

MEMORANDUM OF UNDERSTANDING
BETWEEN THE
STATE OF ALASKA
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
AND
TECK COMINCO ALASKA INCORPORATED
RELATING TO FUGITIVE DUST AT THE RED DOG MINE

(Restated and Amended Effective January 1, 2007 through December 31, 2007)

A Memorandum of Understanding (“MOU”) was entered into September, 2005, by and between the **State of Alaska, Department of Environmental Conservation (“DEC”)** and **Teck Cominco Alaska Incorporated (“TCAK”)** relating to fugitive dust originating upstream of the Delong Mountain Regional Transportation System at the Red Dog Mine. Specifically, emissions include those originating from activities or sources at the mine, the processing mill and associated facilities and activity zones, prior to transport of concentrate on the Delong Mountain Regional Transportation System. DEC and TCAK are restating and amending the MOU to

update the actions to be taken by the parties and to extend the term of the MOU to December 31, 2007.

RECITALS:

A. TCAK operates the Red Dog Mine ("Mine") located in the DeLong Mountains of Alaska's Brooks Range, approximately 82 miles north of Kotzebue and 47 miles inland of the Chukchi Sea. Zinc and lead concentrates are produced at the Mine and trucked to a port for loading on ships. The haul road and port are referred to collectively below as the "DeLong Mountain Regional Transportation System or "DMTS."

B. A variety of activities typically associated with mining, such as blasting, loading, dumping, trucking, crushing and the storage of material in uncovered stock piles, could lead to the release of fugitive dust.

C. Fugitive and point source air emissions from facilities at the Mine are regulated by DEC under Title V Operating Permit No. AQ0290TVP01 issued effective January 1, 2004, which has incorporated the facility-specific terms and conditions of Air Quality Control Permit-to-Operate No. 9332-AA003 Amendment 2 and Air Quality Control Construction Permit Nos. 0032-AC018 Rev.1 and 9932-AC005 Rev.2, and minor source permits: AQ0290MSS01, AQ0290MSS02, AQ0290MSS03, and AQ0290MSS05 (collectively "Air Permits"). The Air Permits include provisions for the control and monitoring of fugitive dust at the Mine, including provisions based on federal New Source Performance Standards, state ambient air quality standards and the

requirement in 18 AAC 50.045(d) to take reasonable precautions to prevent particulates from being emitted into ambient air.

D. A tundra moss study conducted in 2001 along the DMTS disclosed evidence of elevated levels of metals. This led to TCAK implementing a number of measures to reduce or prevent the release of fugitive dust from activities associated with the DMTS. TCAK also contracted with an environmental consulting firm, Exponent, to perform a human health and ecological Risk Assessment under the oversight of DEC. In addition to looking at areas which might have been impacted from activities associated with the DMTS, the Risk Assessment also examined areas around the Mine but outside the ambient air boundary ("Mine boundary") established under the Air Permits. The final Risk Assessment is anticipated to be issued in first quarter 2007, and the Risk Management Plan in the second quarter 2007. The work done under this MOU is not intended to supercede, delay, or otherwise impact the on-going Risk Assessment.

E. In 2003 and 2004, partially using the services of Exponent, TCAK sampled tundra within and adjacent to the Mine boundary, looking for possible impacts of fugitive dust from the Mine. The results of this sampling indicated elevated lead and zinc downwind of the Mine (primarily westward and to a lesser extent northward) as a result of the deposition of metal-bearing fugitive dust. A majority of the higher values were confined to areas within the Mine boundary. Stressed vegetation was also observed

within the Mine Boundary in certain areas immediately adjacent to and downwind of active operations.

F. DEC's review of TCAK facility operating reports did not disclose any violations of Air Permit provisions relating to the control of fugitive dust at the Mine. DEC had taken action in the past relating to fugitive dust emissions of the Mine, issuing a compliance order by consent (COBC) in June, 1992. TCAK spent approximately four million dollars (\$4,000,000) in making operational improvements pursuant to that COBC to address fugitive dust at the Mine. Recent air monitoring data confirms that metal-bearing dust particles are present within the mine ambient air boundary and subsequent settling is occurring to some degree as demonstrated by dust-fall jar analysis. Yet it remains uncertain to what degree the elevated metals in the tundra around the Mine discovered in the 2003-2004 sampling are a result of the fugitive releases that occurred prior to TCAK's implementation of dust control measures under the 1992 COBC.

