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20 January 2014

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

24 February 2014

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 8, 2013. Annual MSHA Refresher Training was conducted on January 9, 2013. In addition, driver training was conducted on January 10, 2013. Radiation training of individual contract employees (contractor new hires) was conducted on an as-needed basis. Equipment hazard training was provided on January 10, 2013. First Aid training is provided every other year and was last 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 2013, as documented in the memorandum entitled "Annual Review of Standard Operating Procedures (SOPs)", dated 28 December 2013.

9. Radiation Work Permits:
No radiation work permits were issued in 2013.

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 28, 2013. 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):
One (1) Safety and Environmental Evaluation (SEE) was issued by the Safety and Environmental Review Panel in 2013.

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 16, May 17 and November 8, 2013. Annual fit testing and respirator training was conducted on January 7 and November 21, 2013.

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 0.054 WL in June 2013 and 0.012 WL in December 2013.

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. 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 12.3-2013.doc

Rio Tinto

Internal memo

24 February 2014

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 reduction in exposure or effluents under the ALARA concept and the use, maintenance and inspection of radiation monitoring equipment, are 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 2013
- 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 0.011 WL to 0.074 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 2013 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 0.011 WL to 0.074 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 28, 2013. 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 2013 Inspection of Tailings Impoundment Liner report dated August 2, 2013. The report states:

> *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 has been lowered to a level everywhere below the surrounding native ground surface, 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. The maximum annual volume pumped by this system was increased from 25 million to 27 million gallons per Safety and Environmental Evaluation (SEE) #23 – Establishing of Annual Pumpback Volumes Based upon Tailings Impoundment Evaporative Capacity, discussed elsewhere in this report. 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 0.5% of the allowable effluent concentrations during 2013, 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 2013.

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-2013.doc

Rio Tinto

Internal memo

4 February 2014

To: NRC File

Subject: Summary of Monthly Radiation Safety Meetings

The following is a summary of the twelve (12) monthly (plus eight (8) additional) Radiation Safety meetings held in 2013:

2013	TOPIC	ATTENDEES
1/23	Discussed radon and Landauer, Inc. RadTrak results. Discussed and described fissile and special nuclear materials.	KUC, SEC
2/27	Discussed Dosimetry including Instadose units, pocket dosimeters and optically stimulated luminescence (OSL) dosimeters.	KUC, SEC
3/18	Discussed radiation safety aspects of performing annual fire extinguisher checks.	GRN
3/26	Discussed internal and external doses received by site workers.	KUC, SEC
4/11	Discussed calibration and use of alpha probes.	KUC, SEC
4/15	Discussed instrument calibrations, mortalities prevented by use of nuclear power and radon in natural gas.	KUC, SEC
4/22	Discussed background radon measurements in air for the facility.	KUC, SEC
5/13	Discussed radiation safety for working in the tailings impoundment.	KUC, SEC, ACI
5/23	Discussed fluid management in the tailings impoundment.	KUC, SEC, ACI
6/13	Discussed levels of radon progeny in the Solvent Extraction (SX) Building and ventilation in the building.	KUC, SEC
6/21	Discussed radiation safety related to inspection of the tailings impoundment.	KUC, TEL
6/26	Discussed film Pandora's Promise, nuclear fission, calculating energy released by fission , chart of the isotopes and line of stable isotopes.	KUC, SEC
7/26	Discussed radiation exposure at Fort Bliss, Texas, radon progeny levels in the Solvent Extraction (SX) Building and the impending Method 115 Test.	KUC, SEC
8/20	Discussed radiation safety for crane inspections.	KUC, KOK
8/23	Discussed Method 115 Test results.	KUC, SEC
9/19	Discussed articles entitled "Japan and the Fate of Nuclear Power" and "If Nuclear Disaster Strikes, Steer Clear of Japan's Playbook".	KUC, SEC
10/24	Discussed background radon concentrations and South Dakota State Medical Association (SDSMA) resolution against uranium mining.	KUC, SEC
11/21	Discussed respiratory protection, conducted respirator training and performed fit tests.	KUC, SEC
12/2	Discussed Wall Street Journal series on contaminated sites and changing criteria for dose to the general public, and release of a site for unrestricted use.	KUC, SEC
12/9	Demonstrated use of a Ludlum 2350-1 data logger and 44-10 gamma scintillation probe.	KUC, SEC

Initial key:

ACI = Archer Construction, Inc.
SEC = Securitas Security Services
KOK = Konecranes
KUC = Kennecott Uranium Company
GRN = Simplex Grinnell
TEL = Telesto Solutions, Inc.

Oscar A Paulson

Oscar Paulson

Rio Tinto

Internal memo

25 January 2014

To: NRC File

Subject: Annual Radiation Refresher Training

Annual radiation safety training for uranium mill workers was conducted by Tetra Tech Inc. on January 8, 2013. 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 are retained on site. The attendees are listed below:

Jed Goodman – Archer Construction, Inc.
Oscar Paulson – Kennecott Uranium Company
Harry Lovato – L & L Electric
Randy McKenzie – Archer Construction, Inc.
Karl Kronfuss – Kennecott Uranium Company
Danny Middlestadt – Archer Construction, Inc.
Tom Foust – Archer Construction, Inc.
Jim McCoy – Archer Construction, Inc.
Jim McMacken – Securitas Security Services
Charles Rider – Securitas Security Services
Shelley Schutterle – Kennecott Uranium Company

In addition, the following two (2) individuals were provided with radiation safety training for uranium mill workers on site on January 28, 2013:

Harold Kelley – Kennecott Uranium Company
Roy N. Hudson – Archer Construction, Inc.

The following individual was provided with radiation safety training for uranium mill workers on July 22, 2013:

Anita Morris – Worthington, Lenhart and Carpenter

Annual respiratory protection training was also conducted by Tetra Tech, Inc. at the Sweetwater Uranium Project on January 7, 2013. The following individuals were trained:

Harold Kelley – Kennecott Uranium Company
Oscar Paulson – Kennecott Uranium Company
Charles Rider – Securitas Security Services
Karl Kronfuss – Kennecott Uranium Company
Harry Lovato – L&L Electric

Only Karl Kronfuss, Harold Kelley and Oscar Paulson were fit tested, are given annual respirator physicals and are part of the site's respirator program. The other two (2) individuals were provided with the training as part of general radiation training.

Additional respiratory protection training was provided on November 21, 2013 to the following individuals:

Oscar Paulson – Kennecott Uranium Company (trainer)
Karl Kronfuss – Kennecott Uranium Company
Harold Kelley – Kennecott Uranium Company
Charles Rider – Securitas Security

Oscar Paulson, Harold Kelley and Karl Kronfuss were fit tested, are given annual respirator physicals and are part of the site's respirator program. Charles Rider was provided the training as part of general site radiation safety training and as part of a radiation safety meeting.

Hazardous (radioactive) materials transportation training was conducted by Tetra Tech, Inc. at the Sweetwater Uranium Project on January 8, 2013. The following individuals were trained:

Karl Kronfuss – Kennecott Uranium Company
Oscar Paulson – Kennecott Uranium Company
Shelley Schutterle – Kennecott Uranium Company
Jim McMacken – Securitas Security Services
Charles Rider – Securitas Security Services

Oscar Paulson

Facility Supervisor

Annual RadRefreshTrng-2013.doc

Rio Tinto

Internal memo

To: Radiation Safety Training File

From: Oscar Paulson

Subject: **Hazmat Employee / Radioactive Materials Transportation Training**

49 CFR part 172.704 states in part:

> *(d) Recordkeeping. A record of current training, inclusive of the preceding three years, in accor4dance with this section shall be created and retained by each hazmat employer for as long as that employee is employed by that employer as a hazmat employee and for 90 days thereafter. The record shall include:*
> *(1) The hazmat employee's name;*
> *(2) The most recent training completion date of the hazmat employee's training;*
> *(3) A description, copy, or the location of the training materials used to meet the requirements in paragraph (a) of this section;*
> *(4) The name and address of the person providing the training; and*
> *(5) Certification that the hazmat employee has been trained and tested, as required by this subpart.*

The following personnel received training:

- Oscar Paulson
- Shelley Schutterle
- Karl Kronfuss
- Jim McMacken
- Charles Rider

The training was provided on Tuesday, January 8, 2013.

The training materials in the form of a printout of a PowerPoint presentation are maintained in the radiation training file at the Sweetwater Uranium Project.

The following is the name, address and other contact information for the person providing the training:

Dr. Jan Johnson
Sopris Environmental, LLC
1001 Painted Lady Lane
Carbondale, Colorado 81623
Telephone: (970) 319-1808
Email: janetj@sopris.net

I certify that the above listed employees have been trained and tested as required by 49 CFR Subtitle B, Subchapter C, Subpart H entitled Training.

Oscar Paulson, Facility Supervisor — Date: February 11, 2013

Rio Tinto

Internal memo

January 29, 2014

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 2013. 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 Site Operations Technician, who during 2013 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	100.6 hours	119.7 hours
Mill Laborer-1	98.3 hours	16.7 hours
Tailings Repair Worker	4.0 hours	44.6 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 Site Operations Technician represent the maximum time spent by an individual in these areas and the Site Operations Technician was the maximally exposed individual on site in 2013.

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 were used to calculate the average and maximum doses from natural uranium, thorium-230 and radium-226 for the time spent in these tailings impoundment. High volume air sampling data was used to calculate average and maximum doses from natural uranium, thorium-230 and radium-226 for the time spent in the 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 from work in the Mill Building since:
    - The breathing zone samples collected in the Mill Building are generally believed to be more representative of worker exposure than high volume air samples of the entire work area, and more conservative.

- The Site Operations Technician 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
- 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 14.7 millirems (0.02 rems) was calculated for the maximally exposed individual (the Site Operations Technician) 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 9.4 millirems (0.009 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

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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	22-May-13	23-May-13	1.99E+09	1.00E-16	2.38E-14	5.69E-15	2.59E-15	1.19E-01	9.48E-02	8.63E-04
2	7-Nov-13	9-Nov-13	4.43E+09	1.00E-16	1.20E-15	2.00E-15	1.30E-15	6.00E-03	3.33E-02	4.33E-04
Average:			3.21E+09		1.25E-14	3.85E-15	1.95E-15	6.25E-02	6.41E-02	6.48E-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								
Notes:										
	Air sampler was located near the northeast corner of the interior of the impoundment.									
	Air sampler was pointed southwest into the prevailing wind to maximize radionuclide concentrations.									
	No sample exceeded effluent limits for natural uranium, radium-226 or thorium-230 in spite of the fact that they were collected inside of the impoundment.									

