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24 February 2011

Mr. Keith McConnell, Deputy Director
Division of Waste Management and Environmental Protection
Office of Federal and State Materials and Environmental Management
U.S. Nuclear Regulatory Commission
11545 Rockville Pike, Mail Stop T7-E18
Rockville, MD 20852

Dear Mr. McConnell:

SUBJECT: Sweetwater Uranium Project – Docket Number 40-8584
Source Material License No. SUA-1350
Annual ALARA Audit

Enclosed is Kennecott Uranium Company's Annual ALARA Audit. This audit addresses conditions 9.3D and 12.3 of Source Material License number SUA-1350.

If you or your staff have any questions or require further information, please contact me at (307) 328-1476.

Sincerely,

Oscar A Paulson

Oscar A. Paulson
Facility Supervisor

cc: James Webb, Project Manager (NRC) (2)
Director, DNMS (NRC) - Arlington, TX (w/o attachments)
Rich Atkinson

Rio Tinto

Internal memo

10 February 2011

To: NRC File

Subject: Sweetwater Uranium Project – Source Materials License SUA-1350: In-House Review of the Radiation Safety Program Including Audits, Inspections, Employee Exposures, Effluent Releases and Environmental Data as Required by License Condition 12.3

As required by License Condition 12.3 of SML #SUA-1350, the radiation safety, health physics and environmental monitoring programs are reviewed herein. In addition, trends in exposure, possible reductions in exposure or effluents under the ALARA concept and the use, maintenance and inspection of radiation monitoring equipment is discussed. The required (License Conditions 9.3 and 12.3) report on the activities of the Safety and Environmental Review Panel (SERP) is also attached.

Attached as part of this review process are the following:

- Summary of Monthly Radiation Safety Meetings
- Summary of Annual Radiation Refresher Training
- Occupational Exposure Assessment - Suspended Operations
- Bioassay Assessment
- Summary of Radiation Instrument Calibrations
- External Gamma Radiation Survey Assessment
- Total and Removable Alpha Radiation Survey Assessment
- Radon Daughter Monitoring Assessment
- Potable Water Quality Summary
- Safety and Environmental Review Panel (SERP)
- Respiratory Protection
- Releases for Unrestricted Use
- Review of Standard Operating Procedures
- Radiation Work Permits
- Dose Assessment/Determination of No Requirement for Individual Monitoring or Dose Calculation at the Sweetwater Uranium Project for 2010
- Discussion of other Items (Fire Protection, etc.).

Review of the Programs

A review of the program revealed the following item(s) which required additional attention or correction during the year:

1. Storage of Contaminated Equipment and Ion Exchange Resin on Site

Contaminated equipment now belonging to the Green Mountain Mining Venture (GMMV), but originally stored on site in 1997 by U.S. Energy Corp./Yellowstone Fuels, Inc., continues to be stored on site. The equipment is stored in the Mill Building, Solvent Extraction (SX) Building, in the tailings impoundment, in a designated restricted area within the Main Shop (the Welding Bay). Ownership of this equipment was transferred to the Green Mountain Mining Venture (GMMV) by U.S. Energy Corp./Yellowstone Fuels, Inc., on September 11, 2000.

In addition, approximately 174,740 pounds of an ion exchange resin/water mixture is stored on site in the Number 1 Counter Current Decantation (CCD) thickener tank in the Mill Building. This material now belongs to the Green Mountain Mining Venture (GMMV), but was originally stored on site by U.S. Energy Corp./Yellowstone Fuels, Inc. This material was unloaded on site between April 22 and May 7, 1998.

This material is stored submerged in the Number 1 CCD tank in the mill, which is heated to prevent freezing in the winter. Ownership of this ion exchange resin was transferred to the Green Mountain Mining Venture (GMMV) by U.S. Energy Corp./Yellowstone Fuels, Inc. on September 11, 2000.

Additional radon monitoring was performed using the modified Kusnetz method during unloading and RadTrak radon monitors are placed on top and below the CCD thickener (used to store the resin) and are changed quarterly. Air sample filters are collected semiannually near the Number 1 Counter Current Decantation (CCD) thickener tank and analyzed using the modified Kusnetz method. This is done to determine if handling or storing the resin creates elevated radon levels in the area. The results of the monitoring show that the radon levels in the storage area remain at background in spite of resin being stored there.

The stored equipment may have been responsible for previously elevated radon daughter concentrations measured in the Solvent Extraction (SX) Building. This situation has been corrected by operating an exhaust fan to remove accumulated radon and radon daughters. Radon daughter monitoring using the modified Kusnetz method has been performed semiannually in this area. The monitoring shows radon daughter concentrations ranging from 0.020 WL to 0.048 WL.

Changes in the Program

Additional Continuous Radon Monitoring
Continuous RadTrak radon monitors are placed on top and at the base of the Number 1 CCD Thickener and changed on a quarterly basis to monitor radon levels in the area to determine if the storage of resin in the thickener increased radon levels in the Mill Building. Radon levels in the Mill Building remain at background levels.

Trends in Exposure
Operations were suspended in April 1983. Operations have remained suspended since that time. Exposures are low. Individual monitoring of personnel is not required since all exposures are below 10% of the allowable limit. In-plant air samples are collected semiannually. Work performed in the mill and tailings impoundment has been under Standard Operating Procedures (SOPs). The only activities conducted in 2010 were property security, preservation, maintenance, operation of the tailings impoundment and Catchment Basin pumpback system, environmental monitoring, storage of equipment and used ion exchange resin, liner repair and land farming of petroleum contaminated soils.

Storage of some of the equipment, notably some steel pressure vessels in the mill, has caused gamma radiation levels to increase slightly in the area within the mill in which they are stored. An exhaust fan is operated in the SX building continuously to vent any accumulated radon and radon progeny. Radon daughter concentrations in this area varied between 0.020 WL to 0.048 WL.

Gamma exposures in the tailings impoundment have been reduced by the addition of the material excavated from the Catchment Basin area. This material has a lower radium-226 concentration than the tailings and acts as shielding attenuation gamma radiation from the tailings. The average gamma exposure rate in the impoundment is 96.9 µRhr.

Possible Reduction of Personnel Exposures or of Effluents under ALARA
With operations suspended since April 1983, there have been no releases of effluents or employee exposures. The mill, with the exception of the dryer, and yellowcake area has been decontaminated. The dryer is locked and entry is restricted. The yellowcake (precipitation) area has been externally cleaned and the tanks are covered. All thirteen (13) nuclear density gauges in the mill are shuttered and are inventoried semiannually. The gauges were inventoried on June 28 and December 13, 2010. The gauges were leak tested on May 24, 2007.

No leakage was detected. An amendment dated April 9, 1998 was obtained to the nuclear density gauge license, which freed the licensee from testing the on-off mechanism on the thirteen (13) nuclear density gauges in the mill as long as operations remain suspended. This change has caused some reduction in personnel exposure in that personnel now spend less time near the gauges and personnel are not exposed to yellowcake dust associated with testing the on-off mechanism of the gauge in the yellowcake barreling area. A Corrective Action Program (CAP) is in place to address the seepage from the tailings impoundment and Catchment Basin. The pumpback system continues to operate as designed. The fan in the Solvent Extraction (SX) Building is now operated continuously to exhaust any accumulated radon and radon daughters emanating from equipment stored there.

Current Use of Control Equipment

Concurrent with the suspension of mill operations in April 1983, all mill control systems have been shut down. The Mill and Solvent Extraction (SX) buildings are kept locked when personnel are not inside them. Security is maintained on site twenty-four (24) hours a day as required by Section 5.4 of the license application that is cited in License Condition 9.5 of SUA-1350, to prevent unauthorized access to the facility and unauthorized entry into the tailings impoundment. This prevents potential exposure to radioactive materials to unauthorized individuals, who may attempt to gain access to the facility buildings or the tailings impoundment. The tailings retention system continues as a passive control system incorporating a synthetic Hypalon liner to retain the tailings fluids. Seepage has occurred in the past due to a liner failure. These repairs were discussed by Kent Bruxvoort of Telesto Solutions, Inc. in the 2010 Inspection of Tailings Impoundment Liner dated July 8, 2010. The report states:

> *The liner is fully maintained and repaired within five vertical feet of the tailings or tailings fluid around the entire perimeter of the impoundment. The liner remains, by observation and testing, plyable. There is no evidence of exposed scrim by either physical or chemical means.*

In addition it also states:

> *Placement of the additional 11(e).2 soils from the catch basin area into the tailings impoundment, regarding of the tailings surface, maintenance and repair of the liner within five vertical feet of the tailings, and completion of lined evaporation lagoons all provide significant measures to manage the tailings. Potential for fluid to escape through the damaged liner is limited, potential for windblown tailings is decreased, the surface of the tailings has been lowered to a level everywhere below the surrounding native ground surface, tailings consolidation throughout the impoundment is promoted, and evaporation enhanced.*

A seepage collection (pumpback) system is in operation. This system was extended to include two (2) wells west of the Catchment Basin in 2005. A system using lagoons constructed on the tailings and operated during non-freezing weather serves to minimize dusting, reduce radon emanation and evaporate fluids. A substantial effort was made in 2008 to regrade / level the tailings in order to construct lined lagoons on the tailings surface to control dusting and aid in evaporation of tailings fluid and pumpback water. This effort has been successful and is described by Kent Bruxvoort of Telesto Solutions, Inc. in the 2010 Inspection of the Tailings Impoundment Liner dated July 8, 2010. The report states:

> *During the latter half of 2007 and in 2009 the tailings surface and the additional 11(e).2 soils were regraded. Beach sands were moved from the elevated western edge of the impoundment to the lower eastern portion of the impoundment. Substantial progress was thereby achieved toward meeting tailings management objectives: regarding the tailings to achieve a more regular surface in anticipation of either reclamation of future tailings storage; leveling the tailings to create a surface that is entirely below the bench, more sheltered from wind, and easier to keep moistened; covering the tailings to limit wind erosion potential; and creating stable, flat, bermed areas as evaporation lagoons for tailings dewatering.*

The Low Volume air samples taken at Air 4A, (downwind of the tailings impoundment) show levels of natural uranium, thorium-230 and radium-226, which each remained below 1.0% of the allowable effluent concentrations during 2010, documenting the effectiveness of the lagoons and spray system in controlling dusting on the tailings impoundment. Evaporation will continue to decrease the potential of seepage from the impoundment. A fan is operated continuously in the Solvent Extraction (SX) Building to exhaust any accumulated radon and radon daughters emanating from equipment stored there.

Additional monitor wells were drilled in 2004 around the Catchment Basin. The nature and extent of the contamination of soils and ground water around the Catchment Basin has been described in submittals dated May 12, July 22 and December 15, 2004 and January 18, 2005. Fluid has been pumped out of one of the shallow monitor wells (TMW-90) beginning on September 4, 2003, under Safety and Environmental Evaluation (SEE) #6 and out of the second shallow monitor well (TMW-105) beginning on March 23, 2004 under an amendment to Safety and Environmental Evaluation (SEE) #6. Pumping of these wells was terminated in 2005 since they pumped dry. Additional information about these wells may be found in the Corrective Action Program (CAP) Review. These two wells were removed by the Catchment Basin Excavation in 2006. In addition, TMW-96 and TMW-97 were pumped during 2010.

A license amendment request to excavate the contaminated soils around the Catchment Basin and expand the pumpback system to include wells around the Catchment Basin was approved on May 26, 2005. During 2006 to 2007 a total of 233,268 cubic yards of contaminated soils were excavated around the Catchment Basin. The excavation area was gridded and sampled. It is now backfilled. The fire water lines removed during the course of that excavation were replaced by the end of 2008. The chain link fence along the east side of the Mill area removed by the excavation was replaced. The top of the grade beam was doweled into the twelve (12) inch slab on grade along the east wall of the Mill Building as recommended by QED Associates/JVA Incorporated to address the separation crack in the report dated November 5, 2007. A seepage collection system consisting of two lines of perforated pipe was installed along the west high wall at the excavation bottom to collect any seepage before it migrates to the Battle Spring Formation. To date no seepage has been detected in these collection systems. Plastic liner was placed on the west high wall to separate contaminated soils beneath the Mill Building and tank slabs from the clean backfill. Details concerning the excavation were provided in the Catchment Basin Excavation Completion Report submitted on May 6, 2008. A request for additional Information (RAI) dated November 19, 2008 was received regarding the report. A response to the Request for Additional Information (RAI) was submitted by January 30, 2009. Pump back of contaminated Battle Spring Aquifer water around the Catchment Basin began in the summer of 2005. Details about this expansion of the pumpback system are included in the Corrective Action Program Review.

Oscar A Paulson

Oscar Paulson

In-House Review-2010.doc

Rio Tinto

Internal memo

10 February 2011

To: NRC File

Subject: Source Material License SUA-1350 - License Condition 12.3 – Annual ALARA Report

The following areas of the Sweetwater Uranium Project Radiation Safety Program were reviewed to determine if occupational radiation safety exposures were managed to be **A**s **L**ow **A**s **R**easonably **A**chievable (ALARA):

1. Employee Exposure Records:
Individual monitoring and reporting of employee exposures at the Sweetwater Uranium Project is not required as per 10 CFR 20.1502 since employees are unlikely to receive in excess of 10% of the limits for external or internal exposure. Gamma radiation levels and concentrations of airborne radionuclides are assessed and doses tracked to verify that employee doses are below the levels requiring individual monitoring and reporting.

