Rio Tinto
Kennecott Uranium Company
42 Miles NW of Rawlins
P.O. Box 1500
Rawlins, WY 82301-1500
USA
T +1 (307) 328 1476
F +1 (307) 324 4925

20 February 2013

Mr. Andrew Persinko, Deputy Director
Decommissioning and Uranium Recovery Licensing Directorate
Division of Waste Management and Environmental Protection
Office of Federal and State Materials and Environmental Management
U.S. Nuclear Regulatory Commission
11545 Rockville Pike
Rockville, MD 20852-2738

Dear Mr. Persinko:

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
Facility Supervisor

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

Rio Tinto

Internal memo

20 February 2013

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 Worker Training was conducted on January 11, 2012. Annual MSHA Refresher Training was conducted on January 10, 2012. In addition, driver training was conducted on January 16, 2012. Radiation training of individual contract employees (contractor new hires) was conducted on an as-needed basis. Equipment hazard training was provided on January 16, 2012. First Aid training was provided on January 10, 2012.

5. Safety Meetings:
Radiation safety meetings were held on at least a monthly basis 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 2012, as documented in the memorandum entitled "Annual Review of Standard Operating Procedures (SOPs)", dated 27 December 2012.

9. Radiation Work Permits:
No radiation work permits were issued in 2012.

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 25 and December 20, 2012. 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. The license was renewed for ten (10) years on October 21, 2011.

11. Safety and Environmental Review Panel (SERP):
Two (2) Safety and Environmental Evaluations (SEEs) were issued by the Safety and Environmental Review Panel in 2012.

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 May 18, August 16 and November 9, 2012. Annual fit testing and respirator training was conducted on January 11, May 21, November 19 and December 27, 2012.

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 0.08 WL in June 2012 and 0.031 WL in December 2012.

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
LC 12.3-2011.doc

Rio Tinto

Internal memo

20 February 2013

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 2011
- 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 since December 11, 2001. Radon daughter monitoring using the modified Kusnetz method has been performed semiannually in this area. The monitoring shows radon daughter concentrations ranging from 0.008 WL to 0.034 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 2011 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 0.008 WL to 0.034 WL.

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 25 and December 20, 2012. 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. The liner was discussed by Kent Bruxvoort of Telesto Solutions, Inc. in the 2012 Inspection of Tailings Impoundment Liner report dated July 31, 2012. 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, pliable. There is no evidence of exposed scrim by either physical or chemical means.*
>
> *Ongoing maintenance of the impoundment serves to allow Kennecott Uranium Company to meet its operational objectives for the impoundment. Specific maintenance completed or ongoing during 2012 includes: 1) repair of lagoon liners through placement of tailings over factory seams subject to tearing (Photograph 5); 2) repair of the base of a portion of the fence; 3) repair of the liner to keep it functional within five feet of the tailings; and 4) ongoing maintenance of the water management system including activities such as pump repair and/or replacement.*
>
> *Kennecott Uranium Company has effectively managed, and continues to do so, the tailings impoundment through the 2006/2007 placement of the additional 11(e).2 soils from the catchment basin area into the tailings impoundment, maintenance and repair of the liner within five vertical feet of the tailings or tailings fluid, and repairs of the liner evaporation lagoons. Potential for fluid to escape through the remaining Hypalon® liner is limited, potential for windblown tailings is decreased, potential for radon emissions is decreased, the surface of the tailings consolidation throughout the impoundment is promoted, and evaporation is enhanced.*

The impoundment's Hypalon liner is inspected weekly by site personnel to insure that it is maintained within five (5) vertical feet of the fluid surface.

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 2008 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: regrading 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 2012, 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 2012.

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-2012.doc

Rio Tinto

Internal memo

14 February 2013

To: NRC File

Subject: Summary of Monthly Radiation Safety Meetings

The following is a summary of the twelve (12) monthly (plus seven (7) additional) Radiation Safety meetings held in 2012:

2012	TOPIC	ATTENDEES
1/30	Discussed radon (upwind and downwind) and airborne particulates.	KUC, SEC
2/28	Discussed dose assessments and doses to site employees to gamma radiation, airborne particulates and radon.	KUC, SEC
3/19	Discussed radiation safety for fire extinguisher inspections.	KUC, SEC, GRN
3/28	Discussed discharge of radium bearing pump test water / Radon-222 fluxes from soils / breathing zone sample results.	KUC, SEC
4/18	Discussed radiation safety for removal of pump from tailings impoundment.	KUC, SEC, ACI
4/23	Discussed radon fluxes from water surfaces and showed presentation on subject.	KUC, SEC
5/21	Discussed Natural Resources Defense Council's paper "Nuclear Fuel – Dirty Beginnings".	KUC, SEC, ACI
5/21	Discussed respiratory protection / conducted respirator training for Karl Kronfuss.	KUC, SEC
6/27	Discussed the Orion Project (pulsed nuclear propulsion) / Viewed video entitled "History Undercover – Orion Project " / Discussed dust lofting (fallout) from nuclear explosions.	KUC, SEC
7/9	Discussed yellowcake drum reactions.	KUC, SEC
7/23	Discussed radon flux measurements / Method 115 testing.	KUC, SEC
7/23	Discussed radiation safety for surveying in the tailings impoundment.	KUC, WLC
8/20	Discussed radiation safety for crane inspections.	KUC, KOK
8/23	Discussed radon / Method 115 Test results.	KUC, SEC
9/25	Discussed release for unrestricted use / use of beta probe.	KUC, SEC, ACI
10/8	Discussed ambient air monitoring / Operation of LoVol sampler.	KUC, SEC
10/9	Discussed restricted and controlled areas.	KUC, SEC
11/19	Discussed respirator use / Conducted respirator training.	KUC, SEC
12/17	Discussed gamma dosimetry / gamma exposures / areas with elevated natural background / well sampling.	KUC, SEC

Initial key:
ACI = Archer Construction, Inc.
SEC = Securitas Security Services
KOK = Konecranes
KUC = Kennecott Uranium Company
GRN = Simplex Grinnell
WLC = Worthington, Lenhart & Carpenter

Oscar A Paulson

Oscar Paulson

Rio Tinto

Internal memo

14 February 2013

To: NRC File

Subject: Annual Radiation Refresher Training

Annual radiation safety training for uranium mill workers was conducted by Tetra Tech Inc. on January 11, 2012. 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.
Tom Foust – Archer Construction, Inc.
Tony Jackson – Archer Construction, Inc.
Jim McCoy – Archer Construction, Inc.
Jeremy LaVine – Archer Construction, Inc.
Randy McKenzie – Archer Construction, Inc.
John Smith – Archer Construction, Inc.
Rich Atkinson – Cedar Mountain Ventures, LLC
Harold Kelley – Kennecott Uranium Company
George Palochak – Kennecott Uranium Company
Oscar Paulson – Kennecott Uranium Company
Harry Lovato – L & L Electric
Jim McMacken – Securitas Security Services
Charles Rider – Securitas Security Services
Anita Morris – Worthington, Lenhart & Carpenter

In addition, the following three (3) individuals were provided with radiation safety training for uranium mill workers on site on May 14, 2012:

Karl Kronfuss – Kennecott Uranium Company
Shelley Schutterle – Kennecott Uranium Co.
James Crook – Archer Construction, Inc.

Annual respiratory protection training was also conducted by Tetra Tech, Inc. at the Sweetwater Uranium Project on January 11, 2012. The following individuals were trained:

Harold Kelley – Kennecott Uranium Company
Oscar Paulson – Kennecott Uranium Company
Charles Rider – Securitas Security Services

Hazardous (radioactive) materials transportation training was conducted by Tetra Tech, Inc. at the Sweetwater Uranium Project on January 12, 2012. The following individuals were trained:

Harold Kelley – Kennecott Uranium Company
Oscar Paulson – Kennecott Uranium Company
Shelley Schutterle – Kennecott Uranium Company
Jim McMacken – Securitas Security Services
Charles Rider – Securitas Security Services

Oscar A Paulson

Oscar Paulson

Facility Supervisor

Annual RadRefreshTrng-2012.doc

Rio Tinto

Internal memo

19 February 2013

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 2012. 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 Tailings Repair Worker, who during 2012 is the individual on site who spent the greatest amount of time within the restricted areas and received the greatest internal 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 following personnel spent the following times in the Sweetwater Mill and Solvent Extraction (SX) buildings and tailings impoundment:

Individual	Time in Mill and Solvent Extraction Buildings	Time in Tailings Impoundment
Site Operations Technician	51.5 hours	158.1 hours
Mill Laborer-1	9.4 hours	24.5 hours
Tailings Repair Worker	6.0 hours	212.2 hours

The hours shown above are based upon entry and exit times for the Mill and Solvent Extraction Buildings and tailings impoundment as logged in the alpha monitoring record upon the employee's exit from the area. The hours logged by the Tailings Repair Worker represent the maximum time spent by an individual in these areas and the Tailings Repair Worker was the maximally exposed individual on site in 2012.

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:

- The average and maximum airborne concentrations for natural uranium, thorium-230 and radium-226, based on breathing zone samples collected on personnel entering the Mill and SX buildings and tailings impoundment were used to calculate the average and maximum doses to natural uranium, thorium-230 and radium-226 for the time spent in the Mill and SX buildings and tailings impoundment.
- The average and maximum air breathing zone 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 and tailings impoundment are generally believed to be more representative of worker exposure than high volume air samples of the entire work area, and more conservative.
- The Tailings Repair Worker was determined to be the maximally exposed radiation worker on site.

