

Rio Tinto

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23 January 2015

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

19 February 2015

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 **As Low As Reasonably Achievable (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 6, 2014. Annual MSHA Refresher Training was conducted on January 8, 2014. In addition, driver training was conducted on January 7, 2014. Radiation training of individual contract employees (contractor new hires) was conducted on an as-needed basis. Equipment hazard training was provided on January 7, 2014. First Aid training is provided every other year and was last provided on January 9, 2014.

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 2014, as documented in the memorandum entitled "Annual Review of Standard Operating Procedures (SOPs)", dated 30 December 2014.

9. Radiation Work Permits:

No radiation work permits were issued in 2014.

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 29 and December 18, 2014. 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):

No Safety and Environmental Evaluations (SEEs) were issued by the Safety and Environmental Review Panel in 2014.

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 0.028 WL in June 2014 and 0.015 WL in December 2014.

An extensive discussion of trends in exposure for the facility was included in the July 2014 Request for a Renewal. The relevant portions are excerpted below:

The Sweetwater Uranium Project's occupational exposure data was reviewed and a discussion of it prepared by Randy Whicker, a Senior Health Physicist with SENES Consultants, and is included below:

Doses to Workers

Doses to workers are estimated on an annual basis based on a combination of gamma surveys, personal dosimeters, radon and air particulate monitoring, and bioassay sampling. Results are compiled in annual internal reports to confirm that worker doses remain below regulatory thresholds that require a formal worker dose monitoring program. Summary estimates of annual doses and uranium intakes for the maximally exposed worker since the last license renewal are shown in Table 5.8-1. All doses since the last license renewal are well below the 10 CFR 20.1502 threshold (500 mrem/yr) that requires worker dose monitoring. All calculated or measured uranium intakes have remained well below 10% of the applicable Allowable Limits on Intake (ALI's) specified in Appendix B to 10 CFR 20. These results verify that the radiation protection program at the Sweetwater Uranium Project facility is effective at maintaining doses to workers that are as low as reasonably achievable (ALARA).

Table 5.8-1: Annual external dose (calculated estimate and personal dosimeter result), internal dose (from radon and air particulates), reported total effective dose equivalent (TEDE), and uranium intake data for the maximally exposed worker from 2004 through 2013.

Annual Dose and Uranium Intake Data for the Maximally Exposed Worker								
Year	External (calculated)	Personal Dosimeter	Radon	Air Particulate	TEDE	Radiation Work Permit Dose (mrem)	Calculated Soluble U-nat Intake (mg)	Bioassay U-nat ($\mu\text{g/L}$)
2004	78	≤ 1	0	100	191	12	1.5	< 5
2005	96	≤ 1	45	135	276	-	2	< 5
2006	58	≤ 1	46	35	139	-	0.1	< 5
2007	114	35	7	72	193	-	0.3	< 5
2008	132	27	4	26	166	1	0.3	< 5
2009	96	3	5	19	120	-	0.2	< 5
2010	90	2	4	44	138	-	0.7	< 5
2011	44	4	12	87	143	-	0.3	< 5
2012	26	6	3	36	65	-	0.03	< 5
2013	13	2	4	15	33	-	0.01	< 5
2014	8	≤ 1	4	17	29	-	0.02	< 5

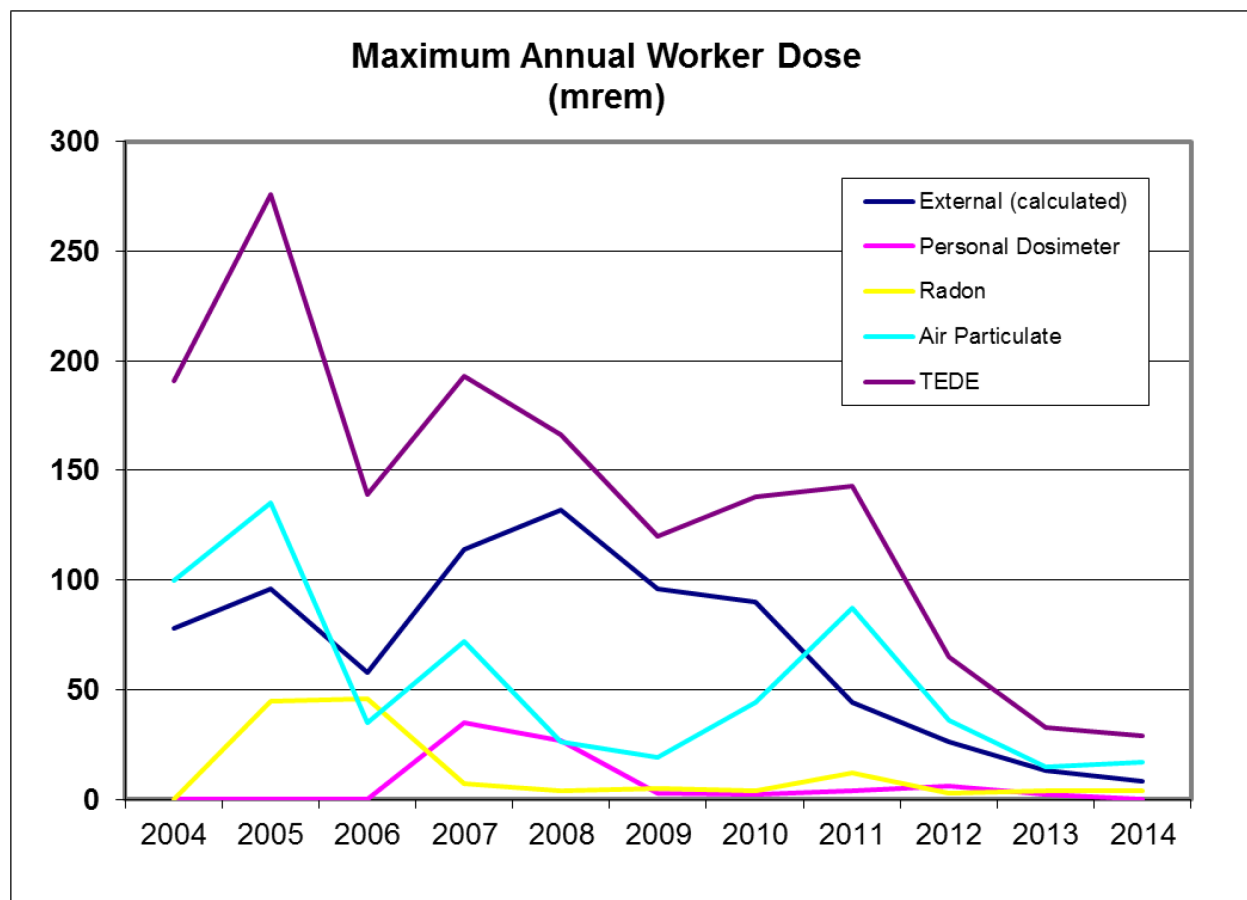
Note: This table has been updated since the license renewal application with 2014 data.

Please note that the sum of the calculated external dose, radon dose, air particulate dose, and if applicable, radiation work permit dose may not add to precisely the reported TEDE due to various rounding errors.

Annual doses from external, radon and air particulate inhalation pathways, along with the corresponding total effective dose equivalent (TEDE) to the maximally exposed worker, are shown graphically in Figure 5.8-1. There is a clear trend of decreasing worker doses over the past decade. Calculated doses are likely to be overestimates as conservative assumptions are used for a number of input parameters. For example, prior to 2012 if a worker entered the Mill or Solvent Extraction Buildings or the tailings impoundment on a given day (as evidenced by a completed line in the Alpha Monitor Record) the entire ten (10) hour work day was assigned to that area regardless of the actual time spent in the area which almost always was considerably less. This method of tracking time greatly increased the calculated worker exposures. Beginning in 2012, workers were required to note the time in and time out of an area in the Alpha Monitoring record. This resulted in much lower calculate doses for times spent in the restricted areas since actual times were being used. This is why calculated worker doses were lower in 2012 and 2013.

Officially reported external gamma dose is based on gamma survey data with conservative estimates of actual worker exposure durations. Personal dosimeter monitoring results, collected in part to verify calculated values, are consistently significantly lower than calculated values. Despite a clear and long-term demonstration that worker monitoring is not required, Kennecott nevertheless continues to issue worker dosimeters to all employees and to monitor the primary potential exposure and dose pathways. This is done to monitor the effectiveness of the radiation protection program, to verify that doses are being kept ALARA, and to continually verify that a formal monitoring program is not required.

Figure 5.8-1: Annual external dose, internal dose (from radon and air particulates), and total effective dose equivalent (TEDE) for the maximally exposed worker from 2004 through 2013.



Note: This graph has been updated since the license renewal application with 2014 data.

Randy Whicker
 SENES Consultants
 8310 South Valley Highway, Suite 135
 Englewood, CO USA 80112
 May, 2014

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 Paulson
Facility Supervisor

LC 12.3-2014.doc

Rio Tinto

Internal memo

19 February 2015

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) Summary
- Respiratory Protection Summary
- Release for Unrestricted Use Summary
- Review of Standard Operating Procedures
- Radiation Work Permit Summary
- 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 0.008 WL to 0.046 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. Trends in exposure are discussed more fully in the document entitled, "Source Material License SUA-1350 – License condition 12.3 – Annual ALARA Report.

Storage of some of the equipment, notably some steel pressure vessels in the mill, has caused gamma radiation levels to increase slightly in the area within the mill in which they are stored. An exhaust fan is operated in the SX building continuously to vent any accumulated radon and radon progeny. Radon daughter concentrations in this area varied between 0.008 WL to 0.046 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 29 and December 18, 2014. 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 Adam Hoffman of Telesto Solutions, Inc. in the 2014 Inspection of Tailings Impoundment Liner report dated September 30, 2014. The report states:

Ongoing maintenance of the impoundment allows Kennecott to meet its operational objectives for the impoundment. Specific maintenance completed or ongoing during 2014 includes: 1) repair of the liner to keep it functional within five feet of the tailings; and 2) ongoing maintenance of the water management system including activities such as pump repair and/or replacement.

Kennecott has effectively managed the tailings impoundment through the 2006/2007 placement of the additional 11(e).2 soils from the catchment basin area into the impoundment, maintenance and repair of the liner within five vertical feet of the tailings or tailings fluid, and repairs of the lined 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 in 2013 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. 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 0.25% of the allowable effluent concentrations during 2014, 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 2014.

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.

Source Material License SUA-1350 is in timely renewal. An application to renew the license was submitted on July 28, 2014. A letter was received dated October 22, 2014 stating that SUA-1350 was in timely renewal. A second letter dated November 25, 2014 stated that the acceptance review had been completed and that the application has, "...sufficient for a detailed technical and environmental review."



Oscar Paulson

Rio Tinto

Internal memo

9 February 2015

To: NRC File

Subject: Summary of Monthly Radiation Safety Meetings

The following is a summary of the twelve (12) monthly (plus six (6) additional) Radiation Safety meetings held in 2014:

2014	TOPIC	ATTENDEES
1/13/14	Discussed in-situ uranium recovery, including excursions, bleed, deep injection wells, and Lost Creek ISR Project Letter of Violation.	KUC, SEC
1/20/14	Discussed dosimeter results and RadTrak results for environmental radon.	KUC, SEC
2/6/14	Viewed independent film entitled "Pandora's Promise on Nuclear Power".	KUC, SEC
3/10/14	Discussed radiation safety for annual fire extinguisher inspections.	KUC, GRN
3/24/14	Discussed yellowcake drum reactions, and reviewed NRC Information Notice 99-03.	KUC, SEC
4/21/14	Discussed the tailings impoundment including pumpback volumes and liner condition.	KUC, SEC
5/22/14	Discussed rulemaking on 40 CFR Part 61 Subpart W.	KUC, SEC
6/16/14	Discussed breathing zone sampling.	KUC, SEC
6/23/14	Discussed wash-down and cleaning of Solvent Extraction (SX) Building.	KUC, SEC
6/25/14	Discussed decommissioning planning rule.	KUC, SEC
6/27/14	Discussed tailings work.	KUC, TEL
7/27/14	Discussed radiation work permits, RadTrak results, impending Method 115 Test and book entitled "The Plutonium Story".	KUC, SEC
8/13/14	Discussed radiation safety for crane inspections	KUC, KOK
8/26/14	Discussed Method 115 Test results and Nuclear Engine for Rocket Vehicle (NERVA).	KUC, SEC
9/23/14	Discussed safe storage of nuclear weapons, showed Neill Blom Kamp video on storage of the South African nuclear devices. Showed video entitled, "How the Rockies Built the Bomb."	KUC, SEC
10/20/14	Discussed respirator protection, provided respirator training and completed fit tests.	KUC, SEC
11/25/14	Discussed Standard Operating Procedures (SOPs) and Radiation Work Permits (RWPs) and the differences between them.	KUC, SEC
12/18/14	Discussed the Toxicological Profile for Uranium, the work of Colonel Asaf Durakoivic on uranium bioassaying of Afghans and reviewed doses to site employees.	KUC, SEC

Initial key: KUC = Kennecott Uranium Company
GRN = Simplex Grinnell
KOK = Konecranes

SEC = Securitas Security Services
TEL = Telesto Solutions, Inc.