2. Bioassay Results:
All bioassay results from site employees were below the first action level. In addition, pre-job bioassays were taken of any new contract employees and post-job bioassays collected from workers no longer working in the restricted area. All results were below the first action level. All bioassay results for personnel were non-detect (ND).

3. Inspections and Reports:
Daily Mill Foreman inspections and weekly work area inspections by the Radiation Safety Officer have been suspended during the period of mill shutdown as per a letter from the licensee dated June 10, 1983 and a response from NRC dated September 23, 1983.

4. Training:
Annual Radiation Safety Refresher Training was conducted on Tuesday, January 5, 2010. Annual MSHA Refresher Training was conducted on Wednesday, January 6, 2010. In addition, driver training was conducted on Monday, January 11, 2010. Also, a first aid class was provided on site on January 7, 2010. Radiation training of individual contract employees (contractor new hires) was conducted on an as-needed basis. Equipment hazard training was provided on Monday, January 11, 2010.

5. Safety Meetings:
Monthly radiation safety meetings were held with site and applicable contract personnel. These are enumerated in this document.

6. Radiation Surveys and Sampling:
Gamma, radon and airborne uranium levels in the mill are low. Internal and external dose levels are below 10% of the applicable limits so individual monitoring of personnel and reporting of individual doses are not required.

7. Reports of Overexposure of Workers:
No overexposures have occurred.

8. Standard Operating Procedures (SOPs):
Standard Operating Procedures (SOPs) were reviewed during 2010, as documented in the memorandum entitled "Annual Review of Standard Operating Procedures (SOPs)", dated 26 December 2010.

9. Radiation Work Permits:
No radiation work permits were issued in 2010.

10. Nuclear Density Gauges:
All nuclear density gauges in the mill are stored in place with the shutters closed and locked. All nuclear density gauges are inventoried semiannually. The gauges were inventoried on June 28 and December 13, 2010. All nuclear density gauges in the mill were leak tested on May 24, 2007. All gauges passed the leak test. Leak testing of the gauges is only required every ten (10) years provided they are in storage and not being used, as is the case at the Sweetwater Uranium Project. An inspection by Nuclear Regulatory Commission (NRC) staff of the gauges was performed on April 22, 2010. No violations were identified.

11. Safety and Environmental Review Panel (SERP):
No Safety and Environmental Evaluations (SEE) were issued by the Safety and Environmental Review Panel in 2010.

12. Instrument Calibrations:
Instrument calibrations were reviewed. All instruments were within their calibration interval when used.

13. Respiratory Protection:
Members of the site's respirator program were qualified for respirator use by a physician on June 2, October 29 and November 22, 2010. Annual fit testing and respirator training was conducted on November 23, 2010.

The following is based on the review of the Radiation Safety Program:

Trends in Exposure

Operations were suspended in April 1983. The mill has been cleaned with the exception of the precipitation and drying areas, which are isolated. Exposures remain low since operations are suspended.

Some equipment stored on site, especially some steel pressure vessels stored in the grinding area of the mill, has created the potential for very slight increases in gamma doses. The gamma dose rates from this equipment are not sufficiently high to require posting under 10 CFR 20.1003; however, site employees have been instructed about the vessels and avoid them. The storage of this equipment has caused slight increases in exposure to individuals working near where the equipment is stored. In addition, the equipment has caused slightly elevated radon daughter concentrations in the Solvent Extraction (SX) Building. This situation was corrected by the installation of a vent fan. The vent fan in that building was adjusted to operate continuously beginning on December 11, 2001, to exhaust accumulated radon and radon daughters. Radon daughter concentrations in the Solvent Extraction (SX) Building averaged 0.042 WL in June 2010 and 0.024 WL in December 2010.

Current Use of Control Equipment

Since the mill is not operating use of control equipment is not required in the Mill Building. The mill and solvent extraction (SX) buildings are kept locked to control access. Lagoons are operated in the tailings impoundment when weather conditions permit to control dusting. A fan is operated continuously in the Solvent Extraction (SX) Building to vent any accumulated radon and radon daughters in the building.

The shutters on the nuclear density gauges in the mill are closed and locked.

Contaminated soils were excavated from the Catchment Basin area during 2006. These soils were spread on top of tailings in the tailings impoundment. These soils, since they were lower in radium-226 than the underlying tailings, reduced gamma exposures in the tailings impoundment by acting as shielding. Airborne radionuclide concentrations in the air samples related to the tailings impoundment have been low.

A discrete Shower/Change/Monitoring trailer was installed in the fence south of the Catchment Basin excavation in 2006 to provide a place for workers to shower, change and monitor, to assure that

contamination was not being taken off site. This facility included a washing machine, showers and sinks that drained to a buried holding tank which could be pumped to the tailings impoundment. This facility was also used by tailings impoundment workers.

Work was performed in the tailings impoundment including liner repair, tailings regrading, and lagoon construction which has reduced the risk of wind induced liner failure and will ultimately enhance control of blowing tailings. This is discussed in greater detail in Sweetwater Uranium Project – Source Materials License SUA-1350: In-House Review of the Radiation Safety Program Including Audits, Inspections, Employee Exposures, Effluent Releases and Environmental Data as Required by License Condition 12.3

Possible Reduction of Exposure under the ALARA Concept

Exposures are at minimal levels due to suspension of operations. Access to known contaminated areas and to stored equipment with slightly elevated gamma levels is limited and controlled. All nuclear density gauge shutters are closed and locked. An amendment to the sealed source license BML-49-19005-01 dated April 9, 1998 was obtained which freed the licensee from the requirement of testing the on-off mechanism on the gauges every six (6) months. This amendment has caused some reduction in exposures by reducing the time that personnel have to work around the gauges and by eliminating personnel having to work with the gauge in the yellowcake barreling area thus reducing exposure to airborne yellowcake particles.

Oscar A Paulson

Oscar Paulson
Facility Supervisor
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Rio Tinto

Internal memo

2 February 2010

To: NRC File

Subject: Summary of Monthly Radiation Safety Meetings

The following is a summary of the twelve (12) monthly (plus eleven (11) additional) Radiation Safety meetings held in 2010:

2010	TOPIC	ATTENDEES
1/26	Discussed thorium and the Toxicological Profile for Thorium.	KUC
2/9	Discussed Environmental Protection Agency (EPA) aquifer exemptions.	KUC
2/24	Discussed radium and the Toxicological Profile for Radium.	KUC, ADC
3/8	Discussed in situ uranium recovery licensing process including draft Supplemental Environmental Impact Statements (SEISs) and Environmental Protection Agency (EPA) comments on them.	KUC
3/23	Discussed book entitled “To the End of the Solar System – The Story of the Nuclear Rocket”.	KUC, ADC
3/29	Discussed Casper Star Tribune article on in situ uranium recovery draft Supplemental Environmental Impact Statements (SEISs).	KUC, ADC
4/8	Discussed Environmental Protection Agency EPA) comments on the draft Supplemental Environmental Impact Statements and National Mining Association (NMA) letter regarding the issue.	KUC
4/12	Listened to National Public Radio (NPR) broadcast on laser enrichment (SILEX) system.	KUC, ADC
4/26	Discussed nuclear density gauge inspection.	KUC, ADC
5/3	Discussed Colorado bill called Uranium Processing Accountability Act (UPAA).	KUC, ADC
5/24	Discussed 40 CFR Part 192.	KUC
6/21	Discussed radon releases from the tailings impoundment in light of 2009 Method 115 Test result. Discussed radon emissions from several sources.	KUC, ADC
7/26	Discussed use of radium to treat adenoids via irradiation. Discussed risks versus benefits. Discussed dirty bombs (radiological dispersion devices).	KUC, ADC
8/25	Reviewed Method 115 Test results and radon flux test results for fluid covered areas.	KUC, ADC
8/30	Discussed University of New Mexico (UNM) study on Navajo health and uranium mining.	KUC, ADC, SEC
8/31	Discussed radiation safety for crane inspections.	KUC, AEQ
9/20	Discussed New Yorker Magazine article on uranium entitled “The Uranium Widows”. Discussed Agency for Toxic Substance and Disease Registry draft report on the Canon City Mill.	KUC, ADC
10/11	Listened to interview with Peter Hessler, author of the article “The Uranium Widows”. Discussed EPA review of Subpart W.	KUC, ADC
11/1	Discussed Tom Zoellner’s book “Uranium”.	KUC, ADC

11/23	Discussed average radon flux values for the tailings impoundment including water covered areas.	KUC, ADC
12/6	Discussed radiation safety in the Mill Building.	KUC, AEQ
12/8	Discussed radiation safety requirements to repair on overhead door in the Mill Building.	KUC, POD
12/16	Discussed background radionuclide concentrations in area wells, some of which are equipped with solar powered submersible pumps by the Bureau of Land Management (BLM) for livestock and wildlife watering. Discussed radon and its decay products.	KUC, ADC

Initial key: **ADC** = Adecco USA, Inc. **AEQ** = American Equipment
KUC = Kennecott Uranium Company **POD** = Performance Overhead Door Company
SEC = Securitas Security Services

Oscar Paulson

MonthlyRadSafetyMeetings-2010.doc

Rio Tinto

Internal memo

7 February 2011

To: NRC File

Subject: Annual Radiation Refresher Training

Annual radiation safety training for uranium mill workers was conducted by Tetra Tech Inc. on Tuesday, January 5, 2010. All permanent site workers and contract workers receive annual radiation safety training for mill workers. Regarding radiation training for contract workers, "Regulatory Guide 8.31 Information Relevant to Ensuring that Occupational Radiation Exposures at Uranium Recovery Facilities will be as Low as is Reasonably Achievable, states: *Contractors that have work assignments in a UR facility should also be given appropriate training and safety instruction. Contractor workers who will perform work on heavily contaminated equipment should receive the same training and radiation safety instruction normally required of all permanent workers."*

A description of the course content and completion certificates are maintained in the file on site. The completed exams were retained by Tetra Tech, Inc. The attendees are listed below:

Jed Goodman – Archer Construction, Inc.
Kelly Haag – Adecco
Harry Lovato – L & L Electric
Jim McCoy – Archer Construction, Inc.
Jim McMacken – Securitas Security Services
Anita Morris – Robert Jack Smith & Associates
Charles Rider – Securitas Security Services
Harold Kelley – Kennecott Uranium Company
George Palochak – "
Oscar Paulson – "
Shelley Schutterle – "

In addition, Transportation of Radioactive Materials Training was conducted on site on Tuesday, January 5, 2010 by Tetra Tech, Inc. Completion certificates are maintained on file on site. The attendee list for this training is the same as the list for radiation worker training, above.

Oscar A Paulson

Oscar Paulson
Facility Supervisor

Annual RadRefreshTrng-2010.doc

Rio Tinto

Internal memo

8 February 2011

To: NRC File

SUBJECT: Internal Occupational Exposure Assessment – Suspended Operations

The following occupational exposure assessment is based on air samples taken in the Sweetwater Mill and Tailings Impoundment during 2010. Annual intakes (based on airborne concentrations and exposure times) below 10% of the applicable Allowable Limits of Intake (ALI) in Table 1, Column 1 of Appendix B (5 E-2 µCi for Class Y natural uranium) do not require individual monitoring or dose assessment. This assessment is of the Mill Foreman, who is the individual on site who spends the greatest amount of time within the restricted areas and receives the greatest exposure.

Airborne Particulate Air Sampling Results

The results of this sampling are attached. The sampling spreadsheets are listed on the following page.

Time Spent in the Mill Building, Tailings Impoundment and Catchment Basin Excavation (Restricted Area)

The Mill Foreman spent a total of 355 hours (35.5 days) in the Sweetwater Mill and 975 hours (97.5 days) in the tailings impoundment during calendar year 2010. This is a maximum estimate of time and is based upon the assumption that for each day the Mill Foreman was in the Restricted Area he spent the entire ten (10) hour day there, even though on many occasions a visit to the mill or tailings impoundment in a given day constituted only a few hours inside the building or inside the impoundment. The days he spent in each area are based on his comments in the Alpha Monitor Record, which he signed upon completion of monitoring after leaving a Restricted Area. A table listing the time the Mill Foreman spent in various areas is included with this document.

Dose Calculation Method

10CFR20.1003 states, “Occupational dose does not include dose received from background radiation…”. In the interest of simplicity and conservatism, however, background airborne radionuclide concentrations have not been deducted from the concentrations, derived air concentrations (DACs) or percentages of allowable limits of intake (ALIs) presented in the table on the spreadsheet or text that follows.

