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9 February 2016

Mr. John Tappert, Deputy Director
Division of Decommissioning, Uranium Recovery, & Waste Programs
Office of Federal and State Materials and Environmental Management Programs
U.S. Nuclear Regulatory Commission
11545 Rockville Pike
Rockville, MD 20852-2738

Dear Mr. Tappert:

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

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

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

Sincerely,

Oscar A Paulson
Oscar A. Paulson
Facility Supervisor

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

Rio Tinto

Internal memo

9 February 2016

To: NRC File

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

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

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

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

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

4. Training:
Annual Radiation Worker Training was conducted on January 8, 2015. Annual MSHA Refresher Training was conducted on January 6, 2015. In addition, driver training was conducted on January 7, 2015. Radiation training of individual contract employees (contractor new hires) was conducted on an as-needed basis. Equipment hazard training was provided on January 7, 2015. 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 2015, as documented in the memorandum entitled "Annual Review of Standard Operating Procedures (SOPs)", dated 30 December 2015.

9. Radiation Work Permits:
No radiation work permits were issued in 2015.

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 May 28 and December 29, 2015. 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 November 17, 2015. No violations were identified. The license was renewed for ten (10) years on October 21, 2011.

11. Safety and Environmental Review Panel (SERP):
Two (2) Safety and Environmental Evaluations (SEEs) were issued by the Safety and Environmental Review Panel in 2015.

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 In January, May and October 2015. Annual fit testing and respirator training was conducted in January and November 2015.

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 0.037 WL in June 2015 and 0.056 WL in December 2015.

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 2015.

Annual Dose and Uranium Intake Data for the Maximally Exposed Worker								
Year	External (calculated) (mrem)	Personal Dosimeter (mrem)	Radon (mrem)	Air Particulate (mrem)	TEDE (mrem)	Radiation Work Permit Dose (mrem)	Weekly Maximum Calculated Soluble U-nat Intake (mg)	Bioassay U-nat (µg/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
2015	5	1	9	9	23	-	0.05	<5

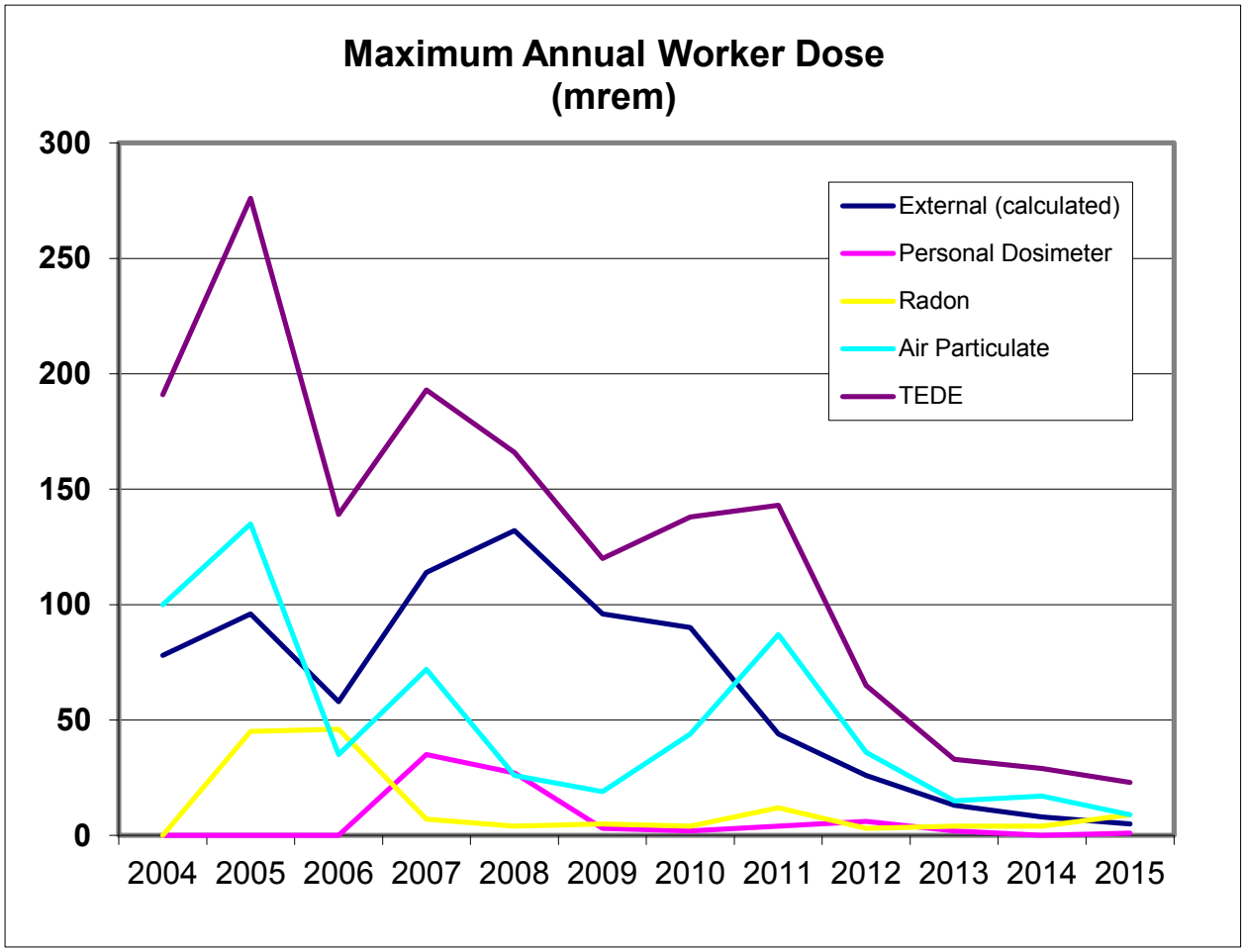
Note: This table has been updated since the license renewal application with 2015 data.