Kennecott Uranium Company											
Sweetwater Uranium Project											
Mill Building											
High Volume Air Samples											
Sample Number	**Date**			**Volume**	**Sample Lower Limit of Detection (LLD)**	**Natural Uranium**	**Thorium 230**	**Radium 226**	**Natural Uranium % of DAC**	**Thorium 230 % of DAC**	**Radium 226 % of DAC**
	Start	**Stop**		**(milliliters)**	**(microCurie per milliliter)**	**(microCurie per milliliter)**	**(microCurie per milliliter)**	**(microCurie per milliliter)**	**(Percent)**	**(Percent)**	**(Percent)**
1	20-May-13	21-May-13	Mill Grinding Area	2.59E+09	1.00E-16	1.35E-15	5.87E-16	7.91E-16	6.75E-03	9.78E-03	2.64E-04
2	20-May-13	21-May-13	Mill Precipitation Area	2.61E+09	1.00E-16	1.65E-15	9.87E-16	4.45E-16	8.25E-03	1.65E-02	1.48E-04
3	6-Nov-12	7-Nov-12	Mill Grinding Area - Second Deck	4.43E+09	1.00E-16	9.10E-16	3.30E-16	8.20E-16	4.55E-03	5.50E-03	2.73E-04
4	7-Nov-13	9-Nov-13	Mill Precipitation Area - Precipitation Deck	4.38E+09	1.00E-16	1.00E-14	6.60E-16	7.40E-16	5.00E-02	1.10E-02	2.47E-04
Average:				3.50E+09		3.48E-15	6.41E-16	6.99E-16	7.50E-03	1.31E-02	2.06E-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:				**2013**			
(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 2013	Site Operations Technician	1.18E-13	1.78E-13	1.13E-13	5.90E-01	2.96E+00	3.76E-02
	Average:	1.18E-13	1.78E-13	1.13E-13	5.90E-01	2.96E+00	3.76E-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 2013	Mill Building	3.48E-15	6.41E-16	6.99E-16	1.74E-02	1.07E-02	2.33E-04
Average for 2013	Tailings Impoundment	1.25E-14	3.85E-15	1.95E-15	6.25E-02	6.41E-02	6.48E-04
	Average:	7.99E-15	2.24E-15	1.32E-15	3.99E-02	1.67E-03	4.41E-04
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	1.18E-13	1.78E-13	1.13E-13	5.90E-01	2.96E+00	3.76E-02
	Tailings	1.25E-14	3.85E-15	1.95E-15	6.25E-02	6.41E-02	6.48E-04
Exposure Calculations							
Hours Worked During 2013							
	Mill	100.6					
	Tailings Impoundment	119.7					
Exposure		**Natural Uranium**	**Thorium-230**	**Radium-226**	**Total**		
		(millirems)	**(millirems)**	**(millirems)**	**(millirems)**		
	Site Operations Technician - Mill	1.48E+00	7.45E+00	9.46E-02	9.03E+00		
	Site Operations Technician - Tailings	1.87E-01	1.92E-01	1.94E-03	3.81E-01		
	Total	1.67E+00	7.65E+00	9.65E-02	9.41E+00		
Notes:	Average airborne concentrations for natural uranium, Radium-226 and Thorium-230 were used in the calculation for each area (mill, and tailings impoundment)						
	No air sample collected for the Site Operations Technician 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:					**2013**			
(Using Maximum Values)								
Breathing Zone Samples								
Maximum for 2013		**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 2013		Site Operations Technician	1.53E-13	2.85E-13	2.50E-13	7.65E-01	4.75E+00	8.33E-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)**			
Maximum for 2013		Mill Building	1.00E-14	9.87E-16	8.20E-16	5.00E-02	1.65E-02	2.73E-04
Maximum for 2013		Tailings Impoundment	2.38E-14	5.69E-15	2.59E-15	1.19E-01	9.48E-02	8.63E-04
		Maximum	2.38E-14	5.69E-15	2.59E-15	8.45E-02	1.67E-03	5.68E-04
Please see attached spreadsheets								
Lower Limit of Detection (LLD) value used in average if result was non-detect.								
Hours Worked During 2013								
	Mill	100.6						
Tailings Impoundment		119.7						
Exposure Calculations								
Exposure			**Natural Uranium**	**Thorium-230**	**Radium-226**	**Total**		
			(millirems)	**(millirems)**	**(millirems)**	**(millirems)**		
	2013	Site Operations Technician - Mill	1.92E+00	1.19E+01	2.10E-01	1.41E+01		
		Site Operations Technician - Tailings	3.56E-01	2.84E-01	2.58E-03	6.42E-01		
		Total	2.28E+00	1.22E+01	2.12E-01	1.47E+01		
Notes:		Maximum airborne concentrations for natural uranium, Radium-226 and Thorium-230 were used in the calculation for each area (mill, and tailings impoundment)						
		No 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)
3-Jan-12	Site Operations Technician	2.48E+06	1.00E-16	8.83E-14	1.84E-13	7.31E-14	0.442	3.067	0.024
13-Feb-13	Site Operations Technician	1.80E+06	1.00E-16	1.53E-13	1.97E-13	-1.31E-14	0.765	3.283	-0.004
12-Mar-13	Site Operations Technician	1.98E+06	1.00E-16	1.20E-13	9.40E-14	7.83E-14	0.600	1.567	0.026
4-Apr-13	Site Operations Technician	2.38E+06	1.00E-16	1.10E-13	6.86E-14	-7.38E-14	0.550	1.143	-0.025
9-May-13	Site Operations Technician	2.25E+06	1.00E-16	1.42E-13	2.85E-13	2.49E-13	0.710	4.750	0.083
4-Jun-13	Site Operations Technician	1.97E+06	1.00E-16	1.31E-13	2.11E-13	2.35E-13	0.655	3.517	0.078
11-Jul-13	Site Operations Technician	1.73E+06	1.00E-16	8.10E-14	2.05E-13	2.41E-13	0.405	3.417	0.080
15-Aug-13	Site Operations Technician	2.84E+06	1.00E-16	7.59E-14	9.06E-14	5.23E-14	0.380	1.510	0.017
5-Sep-13	Site Operations Technician	2.17E+06	1.00E-16	1.07E-13	9.01E-14	1.72E-13	0.535	1.502	0.057
16-Oct-13	Site Operations Technician	2.79E+06	1.00E-16	7.90E-14	8.30E-14	1.10E-13	0.395	1.383	0.037
13-Nov-13	Site Operations Technician	2.41E+06	1.00E-16	9.10E-14	9.00E-14	1.60E-13	0.455	1.500	0.053
3-Dec-13	Site Operations Technician	2.09E+06	1.00E-16	1.30E-13	1.70E-13	2.50E-13	0.650	2.833	0.083
Average:		2.24E+06	1.00E-16	1.09E-13	1.47E-13	1.28E-13	5.45E-01	2.46E+00	4.26E-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 Mill Foreman 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 provided by the laboratory.

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)
3-Jan-12	Site Operations Technician	2.48E+06	1.00E-16	8.83E-14	1.84E-13	7.31E-14	0.442	3.067	0.024
13-Feb-13	Site Operations Technician	1.80E+06	1.00E-16	1.53E-13	1.97E-13	ND	0.765	3.283	ND
12-Mar-13	Site Operations Technician	1.98E+06	1.00E-16	1.20E-13	9.40E-14	7.83E-14	0.600	1.567	0.026
4-Apr-13	Site Operations Technician	2.38E+06	1.00E-16	1.10E-13	6.86E-14	ND	0.550	1.143	ND
9-May-13	Site Operations Technician	2.25E+06	1.00E-16	1.42E-13	2.85E-13	2.49E-13	0.710	4.750	0.083
4-Jun-13	Site Operations Technician	1.97E+06	1.00E-16	1.31E-13	2.11E-13	2.35E-13	0.655	3.517	0.078
11-Jul-13	Site Operations Technician	1.73E+06	1.00E-16	8.10E-14	2.05E-13	2.41E-13	0.405	3.417	0.080
15-Aug-13	Site Operations Technician	2.84E+06	1.00E-16	7.59E-14	9.06E-14	5.23E-14	0.380	1.510	0.017
5-Sep-13	Site Operations Technician	2.17E+06	1.00E-16	1.07E-13	9.01E-14	1.72E-13	0.535	1.502	0.057
16-Oct-13	Site Operations Technician	2.79E+06	1.00E-16	7.90E-14	8.30E-14	1.10E-13	0.395	1.383	0.037
13-Nov-13	Site Operations Technician	2.41E+06	1.00E-16	9.10E-14	9.00E-14	1.60E-13	0.455	1.500	0.053
3-Dec-13	Site Operations Technician	2.09E+06	1.00E-16	1.30E-13	1.70E-13	2.50E-13	0.650	2.833	0.083
Average:		2.24E+06	1.00E-16	1.09E-13	1.47E-13	1.62E-13	5.45E-01	2.46E+00	5.40E-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 Mill Foreman 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 **ND**

	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

Date	Time In	Time Out	Time Mill (Days)	Tails (Days)	Washbay (Days)
1/2/2013	9:00	11:30	0.104		
1/3/2013	8:05	9:10	0.045		
1/3/2013	11:45	16:00	0.177		
1/22/2013	17:00	17:10	0.007		
1/28/2013	8:30	8:50	0.014		
1/31/2013	8:40	9:35	0.038		
1/31/2013	9:50	10:15	0.017		
2/12/2013	9:00	10:55	0.080		
2/13/2013	8:20	10:15	0.080		
2/13/2013	10:35	11:45	0.049		
2/14/2013	9:55	10:00	0.003		
2/25/2013	9:35	9:40	0.003		
2/26/2013	11:30	12:00	0.021		
2/27/2013	14:05	14:33		0.019	
3/7/2013	9:45	11:00		0.052	
3/11/2013	9:10	10:00	0.035		
3/12/2013	9:10	11:00	0.076		
3/12/2013	15:40	16:25	0.031		
3/18/2013	8:45	9:00		0.010	
3/18/2013	11:00	14:30	0.146		
3/20/2013	15:00	15:30		0.021	
4/1/2013	8:45	11:15		0.104	
4/1/2013	12:45	17:00		0.177	
4/2/2013	7:45	9:15		0.063	
4/2/2013	12:45	13:30		0.031	
4/3/2013	9:00	10:15		0.052	
4/3/2013	12:45	15:20	0.108		
4/4/2013	9:00	10:30		0.063	
4/4/2013	10:30	11:45	0.052		
4/4/2013	12:40	13:40	0.042		
4/8/2013	9:00	12:00	0.125		
4/8/2013	13:45	16:00	0.094		
4/15/2013	10:00	12:10	0.090		
4/15/2013	13:20	16:00	0.111		
4/17/2013	10:15	11:00	0.031		
4/22/2013	8:30	9:30	0.042		
4/24/2013	9:30	10:45	0.052		
4/24/2013	10:45	12:00		0.052	