Attached please find in addition to the spreadsheets entitled “Airborne Sampling Results for the Tailings Repair Worker” using average values and using maximum values broken down by quarter, the following spreadsheets:

- Mill High Volume Air Samples
- Tailings Impoundment High Volume Air Samples
- Site Operations Technician Breathing Zone Samples
- Mill Laborer-1 Breathing Zone Samples
- Tailings Repair Worker Breathing Zone Samples
- Spreadsheet showing times in the Mill and SX buildings and tailings impoundment for the Site Operations Technician, Mill Laborer-1 and Tailings Repair Worker
- Airborne Particulate Dose using maximum breathing zone samples
- Airborne Particulate Dose using average breathing zone samples

Dose Calculation Results

A maximum internal dose of 35.5 millirems (0.04 rems) was calculated for the maximally exposed individual (the Tailings Repair Worker) using the highest breathing zone sample results collected in the Mill and SX buildings and the highest breathing zone sample results from the tailings impoundment and the exposure times included in the attached spreadsheets. This calculation is on the attached spreadsheet entitled Airborne Sampling Results (Using Maximum Values). A second calculation was made using the average natural uranium, radium-226 and thorium-230 results from breathing zone samples collected in the Mill and SX buildings and breathing zone sample results from the tailings impoundment. This calculation resulted in an internal dose of 21.2 millirems (0.02 rems). This calculation is on the attached spreadsheet entitled Airborne Sampling Results (Using Average Values).

These calculated doses are all less than 10% of the 5,000 millirem internal dose limit (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 and SX buildings 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-2012.doc

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	3-Jun-12	4-Jun-12	2.03E+09	1.00E-16	3.24E-15	5.77E-15	4.10E-15	1.62E-02	9.62E-02	1.37E-03
2	5-Jun-12	7-Jun-12	2.01E+09	1.00E-16	8.07E-15	2.71E-14	1.85E-14	4.04E-02	4.52E-01	6.17E-03
3	19-Jun-12	21-Jun-12	1.22E+09	1.00E-16	5.37E-15	1.06E-14	7.64E-15	2.69E-02	1.77E-01	2.55E-03
4	25-Jun-12	28-Jun-12	2.89E+09	1.00E-16	3.42E-15	9.92E-15	5.03E-15	1.71E-02	1.65E-01	1.68E-03
5	6-Nov-12	7-Nov-12	2.20E+09	1.00E-16	5.37E-15	5.62E-16	7.45E-16	2.69E-02	9.37E-03	2.48E-04
Average:			2.07E+09		5.09E-15	1.08E-14	7.20E-15	2.55E-02	1.80E-01	2.40E-03
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.									
		Multiday composite								

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	3-Jun-12	4-Jun-12	Mill Grinding Area	2.86E+09	1.00E-16	2.45E-15	7.28E-16	7.66E-16	1.23E-02	1.21E-02	2.55E-04
2	3-Jun-12	4-Jun-12	Mill Precipitation Area	2.76E+09	1.00E-16	1.56E-14	7.35E-16	8.35E-16	7.80E-02	1.23E-02	2.78E-04
3	6-Nov-12	7-Nov-12	Mill Grinding Area - Second Deck	2.77E+09	1.00E-16	8.96E-16	4.76E-16	6.06E-16	4.48E-03	7.93E-03	2.02E-04
4	6-Nov-12	7-Nov-12	Mill Precipitation Area - Precipitation Deck	2.92E+09	1.00E-16	1.84E-15	1.32E-15	9.98E-16	9.20E-03	2.20E-02	3.33E-04
Average:				2.83E+09		5.20E-15	8.15E-16	8.01E-16	2.60E-02	1.36E-02	2.67E-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: **2012**
(Using Average Values)
Breathing Zone Samples

		Concentration			Percent of DAC		
		(Natural Uranium Only)	Thorium-230	Radium-226	Natural Uranium	Thorium-230	Radium-226
		(microCuries/ml)	(microCuries/ml)	(microCuries/ml)			
Average for 2012	Site Operations Technician - Mill	1.16E-13	1.21E-13	1.43E-13	5.80E-01	2.02E+00	4.77E-02
Average for 2012	Tailings Repair Worker - Tailings	1.04E-13	2.02E-13	1.04E-13	5.21E-01	3.36E+00	3.48E-02
	Average:	1.10E-13	1.61E-13	1.24E-13	5.50E-01	2.69E+00	4.12E-02

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	Thorium-230	Radium-226	Natural Uranium	Thorium-230	Radium-226
		(microCuries/ml)	(microCuries/ml)	(microCuries/ml)			
Average for 2012	Mill Building	5.20E-15	8.15E-16	8.01E-16	2.60E-02	1.36E-02	2.67E-04
Average for 2012	Tailings Impoundment	5.09E-15	1.08E-14	7.20E-15	2.55E-02	1.80E-01	2.40E-03
	Average:	5.15E-15	5.80E-15	4.00E-15	2.57E-02	1.67E-03	1.33E-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	Thorium-230	Radium-226	Natural Uranium	Thorium-230	Radium-226
		(microCuries/ml)	(microCuries/ml)	(microCuries/ml)			
	Site Operations Technician -Mill	1.16E-13	1.21E-13	1.43E-13	5.80E-01	2.02E+00	4.77E-02
	Tailings Repair Worker - Tailings	1.04E-13	2.02E-13	1.04E-13	5.21E-01	3.36E+00	3.48E-02

Exposure Calculations

Hours Worked During 2012

Mill	6
Tailings Impoundment	212.18

Exposure		Natural Uranium (millirems)	Thorium-230 (millirems)	Radium-226 (millirems)	Total (millirems)
	Tailings Repair Worker - Mill	8.69E-02	3.03E-01	7.15E-03	3.97E-01
	Tailings Repair Worker - Tailings	2.76E+00	1.78E+01	1.85E-01	2.08E+01
	Total	2.85E+00	1.81E+01	1.92E-01	2.12E+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 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: **2012**
(Using Maximum Values)
Breathing Zone Samples

Maximum for 2012	**Exposed Individual**	**Concentration**			**Percent of DAC**		
		(Natural Uranium Only)	**Thorium-230**	**Radium-226**	**Natural Uranium**	**Thorium-230**	**Radium-226**
		(microCuries/ml)	**(microCuries/ml)**	**(microCuries/ml)**			
Maximum for 2012	Site Operations Technician - Mill	2.40E-13	1.91E-13	4.38E-13	1.20E+00	3.18E+00	1.46E-01
Maximum for 2012	Tailings Repair Worker - Tailings	1.36E-13	3.47E-13	3.13E-13	6.80E-01	5.78E+00	1.04E-01
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	**Thorium-230**	**Radium-226**	**Natural Uranium**	**Thorium-230**	**Radium-226**
		(microCuries/ml)	**(microCuries/ml)**	**(microCuries/ml)**			
Maximum for 2012	Mill Building	1.56E-14	1.32E-15	9.98E-16	7.80E-02	2.20E-02	3.33E-04
Maximum for 2012	Tailings Impoundment	8.07E-15	2.71E-14	1.85E-14	4.04E-02	4.52E-01	6.17E-03
	Maximum	1.56E-14	2.71E-14	1.85E-14	5.92E-02	1.67E-03	3.25E-03
Please see attached spreadsheets							
Lower Limit of Detection (LLD) value used in average if result was non-detect.							
Measured Concentrations Used							
		Natural Uranium	**Thorium-230**	**Radium-226**	**Natural Uranium**	**Thorium-230**	**Radium-226**
		(microCuries/ml)	**(microCuries/ml)**	**(microCuries/ml)**			
	Site Operations Technician -Mill	2.40E-13	1.91E-13	4.38E-13	1.20E+00	3.18E+00	1.46E-01
	Tailings Repair Worker - Tailings	1.36E-13	3.47E-13	3.13E-13	6.80E-01	5.78E+00	1.04E-01
Hours Worked During 2012							
	Mill	6					
	Tailings Impoundment	212.18					
Exposure Calculations							
Exposure		**Natural Uranium**	**Thorium-230**	**Radium-226**	**Total**		
		(millirems)	**(millirems)**	**(millirems)**	**(millirems)**		
2012	Tailings Repair Worker - Mill	1.80E-01	4.78E-01	2.19E-02	6.79E-01		
	Tailings Repair Worker - Tailings	3.61E+00	3.07E+01	5.53E-01	3.48E+01		
	Total	3.79E+00	3.12E+01	5.75E-01	3.55E+01		
Notes:	Maximum airborne concentrations for natural uranium, Radium-226 and Thorium-230 were used in the calculation for each area (mill, and tailings						
	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
Site Operations Technician
Breathing Zone Samples

Date	Task	Volume (milliliters)	Sample Lower Limit of Detection (LLD) (microCurie per milliliter)	Natural Uranium (microCurie per milliliter)	Thorium-230 (microCurie per milliliter)	Radium-226 (microCurie per milliliter)	Natural Uranium % of DAC (Percent)	Thorium 230 % of DAC (Percent)	Radium 226 % of DAC (Percent)
7-Jun-12	Site Operations Technician	3.58E+06	1.00E-16	6.84E-14	1.23E-13	1.00E-16	0.342	2.050	0.000
18-Jul-12	Site Operations Technician	2.61E+06	1.00E-16	2.02E-13	1.91E-13	4.38E-13	1.010	3.183	0.146
7-Aug-12	Site Operations Technician	3.63E+06	1.00E-16	1.20E-13	9.28E-14	1.92E-13	0.600	1.547	0.064
12-Sep-12	Site Operations Technician	4.83E+06	1.00E-16	9.61E-14	9.11E-14	1.00E-16	0.481	1.518	0.000
2-Oct-12	Site Operations Technician	2.51E+06	1.00E-16	0.00E+00	1.20E-13	1.00E-16	0.000	2.000	0.000
6-Nov-12	Site Operations Technician	2.39E+06	1.00E-16	8.49E-14	1.03E-13	3.16E-13	0.425	1.717	0.105
12-Dec-12	Site Operations Technician	1.70E+06	1.00E-16	2.40E-13	1.27E-13	5.45E-14	1.200	2.117	0.018
Average:		3.04E+06	1.00E-16	1.16E-13	1.21E-13	1.43E-13	5.80E-01	2.02E+00	4.77E-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 plus time spent in the restricted area to date show that the maximally exposed worker was unlikely to have received in excess of 10% of the applicable ALI thus individual monitoring of intakes is not required.								
	Some results for Radium-226 were reported as negative values (less than zero) signifying concentrations below the Lower Limit of Detection (LLD).								
	These Radium-226 results are shown on the spreadsheet a values at the Lower limit of Detection (LLD) of 1E-16								

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
Site Operations Technician
Breathing Zone Samples

