.

Discussion:

It is stated that "Total phosphorous levels were low, indicating oligotrophic to mesotrophic conditions", however, there is no mention of nitrogen levels. Both of these nutrients are important in determining the productivity of the area yet total nitrogen and total kjeldahl nitrogen were not measured in the baseline water chemistry studies. This information is important in defining nutrient conditions and as indicated above, in defining trophic status of the lakes.

Requests:

a) *Should additional baseline work be conducted, analysis of nitrogen in surface waters should be conducted.*

Item No.: 3-20

References:

1) Draft EIS. Section 3.1.6, page 3-5; Section 3.1.7, page 3-6.
2) Supporting Document F - Aquatic Baseline Studies Doris Hinge Project 1995 – 2000. Sections 3 and 4.

Discussion:

The discussion of water (and sediment) chemistry results in the EIS should be focused on those for relevant lakes. A number of lakes that will not be affected by the project have been sampled, however, while these may function as reference lakes for this project, the focus of the EIS should be on lakes that will potentially be affected by the project such as Tail, Doris, and Little Roberts lakes. The ranges of values for Tail, Doris, and Little Roberts lakes could be presented within the EIS in more detail and discussed in relation to values from other lakes in the area. In the Draft EIS, this section provides a very limited overview of all lakes in the area, which may or may not be similar to the potentially affected lakes for all parameters.

Requests:

a) *Provide more focused discussion/information on lakes potentially affected by the project, instead of a general survey of all results from all lakes sampled in the area.*

Item No.: 3-21

References:

1) Draft EIS. Section 3.1.6, page 3-5.
2) Supporting Document F - Aquatic Baseline Studies Doris Hinge Project 1995 – 2000. Sections 3 and 4.
3) Government of Canada. 2002. Metal Mine Effluent Regulations. Fisheries Act Report SOR 2002-22.

Discussion:

It is noted that three different laboratories have been used in over the years for assessments of water and sediment chemistry. The use of different laboratories potentially results in samples being analyzed by different analytical techniques, with different QA/QC procedures, and different detection limits from year to year (e.g., lakes analytical detection limits for arsenic were 1 ug/L in 1995, 0.5 ug/L in 1996 and 0.1 ug/L in 1997). In order to produce data that are comparable from site to site year to year it is important to reduce extraneous sources of variability within the data set as much as possible.

Requests:

a) *To reduce the error introduced by these differences it is highly recommended that one lab be chosen for all future analyses (including any additional pre-project, construction, operational, and post-project monitoring activities). This lab must meet the detection limits and QA/QC procedures as outlined in the MMER.*

Item No.: 3-22

References:

1) Draft EIS. Section 3.1.6, page 3-5.
2) Supporting Document F- Aquatic Baseline Studies Doris Hinge Project 1995 – 2000., Figures 3.2 and 3.3, p. 32 and 38

Discussion:

There is some indication that relatively low dissolved oxygen (DO) concentrations may occur in Doris and Tail lakes, at certain times of the year (e.g., in July 1997 DO concentrations were approximately 5 mg/L in Tail Lake), even at the water surface (Figures 3.2 and 3.3 in Supporting Document F). This is a very significant observation yet it is not discussed anywhere in the Draft EIS or Supporting Document F. The occurrence of low DO in the open-water season indicates that these lakes already experience fairly severe DO depletion given the lack of point sources in the area and are pre-disposed to critical drops in DO. Addition of sewage to Tail Lake may exacerbate this condition in the downstream receiving environment (i.e., via input of biochemical oxygen demand from Tail Lake).

Requests:

a) *Provide a discussion of DO results inasmuch as they may affect the prediction of sewage discharge impacts.*

3.1.7 Sediments

Item No.: 2-23

References:

1) Draft EIS. Section 3.1.7, page 3-5.
2) Supporting Document F- Aquatic Baseline Studies Doris Hinge Project 1995 – 2000. Section 4.

Discussion:

Only individual (non-replicated) sediment samples were collected from one location in Tail, Doris, and Little Roberts lakes. Given the heterogeneity of lake sediments, it is recommended that future monitoring activities collect replicate samples for sediment chemistry (i.e. at least triplicate).

Requests:

a) *Any assessment of sediment chemistry to date should be interpreted with caution as apparent differences between lakes may simply be related to within lake sediment variability. It is recommended in future that replicate sediment samples be collected (at least in triplicate). To assist in data interpretation it is recommended that particle size analysis be determined in future sediment samples.*

Item No.: 3-24

References:

1) Draft EIS. Section 3.1.7, page 3-6.
2) Supporting Document F- Aquatic Baseline Studies Doris Hinge Project 1995 – 2000., Section 4, Pg. 121.

Discussion:

The Draft EIS states, "Sediment TOC levels varied between lakes. For lake sediments with relatively elevated TOC (Doris and Tail Lakes), colour and mineralogy indicated that reducing conditions were predominant in the surficial layer as well as the underlying sediments. For lake sediments with relatively low to moderate TOC concentrations, colour and mineralogy indicated a strong redox gradient between an oxic surficial layer and reducing underlying upper layer."

The data indicate that total organic carbon concentrations were not notably different between sampling locations, given the lack of sample replication, and all concentrations were relatively low.

Requests:

a) *Avoid drawing conclusions regarding baseline sediment conditions and potential impacts, based on an "over-interpretation" from very limited data.*

3.1.8 Land use

Item No.: 3-25

References:

1) Draft EIS. Section 3.1.8.2, page 3-7 and Figure 1.1.2.
2) Supporting Document H - Archaeological Investigations, 1995 - 2000, Compiled Report. Pages 71, 73 and Figure 5

Discussion:

The Draft EIS states that there are no archaeological sites within the project footprint. Supporting Document H indicates that archaeological investigations were conducted based on project plans as available in 2000. Modifications to that plan were not investigated and inventory and assessment of the potential roads were described as preliminary overview assessments. As such, the heritage (archaeological) resource impact assessment is incomplete.

A comparison of archaeologically surveyed areas (Supporting Document H, Figure 5) with the project footprint (Draft EIS, Figure 1.1.2) supports this deficiency. For example, the road alignment east of Doris Lake in Figure 1.1.2 does not correspond to the examined corridor indicated in Figure 5. The scale of the maps in these documents makes more detailed comparison impossible. Given the demonstrated richness of the area for archaeological sites, there is a high likelihood that as yet unrecorded archaeological sites may occur in, and may be in conflict with, the current project footprint. Also of potential concern are the eight sites *adjacent to the LSA*. For example, based on a comparison of maps, it appears that NbNh 13 could be impacted by the development.

Requests:

a) Provide clarification as to completeness of archaeological impact assessment.
b) Indicate commitment to completion of assessment prior to construction.
c) Provide a map of the project footprint with detail insets where sites such as NbNh 13 lie in proximity to the footprint.
d) Ensure compliance with GN regulations related to archaeological and cultural sites.

3.2 Biological Environment

3.2.1 Marine Biota and Habitat

Item No.: 3-26

References:

1) Draft EIS. Section 3.2.1, page 3-7.
2) Supporting Document C – Biophysical Environment Baseline Report, Doris North Project, Nunavut. Section 2.4.1, pages C-34 to C-36.
3) Supporting Document F – Aquatic Baseline Studies, Doris Hinge Project 1995 - 2000. Section 6.5, pages 203 to 208; Section 8.3, pages 312 to 320.

Discussion:

"No rare or endangered species were identified within the project area…". What criteria were used to define 'rare' or 'endangered'? Those species listed by COSEWIC (Committee On the Status of Endangered Wildlife In Canada), IUCN (The World Conservation Union)?

Supporting Document C states the overall objective was " to document the presence, abundance and distribution of marine biota species and to assess the quality of habitat for fish and benthic marine organisms within the area of interest". The authors attribute differences in composition and abundance of benthos to physicochemical (e.g., water depth, salinity) characteristics at sampling sites. No mention is made of either the likely contribution of substrata differences or inter-annual (temporal) and spatial variability ('patchiness') contributing to these differences.

Habitat was assessed in the nearshore environment only; therefore, the quality and quantity of habitat available for benthic organisms was not truly evaluated as two of the three benthic sampling sites fell outside of the area assessed for habitat. Additionally, habitat availability/suitability was qualitatively assessed. Quantification of habitat i.e., mapping of habitat-type polygons is required to assess project impacts and any requirements for compensation.

Requests:

a) *Provide the criteria used to define 'rare' or 'endangered' species and identify the source listing those species (e.g., COSEWIC, IUCN, other).*
b) *Provide additional information with respect to the physiochemical characteristics contributing to the composition and distribution of marine benthic invertebrates.*
c) *Provide a brief summary of the available marine benthic invertebrate data used to formulate the assumption of " The composition of benthic communities within Roberts Bay was typical for the Arctic and Antarctic regions of the world", as this conclusion is based upon sample collection at 3 sites over limited spatial and temporal scales.*

3.2.2 Freshwater Biota and Habitat

Item No.: 3-27

References:

1) Draft EIS. Section 3.2, page 3-7; Section 3.2.2, pages 3-8 – 3.10.
2) Supporting Document C – Biophysical Environment Baseline Report. Section 2.4.2, pages C-36 to C-39, pages C-40 to C-42.
3) Supporting Document F. Aquatic Baseline Studies Doris Hinge Project 1995-2000. Section 5.0, pages 123 to 149; Section 6.0, pages 150 to 203; Section 8.0, pages 291 to 319.
4) James, M.R. 1991. Sampling and preservation methods for the quantitative enumeration of microzooplankton. New Zealand Journal of Marine and Freshwater Research 25: 305-310.
5) Likens, G.E. and J.J. Gilbert. 1970. Notes on the quantitative sampling of natural populations of

plankton rotifers. Limnology and Oceanography 15: 816-820.
6) Nichols, J.H. and A.B. Thompson. 1991. Mesh selection of copepodite and nauplius stages of four calanoid copepod species. Journal of Plankton Research 13: 661-671.
7) Schindler, D.W. 1969. Two useful devices for vertical plankton and water sampling. Journal of the Fisheries Research Board of Canada 26: 1948-1955.

Discussion:

"No rare or endangered species were identified within the project area…". What criteria were used to define 'rare' or 'endangered'? Those species listed by COSEWIC (Committee On the Status of Endangered Wildlife In Canada), IUCN (The World Conservation Union)?

Unlike Marine Biota and Habitat, Supporting Document C (or F) does not provide the overall objectives for Freshwater Biota and Habitat studies conducted, therefore it is not possible to assess whether or not objectives were addressed through the studies conducted.

Information provided in the main volume with respect to phytoplankton, zooplankton, periphyton, and benthic invertebrates is insufficient to adequately assess conclusions made. The assessment of production is not in relation to any numeric values either among study area waterbodies or to other small lakes in the Canadian Arctic or sub-Arctic.

Phytoplankton biomass as either chorophyll *a* concentration or using cell biovolume (mg/m^3) was not assessed, thereby limiting the assessment of production for the study lakes. Results should be interpreted with caution.

Periphyton biomass was assessed as cholorphyll *a* concentration and used as a surrogate for production. Results should be interpreted with caution, as biomass assessed using cell biovolume (mg/m^3) will often produce results that differ. The lack of direct correlation between these estimators of phytoplankton biomass is not unusual and is most likely related to differences in chlorophyll *a* concentrations among types of algae.

The mesh size used for the zooplankton tows was 118 μm, which is too large to retain copepod nauplii. As the net does not effectively sample this life stage, it is not appropriate to quantify it. A mesh size of 50 μm is usually sufficient to retain the smallest stages of planktonic Crustacea, with the possible exception of copepod nauplii (Nichols and Thompson 1991). Additionally, a mesh size of 118 μm is too large to retain the majority of rotifers and it is not appropriate to quantify them. Rotifers are smaller than crustacean zooplankton and are retained quantitatively only on meshes of 10-35 μm (Schindler 1969, Likens and Gilbert 1970). Nets are viewed as inappropriate for the quantitative collection of rotifers because such fine meshes will clog (James 1991). As such, it is recommended that rotifers be collected with plankton traps, bottles, or tubes.

The authors attribute differences in composition and abundance of benthos to physical and energetic characteristics among the sampling locations. No mention is made of either the likely contribution of substrata differences or inter-annual (temporal) and spatial variability ('patchiness') contributing to these differences.

Habitat was assessed in the nearshore environment only; therefore, the quality and quantity of habitat available for benthic invertebrates was not truly evaluated as a number of benthic sites investigated fell outside of the habitat area assessed. Additionally, habitat availability/suitability was qualitatively assessed; actual quantification of habitat is preferred (i.e., mapping of habitat-type polygons and presenting number benthos available as food items within different habitat types).

Requests:

a) *Provide the criteria used to define 'rare' or 'endangered' species and identify the source listing those species (e.g., COSEWIC, IUCN, other).*
b) *Provide objectives for all studies conducted.*
c) *Provide additional information with respect to the physical and energetic characteristics contributing to the composition and distribution of benthic invertebrates in lakes, drift organisms in streams, and benthic invertebrates in streams.*
d) *Provide a brief summary of the available phytoplankton and zooplankton data used to formulate the assumption that these communities "were similar in many respects to the communities of other small lakes in the Arctic and sub-Arctic.".*
e) *Provide a brief summary of the available benthic invertebrate data used to formulate the assumption that the "benthic communities of the eight study lakes were similar in many respects to the communities of other small lakes in the Canadian Arctic and sub-Arctic."*

Item No.: 3-28

References:

1) Draft EIS. Section 3.2.2, page 3-9.
2) Supporting Document F – Aquatic Baseline Studies, Doris Hinge Project 1995 – 2000. Section 7.3 Fish Tissues

Discussion:

It is noted that sufficient samples for fish tissue residue analysis were only obtained from Doris, Patch, and Windy lakes in 1997 and Pelvic Lake in 1998. As Little Roberts Lake is within the RSA, is located downstream of the project, and will receive discharges from Tail Lake during and after operation of the project, it is recommended that baseline fish tissue residues also be obtained in fish from Little Roberts Lake. Furthermore, as fish may survive within Tail Lake for some period of time it would also be advisable to obtain a sufficient number of background samples from Tail Lake as well.

Requests:

a) *Collect baseline data to define pre-project metal concentrations in fish captured from sites located in Tail Lake and downstream of the Tail Lake discharge (i.e., Little Roberts Lake, Roberts Lake).*

3.2.3 Vegetation

Item No.: 3-29

References:

1) Draft EIS. Section 3.2.3, 3-10.
2) Supporting Document C – Biophysical Baseline Report, Doris North Project, Nunavut. Section 2.4.3, page C-43
3) McJannet, C.L., G.W. Argus and W.J. Cody. 1995. *Rare vascular plants in the Northwest Territories*. Canadian Museum of Nature. Syllogeus 73.