The following additional steps were followed to ensure that the calculated dose is conservative:

- An assumption of ten (10) hours occupancy (a full working day) in either the Mill Building or tailings impoundment was assumed if the Mill Foreman entered either area on a given day in spite of the fact that actual occupancy may have been far less.
- The average and maximum airborne concentrations for thorium-230 and radium-226, based on breathing zone samples collected on the Mill Foreman and high volume air samples collected in the Mill Building were used to calculate the doses to thorium-230 and radium-226 for the time spent in the Mill Building.
- The average and maximum airborne concentrations for natural uranium, thorium-230 and radium-226 based on high volume air samples were used to calculate the doses for natural uranium, thorium-230 and radium-226 for time spent in the tailings impoundment.
- The average and maximum air sample results for natural uranium, thorium-230 and radium-226 were used to calculate the internal dose since:
    - The breathing zone samples collected in the Mill Building are believed to be more representative of worker exposure than high volume air samples of the entire work area.

Attached please find in addition to the spreadsheets entitled “Airborne Sampling Results” using average values and using maximum values, the following spreadsheets:

- Mill High Volume Air Samples.
- Tailings Impoundment High Volume Air Samples (with Non-Detect results reported as ND)
- Mill Foreman Breathing Zone Samples (with Non-Detect results reported as ND)
- Mill Foreman Breathing Zone Samples (with Non-detect results reported as the Lower Limit of Detection (LLD))

Dose Calculation Results

An internal dose of 21.5 millirems (0.022 rems) was calculated for the maximally exposed individual (the Mill Foreman) using average breathing zone sample results collected in the tailings impoundment and the Mill Building. This calculation is on the attached spreadsheet entitled Airborne Sampling Results. A second calculation was made using the maximum natural uranium, radium-225 and thorium-230 results from breathing zone samples collected from the Mill Foreman and in the tailings impoundment and Mill Building. This calculation resulted in an internal dose of 44.3 millirems (0.044 rems). This calculation is on the attached spreadsheet entitled Airborne Sampling Results (using maximum concentrations).

These calculated doses are all less than 10% of the limit of 500 millirems, above which individual monitoring is required as per 10 CFR 20.1502(b)(1). Also, the maximally exposed individual received less than 10% of the ALI for natural uranium, radium-226 and thorium-230 when working in the Mill Building and Tailings Impoundment, meaning that no worker was “…likely to receive in 1 year an intake in excess of 10 percent of the applicable ALI(s) in table 1, Columns 1 and 2 of Appendix B to §20.1001-21.2401: …” Thus, individual monitoring of occupational intake for airborne particulate radionuclides was not required.

Oscar A Paulson

Oscar A. Paulson

InternalOccExpAssess-2010.doc

KENNECOTT URANIUM COMPANY
SWEETWATER URANIUM PROJECT
MILL FOREMAN
RESTRICTED AREA TIMES

2010	Mill	Tailings	Total
5-Jan		10	10
6-Jan		10	10
13-Jan		10	10
18-Jan		10	10
25-Jan	10		10
28-Jan	10		10
3-Feb		10	10
4-Feb		10	10
8-Feb	10		10
9-Feb	10		10
10-Feb	10		10
11-Feb	5	5	10
15-Feb	10		10
16-Feb	5	5	10
17-Feb	5	5	10
18-Feb	5	5	10
22-Feb	5	5	10
23-Feb		10	10
24-Feb		10	10
25-Feb	5	5	10
1-Mar	5	5	10
2-Mar		10	10
3-Mar		10	10
4-Mar		10	10
10-Mar	10		10
15-Mar		10	10
16-Mar		10	10
18-Mar		10	10
23-Mar	5	5	10
25-Mar		10	10
29-Mar		10	10
30-Mar		10	10
31-Mar	5	5	10
1-Apr		10	10
8-Apr		10	10
12-Apr		10	10
13-Apr		10	10
15-Apr		10	10
19-Apr		10	10
20-Apr		10	10
22-Apr	10		10
29-Apr	5	5	10
3-May	5	5	10
4-May	5	5	10
5-May		10	10
12-May		10	10
31-May		10	10
17-May		10	10
18-May		10	10
20-May		10	10
24-May		10	10
25-May		10	10

MILL FOREMAN
RESTRICTED AREA TIMES

2010	Mill	Tailings	Total
26-May		10	10
27-May	5	5	10
1-Jun	5	5	10
2-Jun	5	5	10
3-Jun		10	10
7-Jun		10	10
8-Jun		10	10
9-Jun		10	10
10-Jun		10	10
14-Jun		10	10
15-Jun		10	10
16-Jun		10	10
17-Jun		10	10
28-Jun		10	10
29-Jun		10	10
30-Jun	5	5	10
1-Jul		10	10
7-Jul		10	10
8-Jul		10	10
12-Jul		10	10
13-Jul		10	10
14-Jul		10	10
15-Jul		10	10
20-Jul		10	10
26-Jul	5	5	10
27-Jul		10	10
28-Jul		10	10
29-Jul		10	10
2-Aug		10	10
3-Aug		10	10
4-Aug		10	10
5-Aug	5	5	10
9-Aug	5	5	10
10-Aug	5	5	10
11-Aug	5	5	10
12-Aug	5	5	10
16-Aug	5	5	10
17-Aug	5	5	10
18-Aug	5	5	10
19-Aug	5	5	10
24-Aug		10	10
25-Aug	5	5	10
26-Aug	5	5	10
30-Aug	10		10
31-Aug	10		10
1-Sep	5	5	10
2-Sep	5	5	10
7-Sep		10	10
8-Sep		10	10
13-Sep		10	10
14-Sep		10	10
15-Sep		10	10
20-Sep		10	10
21-Sep	5	5	10

MILL FOREMAN
RESTRICTED AREA TIMES

2010	Mill	Tailings	Total
27-Sep	5	5	10
28-Sep		10	10
29-Sep	5	5	10
30-Sep	5	5	10
13-Oct		10	10
14-Oct		10	10
18-Oct		10	10
19-Oct		10	10
20-Oct		10	10
21-Oct		10	10
23-Oct	10		10
25-Oct		10	10
26-Oct	5	5	10
27-Oct	5	5	10
28-Oct	5	5	10
1-Nov		10	10
2-Nov		10	10
3-Nov	5	5	10
4-Nov	5	5	10
9-Nov	10		10
10-Nov	10		10
11-Nov	5	5	10
16-Nov		10	10
24-Nov	10		10
2-Dec	5	5	10
27-Dec	5	5	10
28-Dec	5	5	10
Total:	**355**	**975**	**1330**

NOTES:

If a single area was recorded for a given day an assumption of ten (10) hours for that day in that area is made, regardless of actual time spent, which would always be less.

Ten (10) hours is the maximum amount of time that could be spent in any area in a day since that is the entire length of the work day.

If multiple areas were checked in the course of a day, the entire ten (10) hour work day was divided evenly between the areas. In most cases only a portion of the entire ten hour work day was spent in restricted areas.

The above described additional hours were probably never really worked in a restricted area, but were added to remain conservative.

Kennecott Uranium Company										
Sweetwater Uranium Project										
Tailings Impoundment										
High Volume Air Samples										
Sample Number	**Date**		**Volume**	**Sample Lower Limit of Detection (LLD)**	**Natural Uranium**	**Thorium 230**	**Radium 226**	**Natural Uranium % of DAC**	**Thorium 230 % of DAC**	**Radium 226 % of DAC**
	Start	**Stop**	**(milliliters)**	**(microCurie per milliliter)**	**(microCurie per milliliter)**	**(microCurie per milliliter)**	**(microCurie per milliliter)**	**(Percent)**	**(Percent)**	**(Percent)**
1	28-Apr-10	29-Apr-10	2.16E+09	1.00E-16	1.23E-15	3.68E-15	1.60E-15	6.15E-03	6.13E-02	5.33E-04
2	10-Nov-10	11-Nov-10	2.76E+09	1.00E-16	1.02E-15	7.08E-16	7.35E-16	5.10E-03	1.18E-02	2.45E-04
Average:			2.46E+09		1.13E-15	2.19E-15	1.17E-15	5.63E-03	3.66E-02	3.89E-04
Derived Air Concentrations Used										
	microCurie per milliliter									
Natural Uranium	2.00E-11	Year								
Radium-226	3.00E-10	Week								
Thorium-	6.00E-12	Year								
Notes:										
	Air sampler was located near the northeast corner of the interior of the impoundment.									
	Air sampler was pointed southwest into the prevailing wind to maximize radionuclide concentrations.									
	No sample exceeded effluent limits for natural uranium, radium-226 or thorium-230 in spite of the fact that they were collected inside of the impoundment.									

Kennecott Uranium Company											
Sweetwater Uranium Project											
Mill Building											
High Volume Air Samples											
Sample Number	**Date**			**Volume**	**Sample Lower Limit of Detection (LLD)**	**Natural Uranium**	**Thorium 230**	**Radium 226**	**Natural Uranium % of DAC**	**Thorium 230 % of DAC**	**Radium 226 % of DAC**
	Start	**Stop**		**(milliliters)**	**(microCurie per milliliter)**	**(microCurie per milliliter)**	**(microCurie per milliliter)**	**(microCurie per milliliter)**	**(Percent)**	**(Percent)**	**(Percent)**
1	28-Apr-10	29-Apr-10	Mill Grinding Area	2.06E+09	1.00E-16	7.41E-16	1.27E-16	2.94E-16	3.71E-03	2.12E-03	9.80E-05
2	28-Apr-10	29-Apr-10	Mill Precipitation Area	3.12E+09	1.00E-16	1.11E-15	2.92E-16	4.14E-16	5.55E-03	4.87E-03	1.38E-04
3	10-Nov-10	11-Nov-10	Mill Grinding Area	2.88E+09	1.00E-16	4.25E-15	1.18E-16	9.25E-16	2.13E-02	1.97E-03	3.08E-04
4	10-Nov-10	11-Nov-10	Mill Precipitation Area	3.14E+09	1.00E-16	3.89E-15	6.02E-16	6.76E-16	1.95E-02	1.00E-02	2.25E-04
Average:				2.80E+09		2.50E-15	2.85E-16	5.77E-16	1.25E-02	4.75E-03	1.92E-04
Derived Air Concentrations Used											
	microCurie per milliliter										
Natural Uranium	2.00E-11	Year									
Radium-226	3.00E-10	Week									
Thorium-230	6.00E-12	Year									

Kennecott Uranium Company
Sweetwater Uranium Project

Airborne Sampling Results: **2010**
(Using Average Values)

Breathing Zone Samples								
		Concentration				**Percent of DAC**		
		(Natural Uranium Only)	**Radium-226**	**Thorium-230**		**Natural Uranium**	**Radium-226**	**Thorium-230**
		(microCuries/ml)	**(microCuries/ml)**	**(microCuries/ml)**				
Average for 2010	Mill Foreman	4.53E-13	1.10E-13	1.00E-16		2.27E+00	3.67E-02	1.67E-03
	Average:	4.53E-13	1.10E-13	1.00E-16		2.27E+00	3.67E-02	1.67E-03
Please see attached spreadsheets								
Lower Limit of Detection (LLD) value used in average if result was non-detect.								
High Volume Air Sampling								
Date	**Location**	**Concentration**				**Percent of DAC**		
		Natural Uranium	**Radium-226**	**Thorium-230**		**Natural Uranium**	**Radium-226**	**Thorium-230**
		(microCuries/ml)	**(microCuries/ml)**	**(microCuries/ml)**				
Average for 2010	Mill Building	2.50E-15	5.77E-16	2.85E-16		1.25E-02	1.92E-04	4.75E-03
Average for 2010	Tailings Impoundment	1.13E-15	1.17E-15	2.19E-15		5.63E-03	3.89E-04	3.66E-02
	Average:	1.81E-15	8.72E-16	1.24E-15		9.06E-03	2.91E-04	1.67E-03
Please see attached spreadsheets								
Lower Limit of Detection (LLD) value used in average if result was non-detect.								
Measured Concentrations Used								
		Concentration				**Percent of DAC**		
		Natural Uranium	**Radium-226**	**Thorium-230**		**Natural Uranium**	**Radium-226**	**Thorium-230**
		(microCuries/ml)	**(microCuries/ml)**	**(microCuries/ml)**				
	Mill Foreman	4.53E-13	1.10E-13	1.00E-16		2.27E+00	3.67E-02	1.67E-03
	Tailings	1.13E-15	1.17E-15	2.19E-15		5.63E-03	3.89E-04	3.66E-02
Exposure Calculations								
Hours Worked During 2010								
	Mill	355						
	Tailings Impoundment	975						
Exposure		**Natural Uranium**	**Radium-226**	**Thorium-230**		**Total**		
		(millirems)	**(millirems)**	**(millirems)**		**(millirems)**		
	Mill Foreman - Mill	2.01E+01	3.26E-01	1.48E-02		2.05E+01		
	Mill Foreman - Tailings	1.37E-01	9.49E-03	8.91E-01		1.04E+00		
	Total	2.03E+01	3.35E-01	9.06E-01		2.15E+01		
Notes:	Average airborne concentrations for natural uranium, Radium-226 and Thorium-230 were used in the calculation for each area (mill, and tailings impoundment)							
	No air sample collected for the Mill Foreman in the Mill Building or in the tailings impoundment exceeded 10% of the Derived Air Concentration (DAC).							
	No worker could have received in excess of 10 percent of the applicable ALIs) in Table 1, Column 1 and 2 of Appendix B to 10 CFR 20.1001 - 20.2401 requiring monitoring of occupational intake.							