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 2015.



Note: This graph has been updated since the license renewal application with 2015 data.

The preceding table, graph, and text are from the Request for Renewal – Source Material License SUA-1350 for a Ten (10) Year Term dated July 24, 2014. The table and graph are updated and the text table and graph were originally prepared by:

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. Exposures have been declining over time.

Oscar A Paulson
Oscar Paulson
Facility Supervisor
LC 12.3-2015.doc

Rio Tinto

Internal memo

9 February 2016

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
- Internal 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 2015
- 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 0.034 WL to 0.059 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 0.034 WL to 0.059 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 May 28 and December 29, 2015. 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 occurred in the past (prior to Kennecott Uranium Company ownership) due to a liner failure. The liner was discussed by Kent Bruxvoort of Telesto Solutions, Inc. in the 2015 Inspection of Tailings Impoundment Liner report dated July 22, 2015. The report states:

> *Ongoing maintenance of the impoundment serves to allow Kennecott Uranium Company to meet its operational objectives. Specific maintenance completed or ongoing during 2014-2015 includes 1) repair of the liner to keep it functional within five feet of the tailings; 2) ongoing maintenance of the water management system including activities such as pump repair and/or replacement; 3) placement of sandbag weights along the south embankment to limit liner buffeting under windy conditions; and 4) maintenance and repair of the outer surfaces of the embankments against erosion effects.*
>
> *Kennecott Uranium Company continues to effectively manage the tailings impoundment through as-needed maintenance of the liner within five vertical feet of the tailings or tailings fluid and keeping the tailings covered with filled 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 over a large surface area within the impoundment 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 2015 Inspection of the Tailings Impoundment Liner dated July 22, 2015. 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: 1) regarding the tailings to a more regular surface in anticipation of either reclamation or future tailings storage; 2) leveling the tailings to create a surface that is entirely below the bench and essentially below the elevation of the surrounding native ground, more sheltered from wind, and easier to keep moistened; 3) covering the tailings to limit wind erosion potential; and 4) creating stable, flat, bermed areas as evaporation lagoons for tailings dewatering and pump-back water evaporation.

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 0.18% of the allowable effluent concentrations during 2015, 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 2015.

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 A Paulson

Oscar Paulson

Rio Tinto

Internal memo

25 January 2016

To: NRC File

Subject: Summary of Monthly Radiation Safety Meetings

The following is a summary of the twelve (12) monthly (plus eleven (11) additional) Radiation Safety meetings held in 2015:

2014	TOPIC	ATTENDEES
1/12/15	Discussed 40 CFR Part 192 Rulemaking and its impact on in-situ uranium recovery	KUC, SEC
2/1/15	Discussed Chernobyl and viewed video “Radioactive Wolves of Chernobyl”. Discussed Video	KUC, SEC
2/10/15	Discussed breathing zone sample filter results and laboratory error on sample results	KUC, SEC
3/17/15	Discussed radiation safety for performing annual fire extinguisher inspections in Mill and Solvent Extraction (SX) Buildings	KUC, GRN
3/25/15	Discussed pump-back system operation, soon to be released book entitled “Building the H Bomb” by Dr. Kenneth Ford and Forbes article on proposed radiation protection regulation revisions. Discussed doses to site personnel	KUC, SEC
3/31/15	Discussed use of control dosimeters	KUC, SEC
4/28/15	Discussed 40 CFR Part 192 rulemaking	KUC
4/29/15	Discussed breathing zone sample results and total and dissolved radionuclide data for PWW-1 and PWW-2	KUC
5/5/15	Discussed air sampler calibrations and calibration methods	KUC
5/12/15	Discussed radiation safety for tailings work	KUC, ARC
5/18/15	Discussed radiation safety for tailings inspections	KUC, TEL
5/20/15	Discussed radiation safety for tailings work and Method 115 Test	KUC, ARC
6/3/15	Discussed use of Ludlum 2350-1 data logger and 43-5 detector for personal monitoring	KUC, ARC
6/25/15	Discussed Writers on the Range article A Uranium Mine is anything but a good neighbor, liquid fluoride thorium reactors and Linear No Threshold (LNT)	KUC
7/30/15	Discussed Requests for Additional Information (RAI’s) received in regard to the license renewal	KUC
8/25/15	Discussed the Method 115 Test result and Linear No Threshold (LNT)	KUC
9/15/15	Discussed radiation safety for crane inspections	KUC, KOK
9/17/15	Discussed radon in air related to the site	KUC
10/21/15	Discussed radon concentrations in the FEMA Trailer, radiation linked cancer in a Fukushima worker and the 40 CFR Part 192 rulemaking	KUC
11/16/15	Discussed radiation safety for filming in the Mill Building	KUC, CP
11/24/15	Discussed respiratory protection & conducted annual fit tests	KUC
12/7/15	Discussed Linear No Threshold (LNT)	KUC
12/21/15	Discussed Method 115 Test results and Method 115 Test Report	KUC

Initial key: **KUC** = Kennecott Uranium Company **KOK** = Konecranes **CP** = Contract Photographer
GRN = Simplex Grinnell **TEL** = Telesto Solutions, Inc.
SEC = Securitas Security Services **ARC** = Archer Construction, Inc.

Oscar A Paulson

Oscar Paulson

Rio Tinto

Internal memo

25 January 2016

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 8, 2015. 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.
Oscar Paulson – Kennecott Uranium Company
David Browley – Securitas Security Services
Roy Hudson – Archer Construction, Inc.
Karl Kronfuss – Kennecott Uranium Company
Shelley Schutterle – Securitas Security Services
Carri Schutterle – Kennecott Uranium Company
Tom Foust – Archer Construction, Inc.
Sean Dwinnell – Archer Construction, Inc.
Jim McMacken – Securitas Security Services
Jeremy LaVine – Archer Construction, Inc.
Rich Atkinson – Cedar Mountain Ventures, LLC
Tony Jackson – Archer Construction, Inc.
Darren Webster – Archer Construction, Inc.