Date	Time In	Time Out	Time Mill (Days)	Time Tails (Days)	Time Washbay (Days)
4/24/2013	12:45	13:45		0.042	
4/24/2013	13:45	14:45	0.042		
4/25/2013	9:30	9:45	0.010		
4/25/2013	12:45	14:15		0.063	
4/30/2013	10:00	11:45		0.073	
5/2/2013	9:00	10:45		0.073	
5/6/2013	10:00	11:45		0.073	
5/8/2013	9:45	11:45	0.083		
5/8/2013	13:00	15:15		0.094	
5/9/2013	9:35	11:50	0.094		
5/13/2013	8:00	12:00		0.167	
5/13/2013	12:45	16:20		0.149	
5/14/2013	12:45	16:45		0.167	
5/15/2013	7:45	8:30	0.031		
5/15/2013	9:15	11:45		0.104	
5/16/2013	9:00	10:30		0.063	
5/20/2013	8:10	8:20	0.007		
5/22/2013	8:30	9:20		0.035	
5/28/2013	8:00	9:10		0.049	
5/29/2013	8:00	9:30		0.063	
6/3/2013	9:40	11:00	0.056		
6/3/2013	15:00	15:45	0.031		
6/4/2013	8:00	8:15		0.010	
6/4/2013	10:00	10:45	0.031		
6/5/2013	10:00	11:45		0.073	
6/6/2013	8:15	9:00		0.031	
6/10/2013	8:15	9:30		0.052	
6/12/2013	8:00	8:37		0.026	
6/12/2013	8:37	9:15	0.026		
6/17/2013	8:15	10:20		0.087	
6/17/2013	13:50	14:25		0.024	
6/18/2013	8:00	9:45		0.073	
6/20/2013	8:15	10:25		0.090	
6/20/2013	13:15	14:00		0.031	
6/26/2013	9:00	10:15		0.052	
6/27/2013	8:05	9:25		0.056	
7/1/2013	10:00	11:10		0.049	
7/8/2013	12:30	13:45		0.052	
7/10/2013	12:50	14:30	0.069		
7/11/2013	8:05	9:00		0.038	

Date	Time In	Time Out	Time Mill (Days)	Time Tails (Days)	Time Washbay (Days)
7/11/2013	12:40	14:25	0.073		
7/11/2013	15:10	15:40		0.021	
7/16/2013	8:00	9:15		0.052	
7/17/2013	9:00	9:45		0.031	
7/17/2013	10:45	12:10		0.059	
7/18/2013	8:00	10:20		0.097	
7/18/2013	11:00	11:50		0.035	
7/18/2013	13:00	13:45		0.031	
7/18/2013	14:45	16:25	0.069		
7/22/2013	8:00	8:10	0.007	0.007	
7/23/2013	7:50	8:45		0.038	
7/23/2013	11:15	11:50			0.024
7/23/2013	15:00	15:45			0.031
7/24/2013	8:00	9:30		0.063	
7/24/2013	14:45	16:00	0.052		
7/29/2013	8:00	11:53		0.162	
7/29/2013	13:30	15:16			0.074
7/30/2013	8:15	8:25			0.007
7/30/2013	9:00	10:03		0.044	
7/31/2013	7:20	8:07		0.033	
7/31/2013	8:10	11:32		0.140	
8/1/2013	14:40	15:10		0.021	
8/13/2013	9:10	10:45		0.066	
8/13/2013	13:15	15:35	0.097		
8/14/2013	9:15	10:50		0.066	
8/14/2013	13:00	15:45	0.115		
8/15/2013	13:00	14:15	0.052		
8/15/2013	14:15	15:30		0.052	
8/19/2013	8:30	10:10		0.069	
8/19/2013	11:00	11:29		0.020	
8/19/2013	15:30	16:05		0.024	
8/20/2013	9:15	12:00	0.115		
8/21/2013	8:50	11:05		0.094	
8/22/2013	8:10	8:52		0.029	
8/22/2013	8:52	9:35	0.030		
8/22/2013	13:45	14:50	0.045		
8/26/2013	8:45	10:15		0.063	
8/27/2013	8:15	8:40		0.017	
8/28/2013	10:30	11:20	0.035		
8/29/2013	8:45	9:58		0.051	

Date	Time In	Time Out	Time Mill (Days)	Time Tails (Days)	Time Washbay (Days)
9/3/2013	8:45	10:50		0.087	
9/4/2013	8:15	8:52		0.026	
9/4/2013	10:30	11:55	0.059		
9/4/2013	13:30	14:25	0.038		
9/5/2013	13:10	15:19	0.090		
9/9/2013	8:45	9:50		0.045	
9/12/2013	13:10	13:45		0.024	
9/17/2013	8:15	9:07	0.036		
9/17/2013	9:07	10:00		0.037	
9/18/2013	9:15	9:42	0.019		
9/18/2013	9:42	10:10			0.019
9/19/2013	7:50	8:15	0.017		
9/19/2013	10:00	12:15	0.094		
9/19/2013	13:45	16:45	0.125		
9/23/2013	8:15	10:02	0.074		
9/23/2013	10:02	11:50		0.075	
9/23/2013	12:30	14:40	0.090		
9/23/2013	14:40	16:50		0.090	
9/24/2013	13:15	15:45	0.104		
9/24/2013	15:45	18:15		0.104	
10/7/2013	9:45	10:30	0.031		
10/7/2013	10:30	11:15		0.031	
10/7/2013	16:05	16:15	0.007		
10/8/2013	8:25	8:52		0.019	
10/8/2013	13:00	13:28	0.019		
10/9/2013	11:20	12:00		0.028	
10/9/2013	12:30	14:40		0.090	
10/9/2013	14:40	16:50			0.090
10/10/2013	9:00	9:15		0.010	
10/10/2013	15:00	15:35	0.024		
10/16/2013	9:45	12:25	0.111		
10/23/2013	10:30	11:45		0.052	
11/4/2013	9:20	9:49		0.020	
11/11/2013	8:15	9:30		0.052	
11/13/2013	8:45	11:50	0.128		
11/13/2013	13:00	15:40	0.111		
11/18/2013	8:40	10:15		0.066	
11/19/2013	15:10	15:25			0.010
11/21/2013	10:30	10:50		0.014	
12/2/2013	10:40	11:45	0.045		

Date	Time In	Time Out	Time Mill (Days)	Tails (Days)	Washbay (Days)	
12/2/2013	12:35	13:48	0.051			
12/3/2013	9:00	9:47		0.033		
12/3/2013	12:55	14:25	0.063			
12/12/2013	9:24	10:31		0.047		
12/18/2013	15:43	15:44			0.001	
12/30/2013	14:45	15:13		0.019		
12/31/2013	10:20	11:07		0.033		
12/31/2013	16:40	16:55	0.010			
Total:			4.192	4.987	0.257	Days
			100.617	119.700	6.167	Hours

Restricted Area Time								
Mill Laborer -1								
					Time			
Date		Time In	Time Out		Mill	Tails	Washbay	
					(Days)	(Days)	(Days)	
1/14/2013		10:30	10:37		0.005			
1/15/2013		14:23	14:33		0.007			
3/25/2013		10:10	11:27			0.053		
3/25/2013		12:58	14:03			0.045		
3/27/2013		13:00	14:05			0.045		
4/17/2013		10:15	11:40		0.059			
4/22/2013		8:30	9:30		0.042			
4/24/2013		9:30	10:30		0.042			
4/24/2013		10:40	12:00		0.056			
4/25/2013		9:40	10:45		0.045			
4/25/2013		10:55	11:10		0.010			
4/29/2013		7:55	8:20			0.017		
5/9/2013		9:04	11:43		0.110			
5/23/2013		13:13	13:30			0.012		
5/28/2013		14:30	14:50		0.014			
5/29/2013		10:20	11:40		0.056			
5/29/2013		14:02	14:49		0.033			
6/5/2013		10:00	11:45			0.073		
6/12/2013		9:00	9:55		0.038			
6/12/2013		10:45	11:20		0.024			
6/18/2013		9:55	11:25		0.063			
6/18/2013		13:55	14:55		0.042			
6/20/2013		7:55	8:50		0.038			
7/18/2013		7:35	8:50		0.052			
7/18/2013		10:00	10:45		0.031			
7/18/2013		14:45	16:25		0.069			
7/22/2013		9:30	11:45		0.094			
7/25/2013		13:05	14:05		0.042			
7/25/2013		14:05	15:05			0.042		
7/29/2013		8:00	12:05				0.170	
7/29/2013		12:45	15:20				0.108	
7/30/2013		6:15	8:07			0.078		
7/30/2013		8:07	10:00				0.078	
7/30/2013		10:15	11:40				0.059	
7/31/2013		8:10	9:52				0.071	
7/31/2013		9:52	11:35			0.072		
8/5/2013		8:40	9:45			0.045		
8/7/2013		13:00	17:00		0.167			

					Time			
Date		**Time In**	**Time Out**		**Mill**	**Tails**	**Washbay**	
					(Days)	**(Days)**	**(Days)**	
8/8/2013		9:30	11:35		0.087			
8/8/2013		14:35	14:55			0.014		
8/12/2013		9:35	10:17			0.029		
8/15/2013		10:45	11:55		0.049			
8/15/2013		13:15	15:25		0.090			
8/19/2013		8:30	10:10			0.069		
8/19/2013		15:50	16:05			0.010		
8/20/2013		7:35	11:50		0.177			
8/20/2013		13:20	16:50		0.146			
8/21/2013		9:30	11:50		0.097			
8/21/2013		13:00	14:40		0.069			
8/22/2013		8:10	11:51		0.153			
8/22/2013		13:35	14:50		0.052			
8/27/2013		8:15	8:40			0.017		
8/29/2013		8:15	8:48		0.023			
9/3/2013		9:45	10:05		0.014			
9/12/2013		8:05	8:44		0.027			
9/12/2013		14:10	15:40				0.063	
9/16/2013		8:10	9:15		0.045			
9/16/2013		9:50	11:25		0.066			
9/16/2013		13:05	17:25		0.181			
9/17/2013		8:00	10:10		0.090			
9/19/2013		8:00	12:15		0.177			
9/23/2013		8:00	11:45		0.156			
9/24/2013		7:45	11:55		0.174			
9/25/2013		7:25	11:55		0.188			
9/25/2013		12:55	16:55		0.167			
9/26/2013		7:30	11:35		0.170			
9/26/2013		12:35	16:50		0.177			
9/27/2013		15:23	15:33		0.007			
9/30/2013		7:50	11:55		0.170			
10/1/2013		15:05	16:50			0.073		
10/9/2013		13:10	13:50		0.028			
10/17/2013		13:15	16:00		0.115			
10/28/2013		9:30	11:00		0.063			
Total:					4.094	0.695	0.549	Days
					98.267	16.683	13.167	Hours

Rio Tinto

Internal memo

29 January 2014

To: NRC File

Subject: Bioassay Assessment

A review of the monthly urinalysis sample results for the Site Operations Technician, Senior Facility Technician, Facility Supervisor and urine analysis sample results of contract and other site employees working in 2013 shows that all results are below the first action level of 15 µg/L. In fact, all urinalysis results for the year 2013 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, monthly while working on the site and at the end of the job. Site and 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 December 2013 and was not bioassayed during that month.

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 2013 urinalysis data.

Oscar A Paulson

Oscar A. Paulson
Facility Supervisor

KENNECOTT URANIUM COMPANY

SWEETWATER URANIUM PROJECT

BIOASSAY TESTING

2013

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	<5.0	<5.0	<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		**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**
Tailings Inspector	TAIL	Telesto Solutions, Inc.						<5.0							**5.0**
Tailings Repair Worker	ACI#1	Archer Construction, Inc.					<5.0				<5.0	<5.0			**5.0**
Tailings Repair Worker	ACI#12	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 whether or not they entered the restricted area.

Was not on site for this month.

[1] Did not work in restricted area in 2013 / 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.
Post job bioassays.