Kennecott Uranium Company
Sweetwater Uranium Project

Airborne Sampling Results: **2010**
(Using Maximum Values)

Breathing Zone Samples								
		Concentration				**Percent of DAC**		
		(Natural Uranium Only)	**Radium-226**	**Thorium-230**		**Natural Uranium**	**Radium-226**	**Thorium-230**
		(microCuries/ml)	**(microCuries/ml)**	**(microCuries/ml)**				
Maximum for 2010	Mill Foreman	9.59E-13	4.40E-13	1.00E-16		4.80E+00	1.47E-01	1.67E-03
	Maximum	9.59E-13	4.40E-13	1.00E-16		4.80E+00	1.47E-01	1.67E-03
Please see attached spreadsheets								
Lower Limit of Detection (LLD) value used in average if result was non-detect.								
High Volume Air Sampling								
Date	**Location**	**Concentration**				**Percent of DAC**		
		Natural Uranium	**Radium-226**	**Thorium-230**		**Natural Uranium**	**Radium-226**	**Thorium-230**
		(microCuries/ml)	**(microCuries/ml)**	**(microCuries/ml)**				
Maximum for 2010	Mill Building	4.25E-15	9.25E-16	6.02E-16		2.13E-02	3.08E-04	1.00E-02
Maximum for 2010	Tailings Impoundment	1.23E-15	1.60E-15	3.68E-15		6.15E-03	5.33E-04	6.13E-02
	Maximum	4.25E-15	1.60E-15	3.68E-15		1.37E-02	4.21E-04	1.67E-03
Please see attached spreadsheets								
Lower Limit of Detection (LLD) value used in average if result was non-detect.								
Measured Maximum Concentrations Used								
		Concentration				**Percent of DAC**		
		Natural Uranium	**Radium-226**	**Thorium-230**		**Natural Uranium**	**Radium-226**	**Thorium-230**
		(microCuries/ml)	**(microCuries/ml)**	**(microCuries/ml)**				
	Mill Foreman	9.59E-13	9.25E-16	6.02E-16		4.80E+00	3.08E-04	1.00E-02
	Tailings	1.23E-15	1.60E-15	3.68E-15		6.15E-03	5.33E-04	6.13E-02
Exposure Calculations								
Hours Worked During 2010								
	Mill	355						
	Tailings Impoundment	975						
Exposure		**Natural Uranium**	**Radium-226**	**Thorium-230**		**Total**		
		(millirems)	**(millirems)**	**(millirems)**		**(millirems)**		
	Mill Foreman - Mill	4.26E+01	2.74E-03	8.90E-02		4.26E+01		
	Mill Foreman - Tailings	1.50E-01	1.30E-02	1.50E+00		1.66E+00		
	Total	4.27E+01	1.57E-02	1.58E+00		4.43E+01		
Notes:	Maximum airborne concentrations for natural uranium, Radium-226 and Thorium-230 were used in the calculation for each area (mill, and tailings impoundment)							
	No air sample collected for the Mill Foreman in the Mill Building or in the tailings impoundment exceeded 10% of the Derived Air Concentration (DAC).							
	No worker could have received in excess of 10 percent of the applicable ALIs) in Table 1, Column 1 and 2 of Appendix B to 10 CFR 20.1001 - 20.2401 requiring monitoring of occupational intake.							

Kennecott Uranium Company									
Sweetwater Uranium Project									
Mill Foreman									
Breathing Zone Samples									
		Volume	**Sample Lower Limit of Detection (LLD)**	**Natural Uranium**	**Thorium-230**	**Radium-226**	**Natural Uranium % of DAC**	**Thorium 230 % of DAC**	**Radium 226 % of DAC**
Date	**Task**	**(milliliters)**	**(microCurie per milliliter)**	**(microCurie per milliliter)**	**(microCurie per milliliter)**	**(microCurie per milliliter)**	**(Percent)**	**(Percent)**	**(Percent)**
31-Mar-10	Mill Foreman	4.66E+05	1.00E-16	9.59E-13	1.00E-16	1.00E-16	4.795	0.002	0.000
30-Jun-09	Mill Foreman	8.39E+05	1.00E-16	5.30E-13	1.00E-16	4.40E-13	2.650	0.002	0.147
30-Sep-10	Mill Foreman	8.42E+05	1.00E-16	1.32E-13	1.00E-16	1.00E-16	0.660	0.002	0.000
28-Dec-10	Mill Foreman	1.59E+06	1.00E-16	1.92E-13	1.00E-16	1.00E-16	0.960	0.002	0.000
Average:		9.34E+05	1.00E-16	4.53E-13	1.00E-16	1.10E-13	2.27E+00	1.67E-03	3.67E-02
Notes:	All results listed on the laboratory reports as being less than the specific sample's Lower Limit of Detection (LLD) are entered at the LLD value of 1.00E-16 microCuries per milliliter.								
	Air sample results to date show that the Mill Foreman is unlikely to receive in excess of 10% of the applicable ALI thus individual monitoring of intakes is not required.								
	Some results for Radium-226 and Thorium-230 were reported as negative values signifying concentrations below the Lower Limit of Detection (LLD).								
	Used revised (recheck) result for natural uranium for the first quarter breathing zone sample.								
Derived Air Concentrations Used									
	microCurie per milliliter								
Natural Uranium	2.00E-11	Year							
Radium-226	3.00E-10	Week							
Thorium-230	6.00E-12	Year							

Kennecott Uranium Company									
Sweetwater Uranium Project									
Mill Foreman									
Breathing Zone Samples									
		Volume	**Sample Lower Limit of Detection (LLD)**	**Natural Uranium**	**Thorium-230**	**Radium-226**	**Natural Uranium % of DAC**	**Thorium 230 % of DAC**	**Radium 226 % of DAC**
Date	**Task**	**(milliliters)**	**(microCurie per milliliter)**	**(microCurie per milliliter)**	**(microCurie per milliliter)**	**(microCurie per milliliter)**	**(Percent)**	**(Percent)**	**(Percent)**
31-Mar-10	Mill Foreman	4.66E+05	1.00E-16	9.59E-13	ND	ND	4.795	ND	ND
30-Jun-09	Mill Foreman	8.39E+05	1.00E-16	5.30E-13	ND	4.40E-13	2.650	ND	0.147
30-Sep-10	Mill Foreman	8.42E+05	1.00E-16	1.32E-13	ND	ND	0.660	ND	ND
28-Dec-10	Mill Foreman	1.59E+06	1.00E-16	1.92E-13	ND	ND	0.960	ND	ND
Average:		9.34E+05	1.00E-16	4.53E-13	ND	4.40E-13	2.27E+00	ND	1.47E-01
Notes:	All results listed on the laboratory reports as being less than the specific sample's Lower Limit of Detection (LLD) are entered as Non-Detect (ND).								
	Air sample results to date show that the Mill Foreman is unlikely to receive in excess of 10% of the applicable ALI thus individual monitoring of intakes is not required.								
	Some results for Radium-226 and thorium-230 were reported as negative values signifying concentrations below the Lower Limit of Detection (LLD).								
	Used revised (recheck) result for natural uranium for the first quarter breathing zone sample.								
Derived Air Concentrations Used									
	microCurie per milliliter								
Natural Uranium	2.00E-11	Year							
Radium-226	3.00E-10	Week							
Thorium-230	6.00E-12	Year							

Rio Tinto

Internal memo

7 February 2011

To: NRC File

Subject: Bioassay Assessment

A review of the monthly urinalysis sample results for the Mill Foreman, Senior Facility Technician, Facility Supervisor and urine analysis sample results of contract and other site employees working in 2010 shows that all results are well below the first action level of 15 µg/L. In fact, all urinalysis results for the year 2010 were less than the lower limit of detection (LLD) of 5.0 µg/liter.

Site employees entering the restricted areas were bioassayed monthly. Contract employees working on site who could potentially contact contaminated materials were bioassayed prior to the commencement of work and monthly while working on the site. If an employee ceased to work on the site, a final bioassay was collected, if at all possible. Contract employees who did not work on site during a given month were not bioassayed during that month. Bioassaying of those employees was restarted when they returned to work on site.

The Security Guards were tested monthly in spite of the fact that they did not work in the restricted area in 2010. The site Administrative Coordinator and contract Administrative Assistant were also tested monthly in spite of the fact that they did not work in the restricted area and worked solely in the office.

Please see attached summary of 2010 urinalysis data.

Oscar A Paulson

Oscar A. Paulson
Facility Supervisor

KENNECOTT URANIUM COMPANY			BIOASSAY TESTING												
SWEETWATER URANIUM PROJECT			2010												
EMPLOYEE TITLE		**EMPLOYER**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	**LLD**
Facility Supervisor	FS	Kennecott Uranium Company	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**5.0**
Mill Foreman	MF	Kennecott Uranium Company	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**5.0**
Senior Facility Technician	FT	Kennecott Uranium Company	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**5.0**
Administrative Coordinator [1]	AC	Kennecott Uranium Company	<5.0 [1]	<5.0 [1]	<5.0 [1]	<5.0 [1]	<5.0 [1]	<5.0 [1]	<5.0 [1]	<5.0 [1]	<5.0 [1]	<5.0 [1]	<5.0 [1]	<5.0 [1]	**5.0**
CONTRACT EMPLOYEE TITLE		**EMPLOYER**													
Administrative Assistant [1]	DATA	Adecco USA, Inc.	<5.0 [1]	<5.0 [1]	<5.0 [1]	<5.0 [1]	<5.0 [1]	<5.0 [1]	<5.0 [1]	<5.0 [1]	<5.0 [1]	<5.0 [1]	<5.0 [1]	<5.0 [1]	**5.0**
Security	SEC # 1	Securitas Security	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**5.0**
Security	SEC # 4	Securitas Security	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**5.0**
Surveyor	SURV	W L C								<5.0					**5.0**
Crane Repair / Inspector	CRN # 2	American Equipment, Inc.									<5.0				
Crane Repair / Inspector	CRN # 3	American Equipment, Inc.												<5.0	**5.0**
Crane Repair / Inspector	CRN # 4	American Equipment, Inc.												<5.0	**5.0**
Door Repair	DR # 1	Performance Overhead Door, Inc.												<5.0	**5.0**

All samples tested by:
ENERGY LABORATORIES, INC.
All samples below first action level.
A high, low and blank spike sent with each batch.

Notes:

Pre-job bioassays were collected on new personnel and final bioassays were collected on personnel leaving the job site.

Contract security guards were tested when on site in spite of the fact that they did not enter the restricted area.

Was not on site for this month.

[1] Did not work in restricted area in 2010 / worked solely in office.

Administrative coordinator and contract administrative assistant were tested in spite of the fact that they worked solely in the office.

Rio Tinto

Internal memo

8 February 2011

To: NRC File

Subject: Summary of Radiation Instrument Calibrations – 2010

Instrument		Date(s) Calibrated
Calibration Orifices (Annual calibration required)		
	Lo Vol-40A S/N M100	2/25/10
	Hi Vol-25A S/N 8080978	2/25/10
	Sierra Instruments TE-5025A	2/25/10
Calibrators (Annual calibration required)		
	CD-530-1 Digital Venturi Calibrator S/N 3039	2/9/10
Alpha Detectors		
	43-5 S/N P-2425	2/6/10, 7/9/10, 1/19/11
	43-5 S/N P-2426	12/28/09, 7/2/10, 1/5/11
	43-5 S/N P-2427	12/28/09, 7/6/10, 1/6/11
	43-5 S/N P-2428	12/28/09, 7/6/10, 1/6/11
	43-5 S/N P-2429	2/17/10, 7/9/10, 1/19/11
	43-90 S/N PR-138872	12/24/09, 7/6/10, 1/19/11
	43-90 S/N PR-138874	2/17/10, 7/9/10, 1/20/11
	43-90 S/N 232499	12/18/09, 6/24/10, 1/5/11
	43-1 S/N PR-206925	2/1/10, 8/20/10
	AC3-5 S/N 3793	1/29/10, 8/23/10
Gamma Meters/Detectors		
	12S S/N 11816	1/19/10, 8/6/10
	5 S/N 8170	1/18/10, 8/14/10
	44-10 S/N 206932	2/1/10, 8/20/10
	44-10 S/N 233869	2/20/10, 8/20/10
	19 S/N 16938	1/20/10, 8/6/10
	44-10 S/N 252103	2/2/10, 8/20/10
	44-10 S/N 252068	6/28/10, 1/4/11
Rate Meters		
	177 S/N 14390	2/16/10, 7/8/10, 1/19/11
	177 S/N 14407	12/24/09, 7/2/10, 1/5/11
	2350-1 S/N 192613	2/5/10, 8/9/10
	2350-1 S/N 216182	2/2/10, 8/20/10
	2350-1 S/N 235547	12/18/09, 6/28/10, 1/4/11
	2350-1 S/N 235565	1/29/10, 8/19/10
	Model 3 S/N 157539	12/29/09, 7/13/10, 1/15/11
	Model 12 S/N 12280	1/27/10, 8/23/10

	PRS-1 S/N 330/3793	1/28/10, 8/23/10
SAC R4		
	S/N 383	12/22/09, 7/12/10, 1/14/11
SAC R5		
	S/N 614	12/23/09, 7/2/10, 1/13/11
	S/N 965	12/14/09, 6/23/10, 1/4/11
	S/N 602548	12/14/09, 1/4/11[1]
Scaler		
	MS-2 S/N 738	12/11/09, 6/23/10, 1/4/11
	MS-2 S/N 994	12/23/09, 7/2/10, 1/13/11
Beta Gamma Detector		
	Model 44-1 S/N PR-156890	1/27/10, 8/25/10
	Model 44-9 S/N PR-093335	12/29/09, 7/13/10, 1/17/11
Air Pumps		
	Buck Basic S/N 12527	Used for personal breathing zone sampling and for radon progeny sampling. Please see attached sheet
	Buck Basic 12 S/N 12486	
	Buck Basic 12 S/N 12494	
Scintillation Detector		
	Model SPA-1 S/N 704727	12/14/09, 6/23/10, 1/4/11
Hi Vol Air Sampler		
	S/N Unit # 1	1/14/10, 4/7/10, 7/14/10, 10/5/10
	S/N Unit # 2	1/14/10, 4/7/10, 7/14/10, 10/4/10
	S/N Unit # 3	1/14/10, 4/7/10, 7/14/10, 10/4/10
	S/N Unit # 4	1/14/10, 4/7/10, 7/14/10, 10/4/10
Lo Vol Air Sampler (Graseby)		
	Unit #2	Removed from service in 2010. [2]
Lo Vol Air Sampler (F & J Specialties)		
	DF-604 S/N 10016	Annual Factory calibration: February 16, 2010. Field calibration/checks: 1/4, 2/23, 3/8, 4/6, 5/3, 6/1, 7/6, 8/2, 9/7, 10/4, 11/1 and 12/6/10.
	DF-604 S/N 8917	Annual Factory calibration: February 24 and November 16, 2010. Field Calibration/checks: 2/1/10.