Oscar Paulson

Rio Tinto

Internal memo

16 February 2015

To: NRC File

Subject: Annual Radiation Refresher Training

Annual radiation safety training for uranium mill workers was conducted by Two Lines, Inc. and Sopris Environmental on January 6, 2014. 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, and the letter attesting to the training is attached. The attendees are listed below:

Jed Goodman – Archer Construction, Inc.	Tom Foust – Archer Construction, Inc.
Oscar Paulson – Kennecott Uranium Company	Harold Kelley – Kennecott Uranium Company
Harry Lovato – L & L Electric	Jim McMacken – Securitas Security Services
Roy Hudson – Archer Construction, Inc.	Charles Rider – Securitas Security Services
Karl Kronfuss – Kennecott Uranium Company	Clayton Coando – Archer Construction, Inc.
Shelley Schutterle – Kennecott Uranium Company	Tony Jackson – Archer Construction, Inc.
Anita Morris – Worthington Lenhart and Carpenter	Reno Gilliland – Archer Construction, Inc.

In addition, the following two (2) individuals were provided with radiation safety training for uranium mill workers on site on August 26, 2014:

Carri Schutterle – Kennecott Uranium Company	Jeff David Brawley – Securitas Security Services
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Annual respiratory protection training was also conducted by Two Lines, Inc. and Sopris Environmental at the Sweetwater Uranium Project on January 6, 2014. The following individuals were trained:

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

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 individual was provided with the training as part of general radiation training. This training is documented in the attached letter.

Additional respiratory protection training was provided on October 20, 2014 to the following individuals:

Oscar Paulson – Kennecott Uranium Company (trainer)	Karl Kronfuss – Kennecott Uranium Company
Harold Kelley – Kennecott Uranium Company	Carri Schutterle – Kennecott Uranium Company

Oscar Paulson, Harold Kelley and Karl Kronfuss were fit tested, are given annual respirator physicals and are part of the site's respirator program. Carri Schutterle 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 Two Lines, Inc. and Sopris Environmental at the Sweetwater Uranium Project on January 7, 2014. The following individuals were trained:

Graham Lilley – Kennecott Exploration	Harley English - Kennecott Exploration
Don Bagshaw - Kennecott Exploration	Arzu Downing - Kennecott Exploration
Ina Parnes - Kennecott Exploration	

This training is documented in the attached letter.

The following two (2) new Sweetwater Uranium Project site employees received hazardous (radioactive) materials training as follows:

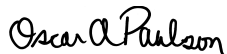
Carri Schutterle – Kennecott Uranium Company – 9/30/14	Jeff David Brawley – Securitas Security Services – 9/30/14
---	---

The certificates of the training are attached.

In addition the following other individuals affiliated with Kennecott Exploration received hazardous (radioactive) materials transportation training as follows:

Anne-Lu Nel – Kennecott Exploration – 3/19/14	Tim Worth - Kennecott Exploration – 8/25/14
Partrick Farrah - Kennecott Exploration – 8/25/14	Bud Rivera - Kennecott Exploration – 8/25/14
Anthony Margarit - Kennecott Exploration – 9/8/14	Candace Wingerter – Kennecott Exploration – 10/30/14
Casey Penz – Kennecott Exploration – 10/30/14	Warren Riemer – Kennecott Exploration – 10/30/14
Russ Pohlman – Kennecott Exploration – 11/11/14	

The certificates of training are attached.



Oscar Paulson
Facility Supervisor

January 8, 2014

Mr. Oscar Paulson, Facility Supervisor
Kennecott Energy Company
Sweetwater Uranium Facility
P.O. Box 1500
Rawlins, Wyoming 82301

RE: Worker Radiation Protection Annual Refresher Training

Dear Mr. Paulson:

The following individuals successfully completed a four-hour Worker Radiation Protection Training class presented at the Kennecott Sweetwater Uranium Facility on January 6, 2014:


Oscar Paulson
Harry Lovato
Anita Morris
Jed Goodman
Tom Foust
Harold Kelley
Clayton Coando

Charles Rider
Jim McMacken
Shelley Schutterle
Karl Kronfuss
Roy Hudson
Tony Jackson
Reno Gilliland

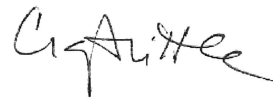
The class included a review of basic radiation protection principles, specific radiation protection issues related to uranium recovery facilities in general and the Sweetwater Uranium Facility in particular, regulatory requirements, and worker rights and responsibilities. The test scores are summarized in the attached table. In addition, respiratory protection training and respirator fit tests were conducted. Five Kennecott exploration workers were trained in radioactive material transportation. The original tests and a copy of the power point presentation should be retained in your files.

As always, it was a pleasure working with your group.

Sincerely yours,



Janet A. Johnson, PhD, CHP
Sopris Environmental



Craig A. Little, Ph.D.
Two Lines, Inc.



Sopris Environmental, LLC
1001 Painted Lady Lane
Carbondale, CO 81623



Radiation Risk Consultants

Attachment 1: January 2014 Worker Training Record

Kennecott Rad Worker Training - January 6, 2014

Name	Company	Test Grade
Paulson, Oscar	Kennecott	100
Rider, Charles	Securitas	94
Shelley Schutterle	Kennecott	98
McMacken, Jim	Securitas	91
Harold Kelley	Kennecott	100
Tony Jackson	Archer	98
Jed Goodman	Archer	96
Kronfuss, Karl	Kennecott	100
Harry Lovato	L&L Electric	100
Clayton Coando	Archer	95
Reno Gilliland	Archer	94
Roy Hudson	Archer	92
Anita Morris	WLC	100
Tom Foust	Archer	100

Kennecott Hazmat Transportation Training - January 7, 2014

Name	Company	Test Grade
Graham Lilly	Kennecott	90
Harley English	Kennecott	95
Don Bagshan	Kennecott	95
Arzu Downing	Kennecott	85
Ira Parnes	Kennecott	90

Kennecott Respiratory Protection Training - January 6, 2014

Name	Company	Fit test?
Kronfuss, Karl	Kennecott	pass
Rider, Charles	Securitas	pass
Kelly, Harold	Kennecott	pass
Paulson, Oscar	Kennecott	pass

Kennecott Uranium Company
42 Miles Northwest of Rawlins
P.O. Box 1500
Rawlins, Wyoming 82301
T: 307-328-1476
F: 307-324-4925

Memorandum

From: Oscar Paulson, Facility Supervisor

To: Annual Radiation Training File

Subject: **Radiation Safety Training**

Date: 26 August 2014

On August 26, 2014 Jeff David Brawley, an employee of Securitas USA, received Radiation Safety Training which consisted of the following:

1. Viewing of the following training DVDs produced by Radiological Training Services:
 - Radiation Risks Revisited
 - Fundamentals of Radiation Safety
 - Radiation Protection Standards
2. Review of Regulatory Guide 8.29 – “Instruction Concerning Risks from Occupational Radiation Exposure”. Discussed in DVD – Radiation Risks Revisited.
3. Review of the principles of radiation safety as contained in Kennecott Uranium Company, Sweetwater Uranium Project’s “Radiation Worker Training Outline”. This training included a Power Point presentation on uranium related contamination, discussion of the principles of radiation penetration (time, distance and shielding), instrumentation and radiation dose limits. Use of various instruments was demonstrated. A tour of the mill was also provided.



Oscar A. Paulson
Annual/Rad-safety trng declaration.doc

I have completed the above-described instruction



Jeff David Brawley
Securitas USA

Kennecott Uranium Company
42 Miles Northwest of Rawlins
P.O. Box 1500
Rawlins, Wyoming 82301
T: 307-328-1476
F: 307-324-4925

Memorandum

From: Oscar Paulson, Facility Supervisor
To: Annual Radiation Training File
Subject: **Radiation Safety Training**
Date: 26 August 2014

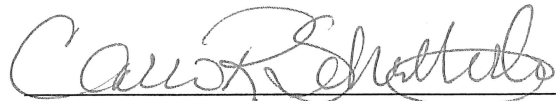
On August 26, 2014 Carri Schutterle, an employee of Kennecott Uranium Company, received Radiation Safety Training which consisted of the following:

1. Viewing of the following training DVDs produced by Radiological Training Services:
 - Radiation Risks Revisited
 - Fundamentals of Radiation Safety
 - Radiation Protection Standards
2. Review of Regulatory Guide 8.29 – “Instruction Concerning Risks from Occupational Radiation Exposure”. Discussed in DVD – Radiation Risks Revisited.
3. Viewing of Radiation and Pregnancy: A Decision to declare which discussed radiation dose to the embryo/fetus. A copy of Regulatory Guide 8.36 Radiation Dose to the Embryo/Fetus was provided.
4. Review of the principles of radiation safety as contained in Kennecott Uranium Company, Sweetwater Uranium Project’s “Radiation Worker Training Outline”. This training included a Power Point presentation on uranium related contamination, discussion of the principles of radiation penetration (time, distance and shielding), instrumentation and radiation dose limits. Use of various instruments was demonstrated. A tour of the mill was also provided.



Oscar A. Paulson
Annual/Rad-safety trng declaration.doc

I have completed the above-described instruction



Carri Schutterle
Administrative Coordinator
Kennecott Uranium Company

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 accordance 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:

- Don Bagshaw
- Arzu Downing
- Harley English
- Graham Lilley
- Ira Parnes

The training was provided on Tuesday, January 7, 2014.

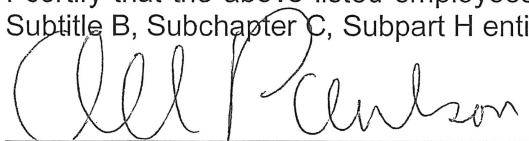
The training materials in the form of a printout of a PowerPoint presentation are maintained in the radiation training file at the Sweetwater Uranium Project.

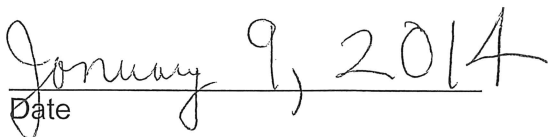
The following is the name, address and other contact information for the persons providing the training:

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

Dr. Craig Little
Two Lines
896 Overview Road
Grand Junction, Colorado 81506
Telephone: (970) 260-2810
Email: craig@2linesinc.com

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/RSO
AnnualHazmatEmpRadMatTransportTrng.doc


Date

Memorandum

From:	Oscar Paulson
To	Radiation Safety Training File
Subject:	Hazmat Employee / Radioactive Materials Transportation Training
Date	30 September 2014

49 CFR part 172.704 states in part:

- (d) Recordkeeping. A record of current training, inclusive of the preceding three years, in accordance 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:

- Carri Schutterle
- Jeff David Brawley

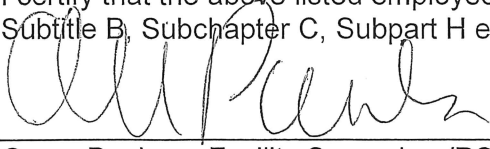
The training was provided on Tuesday, September 30, 2014

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 persons providing the training:

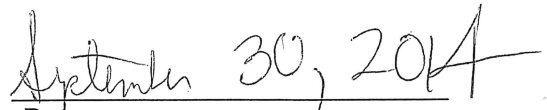
Oscar Paulson
 Facility Supervisor/RSO
 Kennecott Uranium Company
 PO Box 1500
 Rawlins, Wyoming 82301-1500
 Telephone: 307-324-4924
 Email: Oscar.Paulson@riotinto.com

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/RSO

Hazmat-Radioactive Trans Trng.doc



Date

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 accordance 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:

- Anne-Lu Nel

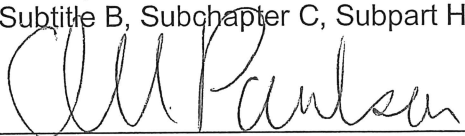
The training was provided on Wednesday, March 19, 2014.