Discussion:

The Draft EIS does not discuss the presence of rare plants in the project area. Review of the list of plant species presented in the 1997 Environmental Data Report prepared by Rescan indicated no COSEWIC listed rare plant species in the project area. McJannet et al published a comprehensive evaluation of the rarity status of vascular plant species in the Northwest Territories "Rare Vascular Plants of the Northwest Territories" in 1995. This document is the most recent source of rare plant data for Nunavut. This work considers a number of previous botanical inventories and evaluations including works by Porsild, Cody and the document "Rare Vascular Plants of Canada" by Argus and Pryor. COSEWIC does not maintain a comprehensive list of rare plant species.

Requests:

a) Assess the rarity of vegetation species observed in the project area based on the publication "Rare Vascular Plants of the Northwest Territories".

Item No.: 3-30

References:

1) Draft EIS. Section 3.2.3, page 3-10.
2) Supporting Document C – Biophysical Baseline Report, Doris North Project, Nunavut. Section 2.4.3, page C-43

Discussion:

The vegetation section of the baseline report identifies vegetation ecosystems in the project area based on fieldwork conducted in the Hope Belt Region in 1996 and 1997. From the list of species identified in the report (Rescan 1998) for each ecosystem unit, an assessment of rare plant presence in the project area has been made.

Surveys designed to characterize dominant vegetation ecosystem units in a region are not compatible with methods used to identify rare plant species. Further information is required to clarify whether the project area has been surveyed for rare plant species.

Requests:

a) *Indicate whether rare plant surveys were conducted for the project LSA, indicating methods, search effort and dates.*
b) *Indicate what vegetation sampling data, specific to the LSA or the RSA, were used to identify vegetation species occurring on the project area.*

3.2.4 Terrestrial Wildlife and Habitat

Item No.: 3-31

References:

1) Draft EIS. Section 3.2, page 3-7.
2) COSEWIC Canadian Species at Risk (2002)
3) Northwest Territories Resources, Wildlife and Economic Development. 2000. NWT Species 2000: General status ranks of wild species in the Northwest Territories. www.nwtwildlife.rwed.gov.nt.ca/monitor/htm

Discussion:

Although no 'rare or endangered' species were identified in the RSA, three "species of concern" (as per COSEWIC) have been recorded in the RSA – tundra peregrine falcon, grizzly bear and wolverine (the polar bear may also occur in the RSA, although it has not been recorded recently). Additionally, the grizzly bear is considered a "sensitive" species in Nunavut, and the tundra peregrine falcon is listed as "may be at risk." The importance of these species should not be under-emphasized.

Requests:

a) *Wherever the statement 'no rare or endangered species are present in the project area" is made, it should be qualified by noting that COSEWIC-listed species do occur in the area.*

Item No.: 3-32

References:

1) Supporting Document C– Biophysical Environment Baseline Report, Doris North Project, Nunavut.
2) Supporting Document E – Terrestrial Wildlife of Hope Bay, Nunavut (An integration of Data Collected from 1994 – 2001).

Discussion:

Information on the timing and number of surveys performed is often not available in the Draft EIS. Some of this information can be found in the supporting documents, but not always. Without more detailed information on survey timing and numbers, it is not possible to assess if the surveys adequately recorded occurrences of wildlife species, or if statements such as "…no polar bears, whales, narwhals, or walrus were observed (during 1996 aerial surveys)" are useful. This, in turn, makes it difficult to evaluate the accuracy of statements made regarding the potential impacts of the project on wildlife species in the area.

Requests:

a) *Provide a detailed account of the timing and number of surveys that were conducted for all wildlife species.*

Item No.: 3-33

References:

1) Draft EIS. Sections 3.2 and 5.3
2) Supporting Document C – Biophysical Environment Baseline Report, Doris North Project, Nunavut.
3) Supporting Document E – Terrestrial Wildlife of Hope Bay, Nunavut (An integration of Data Collected from 1994 – 2001).

Discussion:

The wildlife data collection focussed on the RSA. There is very little reference to the LSA, and no data collection appeared to address the project footprint (including proposed road corridors), specifically. This deficiency is evident both in this section (3.2) and in Section 5.3. The paucity of data for the LSA is a concern given that impacts, although considered minor are confined to the immediate project area. Why then is there limited wildlife (and bird) data for the immediate study area? In particular, wildlife inventory and habitat use information for Doris and Tail lakes and Roberts Bay is essential.

Requests:

a) *Provide wildlife and wildlife habitat information for the LSA, in particular in relation to the project footprint and road corridors, and specifically for Doris and Tail Lakes, and Roberts Bay.*

Item No.: 3-34

References:

1) Draft EIS. Section 3.2.4, page 3-11; Figures 3.2.3 – 3.2.8.

Discussion:

Do Figs. 3.2.3 – 3.2.8 (maps of wildlife observations) represent observations of single animals, or simply locations of sightings?

Requests:

a) *Clarify figure captions and any text references to indicate what data are presented in these figures.*

Item No.: 3-35

References:

1) Draft EIS. Section 3.2.

Discussion:
The wildlife species accounts include limited up-to-date and area-specific information.

Requests:

a) *Expand the literature review to include regional information and current research and inventory information for the Central Arctic.*

3.2.5 Birds

Item No.: 3-36

References:

1) Draft EIS. Section 3.2.5, page 3-11.
2) Supporting Document C – Biophysical Environment Baseline Report, Doris North Project, Nunavut.
3) Supporting Document E – Terrestrial Wildlife of Hope Bay, Nunavut (An integration of Data Collected from 1994 – 2001).

Discussion:
It is stated on this page (section 3.2.5, pg 3-11) that: "The study area did not represent a concentration of breeding migratory birds, or staging or resting areas." This is questionable given that there is a CWS bird sanctuary 40 km east of the project area. It is not clear from the Draft EIS or either Documents C or E what time of year and how many surveys were conducted for migratory waterfowl. Were surveys performed during spring migration, the breeding season, and the fall migratory period? What is the importance of the area, especially Roberts Bay, for moulting waterfowl, and or spring and fall migratory waterfowl?

Requests:

a) *Provide a detailed account of the timing and number of surveys that were conducted for migratory waterfowl.*
b) *Information on waterfowl use (including fall use) of Roberts Bay is required.*

4. SOCIO-ECONOMIC BASELINE

Item No.: 4-1

References:

1) Draft EIS. Section 4.
2) Supporting Document L – A Socio-Economic Impact Assessment of the Doris North Project on the Kitikmeot Communities, Nunavut and Yellowknife, Northwest Territories.

Discussion:

The Socio-economic baseline presented in the Draft EIS has been culled from the excellent overview prepared by Robert Hornal and Associates Ltd. (2003, Supporting Document L). The Draft EIS presents general information in the Kitikmeot Region and Yellowknife and limits valuable Nunavut community level information to the supporting document.

Requests:

a) Provide more Nunavut community level information in the EIS text regarding socio-economic baseline.

5. ENVIRONMENTAL IMPACT ASSESSMENT

5.1 Methodology

Item No.: 5-1

References:

1) Draft EIS. Section 5.1, page 5-1.

Discussion:

As stated on this page: "Methods for predicting impacts in this EIS include: mathematical modelling, traditional knowledge, previous experience, predicting tendencies, and expert opinion." It is not clear whether, or how these methods were applied to each VEC examined.

Requests:

a) *Clarify the methods used for impact assessment of each VEC (e.g., include a methodology section for each environmental component examined).*
b) *Clarify what, if any traditional knowledge was applied to the assessment of each VEC.*

Item No.: 5-2

References:

1) Draft EIS. Section 5.1.1, page 5-1.

Discussion:

It is apparent from the project description that further exploration will take place at the project site with the intention of further development based on results of exploration. Estimates of additional indicated and inferred reserves are provided. The project description indicates that the facilities design can accommodate projected volumes of ore and tailings associated with ongoing mining. Since the project is designed for operation beyond two years, the project assessment should consider the impacts of development beyond two years. In particular the measures to ensure proper management of tailings and rock in the case of extended operations should be included in the scope of this assessment, as well as an assessment of effects on wildlife and aquatic resources.

Requests:

a) *Clarify the rationale for the spatial and temporal scope of the assessment and include an assessment of the effects of potential ongoing development of the mine, beyond 2 years.*

Item No.: 5-3

References:

1) Draft EIS. Section 5.1.2, page 5-2; Table 5.1.1.

Discussion:

The rationale for selection of VECs is not clearly articulated. In particular the rationale for selection of each VEC based on scientific knowledge, consultation with regulatory agencies and stakeholders and application of traditional knowledge is not clearly specified. It is inferred that species at risk and species of special concern were included in selection of VECs but again, the specific linkages to identified VECs are not made. Discussion of methods for identifying and assessing potential impacts on rare or endangered species is inconsistent in subsequent sections. The assessment of VECs is not carried out in a consistent manner in subsequent sections (i.e., the listed VECs are not each assessed according to stated criteria).

Requests:

a) *Clearly articulate the rationale for the selection of each VEC and ensure that the assessment in subsequent sections is consistent with the identified VECs and identified methodologies for assessment, including the criteria for assessment.*

5.2 Statement of Limitations

No comments.

5.3 Physical and Biological Environmental Components

5.3.1 Climate

Item No.: 5-4

References:

1) Draft EIS. Section 5.3.1, page 5-6.

Discussion:

The Draft EIS has concluded that global warming will not significantly affect the project during its 24-month life. However, could global warming affect the predicted post-closure performance?

Requests:

a) *Clarify the long-term prediction for the behaviour of the tailings impoundment area in the event the tailings dam and underlying soils become unfrozen.*

5.3.2 Air Quality

Item No.: 5-5

References:

1) Draft EIS Sections 5.3.1 and 5.3.2, pages 5-6 to 5-13
2) Guideline Respecting Ambient Air Quality Standards for Sulphur Dioxide and Total Suspended Particulate in Nunavut, Nunavut Environmental Protection Act, January 2002.

3) Canada-Wide Standards for Particulate Matter (PM) and Ozone (and Annexes), Canadian Council of Ministers of the Environment, June 2000.

Discussion:

Section 5.3.1 treats climate only in terms of 'climate change.' The nature and frequency of atmospheric inversions and meteorological factors such as wind speed and wind direction need to be discussed in more detail so that the reader can judge the basis for the proponent's conclusions that air quality issues are not of concern.

The NIRB guidelines for the Project require the proponent to "address and quantify ... potential air quality effects" including gaseous emissions from fuel consumption. The NIRB guidelines further "invite MHBL to address" a number of factors: atmospheric dispersion, atmospheric conversion processes (secondary particulates), linkages between chemicals, the environment and human health and potential biological receptors. Emissions of common air contaminants are only partially quantified (significant common air contaminant emissions from power generation are not quantified, while minor emissions from other sources are quantified) and potential impacts of gaseous emissions on receptors in the LSA and RSA are not discussed at all.

The Draft EIS does not discuss the role of the Nunavut Guideline for ambient air quality (SO_2 and TSP), the Canadian National Ambient Air Quality Objectives (NAAQOs) or the provision in the Canada-Wide Standards for PM and Ozone for "keeping clean areas clean" (Annex A).

Figure 5.3.1 referenced in the Draft EIS is labelled as Figure 5.1.1 and Figure 5.3.2 ("a flow diagram presenting the potential sources of airborne dust") appears to be missing. Figure 5.3.1 shows schematically the linkages among emissions and the various impacts, but the emissions and impacts are not discussed in any detail in the body of the text.

Requests:

a) *Provide clarification on how baseline air quality and estimated project impacts would compare with the Nunavut air quality Guideline and the NAAQOs and how they are consistent with the 'keeping clean areas clean' requirement of the Canada-Wide Standards.*
b) *Provide quantified estimates of emissions of common air contaminants from power generation sources (total emissions appear to be several hundred tonnes per year). Summarize total emissions of common air contaminants from all project sources.*
c) *Provide information on the quality of diesel fuel that will be used (including estimated sulphur content).*
d) *Provide information on the composition of PM emissions. Will PM emitted from blast areas and the mine contain air contaminants that might be harmful when breathed by wildlife or humans in the vicinity or when deposited to vegetation and soil?*
e) *On page 5-10, potential impacts of dust on lichens are discussed. Provide an assessment of the potential impacts of SO_2 on lichens, since lichens are known to be especially sensitive to SO_2 (and are a potential food source for local wildlife).*

Item No.: 5-6

References:

1) Draft EIS Sections 5.3.2.5, pages 5-11 to 5-12

Discussion:

Construction Phase:

The second bullet in Section 5.3.2.5 is not explicit enough to determine what mitigation measures are proposed for dust control in underground construction.

Operations Phase:

The last sentence in the third paragraph on page 5-12 ("Tailings deposition will be ....") is not qualified by whether sub-aqueous deposition will be effective 100% of the time, or whether there will be times when the lake water level might be below the tailings fines level, thus creating potential for wind erosion of the fines. See potential concern identified on page 5-8 ("dust release from tailings deposited or stored above the low water line in Tail Lake").

Requests:

a) *Provide clarification of what is meant by the bullet beginning "Attenuating dust generated by ...." on page 5-11.*
b) *Provide clarification of the effectiveness of the sub-aqueous tailings deposition in Tail Lake as it pertains to management of impacts on air quality.*

Item No.: 5-7

References:

1) Draft EIS. Section 5.3.2.6, pages 5-12 to 5-13

Discussion:

The summary of residual impacts assessment in Table 5.3.5 indicates that for both construction and operation phases 'mitigation success' for emissions from diesel fuelled equipment will be 'medium.' No mitigation measures for emissions from diesel fuelled equipment are mentioned in the text.

Requests:

a) *Provide a description of the mitigation measures that will affect emissions from diesel fueled equipment. Is the categorization of 'medium' mitigation effectiveness in Table 5.3.5 meant to imply that premium diesel fuel will be used (e.g., low-sulphur)?*

Item No.: 5-8

References:

1) Draft EIS. Section 5.2.3.4, page 5-9; Table 5.3.3 - Annual Consumption of Fuel.

Discussion:
Fuel units are not given.

Requests:

a) *Indicate what units of fuel are used.*

5.3.3 Noise

Item No.: 5-9

References:

1) Draft EIS. Section 5.3.3, pages 5-13 to 5-16

Discussion:
The discussion in Section 5.3.3 indicates that although noise impacts may affect wildlife patterns in the vicinity of the project during construction and operation, "... the impact should be mitigated naturally once wildlife becomes used to it." (Section 5.3.3.4).

Section 5.3.3.5 (Residual Impact Rating) states: "Overall rating from potential noise related impacts is minor, as they are not expected to impair or disturb wildlife use or migration in the area."

No evidence or argument is provided to support the contention that the situation will return to pre-project conditions respecting wildlife use of the area once the project is closed.

Requests:

a) *Provide information to support the contention that wildlife use of the project area that may be disturbed by noise from the project will return to normal after project closure. The information may be based on the literature concerning effects of noise on wildlife, in particular in northern settings, and/or on anecdotal information from other northern project sites or communities.*

Item No.: 5-10

References:

1) Draft EIS. Section 5.3.3, page 5-15; Section 5.3.7, page 5-52.