G. DEC and TCAK are entering into this MOU to set out the steps TCAK will take to better identify and understand: potential historic and current sources of fugitive dust emissions at the Mine; reasonable control measures that can be implemented to reduce these emissions over time; the likely source of the elevated metals in the tundra around the Mine; and the likely impact, if any, of these elevated metals concentrations over time. This MOU is also intended to provide the means for DEC to coordinate its review and response to information regarding fugitive dust generated at the Mine, including

both present and historical emissions. Specifically, this MOU provides for single points of contact at DEC and TCAK in exchanging information and comments with regard to fugitive dust at the Mine, facilitates the gathering of relevant and useful information by TCAK relating to such fugitive, and encourages the dissemination of this information to interested agencies and to the public.

H. DEC is currently in the process of developing a draft Integrated Waste Management and Disposal Authorization for the Mine as required under AS 46.03.100, this permit will, among other things; include certain reclamation requirements for the Mine. This work is being coordinated with the State of Alaska Department of Natural Resources (DNR), which has responsibility under AS 27.19.030 for approving a reclamation and closure plan (Reclamation Plan) for the Mine. In the course of performing work under this MOU the parties intend to give due consideration to what future work would be best accomplished under the Integrated Waste Management and Disposal Authorization and/or Reclamation Plan.

I. In addition to reporting the results of the 2003-04 sampling program at the Mine to DEC and other state agencies, TCAK has presented this information at public meetings held in Kotzebue and in all of the NANA Region villages in 2005. The information was also presented to the Subsistence Committee (hunters and fishermen from Kivalina and Noatak) and at an Ikayuqtit Team meeting in February 2005, at which representatives from NANA, Noatak IRA, Kivalina IRA, AIDEA, National Park Service,

EPA, DEC, Alaska Department of Public Health, Alaskans for Responsible Mining, Center for Science and Public Participation, Northern Alaska Environmental Center and the National Parks Conservation Association were in attendance. The information presented at these meetings was further developed and compiled into a technical report titled "Summary of Mine Related Fugitive Dust Studies – Red Dog Mine Site" which was submitted to DEC on March 14, 2005 and is currently posted on DEC's website. In 2006 TCAK continued to provide information pertaining to mine fugitive dust to stake holders. A Subsistence Committee meeting was held in March to present the group with the results of the mine site risk evaluation and community updates via village meetings were provided to all 11 villages in the NANA Region in September. Additionally, DEC continues to promptly post TCAK's submittals of information, reports, and presentations provided to the agency in relation to the mine fugitive dust on DEC's website.

J. The following studies were completed in accordance with the original terms of this MOU:

1. Snow-drift sampling: In April, 2005 snow samples were collected by TCAK from drifted and non-drifted areas upwind and downwind of the Mine. These samples were analyzed for lead and zinc. TCAK submitted the sampling results to DEC in the September 2005 quarterly report.
2. Particle Fate Analysis: In its December 2005 quarterly report to DEC, TCAK submitted a study plan to determine the release, through chemical mechanisms, of metals in the mineralized fugitive dust found at the Mine.

This study is specific to the fate of the metals in the dust that has been deposited in the tundra. TCAK submitted preliminary results from the study to DEC during the October 2006 Semi-annual Meeting. The final report from the study will be submitted to DEC in the first quarter 2007.

3. Mine Area Ecological Risk Evaluation: An evaluation of potential ecological effects of fugitive dust in the mine area has been undertaken as part of the closure planning process for the Integrated Waste Management and Disposal Authorization. The evaluation of current and predicted post-closure conditions was conducted using food web models developed in the DMTS risk assessment.
4. Hi-Vol / TEOM Comparison: An evaluation was conducted to determine the comparability of the historic Hi-Vol results with the current TEOM results. The results of the study were submitted to ADEC in March 2006 as part of the report titled "*Particle Collection Efficiency Difference of a Hi-Vol Particulate Collection System and a R&P 1400AB TEOM Particulate Collection System*".