Rio Tinto

Internal memo

23 February 2014

To: NRC File

Subject: Summary of Radiation Instrument Calibrations – 2013

Instrument		Date(s) Calibrated
Calibration Orifices (Annual calibration required)		
	Lo Vol-40A S/N M100	1/23/13
	Hi Vol-25A S/N 8080978	1/23/13
	Sierra Instruments TE-5025A	1/23/13
Calibrators (Annual calibration required)		
	CD-530-1 Digital Venturi Calibrator S/N 3039	1/28/13
Alpha Detectors		
	43-5 S/N P-2425	4/25/13, 10/31/13
	43-5 S/N P-2426	3/27/13, 5/16/13, 11/27/13
	43-5 S/N P-2427	3/27/13, 5/16/13, 11/27/13
	43-5 S/N P-2428	3/27/13, 5/16/13, 11/27/13
	43-5 S/N P-2429	4/25/13, 10/31/13
	43-90 S/N PR-138872	4/25/13, 10/31/13
	43-90 S/N PR-138874	4/25/13, 10/31/13
	43-90 S/N 232499	4/25/13, 10/31/13
	43-1 S/N PR-206925	1/13/13, 7/24/13
	AC3-5 S/N 3793	1/14/13, 7/24/13
Gamma Meters/Detectors		
	12S S/N 11816	1/10/13, 7/24/13
	5 S/N 8170	1/13/13, 7/24/13
	44-10 S/N 206932	1/13/13, 5/6/13, 11/12/13
	44-10 S/N 233869 [6]	1/13/13, 9/5/13
	19 S/N 16938	1/13/13, 7/25/13
	44-10 S/N 252103	1/13/13, 5/7/13, 7/24/13
	44-10 S/N 252068	4/23/13, 10/31/13
Rate Meters		
	177 S/N 14390	3/19/13, 5/16/13, 11/27/13
	177 S/N 14407	3/19/13, 4/25/13, 10/31/13
	2350-1 S/N 192613	1/13/13, 5/7/13, 11/27/13
	2350-1 S/N 216182	1/13/13, 5/6/13, 11/12/13
	2350-1 S/N 235547	4/23/13, 10/31/13
	2350-1 S/N 235565	1/13/13, 7/24/13
	Model 3 S/N 157539	3/25/13, 10/7/13
	Model 12 S/N 12280	1/13/13, 7/24/13
	PRS-1 S/N 330/3793	1/14/13, 7/24/13

SAC R4		
	S/N 383 [5]	3/22/13, 5/1/13
SAC R5		
	S/N 614	3/22/13, 4/17/13, 11/4/13
	S/N 965	3/25/13, 4/17/13, 11/4/13
	S/N 602548	3/25/13, 4/17/13, 11/4/13
Scaler		
	MS-2 S/N 738	3/25/13, 10/7/13
	MS-2 S/N 994	3/22/13, 4/17/13, 11/4/13
Beta Gamma Detector		
	Model 44-1 S/N PR-156890	1/13/13, 7/24/13
	Model 44-9 S/N PR-093335	3/25/13, 4/23/13, 10/7/13
	Model 44-142 S/N PR-302659	4/23/13, 10/31/13
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	3/25/13, 4/17/13, 10/7/13
Hi Vol Air Sampler		
	S/N Unit # 1	1/15/13, 4/10/13, 7/9/13, 10/8/13
	S/N Unit # 2	1/15/13, 4/10/13, 7/9/13, 10/8/13
	S/N Unit # 3	1/15/13, 4/10/13, 7/9/13, 10/8/13
	S/N Unit # 4 [3]	1/15/13, 4/10/13, 5/22/13, 7/9/13, 10/8/13
	S/N 11314	2/2/13[4], 4/14/13, 7/9/13, 10/8/13, 12/18/13 [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 18, 2013 Field calibration/checks: 1/14/13, 7/22/13, 8/5/13, 9/3/13, 10/14/13, 11/4/13, 12/2/13
	DF-604 S/N 8917	Annual Factory calibration: August 1, 2013 Field Calibration/checks: 1/31/13, 2/11/13, 3/5/13, 4/1/13, 5/6/13, 6/3/13, 7/8/13

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 14, 2013 and July 20 to December 31, 2013. The DF-604 unit with serial number 8917 operated from January 14 to July 20, 2013.

Note: Portable electronic survey instruments are calibrated by a contract calibrator whose calibration system conforms to the requirements of ANSI/NCSL-2-540-1-1994 and ANSI N323-1978.

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 lost a key staff member in late January 2013. This caused delays in calibrating electronic survey and measurement instruments as a new calibrator had to be obtained and familiarized with site instruments. All instruments were sent promptly to the calibrator at the end of their calibration intervals and no non calibrated instruments remained on site. Some instruments remained at the new calibrator for an unusually long period in 2013 due in part to initial problems performing the calibrations. Some instruments were calibrated several times within a short time interval (twice within a month) for quality control purposes to assure proper calibration.

[1] The December 18, 2013 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.
[3] Replaced motor on May 22, 2013 and recalibrated.
[4] Forced to delay calibration until February 2, 2013 when calibrator was returned to site.
[5] This unit was sent for calibration at the end of the six (6) month calibration period. It was reported broken by the calibrator and is being held by the calibrator pending repair.
[6] This instrument was retained a longer time than normal by the calibrator awaiting receipt of other instruments.

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
1/15/13	13:04
4/10/13	15:43
5/11/13	16:46
6/4/13	12:41
6/11/13	16:55
6/12/13	17:44
7/3/13	14:32
7/16/13	13:59
7/24/13	14:29
8/18/13	17:22
9/10/13	17:19
10/15/13	17:45
10/21/13	17:07
11/19/13	11:40
12/5/13	17:03
12/5/13	17:09
12/17/13	12:54

Buck Basic 12 – S/N B12494

Date	Time
1/15/13	12:56
4/10/13	15:36
7/3/13	14:15
10/8/13	17:20

Buck Basic 12 – S/N B12486

Date	Time
1/2/13	8:28
1/15/13	12:45
2/27/13	16:28
3/27/13	14:41
4/2/13	8:45
4/9/13	14:28
7/3/13	14:24
10/8/13	17:26

Oscar Paulson
Facility Supervisor

Rio Tinto

Internal memo

17 February 2014

TO: Gamma Radiation Monitoring File

Subject: External Gamma Radiation Survey Assessment

In 2013, gamma surveys of the Mill were conducted on June 24 and December 22, 2013. Gamma surveys of the interior of the tailings impoundment were conducted on June 26 and December 12, 2013. Gamma surveys of the Ion Exchange area were conducted on June 24 and December 18 and 30, 2013.

Eighteen (18) areas or items associated with the Ion Exchange equipment were surveyed on June 24, December 18 and 30, 2013. Thirty (30) locations in the Mill and Solvent Extraction (SX) Buildings were surveyed for gamma radiation on June 24, 2013 and December 22, 2013.

Average gamma readings for discrete items or areas ranged from 24.2 to 684.2 µR/hour (176.5 µR/hr average for the year) for the Ion Exchange areas and related equipment, to 8.9 to 1162.1 µR/hour (66 µR/hr average for the year) in the Mill and Solvent Extraction (SX) Buildings.

The stored equipment was monitored as well on June 27, December 22, 23 and 30, 2013. Average gamma readings for discrete items of stored equipment ranged from 10 to 3994.7 µR/hr at 30 centimeters from 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 3.99 mR/hr (0.004 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 26 and December 12, 2013. This area averaged 92.5 µR/hr for 2013. Due to the large number of readings taken in the impoundment on June 26 and December 12, 2013, 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 2 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 (uR/hr)	Bottom (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
25-Jun-13	12.6	63.1
18-Dec-13	13.6	131.3
Average	33.2	100.1
Standard Deviation:	17.1	46.9

KENNECOTT URANIUM COMPANY

OCCUPATIONAL RADIATION DOSIMETRY RESULTS / DEEP DOSE

Sweetwater Uranium Project

2013

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 TECHNICIAN	MF	96	KENNECOTT URANIUM CO.	2	M	M	M	M	M	M	M	M	M	M	M	2
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	M	M	M	M	M	0
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											0
TAILINGS REPAIR WORKER	ACI#4	91	ARCHER CONSTRUCTION, INC.	M	M	M	M	M	M	M	M	M	M			0
TAILINGS REPAIR WORKER	ACI#7	94	ARCHER CONSTRUCTION, INC.	M	M	M	M									0
TAILINGS REPAIR WORKER	ACI#8	97	ARCHER CONSTRUCTION, INC.	M	M	M	M	M	M	M	M	M	M			0
TAILINGS REPAIR WORKER	ACI#9	98	ARCHER CONSTRUCTION, INC.	M	M											0
TAILINGS REPAIR WORKER	ACI#10							M/D-3								
VISITOR BADGE	D-1	35		M	M	M	M	M	M	M	M	M	M	M	M	0
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								M/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				
TAILINGS INSPECTOR	TAIL		TELESTO SOLUTIONS, INC.						M/D-1							
Land Quality Division (LQD)	LQD													M/D-2		
Bureau of Land Management (BLM)	BLM													M/D-1		

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

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).

2014-01-01 through 2014-12-31

Effective dates

DEPARTMENT OF COMMERCE * UNITED STATES OF AMERICA *

For the National Institute of Standards and Technology

NVLAP-01C (REV. 2009-01-28)

Rio Tinto

Internal memo

23 February 2014

To: Total and Removable Alpha Monitoring File

Subject: Total and Removable Alpha Monitoring Assessment

In 2013 removable alpha monitoring was performed in the Mill and Solvent Extraction (SX) Buildings on June 20 and December 17, 2013 and in the Ion Exchange area on June 19 and December 17, 2013. Total alpha monitoring was performed on June 26, December 23 and 30, 2013 in the Mill and SX buildings and on June 26 and December 23, 2013 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 19.8 and 54,576 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 ND to 586.1 dpm/100 cm^2. The single high removable alpha measurement was taken on June 26, 2013 of the Change Room floor. This area is within the restricted area. The area was cleaned. The December 17, 2013 removable alpha reading for this area was 29.9 dpm/100 cm^2.

Total average alpha contamination levels in the Ion Exchange area ranged from 96.9 to 2676.9 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 2.0 to 16.7 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 27, December 30 and 31, 2013. Removable alpha monitoring of the stored equipment was performed on June 20 and December 18, 2013. Average total alpha readings on the equipment ranged from 35 to 8,156 dpm/100 cm^2. A maximum total reading of 81,183 dpm/100 cm^2 was recorded for vessel #71. Removable alpha readings for the stored equipment ranged from 0.2 to 27,765 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. The connecting pipes on these vessels were plugged with foam in 2013 to eliminate any potential to access this contaminated rubber liner material.

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

6 February 2014

To: Radon Monitoring File

Subject: Radon Daughter Monitoring Assessment

In 2013 radon daughter monitoring was conducted on June 5 and December 8, 2013 in the Ion Exchange Area. Radon daughter monitoring was conducted in the Mill Building on June 11 and December 9, 15 and 17, 2013.