In addition, the following individual was provided with radiation safety training for uranium mill workers on site on July 29, 2015:

Craig Micek – Worthington Lenhart and Carpenter

Annual respiratory protection training was also conducted by Two Lines, Inc. and Sopris Environmental at the Sweetwater Uranium Project on January 7, 2015. The following individuals were trained:

Oscar Paulson – Kennecott Uranium Company
Karl Kronfuss - Kennecott Uranium Company
David Brawley – Securitas Security Services

Additional respiratory protection training was provided on November 24, 2015 to the following individuals:

Oscar Paulson – Kennecott Uranium Company (trainer)
Karl Kronfuss – Kennecott Uranium Company

Oscar Paulson, Karl Kronfuss and David Brawley were fit tested, given annual respirator physicals, trained and were part of the site's respirator program in 2015.

Oscar A Paulson

Oscar Paulson
Facility Supervisor

Annual RadRefreshTrng-2015.doc

Two Lines, Inc.
Radiation Risk Consultants

February 9, 2015

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 8, 2015:

Rich Atkinson	Karl Kronfuss
David Brawley	Jeremy LaVine
Jean Dwinnell	Jim McMacken
Tom Foust	Oscar Paulson
Jed Goodman	Carri Schutterle
Nick Hudson	Shelley Schutterle
Tony Jackson	Aaron Webster

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 for three individuals: Karl Kronfus, Jeff "David" Brawley and yourself. 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,

Sopris Environmental

Janet A. Johnson, PhD, CHP

Two Lines, Inc.

Craig A. Little, Ph.D.

896 Overview Rd.
Grand Junction, CO
81506

Phone: (970) 260-2810
Efax: (309) 214-2569
E-mail: twolines@bresnan.net

Rio Tinto

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	29 July 2015

On July 29, 2015, Craig Micek, an employee of Worthington, Lenhart and Carpenter, Inc., 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.

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

I have completed the above-described instruction

Craig T. Micek

Craig Micek
Worthington, Lenhart and Carpenter, Inc.

Rio Tinto

Internal memo

2 February 2016

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 2015. 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 Facility Technician, who during 2015 is the individual on site who spent the greatest amount of time within the Mill and Solvent Extraction (SX) Buildings and Tailings Impoundment and should have 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	Total
Site Operations Technician	18.6 hours	58.4 hours	77.0 hours
Facility Technician	33.9 hours	44.4 hours	78.3 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 Facility Technician represent the maximum time spent by an individual in these areas and the Facility Technician was the maximally exposed individual on site in 2015.

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 Facility 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
- Site Operations Technician Breathing Zone Samples
- Spreadsheet showing times in the Mill and SX buildings and tailings impoundment for the Site Operations Technician and Facility Technician
- Airborne Particulate Dose using maximum breathing zone samples
- Airborne Particulate Dose using average breathing zone samples

Dose Calculation Results

A maximum internal dose of 9.0 millirems (0.009 rems) was calculated for the maximally exposed individual (the Site Facility 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 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 high volume air sample results from the tailings impoundment. This calculation resulted in an internal dose of 4.2 millirems (0.004 rems). This calculation is on the attached spreadsheet entitled Airborne Sampling Results (Using Average Values).

These calculated doses are all less than 10% of the 5,000 millirem internal dose limit (500 millirems), above which individual monitoring is required as per 10 CFR 20.1502(b)(1). Also, the maximally exposed individual received less than 10% of the ALI for natural uranium, Radium-226 and Thorium-230 when working in the Mill and SX buildings and tailings impoundment, meaning that no worker was “…*likely to receive in 1 year an intake in excess of 10 percent of the applicable ALI(s) in table 1, Columns 1 and 2 of Appendix B to §20.1001-21.2401:…*” Thus, individual monitoring of occupational intake for airborne particulate radionuclides was not required.

Oscar A. Paulson

Oscar A. Paulson

InternalOccExpAssess-2015.doc

Kennecott Uranium Company										
Sweetwater Uranium Project										
Tailings Impoundment										
High Volume Air Samples										
Sample Number	**Date**		**Volume**	**Sample Lower Limit of Detection (LLD)**	**Natural Uranium**	**Thorium 230**	**Radium 226**	**Natural Uranium % of DAC**	**Thorium 230 % of DAC**	**Radium 226 % of DAC**
	Start	**Stop**	**(milliliters)**	**(microCurie per milliliter)**	**(microCurie per milliliter)**	**(microCurie per milliliter)**	**(microCurie per milliliter)**	**(Percent)**	**(Percent)**	**(Percent)**
1	18-May-15	19-May-15	2.13E+09	1.00E-16	1.60E-15	6.00E-16	1.30E-15	8.00E-03	1.00E-02	4.33E-04
2	23-Nov-15	24-Nov-15	2.64E+09	1.00E-16	1.20E-15	5.00E-16	1.40E-15	6.00E-03	8.33E-03	4.67E-04
Average:			2.39E+09		1.40E-15	5.50E-16	1.35E-15	7.00E-03	9.17E-03	4.50E-04
Derived Air Concentrations Used										
	microCurie per milliliter									
Natural Uranium	2.00E-11	Year								
Radium-226	3.00E-10	Week								
Thorium-230	6.00E-12	Year								
Notes:										
	Air sampler was located near the northeast corner of the interior of the impoundment.									
	Air sampler was pointed southwest into the prevailing wind to maximize radionuclide concentrations.									
	No sample exceeded effluent limits for natural uranium, radium-226 or thorium-230 in spite of the fact that they were collected inside of the impoundment.									
		Multiday composite								