Date	Task	Volume (milliliters)	Sample Lower Limit of Detection (LLD) (microCurie per milliliter)	Natural Uranium (microCurie per milliliter)	Thorium-230 (microCurie per milliliter)	Radium-226 (microCurie per milliliter)	Natural Uranium % of DAC (Percent)	Thorium 230 % of DAC (Percent)	Radium 226 % of DAC (Percent)
7-Jun-12	Site Operations Technician	3.58E+06	1.00E-16	6.84E-14	1.23E-13	ND	0.023	2.050	ND
18-Jul-12	Site Operations Technician	2.61E+06	1.00E-16	2.02E-13	1.91E-13	4.38E-13	0.067	3.183	7.300
7-Aug-12	Site Operations Technician	3.63E+06	1.00E-16	1.20E-13	9.28E-14	1.92E-13	0.040	1.547	3.200
12-Sep-12	Site Operations Technician	4.83E+06	1.00E-16	9.61E-14	9.11E-14	ND	0.032	1.518	ND
2-Oct-12	Site Operations Technician	2.51E+06	1.00E-16	0.00E+00	1.20E-13	ND	0.000	2.000	ND
6-Nov-12	Site Operations Technician	2.39E+06	1.00E-16	8.49E-14	1.03E-13	3.16E-13	0.028	1.717	5.267
12-Dec-12	Site Operations Technician	1.70E+06	1.00E-16	2.40E-13	1.27E-13	5.45E-14	0.080	2.117	0.908
Average:		3.04E+06	1.00E-16	1.16E-13	1.21E-13	2.50E-13	3.86E-02	2.02E+00	4.17E+00

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 plus time spent in the restricted area to date show that the maximally exposed worker was unlikely to have received 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).
These results are shown as Non-Detect (ND).

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 Laborer - 1
Breathing Zone Samples

Date	Task	Volume (milliliters)	Sample Lower Limit of Detection (LLD) (microCurie per milliliter)	Natural Uranium (microCurie per milliliter)	Thorium-230 (microCurie per milliliter)	Radium-226 (microCurie per milliliter)	Natural Uranium % of DAC (Percent)	Thorium 230 % of DAC (Percent)	Radium 226 % of DAC (Percent)
21-May-12	Mill Laborer 1	3.08E+06	1.00E-16	3.12E-13	7.60E-14	5.04E-14	1.560	1.267	0.017
10-Apr-12	Mill Laborer 1	2.37E+06	1.00E-16	6.10E-14	9.49E-14	1.00E-16	0.305	1.582	0.000
1-Mar-12	Mill Laborer 1	2.39E+06	1.00E-16	1.12E-13	4.98E-14	7.84E-14	0.560	0.830	0.026
6-Feb-12	Mill Laborer 1	2.61E+06	1.00E-16	3.71E-13	2.61E-13	1.00E-16	1.855	4.350	0.000
Average:		2.61E+06	1.00E-16	2.14E-13	1.20E-13	3.23E-14	1.07E+00	2.01E+00	1.08E-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 plus time spent in the restricted area to date show that the maximally exposed worker was unlikely to have received in excess of 10% of the applicable ALI thus individual monitoring of intakes is not required.								
	Some results for Radium-226 were reported as negative values (less than zero) signifying concentrations below the Lower Limit of Detection (LLD).								
	These Radium-226 results are shown on the spreadsheet as values at the Lower limit of Detection (LLD) of 1E-16.								

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 Laborer - 1
Breathing Zone Samples

Date	Task	Volume (milliliters)	Sample Lower Limit of Detection (LLD) (microCurie per milliliter)	Natural Uranium (microCurie per milliliter)	Thorium-230 (microCurie per milliliter)	Radium-226 (microCurie per milliliter)	Natural Uranium % of DAC (Percent)	Thorium 230 % of DAC (Percent)	Radium 226 % of DAC (Percent)
21-May-12	Mill Laborer 1	3.08E+06	1.00E-16	3.12E-13	7.60E-14	5.04E-14	1.560	1.267	0.017
10-Apr-12	Mill Laborer 1	2.37E+06	1.00E-16	6.10E-14	9.49E-14	ND	0.305	1.582	ND
1-Mar-12	Mill Laborer 1	2.39E+06	1.00E-16	1.12E-13	4.98E-14	7.84E-14	0.560	0.830	0.026
6-Feb-12	Mill Laborer 1	2.61E+06	1.00E-16	3.71E-13	2.61E-13	ND	1.855	4.350	ND
Average:		2.61E+06	1.00E-16	2.14E-13	1.20E-13	6.44E-14	1.07E+00	2.01E+00	2.15E-02

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 plus time spent in the restricted area to date show that the maximally exposed worker was unlikely to have received in excess of 10% of the applicable ALI thus individual monitoring of
	Some results for Radium-226 and Thorium-230 were reported as negative values signifying concentrations below the Lower Limit of
	These results are shown as Non-Detect (ND).

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
Tailings Laborer - 1
Breathing Zone Samples

Date	Task	Volume (milliliters)	Sample Lower Limit of Detection (LLD) (microCurie per milliliter)	Natural Uranium (microCurie per milliliter)	Thorium-230 (microCurie per milliliter)	Radium-226 (microCurie per milliliter)	Natural Uranium % of DAC (Percent)	Thorium 230 % of DAC (Percent)	Radium 226 % of DAC (Percent)
19-Jun-12	Tailings Repair Worker	4.19E+06	1.00E-16	6.87E-14	1.32E-13	1.00E-16	0.344	2.200	0.000
21-Jun-12	Tailings Repair Worker	2.47E+06	1.00E-16	1.08E-13	1.26E-13	1.00E-16	0.540	2.100	0.000
25-Jun-12	Tailings Repair Worker	2.32E+06	1.00E-16	1.36E-13	3.47E-13	3.13E-13	0.680	5.783	0.104
Average:		2.99E+06	1.00E-16	1.04E-13	2.02E-13	1.04E-13	5.21E-01	3.36E+00	3.48E-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 plus time spent in the restricted area to date show that the maximally exposed worker was unlikely to have received in excess of 10% of the applicable ALI thus individual monitoring of intakes is not required.
	Some results for Radium-226 were reported as negative values (less than zero) signifying concentrations below the Lower Limit of Detection (LLD).
	These Radium-226 results are shown on the spreadsheet as values at the Lower limit of Detection (LLD) of 1E-16.

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
Tailings Laborer - 1
Breathing Zone Samples

Date	Task	Volume (milliliters)	Sample Lower Limit of Detection (LLD) (microCurie per milliliter)	Natural Uranium (microCurie per milliliter)	Thorium-230 (microCurie per milliliter)	Radium-226 (microCurie per milliliter)	Natural Uranium % of DAC (Percent)	Thorium 230 % of DAC (Percent)	Radium 226 % of DAC (Percent)
19-Jun-12	Tailings Repair Worker	4.19E+06	1.00E-16	6.87E-14	1.32E-13	ND	0.344	2.200	ND
21-Jun-12	Tailings Repair Worker	2.47E+06	1.00E-16	1.08E-13	1.26E-13	ND	0.540	2.100	ND
25-Jun-12	Tailings Repair Worker	2.32E+06	1.00E-16	1.36E-13	3.47E-13	3.13E-13	0.680	5.783	0.104
Average:		2.99E+06	1.00E-16	1.04E-13	2.02E-13	3.13E-13	5.21E-01	3.36E+00	1.04E-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 plus time spent in the restricted area to date show that the maximally exposed worker was unlikely to have received 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).

These results are shown as Non-Detect (ND).

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

Restricted Area Time						
Site Operations Technician						
					Time	
Date		Time In	Time Out		Mill	Tails
					(Days)	(Days)
5/14/2012		14:00	16:45			0.11
5/15/2012		13:00	16:30			0.15
5/16/2012		7:00	10:15			
		13:30	17:00			0.15
5/17/2012		10:15	12:00			0.07
		13:00	15:00			0.08
5/21/2012		10:30	12:00		0.06	
		12:45	16:15		0.15	
5/22/2012		8:30	11:45			0.14
5/23/2012		8:00	9:30			0.06
		10:30	11:50			0.06
5/24/2012		7:30	12:00			0.19
		12:30	15:00			0.10
5/29/2012		8:30	12:00			0.15
5/31/2012		7:30	12:00			0.19
		12:45	15:00			0.09
6/4/2012		8:30	11:30		0.13	
6/5/2012		10:30	12:41		0.09	
		13:30	16:15		0.11	
		12:30	13:45		0.05	
6/6/2012		12:30	16:57			0.19
6/7/2012		8:00	9:30			0.06
		12:30	13:45		0.05	
		13:45	15:00			0.05
6/11/2012		13:00	16:45		0.16	
6/12/2012		8:00	10:32		0.11	
		10:32	13:04			0.11
		13:50	16:00		0.09	
6/13/2012		8:00	13:45		0.24	
		14:15	15:15		0.04	
6/14/2012		7:30	10:00			0.10
		14:30	16:45			0.09
6/18/2012		8:00	12:00			0.17
		13:00	14:55			0.08
6/19/2012		7:30	12:00			0.19
		13:00	16:00			0.13
6/20/2012		12:45	17:00			0.18
6/21/2012		7:30	12:00			0.19
		15:30	16:30			0.04
6/25/2012		16:45	17:00			0.01
6/26/2012		10:00	11:40			0.07
		7:30	12:00			0.19
		13:30	15:35			0.09
		16:15	16:45			0.02
6/27/2012		9:00	12:00			0.13
		14:00	16:50			0.12
6/28/2012		9:00	11:45			0.11
		13:00	14:00			0.04
		15:00	15:50			0.03
7/2/2012		9:00	9:50			0.03
		16:00	16:30			0.02
7/3/2012		7:30	8:45			0.05
		9:30	10:30			0.04
		15:15	16:30			0.05
7/9/2012		8:30	11:50			0.14
		13:15	14:10			0.04
		15:30	16:00			0.02
7/10/2012		7:45	9:15			0.06