Lo Vol Air Sampler In-Service Dates:
One unit is required to be operating at the single required downwind air monitoring station during non-operating periods. The F&J Specialties DF-604 unit with serial number 10061 operated from January 1 to February 1, 2010. The DF-604 unit with serial number 8917 operated from February 1 to February 18, 2010. The DF-604 unit with serial number 10016 operated from February 18 to December 31, 2010.

Note: Portable electronic survey instruments calibrated by a contract laboratory (Energy Laboratories, Inc.) in accordance with ANSI Standard N323A-1997 – American National Standard – Radiation Protection Instrumentation – Test and Calibration, Portable Survey Instruments.

Orifices are calibrated annually as stated in the Environmental Protection Agency Quality Assurance Handbook for Air Pollution Measurement Systems - Volume II – Ambient Air Specific Methods. Calibrators are calibrated annually, as per the manufacturer.

No electronic survey instrument was used on site unless that instrument had been calibrated within the last six (6) months prior to use. Instruments were sent to the off-site calibrator following six (6) months of last calibration. The off-site calibrator has experienced severe delays in calibrating and returning instruments to the site in the past. They have since hired another technician and turnaround time has improved, though delays occur periodically.

[1] Unit out of service June 14, 2010 until January 4, 2011, at calibrator; photomultiplier tube required replacement.
[2] Not required as a standby unit since site has two DF-604 units (serial numbers 8917 and 10016). One is in use and the second is on standby in the event the operating unit fails. A spare plenum and motor are kept on site as well.

To insure a high level of accuracy of breathing zone sample volumes, these units were calibrated between each sample event, on the following dates/times:

Buck Basic 12 – S/N B12527

Date	Time
1/14/10	15:33
4/7/10	10:30
7/12/10	15:33
10/7/10	13:54

Buck Basic 12 – S/N B12494

Date	Time
1/14/10	16:35
4/7/10	10:21
5/20/10	16:02
7/12/10	14:50
9/13/10	16:42
10/7/10	13:40
12/1/10	17:22
12/2/10	10:18

Buck Basic 12 – S/N B12486

Date	Time
1/14/10	12:54
3/9/10	14:57
3/31/10	15:52
4/7/10	10:15
7/12/10	15:26
10/7/10	13:46
1/8/11	16:44

Oscar A Paulson

Oscar Paulson
Facility Supervisor

Rio Tinto

Internal memo

9 February 2011

TO: Gamma Radiation Monitoring File

Subject: External Gamma Radiation Survey Assessment

In 2010, gamma surveys of the Mill were conducted on June 14 and December 2 and 6, 2010. Gamma surveys of the interior of the tailings impoundment were conducted on June 24 and December 7, 2010. Gamma surveys of the Ion Exchange area were conducted on June 8, 14, 24 and December 6 and 22, 2010.

Eighteen (18) areas or items associated with the Ion Exchange equipment were surveyed on June 8, 14, 24 and December 6 and 22, 2010. Twenty-eight (28) locations in the Mill and Solvent Extraction (SX) Buildings were surveyed for gamma radiation in June 2010 while thirty-one (31) locations were surveyed on December 2 and 6, 2010.

Average gamma readings for discrete items or areas ranged from 32 to 526 µR/hour (159-µR/hr average for the year) for the Ion Exchange areas and related equipment, to 12 to 751 µR/hour (74 µR/hr average for the year) in the Mill and Solvent Extraction (SX) Buildings.

The stored equipment was monitored as well on June 14, 15 and December 7, 2010. Average gamma readings for discrete items of stored equipment ranged from 14 to 3715 µR/hr at the equipment surface. The stored equipment generally exhibited higher gamma readings than the existing mill equipment, with the overall effect of slightly increasing gamma doses in the mill in areas where the equipment is stored.

None of the stored equipment exhibited dose rates at thirty (30) centimeters from the equipment (greater than 0.005 rems) sufficient to require posting under 10 CFR 20.1003 as a radiation area. The highest reading encountered at thirty (30) centimeters from any piece of equipment was 2.79 mR/hr (0.003 R/hr). Employees and contract personnel have been instructed to avoid certain pieces of stored equipment (pressure vessels) in the mill that exhibit the highest levels of gamma radiation. The area in which the pressure vessels are stored in the mill has been identified.

Two gamma surveys were completed in the tailings impoundment on June 24 and December 7, 2010. This area averaged 96.9 µR/hr for 2010. Due to the large number of readings taken in the impoundment on June 24 and December 7, 2010, the tables with all of the readings are not included. Over 400 readings were taken in the impoundment each time.

Gamma radiation levels from the stored resin in the thickener in the Counter Current Decantation (CCD) area of the mill are tracked. The levels remain low. The results of the monitoring are included on the attached table entitled “Stored Resin Gamma Radiation Monitoring Results”.

In spite of the fact that personal monitoring of dose at the site is not required due to the demonstrated low doses to individuals, personal external dosimeters were issued to site and contract personnel. The maximum annual external deep dose above background received by any site Luxel dosimeter was 3 millirems. A summary of the dosimetry results is attached.

An assessment of dose (external and internal) to the maximally exposed individual (the Mill Foreman) demonstrating the lack of need for individual monitoring under 10 CFR 20.1502 is maintained on file on site.

Oscar A Paulson

Oscar Paulson

Kennecott Uranium Company

Sweetwater Uranium Project

Stored Resin

Stored Resin Gamma Radiation Monitoring Results

	Gamma	
	Top	**Bottom**
Date	**(uR/hr)**	**(uR/hr)**
28-Apr-98	25	60
8-Oct-98	22	160
12-May-99	19	60
17-Nov-99	45	90
21-May-00	30	70
21-Dec-00	40	70
20-Jun-01	40	65
26-Dec-01	90	80
24-Jun-02	60	80
23-Dec-02	14	60
25-Jun-03	20	60
16-Dec-03	41.8	71.7
28-Jun-04	57.8	152
16-Dec-04	28.7	110
8-Jun-05	18	120
22-Dec-05	53.4	262
14-Jun-06	32.7	125
21-Dec-06	50.1	117
26-Jun-07	25.1	111
13-Dec-07	24.9	133
24-Jun-08	27.3	24.3
23-Dec-08	52.6	71.2
23-Jun-09	37.6	78.3
24-Nov-09	43.8	71.9
14-Jun-10	34	74
2-Dec-10	19	179
Average:	**36.6**	**98.3**
Standard Deviation:	**17.1**	**49.4**

OAP:2/9/10

resin0001.xls

KENNECOTT URANIUM COMPANY

Sweetwater Uranium Project

OCCUPATIONAL RADIATION DOSIMETRY RESULTS / DEEP DOSE

2010

EMPLOYEE TITLE	CODE	BADGE	EMPLOYER	January	February	March	April	May	June	July	August	September	October	November	December	Total
FACILITY SUPERVISOR	FS	24	KENNECOTT URANIUM CO.	M	M	M	M	M	M	M	M	M	M	M	M	0
MILL FORMAN	MF	26	KENNECOTT URANIUM CO.	M	M	M	M	M	M	M	M	M	M	M	M	0
SR. FACILITY TECHNICIAN	FT	27	KENNECOTT URANIUM CO.	M	M	M	M	M	M	M	M	M	M	M	M	0
Administrative Coordinator	AC	25	KENNECOTT URANIUM CO.	M	M	M	M	M	M	M	M	M	M	M	M	0
CONTRACT EMPLOYEE																
TITLE			**EMPLOYER**													
Administrative Assistant	AST	75	ADECCO USA Inc.	M	M	M	M	M	M	M	M	M	M	M	M	0
SECURITY	SEC # 1	49	SECURITAS	M	2	M	M	M	M	M	M	M	M	M	M	2
SECURITY	SEC # 4	88	SECURITAS	M	M	M	M	M	M	M	M	M	M	M	M	0
SURVEYOR	SURV	28	WLC Inc.	M	M	M	M	M	M	M	M	M	M	M	M	0
VISITOR BADGE	D-1	35		M	2	M	M	M	M	M	M	M	M	M	1	3
VISITOR # 1BADGE	D-2	36		M	M	M	M	M	M	M	M	M	M	M	M	0
VISITOR # 3 BADGE	D-3	33		M	M	M	M	M	M	M	M	M	M	M	M	0
Crane Repair / Inspection	CRN # 2		AMERICAN EQUIPMENT, Inc.								M / D-1					
Crane Repair / Inspection	CRN # 3		AMERICAN EQUIPMENT, Inc.												M / D-1	
Crane Repair / Inspection	CRN # 4		AMERICAN EQUIPMENT, Inc.												M / D-2	
Door Repair / Inspection	DR # 1		PERFORMANCE OVERHEAD DOOR Inc.												M / D-1	

Employees listed by title (number) to preserve confidentiality

Not on site during month

Dosimeter lost/Dose estimated by Landauer, Inc.

M = Minimal reporting service of 1 MREM

D-1 - Issued Visitor Dosimeter Badge

D-2 - Issued Visitor-1 Dosimeter Badge

D-3 - Issued Visitor-3 Dosimeter Badge

NOTE: Workers new to the site were issued a visitor dosimeter until their assigned/permanent dosimeter arrived from Landauer, Inc.

All exposures are less than 10% of the limits in 10 CFR 20.1502 and as such monitoring and reporting of doses is not required.

This individual tracking of doses using dosimeters exchanged on a monthly basis is being performed to insure that external doses are indeed being maintained ALARA

Rio Tinto

Internal memo

23 February 2011

To: Total and Removable Alpha Monitoring File

Subject: Total and Removable Alpha Monitoring Assessment

In 2010 removable alpha monitoring was performed in the Mill and Solvent Extraction (SX) Buildings and in the Ion Exchange area on June 23 and December 13, 2010. Total alpha monitoring was performed on June 21, 22, December 16, 21 and 26, 2010 (total alphas in the Mill and Ion Exchange areas).

Total and removable alpha monitoring was performed at least four (4) locations related to the Ion Exchange plant and at least nineteen (19) locations related to the Mill and Administration Buildings.

Total average alpha contamination levels in the Mill Building ranged between 81.6 and 45,703 dpm/100 cm^2. The single high reading was taken at the southeast corner of the centrifuge support frame in the Yellowcake Area of the Mill Building. This area is part of the restricted area. Removable alpha contamination in the Mill Building ranged from 0.2 to 675.7 dpm/100 cm^2. The single high removable alpha measurement was taken on June 23, 2010 of the southeast corner of the centrifuge support frame in the yellowcake area of the Mill Building. This item is within the restricted area. Most of the alpha contamination on the centrifuge support frame is fixed in place and non-mobile. The removable contamination on the support frame varied from 30.4 to 675.7 dpm/100 $cm^{2.}$ The contamination on the centrifuge frame appears to be fixed to the zinc coating on the galvanized steel support frame.

Total average alpha contamination levels in the Ion Exchange area ranged from 67.2 to 2177 dpm/100 cm^2. This single high reading was on the elution pump skid. The Ion Exchange area is a restricted area. Removable alpha contamination levels in the Ion Exchange area ranged from 1.2 to 22.3 dpm/100 cm^2. Both the high total and removable alpha readings are below the limits (5000/1000 dpm/100 cm^2) for release for unrestricted use.