Discussion:
It is stated in the Draft EIS that: "Noise levels for an underground mine will be less than for an open pit mine." How much less? Will these levels be significant to wildlife? Also, what are the potential impacts of noise disturbance due to the rock quarry activities and causeway construction in Roberts Bay on waterfowl in the marine environment?

Requests:

a) *Provide information on noise levels that create disturbances to wildlife, and relate this to the levels that will be incurred during construction and operation of the project.*

5.3.4 Landscape and Terrain

Item No.: 5-11

References:

1) Draft EIS, Section 5.3.4.4, pages 5-16 – 5-20.

Discussion:

The Draft EIS states in section 5.3.4.4, "Potential Effects and Impacts, Operational Phase" (pg 5-18) that potential effects to landscape and terrain include; surface and subsurface contamination from minor discharges, leakage and drainage of fuel, tailings slurry, wastewater, and ARD and metals from ore and wasterock stockpiles, building and facility pads, solid waste management areas and access and service roads (pg 5-18). No quantification of contaminants released through discharges, leakage and drainage was provided in the Draft EIS, and no quantified assessment was completed of subsequent accumulation of contaminants in the surface and subsurface layers.

In the subsequent section 5.3.4.5 "Mitigation Measures", (pg 5-19) the Draft EIS states that no surface or subsurface contamination by ARD or metal leachates is expected, due to use of non acid generating rock for all site development.

Requests:

a) *Provide a systematic inventory of potential sources of releases of contaminants onto terrain through project discharges, leakage and drainage and proposed mitigation measures.*
b) *Characterize the potential for and magnitude of accumulation of contaminants in surface and subsurface layers in the project LSA and RSA, and identify clean-up and remedial measures.*
c) *Clarify whether potential effects are predicted for surface and subsurface contamination by ARD and metal leachates, with special consideration of ore and wasterock stockpiles, and summer months when minor permafrost degradation and groundwater flow is expected (pg 5-27).*

Item No.: 5-12

References:

1). Draft EIS. Section 5.3.4.4, page 5-18; Section 5.3.4.5, pages 5-18 – 5-20.
2). Supporting Document A – Project Description & Alternatives. Section 2.16.
3). Supporting Document I - Spyder Lake Area Terrain Analysis and Surficial Geology. Section 5.

Discussion:

Draft EIS Section 5.3.4.4 acknowledges that protection of the permafrost is an important issue in order to avoid activation of the permafrost layer and thawing of ground ice. The Draft EIS states that no effects on the permafrost are expected. Crushed rock pads will be used to protect the permafrost. Few details are given in the Draft EIS, although more comprehensive discussion is included in Supporting Document A. with pads being required for facility foundations (Section 2.3), all weather airstrip (Section 2.15), all weather roads (Section 2.16) and beach tank farm (2.17.4).

Supporting Document A (Section 2.16) states that the soil type and ground ice conditions will dictate the thickness of pad required to protect the permafrost. Section 2.16.1 (Main Road from Beach to Mill/Camp Site) indicates there are zones where large ice-wedge polygons are visible, suggesting that the material contains massive ice lenses. This contradicts the statement in Section 2.15, which states that as far as foundation conditions for the airstrip are concerned, there appears to be no complicating factors. These considerations again emphasize the need for site-specific geotechnical data to complete the designs, as per Item 3-3, pertaining to Section 3.1.4.1 above. This is also highlighted by the following paragraph from Supporting Document I (Section 5.0):

"The marine lowlands that are widespread at the site are the most sensitive to disturbance by site development. The well developed surficial organic layer, high ground ice contents and permafrost features such as ice wedges make this terrain unit particularly sensitive to disturbance. Where the site development such as roads and/or an airstrip encroaches on this unit, thicker than normal fills may be required to reduce the risk of thaw and construction should be restricted to the winter (frozen tundra) season."

Supporting Document A (Section 2.16) indicates that basic thermal modeling suggests a 1.5 m pad thickness and wherever possible roads will be constructed in winter. Section 2.3 (Mill Crusher and Ore Stockpile), indicates that the mill and camp will be constructed partly on exposed bedrock and partly on permafrost tundra and the pad thickness will be at least 1.5 m on the tundra. Satisfactory thermal performance is critical to avoid differential settlement of these facilities. Since the facilities will be heat generating, additional insulation measures may be required to protect the permafrost.

Requests:

a) *Clarify that the following represent design and construction criteria for the rock pads:*
   - *The pad thickness will be designed to maintain the unfrozen zone within the pad.*
   - *Fill will only be placed on frozen ground.*

b) *Section 5.3.4.5 of the Draft EIS indicates that thermal modeling prior to construction will be conducted to ensure that pad thickness and grain size of the building material will be optimal to protect the permafrost. Since the placement of large volumes of rock represents a critical component of the project, it is considered appropriate to review the pad design at this review stage:*
   - *Provide the thermal analyses carried out to date, together with assumptions of climatic conditions and soil/rock properties.*
   - *Provide details on their proposed method for protecting the permafrost in the vicinity of heated facilities.*

Item No.: 5-13

References:

1) Draft EIS. Section 5.3.4.5, pages 5-18 – 5-20.

Discussion:

Section 5.3.4.5 indicates that the air within the underground mine will not be heated to ensure minimal effects on permafrost integrity.

Requests:

a) *Indicate whether air temperatures will be maintained below 0º C in the decline ramp during the summer months. How will this be achieved?*
b) *Clarify whether any ice-filled fractures exist in the bedrock, particularly in the decline ramp. Has the possibility of tunnel roof/wall instability due to thawing of frozen, fractured, ice-rich bedrock been considered? What type of tunnel support measures would be proposed to mitigate such a scenario?*

Item No.: 5-14

References:

1) Draft EIS. Section 5.3.4.5, pages 5-18 – 5-20.

Discussion:

Part of the 5.6 m high tailings impoundment dam and the foundation soils will be frozen using thermosyphons. These will extend approximately 15 m below existing grade, and will be based in the bedrock. This will be an important component of the project both in terms of capital cost, schedule and environmental protection. Accordingly, it is appropriate to review the thermosyphon design to confirm the feasibility of this method and to confirm that freezing can be achieved within the timeframe required for the start-up of tailings deposition.

The possibility of seepage through fractured bedrock above the permafrost needs to be considered.

Requests:

a) *Provide the following report for inclusion in the supporting documents for the EIS:*
SRK Consulting, 2002. Hope Bay Doris North Project – Tail Lake Dam Site – Geotechnical Investigation and Conceptual Design Report, December 2002.
b) *Provide clarification on the depth to permafrost at the dam site. Is the rock fractured and is there a possibility of seepage through fractured rock above the permafrost surface?*
c) *Provide the analyses for the preliminary design of the dam and thermosyphon system.*
d) *Has the proponent considered alternative dam designs that would provide a dam structure that is intrinsically stable without freezing? If not, why? If it was assessed, provide discussion.*

Item Number: 5-15

References:

1) Draft EIS. Section 5.3.4.5, 5-18 – 5-19

Discussion:

Subaqueous disposal is an appropriate mitigation concept for minimizing toxic release of metals from the oxidation of sulphide-containing tailings. However, temporary or intermittent exposure of tailings to the

atmosphere during deposition and storage may have long-term effects on the geochemical stability of the tailings. The post-closure water level is proposed to be only 1 m, which is not necessarily sufficient to prevent re-suspension of tailings under all wind conditions. Similarly, seasonal and annual variations may affect the post-closure water depth.

Requests:

a) *Design of the tailings discharge system to Tail Lake should place tailings directly under the water surface and not rely on tailings beaches. Justification for the 1 m water cover should be presented in either the EIS or Tailings Management Plan.*

5.3.5 Hydrology and Water Quality

Item No.: 5-16

References:

1) Draft EIS. Section 5.3.5.2, 5-21 – 5-25.
2) Supporting Document D – Meteorology and Hydrology Baseline, Doris North Project, Nunavut.
3) Canadian Council of Ministers of the Environment (CCME). 1999. Environmental Quality Guidelines. CCME, Winnipeg, MB.

Discussion:

Section 5.3.5.2 indicates that the maximum discharge rate from Tail Lake would be 0.056 m^3/s in June and July. Supporting Document D indicates that outflows from Doris Lake have consistently dropped to less than 0.5 m^3/s in the later portion of July. There is no indication of the origin of the Doris Lake outflow discharges that were used in the water quality model.

Requests:

a) *Will MHBL monitor outflows from Doris Lake to determine dilution factors?*
b) *Is a minimum dilution factor proposed to ensure that water quality in Doris Lake outflow meets the Canadian Council of Ministers of the Environment (1999) water quality guidelines (i.e., low discharges for Doris Lake outflow)? What factor is proposed?*

Item No.: 5-17

References:

1) Draft EIS. Section 5.3.5.2, 5-21 – 5-25.
2) Supporting Document D – Meteorology and Hydrology Baseline, Doris North Project, Nunavut.
3) Government of Canada. 2002. Metal Mine Effluent Regulations. Fisheries Act Report SOR 2002-22.

Discussion:

Considering the limited site specific meteorologic and hydrologic data, the numerous adjustments in the compiled raw data and the various correlations required to develop estimates of average, wet and dry year conditions, as well as the potential natural variability in hydrologic conditions, a water balance analysis that

considers this variability (sensitivities) and the related impact on Tail Lake effluent water quality would be useful.

Requests:

a) *Provide assumptions and basis for a worst case scenario illustration to document the potential range of critical water quality parameters in the effluent / or what maximum period of storage may be required before decanting will meet MMER discharge limits.*
b) *Related to this, what are the minimum and maximum time frames expected for removal of the Tail Lake dam after decommissioning? Provide supporting assumptions and documentation.*
c) *In view of the indicated potential to use Tail Lake to hold additional tailings, what is the maximum potential volume that would be proposed? Would a 1 m water cap still be proposed, after decommissioning and removal of the dam?*

Item No.: 5-18

References:

1) Draft EIS. Section 5.3.5.2; Figure 5.3.1; Tables 5.3.11, 5.3.12.

Discussion:

On Figure 5.3.1 – Simplified Water balance for the Tail Lake Tailings Containment Area, the annual precipitation is shown as 139 mm. This does not include "under-catch" (i.e., sub-surface flows that could contribute to the tailings impoundment water balance). Was under-catch considered in the water balance?

Regarding Table 5.3.11 - SRK Water Balance for Tail Lake, the original SRK report was not available for review. Therefore, the assumptions and detailed calculations are not clear. For example, runoff is shown for all 12 months of the year and the basis of calculating "New Tailings Lake Water Volume" numbers are not clear. This also applies to Table 5.3.12 - Predictive Water Quality Model. A series of footnotes explaining assumptions and calculations would have been helpful.

Requests:

a) *Clarify whether precipitation values for the water balance consider "undercatch".*
b) *Summarize the assumptions applied in Table 5.3.11 and the basis of the calculations (e.g. by numbering rows and showing how subsequent rows are calculated. An area-capacity curve and a tracking of the lake level would also be helpful.*
c) *On Table 5.3.12, provide footnotes explaining assumptions and calculations.*

Item No.: 5-19

References:

1) Draft EIS. Section 5.3.5.3, page 5-30; Table 5.3.11 - SRK Water Balance for Tail Lake Tailings Containment Area

Discussion:

Estimation of seepage losses is given as zero.

Requests:

a) *Discuss the monitoring for seepage losses*

Item No.: 5-20

References:

1) Draft EIS. Section 5.3.5.3, page 5-31; Figure 5.3.5 - Total as Concentration in Tail Lake over Mine Life

Discussion:

The graph shows a steadily increasing concentration of arsenic over the life of the mine.

Requests:

a) *Discuss plans to ensure that the controlled release of water from Tail Lake to the receiving environment during the annual spring freshet does not raise downstream arsenic levels above the applicable guidelines if the life of the mine is extended*
b) *Extend the projection for concentration beyond the closure of the mine to indicate whether concentrations will increase, decrease or stabilize over the long term*
c) *Discuss the long term stability of sub-aqueous containment for arsenic, referencing stability under the anticipated ph and water level conditions*

Item No.: 5-21

References:

1) Draft EIS. Section 5.3.5.3, page 5-31; Figure 5.3.7 - Total Cyanide Concentration in Tail Lake over Mine Life
2) Government of Canada. 2002. Metal Mine Effluent Regulations. Fisheries Act Report SOR 2002-22.

Discussion:

The graph shows a steadily increasing concentration of cyanide over the life of the mine.

Requests:

a) *Discuss plans to ensure that the Metal Mining Effluent Regulations for Total CN is not exceeded, if the work at the mine is expanded.*
b) *Discuss what downstream monitoring will be undertaken*
c) *Extend the projection for concentration beyond the closure of the mine to indicate whether concentrations will increase, decrease or stabilize over the long term*
d) *Discuss the long term stability of sub-aqueous containment for cyanide, referencing stability under the anticipated pH and water level conditions*

Item No.: 5-22

References:

1) Draft EIS. Section 5.3.5.3, page 5-31; Figure 5.3.8 - Total Hg Concentration in Tail Lake over Mine Life

Discussion:

The graph shows a steadily increasing concentration of mercury over the life of the mine.

Requests:

a) *Explain the dilution factors that have been used in obtaining these values.*
b) *Add a line indicating the regulatory criteria that the proponent is using.*
c) *Describe plans to ensure that the controlled release of water from Tail Lake to the receiving environment during the annual spring freshet does not raise downstream mercury levels above the applicable guidelines.*
d) *Document what downstream monitoring activities will be undertaken.*
e) *Describe mitigation measures to minimize the risk of bioaccumulation and bio-magnificaiton of mercury in fish and wildlife and awareness programs for local residents, if needed, about precautions regarding consumption of water and fish from areas with elevated mercury levels.*
f) *Discuss the long-term stability of sub-aqueous containment for mercury, referencing stability under the anticipated ph and water level conditions.*
g) *Extend the projection for concentration beyond the closure of the mine to indicate whether concentrations will increase, decrease or stabilize over the long term.*

Item No.: 5-23

References:

1) Draft EIS. Executive Summary, Section 3.1.6, Section 5.3.2.4, Section 5.3.5.3 (5-27 – 5-28); Table 5.3.10.

Discussion:

In the Executive Summary and section 3.1.6 of the Draft EIS, regional water bodies are described as oligotrophic (nutrient poor) or mesotrophic (medium nutrient availability) with respect to relative nutrient presence. Ammonia is present as a product of the proposed cyanide detoxification process, nitrates and nitrites residue are predicted as a result of blasting, and an increase in local nitrogen oxides concentrations in air is predicted from construction and operational phase blasting and vehicle and aircraft use. The Draft EIS states that the use of "best practices" will mitigate the potential effects of nitrogen compounds on receiving water quality.