					Time	
Date		Time In	Time Out		Mill	Tails
					(Days)	(Days)
		15:55	16:30			0.02
		9:40	11:40		0.08	
		14:10	15:00		0.03	
7/11/2012		7:15	7:52		0.03	
		7:52	8:30			0.03
		9:30	10:15			0.03
		10:30	12:00			0.06
		13:05	14:25		0.06	
		15:15	16:10			0.04
7/12/2012		7:45	8:45			0.04
		10:00	11:15			0.05
		13:00	16:40			0.15
7/16/2012		8:00	11:00			0.13
		15:30	16:00		0.02	
7/17/2012		8:10	9:00			0.03
		11:15	12:15			0.04
		13:00	16:30			0.15
7/18/2012		10:00	11:30		0.06	
		15:30	16:45			0.05
7/19/2012		8:00	12:00			0.17
		13:15	16:20			0.13
7/23/2012		9:00	11:00			0.08
		14:00	15:30			0.06
		16:00	16:30		0.02	
7/24/2012		8:30	10:00			0.06
		13:30	14:00			0.02
7/25/2012		8:30	10:00			0.06
		11:15	12:00			0.03
7/26/2012		8:15	10:00			0.07
		14:00	16:15			0.09
7/30/2012		8:00	9:00			0.04
		10:15	11:30			0.05
		15:00	15:45			0.03
7/31/2012		8:20	10:50			0.10
		13:30	15:00		0.06	
		16:00	16:45			0.03
8/1/2012		7:30	8:30		0.04	
		10:00	12:00			0.08
		13:00	16:30			0.15
8/2/2012		8:00	12:00			0.17
		12:30	16:30			0.17
8/6/2012		7:30	9:30			0.08
		9:30	11:30		0.08	
		13:30	15:26		0.08	
8/7/2012		8:00	9:45		0.07	
		9:45	11:30			0.07
		14:00	15:00			0.04
		15:00	16:00		0.04	
8/8/2012		14:00	15:25		0.06	
		15:25	16:50			0.06
8/9/2012		7:30	9:30		0.08	
		9:30	11:30			0.08
8/20/2012		11:30	12:30		0.04	
		13:00	14:40			0.07
		14:40	16:20		0.07	
8/21/2012		7:30	11:25		0.16	
		15:00	16:00			0.04
8/22/2012		7:30	9:00			0.06
		14:00	15:30			0.06
8/23/2012		7:45	10:15			0.10
		13:46	14:34			0.03

					Time	
Date		Time In	Time Out		Mill	Tails
					(Days)	(Days)
		15:00	16:15			0.05
8/27/2012		8:00	9:15			0.05
		12:45	18:20			0.23
8/28/2012		7:30	11:45			0.18
		13:00	17:00			0.17
8/29/2012		7:30	10:00			0.10
8/30/2012		8:00	9:15			0.05
		13:00	14:15			0.05
9/4/2012		8:00	9:45			0.07
		13:15	15:00			0.07
9/5/2012		7:30	11:30			0.17
		14:00	16:40			0.11
9/6/2012		7:20	8:40			0.06
		15:30	16:30			0.04
9/10/2012		7:30	9:30			0.08
		13:40	16:15		0.11	
9/11/2012		7:45	9:47			0.08
		9:47	11:50		0.09	
		13:30	15:10		0.07	
		16:30	17:00		0.02	
9/12/2012		7:30	9:37		0.09	
		9:37	11:45			0.09
		15:00	15:52		0.04	
		15:52	16:45			0.04
9/13/2012		8:00	9:30			0.06
		15:00	16:00			0.04
9/18/2012		7:30	12:00			0.19
		12:45	17:00			0.18
9/19/2012		12:30	14:00			0.06
		15:00	16:20			0.06
9/20/2012		12:30	16:00			0.15
9/24/2012		8:45	10:15			0.06
		14:45	15:30			0.03
9/25/2012		8:30	10:45			0.09
		15:30	16:30			0.04
9/26/2012		8:00:00	9:07		0.05	
		9:07	10:15			0.05
		16:00	16:30			0.02
9/27/2012		7:30	8:00		0.02	
		8:00	8:30			0.02
		16:00	16:45			0.03
10/2/2012		8:00	8:45			0.03
		14:30	15:30		0.04	
		15:30	16:30			0.04
10/3/2012		9:00	10:20		0.06	
		10:20	11:40			0.06
		13:45	15:25		0.07	
10/4/2012		10:30	11:07			0.03
		11:07	11:45		0.03	
10/8/2012		8:45	9:30			0.03
10/9/2012		9:15	9:52		0.03	
		9:52	10:30			0.03
		14:15	15:00			0.03
		16:20	17:03			0.03
10/10/2012		9:00	9:45			0.03
		15:00	16:00			0.04
10/11/2012		9:00	9:30			0.02
		15:15	15:37		0.02	
		15:37	16:00			0.02
10/15/2012		7:45	8:30			0.03
10/16/2012		11:00	11:50			0.03

					Time	
Date		**Time In**	**Time Out**		**Mill**	**Tails**
					(Days)	**(Days)**
10/17/2012		7:30	8:15			0.03
10/22/2012		8:45	9:30			0.03
		14:25	15:30			0.05
10/24/2012		10:45	11:30			0.03
10/25/2012		8:45	9:30			0.03
10/29/2012		9:00	10:43			0.07
10/30/2012		8:15	9:00			0.03
10/31/2012		8:00	10:00			0.08
11/5/2012		8:00	9:00			0.04
		14:05	15:35		0.06	
11/6/2012		8:07	8:43		0.03	
		10:35	11:45		0.05	
		12:40	13:35		0.04	
		13:55	15:00		0.05	
11/7/2012		8:30	9:25			0.04
		14:00	14:40			0.03
11/8/2012		8:15	9:10			0.04
11/12/2012		8:45	9:30			
		14:15	14:37		0.02	
		14:37	15:00			0.02
11/13/2012		8:20	9:00			0.03
11/14/2012		8:00	8:45			0.03
11/15/2012		14:30	15:00		0.02	
		15:00	15:30			0.02
11/19/2012		8:45	9:15			0.02
11/20/2012		11:15	11:50			0.02
11/26/2012		9:00	9:45			0.03
		10:40	12:00			0.06
11/27/2012		7:00	7:15			0.01
		9:45	14:20			0.19
11/28/2012		10:00	11:20			0.06
12/5/2012		8:00	9:00			0.04
12/10/2012		8:30	9:15			0.03
		10:45	11:05		0.01	
		14:10	15:00		0.03	
12/12/2012		11:00	11:45		0.03	
		13:45	15:05		0.06	
12/13/2012		8:00	9:00			0.04
12/17/2012		9:00	9:45			0.03
12/18/2012		15:30	16:05		0.02	
		16:05	16:40			0.02
12/19/2012		10:00	11:05			0.05
12/26/2012		9:00	9:25		0.02	
		14:00	14:50			0.03
Total:	**(Days)**				2.15	6.59
Total:	**(Hours)**				51.52	158.12

Restricted Area Time						
Mill Laborer						
					Time	
Date		Time In	Time Out		Mill	Tails
					(Days)	(Days)
1/4/2012		7:45	8:32			0.03
		8:32	9:20		0.03	
1/5/2012		11:30	12:40		0.05	
		13:40	14:40		0.04	
		16:25	16:45		0.01	
1/12/2012		12:36	14:00			0.06
1/16/2012		12:00	12:15		0.01	
		12:20	13:05		0.03	
1/19/2012		9:05	9:30		0.02	
		10:40	12:00		0.06	
		12:55	13:15		0.01	
1/24/2012		12:55	13:05		0.01	
2/1/2012		8:00	12:10			0.17
		13:45	17:00			0.14
2/2/2012		10:45	12:05			0.06
		13:00	16:05			0.13
2/6/2012		8:00	11:40		0.15	
		12:40	14:20		0.07	
2/14/2012		8:05	9:55		0.08	
2/21/2012		8:15	8:30		0.01	
3/1/2012		8:10	11:50		0.15	
		13:10	14:40		0.06	
3/13/2012		10:20	12:15			0.08
3/19/2012		10:25	12:00		0.07	
		13:10	15:55		0.11	
3/20/2012		10:10	11:50			0.07
		13:00	13:40			0.03
3/21/2012		8:05	9:03		0.04	
		9:03	10:00			0.04
3/27/2012		8:40	12:10			0.15
3/28/2012		9:00	10:00			0.04
4/4/2012		15:00	16:00			0.04
4/9/2012		11:50	12:05			0.01
4/10/2012		8:10	11:51		0.15	
		13:12	14:45		0.06	
4/11/2012		9:00	12:10			0.13
		13:00	15:00			0.08
4/12/2012		8:10	8:25			0.01
4/14/2012		8:41	9:49			0.05
4/18/2012		9:45	10:12			0.02
		10:55	11:45			0.03
		13:25	14:20			0.04
4/19/2012		9:30	10:15			0.03
5/3/2012		16:15	16:30			0.01
5/9/2012		8:30	9:00			0.02
5/14/2012		8:15	8:30		0.01	
5/21/2012		12:42	16:15		0.15	
5/23/2012		16:00	16:30			0.02
5/29/2012		8:00	8:15		0.01	
7/3/2012		15:45	16:30			0.03
7/5/2012		7:15	7:50			0.02
		15:00	15:25			0.02
7/7/2012		16:45	17:30		0.03	
7/9/2012		8:30	11:50			0.14
7/11/2012		9:30	10:15			0.03
7/12/2012		10:11	11:45			0.06
		13:00	15:00			0.08
7/18/2012		11:00	11:20		0.01	

7/19/2012		8:00	12:00			0.17
		15:15	16:20			0.05
7/23/2012		14:00	16:30		0.10	
7/26/2012		9:30	10:00			0.02
		14:00	16:15			0.09
7/31/2012		6:40	10:50			0.17
		14:00	15:30		0.06	
8/8/2012		15:40	16:10		0.02	
8/9/2012		8:40	9:20			0.03
		15:15	16:15			0.04
8/13/2012		9:20	10:15			0.04
		13:15	14:40		0.06	
		16:40	17:10			0.02
8/14/2012		7:25	7:45			0.01
		16:30	17:00			0.02
8/15/2012		7:40	8:05			0.02
		16:00	16:47			0.03
8/29/2012		7:30	8:10			0.03
9/17/2012		9:50	11:04			0.05
		11:30	12:10			0.03
10/25/2012		12:40	12:55		0.01	
Total:	**(Days)**				0.39	1.02
Total:	**(Hours)**				9.38	24.47