AGREEMENT:

DEC and TCAK agree as follows:

1. **Studies** – TCAK shall perform the following studies by the following dates and shall submit quarterly status reports to DEC as described in Section 6 below.

1.1 Tundra "Soil" Sampling: The initial reconnaissance work performed in 2003 and 2004 by TCAK (described in recital E above) identified some areas around

the perimeter of the Mine boundary and within that boundary warranting further assessment. The parties recognize that further assessment of these areas will be more productive after the Risk Assessment for the DMTS has been finalized and the DMTS fugitive dust Risk Management Plan has been approved by DEC. It is anticipated the Risk Assessment and Risk Management Plan will be used fully in targeting relevant tundra "soil" concentrations, exposure unit area and depth, and evaluating possible effects of metals concentrations based on specific species exposure risks. TCAK shall use the results of the Risk Assessment for the DMTS, the subsequent Risk Management Plan, the particle fate analysis, the Mine Area Ecological Risk Evaluation and the vegetation monitoring program to evaluate whether a tundra soil sampling program could serve as a good indicator for future trend analysis as it pertains to fugitive dust deposition. If the tundra soil sampling program is determined by DEC and TCAK to be an appropriate indicator, then TCAK shall design and submit to DEC a site assessment sampling program for areas within and immediately outside the Mine.

2. Ambient and Fugitive Monitoring:

TCAK shall conduct the following monitoring and report the results to DEC by the following dates:

2.1 TCAK currently monitors Total Suspended Particulates (TSP), lead and zinc using R & P 1400AB TEOM monitors at the Tailings Dam and Personnel Accommodations Complex (PAC) sampling sites. TSP samples are collected continuously at the two sites. A lead and zinc sample is also collected from these same monitors when the automated cartridge collection units (ACCU) is activated on an every

other day schedule at the two sites. A report of the TSP, lead, and zinc 2006 sample results from the PAC and Tailings Dam sites shall be included in the April 2007 quarterly report.

DEC is not confident that TCAK can correlate the continuous TEOM TSP measurements to High Volume TSP monitoring data, and thereby link historical data values to current day measurements. TCAK and DEC staff will work together to reconcile issues related to the data comparison and to determine what steps need to be taken to create a valid data correlation or to identify new measurement methods which are acceptable.

2.2 Vegetation Monitoring: During the summer of 2006 the vegetation monitoring program reviewed by DEC was initiated consisting of laying out 3,000 meter monitoring transects radiating out from the mine site, and the establishment of vegetation plots in impacted areas to test various ameliorative treatments. TCAK shall continue to monitor the site pursuant to this program over the next two years for a total of a three year period. TCAK shall also delineate and classify the areas of affected vegetation surrounding the mine site and establish permanent monitoring plots to track annual trends and changes in plant cover. Annual vegetation reports shall be provided to DEC with the fourth quarter reports.

3. Engineered Controls:

TCAK shall take the following actions by the following dates to reduce fugitive dust emissions at the Mine:

3.1 Control Options Study: In March 2005, Ridesic Consultants Inc. conducted a review of the Mine's crushing, milling, and storage facilities for TCAK. The review identified several areas where improvements can be made that will reduce mineralized dust generation. A multi-year evaluation of potential improvements to the Gyratory Crusher Dump Pocket, Jaw Crusher Dump Pocket, Coarse Ore Stockpile Building (China Hat), and Concentrate Storage Building was commenced in 2005. The areas determined to be of highest priority were the gyratory crusher and jaw crusher dump pockets. TCAK has completed the installation of the dust collection system for each dump pocket enclosure and will continue with more detailed study of potential dust control measures for the Coarse Ore Stockpile Building and the Concentrate Storage Building.

3.2 Coarse Ore Stockpile Building: In early 2005, Ridesic Consultants Inc was retained by TCAK to evaluate the feasibility of installing a fugitive dust control system in the Coarse Ore Storage Building (COSB). Several alternative preliminary designs were developed, and TCAK selected what it believed to be the best option for detailed design of the dust control equipment (baghouse, ducting and fan). This design work was completed late in 2005.