Requests:

a) *Provide a description of ammonia, nitrates and nitrites, and nitrogen oxide loading to the nutrient balance in the lakes and how predicted increases in nutrients are expected to impact receiving stream flora and fauna*
b) *Describe remedial procedures to mitigate the impacts of nutrient fate and loading in receiving water bodies*

Item No.: 5-24

References:

1) Draft EIS. Section 5.3.5.3, page 5-27.
2) Supporting Document G – Integrated ARD Characterization Report, Appendix A

Discussion:

The statement that "the time to onset of ARD generation under non-permafrost conditions is in excess of 50 years due to the high contained carbonate content", was based on a laboratory artifact of the humidity cells. The humidity cell samples exhibited leachate pH~9.0 and low sulphate release <10 mg/kg from sulphide oxidation despite containing >1 %S in the solid phase. Thus, the primary control on the depletion of neutralization potential in these cells was the amount of deionized water relative to rock mass rather than the neutralization of acid produced by sulphide oxidation.

Requests:

a) *A critical review of the humidity cell interpretations should be undertaken to ensure that the proponent does not establish inappropriate segregation criteria based on the results of the humidity cell tests. A defensible segregation criteria should be stated and used to estimate a) the material volumes that will need to be re-handled underground and b) the available storage space underground recognizing that ramp access may be necessary to access future reserve areas.*

Item No.: 5-25

References:

1) Draft EIS. Section 5.3.5.3, page 5-27.
2) Supporting Document G – Integrated ARD Characterization Report

Discussion:

The Draft EIS states that ARD releases and metal leaching are not expected from ramp development and quarry sites. Although this statement may be true it cannot be easily verified with the information regarding sample location with respect to geology and proposed mine workings that is provided in the Draft EIS and Supporting Documents.

Requests:

a) *Provide additional information on geology and mine development as per requests in items pertaining to Draft EIS Section 3.1.4.*

Item No.: 5-26

References:

1) Draft EIS. Section 5.3.5.3, page 5-28.

Discussion:

MHLB plans to store PAG material on a designated section of the ore storage pad until it can be returned underground as internal rock fill. The concept for handling material from the underground mine appears to be sound, however, there is no indication on the available underground storage capacity and expected volumes of waste rock that are expected to be returned underground to allow for an evaluation of the feasibility of this management option.

Requests:

a) *Provide a schedule of waste storage capacity over the mine life and calculate the volume of material that will be required to be replaced underground mine workings.*

Item No.: 5-27

References:

1) Draft EIS. Section 5.3.5.3, page 5-30, Section 9; Table 5.3.10.

Discussion:

As stated in Draft EIS, MHBL plans to use Caro's Acid (a mix of hydrogen peroxide and sulphuric acid) to oxidize free and weakly-bound cyanide complexes to the much less toxic cyanate form and to precipitate metals as hydroxides. Support for this procedure is based on case studies in Nevada (Newmont, Barrick, Sante Fe Gold) and Tasmania, Australia (Bateman Minerals, 2003). The predicted concentration for Total CN in the combined tailing in Table 5.3.10 "were derived from laboratory testing on ore samples taken from the Doris North deposit and from typical effluent values reported in the literature for BATEA cyanide detoxification". Although literature values can be used in support of the technology, predicted values should be primarily based on pilot-scale test work. There is mention of "laboratory testing" but the details are not provided. Specifically, there is no indication as to whether such testing was "benc h-scale" or done on a more representative "pilot-plant scale".

Requests:

a) *Full review of the adopted cyanide detox system cannot be completed until more rigorous data are provided. Specifically, details of the testing methodology should be provided as part of the Outstanding Issues outlined in Section 9.0, which state "MHBL is conducting additional metallurgical testing to refine the ore processing flowsheet and to set design criteria and specifications. Additional testing of the Caro's acid cyanide detoxification process is being conducted as part of this ongoing work. The information from this test work will be incorporated into the final EIS for the Doris North Project". In addition to the results of this work, the methods of the test work should be provided in order to support their predicted concentrations of Total CN (and other contaminants, such as arsenic and mercury) in the final mill stream.*

Item No.: 5-28

References:

1) Draft EIS. Section 5.3.5.3, page 5-30.

Discussion:
Some references provided in the text are not included in the bibliography.

Requests:

a) Add Bateman Minerals (2003) on Page 5-30 must be referenced in the bibliography and Ontario Ministry of the Environment (June 1992) to the bibliography. A website address for the latter reference, if available, should also be provided.

Item No.: 5-29

References:

1) Draft EIS. Section 5.3.5.3, page 5-34.

Discussion:
ABA results on Doris Lake tailings material is presented on page 5-34. This information was not presented in the geochemistry section of the Draft EIS or Supporting Document G and the source of this information is not referenced.

Requests:

1) Provide details on the metallurgical flow sheet used to derive the source of the ore used to make the tailings sample.

Item No.: 5-30

References:

1) Draft EIS. Section 5.3.5.3, Figure 5.1.1, Figure 5.3.3.

Discussion:
Associated with cyanide detoxification are environmental and regulatory issues surrounding ammonia. Ammonia is a common environmental concern at gold mines which employ cyanidation for gold recovery. The cyanide destruction process results in the formation of ammonia, cyanate (CNO) and thiocyanate (SCN). Cyanate and thiocyanate will eventually hydrolyze to ammonia. Accordingly, gold-mill effluents typically have elevated levels of ammonia. Excess blasting reagents (e.g., ANFO) can also contribute to high ammonia concentrations in the final tailing.

Within the body of the Draft EIS, the environmental significance of ammonia is presented in figures, although there is little accompanying discussion. For example, reference to ammonia appears in the following:

- In Figure 5.1.1, ammonia is presented as a potential toxicity agent.
- In Figure 5.3.3, ammonia ("*nitrogen compounds*") is mentioned as part of increased contaminant loadings from the periodic release of effluent from Tail Lake, as well as from seepage from the tailings containment area.

Requests:

a) *Provide predictions of ammonia concentrations in the final tailings stream taking into account cyanide degradation and residual blasting agents. Information should be included in Table 5.3.10.*
b) *Within Tail Lake, cyanate and thiocyanate will degrade to ammonia. Accordingly, predicted levels for cyanate and thiocyanate in the combined mill stream should be provided.*
c) *Include ammonia in the water quality predictions for Tail Lake and compare to regulatory guidelines. Predictions should include the potential ammonia levels that may result from the conversion of cyanate and thiocyanate to ammonia. Calculations could consider complete conversion to ammonia in order to provide an upper end member of ammonia levels. This is not an unrealistic assumption given that the residence time of effluents discharged to Tail Lake will be long (years). Assuming pH in Tail Lake to be neutral to slightly acidic, the fraction of the total ammonia which is hosted as unionized NH_3, can be assumed to be negligible, and accordingly, ammonia losses to the atmosphere via volatilization can be assumed to be insignificant. Biological assimilation can also be assumed to be negligible for the sake of conservatism.*

Item No.: 5-31

References:

1) Draft EIS. Section 5.3.5.3, pages 5-26 – 5-42
2) NIRB Guidelines
3) Government of Canada. 2002. Metal Mine Effluent Regulations. Fisheries Act Report SOR 2002-22.

Discussion:

The Metal Mining Effluent Regulations require effluent and water quality monitoring studies for mine effluent, consisting of effluent characterization, sublethal toxicity testing and water quality monitoring. The Metal Mining Effluent Regulations outline methods and timelines for these monitoring studies.

Monitoring of mine effluent and water quality testing of releases to Doris Lake outflow were not discussed in the Draft EIS.

Requests:

a) *Discuss in regards to requirements outlined by the Metal Mining Effluent Regulations, proposed plans for effluent and water quality monitoring studies.*

Item No.: 5-32

References:

1) Draft EIS. Section 5.3.5.3, pages 5-26-5-42.

Discussion:

There is no discussion of expected sewage effluent quality or prediction of effects to water quality in Tail Lake

and the downstream environment. There are statements indicating effects would be small, but no numbers were provided to back up these predictions. For example, it is indicated that sewage will result in "minor increases in nutrient loadings in any water released from the tailings impoundment on an annual basis." On what basis is this conclusion reached? If the proponent has information on expected nutrient loads for the sewage effluent, they should be presented in the EIS.

There is also no discussion provided for other key substances that will be discharged in the sewage effluent. Assessment of nitrate, ammonia, biochemical oxygen demand, and fecal coliform bacteria should be included.

Requests:

a) *Describe the sewage treatment system and provide data for projected sewage effluent quality and assessment of the effects of the effluent on water quality in Tail Lake and the downstream environment.*
b) *Provide QA/QC for in situ measurements and/or evaluation of data quality*
c) *Provide additional discussion of dissolved oxygen depletion and nutrient status*
d) *Ensure compliance with GN regulations and guidelines concerning waste discharges.*

Item No.: 5-33

References:

1) Draft EIS. Section 5.3.5.3; Table 5.3.10.
2) Supporting Document F – Aquatic Baseline Studies Doris Hinge Project 1995. Page 32.

Discussion:

"The predicted water quality of the combined mill tailings is presented in Table 5.3.10. These values were derived from laboratory testing on ore samples taken from the Doris North deposit and from typical effluent values reported in the literature for BATEA cyanide detoxification plants (Ontario Ministry of the Environment, June 1992)."

It appears that they looked at the components of the ore and then tried to find literature values for similar ores from mines that use similar treatment technologies, however, this is not entirely clear. Furthermore, concentrations of some of the most relevant trace elements included in the assessment (i.e. As, Cu, Hg, Ni, and Pb, Table 5.3.10) were simply based on detection limit values that were very high. A very brief comparison of these concentrations to those for effluent from another gold mine in Manitoba, suggests that the concentrations of these substances used in the model may be somewhat elevated. In this regard the model may be representative of a "worst case scenario" for these elements. However, there may need to be a lot of room for error, given the "apparent" simplicity of the model; there is really no description of the model provided within the Draft EIS or the supporting documents.

One component of the model that is lacking is any assessment of sewage inputs (ammonia, nitrogen, phosphorus, biochemical oxygen demand, total organic carbon etc.) as well as an assessment of inputs of ammonia and nitrate from blasting. In various places it indicates that these impacts will be mitigated, yet very little description of how this will occur is provided. Regardless of mitigating the effects of sewage and nitrates

from blasting to Doris Lake, these substances will definitely be increased in Tail Lake. This could increase phytoplankton productivity of Tail Lake. As many of these substances are water soluble, and/or readily taken up by phytoplankton, any increase in their concentration in Tail Lake may be transported downstream with decant water from Tail Lake (either dissolved in the water or within phytoplankton cells), potentially enriching the downstream environment. Furthermore, within Tail Lake itself, this increase in nutrient levels and total organic carbon may result in greater incidences of winter anoxia in water adjacent to the sediments (as already reported, Figure 3.3, page 32, Supporting Document F). This could result in increasing the mobility of metals from the contaminated sediments in Tail Lake as the solubility of many metals increases under anoxic conditions.

The text of the document indicates that the potential for increased activity at the Doris North Project is high based on exploration activities. As Tail Lake is capable of retaining enough tailings for at least a five year period, it is recommended that the modeling be extended for a longer period of time, so that some estimate of potential tailings discharge concentrations can be determined.

Requests:

a.) *Provide a more detailed description of the methods used to predict the water quality of the combined mill tailings as provided in the model.*

b.) *Provide a more detailed description of the model used to calculate trace element concentrations in Tail Lake.*

c.) *Run the model for a longer period of time to predict effluent discharge concentrations once Tail Lake has reached maximum capacity.*

5.3.6 Archaeology

Item No.: 5-34

References:

1) Draft EIS. Section 5.3.6.2, page 5-42.
2) Supporting Document H – Archaeological Investigations 1995 – 2000 Compiled Report. page 17.

Discussion:

The rationale for selecting the Hope Bay Belt as the Regional Study Area for archaeological sites is not clear. Supporting Document H states that the earliest archaeological investigations in the region east of Bathurst Inlet occurred in 1995. As such there is very little archaeological information regarding the selected RSA and effects assessment.

Requests:

a) *Provide a map indicating the boundaries of the Hope Bay Belt/RSA.*

b) *Clarify the relevance of the selected RSA to the archaeological assessment for this project.*

Item No.: 5-35

References:

1) Draft EIS. Section 5.3.6.3, page 5-42

Discussion:

The Draft EIS states that there are no known archaeological sites within the footprint and as such there is not reference to "confirmatory mitigative measures" to date. Also, as noted in Item 3-25 concerning Draft EIS section 3.1.8, the impact assessment does not appear to have been completed for the current project footprint. If future exploration is to be included in the project description, the means of identifying potential interactions with archaeological resources should be clarified. Any potential changes in footprint associated with ongoing operations and ultimate decommissioning should also be considered.

Requests:

a) *Provide clarification of potential project interactions, based on the current project description and any related current archaeological studies, or provide specific commitment to necessary studies to confirm project interactions (as related to both footprint effects and/or potential future exploration activities) and define mitigation measures prior to commencement of project-related disturbances.*

Item No.: 5-36

References:

1) Draft EIS, Section 5.3.6.4, page 6-42

Discussion:

This section does not describe potential project effects or impacts on archaeological resources. It needs to be updated based on clarification of section 5.3.6.3 as requested in Item 5-35. In addition to direct impacts of project related ground disturbance, indirect disturbance due to access and proximity development activities (i.e., within the buffer zone) over the life of the mine should be considered.

Requests:

a) *Based on clarification of section 5.3.6.3 as requested above, describe potential project effects and related impacts.*

Item No.: 5-37

References:

1) Draft EIS. Section 5.3.6.5, p 5-43

Discussion:

Archaeological inventory and assessment is not a mitigative measure. Archaeological inventory and individual site evaluation are required for formulation of impact assessment statements (as noted in Item 5-35 above). Based on clarification of potential impacts in sections 5.3.6.3 and 5.3.6.4, this section needs to clarify

commitments to mitigation in the form of recording, excavation, protective measures etc. of any sites found in the course of completing the archaeological impact assessment.

Requests:

a) Confirm whether or not there are archaeological sites within the project footprint.
b) Provide explicit commitments to mitigation of impacts to sites, should they be found within the footprint.
c) Ensure compliance with GN regulations related to cultural and archaeological sites.

Item No.: 5-38

References:

1) Draft EIS. Section 5.3.6.6, page 5-43

Discussion:

There will be no residual impact to archaeological sites only if there are no sites within the area of the footprint. A lack of sites has not been demonstrated.

Requests:

a) Update the conclusions of this section based on requested clarification in sections 5.3.6.3, 5.3.6.4 and 5.3.6.5.

5.3.7 Aquatic Organisms and Habitat

Item No.: 5-39

References:

1) Draft EIS. Section 5.3.7, pages 5-43 – 5-56
2) NIRB Guidelines
3) Government of Canada. 2002. Metal Mine Effluent Regulations. Fisheries Act Report SOR 2002-22.

Discussion:

The NIRB Guidelines require the proponent to review potential impacts on aquatic organisms and habitat including bioaccumulation and biomagnification of toxins. The Draft EIS states that bioaccumulation and biomagnification of contaminants are not expected as treated effluent will meet Metal Mining Effluent Regulations. Although the Metal Mining Effluent Regulations set limits for concentrations of contaminants in effluent they do not ensure that contaminants will not accumulate in sediments or bioaccumulate in fish tissues. Contaminants can accumulate in fish tissue at extremely small concentrations. Methyl mercury is well known for its potential to biomagnify in predatory fish and marine mammals.