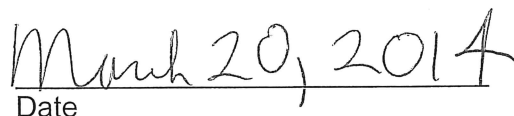
The training materials in the form of a printout of a PowerPoint presentation are maintained in the radiation training file at the Sweetwater Uranium Project.

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

Oscar Paulson
Facility Supervisor/RSO
Kennecott Uranium Company
P.O. Box 1500
Rawlins, Wyoming 82301-1500
Telephone: 307-324-4924
Email: oscar.paulson@riotinto.com

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


Oscar Paulson, Facility Supervisor/RSO
AnnualHazmatEmpRadMatTransportTrng.doc


Date

Memorandum

From:	Anne-Lu Nel
To	Radiation Safety Training File
Subject:	Hazmat Employee / Radioactive Materials Transportation Training
Date	27 August 2014

49 CFR part 172.704 states in part:

(d) Recordkeeping. A record of current training, inclusive of the preceding three years, in accordance 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:

- Tim Worth
- Patrick Farrah
- Bud Rivera

The training was provided on Monday, August 25, 2014

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 persons providing the training:

Anne-Lu Nel
 Senior Advisor – HSE
 Rio Tinto Exploration
 165 Warren Street
 Tamarack, Minnesota 55787
 Telephone: (218) 768-3292
 Email: Anne-Lu.Nel@riotinto.com

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.

Ute 2014.09.16
 14:31:23 -05'00'

Ann-Lu Nel, Senior Advisor – HSE

Date

Memorandum

From:	Graham Lilley
To	Radiation Safety Training File
Subject:	Hazmat Employee / Radioactive Materials Transportation Training
Date	9 September 2014

49 CFR part 172.704 states in part:

(d) Recordkeeping. A record of current training, inclusive of the preceding three years, in accordance 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:

- Anthony Margarit

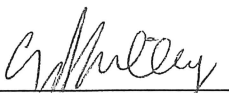
The training was provided on Monday, September 8, 2014.

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 persons providing the training:

Graham Lilley
Principal II Geoscientist
Rio Tinto Exploration
224 North, 2200 West
Salt Lake City, UT 84116
Telephone: (801) 204-3872
Email: Graham.Lilley@riotinto.com

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.



Graham Lilley, Principal II Geoscientist
Hazmat-Radiactive Trans Trng.doc

September 10 2014

Date

Memorandum

From: Anne-Lù Hovis

To: Radiation Safety Training File

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

Date: 30 September 2014

49 CFR part 172.704 states in part:

(d) Recordkeeping. A record of current training, inclusive of the preceding three years, in accordance 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:

- Candice Wingerter
- Casey Pentz
- Warren Riemer

The training was provided on Thursday, October 30, 2014

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 persons providing the training:

Anne-Lù Hovis
Senior Advisor – HSE
165 Warren Street
Tamarack, Minnesota, 55787
Tel: (801) 230 4666
Email: anne-lu.nel@riotinto.com

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.



Anne-Lù Hovis, Senior Advisor - HSE

Date 30 October 2014

Memorandum

From: Candice Wingerter

To: Radiation Safety Training File

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

Date: 11 November, 2014

49 CFR part 172.704 states in part:

(d) Recordkeeping. A record of current training, inclusive of the preceding three years, in accordance 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:

- Russ Pohlman

The training was provided on Tuesday, 11 November, 2014

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:

Anthony Margarit
Operations Manager
Rio Tinto Exploration Canada Inc.
354-200 Granville St.
Vancouver, BC,
V6C 1S4, Canada
1.604.408.4822
Anthony.Margarit@riotinto.com

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.



Anthony Margarit, Operations Manager

Date 11 / 11 / 14

Rio Tinto

Internal memo

16 February 2015

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 2014. 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 2014 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	72.4 hours	61.0 hours
Mill Laborer-1	35.0 hours	4.0 hours
Mill Laborer-2	36.5 hours	12.7 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 2014.

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 natural uranium results for two (2) breathing zone samples filters (April and December 2014) were considered invalid and not used in any calculations for the following reasons:
 - The uranium result for the April 24, 204 breathing zone sample was declared invalid by Energy Laboratories, Inc. The analytical summary report for that sample stated:
The uranium results in this report are not usable due to the filters being contaminated by the laboratory during the preparation process. A corrective action investigation is in progress to uncover the root cause(s) and to prevent further contamination events.

REVISED/SUPPLEMENTAL REPORT (R1)

The attached analytical report has been revised from a previously submitted report due to the request by Oscar Paulson for the reanalysis of Uranium on samples 001A (Breathing zone Sample Site Operations Technician), and 002A (Blank). Duplicate data exists in the system, supporting the original report; however, investigation reveals an apparent low level contamination of ≈ 3 $\mu\text{g/L}$ in the preparation blank (MB-41315). Further, it appears from the investigation this low level contamination (≈ 3 $\mu\text{g/L}$) is present in both samples. Since these samples are a one-time preparation, re-preparation is not possible. The laboratory regrets this error; and has made changes to the preparation process in order to avoid this issue in the future. Source: Revised Supplemental Report Laboratory ID: C14050166

The investigation of this sample result was triggered by the fact that the filter result should have an activity of $9.0 \text{ E-}13$ $\mu\text{Ci/mL}$, and a quality assurance / quality control blank filter accompanying the sample should have an activity of $8.7 \text{ E-}13$ $\mu\text{Ci/mL}$. Given the elevated activity result of the quality assurance / quality control blank filter, an investigation was initiated resulting in the uranium result being invalidated.

- The uranium result for the December 3, 2014 breathing zone sample was declared invalid by Energy Laboratories, Inc. The analytical summary reported for that sample stated:
The Uranium results in this report are not usable due to the filters being contaminated by the laboratory during the preparation process. A corrective action investigation is in progress to uncover the root cause(s) and to prevent further contamination events.

ANALYTICAL COMMENTS

Uranium analysis for this sample set and the associated preparation blank showed significantly elevated data when compared to previous sample submittals. Reanalysis of the batch using alternate aliquots gave same results.

Corrective Action ELICA-0076 from June 2014 has been reviewed concerning Uranium contamination and will be investigated further.

An IDL study has already been started on blank filters received from Oscar Paulson on February 5, 2015. The results of this study will be included in the Corrective Action Report when completed. Source: Revised/Supplemental Report Laboratory ID: C14120812

The investigation of this sample result was triggered by the fact that the filter result showed an activity of $8.06 \text{ E-}11$ $\mu\text{Ci/mL}$ and the accompanying quality assurance / quality control blank filter showed an activity of $2.39 \text{ E-}11$ $\mu\text{Ci/mL}$. An investigation was initiated resulting in the uranium result being invalidated.

These two (2) filters were discussed with James Webb of the Nuclear Regulatory Commission (NRC) on the morning of Monday, February 23, 2015. At his request, the discussion provided by the laboratory was sent to him in an e-mail. This e-mail is at the end of this section.

- 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
- Solvent Extraction (SX) Building High Volume Air Samples
- Mill Building (Roller Room) High Volume Air Samples
- Mill Building (Roller Room) High Volume Air Sample Dose Assessment
- 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 16.8 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. The highest high volume air sample results from the tailings impoundment, the calculated dose of 0.128 millirems for the work performed in the Roller Room, and the exposure times are 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 6.6 millirems (0.007 rems). This calculation is on the attached spreadsheet entitled Airborne Sampling Results (Using Average Values).

These calculations excluded all the natural uranium results from the April and December 2014 breathing zone samples, for which the natural uranium results were considered invalid, because the accompanying blank filters yielded results of 4.3% and 119% of the DAC respectively which indicates an analytical problem / laboratory based sample contamination.

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

InternalOccExpAssess-2014.doc

Kennecott Uranium Company							
Sweetwater Uranium Project							
Airborne Sampling Results:							
(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 2014	Site Operations Technician/Mill Laborer	1.29E-13	1.78E-13	8.53E-14	6.43E-01	2.96E+00	2.84E-02
	Average:	1.29E-13	1.78E-13	8.53E-14	6.43E-01	2.96E+00	2.84E-02
Please see attached spreadsheets							
Lower Limit of Detection (LLD) value used in average if result was non-detect.							
High Volume Air Sampling							
		Concentration			Percent of DAC		
		Natural Uranium	Thorium-230	Radium-226	Natural Uranium	Thorium-230	Radium-226
		(microCuries/ml)	(microCuries/ml)	(microCuries/ml)			
Average for 2014	Mill Building	3.96E-15	5.33E-16	6.70E-16	1.98E-02	8.88E-03	2.23E-04
Average for 2014	Tailings Impoundment	1.55E-15	4.95E-16	9.95E-16	7.75E-03	8.25E-03	3.32E-04
	Average:	2.75E-15	5.14E-16	8.33E-16	1.38E-02	1.67E-03	2.78E-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	1.29E-13	1.78E-13	8.53E-14	6.43E-01	2.96E+00	2.84E-02
	Tailings	1.55E-15	4.95E-16	9.95E-16	7.75E-03	8.25E-03	3.32E-04
Exposure Calculations							
Hours Worked During 2014							
	Mill	72.3					
	Tailings Impoundment	61.0					
Exposure		Natural Uranium	Thorium-230	Radium-226	Total		
		(millirems)	(millirems)	(millirems)	(millirems)		
	Site Operations Technician - Mill	1.16E+00	5.36E+00	5.14E-02	6.57E+00		
	Site Operations Technician - Tailings	1.18E-02	1.26E-02	5.06E-04	2.49E-02		
	Total	1.17E+00	5.37E+00	5.19E-02	6.60E+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:									
(Using Maximum Values)									
Breathing Zone Samples									
Maximum for 2014									
		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 2014		Site Operations Technician	3.40E-13	4.50E-13	2.49E-13	1.70E+00	7.50E+00	8.30E-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 2014		Mill Building	1.10E-14	7.00E-16	1.00E-15	5.50E-02	1.17E-02	3.33E-04	
Maximum for 2014		Tailings Impoundment	2.10E-15	9.90E-16	1.40E-15	1.05E-02	1.65E-02	4.67E-04	
		Maximum	1.10E-14	9.90E-16	1.40E-15	3.28E-02	1.67E-03	4.00E-04	
Please see attached spreadsheets									
Lower Limit of Detection (LLD) value used in average if result was non-detect.									
Hours Worked During 2014									
		Mill	72.3						
		Tailings Impoundment	61.0						
Exposure Calculations									
Exposure			Natural Uranium	Thorium-230	Radium-226	Total			
			(millirems)	(millirems)	(millirems)	(millirems)			
2012		Site Operations Technician - Mill	3.07E+00	1.36E+01	1.50E-01	1.68E+01			
		Site Operations Technician - Tailings	1.60E-02	2.51E-02	7.11E-04	4.19E-02			
		Total	3.09E+00	1.36E+01	1.51E-01	1.68E+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										
		Volume	Sample Lower Limit of Detection (LLD)	Natural Uranium	Thorium-230	Radium-226	Natural Uranium % of DAC	Thorium 230 % of DAC	Radium 226 % of DAC	
Date	Task	(milliliters)	(microCurie per milliliter)	(microCurie per milliliter)	(microCurie per milliliter)	(microCurie per milliliter)	(Percent)	(Percent)	(Percent)	
14-Jan-14	Site Operations Technician	2.87E+06	1.00E-16	8.00E-14	1.00E-13	1.00E-16	0.400	1.667	0.000	
5-Feb-14	Site Operations Technician	2.83E+06	1.00E-16	7.10E-14	1.30E-13	1.00E-16	0.355	2.167	0.000	
6-Mar-14	Site Operations Technician	2.45E+06	1.00E-16	8.30E-14	1.50E-13	1.00E-16	0.415	2.500	0.000	
24-Apr-14	Site Operations Technician	2.48E+06	1.00E-16	9.00E-13	1.30E-13	6.20E-14	4.500	2.167	0.021	
6-May-14	Site Operations Technician	2.58E+06	1.00E-16	9.30E-14	2.70E-13	2.49E-13	0.465	4.500	0.083	
12-Jun-14	Site Operations Technician	2.35E+06	1.00E-16	9.40E-14	3.00E-13	1.60E-13	0.470	5.000	0.053	
8-Jul-14	Site Operations Technician	2.49E+06	1.00E-16	1.10E-13	8.10E-14	2.30E-13	0.550	1.350	0.077	
5-Aug-14	Site Operations Technician	2.62E+06	1.00E-16	1.20E-13	3.40E-14	5.50E-14	0.600	0.567	0.018	
16-Sep-14	Site Operations Technician	3.76E+06	1.00E-16	3.40E-13	1.30E-13	1.10E-13	1.700	2.167	0.037	
7-Oct-14	Mill Laborer	1.01E+06	1.00E-16	2.00E-13	2.90E-13	1.00E-13	1.000	4.833	0.033	
10-Nov-14	Mill Laborer	2.11E+06	1.00E-16	9.50E-14	6.70E-14	4.80E-14	0.470	1.117	0.016	
3-Dec-13	Mill Laborer	1.44E+06	1.00E-16	8.06E-11	4.50E-13	9.20E-15	403.000	7.500	0.003	
Average:		2.42E+06	1.00E-16	1.29E-13	1.78E-13	8.53E-14	6.43E-01	2.96E+00	2.84E-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 either the LLD value of 1.00E-16 microCuries per milliliter or an LLD value provided for that specific filter and analyte by the laboratory. LLD values used in this sheet are flagged.									
	LLD values used in the averages.									
	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 a values at the Lower limit of Detection (LLD) of 1E-16									
	Filters with invalid natural uranium analyses based on the analytical results for accompanying blank quality assurance/quality control filters and counting of the filter prior to shipment to the laboratory for analysis. These natural uranium sample results were not used.									
	The uranium result for the April 24, 2014 breathing zone sample was declared invalid by Energy Laboratories, Inc. The analytical summary report for that sample stated: <i>The uranium results in this report are not usable due to the filters being contaminated by the laboratory during the preparation process. A corrective action investigation is in progress to uncover the root cause(s) and to prevent further contamination events.</i> REVISED/SUPPLEMENTAL REPORT (R1) <i>The attached analytical report has been revised from a previously submitted report due to the request by Oscar Paulson for the reanalysis of Uranium on samples 001A (Breathing zone Sample Site Operations Technician), and 002A (Blank). Duplicate data exists in the system, supporting the original report; however, investigation reveals an apparent low level contamination of ~3 µg/L in the preparation blank (MB-41315). Further, it appears from the investigation this low level contamination (~3 µg/L) is present in both samples. Since these samples are a one-time preparation, re-preparation is not possible. The laboratory regrets this error, and has made changes to the preparation process in order to avoid this issue in the future. Source: Revised Supplemental Report Laboratory ID: C14050166</i> <i>The investigation of this sample result was triggered by the fact that the filter result should have an activity of 9.0 E-13 µCi/mL, and a quality assurance / quality control blank filter accompanying the sample should have an activity of 8.7 E-13 µCi/mL. Given the elevated activity result of the quality assurance / quality control blank filter, an investigation was initiated resulting in the uranium result being invalidated.</i>									
	The uranium result for the December 3, 2014 breathing zone sample was declared invalid by Energy Laboratories, Inc. The analytical summary reported for that sample stated: <i>The Uranium results in this report are not usable due to the filters being contaminated by the laboratory during the preparation process. A corrective action investigation is in progress to uncover the root cause(s) and to prevent further contamination events.</i> ANALYTICAL COMMENTS <i>Uranium analysis for this sample set and the associated preparation blank showed significantly elevated data when compared to previous sample submittals. Reanalysis of the batch using alternate aliquots gave same results. Corrective Action ELICA-0076 from June 2014 has been reviewed concerning Uranium contamination and will be investigated further.</i> <i>An IDL study has already been started on blank filters received from Oscar Paulson on February 5, 2015. The results of this study will be included in the Corrective Action Report when completed. Source: Revised/Supplemental Report Laboratory ID: C14120812</i> <i>The investigation of this sample result was triggered by the fact that the filter result showed an activity of 8.06 E-11 µCi/mL and the accompanying quality assurance / quality control blank filter showed an activity of 2.39 E-11 µCi/mL. An investigation was initiated resulting in the uranium result being invalidated.</i>									
Derived Air Concentrations Used										
	microCurie per milliliter									
Natural Uranium	2.00E-11									
Radium-226	3.00E-10									
Thorium-230	6.00E-12									