Kennecott Uranium Company											
Sweetwater Uranium Project											
Mill Building											
High Volume Air Samples											
Sample Number	Date			Volume	Sample Lower Limit of Detection (LLD)	Natural Uranium	Thorium 230	Radium 226	Natural Uranium % of DAC	Thorium 230 % of DAC	Radium 226 % of DAC
	Start	Stop		(milliliters)	(microCurie per milliliter)	(microCurie per milliliter)	(microCurie per milliliter)	(microCurie per milliliter)	(Percent)	(Percent)	(Percent)
1	18-May-15	19-May-15	Mill Grinding Area - Second Deck	2.29E+09	1.00E-16	2.40E-15	6.00E-16	6.00E-16	1.20E-02	1.00E-02	2.00E-04
2	18-May-15	19-May-15	Mill Precipitation Area - Precipitation Deck	2.65E+09	1.00E-16	3.20E-15	6.00E-16	9.00E-16	1.60E-02	1.00E-02	3.00E-04
3	23-Nov-15	24-Nov-15	Mill Grinding Area - Second Deck	2.69E+09	1.00E-16	1.80E-15	5.00E-16	1.10E-15	9.00E-03	8.33E-03	3.67E-04
4	23-Nov-15	24-Nov-15	Mill Precipitation Area - Precipitation Deck	2.70E+09	1.00E-16	2.90E-15	5.00E-16	1.00E-15	1.45E-02	8.33E-03	3.33E-04
Average:				2.58E+09		2.58E-15	5.50E-16	9.00E-16	1.40E-02	1.00E-02	2.50E-04
Derived Air Concentrations Used											
	microCurie per milliliter										
Natural Uranium	2.00E-11	Year									
Radium-226	3.00E-10	Week									
Thorium-230	6.00E-12	Year									

Kennecott Uranium Company											
Sweetwater Uranium Project											
Solvent Extraction (SX) Building											
High Volume Air Samples											
Sample Number	**Date**			**Volume**	**Sample Lower Limit of Detection (LLD)**	**Natural Uranium**	**Thorium 230**	**Radium 226**	**Natural Uranium % of DAC**	**Thorium 230 % of DAC**	**Radium 226 % of DAC**
	Start	**Stop**		**(milliliters)**	**(microCurie per milliliter)**	**(microCurie per milliliter)**	**(microCurie per milliliter)**	**(microCurie per milliliter)**	**(Percent)**	**(Percent)**	**(Percent)**
1	18-May-15	19-May-15	Solvent Extraction (SX) Building - Upper Deck	2.61E+09	1.00E-16	2.20E-15	5.00E-16	1.00E-15	1.10E-02	8.33E-03	3.33E-04
2	23-Nov-15	24-Nov-15	Solvent Extraction (SX) Building - Upper Deck	2.79E+09	1.00E-16	1.70E-15	4.00E-16	8.00E-16	8.50E-03	6.67E-03	2.67E-04
Average:				2.70E+09		1.95E-15	4.50E-16	9.00E-16	9.75E-03	7.50E-03	3.00E-04
Derived Air Concentrations Used											
	microCurie per milliliter										
Natural Uranium	2.00E-11	Year									
Radium-226	3.00E-10	Week									
Thorium-230	6.00E-12	Year									

Kennecott Uranium Company							
Sweetwater Uranium Project							
Airborne Sampling Results:				**2015**			
(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 2015	Site Operations Technician/Mill Laborer	2.28E-13	2.17E-13	4.19E-13	1.14E+00	3.62E+00	1.40E-01
	Average:	2.28E-13	2.17E-13	4.19E-13	1.14E+00	3.62E+00	1.40E-01
Please see attached spreadsheets							
If results listed as less than (<1.8E-13) then value 1.8E-13 was used. Negative values were used if provided.							
High Volume Air Sampling							
Date	**Location**	**Concentration**			**Percent of DAC**		
		Natural Uranium	**Thorium-230**	**Radium-226**	**Natural Uranium**	**Thorium-230**	**Radium-226**
		(microCuries/ml)	**(microCuries/ml)**	**(microCuries/ml)**			
Average for 2015	Mill Building	2.58E-15	5.50E-16	9.00E-16	1.29E-02	9.17E-03	3.00E-04
Average for 2015	Tailings Impoundment	1.40E-15	5.50E-16	1.35E-15	7.00E-03	9.17E-03	4.50E-04
	Average:	1.99E-15	5.50E-16	1.13E-15	9.94E-03	1.67E-03	3.75E-04
Please see attached spreadsheets							
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	2.28E-13	2.17E-13	4.19E-13	1.14E+00	3.62E+00	1.40E-01
	Tailings	1.40E-15	5.50E-16	1.35E-15	7.00E-03	9.17E-03	4.50E-04
Exposure Calculations							

Hours Worked During 2015							
	Mill	33.9					
	Tailings Impoundment	44.4					
Exposure		**Natural Uranium (millirems)**	**Thorium-230 (millirems)**	**Radium-226 (millirems)**	**Total (millirems)**		
	Facility Technician - Mill	9.67E-01	3.07E+00	1.19E-01	4.16E+00		
	Facility Technician - Tailings	7.77E-03	1.02E-02	5.00E-04	1.85E-02		
	Total	9.75E-01	3.08E+00	1.19E-01	4.17E+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: **2015**
(Using Maximum Values)
Breathing Zone Samples

Maximum for 2015	**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 2015	Facility Technician	6.70E-13	4.10E-13	1.30E-12	3.35E+00	6.83E+00	4.33E-01

Please see attached spreadsheets

Lower Limit of Detection (LLD) value used in average if result was non-detect.