The Metal Mining Effluent Regulations state that the owner or operator of a mine shall conduct environmental effects monitoring studies of the potential effects of effluent on the fish population, on fish tissue and on the benthic invertebrate community in accordance with the requirements and within the periods set out in Schedule 5. They also outline methods and timing of acute lethality testing. Both monitoring and acute lethality testing

according to the Metal Mining Effluent Regulations were not mentioned in the Draft EIS.

Requests:

a) *Provide an assessment of bioaccumulation and biomagnification of contaminants in freshwater fish tissues, based on quantified contaminants concentrations in effluent released to Doris Lake outflow.*
b) *Discuss proposed plans for environmental effects monitoring studies and acute lethality testing of mine effluent in regards to requirements outlined by the Metal Mining Effluent Regulations.*

Item No.: 5-40

References:

1) Draft EIS. Section 5.3.7.2.
2) Supporting Document F – Aquatic Baseline Studies Doris Hinge Project 1995 – 2000. Section 7.3, pages 262-265.
3) Government of Canada. 2002. Metal Mine Effluent Regulations. Fisheries Act Report SOR 2002-22.

Discussion:

"Bioaccumulation and biomagnification of toxins in freshwater aquatic organisms are not anticipated, since only treated effluent that meets the federal Metal Mine Effluent Regulations will be released."

This is not an accurate or biologically justifiable statement. Bioaccumulation and biomagnification (Hg) may still be possible at concentrations at MMER guideline levels after long-term exposure (note that mercury, which may biomagnify, is not included in the MMER guidelines). Metals at concentrations higher than background may be released from Tail Lake for many years. Not to mention the potential for other forms of aquatic life (phytoplankton, zooplankton, and fish, once the lake can support them again) to be transported downstream in flows from Tail Lake during decant, and for many years after decommissioning.

With respect to text in Supporting Document F, there seems to be some confusion with respect to bioaccumulation and bioaccumulation in food webs, otherwise referred to as biomagnification. All elements bioaccumulate to some extent in individual organisms. While only organic forms, such as methyl mercury tend to biomagnify within food webs, other elements will bioaccumulate within individual organisms. As such, the following statements are not entirely accurate:

> "Aluminum can be acutely toxic at high exposure levels, but it does not bioaccumulate in aquatic organisms" (p. 262).
>
> "Copper is not considered to be a cumulative systematic poison as most of it is excreted from the body (Falk et al. 1973)." The statement is likely intended to read "systemic" instead of "systematic", and, while copper is largely excreted, it will still build up over time (bioaccumulate) upon continual exposure via sediments etc.
>
> "Lead does not appear to bioaccumulate." While lead does not bioaccumulate/biomagnify in

food webs, it will bioaccumulate in individual organisms.

Requests:

a) *Modify EIS statement to more explicitly reflect the potential for bioaccumulation and biomagnification and the implications in terms of environmental protection and management.*

Item No. 5-41

References:

1) Draft EIS. Section 5.3.7.2 & 5.3.7.3, pages 5-44 – 5-79
2) Government of Canada. 2002. Metal Mine Effluent Regulations. Fisheries Act Report SOR 2002-22.

Discussion:

Release of water from Tail Lake during and after the project will introduce metals and metalloids to the downstream environment. While water quality guidelines may not be exceeded, there is the potential for accumulation of metals in aquatic biota and subsequent increased risk of sub-lethal effects. Sediments typically act as a sink for metals and metals will accumulate in the sediments of Tail Lake. It is likely that the loads of metals introduced to Doris Lake may also accumulate in those lake sediments; in turn, metals may accumulate through trophic transfer from the sediments. Restoring access of aquatic biota to Tail Lake will also contribute to their exposure to metals in the water and sediments.

The Metal Mining Environmental Effects Monitoring (EEM) requirements of the Metal Mine Effluent Regulations (MMER) were developed specifically in recognition of the fact effluent discharge limits may not be adequate to protect aquatic life form the hazards of metal exposure. Therefore, there is reason to believe that project may have long-term chronic effects to aquatic life. This issue would be evaluated through the design and conduct of an EEM, as required by the Fisheries Act.

Requests:

a) *Revise text to acknowledge the potential effects of decommissioning on aquatic biota due to chronic exposure to metals.*

Item No.: 5-42

References:

1) Draft EIS. Section 5.3.7.2, pages 5-44 to 5-51; Section 5.3.7.3, pages 5-52 to 5-76.
2) Supporting Document N – Doris North Project No Net Loss Plan.

Discussion:

The NIRB guidelines for the Project require the proponent to "address potential impacts on aquatic organisms and their habitat." Specifically, the assessments are to focus on the productive capacity of aquatic ecosystems; water quality; habitat loss, alteration or alienation; rare and/or sensitive aquatic organisms and their habitats; mortality; noise and blasting; bio-accumulation and bio-magnification of toxins.

Habitat in Tail Lake was assessed in the nearshore environment only. Additionally, habitat availability/suitability was only qualitatively assessed; whereas, mapping of habitat-type polygons providing quantification of fish habitat available is preferred.

In Supporting Document N, Section 4.0, compensation options for the loss of habitat in Tail Lake are discussed. However, habitat quantification of Roberts Lake is based upon a number of assumptions, as detailed habitat data are not available.

Requests:

a) *Provide additional detailed habitat information for Tail Lake and Roberts Lake to reduce the number of assumptions required for the 'No Net Loss Plan'.*

Item No.: 5-43

References:

1) Draft EIS. Section 5.3.7.3.

Discussion:

It is not clear if the causeway design has considered tidal, wave, ice shove and shoreline sediment transport conditions in the design and related impacts.

Requests:

a) *Provide a discussion of the effects of the causeway on physical dynamics and shoreline processes as a basis for identifying any potential related environmental effects.*

Item No.: 5-44

References:

1) Draft EIS. Section 5.3.7.3, pages 5-53 and 5-55.

Discussion:

There is not much data provided on the wildlife and birds using the marine environment given that some of the project impacts will be occurring there (Roberts Bay). There was only one year of marine mammal surveys and waterfowl, shorebird and seaduck use of the bay is not presented. On page 5-53 the potential for impacts to ringed seals and other marine mammals is noted but there is no mention of birds. The only reference to birds in the marine environment is regarding noise disturbance from rock dumping (page 5-55).

Requests:

a) *Provide further data on wildlife and bird use of the marine environment and discuss potential impacts of project-related activities (sea lift, barge-off loading, bulk fuel storage etc.).*

5.3.8 Vegetation

Item No.: 5-45

References:

1) Draft EIS. Section 5.3.8.4, pages 5-56 - 58
2) Walker, D.A. and K.R. Everett. 1987. Road dust and its environmental impact on Alaskan taiga and tundra. Arctic and Alpine Research 19(4): 479–489.

Discussion:

Section 5.3.8.4 states that impacts to plant phenology are not expected. Dust has been observed to cause increased active layer depths near roads resulting in thermokarst and decreased snow albedo (Walker and Everett 1987). These effects can result in earlier snowmelt and early flowering in some plant species.

During both construction and operations phases, dust is identified as potentially impacting vegetation health and productivity. Section 5.3.8.4 states that, "water will be applied to roads in dry non-winter seasons if dust becomes a problem". No monitoring program is identified to measure dust accumulation adjacent to roads and plant infrastructure such as quarries to identify when dust becomes problematic to vegetation.

Requests:

a) Discuss potential impacts to plant phenology considering current literature on impacts of dust on tundra.
b) Identify a monitoring program for all potential areas of dust emissions onto vegetation.
c) Ensure compliance with GN guidelines for dust suppression.

Item No.: 5-46

References:

1) Draft EIS. Section 5.3.8, pages 5-56 – 5-60
2) NIRB Guidelines

Discussion:

The NIRB Guidelines for the project require that contaminant uptake be addressed in the EIS. It was concluded that contaminant uptake in vegetation was unlikely as exposure pathways through air and water were limited (pg 5-57). As emissions of common air contaminants are only partially quantified, the potential impacts of gaseous emission on vegetation receptors are not adequately addressed. Terrestrial vegetation has the potential to take up contaminants via their root systems. Vascular plants, mosses and particularly lichen, can absorb gaseous emissions directly from the air. These pathways of exposure were not addressed in the Draft EIS.

Requests:

a) Provide an assessment of potential bioaccumulation of common air contaminants (including PM composites) in vegetation receptors, based on quantification of air contaminants requested in Item No. 5-3
b) Provide an assessment of potential bioaccumulation of contaminants in vegetation through root system uptake.

5.3.9 Terrestrial Wildlife and Habitat

Item No.: 5-47

References:

1) Draft EIS, Section 5.3.9, pg. 5–60 – 5-75
2) NIRB Guidelines

Discussion:

The NIRB Guidelines require the proponent to review potential impacts on wildlife including bioaccumulation and biomagnification of toxins. The Draft EIS states that due to limited sources, pathways of exposure and exposure time, no bioaccumulation of contaminants is expected in wildlife (pg 5-63). The Draft EIS did not address the consumption of vegetation, soils, fish and mammals as potential exposure pathways for wildlife. No quantified estimate of bioaccumulation or biomagnification of contaminants in wildlife tissues has been presented in the Draft EIS.

Tail Lake was identified as a potential source of contaminants to wildlife through drinking water (pg 5-64). Potential health effects to caribou, musk oxen, and birds in relation to use of Tail Lake, were identified in the Draft EIS. An assessment of longer term effects related to the residual contamination in Tail Lake after project decommissioning was not discussed in the Draft EIS.

The Draft EIS states in section 5.3.9.6, "Residual Impacts and Rating", that impacts from bioaccumulation and biomagnification cannot be predicted and are rated as unknown (pg 5-76).

Requests:

a) *Provide a characterization of pathways and risks associated with the potential for bioaccumulation and biomagnification of contaminants in wildlife tissues (large mammals, small mammals and birds), in consideration of all pathways of exposure, and the potential for contaminants such as mercury to biomagnify up the food chain.*
b) *Discuss residual impacts to wildlife related to concentrations of contaminants in Tail Lake after project decommissioning.*
c) *discuss mitigation measures that would reduce wildlife interactions with Tail Lake.*

Item No.: 5-48

References:

1) Draft EIS. Section 5.3.9, section 5.3.3, page 5-14
2) Supporting Document A – Project Description and Alternatives, Doris North Project, Nunavut, page A-3.
3) Supporting Document E – Terrestrial Wildlife of Hope Bay, Nunavut (An integration of Data Collected from 1994 – 2001).

Discussion:

It is stated on this page that: "During the construction phase, the project site will be served by 5 to 7 flights per

week, so the local disturbance will be relatively small." Also, from Supporting Document A (page A-3): "Mine development and construction crews will be based at the existing Windy Exploration Camp during the summer of 2004, and transported by helicopter to the Doris North decline site…and to Roberts Bay." Will this amount of flight activity in the project area create disturbances to breeding raptors, migratory waterfowl, and caribou? What levels of flight activity are these groups able to tolerate?

Requests:

a) *Provide (and cite) detailed information on the disturbance effects of helicopter and fixed wing aircraft flights on breeding raptors, migratory waterfowl, and caribou, with special attention given to the levels and types of disturbance that these wildlife groups can tolerate. Indicate any mitigative measures that can be taken (e.g., helicopter flight paths, elevations) and include this information in the wildlife management plan.*

Item No.: 5-49

References:

1) Draft EIS. Section 5.3.3, page 5-14, Section 5.3.9.

Discussion:

During the construction phase "All personnel and visible wildlife will be cleared to a safe distance prior to blasting." What means will be used to move wildlife? How will this apply to nesting birds?

Requests:

a) *Expand the discussion of impacts to include this action. Include a description of mitigation measures in the wildlife management plan.*

Item No.: 5-50

References:

1) Draft EIS. Section 5.3.9, page 5-62
2) Supporting Document E - Terrestrial Wildlife of Hope Bay, Nunavut (An integration of Data Collected from 1994 – 2001).

Discussion:

It is stated that no wildlife migratory corridors have been identified in the LSA, and that the disruption of wildlife movements is not expected. This statement needs to be qualified for waterfowl and for caribou. The Victoria Island caribou herd do migrate through the RSA and could pass through the LSA. (figure in Appendix 4, Supporting Document E).

Requests:

a) *Provide a detailed account of migratory routes and migration periods for waterfowl in the area, with special attention given to the Roberts Bay area.*
b) *Provide information on the timing (i.e., seasons) and routes for sea lifts, helicopter and fixed winged aircraft flights, and relate these to migratory routes and migration periods for waterfowl in the area.*
c) *Clarify information on the migratory route of the Victoria Island caribou herd in the area.*
d) *Provide information on the timing (i.e., seasons) and routes for sea lifts, helicopter and fixed winged aircraft flights, and relate these to migratory routes of caribou in the area.*

Item No.: 5-51

References:

1) Draft EIS, Section 5.3.9.3, pages 5-64 and 5-65; Section 5.3.9.4, page 5-73.
2) Supporting Document E – Terrestrial Wildlife of Hope Bay, Nunavut (An integration of Data Collected from 1994 – 2001).

Discussion:

The impacts of the development of Tail Lake have not been well addressed for wildlife. For example, "… the use of Tail Lake as a source of drinking water for wildlife is not documented…". Does this mean that no surveys of wildlife use of the lake have been done, or that surveys have been done, but no wildlife were recorded using the lake as a water source? If the latter, detailed information on survey dates and results need to be provided. Similarly, "…use of Tail Lake by waterfowl is not documented…". Again, does this mean that waterfowl have not been found using the lake, or that no surveys of that area have been done?

The following statements are made on the pages noted above: "exposure to water from Tail Lake, could, therefore, cause health impacts to wildlife"; "while not an ideal source of drinking water, water quality in Tail Lake is not likely to result in any significant adverse health impact to wildlife"; "Tail Lake, will, however, be lost as aquatic habitat for use by terrestrial wildlife as a source of drinking water…"; "the use of Tail Lake for tailings disposal does not cause loss of habitat for waterfowl as the existing open water surface will remain available throughout the operation of the facilities"; and, finally, "exposure and contact of water from Tail Lake by waterfowl could cause health impacts." It is apparent from the preceding that the discussion on the impacts on wildlife of tailings disposal into Tail Lake needs considerable clarification and expansion (e.g., include methods for preventing wildlife access to Tail Lake and methods for monitoring wildlife health impacts).

As a final point, if the development of Tail Lake does indeed cause loss of habitat to waterfowl then its area (80.2 ha) should be included as part of the total area lost to the proposed project (28.3 ha as calculated at present).