Kennecott Uranium Company									
Sweetwater Uranium Project									
Site Operations Technician									
Breathing Zone Samples									
		Volume	Sample Lower Limit of Detection (LLD)	Natural Uranium	Thorium-230	Radium-226	Natural Uranium % of DAC	Thorium 230 % of DAC	Radium 226 % of DAC
Date	Task	(milliliters)	(microCurie per milliliter)	(microCurie per milliliter)	(microCurie per milliliter)	(microCurie per milliliter)	(Percent)	(Percent)	(Percent)
14-Jan-14	Site Operations Technician	2.87E+06	1.00E-16	8.00E-14	1.00E-13	-7.90E-14	0.400	1.667	ND
5-Feb-14	Site Operations Technician	2.83E+06	1.00E-16	<7.1E-14	1.30E-13	-5.40E-14	ND	2.167	ND
6-Mar-14	Site Operations Technician	2.45E+06	1.00E-16	8.30E-14	1.50E-13	-3.60E-14	0.415	2.500	ND
24-Apr-14	Site Operations Technician	2.48E+06	1.00E-16	9.00E-13	1.30E-13	6.20E-14	4.500	2.167	0.021
6-May-14	Site Operations Technician	2.58E+06	1.00E-16	9.30E-14	2.70E-13	2.49E-13	0.465	4.500	0.083
12-Jun-14	Site Operations Technician	2.35E+06	1.00E-16	9.40E-14	3.00E-13	1.60E-13	0.470	5.000	0.053
8-Jul-14	Site Operations Technician	2.49E+06	1.00E-16	1.10E-13	8.10E-14	2.30E-13	0.550	1.350	0.077
5-Aug-14	Site Operations Technician	2.62E+06	1.00E-16	1.20E-13	3.40E-14	5.50E-14	0.600	0.567	0.018
16-Sep-14	Site Operations Technician	3.76E+06	1.00E-16	3.40E-13	1.30E-13	1.10E-13	1.700	2.167	0.037
7-Oct-14	Mill Laborer	1.01E+06	1.00E-16	<2.0E-13	2.90E-13	1.00E-13	ND	4.833	0.033
10-Nov-14	Mill Laborer	2.11E+06	1.00E-16	<9.5E-14	6.70E-14	4.80E-14	ND	1.117	0.016
3-Dec-13	Mill Laborer	1.44E+06	1.00E-16	8.06E-11	4.50E-13	9.20E-15	403.000	7.500	0.003
Average:		2.42E+06	1.00E-16	1.31E-13	1.78E-13	7.12E-14	6.57E-01	2.96E+00	3.79E-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 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 Non-detect (ND)								
	Filters with invalid laboratory natural uranium analyses based on the analytical results for accompanying blank quality assurance/quality control filters and counting of the filter prior to shipment to the laboratory for analysis. These natural uranium sample results were not used.								
	The uranium result for the April 24, 2014 breathing zone sample was declared invalid by Energy Laboratories, Inc. The analytical summary report for that sample stated: <i>The uranium results in this report are not usable due to the filters being contaminated by the laboratory during the preparation process. A corrective action investigation is in progress to uncover the root cause(s) and to prevent further contamination events.</i> REVISED/SUPPLEMENTAL REPORT (R1) The attached analytical report has been revised from a previously submitted report due to the request by Oscar Paulson for the reanalysis of Uranium on samples 001A (Breathing zone Sample Site Operations Technician), and 002A (Blank). Duplicate data exists in the system, supporting the original report; however, investigation reveals an apparent low level contamination of ≈3 µg/L in the preparation blank (MB-41315). Further, it appears from the investigation this low level contamination (≈3 µg/L) is present in both samples. Since these samples are a one-time preparation, re-preparation is not possible. The laboratory regrets this error; and has made changes to the preparation process in order to avoid this issue in the future. Source: Revised Supplemental Report Laboratory ID: C14050166 The investigation of this sample result was triggered by the fact that the filter result should have an activity of 9.0 E-13 µCi/mL, and a quality assurance / quality control blank filter accompanying the sample should have an activity of 8.7 E-13 µCi/mL. Given the elevated activity result of the quality assurance / quality control blank filter, an investigation was initiated resulting in the uranium result being invalidated.								
	The uranium result for the December 3, 2014 breathing zone sample was declared invalid by Energy Laboratories, Inc. The analytical summary reported for that sample stated: <i>The Uranium results in this report are not usable due to the filters being contaminated by the laboratory during the preparation process. A corrective action investigation is in progress to uncover the root cause(s) and to prevent further contamination events.</i> ANALYTICAL COMMENTS Uranium analysis for this sample set and the associated preparation blank showed significantly elevated data when compared to previous sample submittals. Reanalysis of the batch using alternate aliquots gave same results. Corrective Action ELICA-0076 from June 2014 has been reviewed concerning Uranium contamination and will be investigated further. An IDL study has already been started on blank filters received from Oscar Paulson on February 5, 2015. The results of this study will be included in the Corrective Action Report when completed. Source: Revised/Supplemental Report Laboratory ID: C14120812 The investigation of this sample result was triggered by the fact that the filter result showed an activity of 8.06 E-11 µCi/mL and the accompanying quality assurance / quality control blank filter showed an activity of 2.39 E-11 µCi/mL. An investigation was initiated resulting in the uranium result being invalidated.								
Derived Air Concentrations Used									
	microCurie per milliliter								
Natural Uranium	2.00E-11								
Radium-226	3.00E-10								
Thorium-230	6.00E-12								

Restricted Area Time							
Site Operations Technician							
Date	Time In	Time Out	Time				
			Mill (Days)	Tails (Days)	Washbay (Days)		
1/13/2014	9:25	11:13	0.075				
1/13/2014	13:35	14:25	0.035				
1/14/2014	8:20	8:30	0.007				
1/14/2014	12:38	13:45	0.047				
1/15/2014	8:50	9:12		0.015			
1/20/2015	10:03	10:57		0.038			
1/20/2015	12:50	13:48	0.040				
1/21/2014	9:53	11:05	0.050				
1/23/2014	12:40	12:55	0.010				
2/4/2014	9:20	11:25	0.087				
2/4/2014	12:55	14:05	0.049				
2/27/2014	13:00	13:50		0.035			
3/10/2014	11:00	12:25	0.059				
3/10/2014	11:00	14:05	0.128				
3/13/2014	7:30	8:02		0.022			
3/13/2014	10:05	10:56	0.035				
3/24/2014	15:15	15:25	0.007				
3/26/2014	10:00	11:15		0.052			
3/31/2014	10:30	10:42	0.008				
4/2/2014	14:00	15:40	0.069				
4/7/2014	11:15	12:00	0.031				
4/7/2014	12:55	14:25	0.063				
4/8/2014	9:00	11:19		0.097			
4/14/2014	10:30	11:00		0.021			
4/15/2014	8:45	9:50		0.045			
4/24/2014	9:30	11:25	0.080				
4/24/2014	12:55	14:30	0.066				
4/28/2014	9:50	10:35	0.031				
4/28/2014	13:05	13:45	0.028				
4/29/2014	9:35	9:40	0.003				
4/30/2014	9:15	10:00	0.031				
5/1/2014	9:30	10:15		0.031			
5/1/2014	13:05	14:55	0.076				
5/1/2014	15:30	16:25		0.038			
5/5/2014	12:15	12:47	0.022				
5/6/2014	8:25	9:00		0.024			
5/6/2014	10:15	11:55	0.069				
5/6/2014	13:15	14:08	0.037				
5/7/2014	10:30	11:17	0.033				
5/8/2014	10:10	10:45		0.024			
5/13/2014	8:40	9:50		0.049			
5/22/2014	9:00	10:15		0.052			
5/29/2014	8:35	9:20		0.031			
6/2/2014	14:15	15:20		0.045			
6/9/2014	13:16	13:50		0.024			
6/9/2014	14:50	16:15		0.059			
6/10/2014	8:00	8:50			0.035		
6/10/2014	8:50	9:40	0.035				
6/10/2014	10:15	11:20		0.045			
6/10/2014	12:30	14:15		0.073			
6/11/2014	10:55	11:50	0.038				
6/11/2014	12:50	13:52	0.043				
6/12/2014	8:45	9:54		0.048			
6/12/2014	11:44	12:00	0.011				
6/16/2014	9:30	9:50	0.014				
6/16/2014	11:20	11:40			0.014		
6/16/2014	13:05	14:35		0.063			
6/16/2014	14:35	16:05	0.063				