High Volume Air Sampling

Date	**Location**	**Concentration**			**Percent of DAC**		
		Natural Uranium	**Thorium-230**	**Radium-226**	**Natural Uranium**	**Thorium-230**	**Radium-226**
		(microCuries/ml)	**(microCuries/ml)**	**(microCuries/ml)**			
Maximum for 2015	Mill Building	3.20E-15	6.00E-16	1.10E-15	1.60E-02	1.00E-02	3.67E-04
Maximum for 2015	Tailings Impoundment	1.60E-15	6.00E-16	1.40E-15	8.00E-03	1.00E-02	4.67E-04
	Maximum	3.20E-15	6.00E-16	1.40E-15	1.20E-02	1.67E-03	4.17E-04

Please see attached spreadsheets

Lower Limit of Detection (LLD) value used in average if result was non-detect.

Hours Worked During 2015

Mill	33.9
Tailings Impoundment	44.4

Exposure Calculations

Exposure		**Natural Uranium**	**Thorium-230**	**Radium-226**	**Total**
		(millirems)	**(millirems)**	**(millirems)**	**(millirems)**
2015	Site Operations Technician - Mill	2.84E+00	5.80E+00	3.68E-01	9.01E+00
	Site Operations Technician - Tailings	8.88E-03	1.11E-02	5.18E-04	2.05E-02
	Total	2.85E+00	5.81E+00	3.68E-01	9.03E+00

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
Mill Building Work
Breathing Zone Samples

Date	Task	Individual	Volume (milliliters)	Sample Lower Limit of Detection (LLD) (microCurie per milliliter)	Natural Uranium (microCurie per milliliter)	Thorium-230 (microCurie per milliliter)	Radium-226 (microCurie per milliliter)	Natural Uranium % of DAC (Percent)	Thorium 230 % of DAC (Percent)	Radium 226 % of DAC (Percent)
13-Jan-15	Facility Technician	David Brawley	1.79E+06	1.00E-16	2.00E-13	1.90E-13	-2.70E-13	1.000	3.167	-9.00E-02
15-Feb-15	Facility Technician	David Brawley	1.42E+06	1.00E-16	1.70E-13	2.10E-13	1.40E-13	0.850	3.500	0.047
9-Mar-15	Facility Technician	David Brawley	1.12E+06	1.00E-16	1.80E-13	1.70E-13	1.10E-12	9.00E-01	2.833	0.367
20-Apr-15	Facility Technician	David Brawley	1.20E+06	1.00E-16	4.10E-13	2.60E-13	1.20E-12	2.050	4.333	0.400
6-May-14	Facility Technician	David Brawley	1.23E+06	1.00E-16	3.70E-13	1.10E-13	1.30E-12	1.850	1.833	0.433
22-Jun-15	Facility Technician	David Brawley	8.52E+05	1.00E-16	6.70E-13	4.10E-13	1.10E-13	3.350	6.833	0.037
30-Jul-15	Facility Technician	David Brawley	1.05E+06	1.00E-16	8.50E-14	2.10E-13	-7.10E-14	0.425	3.500	-2.37E-02
27-Aug-15	Facility Technician	David Brawley	1.04E+06	1.00E-16	6.10E-14	1.40E-13	-2.40E-13	0.305	2.333	-8.00E-02
30-Sep-15	Facility Technician	David Brawley	1.06E+06	1.00E-16	1.90E-13	3.50E-13	1.40E-13	9.50E-01	5.833	0.047
22-Oct-15	Site Operations Technician	Karl Kronfuss	1.79E+06	1.00E-16	1.10E-13	3.70E-13	5.10E-13	5.50E-01	6.167	0.170
30-Nov-15	Site Operations Technician	Karl Kronfuss	1.33E+06	1.00E-16	1.50E-13	1.30E-13	6.70E-13	4.70E-01	2.167	0.223
17-Dec-15	Site Operations Technician	Karl Kronfuss	1.45E+06	1.00E-16	1.40E-13	5.60E-14	4.40E-13	7.00E-01	0.933	0.147
Average:			1.28E+06	1.00E-16	2.28E-13	2.17E-13	4.19E-13	1.12E+00	3.62E+00	1.40E-01

Notes:

Listed as less than (<) the value for uranium provided, such as <1.80E-13. In this case 1.80E-13 was used.

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 of intakes is not required.

Radium-226 results listed as negative values. The negative values were used as provided.

Derived Air Concentrations Used

	microCurie per milliliter	
Natural Uranium	2.00E-11	Year
Radium-226	3.00E-10	Week
Thorium-230	6.00E-12	Year

Restricted Area Time
Site Operations Technician

Date	Time In	Time Out	Time Mill (Days)	Time Tails (Days)	Time Washbay (Days)
1/15/2015	9:20	10:10		0.035	
1/15/2015	11:30	12:15	0.031		
1/29/2015	13:15	14:06		0.035	
2/5/2015	10:05	10:35	0.021		
2/5/2015	12:30	13:10	0.028		
2/9/2015	9:57	11:04		0.047	
2/10/2015	8:40	9:58		0.054	
2/20/2015	15:28	15:40	0.008		
2/24/2015	9:00	12:05		0.128	
3/11/2015	8:15	9:30		0.052	
3/18/2015	9:00	9:20		0.014	
3/19/2015	8:20	9:15		0.038	
3/25/2015	10:15	11:10		0.038	
3/30/2015	16:40	16:49		0.006	
3/31/2015	9:05	9:54		0.034	
4/7/2015	13:15	14:07		0.036	
4/9/2015	8:32	11:37		0.128	
4/16/2015	10:40	11:15		0.024	
4/20/2015	10:10	10:45		0.024	
4/20/2015	14:05	16:10		0.087	
4/21/2015	9:30	11:30		0.083	
4/27/2015	9:55	11:12		0.053	
4/28/2015	9:40	10:15		0.024	
5/27/2015	13:30	14:15		0.031	
6/1/2015	9:30	10:41		0.049	
6/2/2015	8:20	9:15		0.038	
6/3/2015	8:20	8:55		0.024	
6/4/2015	8:50	10:05		0.052	
6/9/2015	13:40	14:55		0.052	
6/9/2015	15:15	15:45		0.021	
6/10/2015	9:10	11:00		0.076	
6/10/2015	13:00	13:45		0.031	
6/11/2015	9:45	10:41		0.039	
6/11/2015	12:45	13:20	0.024		
6/17/2015	8:25	9:45		0.056	
6/18/2015	8:35	9:21		0.032	
7/6/2015	14:40	15:45		0.045	
7/9/2015	11:50	12:05	0.010		
7/15/2015	8:10	8:50		0.028	
7/16/2015	9:45	10:05	0.014		
7/16/2015	13:40	14:10		0.021	
7/23/2015	8:45	9:18		0.023	
7/23/2015	10:15	11:20			0.045
7/28/2015	9:15	9:52		0.026	
7/28/2015	13:10	14:05	0.038		
7/29/2015	14:18	18:00		0.154	
7/30/2015	9:10	9:30		0.014	
7/30/2015	13:10	15:20			0.090
8/3/2015	13:00	13:55	0.038		
8/4/2015	9:15	13:45			0.188
8/5/2015	8:30	9:15			0.031
8/5/2015	10:15	13:11			0.122
8/5/2015	13:25	15:20			0.080
8/10/2015	11:05	11:42		0.026	
8/13/2015	8:45	11:10		0.101	
8/20/2015	13:05	14:30		0.059	
8/24/2015	9:05	11:42		0.109	
8/24/2015	12:50	13:24	0.024		