Requests:

a) *Provide survey information on wildlife and waterfowl use of Tail Lake and the vicinity.*
b) *Clarify, in detail, the type and degree of impact to wildlife of tailings disposal into Tail Lake.*
c) *Provide information on how the heath impacts on wildlife will be assessed, and what methods will be used to*

prevent wildlife (including waterfowl) access to Tail Lake. Include this information in the wildlife management plan.

d) Revise the total area lost to the proposed development to include the area of Tail Lake.

Item No.: 5-52

References:

1) Draft EIS. Section 5.3.9.3, page 5-65.
2) Supporting Document A – Project Description & Alternatives, Doris North Project, Nunavut.

Discussion:

It is stated on this page that: "Interaction between project components that will remain in place following closure is limited to access to building pads, dam and berm structures, and Tail Lake. These will not cause impacts to wildlife." Supporting Document A (pp. A-26, A-27), however, states that the causeway, airstrip, and all-weather roads will remain in place after closure, and that no rehabilitation will be done on the winter road routes. The causeway, airstrip, and roads all provide increased human access to the area, which in turn, can potentially lead to wildlife disturbances, and indirect and direct mortality.

Requests:

a) Provide an assessment of the potential impact on wildlife of increased human access due to leaving the project causeway, airstrip, and all-weather roads in place after closure. Include a description of this action in the wildlife management plan.

Item No.: 5-53

References:

1) Draft EIS. Section 5.3.9.4, page 5-72.
2) Supporting Document C – Biophysical environment Baseline Report, Doris North Project, Nunavut.
3) Supporting Document E – Terrestrial Wildlife of Hope Bay, Nunavut (An integration of Data Collected from 1994 – 2001).

Discussion:

There are two known raptor nesting sites in the LSA that may be subject to disturbance from construction activities. Three species nested at these sites including peregrine falcons

Requests:

a) Address the impacts of potential disturbances to raptor species with special attention to the peregrine falcons.

Item No.: 5-54

References:

1) Draft EIS. Section 5.3.9.4, page 5-72.

2) Supporting Document E – Terrestrial Wildlife of Hope Bay, Nunavut (An integration of Data Collected from 1994 – 2001).

Discussion:

It is stated on page 5-72, "Given the short 24-months operating period, and the possibility to return to nest sites(s) following cessation of site activities, these (disturbance-related) impacts are rated as minor." Document E (e.g., pg. 59) states that nest site re-occupancy rates are high for peregrine falcons, possibly because nesting habitat in the area is saturated. What are the return rates at sites where disturbances have occurred? If it is low, what is the potential impact on the peregrine population if availability of alternative nesting habitat is limited?

Requests:

a) *Provide information on the effects of disturbances on peregrine falcon nest site philopatry, and use that information to assess the potential impact of disturbances on nesting peregrines in the project area.*

Item No.: 5-55

References:

1) Draft EIS. Section 5.3.9.4, page 5-72.

Discussion:

A decline in raptor nest numbers and success in last few years has been observed in the region. What is the potential significance of this information with respect to introduction of disturbance into area?

Requests:

a) *Consider the potential significance of the decline in raptor reproductive success in the area when determining the impacts of project activities on this group.*
b) *A 2003 raptor nest census of identified raptor nest sites in the RSA is required to further describe any trends in reproductive success.*

Item No.: 5-56

References:

1) Draft EIS. Section 5.3.9.4, page 5-72.

Discussion:

The potential effects of project-related activities on raptor foraging patterns and opportunities in the LSA have not been considered.

Requests:

a) *Provide information on the potential impacts of project-related disturbances on raptor foraging activities in the LSA.*

Item No.: 5-57

References:

1) Draft EIS. Section 5.3.9.4, pages 5-66 to 5-74
2) McLoughlin, P.D., H.D. Cluff and F. Messier. 2002. Denning ecology of barren-ground grizzly bears in the Central Arctic. J. Mammal. 83:188-198.
3) Supporting Document C – Biophysical Environment Baseline Report, Doris North Project, Nunavut.
4) Supporting Document E – Terrestrial Wildlife of Hope Bay, Nunavut (An integration of Data Collected from 1994 – 2001).

Discussion:

The wildlife VECs identified on page 5-2 were addressed to varying degrees by the baseline studies. Specific deficiencies noted in the baseline studies were:

a) The den survey methodology was acknowledged to be unsuccessful (Supporting Document E, p. 96); therefore, drawing conclusions about local area den abundance for wolves, foxes, grizzly bears and wolverines is misleading. There were no dens observed in the immediate area of the Doris North Project (Draft EIS, p. ix), but only a few were ever found anywhere in the larger study area. McLoughlin et al. (2002) note the difficulty in detecting dens from the air in habitats other than eskers in the same region.
b) No inventories/surveys were conducted specifically for furbearers, particularly wolverines, foxes, and wolves.
c) No inventories/surveys were conducted for arctic hare and arctic ground squirrels. This information is important based on the number of raptors and carnivores in the area.
d) Marine mammal surveys were conducted only in June of 1996.

These deficiencies in baseline information influence conclusions regarding project effects.

Requests:

a) Conduct winter track surveys in the LSA (to increase data base on furbearers in particular).
b) Conduct ground surveys in the summer in the LSA to locate dens of large and small mammals.
c) Identify and describe the wildlife value of the habitats in the LSA.

Item No.: 5-58

References:

1) Draft EIS. Section 5.3.9.4

Discussion:

A review of the literature on the impacts of mining development on wildlife and wildlife habitat is not available as part of, or in support of the Draft EIS. This is a notable omission given the frequent statements on presence/absence of effects as observed at other mine sites that are not cited nor described in any detail. As such, it is not possible to assess the validly of these assertions or to evaluate their applicability to the Doris North

project. Examples include: page 5-14 uncited reference to Alaska oil field studies that suggest wildlife are not disturbed by noise of human activities; page 5-69 uncited statement: that information from other northern sites support the assumption that potential health effects on musk oxen from air emissions are not likely to be significant; and page 5-73 uncited statement that: "The experience at other gold mining sites…in the Canadian north suggests that open water within gold mine tailings impoundment has not resulted in significant adverse health impacts to waterfowl or other birds." .

Requests:

a) Provide a literature review of the impacts of mining develop on wildlife and wildlife habitat.

b) Cite data sources where applicable and include these citations in the EIS Reference Section.

Item No.: 5-59

References:

1) Draft EIS. Section 5.3.8, page 5-56; Section 5.3.9.4; Table 5.3.17.

Discussion:

Habitat loss and alteration are not addressed very well for wildlife. There are no data presented that link wildlife and habitat in the LSA (NIRB guidelines require that the potential impacts for those wildlife that are dependent on specific habitat or species of vegetation are described – see Section 5.3.8, page 5-56).. The relevance, if any, of the loss of certain ecosystem units (as summarized in Table 5.3.17) to any species is not discussed.

Requests:

a) Provide information on the relationship between wildlife and habitats in the LSA and RSA and discuss these relationships in terms of the impacts of the proposed project.

5.4 Biodiversity

Item No.: 5-60

References:

1) Draft EIS. Section 5.4, page 5-76.
2) A Guide on Biodiversity and Environmental Assessment, Canadian Environmental Assessment Agency (CEAA) prepared jointly with the Biodiversity Convention Office, April, 1996. www.ceaa.gc.ca/0012/images/CEAA_19E.PDF

Discussion:

The Draft EIS does not discuss how the issue of 'Arctic biodiversity' is addressed either through participation in the Arctic Council or the working group within the council.

The authors state that "Biodiversity is not addressed as an individual environmental component in this assessment but rather it is considered as part of each key component of the biological environment including vegetation, wildlife and aquatic resources. An overall assessment of impacts on biodiversity is therefore derived

by inference from the assessment of impacts on components that make up biodiversity."

Without having a definition of 'biodiversity' provided by the proponent (i.e., what is their concept of biodiversity), it is difficult to assess the "impacts on components that make up biodiversity".

Requests:

a) *Provide an acceptable and recognized definition of 'biodiversity'.*
b) *As species identifications are available, an assessment of diversity for aquatic biota should be conducted (e.g., calculation of a diversity index to better describe the benthic invertebrate communities in lakes).*
c) *Provide additional information to support the assertion that the Project is only expected to have minor impacts on a broad concept, such as biodiversity.*

5.5 Accidents and Malfunctions

Item No.: 5-61

References:

1) Draft EIS. Section 5.5, page 5-77.

Discussion:

The second paragraph, first and second bullets state, "Spills associated with the transportation of hydrocarbons, chemicals, …" and "Spills associated with the ore processing …"

Requests:

1) *Refer to the specific sections of the Spill Contingency Plan where these issues are addressed.*
2) *Ensure that the sealift contractors have comparable spill contingency plans of their own or abide by the proponent's plan.*

Item No.: 5-62

References:

1) Draft EIS. Section 5.5, page 5-77.

Discussion:

The second paragraph, third bullet states, "Upset conditions associated with the operation of the cyanide detoxification circuit … (Criteria will be established …)."

Requests:

a) *Refer to the specific sections of the Spill Contingency Plan where these issues are addressed.*
b) *Indicate where these criteria are located.*

5.6 Cumulative Environmental Effects

Item No.: 5-63

References:

1) Draft EIS. Section 5.6.

Discussion:

The overall framework for the cumulative effects assessment and rationale for assessment conclusions is not well documented. Study areas for the cumulative effects assessment as they pertain to individual VECs are not described. A list of applicable projects is provided in a summary table, but discussion of these projects as they may or may not contribute to cumulative effects (e.g., occurrence within bird and wildlife migratory ranges, evidence of effects at other project sites etc.) are not described. The effect of the project as a staging area for further mining development activities is not discussed. For example it is not known whether exploration activities are planned at nearby deposits and what kinds of effects those activities might have in combination with the Doris North project. There is no discussion of other uses in the area that might be affected by or interact with activities at Doris North (e.g., guiding activities, hunting as affected by access facilities). There is no mention of marine transport and the contribution of Doris activity to existing levels of marine transport use and routes.

Requests:

a) *Provide a thorough discussion of the framework and rationale for the cumulative effects assessment. List all other potential activities in the area and the rationale for including or not including them in the cumulative effects assessment.*

5.6.1 Land

Item No.: 5-64

References:

1) Draft EIS. Section 5.6.1, page 5-80

Discussion:

The Draft EIS states, "There will be no cumulative effect to these disturbed lands in combination with any other project in the region."

Requests:

a) List the other projects referred to.
b) Discuss the potential for future unauthorized site access via the abandoned airstrip, roads or the barge off- loading causeway on Roberts Bay, or via the float plane dock at Doris Lake.
c) If the proposed de-commissioning of these features were sufficient to render them unusable, state this.

5.6.2 Air Quality

Item No.: 5-65

References:

1) Draft EIS. Section 5.6.2, pages 5-79 to 5-82

Discussion:

Section 5.3.2.3 (Spatial and Temporal Boundaries) indicates that the temporal boundary for effects that extend beyond the life of the mine will be the length of time that the effect lasts (cumulative effect).

Cumulative effects in Section 5.6.2 (Air Quality) are summarized in terms of greenhouse gases only. Potential cumulative effects of deposition of common air contaminants (especially SO_2 and particles) are not addressed in this section. Sensitive receptors in the southern Arctic tundra (e.g., lichens) may be affected, possibly irrerversibly, even for the short time during which emissions from the project will persist. This type of potential impact should also be treated as a cumulative effect and discussed in the EIS.
Table 5.7.1 indicates the cumulative effect of impacts of the project on air quality to be 'minor.'

Section 5.6.10 (Summary of Cumulative Effects Assessment) suggests that "there are no cumulative effects expected" from the project "because the project is geographically removed from existing or potential projects." This statement addresses only the spatial clustering or crowding dimension of cumulative effects and ignores the time and persistence dimension.

Requests:

a) *Provide additional justification for the assessment as 'minor' of the potential to cause cumulative effects for air emissions from the project other than greenhouse gases.*

5.6.3 Water Quantity

No comments

5.6.4 Water Quality

Item No.: 5-66

References:

1) Draft EIS. Section 5.6.4, page 5-80.

Discussion:

Exploitation of additional reserves within the Doris Property may have an incremental cumulative effect on water quality within the Doris Lake LSA.

Requests:

a) *Characterize the potential for cumulative effects to receiving water quality resulting from mining and processing additional reserves within the Doris Property.*

5.6.5 Permafrost

No comments

5.6.6 Aquatic Organisms and Habitats

No comments.

5.6.7 Wildlife and Habitat

Item No.: 5-67

References:

1) Draft EIS. Section 5.6.7, page 5-81; Table 5.6.7
2) McLoughlin, P.D., H.D. Cluff and F. Messier. 2002. Denning ecology of barren-ground grizzly bears in the Central Arctic. J. Mammal. 83:188-198.

Discussion:

The first and second parts of this table are inconsistent. For example, under the Ulu project there are interactions with the Doris North project for caribou but not apparently in the inverse. Also, in light of footnote to this table regarding cumulative effects and animals with large home ranges, it would seem that grizzly bears (see also McLoughlin et al. 2002) and migratory birds should be included in this table. Finally, there is reference to the Doris Central and Doris Connector projects (pages 1-2) but these have not been included in any discussions on potential cumulative effects.

Requests:

a) Check the accuracy of Table 5.6.1
b) Expand Table 5.6.1 to include grizzly bears and migratory birds.
c) Include the Doris Central and Doris Connector projects in discussions on potential cumulative effects.

5.6.8 Vegetation

No comments

5.6.9 Heritage Resources

Item No.: 5-68

References:

1) Draft EIS. Section 5.6.9, page 5-81

Discussion:

The archaeological impact assessment is incomplete. The cumulative effects assessment needs to be updated based on the completed impact assessment. In the event residual project effects are identified, cumulative effects in the context of the identified RSA should be clarified.

Requests:

a) *Provide a cumulative effects assessment for archaeological impacts based on the completed archaeological impacts assessment and consideration of other activities such as further exploration in the Hope Belt and increased access in general.*

5.6.10 Summary of Cumulative Effects Assessment

Item No.: 5-69

References:

1) Draft EIS. Section 5.6.10, page 5-82.

Discussion:

The Draft EIS states, "…there are no cumulative effects expected … as identified by NIRB."

Requests:

a) *List the other projects mentioned.*
b) *Discuss potential future projects that may be outside the scope or present day knowledge of NIRB*
c) *Clarify that the statement include the associated infrastructure (ramps, roads, docks, air strip, etc.) as well as the Doris North facility.*

5.7 Summary of Impacts

No comment

6. SOCIO-ECONOMIC IMPACT ASSESSMENT

Item No.: 6-1

References:

1) Draft EIS. Section 6.
2) Supporting Document L – A Socio-Economic Impact Assessment of the Doris North Project on the Kitikmeot Communities, Nunavut and Yellowknife, Northwest Territories.

Discussion:

The Socio-economic Impact Assessment (SEIA) does not address the socio-economic consequences of this extremely short-lived project. For example, the issue of individuals in the north "gearing up" for essentially two years of employment has not been evaluated. Similarly, the impacts of a "bust", after such a short duration, has not been discussed.