Date	Time In	Time Out	Time		
			Mill	Tails	Washbay
			(Days)	(Days)	(Days)
6/17/2014	7:30	8:33	0.044		
6/23/2014	8:40	9:40	0.042		
6/23/2014	9:40	10:45		0.045	
6/23/2014	14:50	15:10	0.014		
6/23/2014	15:20	16:55	0.066		
6/24/2014	8:45	10:05	0.056		
6/24/2014	14:30	15:20	0.035		
6/25/2014	8:00	8:45		0.031	
6/25/2014	8:45	9:31	0.032		
6/30/2014	10:20	11:15		0.038	
7/1/2014	8:50	9:45		0.038	
7/7/2014	10:40	11:55	0.052		
7/8/2014	8:00	9:10		0.049	
7/8/2014	10:15	11:23	0.047		
7/8/2014	12:40	13:55	0.052		
7/9/2014	7:45	8:11	0.018		
7/9/2014	9:01	9:32		0.022	
7/10/2014	11:10	11:32		0.015	
7/10/2013	11:32	11:55	0.016		
7/17/2014	8:45	9:30		0.031	
7/24/2014	7:50	10:40		0.118	
7/24/2014	13:30	15:30		0.083	
7/28/2014	8:20	9:25		0.045	
7/29/2014	14:30	15:05		0.024	
7/30/2014	12:45	13:09		0.017	
7/31/2014	9:45	10:30		0.031	
8/4/2014	10:00	11:30	0.063		
8/4/2014	12:40	14:00	0.056		
8/4/2014	15:30	16:10		0.028	
8/5/2014	8:50	10:40	0.076		
8/6/2014	6:20	8:05		0.073	
8/6/2014	8:05	9:50			0.073
8/7/2014	7:20	9:43			0.099
8/7/2014	9:43	12:06		0.099	
8/12/2014	8:35	9:46		0.049	
8/13/2014	8:00	9:30	0.063		
8/13/2014	12:05	14:10	0.087		
8/14/2014	8:05	9:10		0.045	
8/26/2014	7:50	9:10		0.056	
8/26/2014	10:40	11:30	0.035		
8/26/2014	15:55	16:28		0.023	
9/4/2014	14:15	15:40		0.059	
9/9/2014	8:05	10:45	0.111		
9/10/2014	9:15	10:29		0.051	
9/15/2014	9:00	9:39		0.027	
9/15/2014	11:00	11:52	0.036		
9/15/2014	12:15	13:50	0.066		
9/15/2014	14:00	14:12	0.008		
9/16/2014	8:05	8:08			0.002
9/16/2014	9:23	11:28	0.087		
9/16/2014	12:37	13:34	0.040		
9/17/2014	8:10	9:15	0.045		
9/17/2014	11:18	12:33	0.052		
9/18/2014	8:40	9:28		0.033	
9/22/2014	9:30	10:00		0.021	
9/23/2014	9:20	9:27			0.005
9/24/2014	14:50	15:40		0.035	
9/25/2014	8:10	8:40		0.021	
10/7/2014	9:50	11:40	0.076		
10/8/2014	7:50	9:10		0.056	
10/14/2014	15:37	16:06		0.020	
10/16/2014	9:20	10:40		0.056	

Date	Time In	Time Out	Time			
			Mill	Tails	Washbay	
			(Days)	(Days)	(Days)	
10/20/2014	9:40	10:10		0.021		
10/23/2014	8:55	10:26		0.063		
11/5/2014	10:05	11:37		0.064		
11/13/2014	12:52	13:43	0.035			
11/17/2014	13:25	14:01		0.025		
11/18/2014	14:40	15:45		0.045		
11/18/2014	17:05	17:45	0.028			
11/20/2014	8:40	9:05	0.017			
11/20/2014	15:10	15:55	0.031			
11/24/2014	8:15	8:24	0.006			
11/25/2014	9:55	10:20			0.017	
12/2/2014	8:15	8:30		0.010		
12/3/2014	9:05	10:05		0.042		
12/9/2014	9:00	9:17	0.012			
12/9/2014	14:05	14:49	0.031			
Total:			3.015	2.540	0.245	Days
			72.350	60.967	5.883	Hours

Restricted Area Time							
Mill Laborer		#1					
				Time			
Date		Time In	Time Out	Mill (Days)	Tails (Days)	Washbay (Days)	
1/15/2014		15:35	16:25			0.035	
1/16/2015		8:00	10:45			0.115	
1/16/2015		11:05	11:12			0.005	
1/20/2014		13:15	14:08			0.037	
1/20/2014		14:08	15:00		0.036		
2/26/2014		9:30	10:20	0.035			
3/10/2014		13:23	14:13	0.035			
5/5/2014		8:10	8:25	0.010			
6/5/2014		15:40	16:00			0.014	
6/10/2014		8:40	10:00	0.056			
6/11/2014		7:55	8:10	0.010			
6/16/2014		10:30	11:45	0.052			
6/16/2014		13:30	16:50	0.139			
6/17/2014		8:30	11:50	0.139			
6/23/2014		10:10	10:45	0.024			
6/23/2014		11:15	12:00	0.031			
6/23/2014		13:25	16:50	0.142			
6/24/2014		8:25	11:45	0.139			
6/24/2014		13:20	16:35	0.135			
6/25/2014		8:10	8:45	0.024			
6/30/2014		15:25	16:30	0.045			
7/8/2014		14:00	16:20	0.097			
7/9/2014		10:15	11:55	0.069			
7/9/2014		13:00	16:10	0.132			
7/10/2014		9:05	9:50	0.031			
7/24/2014		9:00	11:30			0.104	
8/4/2014		13:30	16:40			0.132	
8/5/2014		12:50	13:25			0.024	
8/6/2014		6:20	8:05		0.073		
8/6/2014		8:05	9:50			0.073	
8/7/2014		9:20	10:43			0.058	
8/7/2014		10:43	12:06		0.058		
8/7/2014		14:25	14:40			0.010	
8/19/2014		7:45	8:10			0.017	
8/25/2014		9:25	10:05			0.028	
8/28/2014		8:45	12:47			0.168	
9/3/2014		12:48	15:28	0.111			
Total:				1.458	0.167	0.819	Days
				35.000	4.000	19.667	Hours

	Restricted Area Time								
	Mill Laborer		#2						
					Time				
	Date		Time In	Time Out	Mill	Tails	Washbay		
					(Days)	(Days)	(Days)		
	8/29/2014		8:06	11:47			0.153		
	9/3/2014		12:48	13:24	0.025				
	9/10/2014		12:52	13:28			0.025		
	9/11/2014		11:00	11:05		0.003			
	9/15/2014		11:30	11:52	0.015				
	9/15/2014		12:45	13:51	0.046				
	9/16/2014		9:23	11:28	0.087				
	9/17/2014		8:20	9:45	0.059				
	9/22/2014		9:30	11:00		0.063			
	9/22/2014		11:30	13:05	0.066				
	9/23/2014		9:20	9:27			0.005		
	9/23/2014		14:30	14:40			0.007		
	9/24/2014		8:00	11:30		0.146			
	9/24/2014		12:00	14:40		0.111			
	9/24/2014		15:15	15:41		0.018			
	9/24/2014		15:41	16:08			0.019		
	9/25/2014		8:10	8:40		0.021			
	9/29/2014		9:27	12:35	0.131				
	9/30/2014		15:35	15:50	0.010				
	10/1/2014		10:15	11:36		0.056			
	10/2/2014		8:10	9:40	0.063				
	10/2/2014		12:30	13:11			0.028		
	10/6/2014		12:30	16:15	0.156				
	10/7/2014		16:15	16:42	0.019				
	10/8/2014		9:00	11:45	0.115				
	10/8/2014		12:15	16:44	0.187				
	10/9/2014		8:50	11:36	0.115				
	10/13/2014		10:30	11:40		0.049			
	10/27/2014		16:30	16:43		0.009			
	11/3/2014		14:00	14:30			0.021		
	11/4/2014		10:15	11:00			0.031		
	11/4/2014		11:00	11:50	0.035				
	11/4/2014		15:45	16:00			0.010		
	11/6/2014		14:30	15:45		0.052			
	11/10/2014		9:30	12:00	0.104				
	11/10/2014		12:30	13:30	0.042				
	11/17/2014		10:45	12:00	0.052				
	11/28/2014		10:00	10:20			0.014		
	12/2/2014		14:30	15:30	0.042				
	12/3/2014		9:30	11:49	0.097				
	12/3/2014		12:30	13:25	0.038				
	12/3/2014		13:50	13:55	0.003				
	12/17/2014		10:45	11:00	0.010				
	12/17/2014		12:40	13:55			0.052		
	12/23/2014		9:20	9:28			0.006		
	12/31/2014		15:40	15:45	0.003				
	Total:				1.519	0.528	0.372	Days	
					36.467	12.667	8.917	Hours	

From: Paulson, Oscar (RTE)
Sent: Monday, February 23, 2015 8:09 AM
To: Webb, James
Cc: Schutterle, Carri (RTE)
Subject: Requested Text

James Webb:

Below please find the text that you requested used in the ALARA Report regarding the April and December 2014 breathing zone sample filters:

The uranium results for two (2) breathing zone samples were declared invalid by the laboratory and not used.

The uranium result for the April 24, 2014 breathing zone sample was declared invalid by Energy Laboratories, Inc. The analytical summary report for that sample stated:

The uranium results in this report are not usable due to the filters being contaminated by the laboratory during the preparation process. A corrective action investigation is in progress to uncover the root cause(s) and to prevent further contamination events.

REVISED/SUPPLEMENTAL REPORT (R1)

The attached analytical report has been revised from a previously submitted report due to the request by Oscar Paulson for the reanalysis of Uranium on samples 001A (Breathing Zone Sample Site Operations Technician), and 002A (Blank). Duplicate data exists in the system, supporting the original report; however, investigation reveals an apparent low level contamination of ≈ 3 $\mu\text{g/L}$ in the preparation blank (MB-41315). Further, it appears from the investigation this low level contamination (≈ 3 $\mu\text{g/L}$) is present in both samples. Since these samples are a one-time preparation, re-preparation is not possible. The laboratory regrets this error; and has made changes to the preparation process in order to avoid this issue in the future. Source: Revised Supplemental Report Laboratory ID: C14050166

The investigation of this sample result was triggered by the fact that the filter result showed an activity of $9.0 \text{ E-}13$ $\mu\text{Ci/mL}$, and a quality assurance / quality control blank filter accompanying the sample showed an activity of $8.7 \text{ E-}13$ $\mu\text{Ci/mL}$. Given the elevated activity result of the quality assurance / quality control blank filter, an investigation was initiated resulting in the uranium result being invalidated.

The uranium result for the December 3, 2014 breathing zone sample was declared invalid by Energy Laboratories, Inc. The analytical summary reported for that sample stated:

The Uranium results in this report are not usable due to the filters being contaminated by the laboratory during the preparation process. A corrective action investigation is in progress to uncover the root cause(s) and to prevent further contamination events.

ANALYTICAL COMMENTS

Uranium analysis for this ample set and the associated preparation blank showed significantly elevated data when compared to a previous sample submittals. Reanalysis of the batch using alternate aliquots gave same results.

Corrective Action ELICA-0076 from June 2014 has been reviewed concerning Uranium contamination and will be investigated further.

An IDL study has already been started on blank filters received form Oscar Paulson on February 5, 2015. The results of this study will be included in the Corrective Action

Report when completed. Source: Revised / Supplemental Report Laboratory ID: C14120812

The investigation of this sample result was triggered by the fact that the filter result showed an activity of 8.06 E-11 $\mu\text{Ci}/\text{mL}$ and the accompanying quality assurance / quality control blank filter showed an activity of 2.39 E-11 $\mu\text{Ci}/\text{mL}$. An investigation was initiated resulting in the uranium result being invalidated.

There were twelve (12) breathing zone samples taken in the Mill Building in 2014 to assist in tracking doses. Since the uranium results were invalidated by the laboratory for these two (2) filters, no data whatsoever from these filters was used in any calculations or estimates. This still left data from ten (10) filters which was used.