Total alpha monitoring of the stored equipment was performed on June 22, 23 and December 21 and 22, 2010. Removable alpha monitoring of the stored equipment was performed on June 24 and December 15, 2010, as well. Total alpha readings on the equipment ranged from 71 to 120,661 dpm/100 cm^2. Removable alpha readings for the stored equipment ranged from Non-Detect to 3166.1 dpm/100 cm^2. The high total and removable alpha readings were from rubber liner material on the inside of a connection pipe welded onto stored pressure vessel #8. This vessel, along with some others, is stored in the tailings impoundment to isolate them.

Nuclear Regulatory Commission (NRC) regulations provide no specific limit on surface contamination levels in the restricted areas. This vessel is stored in the tailings impoundment, a restricted area.

Regulatory Guide 8.30 *Health Physics Surveys in Uranium Recovery Facilities* states in section 2.5:

> ***2.5 Surveys for Surface Contamination in Restricted Area***
>
> *NRC regulations provide no specific limit on surface contamination levels in restricted areas. However, yellowcake or ore dust lying on surfaces can become resuspended and contribute to the intake of radionuclides, which is limited by 10 CFR 20.1204.*
>
> *In ore handling areas, surface contamination is not a problem because of the very low specific activity of the ore. In fact, cleanup attempts by methods such as sweeping are likely to produce a*

more serious hazard through resuspension in the air than if the ore dust were allowed to remain where it lies. When necessary, cleanup may be performed by hosing down the ore dust into floor sumps or by using vacuum suction systems with filtered exhausts.

In leaching and chemical separation areas there is usually little dust and little difficulty with surface contamination.

In the precipitation circuit and the yellowcake drying and barreling areas, surface contamination can be a problem because of the concentrated nature of the yellowcake. The International Atomic Energy Agency (IAEA) recommends (Ref.2) a limit for alpha contamination on such areas as walls, floors, benches, and clothing of 10-³ μ Ci/cm2 (220,000 dpm/100 cm2), which is equivalent to about 2 mg/cm2 of natural uranium. Based on experience, the IAEA concluded that if surface contamination levels are kept below this value, the contribution to airborne radioactivity from surface contamination will be well below applicable limits. The British National Radiological Protection Board also recommends a limit of 10-³ μ Ci/cm2 for uranium alpha contamination in active areas of plants (Ref.22), based on calculation using resuspension factors rather than experience.

The NRC staff considers surface contamination levels of 10-³ μ Ci/cm2 acceptable to meet the ALARA concept in UR facilities. The levels are low enough to ensure little contribution to airborne radioactivity, yet are practical to meet. Such an amount of yellowcake surface contamination is readily visible because of the low specific activity of uranium and does not require a survey instrument for detection. It is recommended that surfaces where yellowcake may accumulate be painted in contrasting colors because surveys for surface contamination in work areas are visual rather than by instrument.

The elevated total and removable alpha readings fall below the 220, 000 dpm/100 cm^2 threshold. In addition, these readings are total alpha readings of alpha contamination fixed to rubber, which poses little risk of becoming airborne. The removable alpha contamination for this surface is only 3166 dpm/100 cm^2

Oscar A Paulson

Oscar A. Paulson

Rio Tinto

Internal memo

9 February 2011

To: Radon Monitoring File

Subject: Radon Daughter Monitoring Assessment

In 2010 radon daughter monitoring was conducted on May 19 and November 30, 2010 in the Ion Exchange Area. Radon daughter monitoring was conducted in the Mill Building on May 19 and December 1, 2010.

At least twelve (12) locations throughout the Mill and three (3) locations around the IX were sampled for radon daughters. In addition, locations in the Security Trailer and Administration Building were sampled for radon daughters as well. Radon daughter concentrations (in working levels) were at low levels, ranging from ND to 0.002 WL in the Ion Exchange area (average: 0.001) and 0.002 to 0.048 WL in the Mill and Solvent Extraction (SX) Buildings (average: 0.014). The ventilation fan operated continuously in the Solvent Extraction (SX) Building. Radon levels varied in the SX building from 0.020 to 0.048 WL, averaging 0.042 WL in May 2010 and 0.024 WL in December 2010. Radon concentrations have not exceeded the 0.08 WL thresholds in the SX Building which would require weekly monitoring. The fan continues to be effective in controlling radon daughter concentrations.

Radon daughter concentrations were measured in May and December 2010 in the Security Trailer to assist in determining an equilibrium factor for the area, for use in calculating dose to the nearest resident.

Radon daughters were sampled and analyzed using the modified Kusnetz method.

Two (2) RadTrak radon monitors were placed above and beneath the Number 1 Counter-Current Decantation (CCD) tank in the Mill during all four quarters of 2010 to monitor radon levels associated with the used ion exchange resin stored in the Number 1 CCD tank. Radon concentrations below the tank varied from 2.1 to 2.7 pCi/L. Radon concentrations on top of the tank varied from 1.5 to 2.9 pCi/L. These values are at background levels since upwind radon concentrations for the facility varied from 1.7 to 3.3 pCi/L during 2010, as shown in the table below:

2010 Radon Concentrations

Quarter	Bottom of CCD#1 (pCi/L)	Top of CCD#1 (pCi/L)	Upwind (Background) (pCi/L)
1st	2.7	2.9	3.3
2nd	2.1	1.5	1.7[2]
3rd	2.2	1.9	2.5[2]
4th	2.3	1.8	2.2[2]
Average	2.3	2.0	2.4

[2] Average of two (2) Rad Trak units.

Radon daughter concentrations at the top and bottom of CCD#1 were low, ranging from 0.006 to 0.014 WL.

A history of the RadTrak results and the radon daughter sampling results is included on the attached tables entitled “Stored Resin RadTrak Monitoring Results” and “Stored Resin Radon Monitoring Results”.

Oscar A Paulson

Oscar Paulson

Kennecott Uranium Company

Sweetwater Uranium Project

Stored Resin

Stored Resin RadTrak Monitoring Results

	RadTrak Results	
	Top	**Bottom**
Date	**(pCi/l)**	**(pCi/l)**
2ND Quarter 1998	1.9	2.0
3RD Quarter 1998	2.3	2.1
4TH Quarter 1998	1.7	1.8
1ST Quarter 1999	3.3	3.3
2ND Quarter 1999	2.3	2.5
3RD Quarter 1999	2.3	2.9
4TH Quarter 1999	4.8	4.5
1ST Quarter 2000	2.7	2.7
2ND Quarter 2000	2.2	3.3
3RD Quarter 2000	2.8	3.2
4TH Quarter 2000	3.9	4.7
1ST Quarter 2001	2.9	5.2
2ND Quarter 2001	1.0	1.5
3RD Quarter 2001	2.0	2.5
4TH Quarter 2001	2.5	3.4
1ST Quarter 2002	2.8	2.6
2ND Quarter 2002	1.8	2.2
3RD Quarter 2002	2.9	2.3
4TH Quarter 2002	2.7	4.7
1ST Quarter 2003	2.5	2.8
2ND Quarter 2003	2.0	3.2
4TH Quarter 2003	3.5	3.3
1ST Quarter 2004	2.9	3.5
2ND Quarter 2004	1.2	2.4
3RD Quarter 2004	2.2	2.7
4TH Quarter 2004	3.2	3.4
1ST Quarter 2005	2.1	2.8
2ND Quarter 2005	1.8	3.2
3RD Quarter 2005	3.0	3.5
4TH Quarter 2005	3.2	3.5
1ST Quarter 2006	3.0	3.0
2ND Quarter 2006	2.0	2.7
3RD Quarter 2006	2.4	2.7
4TH Quarter 2006	3.5	3.7
1ST Quarter 2007	3.8	2.7
2ND Quarter 2007	2.1	1.2
3RD Quarter 2007	2.8	3.7
4TH Quarter 2007	2.6	3.1
1ST Quarter 2008	3.4	3.9
2ND Quarter 2008	2.2	2.9
3RD Quarter 2008	2.7	3.1
4TH Quarter 2008	3.4	3.4
1ST Quarter 2009	3.4	3.0
2ND Quarter 2009	2.3	2.8
3RD Quarter 2009	2.3	2.8
4TH Quarter 2009	3.0	3.0
1ST Quarter 2010	2.9	2.7
2ND Quarter 2010	1.5	2.1
3RD Quarter 2010	1.9	2.2
4TH Quarter 2010	1.8	2.3
Average:	**2.6**	**3.0**
Standard Deviation:	**0.7**	**0.8**
3.7	Corrected value	

Kennecott Uranium Company		
Sweetwater Uranium Project		
Stored Resin		
Stored Resin Radon Monitoring Results		
	Radon	
	Top	**Bottom**
Date	**(WL)**	**(WL)**
24-Nov-98	0.028	0.023
19-May-99	0.037	0.020
12-Oct-99	0.040	0.057
26-Apr-00	0.008	0.005
21-Nov-00	0.030	0.023
15-May-01	0.027	0.027
10-Dec-01	0.024	0.023
16-Jun-02	0.013	0.012
25-Nov-02	0.027	0.028
2-Jun-03	0.013	0.011
30-Nov-03	0.012	0.007
30-Jun-04	0.010	0.013
2-Dec-04	0.011	0.027
21-Jun-05	0.028	0.016
1-Dec-05	0.022	0.025
12-Jun-06	0.002	0.000
19-Dec-06	0.043	0.043
24-Jun-07	0.005	0.012
10-Dec-07	0.021	0.012
10-Jun-08	0.022	0.027
9-Dec-08	0.009	0.007
2-Jun-09	0.003	0.006
9-Dec-09	0.008	0.008
19-May-10	0.013	0.014
1-Dec-10	0.006	0.008
Average:	**0.018**	**0.018**
Standard Deviation:	**0.012**	**0.013**

Rio Tinto

Internal memo

POTABLE WATER QUALITY SUMMARY
2010

Coliform Count Summary

Date	**Drake #1** (well head)	**Administration Building Water Supply (PWW-1 or PWW-2)** (kitchen sink cold tap)
1/4/10	Good	Good
2/8/10	Good	Good
3/1/10	Good	Good
4/6/10	Good	Good
5/4/10	Good	Good
6/1/10	Good	Good
7/6/10	Good	Good
8/9/10	Good	Good
9/13/10	Good	Good
10/4/10	Good	Good
11/1/10	Good[1]	Good[1]
11/8/10	Good	Good
12/6/10	Good	Good

The Administration Building can be supplied by either PWW-1 or PWW-2. The water is tested monthly at the point of use and the results apply to whichever well is supplying the building at that time. The Senior Facility Technician and Security Guard Trailers are supplied by Drake #1 well.

[1] Exceeded hold time.

KENNECOTT URANIUM COMPANY						
POTABLE WATER QUALITY SUMMARY						
2010						
DRAKE #1						
CHEMICAL ANALYSIS SUMMARY:						
Use Suitability	Domestic *	**DRAKE #1**	**DRAKE #1**	**DRAKE #1**	**DRAKE #1**	
Parameter	Concentration **	01/13/10	04/19/10	07/06/10	10/11/2010	
Ammonia (NH3-N)	0.5	-	-	-	-	
Arsenic (As)	0.05	0.002	0.002	0.002	0.002	
Barium (Ba)	2	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	
Boron (B)	0.75	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	
Cadmium (Cd)	0.005	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	
Chloride (Cl)	250	2	2	2	2	
Chromium (Cr)	0.1	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	
Copper (Cu)	1	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	
Cyanide (CN)	0.2	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	
Fluoride (F)	4	0.1	0.2	0.2	0.2	
Hydrogen Sulfide (H2S)	0.05	-	-	-	-	
Iron (Fe)	0.3	ND (.05)	ND (.05)	ND (.05)	ND (.05)	
Lead (Pb)	0.015	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	
Manganese (Mn)	0.05	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	
Mercury (Hg)	0.002	ND (0.0002)	ND (0.0002)	ND (0.0002)	ND (0.0002)	
Nitrogen, Nitrate+Nitrite as N		ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	
Nitrite (NO2-N)	1	-	-	-	-	
Oil and Grease	Virtually Free	ND (5)	ND (5)	ND (5)	ND (5)	
Phenol	0.001	-	-	-	-	
Selenium (Se)	0.05	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	
Silver (Ag)	0.1	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	
Sulfate (SO4)	250	42	46	47	46	
Total Dissolved Solids (TDS)	500	166	155	167	161	
Zinc (Zn)	5	0.12	0.01	0.02	0.01	
pH (Standard Units)	6.5 - 8.5	8.2	8.25	7.52	8.26	
Combined Ra226/Ra228 (pCi/L)	5.0 pCi/l	2.5	2	2.34	2.7	
Natural Uranium (pCi/L)	pCi/L	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	
Uranium - Suspended	mg/L	ND (0.0003)	ND (0.0003)	0.0006	ND (0.0003)	
Uranium - Total	mg/L	ND (0.0003)	ND (0.0003)	0.0008	ND (0.0003)	
Lead 210 (pCi/L)	pCi/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	
Total Strontium 90 (pCi/L)	8.0 pCi/l	-	-	-	-	
Gross Alpha Radioactivity *** (pCi/L)	15.0 pCi/l	1.1 ± 0.4	0.8 ± 0.5	0.7 ± 0.6	1.6 ± 0.9	
* This list does not include all constituents in the national drinking water standards.						
** mg/L, unless otherwise indicated						
*** Including Radium 226 but excluding Radon and Uranium						