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 0.001 to 0.004 WL in the Ion Exchange area (average: 0.002) and Non-detect to 0.074 WL in the Mill and Solvent Extraction (SX) Buildings (average: 0.009). The ventilation fan operated continuously in the Solvent Extraction (SX) Building. Radon levels varied in the SX building from 0.011 to 0.074 WL, averaging 0.054 WL in June 2013 and 0.012 WL in December 2013. 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 2013 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 below the Number 1 Counter-Current Decantation (CCD) tank in the Mill during all four quarters of 2013 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 2.3 to 3.0 pCi/L. Radon concentrations on top of the tank varied from 1.8 to 2.6 pCi/L. These values are at background levels since upwind radon concentrations for the facility varied from 2.1 to 3.1 pCi/L during 2013, as shown in the table below:

2013 Radon Concentrations

Quarter	Bottom of CCD#1 (pCi/L)	Top of CCD#1 (pCi/L)	Upwind (Background) (pCi/L)
1st	2.8	2.5	2.1[2]
2nd	2.3	1.8	3.1[2]
3rd	3.0	2.1	2.5[2]
4th	3.0	2.6	2.6[2]
Average	2.78	2.25	2.6

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

Radon daughter concentrations at the top and bottom of CCD#1 were low, ranging from 0.001 to 0.009 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 (WL)	Bottom (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
11-Jun-13	0.005	0.006
9-Dec-13	0.001	
15-Dec-13		0.009
Average	0.017	0.016
Standard Deviation:	0.012	0.012

OAP:
resin0001.xls

Kennecott Uranium Company
Sweetwater Uranium Project
Stored Resin

Stored Resin RadTrak Monitoring Results

Date	RadTrak Results	
	Top (pCi/l)	Bottom (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
1ST Quarter 2013	2.5	2.8
2ND Quarter 2013	1.8	2.3
3RD Quarter 2013	2.1	3.0
4TH Quarter 2013	2.6	3.0
Average	2.5	2.9
Standard Deviation:	0.7	0.7

3.7 Corrected value

POTABLE WATER QUALITY SUMMARY

2013

Coliform Count Summary

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

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

A trailer was installed on site in May 2012. It is supplied by a frost free hydrant. The water from this hydrant was tested monthly beginning on May 8, 2012. Testing of this water ceased in July 2013 since the trailer was moved and connected to the Drake #1 well.

KENNECOTT URANIUM COMPANY					
POTABLE WATER QUALITY SUMMARY					
2013					
DRAKE #1					
CHEMICAL ANALYSIS SUMMARY:					
Use Suitability	Domestic *	**DRAKE #1**	**DRAKE #1**	**DRAKE #1**	**DRAKE #1**
Parameter	Concentration **	01/21/13	04/08/13	7/22/2013	10/28/2013
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	3	3	2	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	0.1
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	54	51	50	49
Total Dissolved Solids (TDS)	500	186	181	168	169
Zinc (Zn)	5	0.01	0.02	0.02	0.01
pH (Standard Units)	6.5 - 8.5	8.23	8.22	8.17	8.28
Combined Ra226/Ra228 (pCi/L)	5.0 pCi/l	3.4	1.5	2.3	2.4
Natural Uranium (pCi/L)	pCi/L	0.2	ND (0.2)	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	ND (0.0003)	0.0003	0.0003	ND (0.0003)
Lead 210 (pCi/L)	pCi/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Total Strontium 90 (pCi/L)	8.0 pCi/l	-	-	-	-
Gross Alpha Radioactivity *** (pCi/L)	15.0 pCi/l	1.6 ± 0.4	1.6 ± 0.5	1.6 ± 0.5	1.1 ± 0.5
* 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					
2013					
PWW-1					
CHEMICAL ANALYSIS SUMMARY:					
Use Suitability	Domestic *	**PWW-1**	**PWW-1**	**PWW-1**	**PWW-1**
Parameter	Concentration **	01/14/13	04/08/13	7/22/2013	10/28/2013
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	0.1
Hydrogen Sulfide (H2S)	0.05	-	-	-	-
Iron (Fe)	0.3	0.15	0.06	ND (0.05)	ND (0.05)
Lead (Pb)	0.015	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)
Manganese (Mn)	0.05	0.04	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	47	46	48	46
Total Dissolved Solids (TDS)	500	182	170	165	168
Zinc (Zn)	5	ND (0.01)	ND (0.01)	ND (0.01)	0.02
pH (Standard Units)	6.5 - 8.5	8.24	8.44	8.24	8.47
Combined Ra226/Ra228 (pCi/L)	5.0 pCi/l	1.68	0.41	0.54	1.29
Natural Uranium (pCi/L)	pCi/L	0.6	0.8	1.1	0.4
Uranium - Suspended	mg/L	ND (0.0003)	ND (0.0003)	ND (0.0003)	ND (0.0003)
Uranium - Total	mg/L	0.0009	0.0013	0.0017	0.0007
Lead 210 (pCi/L)	pCi/L	0.4 ± 0.4	0.3 ± 0.7	ND (0.2)	ND (0.2)
Total Strontium 90 (pCi/L)	8.0 pCi/l	-	-	-	-
Gross Alpha Radioactivity *** (pCi/L)	15.0 pCi/l	0.4 ± 0.3	0.5 ± 0.3	1.1 ± 0.4	0.4 ± 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					
2013					
PWW-2					
CHEMICAL ANALYSIS SUMMARY:					
Use Suitability	Domestic *	**PWW-2**	**PWW-2**	**PWW-2**	**PWW-2**
Parameter	Concentration **	01/15/13	04/08/13	7/22/2013	10/28/2013
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	0.16	0.15	0.11	0.14
Lead (Pb)	0.015	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)
Manganese (Mn)	0.05	0.02	0.02	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	43	40
Total Dissolved Solids (TDS)	500	165	168	159	161
Zinc (Zn)	5	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)
pH (Standard Units)	6.5 - 8.5	8.4	8.47	8.32	8.54
Combined Ra226/Ra228 (pCi/L)	5.0 pCi/l	1.86	0.35	2.11	3.04
Natural Uranium (pCi/L)	pCi/L	1.6	1.6	1.6	1.7
Uranium - Suspended	mg/L	ND (0.0003)	0.0003	0.0006	ND (0.0003)
Uranium - Total	mg/L	0.0024	0.0026	0.0029	0.0023
Lead 210 (pCi/L)	pCi/L	0.6 ± 0.4	0.3 ± 0.8	0.7 ± 0.7	ND (0.2)
Total Strontium 90 (pCi/L)	8.0 pCi/l	-	-	-	-
Gross Alpha Radioactivity *** (pCi/L)	15.0 pCi/l	0.6 ± 0.3	0.6 ± 0.4	0.6 ± 0.4	0.4 ± 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					

Rio Tinto

Internal memo

20 February 2014

To: SERP File

Subject: Safety and Environmental Review Panel (SERP) – 2013

During the calendar year 2013 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 a single Safety and Environmental Evaluation (SEE) in 2013.

The single evaluation, Safety and Environmental Evaluation (SEE) #23 – Establishing of Annual Pumpback Volumes Based upon Tailings Impoundment Evaporative Capacity, was finalized on May 31, 2013. It revised Standard Operating Procedure TOP-1 – General Tailings and Evaporation Impoundment Procedures, by increasing the annual pumpback volume limit from 25 million to 27 million gallons per year.

The preparation of this Safety and Environmental Evaluation (SEE) was discussed with James Webb in telephone conversations on Thursday, September 27 and Monday, October 1, 2012 and in a letter dated October 10, 2012, copy of which is attached. A reply from James Webb dated November 15, 2012 stated, “The NRC staff recommends that KUC review the proposed activities using the Safety and Environmental Review Plan (SERP) process.” A copy of this letter is also attached. Such a review was performed resulting in the conclusion that the pumpback volume limit could be raised to 27 million gallons per year.

Oscar A Paulson

Oscar Paulson

SERP Review-2013.doc

Rio Tinto
Kennecott Uranium Company
42 Miles NW of Rawlins
P.O. Box 1500
Rawlins, WY 82301-1590
USA
T +1 (307) 328 1476
F +1 (307) 324 4925

10 October 2012

Mr. Keith McConnell, Deputy Director
Decommissioning and Uranium Recovery Licensing Directorate
U.S. Nuclear Regulatory Commission
Mail Stop T-7 E18
Washington, D.C. 20555-0001

Dear Mr. McConnell:

Subject: Docket Number 040-08584 – Source Material License SUA-1350 – Tailings Impoundment Corrective Action Program – Pumpback Volume

Kennecott Uranium Company operates a Corrective Action Program (CAP) at the Sweetwater Uranium Project as required by SUA-1350 License Condition 11.3. The recovered water from the pumpback wells operated under the Corrective Action Program (CAP) is pumped into the tailings impoundment and evaporated. The total volume of water to be pumped back into the impoundment each year was established at 25 million gallons as per a letter dated May 9, 1990. This specified annual volume is not contained in the current license nor is the May 9, 1990 letter directly referenced in the license. This specified annual volume is not mentioned in the Revised Environmental Report dated August 1994, the Safety Evaluation Report dated July 1999, the Technical Evaluation Reports dated June 8 and August 6, 1999 or the Environmental Assessment dated July 1999.

Since May 9, 1990, the tailings impoundment has changed substantially. Specifically, the tailings have been regraded following the addition of the contaminated soils excavated from the area around and beneath the Catchment Basin in 2006 and 2007. As these materials were added, the tailings were leveled. Fifteen (15) lagoons designed to retain and evaporate the pumpback water and tailings fluids were then constructed on top of the regraded tailings.

These changes in the impoundment over time are documented in the three (3) Google Earth images dated July 22, 1994 (Figure 1), July 11, 2006 (Figure 2) and July 5, 2009 (Figure 3) provided at the end of this letter, and also in the four (4) maps of the impoundment showing its status in July/August 2005, October 2007, December 29, 2008 and in December 2009 (its current configuration).

The net effect of these lagoons has been to increase the evaporative capacity of the impoundment above the capacity of 25 million gallons per year established in the letter dated May 9, 1990. The evaporative capacity of the impoundment has been recalculated using the site's pan evaporation rate of 60.7 inches per year as documented in the Revised Environmental Report dated August 1994 and reducing it by multiplying it by 0.7 to convert it from pan evaporation to lake evaporation (Sellars, W.D., Physical Climatology 1965). The

calculation yields an evaporative capacity of 29,463,100 gallons per year for the impoundment as shown in the attached spreadsheet entitled **Tailings Impoundment Evaporation Capacity**.

In order to enhance groundwater remediation at the facility, Kennecott Uranium Company would like to increase the annual pumpback volume for the Corrective Action Program (CAP) to 29 million gallons per year to roughly match the evaporative capacity of the impoundment. Should this new annual pumpback volume ever be found to be too high, the pumpback rate can be readily reduced to match the evaporative capacity of the impoundment at that time.

This issue was discussed with James Webb of your staff on Thursday, September 27, and Monday, October 1, 2012. In the conversation on Monday, October 1, 2012, he suggested that this letter be submitted to explain the situation. Kennecott Uranium Company would like to make this change through its Safety and Environmental Review Panel (SERP) via a Safety and Environmental Evaluation (SEE). James Webb suggested sending this letter prior to proceeding with such an action so that it could be evaluated. Please inform Kennecott Uranium Company as to the staff's view on such an action.

If you have any questions please do not hesitate to contact me.