Oscar Paulson

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Rio Tinto

Internal memo

11 February 2015

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 2014 shows that all results are below the first action level of 15 µg/L. In fact, all urinalysis results for the year 2014 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. One site employee retired in June 2014, another was offsite on short term disability during November and December 2014.

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 2014 urinalysis data.



Oscar A. Paulson
Facility Supervisor

KENNECOTT URANIUM COMPANY			BIOASSAY TESTING												
SWEETWATER URANIUM PROJECT			2014												
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
Administrative Coordinator ¹	AC#2	Kennecott Uranium Company	<5.0 ¹	<5.0 ¹	<5.0 ¹	<5.0 ¹	<5.0 ¹	<5.0 ¹							5.0
Administrative Coordinator ¹	AC#2	Kennecott Uranium Company								<5.0 ¹	<5.0 ¹	<5.0 ¹	<5.0 ¹	<5.0 ¹	
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
Security/SITE LABOR	SEC # 5	Securitas Security								<5.0	<5.0	<5.0	<5.0	<5.0	
Surveyor	SURV	W L C	<5.0						<5.0						5.0
Electrician	ELEC	L&L Electric									<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
	ACI	Archer Construction, Inc.						<5.0			<5.0				
	ACI	Archer Construction, Inc.									<5.0				
Crane Repair Worker	CRN	Kone Cranes								<5.0					5.0
Mechanic	MECH	Wyoming Machinery									<5.0				
Fire Extinguisher Inspector	GRN	Simplex Grinnell			<5.0										5.0
All samples tested by:		Notes:	Pre-job bioassays were collected on new personnel and final bioassays were collected on personnel leaving the job site.												
ENERGY LABORATORIES, INC.			Contract security guards were tested when on site whether or not they entered the restricted area.												
All samples below first action level.															
A high, low and blank spike sent with each batch.															
		¹	Did not work in restricted area in 2014 / worked solely in office.												
			Administrative coordinator was tested in spite of the fact that she worked solely in the office.												
			Pre-job bioassay.												
			Final bioassay												
			Pre-job and post job bioassay collected in same month. Worked in restricted area.												
			Pre and post job bioassays collected. Never worked in restricted area.												
			Pre-job and working bioassay collected during month.												
			Post job and working bioassays collected during month.												

Rio Tinto

Internal memo

9 February 2015

To: NRC File

Subject: Summary of Radiation Instrument Calibrations – 2014

Instrument	Date(s) Calibrated
Calibration Orifices (Annual calibration required)	
Lo Vol-40A S/N M100	1/21/14
Hi Vol-25A S/N 8080978	1/21/14
Sierra Instruments TE-5025A	1/21/14
Calibrators (Annual calibration required)	
CD-530-1 Digital Venturi Calibrator S/N 3039	1/21/14, 4/14/14
Alpha Detectors	
43-5 S/N P-2425	5/15/14, 12/2/14
43-5 S/N P-2426	6/10/14, 12/18/14
43-5 S/N P-2427	6/10/14, 12/18/14
43-5 S/N P-2428	6/10/14, 12/18/14
43-5 S/N P-2429	5/15/14, 12/21/14
43-90 S/N PR-138872	5/15/14, 12/21/14
43-90 S/N PR-138874	5/15/14, 12/21/14
43-90 S/N 232499	5/15/14, 12/2/14
43-1 S/N PR-206925	2/6/14, 8/19/14
AC3-5 S/N 3793	2/7/14, 8/18/14
Gamma Meters/Detectors	
12S S/N 11816	2/3/14, 8/19/14
5 S/N 8170	2/3/14, 8/15/14
44-10 S/N 206932	5/29/14, 12/10/14
44-10 S/N 233869 ⁶	3/11/14, Unit Broken / Replaced with S/N: 339878
19 S/N 16938	2/3/14, 8/19/14
44-10 S/N 252103	2/6/14, 8/19/14
44-10 S/N 252068	5/15/14, 12/2/14
44-10 S/N 339878	7/15/14 – Purchased/Placed in Service
Rate Meters	
177 S/N 14390	6/10/14, 12/18/14
177 S/N 14407	5/15/14, 12/2/14
2350-1 S/N 192613	6/10/14, 12/18/14
2350-1 S/N 216182	5/29/14, 12/11/14
2350-1 S/N 235547	5/15/14, 12/21/14
2350-1 S/N 235565	2/6/14, 8/19/14
Model 3 S/N 157539	4/28/14, 11/3/14
Model 12 S/N 12280	2/6/14, 8/18/14
PRS-1 S/N 330/3793	2/7/14, 8/18/14

SAC R4		
	S/N 383 ³	Removed from Service
SAC R5		
	S/N 614	5/9/14, 10/27/14
	S/N 965	5/9/14, 12/1/14
	S/N 602548	5/9/14, 10/27/14
Scaler		
	MS-2 S/N 738	4/28/14, 5/12/14, 12/1/14
	MS-2 S/N 994	5/9/14, 10/27/14
Beta Gamma Detector		
	Model 44-1 S/N PR-156890	2/6/14, 8/19/14
	Model 44-9 S/N PR-093335	4/28/14, 5/15/14, 11/3/14
	Model 44-142 S/N PR-302659	5/15/14, 12/2/14
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	5/12/14, 12/1/14
Hi Vol Air Sampler		
	S/N Unit # 1	1/14/14, 4/14/14, 7/31/14, 10/21/14
	S/N Unit # 2	1/14/14, 4/16/14, 7/31/14, 10/21/14
	S/N Unit # 3 ²	1/14/14, 4/16/14, 6/16/14, 7/31/14, 10/21/14
	S/N Unit # 4	1/14/14, 4/16/14, 7/31/14, 10/21/14
	S/N 11314	1/13/14, 4/16/14, 7/31/14, 10/23/14
Lo Vol Air Sampler (Graseby)		
	Unit #2	Removed from service in 2010 ¹
Lo Vol Air Sampler (F & J Specialties)		
	DF-604 S/N 10016	Annual Factory calibration: January 21, 2014 Field calibration/checks: 1/5/14, 7/7/14, 8/4/14, 9/2/14, 10/14/14, 11/11/14, 12/1/14
	DF-604 S/N 8917	Annual Factory calibration: July 17, 2014 Field Calibration/checks: 1/14/14, 2/3/14, 3/3/14, 4/7/14, 4/7/14, 5/5/14, 5/6/14, 6/2/14 ^{5,6}

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, 2014 and July 7 to December 31, 2014. The DF-604 unit with serial number 8917 operated from January 14 to July 7, 2014.

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.

No air sampling device is used on site unless that device has been calibrated within the last three (3) months.

¹ 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.

² Replaced motor on June 16, 2014 and recalibrated.

³ This unit was reported broken by the calibrator, is unrepairable, and was removed from service.

⁴ Unit broken / removed from service / replaced by PR-3398783

⁵ DF-604 S/N 8918 calibrated twice in April 2014 due to initial calibrator problems.

⁶ DF-604 S/N 8917 calibrated twice in May 2014 due to initial calibrator problems.

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 B12486

Date	Time
1/14/14	13:50
2/10/14	18:01
4/16/14	11:10
6/15/14	17:18
7/15/14	11:21
10/1/14	9:21
12/3/14	14:12
12/8/14	17:42

Buck Basic 12 – S/N B12494

Date	Time
1/14/14	13:39
4/16/14	11:19
7/15/14	11:29
10/1/14	9:02
12/3/14	13:14

Buck Basic 12 – S/N B12527

Date	Time
1/14/14	14:23
2/5/14	16:15
3/12/14	11:18
4/16/14	10:29
4/29/14	9:37
5/8/14	9:36
6/15/14	17:07
7/2/14	9:58
7/15/14	11:12
8/12/14	9:49
9/30/14	8:46
10/1/14	9:33
10/16/14	8:16
11/20/14	9:33
12/3/14	13:03

Oscar A Paulson

Oscar Paulson
Facility Supervisor

Rio Tinto

Internal memo

11 February 2015

TO: Gamma Radiation Monitoring File

Subject: External Gamma Radiation Survey Assessment

In 2014, gamma surveys of the Mill were conducted on June 26 and December 17 and 18, 2014. Gamma surveys of the interior of the tailings impoundment were conducted on May 29 and December 3, 2014. Gamma surveys of the Ion Exchange area were conducted on June 26 and December 5 and 31, 2014.

Eighteen (18) areas or items associated with the Ion Exchange equipment were surveyed on June 26, December 15 and 31, 2014. Thirty (30) locations in the Mill and Solvent Extraction (SX) Buildings were surveyed for gamma radiation on June 26, 2014 and December 17 and 18, 2014.

Gamma readings for discrete items or areas ranged from 23.4 to 619.7 $\mu\text{R}/\text{hour}$ (172.3 $\mu\text{R}/\text{hr}$ average for the year) for the Ion Exchange areas and related equipment, to 8.2 to 973.4 $\mu\text{R}/\text{hour}$ (69 $\mu\text{R}/\text{hr}$ average for the year) in the Mill and Solvent Extraction (SX) Buildings.

The stored equipment was monitored as well on June 29 and December 30, 2014. Gamma readings for discrete items of stored equipment ranged from 10 to 4033 $\mu\text{R}/\text{hr}$ 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 4.03 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 May 29 and December 3, 2014. This area averaged 96.8 $\mu\text{R}/\text{hr}$ for 2014. Due to the large number of readings taken in the impoundment on May 29 and December 3, 2014, the tables with all of the readings are not included. Over 300 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. No external deep dose exceeded 1 millirem the Luxel dosimeter's Lower Limit of Detection (LLD) during 2014. 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 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
26-Jun 14	12.6	161.0
18-Dec-14	20.0	61.2
Average	32.2	100.7
Standard Deviation:	17.1	47.1

KENNECOTT URANIUM COMPANY				OCCUPATIONAL RADIATION DOSIMETRY RESULTS / DEEP DOSE												
Sweetwater Uranium Project				2014												
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.	M	M	M	M	M	M	M	M	M	M	M	M	0
SR. FACILITY TECHNICIAN	FT	27	KENNECOTT URANIUM CO.	M	M	M	M	M	M	M	M	M	M	M	M	0
ADMINISTRATIVE COORDINATOR	AC#1	25	KENNECOTT URANIUM CO.	M	M	M	M	M	M	M						0
ADMINISTRATIVE COORDINATOR	AC#2	103	KENNECOTT URANIUM CO.									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
SITE/MILL LABORER	SEC#5	104	SECURITAS									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#11	99	ARCHER CONSTRUCTION, INC.							M	M	M	M	M	M	0
TAILINGS REPAIR WORKER	ACI#12	100	ARCHER CONSTRUCTION, INC.						M	M	M	M	M	M	M	0
VISITOR BADGE	D-1	35		M	M	M	M	M	M	M	M	M	M	M	M	0
VISITOR # 1 BADGE	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
RIO TINTO VISITOR	RTV		RIO TINTO	M/D-1												
ADMINISTRATIVE COORDINATOR	AC#2		RIO TINTO								M/D-2					
CRANE REPAIR WORKER	CRN		KONE CRANES								M/D-1					
FIRE EXTINGUISHER INSPECTOR	GRN		SIMPLEX GRINNELL			M/D-1					M/D-1					
ELECTRICIAN	ELEC		L&L ELECTRIC				M/D-1					M/D-1				
TAILINGS INSPECTOR	TAIL		TELESTO SOLUTIONS, INC.						M/D-1							
MECHANIC	MECH		WYOMING MACHINERY									M/D-1				
MILL LABORER	SEC#5		SECURITAS									M/D-3				
TAILINGS REPAIR WORKER	ACI		ARCHER CONSTRUCTION, INC.										M/D-3			
TAILINGS REPAIR WORKER	ACI		ARCHER CONSTRUCTION, INC.											M/D-1		
Employees listed by title (number) to preserve confidentiality				Not on site during month				M = Minimal reporting service of 1 MREM								
				Dosimeter lost/Dose estimated by Landauer, Inc.												
				Did not work on site.								D-1 - Issued Visitor Dosimeter Badge				
				Did not work in restricted area.								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



A handwritten signature in black ink, appearing to read "Walter R. M. L.", is enclosed in a rectangular box.