Restricted Area Time						
Tailings Repair Worker						
					Time	
Date		Time In	Time Out		Mill	Tails
4/4/2012		11:10	12:10			0.04
4/18/2012		8:00	8:58			0.04
4/19/2012		9:30	10:15			0.03
5/10/2012		8:00	8:30			0.02
		13:00	15:10			0.09
		16:00	16:55			0.04
5/14/2012		8:00	11:01			0.13
		12:30	16:45			0.18
5/15/2012		12:30	16:30			0.17
5/16/2012		7:10	11:58			0.20
		13:00	17:18			0.18
5/17/2012		7:30	11:50			0.18
		13:00	15:00			0.08
5/21/2012		8:00	12:00			0.17
		12:30	16:50			0.18
5/22/2012		7:30	12:00			0.19
5/23/2012		8:00	9:30			0.06
		14:48	16:44			0.08
5/24/2012		7:30	12:30			0.21
		12:30	16:50			0.18
5/29/2012		8:00	12:00			0.17
		12:30	16:30			0.17
5/30/2012		8:00	12:00			0.17
		12:30	16:30			0.17
5/31/2012		7:30	12:00			0.19
		12:45	17:00			0.18
6/4/2012		8:00	11:49			0.16
		12:41	16:00			0.14
6/5/2012		8:00	10:30			0.10
		10:30	11:00			0.02
6/6/2012		12:30	16:55			0.18
6/11/2012		7:30	12:00			0.19
		12:30	16:45			0.18
6/12/2012		7:30	12:00			0.19
		12:30	16:53			0.18
6/13/2012		7:30	12:00			0.19
		13:00	16:30		0.15	
6/14/2012		14:30	16:45			0.09
6/18/2012		7:30	12:00			0.19
6/19/2012		7:30	12:00			0.19
		12:30	16:45			0.18
6/20/2012		7:30	12:00			0.19
		13:45	17:00			0.14
6/21/2012		12:30	16:30			0.17
6/25/2012		7:30	11:05			0.15
6/26/2012		7:30	11:50			0.18
		12:30	15:30			0.13
6/27/2012		7:20	12:00			0.19
		12:30	16:30			0.17
6/28/2012		7:30	12:03			0.19
		12:30	17:12			0.20
7/31/2012		8:20	10:37			0.10
		11:00	12:00			0.04
		13:30	15:00		0.06	
8/1/2012		7:30	8:30		0.04	
		9:00	12:00			0.13
		12:40	13:50			0.05
8/2/2012		8:00	11:00			0.13
		12:30	16:30			0.17

					Time	
Date		**Time In**	**Time Out**		**Mill**	**Tails**
9/17/2012		7:45	12:10			0.18
9/18/2012		7:30	12:00			0.19
		12:45	14:52			0.09
9/19/2012		12:30	15:02			0.11
		15:02	16:20			0.05
9/20/2012		12:30	16:00			0.15
9/25/2012		8:30	10:45			0.09
		15:30	16:30			0.04
Total:	**(Days)**				0.25	8.84
Total:	**(Hours)**				6.00	212.18

Rio Tinto

Internal memo

14 February 2013

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 2012 shows that all results are below the first action level of 15 µg/L. In fact, all urinalysis results for the year 2012 were less than the lower limit of detection (LLD) of 5.0 µg/liter.

Site employees were bioassayed monthly. Contract employees working on site who could potentially contact uranium 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. A site employee was not present on site during October and November 2012 and was not bioassayed during those months.

The site Administrative Coordinator was also tested in spite of the fact that she did not work in the restricted area and worked solely in the office.

Please see attached summary of 2012 urinalysis data.

Oscar A Paulson

Oscar A. Paulson
Facility Supervisor

KENNECOTT URANIUM COMPANY

SWEETWATER URANIUM PROJECT

BIOASSAY TESTING

2012

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**
Site Operations Technician	SO	Kennecott Uranium Company					<5.0	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**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**
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**													
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/SITE LABOR	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**
Electrician	ELEC	L&L Electric	<5.0	<5.0		<5.0		<5.0		<5.0			<5.0		**5.0**
ELECTRICAL HELPER	GPL	L&L Electric						<5.0							
Tailings Inspector	TAIL	Telesto Solutions, Inc.						<5.0							**5.0**
Tailings Repair Worker	ACI#11	Archer Construction, Inc.					<5.0								
Tailings Repair Worker	ACI#2	Archer Construction, Inc.				<5.0	<5.0	<5.0							**5.0**
Tailings Repair Worker	ACI#4	Archer Construction, Inc.													**5.0**
Tailings Repair Worker	ACI#1	Archer Construction, Inc.				<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0			**5.0**
Tailings Repair Worker	ACI#8	Archer Construction, Inc.					<5.0	<5.0							
Tailings Repair Worker	ACI#9	Archer Construction, Inc.					<5.0	<5.0							
Tailings Repair Worker	ACI#10	Archer Construction, Inc.					<5.0	<5.0							
Tailings Repair Worker	ACI#7	Archer Construction, Inc.						<5.0							
Crane Repair Worker	CRN	Kone Cranes								<5.0					**5.0**
Fire Extinguisher Inspector	GRN	Simplex Grinnell			<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 2012 / worked solely in office.
Administrative coordinator was tested in spite of the fact that she worked solely in the office.

Pre-job bioassay.

Final bioassay

Pre-job and post job bioassay collected in same month. Worked in restricted area.

Pre and post job bioassays collected. Never worked in restricted area.

Pre-job and working bioassay collected during month.

Post job and working bioassays collected during month.

Rio Tinto

Internal memo

19 February 2013

To: NRC File

Subject: Summary of Radiation Instrument Calibrations – 2012

Instrument		Date(s) Calibrated
Calibration Orifices (Annual calibration required)		
	Lo Vol-40A S/N M100	2/14/12
	Hi Vol-25A S/N 8080978	2/14/12
	Sierra Instruments TE-5025A	2/14/12
Calibrators (Annual calibration required)		
	CD-530-1 Digital Venturi Calibrator S/N 3039	2/21/12
Alpha Detectors		
	43-5 S/N P-2425	4/3/12, 10/11/12
	43-5 S/N P-2426	1/18/12, 8/23/12
	43-5 S/N P-2427	1/20/12, 8/23/12
	43-5 S/N P-2428	1/25/12, 8/23/12
	43-5 S/N P-2429	4/3/12, 10/11/12
	43-90 S/N PR-138872	2/17/12, 8/28/12
	43-90 S/N PR-138874	2/17/12, 8/28/12
	43-90 S/N 232499	1/27/12, 8/23/12
	43-1 S/N PR-206925	6/14/12, 1/13/13
	AC3-5 S/N 3793	6/18/12, 1/14/13
Gamma Meters/Detectors		
	12S S/N 11816	6/15/12, 1/13/13
	5 S/N 8170	6/14/12, 1/13/13
	44-10 S/N 206932	6/13/12, 1/13/13
	44-10 S/N 233869	6/13/12, 1/13/13
	19 S/N 16938	6/13/12, 1/13/13
	44-10 S/N 252103	6/13/12, 1/13/13
	44-10 S/N 252068	2/16/12, 10/11/12
Rate Meters		
	177 S/N 14390	2/17/12, 8/28/12
	177 S/N 14407	1/18/12, 8/23/12
	2350-1 S/N 192613	6/8/12, 1/13/13
	2350-1 S/N 216182	6/8/12, 1/13/13
	2350-1 S/N 235547	2/16/12, 10/11/12
	2350-1 S/N 235565	6/8/12, 1/13/13
	Model 3 S/N 157539	2/16/12, 9/7/12
	Model 12 S/N 12280	6/8/12, 1/13/13
	PRS-1 S/N 330/3793	6/18/12, 1/14/13

SAC R4		
	S/N 383	2/14/12, 9/7/12
SAC R5		
	S/N 614	2/14/12, 8/29/12
	S/N 965	2/1/12, 9/5/12
	S/N 602548	2/1/12, 8/30/12
Scaler		
	MS-2 S/N 738	2/1/12, 8/30/12
	MS-2 S/N 994	2/14/12, 8/29/12
Beta Gamma Detector		
	Model 44-1 S/N PR-156890	6/12/12, 1/13/13
	Model 44-9 S/N PR-093335	2/17/12, 9/7/12
	Model 44-142 S/N PR-302659	1/31/12, 9/6/12
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	2/1/12, 9/5/12
Hi Vol Air Sampler		
	S/N Unit # 1	1/12/12, 4/18/12, 7/30/12, 10/30/12
	S/N Unit # 2	1/12/12, 4/18/12, 7/30/12, 10/30/12
	S/N Unit # 3	1/12/12, 4/18/12, 7/30/12, 10/30/12
	S/N Unit # 4	1/12/12, 4/18/12, 7/30/12, 10/30/12
	S/N 11314	1/11/12, 4/16/12, 7/30/12, 10/30/12, 12/4/12 [1]
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: January 25, 2012 Field calibration/checks: 11/5/12, 12/10/12
	DF-604 S/N 8917	Annual Factory calibration: November 27, 2012 Field Calibration/checks: 1/17, 2/6, 3/14, 4/2, 5/7, 6/4, 7/9, 8/13, 9/4 and 10/1/12

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 10016 operated from January 1 to January 17, 2012 and November 5 to December 31, 2012. The DF-604 unit with serial number 8917 operated from January 17 to November 5, 2012.

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 intermittently experiences delays in calibrating and returning instruments to the site in the past.