As the selected concept shared some design similarities with the gyratory and jaw crusher fugitive dust control systems that were being installed in early 2006, TCAK decided to evaluate operation of those systems before moving forward with further work on the COSB system. The crusher dust control systems have operated well to date, so

in late 2006, Westmar Consultants were retained by TCAK to prepare a design of the support and ancillary systems associated with the dust control system for the COSB. Westmar will prepare a project cost estimate that will be used to support a capital expenditure request that is anticipated to be ready by Feb 15, 2007. If the capital request is approved by TCAK management, then the preliminary construction schedule calls for completion of engineering and procurement of materials in time for the 2007 sealift. This would allow installation of the COSB fugitive dust control system during the second half of 2007. Air Quality Control Minor Permit AQ0290MSS03 has been issued by DEC authorizing the construction and operation of the proposed COSB fugitive dust control system in order to avoid any delays if the decision is made to proceed with this project.

3.3 Mine CSB/Truck Loading Facility Fugitive Dust Reduction Review:

TCAK has tested the feasibility of using a baghouse dust collection system in the Mine Concentrate Storage Building, and determined dry filtration technology using PTFE filters is applicable for full scale CSB dust control bearing in mind that there will be periods of time when flow will be restricted due to high relative humidity inside of the building. Knowing that dry filtration is a viable option for dust control TCAK will conduct an engineering study in 2007 to look at opportunities for improvements to the entire concentrate handling and storage system within the mine CSB. The engineering study will consider dust control, alternate loading methods, options for improved load out practices, and subsequent reductions in potential tracking of concentrates. TCAK will provide DEC a status report on the engineering study of the options available and a

preliminary indication of the features of an alternate concentrate handling and dust control system in the second quarter 2007 report with the final results of these studies in the quarterly report for fourth quarter 2007. The goal of this program is to have the preferred option selected and the engineering complete in time to allow for procurement and construction in the 2008 construction season.

4. **Source Apportionment and Particle Deposition Modeling:** Senes Consultants Limited has been engaged by TCAK to develop a historic site fugitive dust emission inventory (including but not limited to waste rock piles and haul roads) and historic fugitive dust emission model. Senes is currently finalizing the inventory and model report for review by TCAK. The preliminary final report is scheduled for TCAK review in January 2007. Following the review and acceptance of the report by TCAK will be provided to DEC, which is anticipated to be during the first quarter of 2007.

5. **Measurement of Improvement:** The scope and plan for monitoring of the effectiveness of the intended improvements are being formulated by TCAK. The plans will be submitted to DEC for review as monitoring programs are developed.

6. **Quarterly Reports and Semiannual Meetings:** TCAK shall submit quarterly reports to DEC describing the status and results of each of the work tasks described in numbered Sections 1-5 above. The quarterly reports will be submitted no later than January 15, April 15, July 15, and October 15, following the end of each quarter. TCAK and DEC will meet twice a year, to review progress made under this MOU and to adjust future work as necessary. Those meetings shall be scheduled in the spring, before April 30, 2007, and in the fall, before October 30, 2007.

7. **Recovery of DEC Air Quality Costs:** TCAK agrees to pay permit administration fees under 18 AAC 50.400(m) for direct costs associated with DEC Air Quality staff work in executing tasks or reviews described in this MOU. Any fees assessed under this MOU will not include DEC work tasks that are normally eligible for inclusion as part of a flat fee for a designated regulatory service under 18 AAC 50.400(a) – (l).

8. **Termination:** This MOU shall terminate on December 31, 2007 unless earlier terminated by either party by providing written notice to the other. This Agreement may be extended by the parties, if the parties are in agreement.

9. **Public Information:** Quarterly reports and all other reports and data submitted by TCAK to DEC pursuant to this MOU shall be considered public information unless TCAK submits them to DEC with a cover page asserting a privilege and providing a reference to the legal basis for such an assertion. DEC will review any assertion of privilege under the state's laws governing public records. At this time, the parties do not anticipate that any information provided by TCAK pursuant to this MOU will be designated by TCAK as privileged. DEC and TCAK shall cooperate in reviewing this information for the public at public meetings at times and locations to be agreed to by the parties.