Sincerely yours,

Oscar A Paulson

Oscar Paulson
Facility Supervisor

cc: James Webb (2 copies)
Director, DNMS, Region IV
Rich Atkinson - via email

Figure 1 22 July 1994

Figure 2 11 July 2006

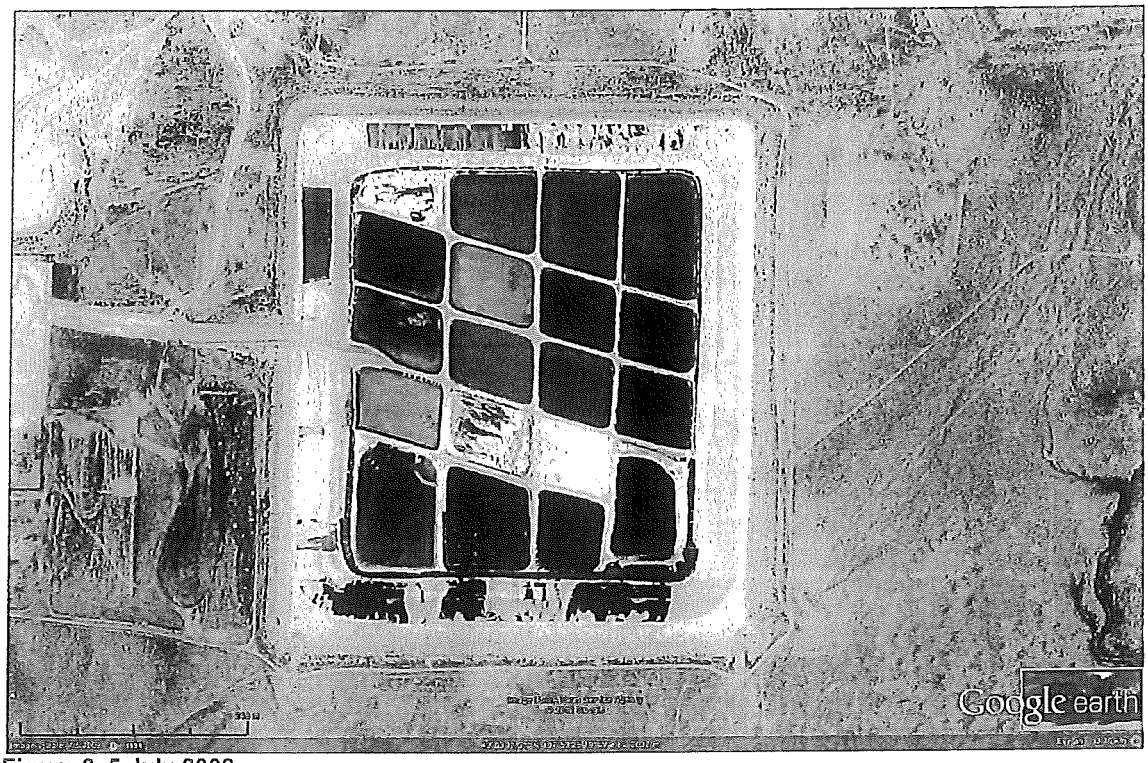
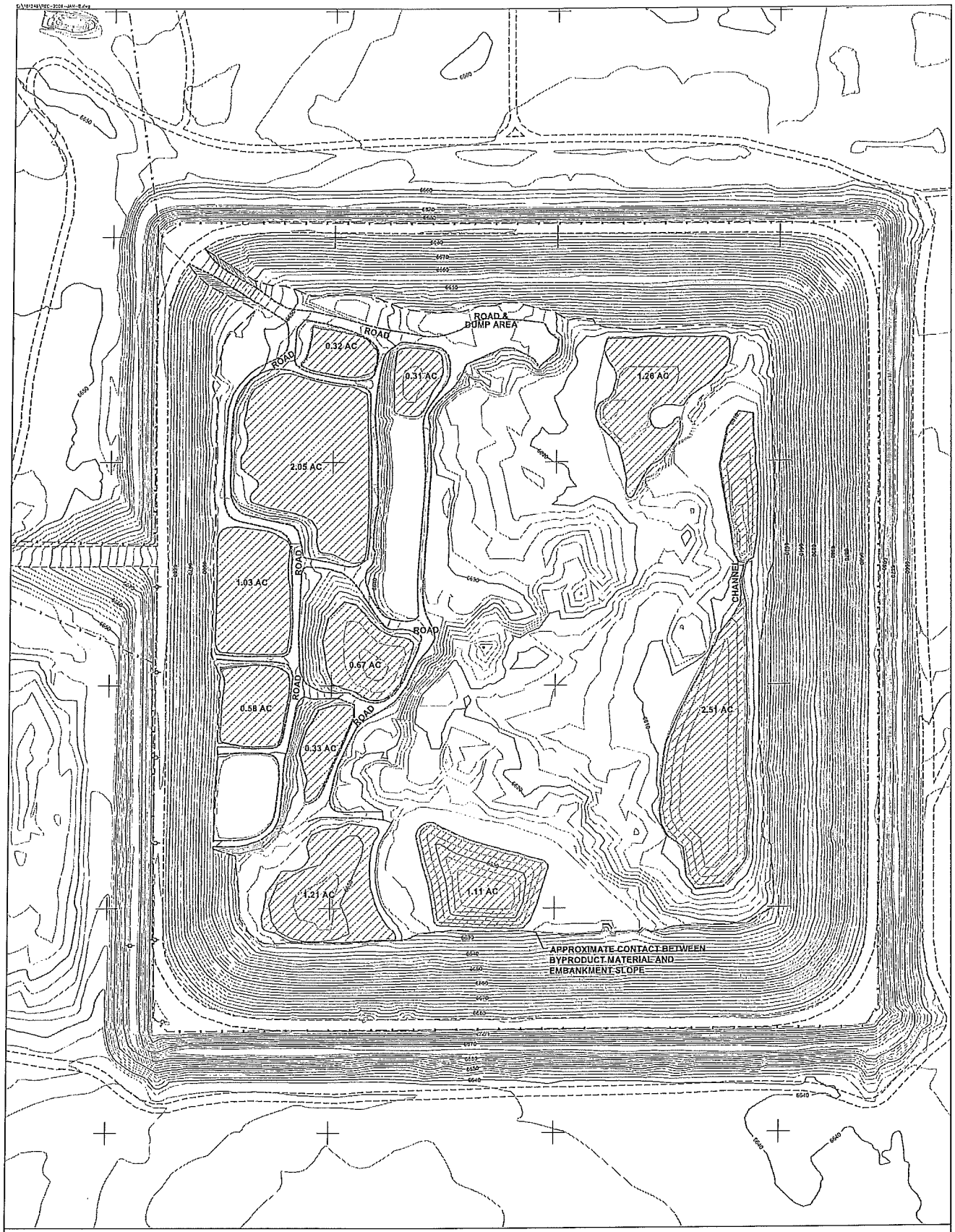


Figure 3 5 July 2009

Kennecott Uranium Company
Sweetwater Uranium Project

Tailings Impoundment Evaporation Capacity

	Area			
Lagoon Designation	Square Feet	Acres	Evaporation at Maximum Pan Rate	Evaporation at Calculated Lake Evaporation Rate
			(Gallons per year)	(Gallons per year)
1-O	81,798.56	1.88	3,095,164.46	2,166,615.13
1-W	99,531.68	2.28	3,766,165.55	2,636,315.89
1-E	100,230.07	2.30	3,792,591.84	2,654,814.29
2-W	72,017.00	1.65	2,725,041.36	1,907,528.95
2-E	77,418.51	1.78	2,929,428.35	2,050,599.85
3-W	68,249.06	1.57	2,582,466.80	1,807,726.76
3-E	53,191.59	1.22	2,012,709.26	1,408,896.48
4-W	58,982.00	1.35	2,231,811.79	1,562,268.25
4-E	78,433.96	1.80	2,967,851.83	2,077,496.28
5-W	58,665.02	1.35	2,219,817.63	1,553,872.34
5-E	57,500.41	1.32	2,175,750.11	1,523,025.08
6-W	60,862.93	1.40	2,302,984.04	1,612,088.83
6-E	68,160.91	1.56	2,579,131.30	1,805,391.91
8-E	112,197.27	2.58	4,245,417.07	2,971,791.95
9-W	65,113.85	1.49	2,463,834.02	1,724,683.81
Total:	1,112,352.82	25.53	42,090,165.41	29,463,115.79



NOTES:

1. TOPOGRAPHY OF TAILINGS AREA FROM GPS SURVEY BY ROBERT JACK SMITH & ASSOC. AUGUST 23, 2005.
2. SURROUNDING TOPOGRAPHY FROM NOVEMBER 3, 1998 AERIAL PHOTOGRAPHY.
3. APPROXIMATE TAILINGS POND AREAS FROM AUGUST 23, 2005 GPS SURVEY DATA AND JULY 25, 2005 DIGITAL PHOTOGRAPHY BY MFG, INC.
4. APPROXIMATE SYNTHETIC LINER AREAS FROM JULY 25, 2005 DIGITAL PHOTOGRAPHY BY MFG, INC.

LEGEND:

APPROXIMATE POND AREAS, JULY-AUGUST 2005

APPROXIMATE AREAS OF WIND-DAMAGED SYNTHETIC LINER, JULY 2005

N

SCALE IN FEET

100 0 200

REVISIONS	No	DESCRIPTION	BY	CHKD.	DATE
	1	PREPARED FOR KEC USE AND CONTRACTOR BIDDING	CLS		01/06

PREPARED BY

consulting scientists and engineers

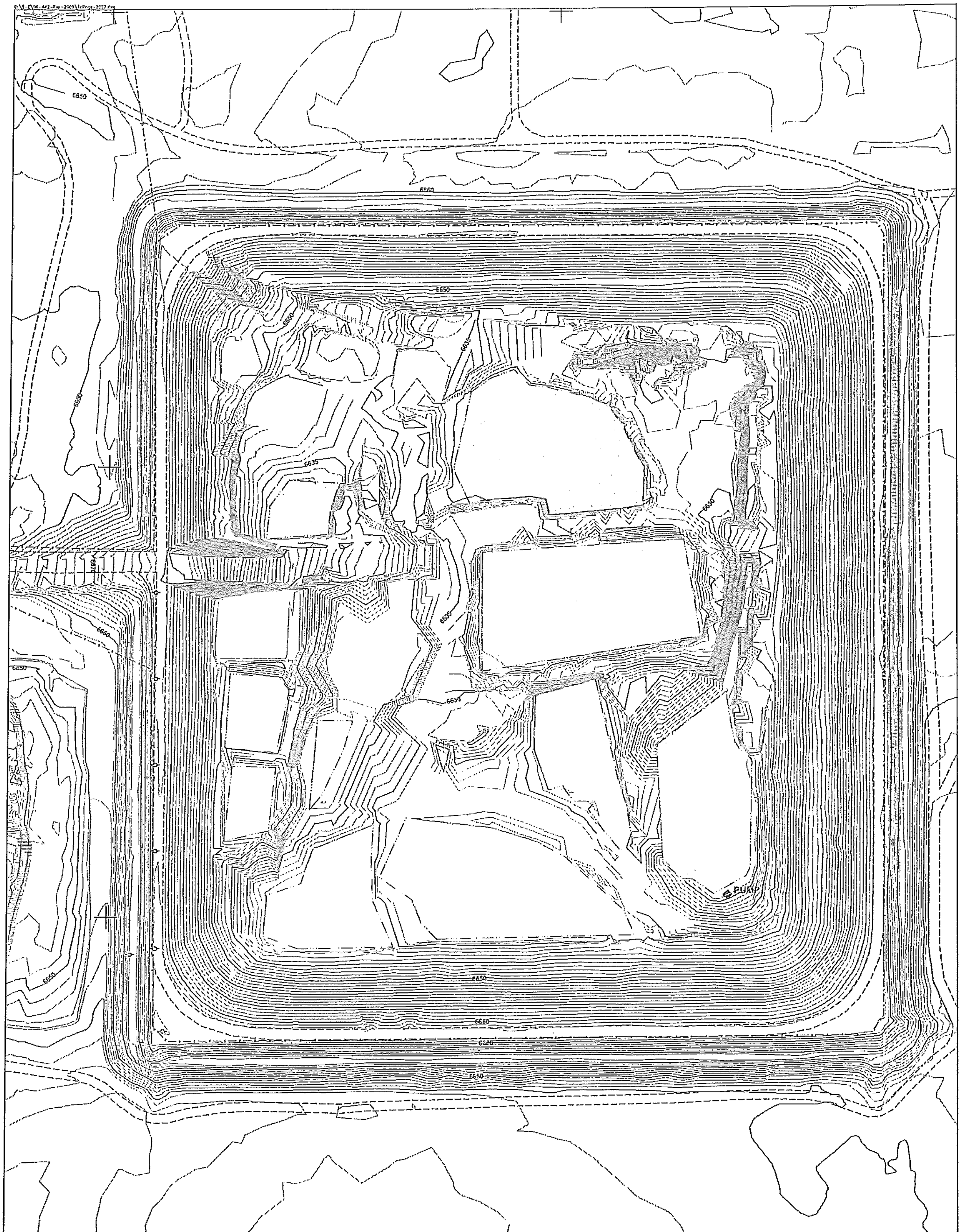
PREPARED FOR

Kennecott Energy

SWEETWATER URANIUM PROJECT

EXISTING IMPOUNDMENT CONFIGURATION

PROJECT	181249	DATE	JANUARY 2006	DRAWING	1	REVISION	1
SCALE	AS SHOWN	ACCEPTED	REC-2006-JAN-B.dwg				



LEGEND:

WATER COVERED AREA

SCALE IN FEET

100 0 200

No	DESCRIPTION	BY	CHKD.	DATE

REVISIONS

PREPARED BY

TETRA TECH

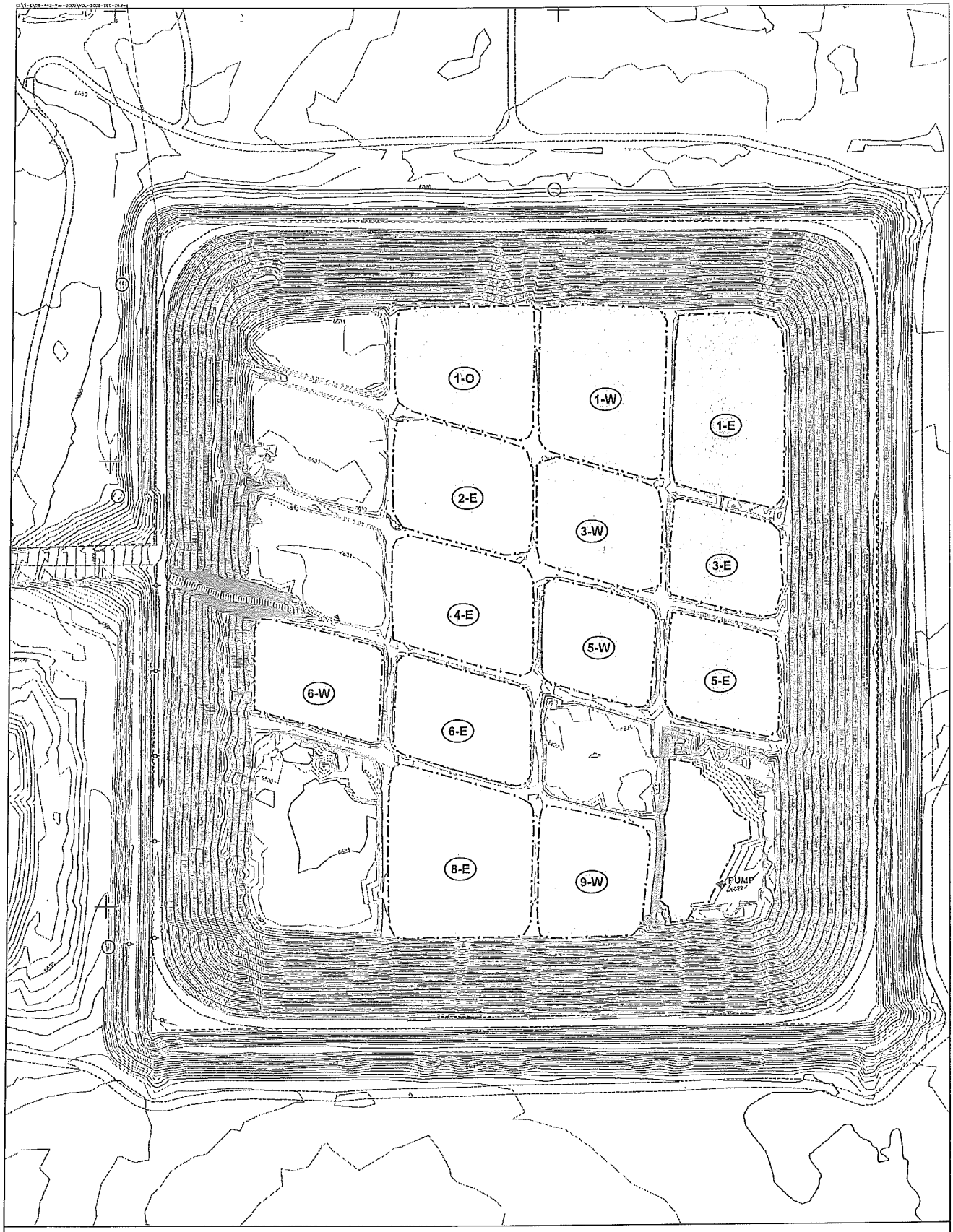
PREPARED FOR

RIO TINTO ENERGY AMERICA

SWEETWATER URANIUM PROJECT

EXISTING CONTOURS
OCTOBER 2007

PROJECT 180559 (181245)	DATE FEBRUARY 2009	DRAWING	REVISION
SCALE AS SHOWN	ACAD FILE TAILINGS-2007.dwg		



LEGEND:

(1W) POND DESIGNATION

WATER COVERED AREA

POST-REGRADING CONTOURS FROM DECEMBER 29, 2008

N

SCALE IN FEET

100 0 200

REVISIONS	No.	DESCRIPTION	BY	CHKD.	DATE

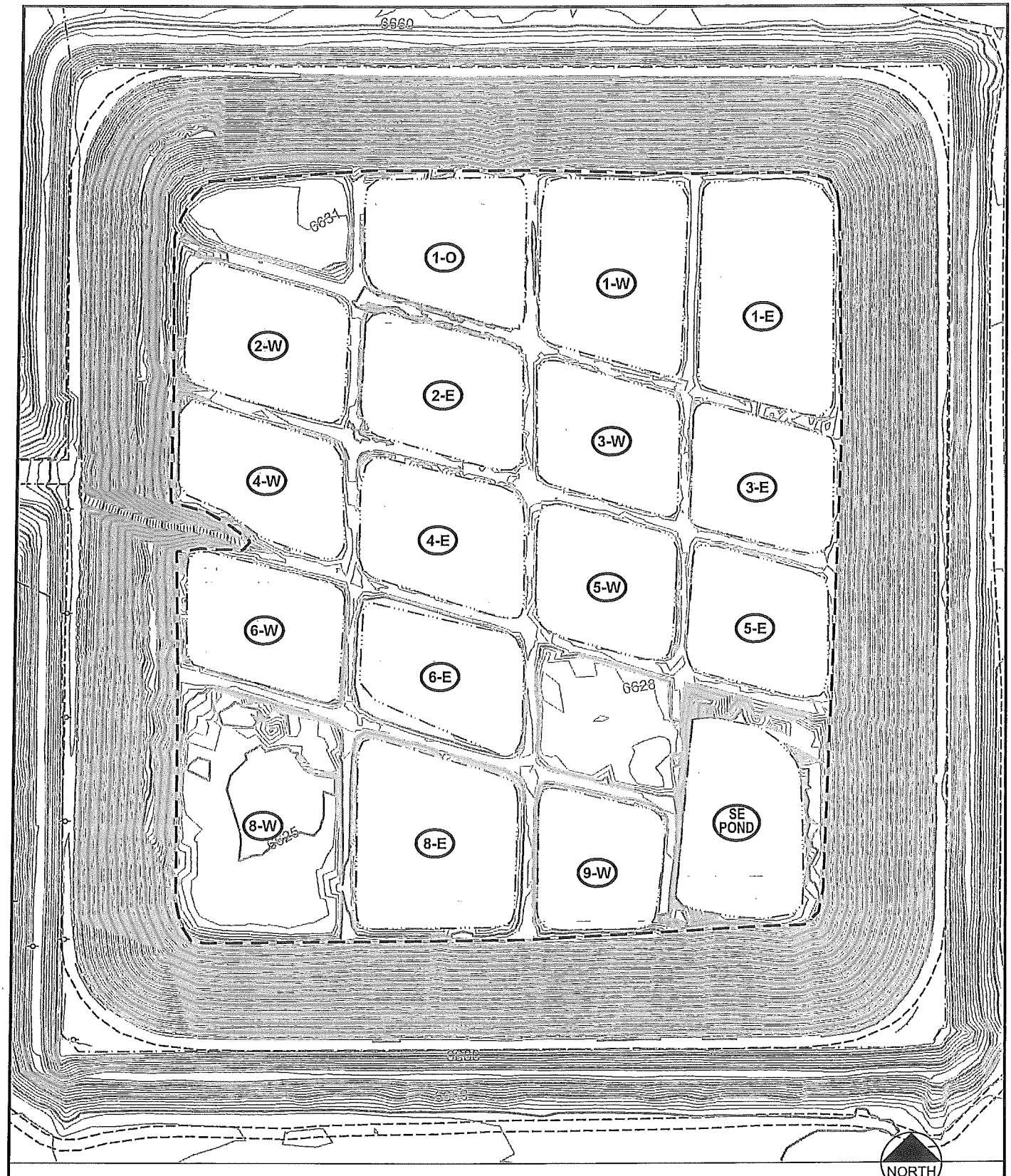
PREPARED BY: TETRA TECH

PREPARED FOR: RIO TINTO EXPLORATION

SWEETWATER URANIUM PROJECT

EXISTING CONTOURS DECEMBER 29, 2008

PROJECT	160589 (161245)	DATE	JANUARY 2009	DRAWING	REVISION
SCALE	AS SHOWN	XREFFED	VOL-2008-DEC-29.dwg		1



SWEETWATER URANIUM FACILITY
TAILINGS IMPOUNDMENT – DECEMBER 2009

Date:	FEBRUARY 2010
Project:	06-442\REP2010\
File:	Tailings 2009-Dec.dwg

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

November 15, 2012

Mr. Oscar Paulson, Facility Supervisor
Kennecott Uranium Company
P.O. Box 1500
Rawlins, WY 82301-1500

SUBJECT: TAILINGS IMPOUNDMENT CORRECTIVE ACTION PROGRAM AT SWEETWATER URANIUM PROJECT - PUMPBACK VOLUME

Dear Mr. Paulson:

By letter dated October 10, 2012, Kennecott Uranium Company (KUC), submitted to the U.S. Nuclear Regulatory Commission (NRC) staff, a letter containing information on Docket Number 040-08584, Source Material License SUA-1350, Tailings Impoundment Corrective Action Program Pumpback Volume. The NRC staff requested this letter for informational purposes and to develop a better understanding of the issue.