Date	Time In	Time Out	Time Mill (Days)	Time Tails (Days)	Time Washbay (Days)
9/10/2015	8:05	9:00	0.038		
9/22/2015	8:05	9:58	0.078		
9/24/2015	11:00	11:45		0.031	
9/24/2015	12:00	13:15		0.052	
10/12/2015	11:10	12:05	0.038		
10/13/2015	10:15	10:30		0.010	
10/13/2015	16:15	16:45		0.021	
10/14/2015	7:10	7:24	0.010		
10/15/2015	8:45	9:14		0.020	
10/15/2015	12:21	13:09		0.033	
10/22/2015	9:30	12:45	0.135		
10/22/2015	13:00	13:52		0.036	
10/27/2015	12:40	13:35		0.038	
11/2/2015	10:10	11:05		0.038	
11/9/2015	11:30	11:51		0.015	
11/10/2015	14:25	15:50		0.059	
11/30/2015	10:53	12:13	0.056		
11/30/2015	12:50	13:59	0.048		
12/1/2015	12:45	13:15	0.021		
12/16/2015	9:20	9:59		0.027	
12/17/2015	9:36	11:50	0.093		
12/21/2015	14:25	14:52	0.019		
Total:			0.773	2.431	0.556 Days
			18.550	58.350	13.350 Hours

Restricted Area Time
Facility Technician

Date	Time In	Time Out	Time Mill (Days)	Time Tails (Days)	Time Washbay (Days)
1/2/2015	13:45	14:45	0.042		
1/13/2015	8:50	11:45	0.122		
1/26/2015	12:55	13:00		0.003	
1/27/2015	13:55	14:00		0.003	
2/3/2015	12:45	14:30	0.073		
2/5/2015	10:00	12:28	0.103		
2/24/2015	9:00	12:08		0.131	
2/24/2015	12:45	15:15		0.104	
2/25/2015	8:30	9:42		0.050	
3/5/2015	13:40	14:20			0.028
3/9/2015	11:40	11:45	0.003		
3/9/2015	12:30	14:30	0.083		
3/17/2015	8:45	9:10	0.017		
3/17/2015	10:00	10:30	0.021		
3/19/2015	9:25	9:30			0.003
4/9/2015	8:30	11:16		0.115	
4/14/2015	13:30	14:00	0.021		
4/20/2015	12:45	14:26	0.070		
4/21/2015	10:30	11:00		0.021	
4/27/2015	12:45	13:20		0.024	
5/5/2015	13:00	13:20		0.014	
5/7/2015	11:00	11:40	0.028		
5/7/2015	12:45	14:25	0.069		
5/18/2015	9:15	16:30	0.302		
5/20/2015	10:30	12:00		0.063	
5/20/2015	14:25	15:14		0.034	
5/26/2015	8:55	9:05	0.007		
6/1/2015	9:30	10:40		0.049	
6/2/2015	11:30	11:45		0.010	
6/2/2015	12:40	15:00		0.097	
6/8/2015	15:45	16:45		0.042	
6/11/2015	10:44	11:15	0.022		
6/11/2015	12:45	13:28	0.030		
6/22/2015	10:30	12:00	0.063		
6/22/2015	12:45	13:30		0.031	
7/9/2015	9:10	9:25		0.010	
7/9/2015	11:50	12:05	0.010		
7/15/2015	9:05	9:39		0.024	
7/15/2015	10:30	13:00		0.104	
7/20/2015	9:30	12:30		0.125	
7/30/2015	10:15	12:10	0.080		
8/3/2015	12:50	13:30		0.028	
8/4/2015	9:30	13:40		0.174	
8/5/2015	9:00	13:11		0.174	
8/5/2015	13:35	15:20		0.073	
8/11/2015	9:30	10:30	0.042		
8/12/2015	10:45	10:50	0.003		
8/13/2015	9:06	11:10		0.086	
8/18/2015	9:06	9:34		0.019	

8/24/2015	7:55	8:00	0.003		
8/24/2015	9:05	11:42		0.109	
8/24/2015	12:50	13:29		0.027	
8/24/2015	15:23	15:30	0.005		
8/27/2015	11:00	12:55	0.080		
8/31/2015	11:40	11:50		0.007	
9/2/2015	11:10	11:42		0.022	
9/3/2015	8:30	8:35	0.003		
9/15/2015	12:04	12:15	0.008		
9/16/2015	9:12	9:28	0.011		
9/16/2015	9:44	9:55	0.008		
9/16/2015	16:10	16:23	0.009		
9/17/2015	8:45	9:00		0.010	
9/22/2015	8:30	10:00		0.063	
9/23/2015	15:25	15:30	0.003		
9/30/2015	14:30	16:15	0.073		
10/5/2015	8:35	8:40		0.003	
		Total:	1.414	1.851	0.031 Days
			33.933	44.417	0.750 Hours

Rio Tinto

Internal memo

25 January 2016

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 2015 shows that all results are below the first action level of 15 µg/L. In fact, all urinalysis results for the year 2015 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 was offsite on short term disability during January and February 2015. He provided a final bioassay in February 2015 and retired.