[1] The December 4, 2012 calibration was an annual factory recalibration.
[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
1/10/12	17:19
4/16/12	14:21
5/20/12	17:40
6/10/12	16:44
6/12/12	15:11
6/20/12	17:51
6/26/12	12:54
7/10/12	8:36
7/22/12	16:42
8/7/12	**(1)**
10/8/12	12:49
11/6/12	15:56

Buck Basic 12 – S/N B12494

Date	Time
1/10/12	17:07
2/6/12	17:06
3/1/12	8:00
3/3/12	17:56
4/9/12	18:11
4/10/12	17:45
6/20/12	17:59
6/21/12	17:06
7/10/12	8:36
7/22/12	15:30
10/3/12	13:25
10/8/12	12:49

Buck Basic 12 – S/N B12486

Date	Time
1/10/12	17:13
4/16/12	14:21
5/20/12	17:31
5/22/12	11:16
7/22/12	16:36
8/9/12	11:49
9/8/12	13:42
9/26/12	11:38
10/1/12	17:48
10/16/12	**(1)**
11/13/12	14:08
12/6/12	17:33
12/16/12	17:12

(1) Factory calibration following repair.

Oscar A Paulson

Oscar Paulson
Facility Supervisor

Rio Tinto

Internal memo

20 February 2013

TO: Gamma Radiation Monitoring File

Subject: External Gamma Radiation Survey Assessment

In 2012, gamma surveys of the Mill were conducted on June 24 and December 19, 2012. Gamma surveys of the interior of the tailings impoundment were conducted on June 20 and December 20, 2012. Gamma surveys of the Ion Exchange area were conducted on June 24 and 29 and December 19 and 20, 2012.

Eighteen (18) areas or items associated with the Ion Exchange equipment were surveyed on June 24 and 29 and December 19 and 20, 2012. Thirty (30) locations in the Mill and Solvent Extraction (SX) Buildings were surveyed for gamma radiation on June 24, 2012 and December 19, 2012.

Average gamma readings for discrete items or areas ranged from 36 to 679 µR/hour (210 µR/hr average for the year) for the Ion Exchange areas and related equipment, to 13 to 973 µR/hour (78 µR/hr average for the year) in the Mill and Solvent Extraction (SX) Buildings.

The stored equipment was monitored as well on June 26, 27, 29 and December 29, 2012. Average gamma readings for discrete items of stored equipment ranged from 15 to 4374 µR/hr at the equipment surface. The maximum gamma reading recorded at the equipment surface was 4,824 microR/hr. These readings were taken directly on 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 gamma radiation reading encountered at thirty (30) centimeters from any piece of equipment was 4.82 mR/hr (0.0048 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. These vessels are checked periodically to insure that gamma levels thirty (30) centimeters from the surface do not exceed 5.00 mR/Hr (0.005 R/hr) and that they do not require signing as a Radiation Area.

Two gamma surveys were completed in the tailings impoundment on June 29 and December 20, 2012. This area averaged 132 µR/hr for 2012. Due to the large number of readings taken in the impoundment on June 29 and December 20, 2012, 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 6 millirems. A summary of the dosimetry results is attached.

An assessment of dose (external and internal) to the maximally exposed individual demonstrating the lack of need for individual monitoring under 10 CFR 20.1502 is included in this report.

Oscar A Paulson

Oscar Paulson

Kennecott Uranium Company		
Sweetwater Uranium Project		
Stored Resin		
Stored Resin Gamma Radiation Monitoring Results		
Date	**Gamma**	
	Top	**Bottom**
	(uR/hr)	**(uR/hr)**
28-Apr-98	25.0	60.0
8-Oct-98	22.0	160.0
12-May-99	19.0	60.0
17-Nov-99	45.0	90.0
21-May-00	30.0	70.0
21-Dec-00	40.0	70.0
20-Jun-01	40.0	65.0
26-Dec-01	90.0	80.0
24-Jun-02	60.0	80.0
23-Dec-02	14.0	60.0
25-Jun-03	20.0	60.0
16-Dec-03	41.8	71.7
28-Jun-04	57.8	152.0
16-Dec-04	28.7	110.0
8-Jun-05	18.0	120.0
22-Dec-05	53.4	262.0
14-Jun-06	32.7	125.0
21-Dec-06	50.1	117.0
26-Jun-07	25.1	111.0
13-Dec-07	24.9	133.0
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	34.0	74.0
2-Dec-10	19.0	179.0
14-Jun-11	22.0	82.0
7-Dec-11	21.0	133.0
24-Jun-12	23.0	155.0
19-Dec-12	18.0	83.0
Average	34.5	100.3
Standard Deviation	16.8	47.6
OAP:2004		
resin0001.xls		

KENNECOTT URANIUM COMPANY

Sweetwater Uranium Project

OCCUPATIONAL RADIATION DOSIMETRY RESULTS / DEEP DOSE

2012

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
SITE OPERATIONS TCHNICIAN	MF	96	KENNECOTT URANIUM CO.					M	M	M	1	M	1	4	M	6
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**													
SECURITY	SEC # 1	49	SECURITAS	M	M	M	M	M	M	M	2	M	M	M	M	2
SITE/MILL LABORER	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
TAILINGS REPAIR WORKER	ACI#1	95	ARCHER CONSTRUCTION, INC.	M	M	M	M	M	M	M	M	M	M	M	M	0
TAILINGS REPAIR WORKER	ACI#2	92	ARCHER CONSTRUCTION, INC.	M	M	M	M	M	M	M	M	M	M	M	M	0
TAILINGS REPAIR WORKER	ACI#3	90	ARCHER CONSTRUCTION, INC.	M	M	M	M									0
TAILINGS REPAIR WORKER	ACI#4	91	ARCHER CONSTRUCTION, INC.	M	M	M	M	M	M	M	M	M	M	M	M	0
TAILINGS REPAIR WORKER	ACI#7	94	ARCHER CONSTRUCTION, INC.	M	M	M	M	M	M	M	M	M	M	M	M	0
TAILINGS REPAIR WORKER	ACI#8	97	ARCHER CONSTRUCTION, INC.					M / D-1	M/D-1	M	M	M	M	M	M	0
TAILINGS REPAIR WORKER	ACI#9	98	ARCHER CONSTRUCTION, INC.					M/D-3	M/D-3	M	M	M	M	M	M	0
TAILINGS REPAIR WORKER	ACI#10		ARCHER CONSTRUCTION, INC.					M/D-2	M/D-2							
VISITOR BADGE	D-1	35		M	M	M	M	M	M	M	1	M	M	M	M	1
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 WORKER	CRN		KONE CRANES								1/D-1					
FIRE EXTINGUISHER INSPECTOR	GRN		SIMPLEX GRINNELL			M/D-1										
ELECTRICIAN	ELEC		L&L ELECTRIC	M/D-1	M/D-1		M/D-1		M/D-2		1/D-1			M/D-1		
TAILINGS INSPECTOR	TAIL		TELESTO SOLUTIONS, INC.						M/D-1							
ELECTRICAL HELPER	GPL		L&L ELECTRIC													

Employees listed by title (number) to preserve confidentiality

Not on site during month

Dosimeter lost/Dose estimated by Landauer, Inc.

Did not work on site.

Did not work in restricted area.

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

United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

Certificate of Accreditation to ISO/IEC 17025:2005

NVLAP LAB CODE: 100518-0

Landauer, Inc.

Glenwood, IL

is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:

IONIZING RADIATION DOSIMETRY

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).

2013-01-01 through 2013-12-31

Effective dates

DEPARTMENT OF COMMERCE * UNITED STATES OF AMERICA *

For the National Institute of Standards and Technology

Rio Tinto

Internal memo

20 February 2013

To: Total and Removable Alpha Monitoring File

Subject: Total and Removable Alpha Monitoring Assessment

In 2012 removable alpha monitoring was performed in the Mill and Solvent Extraction (SX) Buildings on June 20 and December 18, 2012 and in the Ion Exchange area on June 20 and December 18, 2012. Total alpha monitoring was performed on June 28 and December 17, 2012 in the Mill and SX buildings and on June 28 and December 17, 2012 in the Ion Exchange area.

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 36.0 and 45,331.4 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 300.3 dpm/100 cm^2. The single high removable alpha measurement was taken on June 20, 2012 of the Change Room floor. This area is within the restricted area. The area is being cleaned.

Total average alpha contamination levels in the Ion Exchange area ranged from 61.0 to 1388.9 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 30.1 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 29 and December 29, 2012. Removable alpha monitoring of the stored equipment was performed on June 20 and December 18, 2012, as well. Average total alpha readings on the equipment ranged from 61 to 26,772 dpm/100 cm^2. A maximum total reading of 79,509 dpm/100 cm^2 was recorded for vessel #71. Removable alpha readings for the stored equipment ranged from 0.7 to 60,681.2 dpm/100 cm^2. The high removable alpha readings were from rubber liner material on the inside of connecting pipes welded onto stored pressure vessels 70 and 71. The high total alpha readings were primarily from the connecting pipes in Vessel #71. These vessels, along with some others, are stored in the tailings impoundment to isolate them. It is planned to plug these connecting pipes with foam in 2013.

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.

Oscar A. Paulson

Oscar A. Paulson

Rio Tinto

Internal memo

14 February 2013

To: Radon Monitoring File

Subject: Radon Daughter Monitoring Assessment

In 2012 radon daughter monitoring was conducted on June 11 and December 6, 2012 in the Ion Exchange Area. Radon daughter monitoring was conducted in the Mill Building on June 11 and December 6, 2012.