On the other hand, the Draft EIS presents the possibility that the project may continue (thus extending the work period, delaying the consequent end of the project and providing a longer benefits horizon for northern workers). This hope is not backed by substantial data or a characterization of potential effects, but is presented only as a possibility.

The impact methodology focuses on "change in the status quo" as its measure of significance. This approach, while generally acceptable for projects with a reasonable mine life (say 10 years), tends to mask the impacts associated with the extremely short duration of the project.

The mitigation measures proposed are limited to the possibility of monitoring; however Table 7.3.1 (Components of Project EMS) which lists elements to be monitored, does not include monitoring of any socio-economic parameters.

Section 1.8 of the Draft EIS states a number of goals pertaining to mineral development which are contained in the Nunavut Planning Commission's "Final Report on Resource Management Planning in West Kitikmeot". These include encouragement of local hiring and purchasing of local goods and services. In the same section MHBL states its commitment to hiring locally and to purchasing local goods and services whenever possible and economically feasible; however few specific mechanisms have been identified to implement this commitment and address this or other of the Planning Commission goals.

Requests:

a) *Provide the Mine Feasibility document for review and/or integrate Mine Feasibility elements (for example, ROI for various gold prices; sensitivity of project to changes in gold prices) into the discussion of temporary shut down and final closure and into the evaluation of the possibility of expansion to the Boston and other ore bodies.*

b) *Develop a revised impact methodology to reflect the impacts of a project of extremely short duration. For example, a project of such short duration is very unlikely to cause population change in Nunavut communities as people with the prospect of a maximum of 30 months of work anticipate relocating. On the other hand, an injection of cash into Nunavut communities for a maximum of 30 months only, and then its cessation is likely to result in significant effects in the individuals and infrastructure facilities of the communities.*

c) *Articulate specific commitments to all residents of Nunavut concerning socio-economic matters.*

d) *Although referred to in the methodology section of Supporting Document L (p 53) no information is provided either on methods for gathering traditional knowledge, nor for the integration of such knowledge into the socio-economic report. This comment can be generalized to the Draft EIS as a whole. Provide much greater detail in the methods for gathering and integrating Traditional knowledge into the EIS.*

e) *Clarify socio-economic parameters to be monitored and reported on to MHBL and affected communities. Stipulate mechanisms for communicating monitoring results to the communities.*

7. ENVIRONMENTAL MANAGEMENT MITIGATION AND MONITORING

7.1 Environmental Management System

Item No.: 7-1

References:

1) Draft EIS. Section 7.1, page 7-1; Table 7.2.1, Table 7.3.1.

Discussion:

Without a formalized and detailed Integrated Management Plan it is not possible to determine the effectiveness of an archaeological sites management plan. Section 5.3.6.5 Mitigation Measures indicates that "all personnel will be advised of their whereabouts with instructions on measures to ensure their protection". Based on the completion of the archaeological impact assessment, specific mitigation measures should be included in the Integrated Management Plan.

Requests:

a) *Include a Heritage Resource Protection Plan in the Integrated Management Plan. As part of the plan provide clarification as to:*
   i. *Who will educate employees regarding identification, reporting, protection and avoidance of archaeological sites?*
   ii. *How implementation of the plan will be monitored?*
   iii. *Who will conduct the monitoring?*
   iv. *What reporting system is in place to respond to needs identified through monitoring?*

b) *Add archaeological site monitoring to the Project Environmental Monitoring Plan, as appropriate based on the completed archaeological impact assessment.*

Item No.: 7-2

References:

1) Draft EIS. Section 7.3, page 7-4

Discussion:

The reports states that *MHBL expects that requirements for monitoring…heritage resources throughout the mine life will be part of the terms and conditions appended to the Project's licenses, permits, and IIBA…*

Requests:

a) *Provide a commitment to monitor the condition of presently recorded sites in the vicinity of the project as a method of controlling disturbance resulting from the changes in land use directly associated with the project development.*

7.2 Integrated Environmental management Plan

7.2.1 Site Specific Environmental Policy and Code of Conduct

No comments

7.2.2 Sediment Control Plan

No comments

7.2.3 Fish Habitat Compensation Plan

Item No.: 7-3

References:

1) Draft EIS. Section 7.2.3, page

Discussion:

The authors state that "MHBL is committed to reaching agreement on an appropriate fish habitat compensation plan with the regulatory agencies and land owners prior to project construction and is committed to implementing such a plan over the mine life". As the biological productive capacity of Tail Lake will be significantly diminished on a permanent basis, i.e., on a considerably longer time scale than the mine life (assuming the author is referring to 24 months), MHBL should consider committing to implementing such a plan over a considerably lengthened period of time.

Requests:

a) *Provide clarification with respect to "mine life".*
b) *Depending on length of time attributed to "mine life", consider committing to implementing a fish habitat compensation plan over a period of time which appropriately reflects the duration of habitat loss due to the project, i.e., throughout the construction, operation, decommissioning, and post-closure phases of the project.*

7.2.4 Tailings Management Plan

Item No.: 7-4

References:

1) Draft EIS. Section 7.2.4, page7-2.

Discussion:

Prior to construction, MHBL will develop an integrated environmental management plan (EMP). Table 7.2.1 summarizes the proposed Tailings Management Plan and indicates that monitoring procedures will be developed for the tailings dam and associated thermosyphon ground freezing system. Since this relates to the overall feasibility of the frozen dam, it is of important to know at this stage, how MHBL intend to monitor the system to ensure that an effective frozen seepage barrier is achieved.

Request:

a) *Provide preliminary details on how MHBL intends to monitor the tailings dam to ensure an effective seepage barrier is achieved. Also indicate a contingency plan, in the event that monitoring indicates the barrier is not completely effective.*

7.2.5 Waste Management Plan

Item No.: 7-5

References:

1) Draft EIS. Section 7.2.5, page 7-3; Table 7.2.1 - Components of Project EMS
2) Supporting Document O - Spill Contingency Plan
3) Hazardous Waste Management Guidelines, Department of Sustainable Development, Government of Nunavut:
   - 2002, Guideline: General Management of Hazardous Waste in Nunavut, 3.3 General Requirements for Storage Facilities
   - 2002, Guideline: General Management of Hazardous Waste in Nunavut, 3.4 Registering a Hazardous Waste Management Facility (may be necessary if storage time exceeds 180 days or on site total exceeds 5000 kg/L)
   - 2002, Guideline: General Management of Hazardous Waste in Nunavut, 3.5 Registering Hazardous Waste Generators, Carriers and Receivers (may be necessary if hazardous waste is transported off site)
   - 2002, Guideline: General Management of Hazardous Waste in Nunavut, 3.6 Waste Manifest Requirements

Discussion:

The Waste Management Plan section of Draft EIS Table 7.2.1 lists the functions that the Plan will address. Supporting Document O - Spill Contingency Plan provides management measures for wastes resulting from spills from some waste sources; however, that document cannot be construed as a waste management plan. There are a number of waste management guidelines pertaining to the Nunavut Environmental Protection Act (Refer to Appendix B for a listing of applicable regulations and guidelines).

Requests:

a) *Provide a Waste Management Plan for the Doris North site, addressing the functions listed in the Waste Management Plan section of Table 7.2.1, and territorial guidelines.*
b) *Include a description of waste manifesting.*
c) *Describe the hazardous waste training provided to employees.*
d) *Provide the proponent's employee site-specific safety manual. It should be provided (or created) as a component of the EMS.*
e) *Provide MSDS for the various chemicals that will be stored and used on site.*
f) *Describe plans for management of domestic solid waste, including, but not limited to, measures to prevent wildlife attraction.*

7.2.6 Storm Water Management Plan

No comments

7.2.7 Wildlife Management Plan

Item No.: 7-6

References:

1) Draft EIS. Section 7.1, page 7-1; Section 7.2.3, page 7-4; Table 7.2.1.

Discussion:

It is stated on page 7-1 that the EMS is to include a wildlife management plan but it is unclear from further related text on p. 7-3 and Table 7.2.1 what this will entail. Table 7.2.1 indicates that the wildlife management plan will be "policy and procedures for dealing with problem wildlife encounters including deterrents, either temporary or permanent". This is very narrow in focus and insufficient as a guideline for an appropriate wildlife management plan. While there are references to wildlife management and mitigation measures throughout the document, they are difficult to assess for their effectiveness and completeness as an actual 'plan'.

Requests:

a) Provide a wildlife management plan for review.
b) Consolidate mitigation measures for various project activities so they can be assessed as a whole.

7.2.8 Emergency Preparedness and Spill Contingency Plan

Item No.: 7-7

References:

1) Draft EIS. Section 7.2.8, page 7-3
2) Supporting Document O - Spill Contingency Plan, page 3-4.
3) 1993, Nunavut Regulation R-068-93, Spill Contingency Planning and Reporting Regulations
4) 1993, Spill Contingency Planning and Reporting in Nunavut: A Guide to the New Regulations

Discussion:

The spill contingency plan provides a description of the storage of fuel containers (page 3), and a discussion regarding waste chemicals (page 4). Fuel storage containers are described as having associated secondary containment structures. There is no mention of spill containment devices for the additional fuel barrels or chemical and waste chemical containers or associated valving.

Requests:

a) Provide the method of secondary spill containment that will be employed for fuel, chemical, waste chemical storage, and fuel piping and valves at the Doris North mine operation and barge off-loading facility.

Item No.: 7-8

References:

1) Draft EIS. Section 7.2.8, page 7-3.
2) Supporting Document O - Spill Contingency Plan
3) Nunavut Regulation R-068-93, Spill Contingency Planning and Reporting Regulations (22 July, 1993)
4) Contingency Planning and Spill Prevention Reporting – A Guide to the New Regulations

Discussion:

Supporting Document O, referenced in the Draft EIS, is not specific to the Doris North Project, and as such does not adequately address potential problems that may be encountered.

The Nunavut Spill Contingency Planning and Reporting Regulations, section, 4(2) (a) thru (f) outlines site-specific information which must be included. Section, 5(1) states that this information must be filled prior to making use of the facility.

Requests:

a) *Update the Spill Contingency Plan to list specifics for the Doris North site and the associated infrastructure (ramps, roads, docks, airstrip, etc.).*
b) *Section 2.4 Fuel Storage. Describe storage facilities at Doris North site and associated infrastructure (ramps, roads, docks, airstrip, etc.).*
c) *Section 2.5 Chemicals. Add information on chemicals associated with the mining activities. In particular the Caro's acid and its constituents (sulphuric acid and hydrogen peroxide) should be addressed.*
d) *Section 3.1 Domestic Sewage. Update to reflect larger camp size.*
e) *Section 5.3 Chemical Spills. Strengthen this to reflect the potentially severe hazards of the Caro's acid (powerful oxidant and an explosive mixture with certain organic compounds). (reference http://www.hypox.co.za/caros_azid/caros_acid.htm accessed March 24 2003)*
f) *Section 6.2 Spill Kits. Update to detail spill kit locations at Doris North site and associated infrastructure (ramps, roads, docks, airstrip, etc.). Indicate where neutralizing base is stored in the event of leakage associated with the Caro's acid and/or its constituents.*
g) *Section 7 Internal Contacts. Update to address the Doris North site and associated infrastructure (ramps, roads, docks, airstrip, etc.)..*
h) *Need to add Sections 13, 14, 15. Provide action plans to deal with Caro's acid, sulphuric acid and hydrogen peroxide spills.*
i) *Provide a site map and a description of spill response training provided to employees as requested in "Contingency Planning and Spill Prevention in Nunavut – a Guide to the New Regulations".*
j) *MSDS for all chemicals on site should be referenced and their locations documented.*
k) *Detail safe working procedures for fuels, each type of chemical/reagent, and any other specific hazardous materials that will be utilized.*
l) *Include an employee safety manual, including a description of personal protective equipment to be utilized.*
m) *Detail secondary containment considerations for all chemicals and fuels.*

7.2.9 ARD/Metal Leaching Management Plan

Item No.: 7-9

References:

1) Draft EIS. Section 7.2.9, page 7-3; Table 7.2.1.

Discussion:

The procedures and mechanisms of the ARD / Metal Leaching Management Plan listed in Table 7.2.1 are appropriate. However, many of these issues should be addressed at the EIS stage of the regulatory process.

Requests:

a) *The procedure and justification for the procedures "for appropriate identification and testing of mine rock to identify material with uncertain or high acid generating / metal leaching potential before it is mined or excavated" should be presented in the EIS. In addition, a conceptual assessment of the following points should be provided in the EIS.*
   i. *The mechanisms to quantify and document quantities of potentially ARD/metal leaching rock, and*
   ii. *The procedures for interfacing the mine plan with the management plan.*

7.2.10 Mine Reclamation Plan

Item No.: 7-10

References:

1) Draft EIS. Section 7.2.10, page 7-4.
2) Supporting Document M – Conceptual Mine Reclamation Plan. Section 3-2, page M-5.
3) Environmental Protection Act, R.S.N.W.T., 1988, c. E-7.

Discussion:

The Buildings and Site Services section of the Conceptual Mine Reclamation Plan indicates that the facility construction pads and laydown areas will not be removed. This may have the effect of attracting other industrial land users to the region, increasing the opportunity for access to the region, disrupting pre-disturbance site drainage, and leaving the land in an "unsightly" condition as described in the Nunavut Environmental Protection Act.

Requests:

a) *Provide clarification regarding the rationale for the plan to leave the pads in place.*
b) *If the pads are left in place to facilitate future resource extraction at the site, indicate any plans to return to the site at a future date.*

Item No.: 7-11

References:

1) Draft EIS. Section 7.2.10, page 7-4.
2) Supporting Document M – Conceptual Mine Reclamation Plan. Section 3.3.
3) Environmental Protection Act, R.S.N.W.T., 1988, c. E-7.

Discussion:

Section 3.3, Roads, Airstrip and Port, of the Conceptual Mine Reclamation Plan indicates that the all-weather roads and airstrip will remain in place after mine closure. This may have the effect of attracting other industrial land users to the region, lengthening the duration of exclusion to re-establishment of indigenous species, increasing the opportunity for access to the region, disrupting pre-disturbance site drainage, and leaving the land in an "unsightly" condition as described in the Nunavut Environmental Protection Act.

Requests:

a) Indicate if the access road to Tail Lake will remain in place after water quality monitoring in Tail Lake has been completed to the satisfaction of the regulator.
b) Provide clarification regarding the rationale for the plan to leave the roads and airstrip in place.
c) If these features are left in place to facilitate future resource extraction at the site, indicate any plans to return to the site at a future date.