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.

A contract security employee was hired by the company in April 2015. He was already part of the bioassay program as a contractor, so no pre-job bioassay sample was collected on him when he was hired in April 2015.

Please see attached summary of 2015 urinalysis data.

Oscar A Paulson

Oscar A. Paulson
Facility Supervisor

KENNECOTT URANIUM COMPANY

SWEETWATER URANIUM PROJECT

BIOASSAY TESTING

2015

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**
Administrative Coordinator	AC	Kennecott Uranium Company	<5.0 [1]	<5.0 [1]	<5.0 [1]	<5.0 [1]	<5.0 [1]	<5.0 [1]	<5.0 [1]	<5.0 [1]	<5.0 [1]	<5.0 [1]	<5.0 [1]	<5.0 [1]	**5.0**
Facility Technician	FT	Kennecott Uranium Company					<5.0	<5.0	<5.0	<5.0	<5.0	<5.0			**5.0**
CONTRACT EMPLOYEE TITLE		**EMPLOYER**													
Security	SEC # 1	Securitas Security	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**5.0**
Security	SEC # 2	Securitas Security	<5.0	<5.0	<5.0	<5.0									
Surveyor	SURV	W L C							<5.0						**5.0**
Electrician	ELEC	IME				<5.0	<5.0								**5.0**
Tailings Inspector	TAIL	Telesto Solutions, Inc.					<5.0								**5.0**
Tailings Repair Worker	ACI#1	Archer Construction, Inc.					<5.0	<5.0							**5.0**
Tailings Repair Worker	ACI#2	Archer Construction, Inc.				<5.0	<5.0	<5.0			<5.0				**5.0**
Tailings Repair Worker	ACI#3	Archer Construction, Inc.				<5.0									**5.0**
Tailings Repair Worker	ACI#4	Archer Construction, Inc.									<5.0				**5.0**
Tailings Repair Worker	ACI#5	Archer Construction, Inc.					<5.0								**5.0**
Mechanic	MECH	Wyoming Machinery										<5.0			**5.0**
Crane Inspector	CRN	Kone Crane									<5.0				**5.0**
Fire Extinguisher Inspector	GRN	Simplex Grinnell			<5.0										**5.0**
Contract photographer	CP												<5.0		**5.0**

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

Notes:

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

Contract security guards were tested when on site whether or not they entered the restricted area.

Was not on site for this month.

[1] Did not work in restricted area in 2013 / worked solely in office.

Administrative coordinator was tested in spite of the fact that she worked solely in the office.

Pre-job bioassay.

Final bioassay

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

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

Pre-job and working bioassay collected during month.

Post job and working bioassays collected during month.

Post job bioassays.

Rio Tinto

Internal memo

9 February 2016

To: NRC File

Subject: Summary of Radiation Instrument Calibrations – 2015

Instrument		Date(s) Calibrated
Calibration Orifices (Annual calibration required)		
	Lo Vol-40A S/N M100	2/3/15
	Hi Vol-25A S/N 8080978	2/3/15
	Sierra Instruments TE-5025A	2/3/15
Calibrators (Annual calibration required)		
	CD-530-1 Digital Venturi Calibrator S/N 3039 [3]	4/14/15, 4/21/15, 5/26/15
Alpha Detectors		
	43-5 S/N P-2425	6/3/15, 12/16/15
	43-5 S/N P-2426	12/18/14, 6/26/15, sent for calibration 12/27/15
	43-5 S/N P-2427	12/18/14, 6/26/15, sent for calibration 12/27/15
	43-5 S/N P-2428	12/18/14, 6/26/15, sent for calibration 12/27/15
	43-5 S/N P-2429	6/3/15, 12/16/15
	43-90 S/N PR-138872	6/3/15, 12/16/15
	43-90 S/N PR-138874	6/17/15, 12/22/15
	43-90 S/N 232499	6/3/15, 12/16/15
	43-1 S/N PR-206925	2/26/15, 9/3/15
	AC3-5 S/N 3793	2/26/15, 9/3/15
Gamma Meters/Detectors		
	12S S/N 11816	2/26/15, 9/3/15
	5 S/N 8170	2/26/15, 9/3/15
	44-10 S/N 206932	6/22/15, 12/31/15
	19 S/N 16938	2/26/15, 9/3/15
	44-10 S/N 252103	2/26/15, 9/3/15
	44-10 S/N 252068	6/3/15, 12/16/15
	44-10 S/N 339878	2/11/15, 8/19/15
Rate Meters		
	177 S/N 14390	12/18/14, 6/26/15, sent for calibration 12/27/15
	177 S/N 14407	6/17/15, 12/22/15
	2350-1 S/N 192613	12/18/14, 6/26/15, sent for calibration 12/27/15
	2350-1 S/N 216182	6/22/15, 12/31/15
	2350-1 S/N 235547	6/3/15, 12/16/15
	2350-1 S/N 235565	2/26/15, 9/3/15
	Model 3 S/N 157539	6/3/15, 12/17/15
	Model 12 S/N 12280	2/26/15, 9/3/15
	PRS-1 S/N 330/3793	2/26/15, 9/3/15