For the National Institute of Standards and Technology

Rio Tinto

Internal memo

23 February 2015

To: Total and Removable Alpha Monitoring File

Subject: Total and Removable Alpha Monitoring Assessment

In 2014 removable alpha monitoring was performed in the Mill and Solvent Extraction (SX) Buildings on June 23 and December 9, 2014 and in the Ion Exchange area on June 23 and December 9, 2014. Total alpha monitoring was performed on June 27 and December 23, 2014 in the Mill and SX buildings and on June 26 and December 22, 2014 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 alpha contamination levels in the Mill Building ranged between 31.0 and 41,028 dpm/100 cm². The single high reading was taken at the southeast corner of the centrifuge support frame in the Yellowcake Area of the Mill Building. This area is part of the restricted area. Removable alpha contamination in the Mill Building ranged from 0.6 to 108.6 dpm/100 cm². The single highest removable alpha contamination measurement was of the Southeast corner of the centrifuge frame which is in the restricted area.

Total alpha contamination levels in the Ion Exchange area ranged from 33.8 to 1512.5 dpm/100 cm². 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 0.8 to 24.2 dpm/100 cm². Both the high total and removable alpha readings are below the limits (5000/1000 dpm/100 cm²) for release for unrestricted use.

Total alpha monitoring of the stored equipment was performed on June 27, December 30 and 31, 2014. Removable alpha monitoring of the stored equipment was performed on June 20 and December 18, 2014. Total alpha readings on the equipment ranged from 34.4 to 18,134 dpm/100 cm². Removable alpha readings for the stored equipment ranged from ND to 331.9 dpm/100 cm². This elevated fixed alpha reading was on some rubber gasket material associated with some stored valves. These valves are stored in the Mill Building on a pallet and covered with plastic.

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 $10^{-3} \mu \text{ Ci/cm}^2$ (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 $10^{-3} \mu \text{ Ci/cm}^2$ 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 $10^{-3} \mu \text{ Ci/cm}^2$ 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 cm² threshold.



Oscar A. Paulson

Rio Tinto

Internal memo

17 February 2015

To: Radon Monitoring File

Subject: Radon Daughter Monitoring Assessment

In 2014 radon daughter monitoring was conducted on June 10 and December 3, 2014 in the Ion Exchange Area. Radon daughter monitoring was conducted in the Mill Building on June 11 and 12 and December 4 and December 8, 2014.

At least twelve (12) locations throughout the Mill and three (3) locations around the IX were sampled for radon daughters. In addition, locations in the Security Trailer and Administration Building were sampled for radon daughters as well. Radon daughter concentrations (in working levels) were at low levels, ranging from non-detect (ND) to 0.004 WL in the Ion Exchange area (average: 0.001) and Non-detect to 0.046 WL in the Mill and Solvent Extraction (SX) Buildings (average: 0.010). The ventilation fan operated continuously in the Solvent Extraction (SX) Building. Radon levels varied in the SX building from 0.008 to 0.046 WL, averaging 0.028 WL in June 2014 and 0.015 WL in December 2014. 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 2014 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 1.5 to 3.4 pCi/L. Radon concentrations on top of the tank varied from 1.4 to 3.1 pCi/L. These values are at background levels since upwind radon concentrations for the facility varied from 1.1 to 3.2 pCi/L during 2014, as shown in the table below:

2014 Radon Concentrations

Quarter	Bottom of CCD#1 (pCi/L)	Top of CCD#1 (pCi/L)	Upwind (Background) (pCi/L)
1 st	2.2	1.9	1.1 ²
2 nd	1.5	1.4	2.6 ²
3 rd	2.2	1.4	2.6 ²
4 th	3.4	3.1	3.2 ¹
Average	2.32	1.95	2.16

¹ Only the results of one (1) RadTrak used. The second unit was found on the ground on November 19, 2014. The results for it are not used.

² Average of two (2) RadTrak units.

Radon daughter concentrations at the top and bottom of CCD#1 were low, ranging from 0.008 to 0.012 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 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
10-Jun-14	0.010	0.012
3-Dec-14	0.009	0.008
Average	0.016	0.016
Standard Deviation:	0.011	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
1ST Quarter 2014	1.9	2.2
2ND Quarter 2014	1.4	1.5
3RD Quarter 2014	1.4	2.2
4TH Quarter 2014	3.1	3.4
Average	2.5	2.9
Standard Deviation:	0.7	0.8

3.7 Corrected value

POTABLE WATER QUALITY SUMMARY

2014

Coliform Count Summary

Date	Drake #1 (well head)	Administration Building Water Supply (PWW-1 or PWW-2) (kitchen sink cold tap)
1/13/14	Good	Good
2/3/14	Good	Good
3/10/14	Good	Good
4/7/14	Good	Good
5/5/14	Well Down	Good
6/2/14	Well Down	Good
6/16/14	Good	
7/7/14	Good	Good
8/4/14	Good	Good
9/8/14	Good	Good
10/14/14	Good	Good
11/11/14	Good	Good
12/1/14	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, Site Operation Technician, and Security Guard Trailers are supplied by Drake #1 well, which is tested monthly.

KENNECOTT URANIUM COMPANY					
POTABLE WATER QUALITY SUMMARY					
2014					
DRAKE #1					
CHEMICAL ANALYSIS SUMMARY:					
Use Suitability	Domestic *	DRAKE #1	DRAKE #1	DRAKE #1	DRAKE #1
Parameter	Concentration **	01/14/14	04/14/14	7/7/2014	10/20/2014
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	3	3
Chromium (Cr)	0.1	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)
Copper (Cu)	1	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)
Cyanide (CN)	0.2	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)
Fluoride (F)	4	0.2	0.2	0.1	0.2
Hydrogen Sulfide (H2S)	0.05	-	-	-	-
Iron (Fe)	0.3	ND (.05)	ND (.05)	ND (.05)	ND (.05)
Lead (Pb)	0.015	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)
Manganese (Mn)	0.05	ND (0.01)	ND (0.01)	ND (0.01)	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 (5.1)	ND (5.1)	ND (5.1)	ND (5.1)
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	51	50	55	56
Total Dissolved Solids (TDS)	500	182	175	190	184
Zinc (Zn)	5	0.02	0.02	ND(0.01)	ND(0.01)
pH (Standard Units)	6.5 - 8.5	8.24	8.28	8.24	8.23
Combined Ra226/Ra228 (pCi/L)	5.0 pCi/l	2.4	3.7	3.6	3.4
Natural Uranium (pCi/L)	pCi/L	0.2	0.2	ND(0.2)	0.3
Uranium - Suspended	mg/L	ND (0.0003)	ND (0.0003)	ND (0.0003)	ND (0.0003)
Uranium - Total	mg/L	0.0005	0.0003	0.0003	ND (0.0003)
Lead 210 (pCi/L)	pCi/L	0.3	0.8	0.7	0.4
Total Strontium 90 (pCi/L)	8.0 pCi/l	-	-	-	-
Gross Alpha Radioactivity *** (pCi/L)	15.0 pCi/l	1.5 ± 0.4	1.6 ± 0.6	.6 ± 0.4	1.6 ± 0.6
* 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					
2014					
PWW-1					
CHEMICAL ANALYSIS SUMMARY:					
Use Suitability	Domestic *	PWW-1	PWW-1	PWW-1	PWW-1
Parameter	Concentration **	01/14/14	04/14/14	7/7/2014	10/20/2014
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	2	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	0.1	0.1
Hydrogen Sulfide (H2S)	0.05	-	-	-	-
Iron (Fe)	0.3	ND (0.05)	0.07	0.05	0.08
Lead (Pb)	0.015	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)
Manganese (Mn)	0.05	0.01	0.01	0.01	0.01
Mercury (Hg)	0.002	ND (0.0002)	ND (0.0002)	ND (0.0002)	ND (0.0002)
Nitrogen, Nitrate+Nitrite as N		ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)
Nitrite (NO2-N)	1	-	-	-	-
Oil and Grease	Virtually Free	ND (5.1)	ND (5)	ND (5.1)	ND (5.1)
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	47	49
Total Dissolved Solids (TDS)	500	173	171	174	171
Zinc (Zn)	5	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)
pH (Standard Units)	6.5 - 8.5	8.43	8.47	8.4	8.37
Combined Ra226/Ra228 (pCi/L)	5.0 pCi/l	1.82	2.98	0.97	2.03
Natural Uranium (pCi/L)	pCi/L	1.3	0.5	1.3	1.4
Uranium - Suspended	mg/L	0.0004	ND (0.0003)	ND (0.003)	ND (0.003)
Uranium - Total	mg/L	0.0023	0.0007	0.0018	0.0017
Lead 210 (pCi/L)	pCi/L	ND (0.2)	0.3 ± 0.7	0.3 ± 0.7	1.0 ± 0.7
Total Strontium 90 (pCi/L)	8.0 pCi/l	-	-	-	-
Gross Alpha Radioactivity *** (pCi/L)	15.0 pCi/l	0.4 ± 0.3	0.8 ± 0.5	0.6 ± 0.4	0.5 ± 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					
2014					
PWW-2					
CHEMICAL ANALYSIS SUMMARY:					
Use Suitability	Domestic *	PWW-2	PWW-2	PWW-2	PWW-2
Parameter	Concentration **	01/14/14	04/14/14	7/7/2014	10/20/2014
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	0.05	0.16	0.16	0.11
Lead (Pb)	0.015	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)
Manganese (Mn)	0.05	0.01	0.01	0.02	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 (5.1)	ND (5)	ND (5.1)	ND (5.1)
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	42	41	42
Total Dissolved Solids (TDS)	500	163	163	166	158
Zinc (Zn)	5	0.02	ND (0.01)	ND (0.01)	ND (0.01)
pH (Standard Units)	6.5 - 8.5	8.43	8.46	8.47	8.49
Combined Ra226/Ra228 (pCi/L)	5.0 pCi/l	2.75	2.1	0.6	2.31
Natural Uranium (pCi/L)	pCi/L	1.5	1.5	1.6	1.5
Uranium - Suspended	mg/L	0.0003	ND (0.0003)	ND (0.0003)	ND (0.0003)
Uranium - Total	mg/L	0.0026	0.0025	0.0022	0.0024
Lead 210 (pCi/L)	pCi/L	ND (0.2)	0.3 ± 0.7	0.6 ± 0.7	0.5 ± 0.7
Total Strontium 90 (pCi/L)	8.0 pCi/l	-	-	-	-
Gross Alpha Radioactivity *** (pCi/L)	15.0 pCi/l	0.5 ± 0.3	1.1 ± 0.6	0.1 ± 0.3	0.2 ± 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

12 February 2015

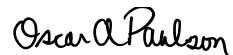
To: SERP File

Subject: Safety and Environmental Review Panel (SERP) – 2014

During the calendar year 2014 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 no Safety and Environmental Evaluations (SEEs) in 2014.



Oscar Paulson

SERP Review-2014.doc

Rio Tinto
Internal memo

16 February 2015

To: Respiratory Protection File

Subject: Respiratory Protection – 2014

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 2014.

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 1, 2014	January 6, 2014 and October 20, 2014
Facility Supervisor	October 17, 2014	January 6, 2014 and October 20, 2014
Site Operations Technician	May 5, 2014	January 6, 2014 and October 20, 2014

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.



Oscar Paulson

Rio Tinto

Internal memo

22 February 2015

To: File

Subject: Releases for Unrestricted Use – 2014

Releases for unrestricted use issued in 2014 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
- Liner sample
- Three (3) fire extinguishers
- Three (3) batteries

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	November 24, 2014	531.5	7.6
One ton pickup	August 28, 2014	1984.5	2.0
Liner Sample	September 16, 2014	664.5	6.0
Toro Dingo	November 24, 2014	122.6	3.7
Three (3) Batteries	September 16, 2014	227.3	1.7
Three(3) fire extinguishers	March 11, 2014	300.1	1.2

ND = Non-Detect

In the course of these releases, no item exceeded 7.6 dpm/100 cm² removable alpha (1,000dpm/100cm² limit) or 1984.5 dpm/100 cm² total alpha (5,000dpm/100 cm² average limit).



Oscar Paulson

ReleaseUnrestrictUse-2014

Rio Tinto

Internal memo

From	Oscar Paulson
To	Standard Operating Procedures File
Reference	Annual Review of Standard Operating Procedures (SOPs)
Date	30 December 2014
Number of pages	2

Requirement

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

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

Review of Standard Operating Procedures (SOPs) is ongoing throughout the year; however, a final review was performed in December 2014. 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 30, 2014 with the preparation of this review document. The date of addition or revision for each procedure follows the name of the procedure.