7.3 Environmental Monitoring and Follow Up

Item No.: 7-12

References:

1) Draft EIS. Section 7.3, page 7-4; Table 7.3.1 – Project Environmental Monitoring Plan
2) Government of Canada. 2002. Metal Mine Effluent Regulations. Fisheries Act Report SOR 2002-22. 34(2), 36(5) and 38(9)
3) Supporting Document "M"- Conceptual Mine Reclamation Plan, Section 4.0, page M-8

Discussion:

The Metal Mine Effluent Regulations, which are under the Fisheries Act (Sections 34(2), 36(5) and 38(9)), and which Environment Canada administers, are applicable to all mines in Canada and specify operational and post operational environmental monitoring techniques and requirements. These Regulations adopted under the *Fisheries Act* replace the *Metal Mining Liquid Effluent Regulations* (MMLER) that have been in place since 1977 and repeal the *Alice Arm Tailings Deposit Regulations*, which were promulgated in 1979. The Regulations apply to all operating metal mines in Canada. They impose limits on releases of cyanide, metals, and suspended solids, and prohibit the discharge of effluent that is acutely lethal to fish. The Regulations also require metal mines to conduct Environmental Effects Monitoring programs to identify any adverse effects of their effluent on fish, fish habitat, and the use of fisheries resources (Environment Canada Website, March 27, 2003).

Requests:

a) *Describe how post closure monitoring will be completed according to Environment Canada requirements with respect to among others: environmental effects monitoring, effluent monitoring conditions, volume and effluent flow rate, calculations of loadings, results reporting, emergency response planning, effluent and water quality monitoring studies, water quality monitoring and reporting, biological monitoring studies including data collection, assessment and reporting, and final biological monitoring study and reporting prior to abandonment.*

Item No.: 7-13

References:

1) Draft EIS. Section 7.2.3, page 7-3; Section 7.3, page 7-4; Table 7.3.1.

Discussion:

The monitoring program for wildlife is poorly described. There are no objectives stated or indicators identified. There are many short-term monitoring opportunities (e.g., disturbance effects during construction phase, problem wildlife incidents) but there are also impacts that will require long-term monitoring (e.g., Tail Lake). None of these opportunities are addressed in this section.

Requests:

a) *Provide the framework for a comprehensive monitoring program for the impacts of the Doris North project on wildlife.*

Item No.: 7-14

References:

1) Draft EIS. Section 7.3, page 7-4.

Discussion:

The authors state that "Environmental monitoring will be the primary tool by which MHBL and the regulatory agencies…". The effectiveness of the fish habitat compensation plan also needs to be evaluated.

Requests:

a) *Provide clarification with respect to how the effectiveness of the fish habitat compensation plan will be evaluated as part of the environmental monitoring and follow up program.*

Item No.: 7-15

References:

1) Draft EIS. Section 7.3, page 7-4; Table 7.3.1.

Discussion:
Beyond the installation of additional thermystors at the design stage, it is likely not practical to attempt to monitor possible permafrost degradation, except at critical installations. However, it is reasonable to expect that MHBL visually monitor the project area, throughout the life of the project, to check for indications of ground surface settlement due to thawing of permafrost. Once recognized, it is reasonable to expect that these areas would be investigated and remediated to prevent further degradation of the permafrost. Such monitoring is not identified in Table 7.3.1.

Request:

a) *Confirm that observations to check for possible degradation of permafrost will be included in the EMP (Table 7.3.1) and confirm that any such situations will be mitigated.*

7.4 Socio-Economic Monitoring

See Section 6.

7.5 Auditing and Continual improvement

No comments

8. CONCEPTUAL MINE RECLAMATION PLAN

See also comments under Mine Reclamation Plan (Items 7-10 and 7-11)

Item No.: 8-1

References:

1) Draft EIS. Section 8
2) Supporting Document "M"- Conceptual Mine Reclamation Plan

Discussion:

Reference is made to aspects of mine site reclamation and post-closure conditions throughout the review document. A key concern is proper documentation and support for conclusions that the tailings pond will remain in a stable and environmentally benign condition following mine closure. Tailings pond issues and relevant discussion and information requests in other parts of this document include the following:

- Item 5.6 – effectiveness of sub-aqueous deposition of tailings and potential for exposure and remobilisation as dust
- Item 5-14 – feasibility of thermosyphon design for tailing impoundment, reliability of permafrost to provide an impermeable seal and structural stability in the short term and in the long term (in the context of climate change) and feasibility of alternative designs which are not dependent on permafrost.
- Item 5-15 – justification of 1m cover of water post closure, potential for remobilisation of sediments in the tailings pond water column
- Item 5-17 – feasibility of maintaining 1 m of water cover at closure in the event of extended mine operations
- Item 5-18 – clarification of assumptions used for tailings pond water balance
- Items 5-20 to 5-22 – clarification of post-closure water quality predictions for arsenic, cyanide and mercury
- Item 5-30 – characterization of ammonia levels in the tailings pond
- Items 5-27, 5-29 and 5-47 – representative tailings sample and testing methods to clarify tailings pond water and sediment quality predictions
- Item 5-41 – assessment of bioaccumulation and biomagnification of tailings pond contaminants in the environment

Another issue relates to waste rock handling and feasibility of backfilling in the context of ongoing exploration and/or operations (Item 5-26).

The plan to leave the causeway, road and airstrip in place at closure is an issue with respect to increased access and related impacts to wildlife (Item 5-52) and management of other problems (e.g., waste) associated with increased human access.

In view of the likelihood of ongoing exploration and development in the project area and related implications to temporary or permanent closure it would be appropriate to discuss various closure scenarios (e.g., full closure and abandonment, care and maintenance as required to ensure long term environmental protection, and ongoing maintenance of selected facilities to support ongoing exploration and development activities in the Hope Bay Belt).

Requests:

a) *Address information requests pertaining to tailings pond stability and environmental protection, post closure.*
b) *Address implications of continued exploration and development to reclamation plans and associated environmental impacts.*
c) *Provide a discussion of potential closure scenarios (e.g., full closure and abandonment, care and maintenance as required to ensure long term environmental protection, and ongoing maintenance of selected facilities to support ongoing exploration and development activities in the Hope Bay Belt) and provide conceptual reclamation plans for each.*

9. OUTSTANDING ISSUES

Item No.: 9-1

References:

1) Draft EIS. Section 9.0, page 9-1
2) Supporting Document H – Archaeological Investigations. Page 51

Discussion:

The report states that a Traditional Knowledge Study is underway. The purpose of Traditional Knowledge studies is to ensure aboriginal input into an impact statement. Completion of the study, endorsement of study findings by affected aboriginal communities, and systematic integration of Traditional Knowledge is required for completion of the EIS.

With respect to archaeological sites, long term residents often shed light on specific use, associated activities, individuals utilizing the site, temporal affiliations of use, and other sites in the area. Traditional Knowledge information provides aboriginal perspectives on individual site values, appropriate mitigation, collection policies, and final dispensation of artifacts. This is extremely important relative to site NaNh 10 which contains a potential grave (Supporting Document H, page 51).

Requests:

a) *Integrate and clearly reference traditional knowledge study findings into the EIS.*
b) *Confirm endorsement of findings and mitigation measures by representatives of affected aboriginal communities*
c) *Ensure Elder visits to the identified archaeological sites,*
d) *Integrate Traditional Knowledge into the archaeology field results.*

Item No.: 9-2

References:

1) Draft EIS. Section 9, page 9-1.

Discussion:

The second bullet in this section sates: "Additional testing of the Caro's acid cyanide detoxification process …" The detoxification process has a number of inherent safety and environmental issues associated with both Caro's acid, and with its constituent products (sulphuric acid and hydrogen peroxide)

Requests:

a) *Address the safety procedures for Caro's acid, sulphuric acid and hydrogen peroxide in the Emergency Preparedness and Spill Contingency Plan.*

Item No.: 9-3

References:

1) Draft EIS. Section 9, page 9-1.

Discussion:

No data gaps are identified for wildlife although they certainly exist (e.g., breeding bird distribution and habitat use in the LSA, wildlife (particularly bird) habitat and use pertaining to Tail Lake and Roberts Bay). The lack of information on the impacts of northern mines on wildlife is also a major data gap.

Requests:

a) *Identify data gaps for wildlife in the area and indicate how they will be addressed.*

Item No.: 9-4

References:

1) Draft EIS. Section 9, page 9-1.

Discussion:

There is an absence of traditional knowledge information on the wildlife of the region. In particular, traditional knowledge could help to address deficiencies in baseline data with respect to wildlife, aquatic life in the Tail Lake and in Roberts Bay would be very valuable.

Requests:

a) *Incorporate traditional knowledge into the discussion of wildlife of the region. Ensure traditional knowledge includes available information on wildlife and aquatic habitat in Tail Lake and Roberts Bay*

Item No.: 9-5

References:

1) Supporting Document E – Terrestrial Wildlife of Hope Bay, Nunavut (An Integration of Data collected form 1994 – 2001).

Discussion:

There appears to be an absence of consultation with regulators, although there is some information provided in Supporting Document E.

Requests:

a) *Consult more extensively with regulators on wildlife and wildlife habitat issues and concerns in the RSA and LSA.*

10. REFERENCES

The following is a list of references, other than the EIS and Supporting Documents (see Appendix A) that were used by the reviewers.

Caldwell, J.M. and M.C. Doyle. 1995. Sediment oxygen demand in the lower Willamette River, Oregon, 1994. U.S. Geological Survey Water Survey Investigations Report 95-4196. Prepared in cooperation with Oregon Department of Environmental Quality. 14 p.

Canadian Council of Ministers of the Environment. 2000. Canada-Wide Standards for Particulate Matter (PM) and Ozone (and Annexes). June.

Canadian Environmental Assessment Agency. 1996. A Guide on Biodiversity and Environmental Assessment. Prepared jointly with the Biodiversity Convention Office, April. www.ceaa.gc.ca/0012/images/CEAA_19E.PDF

Government of Canada. 2002. Metal Mine Effluent Regulations. Fisheries Act Report SOR 2002-22.

Inuit Qaujimajatuqangit (IQ) Task Force. 2002. First Annual Report. August

James, M.R. 1991. Sampling and preservation methods for the quantitative enumeration of microzooplankton. New Zealand Journal of Marine and Freshwater Research 25: 305-310.

Likens, G.E. and J.J. Gilbert. 1970. Notes on the quantitative sampling of natural populations of plankton rotifers. Limnology and Oceanography 15: 816-820.

McJannet, C.L., G.W. Argus and W.J. Cody. 1995. Rare vascular plants in the Northwest Territories. Canadian Museum of Nature. Syllogeus 73.

McLoughlin, P.D., H.D. Cluff and F. Messier. 2002. Denning ecology of barren-ground grizzly bears in the Central Arctic. J. Mammal. 83:188-198.

Nichols, J.H. and A.B. Thompson. 1991. Mesh selection of copepodite and nauplius stages of four calanoid copepod species. Journal of Plankton Research 13: 661-671.

Northwest Territories Resources, Wildlife and Economic Development. 2000. NWT Species 2000: General status ranks of wild species in the Northwest Territories. www.nwtwildlife.rwed.gov.nt.ca/monitor/htm

Rounds, S.A. and M.C. Doyle. 1997. Sediment oxygen demand in the Tualatin River basin, Oregon, 1992-96. U.S. Geological Survey Water-Resources Investigations Report 97-4103. Prepared in cooperation with the Unified Sewerage Agency of Washington County, Oregon.

Schindler, D.W. 1969. Two useful devices for vertical plankton and water sampling. Journal of the Fisheries Research Board of Canada 26: 1948-1955.

Walker, D.A. and K.R. Everett. 1987. Road dust and its environmental impact on Alaskan taiga and tundra. Arctic and Alpine Research 19(4): 479–489.

Wood, T.M. 2001. Sediment oxygen demand in upper Klamath and Agency lakes, Oregon, 1999. Water-Resources Investigation Report 01-4080. Prepared in cooperation with the Bureau of Reclamation. 13 p.

Appendix A – EIS Documents Reviewed

Miramar Hope Bay Ltd. 2003. DRAFT Environmental Impact Statement, Doris North Project, Nunavut, Canada. Main Document. Prepared by AMEC Earth & Environmental Limited, Burnaby, BC, for Miramar Hope Bay Ltd.

Supporting Documents:

A Project Description & Alternatives, Doris North Project, Nunavut, AMEC Earth & Environmental Limited.

B Environmental Policy for Hope Bay Miramar Limited, Miramar Hope Bay Ltd.

C Biophysical Environment Baseline Report, Doris North Project, Nunavut, AMEC Earth & Environmental Limited

E Terrestrial Wildlife of Hope Bay, Nunavut (An Integration of Data Collected from 1994 – 2001), Hubert and Associates.

F Aquatic Baseline Studies Doris Hinge Project 1995 – 2000, RL&L Environmental Ltd./Golder Associates.

G Integrated ARD Characterization Report 2002, Volume 1& 2, Knight Piesold Ltd.

H Archaeological Investigations 1995 – 2000 Compiled Report, Points West Heritage Consulting Ltd./Rescan Environmental Services Limited.

I Spyder Lake Area (Hope Bay Greenstone Belt), Terrain Analysis and Surficial Geology, J.M. Ryder and Associates, 1992.

J Boston Gold Project, Surficial Geology and Permafrost Features, EBA Engineering Consultants Ltd., 1996.

K Report on Thermystor Data Review – Hope Bay Project, Golder Associates Ltd., 2001.

L A Socio-Economic Impact Assessment of the Doris North Project on the Kitikmeot Communities, Nunavut and Yellowknife, Northwest Territories, Robert Hornal & Associates.

M Conceptual Mine Reclamation Plan for the Doris North Project, AMEC Earth & Environmental Limited.

N Doris North Project No Net Loss Plan, RL&L Environmental Ltd./ Golder Associates.

O Spill Contingency Plan – Hope Bay Project – 2002, Miramar Hope Bay Ltd.

P Executive Summary from the Doris North Project Feasibility Study, Miramar Hope Bay Ltd.

Appendix B – Government of Nunavut, Department of Sustainable Development – List of Relevant Regulations and Guidelines

Acts and Regulations

Environmental Protection Act, R.S.N.W.T., 1988, c.E-7

Environmental Rights Act (Administered by the Legislative Assembly) R.S.N.W.T 1988, c.83

Spill Planning and Reporting Regulations, March 2002

Asphalt Paving Industry Emission Regulations, R.R.N.W.T.1990, c-E-23

Pesticide Act, R.S.N.W.T. 1988, c. P-4

Pesticide Regulations, R.R.N.W.T. 1990, c. P-2

Environmental Guidelines

Environmental Protection Act: Simplified Summary, March 2002

A Guide to Spill Contingency Planning & Reporting, March 2002

Dust Suppression, March 2002

General Management of Hazardous Waste, March 2002

Industrial Projects on Commissioner's Lands, March 2002

Industrial Waste Discharges, March 2002

Ozone Depleting Substances, March 2002

Site Remediation, March 2002

Sulphur Dioxide & Suspended Particulates, March 2002

Waste Antifreeze, March 2002

Waste Asbestos, March 2002

Waste Batteries, March 2002

Waste Paint, March 2002

Waste Solvents, March 2002

Policies

Management of Waste Lead, March 2002

Municipal Solid Wastes Suitable for Open Burning, March 2002

Management of Fluorescent Lamp Tubes, March 2002