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 Non Detect to 0.005 WL in the Ion Exchange area (average: 0.003) and 0.001 to 0.034 WL in the Mill and Solvent Extraction (SX) Buildings (average: 0.011). The ventilation fan operated continuously in the Solvent Extraction (SX) Building. Radon levels varied in the SX building from 0.008 to 0.034 WL, averaging 0.018 WL in June 2012 and 0.031 WL in December 2012. 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 June and December 2012 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 2012 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 2.4 to 3.0 pCi/L. Radon concentrations on top of the tank varied from 1.9 to 2.4 pCi/L. These values are at background levels since upwind radon concentrations for the facility varied from 2.2 to 3.3 pCi/L during 2012, as shown in the table below:

2012 Radon Concentrations

Quarter	Bottom of CCD#1 (pCi/L)	Top of CCD#1 (pCi/L)	Upwind (Background) (pCi/L)
1st	2.4	2.0	2.2[2]
2nd	2.6	1.9	2.6[2]
3rd	2.5	2.3	2.7
4th	3.0	2.4	3.3
Average	2.63	2.15	2.7

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

Radon daughter concentrations at the top and bottom of CCD#1 were low, ranging from 0.002 to 0.011 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 Radon Monitoring Results		
Date	**Radon**	
	Top	**Bottom**
	(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
7-Jun-11	0.003	0.001
30-Nov-11	0.022	0.021
11-Jun-12	0.011	0.011
6-Dec-12	0.011	0.002
Average	0.018	0.017
Standard Deviation:	0.011	0.013
OAP:		
resin0001.xls		

Kennecott Uranium Company		
Sweetwater Uranium Project		
Stored Resin		
Stored Resin RadTrak Monitoring Results		
Date	RadTrak Results	
	Top	Bottom
	(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
1ST Quarter 2011	1.7	1.7
2ND Quarter 2011	1.3	1.6
3RD Quarter 2011	2.4	2.7
4TH Quarter 2011	2.6	2.8
1ST Quarter 2012	2.0	2.4
2ND Quarter 2012	1.9	2.6
3RD Quarter 2012	2.3	2.5
4TH Quarter 2012	2.4	3.0
Average	2.5	2.9
Standard Deviation:	0.7	0.8
3.7	Corrected value	

Rio Tinto

Internal memo

POTABLE WATER QUALITY SUMMARY
2012

Coliform Count Summary

Date	**Drake #1** (well head)	**Administration Building Water Supply (PWW-1)** (kitchen sink cold tap)	**Frost Free Hydrant South of Facility (PWW-1)**
1/8/12	Good	Good	
2/6/12	Good	Good	
3/13/12	Good	Good	
4/2/12	Good	Good	
5/7/12	Good	Good	
5/8/12			Good
6/4/12	Good	Good	Good
7/9/12	Good	Good	Good
8/7/12	Good	Good	Good
9/4/12	Good	Good	Good
10/1/12	Good	Good	Good
11/5/12	Good	Good	Good
12/3/12	Good	Good	Good

The Administration Building is supplied by PWW-1. The water is tested monthly at the point of use. The Senior Facility Technician and Security Guard Trailers are supplied by Drake #1 well. The frost free hydrant south of the facility fence is also tested since it is used as a potable water supply. Use of the hydrant began after May 8, 2012.

KENNECOTT URANIUM COMPANY					
POTABLE WATER QUALITY SUMMARY					
2012					
DRAKE #1					
CHEMICAL ANALYSIS SUMMARY:					
Use Suitability	Domestic *	**DRAKE #1**	**DRAKE #1**	**DRAKE #1**	**DRAKE #1**
Parameter	Concentration **	01/17/12	04/11/12	7/11/2012	10/1/2012
Ammonia (NH3-N)	0.5	-	-	-	-
Arsenic (As)	0.05	0.002	0.002	0.002	0.001
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	3	2	3	3
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 (.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	53	48	53	62
Total Dissolved Solids (TDS)	500	163	177	174	194
Zinc (Zn)	5	0.01	0.01	0.03	0.03
pH (Standard Units)	6.5 - 8.5	8.06	8.28	8.25	8.16
Combined Ra226/Ra228 (pCi/L)	5.0 pCi/l	3.3	3	2.9	3.8
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)	ND (0.0003)	ND (0.0003)
Uranium - Total	mg/L	0.0003	ND (0.0003)	ND (0.0003)	0.0003
Lead 210 (pCi/L)	pCi/L	ND (1.0)	ND (1.0)	ND (1.0)	1 ± 0.5
Total Strontium 90 (pCi/L)	8.0 pCi/l	-	-	-	-
Gross Alpha Radioactivity *** (pCi/L)	15.0 pCi/l	1.7 ± 0.7	1.0 ± 0.4	1.4 ± 0.4	1.8 ± 0.4
* 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					
2012					
PWW-1					
CHEMICAL ANALYSIS SUMMARY:					
Use Suitability	Domestic *	**PWW-1**	**PWW-1**	**PWW-1**	**PWW-1**
Parameter	Concentration **	01/17/12	04/11/12	7/11/2012	10/1/2012
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	3	3	3
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	0.06	ND (0.05)	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	48	46	52	51
Total Dissolved Solids (TDS)	500	165	158	179	171
Zinc (Zn)	5	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)
pH (Standard Units)	6.5 - 8.5	8.2	8.44	8.39	8.27
Combined Ra226/Ra228 (pCi/L)	5.0 pCi/l	1.51	1.8	0.64	0.44
Natural Uranium (pCi/L)	pCi/L	0.9	0.6	2.4	1.7
Uranium - Suspended	mg/L	0.0004	ND (0.0003)	ND (0.0003)	ND (0.0003)
Uranium - Total	mg/L	0.0017	0.001	0.0033	0.0027
Lead 210 (pCi/L)	pCi/L	0.3 ± 0.7	0.5 ± 0.6	0.8 ± 0.7	0.6 ± 0.5
Total Strontium 90 (pCi/L)	8.0 pCi/l	-	-	-	-
Gross Alpha Radioactivity *** (pCi/L)	15.0 pCi/l	1.1 ± 0.6	0.4 ± 0.3	0.4 ± 0.2	0.4 ± 0.3
* 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					
2012					
PWW-2					
CHEMICAL ANALYSIS SUMMARY:					
Use Suitability	Domestic *	**PWW-2**	**PWW-2**	**PWW-2**	**PWW-2**
Parameter	Concentration **	01/30/12	04/11/12	7/11/2012	10/1/2012
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	0.18	0.12	0.15	0.09
Lead (Pb)	0.015	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)
Manganese (Mn)	0.05	0.02	0.01	0.02	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	41	41	42	42
Total Dissolved Solids (TDS)	500	167	161	163	165
Zinc (Zn)	5	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)
pH (Standard Units)	6.5 - 8.5	8.33	8.48	8.43	8.43
Combined Ra226/Ra228 (pCi/L)	5.0 pCi/l	2.24	1.02	1.6	1.62
Natural Uranium (pCi/L)	pCi/L	1.6	1.6	1.5	1.6
Uranium - Suspended	mg/L	ND (0.0003)	0.0003	ND (0.0003)	ND (0.0003)
Uranium - Total	mg/L	0.0027	0.0026	0.0024	0.0025
Lead 210 (pCi/L)	pCi/L	0.5 ± 0.6	0.2 ± 0.6	0.7 ± 0.7	0.9 ± 0.5
Total Strontium 90 (pCi/L)	8.0 pCi/l	-	-	-	-
Gross Alpha Radioactivity *** (pCi/L)	15.0 pCi/l	0.2 ± 0.1	0.07 ± 0.2	0.3 ± 0.2	0.1 ± 0.2
* 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

14 February 2013

To: SERP File

Subject: Safety and Environmental Review Panel (SERP) – 2012

During the calendar year 2012 the licensee has not:

- Made changes in the facility as described in the license application (as updated);
- Made changes in the procedures as described 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 two (2) Safety and Environmental Evaluations (SEEs) in 2012.

The first document dated March 7, 2012 replaced James Berson as President of Kennecott Uranium Company with Alexander (Sasha) Serebryakov, General Manager Business Development – Uranium. It also replaced James Berson on the Safety and Environmental Review Panel (SERP) with Sasha Serebryakov as the permanent member having expertise in management and responsibility for managerial and financial approval of changes.

The second document dated December 17, 2012 replaced Alexander (Sasha) Serebryakov, General Manager Business Development – Uranium, with James Fraser, General Manager Commercial, Finance and Legal – Rio Tinto Energy, as the individual to whom the Facility Supervisor of the Sweetwater Uranium Project reports. Alexander (Sasha) Serebryakov will remain on the Safety and Environmental Review Panel (SERP) as the permanent member having expertise in management and responsibility for managerial and financial approval of changes. It also changed the title of Mill Foreman to that of Site Operations Technician.

Oscar A Paulson

Oscar Paulson

SERP Review-2012.doc

Rio Tinto

Internal memo

12 February 2013

To: Respiratory Protection File

Subject: Respiratory Protection – 2012

The Site Operations Technician, Senior Facility Technician and Facility Supervisor were the three (3) employees on site that were part of the facility's respirator program in 2012.

Their respirator physicals and fit tests with respirator training were conducted on the following dates:

TITLE	RESPIRATOR PHYSICAL	FIT TEST/TRAINING
Senior Facility Technician	August 16, 2012	January 11, 2012 and December 27, 2012
Facility Supervisor	November 9, 2012	January 11, 2012 and November19, 2012
Site Operations Technician	May 18, 2012	May 21, 2012 and November 19, 2012

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.

The Senior Facility Technician's respirator physical was slightly delayed in 2012 due to a vacation.

The Facility Supervisor's respirator physical was slightly delayed in 2012 due to a respiratory tract infection.

The Site Operations Technician started on site for initial training and site familiarization on Thursday, May 10, 2012.

The Senior Facility Technician's fit test in Fall 2012 was delayed since he was off work from September 4, 2012 until December 16, 2012.

Oscar A Paulson

Oscar Paulson

Rio Tinto

Internal memo

16 February 2013

To: File

Subject: Releases for Unrestricted Use – 2012

Releases for unrestricted use issued in 2012 were primarily related to the release of equipment, including:

- Toro Dingo (small walk-behind trencher)
- Michigan 275 front end loader
- Trackhoe
- Liner sheet for testing
- Sump pump

The table below shows the maximum fixed (total) and removable alpha for these items:

Item	Release Date	Maximum fixed alpha dpm/100 cm^2	Maximum removable alpha dpm/100 cm^2
Liner	July 19, 2012	1162.2	14.0
Trackhoe	July 10, 2012	400.0	10.8
Michigan loader	September 18, 2012	581.7	13.2
Toro Dingo	September 18, 2012	239.2	46.9
Sump pump	November 28, 2012	404	20.4

In the course of these releases, no item exceeded 5.4 dpm/100 cm^2 removable alpha or 1162.2 dpm/100 cm^2 total alpha. The item with the highest fixed alpha was the sheet of liner sent for testing.