KENNECOTT URANIUM COMPANY						
POTABLE WATER QUALITY SUMMARY						
2010						
PWW-1						
CHEMICAL ANALYSIS SUMMARY:						
Use Suitability	Domestic *	**PWW-1**	**PWW-1**	**PWW-1**	**PWW-1**	**PWW-1**
Parameter	Concentration **	01/13/10	04/19/10	07/06/10	10/11/2010	12/14/2010
Ammonia (NH3-N)	0.5	-	-	-	-	-
Arsenic (As)	0.05	0.002	0.002	0.002	0.002	0.002
Barium (Ba)	2	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)
Boron (B)	0.75	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)
Cadmium (Cd)	0.005	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)
Chloride (Cl)	250	2	2	2	2	3
Chromium (Cr)	0.1	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)
Copper (Cu)	1	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)
Cyanide (CN)	0.2	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)
Fluoride (F)	4	0.2	0.2	0.2	0.2	0.2
Hydrogen Sulfide (H2S)	0.05	-	-	-	-	-
Iron (Fe)	0.3	0.16	0.15	0.1	0.06	0.09
Lead (Pb)	0.015	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)
Manganese (Mn)	0.05	0.02	0.02	0.02	0.01	0.01
Mercury (Hg)	0.002	ND (0.0002)	ND (0.0002)	ND (0.0002)	ND (0.0002)	ND (0.0002)
Nitrogen, Nitrate+Nitrite as N		ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)
Nitrite (NO2-N)	1	-	-	-	-	-
Oil and Grease	Virtually Free	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)
Phenol	0.001	-	-	-	-	-
Selenium (Se)	0.05	0.001	ND (0.001)	ND (0.001)	0.001	0.001
Silver (Ag)	0.1	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)
Sulfate (SO4)	250	45	46	47	46	48
Total Dissolved Solids (TDS)	500	149	157	150	180	152
Zinc (Zn)	5	0.03	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)
pH (Standard Units)	6.5 - 8.5	8.25	8.29	7.58	8.36	8.16
Combined Ra226/Ra228 (pCi/L)	5.0 pCi/l	1.34	1.09	1.39	1.67	1.34
Natural Uranium (pCi/L)	pCi/L	2.4	0.6	1.2	5.4	1.5
Uranium - Suspended	mg/L	ND (0.0003)	ND (0.0003)	ND (0.0003)	0.0159	ND (0.0003)
Uranium - Total	mg/L	0.0034	0.0009	0.0017	0.0234	0.0018
Lead 210 (pCi/L)	pCi/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Total Strontium 90 (pCi/L)	8.0 pCi/l	-	-	-	-	-
Gross Alpha Radioactivity *** (pCi/L)	15.0 pCi/l	0.7 ± 0.4	0.9 ± 0.5	0.6 ± 0.6	1.0 ± 0.8	1.3 ± 0.7
* This list does not include all constituents in the national drinking water standards.						
** mg/L, unless otherwise indicated						
*** Including Radium 226 but excluding Radon and Uranium						

Note: A sample was collected on October 11, 2010. It returned results of 0.008 mg/L dissolved uranium and 0.0159 mg/L suspended uranium for a total uranium concentration of 0.0239 mg/L. While this is below the public water supply standard of 0.030 mg/L, this result is anomalous for this well. Upon receipt of the October sample results the well was resampled on December 14, 2010. This sample had results of ND for suspended uranium, 0.0021 mg/L for dissolved uranium and 0.0018 mg/L for total uranium. This result is in keeping with historical analytical results for the well. The results from the October 11, 2010 sample are considered suspect. While the laboratory did recheck the results there may have been contamination of the sample following collection.

KENNECOTT URANIUM COMPANY						
POTABLE WATER QUALITY SUMMARY						
2010						
PWW-2						
CHEMICAL ANALYSIS SUMMARY:						
Use Suitability	Domestic *	**PWW-2**	**PWW-2**	**PWW-2**	**PWW-2**	
Parameter	Concentration **	1/18/2010	4/19/2010	7/6/2010	10/11/2010	
Ammonia (NH3-N)	0.5	-	-	-	-	
Arsenic (As)	0.05	0.002	0.002	0.002	0.002	
Barium (Ba)	2	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	
Boron (B)	0.75	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	
Cadmium (Cd)	0.005	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	
Chloride (Cl)	250	2	2	2	2	
Chromium (Cr)	0.1	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	
Copper (Cu)	1	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	
Cyanide (CN)	0.2	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	
Fluoride (F)	4	0.2	0.2	0.2	0.2	
Hydrogen Sulfide (H2S)	0.05	-	-	-	-	
Iron (Fe)	0.3	ND (0.05	ND (0.05	ND (0.05	ND (0.05	
Lead (Pb)	0.015	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	
Manganese (Mn)	0.05	0.01	0.01	0.01	0.01	
Mercury (Hg)	0.002	ND (0.0002)	ND (0.0002)	ND (0.0002)	ND (0.0002)	
Nitrogen, Nitrate+Nitrite as N		ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	
Nitrite (NO2-N)	1	-	-	-	-	
Oil and Grease	Virtually Free	ND (5)	ND (5)	ND (5)	ND (5)	
Phenol	0.001	-	-	-	-	
Selenium (Se)	0.05	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	
Silver (Ag)	0.1	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	
Sulfate (SO4)	250	39	41	40	39	
Total Dissolved Solids (TDS)	500	162	140	144	157	
Zinc (Zn)	5	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	
pH (Standard Units)	6.5 - 8.5	8.48	8.42	7.8	8.56	
Combined Ra226/Ra228 (pCi/L)	5.0 pCi/l	0.1	0.91	1.06	0.73	
Natural Uranium (pCi/L)	pCi/L	1.9	1.7	1.9	1.8	
Uranium - Suspended	mg/L	0.0003	ND (0.0003)	ND (0.0003)	ND (0.0003)	
Uranium - Total	mg/L	0.0031	0.0028	0.0026	0.0028	
Lead 210 (pCi/L)	pCi/L	ND (1.0)	ND (1.0)	1.3 ± 2.0	1.3 ± 2.0	
Total Strontium 90 (pCi/L)	8.0 pCi/l	-	-	-	-	
Gross Alpha Radioactivity *** (pCi/L)	15.0 pCi/l	0.5 ± 0.5	.08 ± 0.7	0.6 ± 0.8	1.1 ± 0.8	
* This list does not include all constituents in the national drinking water standards.						
** mg/L, unless otherwise indicated						
*** Including Radium 226 but excluding Radon and Uranium						

Rio Tinto

Internal memo

22 February 2011

To: Distribution

Subject: Safety and Environmental Review Panel (SERP) – 2010

During the calendar year 2010 the licensee has not:

- Made changes in the facility as described in the license application (as updated);
- Made changes in the procedures as desibed in the license application (as updated);
- Conducted tests or experiments not presented in the license application (as updated).

The Safety and Environmental Review Panel (SERP) issued no Safety and Environmental Evaluations (SEEs) in 2010.

Oscar Paulson

Rio Tinto

Internal memo

22 February 2011

To: Respiratory Protection File

Subject: Respiratory Protection – 2010

The Mill Foreman, Senior Facility Technician and Facility Supervisor were the three (3) employees on site that were part of the facility's respirator program in 2010.

Their respiratory physicals and fit tests were conducted on the following dates:

TITLE	RESPIRATOR PHYSICAL	FIT TEST
Mill Foreman	November 22, 2010	November 23, 2010
Senior Facility Technician	June 2, 2010	November 23, 2010
Facility Supervisor	October 29, 2010	November 23, 2010

All fit tests were conducted with stannic chloride irritant smoke. No employee used a respirator on site unless that individual had successfully completed a respirator physical and fit test within the last twelve (12) months. Assigned respirators were wipe-tested during 2010 to assure that the interiors are free of removable contamination.

Oscar A Paulson

Oscar Paulson

Rio Tinto

Internal memo

10 February 2011

To: File

Subject: Releases for Unrestricted Use – 2010

Releases for unrestricted use issued in 2010 were primarily related to the release of equipment, including:

- A backhoe/loader used to remove frozen spilled pumpback fluid
- Two (2) pickup trucks
- A welder
- A piece of liner material for semiannual testing
- Miscellaneous hand tools.

Oscar Paulson

Rio Tinto

Internal memo

From	Oscar Paulson
To	Standard Operating Procedures File
Reference	**Annual Review of Standard Operating Procedures (SOPs)**
Date	26 December 2010
Number of pages	2

Requirement

License Condition 12.1 states: "An annual report of the review of all existing standard operating procedures, required to be performed by the RSO, shall be prepared and retained on site."

License Condition 9.6 states in part: "In addition, the RSO shall perform a documented review of all existing standard operating procedures at least annually."

Review of Standard Operating Procedures (SOPs) is ongoing throughout the year; however, a final review was performed in December 2009. This review included all Standard Operating Procedures (SOPs) related to the Nuclear Regulatory Commission (NRC) license including Mill Operating Procedures (MOPs), Tailings Operating Procedures (TOPs), Health Physics Procedures (HPs), Environmental Procedures (EPs) and other Standard Operating Procedures (SOPs). Also, SOPs not related to the Nuclear Regulatory Commission (NRC) license were reviewed, revised and updated. The review was conducted over the course of the year and completed on December 26, 2010 with the preparation of this review document. The date of addition or revision for each procedure follows the name of the procedure.

A. Non-Radiologic SOPs

The following non-radiologic procedures were modified:

- The *Extreme Snowfall Plan* was revised on November 23, 2010 to reflect the availability of Archer Construction, Inc. during the winter of 2010-2011 for snow removal.
- SOP-8 *Cold Weather Operations* was revised on November 29, 2010.

B. Radiological (NRC License) Related SOPs (HP, EP, TOP, SERP-OP and MOP)

The following procedures were modified:

- HP-2 – *Gamma Survey* – May 5, 2010
- HP-3 – *Beta Survey* – May 20, 2010
- HP-4 – *Radon Daughter Survey* – July 21, 2010
- HP-5 – *Internal and External Occupational Doses* – May 5, 2010
- HP-6 – *Total Alpha Surveys* – May 5, 2010
- HP-7 – *Personnel Alpha Monitoring and Decontamination* – May 5, 2010
- HP-8 – *Removable Alpha Radiation Sampling* – May 5, 2010
- HP-10 – *Air Sampling in the Workplace* - April 21, 2010
- HP-17 – *Yellowcake Pre Shipment Survey* – April 21, 2010 and December 22, 2010
- HP-18 – *Release of Equipment to Unrestricted Areas* – April 21, 2010
- HP-20 – *Radiation Work Permit* – April 21, 2010
- HP-21 – *Respiratory Protection* – April 21, 2010
- HP-32 – *Sealed Source Leak Test Procedure* – April 21, 2010
- HP-33 – *Shipment of Radioactive Samples* – December 22, 2010
- HP-35 – *Spill, Release, Excursion, Leak and Incident/Event Reporting* – July 21, 2010
- EP-11 – *Thermoluminescent Dosimeter Area (TLD) Monitoring* – December 22, 2010

- EP-12b – *General Surface Water Sampling, Sample Preparation and Water Level Measurement Procedures* – December 22, 2010
- TOP-1 – *General Tailings and Evaporation Impoundment Procedures* – December 22, 2010
- TOP-4 – *Reduction of Voids in Material Placed in Tailings Cell for Disposal* – December 22, 2010

The following procedure was added:

- MOP-18 – *General Procedures for Mill Maintenance and Repair Operations Not Including Yellowcake Slurry, Dried Yellowcake or Vessel Entries* – December 27, 2010

C. Other Procedures

The *Suspended Operations Procedure* was revised on December 27, 2010.

Oscar Paulson

Annual SOP Review-2010.doc

Rio Tinto

Internal memo

7 February 2011

To: Radiation Work Permit File

Subject Radiation Work Permits

No radiation work permits (RWPs) were issued in 2010.

Oscar A Paulson

Oscar Paulson

Rio Tinto

Internal memo

10 February 2011

Memo to File

SUBJECT: Dose Assessment / Determination of No Requirement for Individual Monitoring or Dose Calculation at the Sweetwater Uranium Project for 2010

This determination is being prepared to demonstrate that individual monitoring and dose calculation is not required at the Sweetwater Uranium Project due to the low levels of gamma radiation, airborne particulate radionuclides and radon present at the facility. The Sweetwater Uranium Project is a non-operating uranium mill, which suspended operations in the spring of 1983. This assessment is based on background data for the facility and data from radiation surveys and air sampling surveys taken at the facility during 2010.

Background

10 CFR 20 (in 20.1003) in the definition of occupational dose states, "Occupational dose does not include dose received from background radiation...." In order to assess the occupational dose received at the facility the background must be deducted from the total dose received. Background data for gamma radiation and airborne particulate radionuclides were collected in 1976 for the Environmental Report and in 1979 for the pre-operational monitoring program. The average upwind radon concentration for 2010 was used to represent the background radon concentration for the facility.