10. **Use of Information:** The parties anticipate that some of the information developed pursuant to this MOU might be of assistance to DEC in finalizing the Waste Management and Disposal Authorization for the Mine and to DNR in its development of any revisions to the Reclamation Plan currently being developed. Some of sampling

and analyses to be performed under this MOU will involve areas outside the Mine boundary, and perhaps overlap with work performed in conjunction with the Risk Assessment. DEC shall coordinate its efforts, as described in paragraph 11.2 below, to avoid any unnecessary duplication or inconsistency in its efforts to implement any regulatory requirements regarding fugitive dust emissions at the Mine. Among other things, DEC will consider whether any impacts that should be addressed are best addressed under DEC's Waste Management and Disposal Authorization (and the Reclamation Plan.) However, nothing in this MOU, or any work performed under it, shall supercede or otherwise interfere with work required to be done as part of the ongoing Risk Assessment or the ongoing development of a Waste Management and Disposal Authorization for the Mine.

11 Notices and Contacts:

11.1 The quarterly reports and any other written notices provided by TCAK to DEC pursuant to this MOU shall be delivered by mail, fax or email to:

Tom Chapple
Director, Division of Air Quality
555 Cordova Street
Anchorage, AK 99501-2617
(fax) 907-269-3098
email: tom_chapple@dec.state.ak.us

Any written notices to TCAK pursuant to this MOU shall be delivered to:

Jim Kulas, Superintendent Environmental

Teck Cominco Alaska Incorporated
3105 Lakeshore Dr., Building A, Ste 101
Anchorage, AK 99517
(fax) 907-426-2108
email: jim.kulas@teckcominco.com

With copies to:

Wayne Hall, Senior Environmental Coordinator
Teck Cominco Alaska Incorporated
3105 Lakeshore Drive, Building A, Ste 101
Anchorage, AK 99517
(fax) 907-426-2108
email: wayne.hall@teckcominco.com

11.2 Tom Chapple will be responsible for coordinating the activities of DEC relating to this MOU, including coordination of the efforts of the different divisions of DEC relating to fugitive dust emissions at the Mine, present and historical. He will be the primary point of contact for TCAK on matters within the scope of this MOU. Jim Kulas will be responsible for coordinating the activities of TCAK and its contractors in regards to their performance of work under this MOU. He will be the primary point of contact for DEC on matters within the scope of this MOU. When he is away from the Mine he may assign someone else in TCAK's Environmental Department as the point of contact for DEC.

12. **Amendments:** This MOU may be amended by the parties at any time but such amendment shall not be effective unless in writing and signed by both parties.

13. **Rights of the Parties:** Nothing in this MOU shall be interpreted to limit any authority of DEC with regard to fugitive dust emissions at the Mine, including, but not limited to, any permitting and enforcement authority it has under any Alaska statute or regulation. Nothing in this MOU, or the fact that the parties are entering into, shall be construed as any admission or inference that TCAK has violated any provision of the Air Permits, 18 AAC.50.045(d), or any other requirement of any kind relating to fugitive dust.

IN WITNESS WHEREOF, the parties hereto have caused this MOU to be signed on the ___ day of _____, 2007

Department of Environmental Conservation

State of Alaska

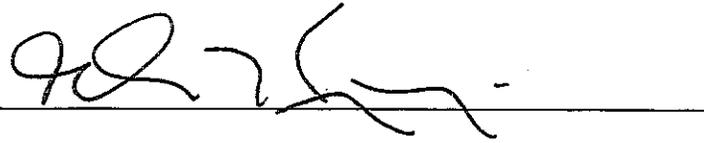


By: Mike Maher

Acting Commissioner

Dated: 2-1-07

Teck Cominco Alaska Incorporated



By: John Knapp

General Manager

Dated: Feb 14/07

ASSENT OF COUNSEL

Approved as to legality and form.

Talis J. Colberg

ATTORNEY GENERAL

By: 

Cameron Leonard

Assistant Attorney General

Dated: Feb. 22, 2007

Approved as to legality and form.

HARTIG, RHODES, HOGE AND LEKISCH

Counsel for Teck Cominco Alaska Incorporated

By: Michael Jungreis

Michael Jungreis

Dated: March 7, 2007