The NRC staff recommends that KUC review the proposed activities using the Safety and Environmental Review Plan (SERP) process. When performing a SERP review, KUC should comply with the requirements of condition 9.3 in the license. Note that condition 9.3c requires that the licensee must obtain an amendment unless the proposed change, test, or experiment is consistent with "NRC conclusions, or the basis of, or analysis leading to, the conclusions of actions, designs, or design configurations analyzed and selected in the site of facility Safety Evaluation Report, TER, EIS, or EA." If the SERP process cannot reach that determination, a license amendment is required.

The NRC staff reviews changes made during the SERP process as part of its inspection program. If you have any questions, I can be reached at 301-415-6252, or by email at James.Webb@nrc.gov.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice for Domestic Licensing Proceedings and Issuance of Orders," a copy of this letter will be available electronically for

public inspection in the NRC Public Document Room or from the Publicly Available Records component of the NRC's ADAMs. ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html.

Sincerely,

James Webb

James Webb, Project Manager
Uranium Recovery Licensing Branch
Decommissioning and Uranium Recovery
Licensing Directorate
Division of Waste Management
and Environmental Protection
Office of Federal and State Materials
and Environmental Management Programs

Docket No.: 40-8584
License No.: SUA-1350

Rio Tinto

Internal memo

19 February 2014

To: Respiratory Protection File

Subject: Respiratory Protection – 2013

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 2013.

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

TITLE	RESPIRATOR PHYSICAL	FIT TEST/TRAINING
Senior Facility Technician	May 17, 2013	January 7, 2013 and November 21, 2013
Facility Supervisor	November 8, 2013	January 7, 2013 and November 21, 2013
Site Operations Technician	May 16, 2013	January 7, 2013 and November 21, 2013

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 Facility Supervisor's respirator physical was slightly delayed in 2013 due to a respiratory tract infection.

Oscar A Paulson

Oscar Paulson

Rio Tinto

Internal memo

24 February 2014

To: File

Subject: Releases for Unrestricted Use – 2013

Releases for unrestricted use issued in 2013 were primarily related to the release of equipment, including:

- Toro Dingo (small walk-behind loader)
- Michigan 275 front end loader
- One (1) ton pickup truck
- Generator
- Small stainless steel sink

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
Michigan loader	May 16, 2013	598.8	13.1
One ton pickup	July 30, 2013	838.5	4.6
Generator	November 20, 2013	129.2	ND
Toro Dingo	November 20, 2013	286.8	0.8
Sm. Stainless steel sink	December 23, 2013	173.5	12.9

ND = Non-Detect

In the course of these releases, no item exceeded 13.1 dpm/100 cm^2 removable alpha or 838.5 dpm/100 cm^2 total alpha.

Oscar A Paulson

Oscar Paulson

ReleaseUnrestrictUse-2013

Rio Tinto

Internal memo

From	Oscar Paulson
To	Standard Operating Procedures File
Reference	**Annual Review of Standard Operating Procedures (SOPs)**
Date	28 December 2013
Number of pages	1

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 2013. 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 28, 2013 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 December 4, 2013 to reflect the availability of Archer Construction, Inc. during the winter of 2013-2014 for snow removal.

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

The following procedures were modified:

- HP-4 – *Radon Daughter Survey* – August 21, 2013 and December 28, 2013
- HP-6 – *Total Alpha Surveys* – August 21, 2013
- HP-8 – *Removable Alpha Radiation Sampling and Alpha Counting* – August 21, 2013
- HP-33 – *Shipment of Radioactive Samples* – January 7, 2013
- HP-41 – *Receipt of Radioactive Material* – January 10, 2013
- EP-10 – *Radon-222 Sampling* – December 28, 2013
- EP-11 – *Thermoluminescent Dosimeter Area (TLD) Monitoring* – December 28, 2013
- EP-12b – *General Surface Water Sampling, Sample Preparation and Water Level Measurement Procedures* – January 23, 2013
- EP-13 – *General Ground Water Sampling and Sample Preparation Procedures* – August 20, 2013
- EP-13b – *General Ground Water Sampling, Sample Preparation and Water Level Measurement Procedures* – August 20, 2013
- EP-18 – *Meteorological Monitoring* – December 28, 2013
- EP-24 – *Monthly Flow Verification Procedure for F&J Specialty Products, Inc. Digital Air Monitoring System – F&J Model DF-604* – January 14, 2013
- TOP-1 – *General Tailings and Evaporation Impoundment Procedures* – June 17, 2013
- TOP-6 – *General Tailings Impoundment Procedures* – December 28, 2013

C. Other Procedures

The *Suspended Operations Procedure* was revised on December 26, 2013.

Rio Tinto

Internal memo

25 January 2014

To: Radiation Work Permit File

Subject **Radiation Work Permits**

No radiation work permits (RWPs) were issued in 2013.

Oscar Paulson

Rio Tinto

Internal memo

17 February 2014

Memo to File

SUBJECT: Dose Assessment / Determination of No Requirement for Individual Monitoring or Dose Calculation at the Sweetwater Uranium Project for 2013

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 2013.

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 2013 of 2.56 pCi/liter was used to represent the background radon concentration for the facility. An equilibrium factor of 0.150 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	2.56 pCi/l	168.96 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:

(2.56 pCi/l) / (1E3 ml/l) / (1E6 pCi/uCi) = 2.56 E-09 uci/ml

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

[(2.56E-09 uCi/ml) / (3E-08 uCi/ml)] * (0.33 WL) = 0.028 WL for background (with daughters present)

The calculated equilibrium factor for the facility (1993 to 2013) average is 0.150. Given that all daughters are not present and the equilibrium factor is 0.150, the actual background radon daughter concentration is:

(0.150) * (0.028 WL) = 0.004 WL

Occupational Dose

1) Gamma Radiation

The average gamma dose at the facility is based on an average of survey results for 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	176.5 uR/hr	22.9 uR/hr	153.6 uR/hr
Mill	66.0 uR/hr	22.9 uR/hr	43.1 uR/hr
Tailings	92.5 uR/hr	22.9 uR/hr	69.6 uR/hr

Approximately 100.6 hours are estimated to have been spent in the Mill and Solvent Extraction (SX) buildings by the Site Operations Technician and 119.7 hours are estimated to have been spent in the tailings impoundment by the Site Operations Technician in 2013. 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	100.6 hours[a]	43.1 uR/hr	4.3 mrem
Tailings	119.7 hours[a]	69.6 uR/hr	8.3 mrem
Total			**12.6 mrem**

[a] Time spent by Site Operations Technician

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 2013 even though their use was not required, in part, to confirm these calculations. The highest external dose received for the calendar year was 2 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 2013. The results are as follows:

Radon Sampling Results

Area	Concentration	Background	Occupational Dose
IX Area	0.002 WL	0.004 WL	0.000 WL
Mill Area	0.009 WL	0.004 WL	0.005 WL

The average occupational radon dose for facility personnel is:

{[(0.005 WL) / (0.33 WL/DAC)] * 100.6 hours} / (2000 DAC hours/ALI) = 0.0008 ALI
(0.0008 ALI) * (5000 millirems/ALI) = 4.0 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 2013 and breathing zone samples taken of personnel working in the Mill and SX Buildings and tailings impoundment during 2013.

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 14.7 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 1.53 E-13 µCi/ml which was the February 13, 2013 breathing zone sample for the Site Operations Technician. 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:	1.53 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:

[(1.53 E-13 µCi/ml)*(40 hours/week)*(60 minutes/hour)*(2.00 E+04 milliliters/minute)*(1E+06 picoCuries per microCurie)] / (677 picoCuries/milligram) = 0.011 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 2013, 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 14.7 millirems per year for 2013.

Conclusions:

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

2) Monitoring and calculation of internal dose at the Sweetwater Uranium Project is not required because:
   a) Radon dose is calculated at 0.004 rem/year (0.0008 ALI)
   b) The maximum calculated particulate dose based upon quarterly breathing zone samples is 0.015 rem/year

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

a)	Estimated external dose:	0.013 rem/yr.
b)	Estimated internal dose (particulates)	0.015 rem/yr.
c)	Estimated internal dose (Radon-222)	0.004 rem/yr.
	Total:	0.032 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 2013 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 two (2) millirems. This proves that the external dose estimate based upon surveys is conservative.

Oscar A. Paulson
Oscar A. Paulson

Rio Tinto

Internal memo

13 February 2014

To: **NRC File**

Subject: Compliance with 10 Mrem Constraint Limit for 2013

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	0.028 mrem/yr
Ra-226:	1.43 E-17 uCi/ml	0.001 mrem/yr
Th-230:	3.87 E-17 uCi/ml	0.076 mrem/yr
Total:		**0.105 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 2013 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

13 February 2014

To: **NRC File**

Subject: Compliance with 40 CFR 190.10 for 2013

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	0.028 mrem/yr
Ra-226:	1.43 E-17 uCi/ml	0.001 mrem/yr
Th-230:	3.87 E-17 uCi/ml	0.076 mrem/yr
Total:		**0.105 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 2013 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	**185.8 mrem**

This measured exposure is slightly below site background.

Conclusions:

- The 2013 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 Paulson
Facility Supervisor

Rio Tinto

Internal memo

From	Oscar Paulson
To	TSCA File
Reference	**Toxic Substances Control Act (TSCA) Reporting Requirements**
Date	23 December 2013
Number of pages	1

On December 23, 2013 the TSCA reporting requirements were reviewed with project personnel. Each individual was provided with a copy of the documents describing this requirement. The document entitled **Toxicological Profile for Uranium** dated September 1999, prepared by the U.S. Department of Health and Human Services/Public Health Service/Agency for Toxic Substances and Disease Registry, was discussed.

The following personnel attended this meeting:

- Karl Kronfuss – Site Operations Technician
- Oscar Paulson – Facility Supervisor
- Chuck Rider – Security Officer

Oscar A Paulson

Oscar Paulson

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Rio Tinto

Internal memo

19 February 2014

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 24 and December 18, 2013.

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
- Fire extinguisher training

Annual fire extinguisher and hose inspections were conducted on March 18 and 19, 2013 by Simplex Grinnell.

Electrical ground integrity testing was performed on February 28, March 3, 4, 5 and 6, 2013 by L and L Electric.

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 9, 2013.
- Driver Training was held on January 10, 2013.
- Task Training was held on January 10, 2013.

Oscar A. Paulson

Oscar A. Paulson