Item	Average Concentration	Dose
Background Gamma		200.7 mrem/yr (22.9uR/hr)
Airborne Particulates:		
U-nat	6.2E-16 uCi/ml	0.34 mrem/yr
Ra-226	3.9E-16 uCi/ml	0.22 mrem/yr
Th-230	3.9E-16 uCi/ml	0.65 mrem/yr
Pb-210	1.7E-14 uCi/ml	1.39 mrem/yr
Radon-222	2.29 pCi/l	168.27 mrem/yr

Note: Based on calculations prepared by Lyda Hersloff dated December 29, 1993.

Radon-222 concentration based on average of the first, second, third and fourth quarter upwind RadTrak Results. Averages of two (2) RadTrak units were used for each quarter except the first quarter. Data from only a single upwind/background RadTrak was used for the first quarter of 2010 since Landauer, Inc. did not return a reading for the second RadTrak.

The background dose for radon in working levels at the upwind monitoring site assuming daughters present is computed as follows:

(2.29 pCi/l) / (1E3 ml/l) / (1E6 pCi/uCi) = 2.29 E-09 uci/ml

0.33 WL = 3E-08 uCi/ml (with all daughters present)

[(2.29E-09 uCi/ml) / (3E-08 uCi/ml)] * (0.33 WL) = 0.025 WL for background (with daughters present)

The calculated equilibrium factor for the facility (1993 to 2010) average is 0.167. Given that all daughters are not present and the equilibrium factor is 0.167, the actual background radon daughter concentration is:

(0.167) * (0.025 WL) = 0.004 WL

Occupational Dose

1) Gamma Radiation

The average gamma dose at the facility is based on an average of survey results for twenty-eight (28) locations in the mill and twelve (12) locations in the ion exchange area and general surveys in the tailings impoundment and Catchment Basin excavation areas. The results are as follows:

Gamma Survey Results

Area	Total Dose	Background Dose	Occupational Dose
IX Area	159.0 uR/hr	22.9 uR/hr	136.1 uR/hr
Mill	74.0 uR/hr	22.9 uR/hr	51.1 uR/hr
Tailings	96.9 uR/hr	22.9 uR/hr	74.0 uR/hr

Approximately 355 hours (35.5 10-hour working days) are estimated to have been spent in the mill and 975 hours (97.5 10 hour working days) are estimated to have been spent in the tailings impoundment by the Mill Foreman in 2010. This estimate is based on the number of entries in the restricted area alpha survey record for 2010, and assuming that each entry constitutes a full ten (10) hour day in either the mill or tailings impoundment, as indicated. If both the mill and tailings impoundment were entered in a single day, then it was assumed that five hours were spent in each area. This assumption is very conservative since many entries in the alpha survey record are the result of a brief (1 - 2 hour) period in either the mill or tailings impoundment.

The table below estimates the gamma dose likely to be received by the Mill Foreman:

Area	Time	Occupational Dose Rate	Total Dose
Mill	355 hours	51.1 uR/hr	18.1 mrem
Tailings	975 hours	74.0 uR/hr	72.2 mrem
Total			**90.3 mrem**

Gamma survey results for the IX Area are not used in the dose assessment since little time is spent in that area since the unit is shut down.

Since the gamma levels are low in the mill and ion exchange area and only a limited amount of time is spent in these areas, it is unlikely that personnel would receive in one year from sources external to the body a dose in excess of 10% of any of the applicable limits in 20.1201(a); therefore, individual monitoring and dose calculation for external exposure is not required. Gamma doses measured in the Ion Exchange (IX) Area were not used in the estimate due to the very small amount of time spent in that area each year. This estimate assumes a one to one to one (1:1:1) equivalence of exposure (in Roentgens) to absorbed dose (in Rads) to equivalent dose (in REMs). For gamma radiation with a Quality Factor (QF) of one (1), this is acceptable.

Personnel (Luxel) dosimeters were used on site by all personnel during 2010 even though their use was not required, in part, to confirm these calculations. The highest external dose received for the calendar year was 3 millirems, confirming the low external exposure rates on site and the inherent conservative nature of these calculations.

2) Radon

The average radon dose at the facility is based on an average of survey results for three (3) locations in the ion exchange area, at least fourteen (14) locations in the mill and two (2) locations in the Solvent Extraction (SX) Building taken in June and December of 2010. The results are as follows:

Radon Sampling Results

Area	Concentration	Background	Occupational Dose
IX Area	0.001 WL	0.004 WL	0.000 WL
Mill Area	0.009 WL	0.004 WL	0.005 WL

The average occupational radon dose for facility personnel is:

{[(0.005 WL) / (0.33 WL/DAC)] * 355 hours} / (2000 DAC hours/ALI) = 0.001 ALI
(0.001 ALI) * (5000 millirems/ALI) = 4.4 millirems
Note: Intake in Allowable Limits of Intake (ALIs) rounded to 0.001 ALI

3) Airborne Particulate Radionuclides (Uranium/Radium-226/Thorium-230)

The average airborne particulate natural uranium dose at the facility is based on high volume air samples taken in the grinding and precipitation areas of the mill and the tailings impoundment in 2010 and four (4) breathing zone samples taken of the Mill Foreman when working in the Mill Building.

The spreadsheet entitled Airborne Sampling Results (Using Maximum Concentrations) attached to the Internal Occupational Exposure Assessment – Suspended Operations, details the maximum airborne particulate (natural uranium, radium-226 and thorium-230) concentrations. It yields a total dose from exposure to natural uranium, radium-226 and thorium-230 of 44.3 millirems to the maximally exposed individual (the Mill Foreman) from work in both the Mill and tailings impoundment. This is well below the 10% threshold that triggers monitoring and dose calculation. This is an extremely conservative dose estimate.

The maximum possible exposure to natural uranium from the Mill and tailings is 42.7 millirems based on airborne uranium concentration measurements. This is 0.009 ALI, and is also below the intake limit of 10 milligrams/week for soluble natural uranium listed/described in 20.1201(e) as per the calculation below:

(0.009 ALI/yr) * (5 E-02 uCi/ALI) = 4.5 E-04 µCi/yr
(4.5 E-04 µCi/yr) * (1 E+06 pCi/uCi) / (677 pCi/mg) = 0.66 mg/yr total intake

This is well below the 10 milligram per week limit.

Based on the levels of airborne natural uranium, radium-226 and thorium-230 as demonstrated by the high volume air samples collected in the Mill Building, the level of natural uranium exhibited by the breathing zone samples collected in the Mill Building, and the levels of natural uranium, radium-226 and thorium-230 exhibited in the high volume air samples collected in the tailings impoundment and the limited time spent in the mill (355 hours), the tailings impoundment (975 hours) by the Mill Foreman in 2010, it is unlikely that personnel would receive in one year an intake in excess of 10 percent of the applicable ALI for uranium (natural), radium-226 and thorium-230 in Table 1, Columns 1 and 2 of Appendix B therefore monitoring and dose calculation for uranium (natural) is not required. It is estimated that the total dose from natural uranium, radium-226 and thorium-230 does not exceed 44.3 millirems per year for 2010.

Conclusions:

1) Monitoring and calculation of external dose is not required at the Sweetwater Uranium Project since no personnel are likely to receive an external occupational dose in excess of 0.5 rem.

2) Monitoring and calculation of internal dose at the Sweetwater Uranium Project is not required because:
   a) Radon dose is calculated at 0.004 rem/yr.
   b) The maximum calculated particulate dose is 0.044 rem/yr.

3) The maximum possible total occupational dose to the maximally exposed individual on site, the Mill Foreman, is as follows:

a)	Estimated external dose:	0.090 rem/yr.
b)	Estimated internal dose (particulates)	0.044 rem/yr.
c)	Estimated internal dose (radon-222)	0.004 rem/yr.
	Total:	0.138 rem/yr.

   These estimates are below 10% of the applicable limits that would trigger individual monitoring.

4) Tracking of external doses was done for all site personnel during 2010 using Luxel dosimeters. Due to the proven low dose rates at the facility, use of dosimeters is not required; however, it was done to confirm external exposure data from surveys. The highest annual dose received by any individual was Three (3) millirems. This proves that the external dose estimate based upon surveys is conservative.

Oscar A Paulson

Oscar A. Paulson

Rio Tinto

Internal memo

7 February 2011

To: **NRC File**

Subject: Compliance with 10 Mrem Constraint Limit for 2010

The following pertains to the dose to a member of the general public from the Sweetwater Uranium Project:

- The mill is not operating so there are no emissions from any stacks.
- The only air emissions excluding radon and its progeny are particulate radionuclides from the tailings impoundment.

The following applies to these particulate emissions:

1. These emissions are monitored at Station 4A by a continuous low-volume system.

2. The radionuclide concentrations and doses encountered at this location are as follows:

U -nat:	1.48 E-16 uCi/L	0.082 mrem/yr
Ra-226:	3.19 E-17 uCi/L	0.002 mrem/yr
Th-230:	7.42 E-17 uCi/L	0.124 mrem/yr
Total:		**0.208 mrem/yr**

3. Background levels for the site are as follows:

U -nat:	6.2E-16 uCi/L	0.34 mrem/yr
Ra-226:	3.9E-16 uCi/L	0.22 mrem/yr
Th-230:	3.9E-16 uCi/L	0.65 mrem/yr
Total:		**1.21 mrem/yr**

Conclusions:

- The 2010 dose from airborne particulate radionuclides was at background levels. The 10 mrem per year constraint limit was not exceeded.

Oscar A Paulson

Oscar Paulson

Rio Tinto

Internal memo

22 February 2011

To: **NRC File**

Subject: Compliance with 40 CFR 190.10 for 2010

The following pertains to the dose to a member of the general public from the Sweetwater Uranium Project:

- The mill is not operating so there are no emissions from any stacks.
- The only air emissions excluding radon and its progeny are particulate radionuclides from the tailings impoundment.

40 CFR 190.10 states:

Subpart B—Environmental Standards for the Uranium Fuel Cycle

§ 190.10 Standards for normal operations.

Operations covered by this subpart shall be conducted in such a manner as to provide reasonable assurance that:

(a) The annual dose equivalent does not exceed 25 millirems to the whole body, 75 millirems to the thyroid, and 25 millirems to any other organ of any member of the public as the result of exposures to planned discharges of radioactive materials, radon and its daughters excepted, to the general environment from uranium fuel cycle operations and to radiation from these operations.

(b) The total quantity of radioactive materials entering the general environment from the entire uranium fuel cycle, per gigawatt-year of electrical energy produced by the fuel cycle, contains less than 50,000 curies of krypton-85, 5 millicuries of iodine-129, and 0.5 millicuries combined of plutonium-239 and other alpha-emitting transuranic radionuclides with half-lives greater than one year.

The following applies to exposures to planned discharges of radioactive materials, radon and its daughters excepted to the general environment from the Sweetwater Uranium Project.

1. These emissions are monitored at Station 4A by a continuous low-volume system.

2. The radionuclide concentrations and doses encountered at this location are as follows:

U -nat: 1.48 E-16 uCi/L	0.082 mrem/yr
Ra-226: 3.19 E-17 uCi/L	0.002 mrem/yr
Th-230: 7.42 E-17 uCi/L	0.124 mrem/yr
Total:	**0.208 mrem/yr**

3. Background levels for the site are as follows:

U -nat: 6.2 E-16 uCi/L	0.34 mrem/yr
Ra-226: 3.9 E-16 uCi/L	0.22 mrem/yr
Th-230: 3.9 E-16 uCi/L	0.65 mrem/yr
Total:	**1.21 mrem/yr**

4. The measured concentrations for 2010 are below background levels.

The following applies to radiation from the operation:

1. Background gamma radiation levels:

Gamma Exposure	**200.70 (approx. 22.9 uR/hr)**

Gamma background data is from the revised Environmental Report (August 1994).

2. Measured gamma radiation levels downwind of the tailings impoundment (downwind (Air 4A) air monitoring station):

	Annual Dose (Downwind (Air 4A) Air Monitoring Station)
Gamma Exposure	**198.5 mrem**

This measured exposure is slightly below site background.

Conclusions:

- The 2010 dose from airborne particulate radionuclides and radiation was at background levels. The 25 mrem per year limit in 40 CFR 190.10 was not exceeded.

Oscar A Paulson
Oscar Paulson
Facility Supervisor

Rio Tinto

Internal memo

7 February 2011

To: NRC File

SUBJECT: Other Items

The following other items are being evaluated.

Fire Protection:

Fire training was held on site for site employees on Tuesday, July 13 and Thursday, October 21, 2010.

Emergency fire protection training involved:

- Training on the Administration Building fire hose station
- Operation of the electric fire pump
- Operation of the diesel fire pump
- Tour of hose reel sheds

Annual fire extinguisher inspections were conducted on March 9 and 10, 2010. Annual fire hose testing was conducted on August 31, 2010.

Electrical ground integrity testing was performed on March 8, 9 and 10, 2010.

Environmental Monitoring Data:

Environmental monitoring data for radon, airborne particulate radionuclides and ambient gamma radiation is addressed in the 40.65 Report.

Environmental monitoring data for groundwater including water quality and water level data is addressed in the Corrective Action Report (CAP) Review.

Other Training:

- MSHA Annual Refresher Training was held on January 6, 2010
- First Aid Training was held on January 7, 2010
- Driver Training was held on January 11, 2010
- Task Training was held on January 11, 2010

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