A. Non-Radiologic SOPs

The following non-radiologic procedures were modified:

- The *Extreme Snowfall Plan* was revised on October 7, 2014 to reflect the availability of Archer Construction, Inc. during the winter of 2014-2015 for snow removal.
- SOP-1 the Standard Operating Procedure for the Four (4) Day Work Week was revised on December 29, 2014
- Instruction for All Security Personnel was revised on December 29, 2014
- SOP-2 Delegation of Authority was revised on October 21, 2014
- SOP-8 Cold Weather Operations was revised on December 29, 2014

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

The following procedures were modified:

- HP-2 Gamma Survey – December 29, 2014
- HP-3 Beta Survey – December 29, 2014
- HP-4 Radon Daughter Survey – December 29, 2014
- HP-6 Total Alpha Surveys – December 30, 2014
- HP-9 Management Control, Bioassay, Urine and In Vivo Programs – December 29, 2014
- HP-12 In Plant High Volume Particulate Sampling – December 29, 2014
- HP-15 Dosimeter Area Monitoring – December 29, 2014
- HP-20 Radiation Work Permit – December 29, 2014
- HP-26 Radiation Safety Officer During Suspended Operations – December 29, 2014
- HP-27 Checking and Decontaminating Equipment Used in the Mill Tailings Impoundment – December 30, 2014
- HP-29 Training, Reporting and Qualifications of Facility Staff – December 30, 2014
- HP-33 Shipment of Radioactive Samples – December 29, 2014
- HP-34 Personnel Dosimetry for External Exposure – December 30, 2014
- EP-10 Radon-222 Sampling – December 29, 2014
- EP-11 Thermoluminescent Dosimeter Area (TLD) Monitoring – December 30, 2014

- MOP-19 Sporadic Contract Maintenance Work in the Mill and Solvent Extraction (SX) Building and Other Restricted Areas Exclusive of the Yellowcake Area During Suspended Operations – September 9, 2014
- MOP-20 Transfer of Small Quantities of Derived Product from Stored Sample Containers to Small Vials for Analysis – November 25, 2014

C. Other Procedures

- SOP-9 The *Suspended Operations Procedure* was revised on December 29, 2014

D. New Procedures

- HP-42 Transportation of Non Atomic Energy Act (AEA) Materials Specifically Naturally Occurring Radioactive Material (NORM) Including Technologically Enhanced Naturally Occurring Radioactive Material (TENORM) and Core Samples Containing Naturally Occurring Radioisotopes – Wyoming and Utah – February 11, 2014
- MOP-20 Transfer of Small Quantities of Dried Product from Stored Sample Containers to Small Vials for Analysis – September 8, 2014

Rio Tinto
Internal memo

12 February 2015

To: Radiation Work Permit File

Subject Radiation Work Permits

No radiation work permits (RWPs) were issued in 2014.

Oscar A Paulson
Oscar Paulson

Rio Tinto

Internal memo

18 February 2015

Memo to File

SUBJECT: Dose Assessment / Determination of No Requirement for Individual Monitoring or Dose Calculation at the Sweetwater Uranium Project for 2014

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 2014.

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 2014 of 2.29 pCi/liter was used to represent the background radon concentration for the facility. An equilibrium factor of 0.141 was used.

<u>Item</u>	<u>Average Concentration</u>	<u>Dose</u>
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	2.29 pCi/l	142.1 mrem/yr

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

Radon-222 concentration based on average of the first, second, third and fourth quarter upwind RadTrak Results. Averages of two (2) RadTrak units were used for each quarter, except the fourth quarter for which only the result of a single unit was used since the second one was found on the ground on November 19, 2014.

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

$$\begin{aligned} &(2.29 \text{ pCi/l}) / (1\text{E}3 \text{ ml/l}) / (1\text{E}6 \text{ pCi/uCi}) = 2.29 \text{ E-}09 \text{ uCi/ml} \\ &0.33 \text{ WL} = 3\text{E-}08 \text{ uCi/ml (with all daughters present)} \\ &[(2.29\text{E-}09 \text{ uCi/ml}) / (3\text{E-}08 \text{ uCi/ml})] * (0.33 \text{ WL}) = 0.025 \text{ WL for background (with daughters present)} \end{aligned}$$

The calculated equilibrium factor for the facility (1993 to 2014) average is 0.141. Given that all daughters are not present and the equilibrium factor is 0.150, the actual background radon daughter concentration is:

$$(0.141) * (0.025 \text{ WL}) = 0.004 \text{ WL}$$

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	172.3 uR/hr	22.9 uR/hr	149.4 uR/hr
Mill	69.0 uR/hr	22.9 uR/hr	46.0 uR/hr
Tailings	96.8 uR/hr	22.9 uR/hr	73.9 uR/hr

Approximately 69.0 hours are estimated to have been spent in the Mill and Solvent Extraction (SX) buildings by the Site Operations Technician and 96.8 hours are estimated to have been spent in the tailings impoundment by the Site Operations Technician in 2014. 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	72.3 hours ^a	46.0 uR/hr	3.3 mrem
Tailings	61.0 hours ^a	73.9 uR/hr	4.5 mrem
Total			7.8 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 2014 even though their use was not required, in part, to confirm these calculations. There were no reported doses (all dosimeters read M (Non-detect) for calendar year 2014, 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:

Area	Radon Sampling Results		Occupational Dose
	Concentration	Background	
IX Area	0.001 WL	0.004 WL	0.000 WL
Mill Area	0.010 WL	0.004 WL	0.006 WL

The average occupational radon dose for facility personnel is:

$$\{[(0.006 \text{ WL}) / (0.33 \text{ WL/DAC})] * 42.3 \text{ hours}\} / (2000 \text{ DAC hours/ALI}) = 0.0007 \text{ ALI}$$

$$(0.0007 \text{ ALI}) * (5000 \text{ millirems/ALI}) = 3.5 \text{ millirems}$$

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 2014 and breathing zone samples taken of personnel working in the Mill and SX Buildings and tailings impoundment during 2014.

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 16.9 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 uranium results for two (2) breathing zone samples were declared invalid by the laboratory and not used.

The uranium result for the April 24, 2014 breathing zone sample was declared invalid by Energy Laboratories, Inc. The analytical summary report for that sample stated:

The uranium results in this report are not usable due to the filters being contaminated by the laboratory during the preparation process. A corrective action investigation is in progress to uncover the root cause(s) and to prevent further contamination events.

REVISED/SUPPLEMENTAL REPORT (R1)

The attached analytical report has been revised from a previously submitted report due to the request by Oscar Paulson for the reanalysis of Uranium on samples 001A (Breathing Zone Sample Site Operations Technician), and 002A (Blank). Duplicate data exists in the system, supporting the original report; however, investigation reveals an apparent low level contamination of $\approx 3 \mu\text{g/L}$ in the preparation blank (MB-41315). Further, it appears from the investigation this low level contamination ($\approx 3 \mu\text{g/L}$) is present in both samples. Since these samples are a one-time preparation, re-preparation is not possible. The laboratory regrets this error; and has made changes to the preparation process in order to avoid this issue in the future. Source: Revised Supplemental Report Laboratory ID: C14050166

The investigation of this sample result was triggered by the fact that the filter result showed an activity of $9.0 \text{ E-}13 \mu\text{Ci/mL}$, and a quality assurance / quality control blank filter accompanying the sample showed an activity of $8.7 \text{ E-}13 \mu\text{Ci/mL}$. Given the elevated activity result of the quality

assurance / quality control blank filter, an investigation was initiated resulting in the uranium result being invalidated.

The uranium result for the December 3, 2014 breathing zone sample was declared invalid by Energy Laboratories, Inc. The analytical summary reported for that sample stated:

The Uranium results in this report are not usable due to the filters being contaminated by the laboratory during the preparation process. A corrective action investigation is in progress to uncover the root cause(s) and to prevent further contamination events.

ANALYTICAL COMMENTS

Uranium analysis for this sample set and the associated preparation blank showed significantly elevated data when compared to a previous sample submittals. Reanalysis of the batch using alternate aliquots gave same results.

Corrective Action ELICA-0076 from June 2014 has been reviewed concerning Uranium contamination and will be investigated further.

An IDL study has already been started on blank filters received from Oscar Paulson on February 5, 2015. The results of this study will be included in the Corrective Action Report when completed. Source: Revised / Supplemental Report Laboratory ID: C14120812

The investigation of this sample result was triggered by the fact that the filter result showed an activity of 8.06 E-11 $\mu\text{Ci}/\text{mL}$ and the accompanying quality assurance / quality control blank filter showed an activity of 2.39 E-11 $\mu\text{Ci}/\text{mL}$. An investigation was initiated resulting in the uranium result being invalidated.

Some work was performed in the Mill Building Roller Room (a respirator area) under a Standard Operating Procedure (MOP-20) on September 9, 2014. High volume air sampling was conducted during the 72 minutes of work. Respirators were worn. The total calculated internal dose was determined to be 0.128 millirems. This dose is being added on the final page of this document.

The maximum valid measured airborne natural uranium concentration was 3.40 E-13 $\mu\text{Ci}/\text{ml}$ which was the September 16, 2014 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:	3.40 E-13 $\mu\text{Ci}/\text{ml}$
Maximum working hours in one (1) week:	40 hours
Minutes per hour:	60 minutes
Respiration rate:	2.00 E+04 ml/min
PicoCuries per microCurie:	1E+06 pCi/ μCi
PicoCuries natural uranium per milligram:	677 picoCuries

Calculation:

$$[(3.40 \text{ E-}13 \mu\text{Ci}/\text{ml}) \cdot (40 \text{ hours}/\text{week}) \cdot (60 \text{ minutes}/\text{hour}) \cdot (2.00 \text{ E+}04 \text{ milliliters}/\text{minute}) \cdot (1\text{E+}06 \text{ picoCuries per microCurie})] / (677 \text{ picoCuries}/\text{milligram}) = 0.024 \text{ milligrams}$$

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 2014, 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 16.9 millirems per year for 2014.

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 0.017 rem/year
- 3) The maximum possible total occupational dose to the maximally exposed individual on site is as follows:

a) Estimated external dose:	0.008 rem/yr.
b) Estimated internal dose (particulates)	0.017 rem/yr.
c) Estimated internal dose (Roller Room work)	0.0001 rem/yr.
d) Estimated internal dose (Radon-222)	0.004 rem/yr.
Total:	0.029 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 2014 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. There were no reported doses (all dosimeters read M (Non-detect) for calendar year 2014. This proves that the external dose estimate based upon surveys is conservative.


Oscar A. Paulson

Rio Tinto

Internal memo

19 February 2015

To: NRC File

Subject: Compliance with 10 Mrem Constraint Limit for 2014

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:	5.35 E-17 uCi/ml	0.030 mrem/yr
Ra-226:	2.95 E-17 uCi/ml	0.002 mrem/yr
Th-230:	4.55 E-17 uCi/ml	0.076 mrem/yr
Total:		0.107 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 2014 dose from airborne particulate radionuclides was at background levels. The 10 mrem per year constraint limit was not exceeded.


Oscar Paulson

Rio Tinto

Internal memo

19 February 2015

To: NRC File

Subject: Compliance with 40 CFR 190.10 for 2014

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:	5.35 E-17 uCi/ml	0.030 mrem/yr
Ra-226:	2.95 E-17 uCi/ml	0.002 mrem/yr
Th-230:	4.55 E-17 uCi/ml	0.076 mrem/yr
Total:		0.107 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 2014 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	193.3 mrem

This measured exposure is slightly below site background.

Conclusions:

- The 2014 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

18 December 2014

To: TSCA File

Subject: Toxic Substances Control Act

On December 18, 2014 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:

- David Brawley – Security Officer
- Karl Kronfuss – Facility Technician
- Oscar Paulson – Facility Supervisor
- Carri Schutterle – Administrative Coordinator


Oscar Paulson
Facility Supervisor

Rio Tinto
Internal memo

19 February 2015

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 30 and December 30, 2014.

Emergency fire protection training involved:

- Operation of the electric fire pump
- Operation of the diesel fire pump
- Opening and operation of a fire hydrant

Annual fire extinguisher and hose inspections were conducted on March 10 and 11, 2014 by Simplex Grinnell.

Electrical ground integrity testing was performed on February 28, March 3, 4, 10, 11, 12, 13, 24, 25 and 26, 2014 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 8, 2014.
- Driver Training was held on January 7, 2014.
- First Aid Training was held on January 9, 2014
- Task Training was held on January 7, 2014.


Oscar A. Paulson