Oscar A Paulson

Oscar Paulson

ReleaseUnrestrictUse-2012

Rio Tinto

Internal memo

From	Oscar Paulson
To	Standard Operating Procedures File
Reference	**Annual Review of Standard Operating Procedures (SOPs)**
Date	27 December 2012
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 2012. 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 27, 2012 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 October 18, 2012 to reflect the availability of Archer Construction, Inc. during the winter of 2012-2013 for snow removal.

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

The following procedures were modified:

- HP-3 – *Beta Survey* – December 26, 2012
- HP-4 – *Radon Daughter Survey* – December 26, 2012
- HP-5 – *Internal and External Occupational Doses* – December 26, 2012
- HP-11 – *Personnel Air Sampling* – December 26, 2012
- HP-12 – *In-Plant High Volume Particulate Sampling* – December 27, 2012
- HP-13 – *Area Composite High Volume Particulate Sampling* – December 27, 2012
- HP-14 – *Calibration of Equipment* – December 27, 2012
- HP-21 – *Respiratory Protection* – December 26, 2012
- HP-29 – *Training, Reporting and Qualifications of Facility Staff* – December 26, 2012
- HP-33 – *Shipment of Radioactive Samples* – December 26, 2012
- EP-11 – *Thermoluminescent Dosimeter Area (TLD) Monitoring* – December 27, 2012
- EP-12 – *General Surface Water Sampling and Sample Preparation Procedures* – December 27, 2012
- EP-12b – *General Surface Water Sampling, Sample Preparation and Water Level Measurement Procedures* – December 27, 2012
- EP-13 – *General Ground Water Sampling and Sample Preparation Procedures* – December 27, 2012
- EP-13b – *General Ground Water Sampling, Sample Preparation and Water Level Measurement Procedures* – December 27, 2012
- EP-18 – *Meteorological Monitoring* – December 27, 2012

- EP-24 – *Monthly Flow Verification Procedure for F&J Specialty Products, Inc. Digital Air Monitoring System – F&J Model DF-604* – December 26, 2012
- TOP-1 – *General Tailings and Evaporation Impoundment Procedures* – December 27, 2012

C. Other Procedures

The *Suspended Operations Procedure* was revised on December 27, 2012.

Oscar Paulson

Oscar Paulson

Annual SOP Review-2012.doc

Rio Tinto

Internal memo

14 February 2013

To: Radiation Work Permit File

Subject Radiation Work Permits

No radiation work permits (RWPs) were issued in 2012.

Oscar Paulson

Rio Tinto

Internal memo

19 February 2013

Memo to File

SUBJECT: Dose Assessment / Determination of No Requirement for Individual Monitoring or Dose Calculation at the Sweetwater Uranium Project for 2012

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 2012.

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 1977 to 1979 as part of the pre-operational monitoring program. The average upwind radon concentration for 2012 of 2.67 pCi/liter was used to represent the background radon concentration for the facility. An equilibrium factor of 0.157 was used.

Item	Average Concentration	Dose
Background Gamma		200.7 mrem/yr (22.9 uR/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	2.67 pCi/l	184.40 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.

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

(2.67 pCi/l) / (1E3 ml/l) / (1E6 pCi/uCi) = 2.67 E-09 uci/ml
0.33 WL = 3E-08 uCi/ml (with all daughters present)
[(2.67E-09 uCi/ml) / (3E-08 uCi/ml)] * (0.33 WL) = 0.029 WL for background (with daughters present)

The calculated equilibrium factor for the facility (1993 to 2012) average is 0.157. Given that all daughters are not present and the equilibrium factor is 0.157, the actual background radon daughter concentration is:

(0.157) * (0.029 WL) = 0.005 WL

Occupational Dose

1) Gamma Radiation

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

Gamma Survey Results

Area	Total Dose	Background Dose	Occupational Dose
IX Area	210.0 uR/hr	22.9 uR/hr	187.1 uR/hr
Mill	78.0 uR/hr	22.9 uR/hr	55.1 uR/hr
Tailings	132.0 uR/hr	22.9 uR/hr	109.1 uR/hr

Approximately 51.5 hours are estimated to have been spent in the Mill and Solvent Extraction (SX) buildings by the Site Operations Technician and 212.2 hours are estimated to have been spent in the tailings impoundment by the Tailings Repair Worker in 2012. These are the maximum times spent by any individuals in these areas. This estimate is based on the entry and exit times for the Mill Building, Solvent Extraction (SX) Building and tailings impoundment recorded by site and contract personnel in the alpha survey record book

The table below estimates the gamma dose likely to be received by a maximally exposed individual:

Area	Time	Occupational Dose Rate	Total Dose
Mill & SX buildings	51.5 hours[a]	55.1 uR/hr	2.8 mrem
Tailings	212.2 hours[b]	109.1 uR/hr	23.2 mrem
Total			**26.0 mrem**

[a] Time spent by Site Operations Technician

[b] Time spent by Tailings Repair Worker

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 2012 even though their use was not required, in part, to confirm these calculations. The highest external dose received for the calendar year was 6 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 2012. The results are as follows:

Radon Sampling Results

Area	Concentration	Background	Occupational Dose
IX Area	0.003 WL	0.005 WL	0.000 WL
Mill Area	0.011 WL	0.005 WL	0.006 WL

The average occupational radon dose for facility personnel is:

{[(0.006 WL) / (0.33 WL/DAC)] * 51.5 hours} / (2000 DAC hours/ALI) = 0.0005 ALI
(0.0005 ALI) * (5000 millirems/ALI) = 2.5 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 2012 and breathing zone samples taken of personnel working in the Mill and SX Buildings and tailings impoundment during 2012.

The spreadsheet entitled Airborne Sampling Results (Using Maximum Values) 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 35.5 millirems to the maximally exposed individual (the Tailings Repair Worker) from work in both the Mill and tailings impoundment. This is well below the 10% threshold that triggers monitoring and dose calculation

The maximum measured airborne natural uranium concentration was 3.71 E-13 µCi/ml which was the February 6, 2012 breathing zone sample for the Mill Laborer-1. If this result were applied to the maximum possible number of hours that could be spent by any site worker (forty (40) hours) in the Mill and SX buildings in any given week and all of the uranium were soluble, it would result in the following exposure:

Calculation Basis:

Airborne activity:	3.71 E-13 µCi/ml
Maximum working hours in one (1) week:	40 hours
Minutes per hour:	60 minutes
Respiration rate:	2.00 E+04 ml/min
PicoCuries per microCurie:	1E+06 pCi/µCi
PicoCuries natural uranium per milligram:	677 picoCuries

Calculation:

[(3.71 E-13 µCi/ml)*(40 hours/week)*(60 minutes/hour)*(2.00 E+04 milliliters/minute)*(1E+06 picoCuries per microCurie)] / (677 picoCuries/milligram) = 0.026 milligrams

The maximum possible weekly exposure to natural uranium does not exceed 10 milligrams per week.

Based on the levels of airborne natural uranium, Radium-226 and Thorium-230 as demonstrated by the high volume air samples and breathing zone samples collected in the Mill Building and

tailings impoundment, and the time spent in the Mill and Solvent Extraction buildings and in the tailings impoundment by the Tailings Repair Worker in 2012, 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 35.5 millirems per year for 2012.

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 0.0025 rem/year (0.0005 ALI)
   b) The maximum calculated particulate dose based upon quarterly breathing zone samples is 0.036 rem/year

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

a)	Estimated external dose:	0.036 rem/yr.
b)	Estimated internal dose (particulates)	0.035 rem/yr.
c)	Estimated internal dose (Radon-222)	0.0025 rem/yr.
	Total:	0.064 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 2012 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 six (6) millirems. This proves that the external dose estimate based upon surveys is conservative.

Oscar A. Paulson

Oscar A. Paulson

Rio Tinto

Internal memo

16 February 2013

To: **NRC File**

Subject: Compliance with 10 Mrem Constraint Limit for 2012

10 CFR 20.1011(d) states:

(d) To implement the ALARA requirements of § 20.1101 (b), and notwithstanding the requirements in §20.1301 of this part, a constraint on air emissions of radioactive material to the environment, excluding Radon-222 and its daughters, shall be established by licensees other than those subject to § 50.43a, such that the individual member of the public likely to receive the highest dose will not be expected to receive a total effective dose equivalent in excess of 10 mrem (0.1 mSv) per year from these emissions. If a licensee subject to this requirement exceeds this dose constraint, the licensee shall report the exceedance as provided in § 20.2203 and promptly take appropriate corrective action to ensure against recurrence.

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:	1.24 E-16 uCi/ml	0.047 mrem/yr
Ra-226:	1.43 E-17 uCi/ml	0.003 mrem/yr
Th-230:	3.87 E-17 uCi/ml	0.146 mrem/yr
Total:		**0.197 mrem/yr**

3. Background levels for the site are as follows:

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
Total:		**1.21 mrem/yr**

Conclusions:

- The 2012 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

16 February 2013

To: **NRC File**

Subject: Compliance with 40 CFR 190.10 for 2012

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:	1.24 E-16 uCi/ml	0.047 mrem/yr
Ra-226:	1.43 E-17 uCi/ml	0.003 mrem/yr
Th-230:	3.87 E-17 uCi/ml	0.146 mrem/yr
Total:		**0.197 mrem/yr**

3. Background levels for the site are as follows:

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

4. The measured concentrations for 2012 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	**196.2 mrem**

This measured exposure is slightly below site background.

Conclusions:

- The 2012 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

19 February 2013

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 June 28 and December 26, 2012.

Emergency fire protection training involved:

- Training on fire water tanks
- Operation of the electric fire pump
- Operation of the diesel fire pump
- Tour of hose reel sheds
- Opening and operation of a fire hydrant

Annual fire extinguisher and hose inspections were conducted on March 19 and 20, 2012 by Simplex Grinnell.

Electrical ground integrity testing was performed on February 23, 27 and March 6, 2012.

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 10, 2012.
- Driver Training was held on January 16, 2012.
- Task Training was held on January 16, 2012.
- First Aid Training was held on January 10, 2012.

Oscar A. Paulson

Oscar A. Paulson