SAC R5		
	S/N 614	5/16/15, 11/12/15
	S/N 965	6/4/15, 12/17/15
	S/N 602548	5/6/15, 11/12/15
Scaler		
	MS-2 S/N 738	6/4/15, 12/17/15
	MS-2 S/N 994	5/16/15, 11/12/15
Beta Gamma Detector		
	Model 44-1 S/N PR-156890	2/26/15, 9/3/15
	Model 44-9 S/N PR-093335	6/3/15, 12/17/15
	Model 44-142 S/N PR-302659	6/3/15, 12/16/15
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	6/4/15, 12/17/15
Hi Vol Air Sampler		
	S/N Unit # 1	1/15/15, 4/7/15, 7/14/15, 10/6/15
	S/N Unit # 2 [1]	1/15/15, 4/7/15, 8/18/15 [1], 10/6/15
	S/N Unit # 3	1/15/15, 4/7/15, 7/14/15, 10/6/15
	S/N Unit # 4	1/15/15, 4/7/15, 7/14/15, 10/6/15
	S/N 11314	1/15/15, 4/29/15, 5/5/15, 7/14/15, 10/6/15
Lo Vol Air Sampler (F & J Specialties)		
	DF-604 S/N 10016	Annual Factory calibration: January 15, 2015 Field calibration/checks: 7/6/15, 8/3/15, 9/10/15, 10/5/15, 11/9/15, 12/8/15
	DF-604 S/N 8917 [2]	Annual Factory calibration: July 16, 2015 Field Calibration/checks: 1/12/15, 2/2/15, 3/2/15, 4/6/15, 5/29/15 [2], 6/9/15

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 12, 2015 and July 6 to December 31, 2015. The DF-604 unit with serial number 8917 operated from January 12 to July 6, 2015.

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] Unit failed (housing plastic cracked) on May 18, 2015. Had to purchase new aluminum housing and rebuild unit. Time was required to obtain parts and rebuild unit. Unit was out of service until repaired and calibrated on August 18, 2015.

[2] Calibrated late in May 2015 since CD-530-1 calibrator had to be sent to manufacturer for repair.

[3] CD-530-1 Digital Venturi Calibrator had problems in 2015 and had to be sent for two (2) additional repairs/recalibrations.

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
1/13/15	16:06
2/23/15	[1]
4/11/15	17:24
6/22/15	14:51
7/14/15	11:09
10/15/15	10:19

Buck Basic 12 – S/N B12494

Date	Time
1/13/15	8:42
1/13/15	14:45
2/23/15	[1]
4/11/15	17:27
4/22/15	17:43
5/2/15	17:05
7/14/15	10:58
10/5/15	10:26
12/7/15	17:37
12/22/15	8:25

Buck Basic 12 – S/N B12527

Date	Time
1/13/15	13:01
2/10/15	13:54
3/17/15	15:58
4/21/15	[1]
4/29/15	12:31
7/14/15	10:50
7/17/15	16:27
8/10/15	11:39
9/2/15	15:09
10/15/15	10:06
11/3/15	17:33
12/1/15	16:29

[1] Factory Repair – no time provided

Oscar Paulson
Facility Supervisor

Rio Tinto

Internal memo

2 February 2016

TO: Gamma Radiation Monitoring File

Subject: External Gamma Radiation Survey Assessment

In 2015, gamma surveys of the Mill were conducted on June 23, June 24 and December 19, 2015. Gamma surveys of the interior of the tailings impoundment were conducted on June 2 and December 19, 2015. Gamma surveys of the Ion Exchange area were conducted on June 23 and December 17, 2015.

Eighteen (18) areas or items associated with the Ion Exchange equipment were surveyed on June 23 and December 17, 2015. Thirty (30) locations in the Mill and Solvent Extraction (SX) Buildings were surveyed for gamma radiation on June 23, June 24, and December 19, 2015.

Average Gamma readings for discrete items or areas ranged from 31.4 to 562.6 µR/hour (182.3 µR/hr average for the year) for the Ion Exchange areas and related equipment, to 11.4 to 1005.5 µR/hour (77.9 µR/hr average for the year) in the Mill and Solvent Extraction (SX) Buildings.

The stored equipment was monitored as well on June 24, June 30 and December 30, 2015. Gamma readings for discrete items of stored equipment ranged from 11.4 to 4654 average. 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. While one stored pressure vessel exhibited a surface gamma reading of 6638.2 µR/hr, the highest gamma radiation reading encountered at thirty (30) centimeters from any piece of equipment was 3.47 mR/hr (0.003 R/hr). Employees and contract personnel have been instructed to avoid certain pieces of stored equipment (pressure vessels) in the mill that exhibit the highest levels of gamma radiation. The area in which the pressure vessels are stored in the mill has been identified. These vessels are checked periodically to insure that gamma levels thirty (30) centimeters from the surface do not exceed 5.00 mR/Hr (0.005 R/hr) and that they do not require signing as a Radiation Area.

Two gamma surveys were completed in the tailings impoundment on June 2 and December 29, 2015. This area averaged 96.4 µR/hr for 2015. Due to the large number of readings taken in the impoundment on June 2 and December 29, 2015, the tables with all of the readings are not included. Over 280 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 A Paulson

Oscar Paulson

Kennecott Uranium Company
Sweetwater Uranium Project
Stored Resin

Stored Resin Gamma Radiation Monitoring Results

Date	Gamma	
	Top (uR/hr)	Bottom (uR/hr)
28-Apr-98	25.0	60.0
8-Oct-98	22.0	160.0
12-May-99	19.0	60.0
17-Nov-99	45.0	90.0
21-May-00	30.0	70.0
21-Dec-00	40.0	70.0
20-Jun-01	40.0	65.0
26-Dec-01	90.0	80.0
24-Jun-02	60.0	80.0
23-Dec-02	14.0	60.0
25-Jun-03	20.0	60.0
16-Dec-03	41.8	71.7
28-Jun-04	57.8	152.0
16-Dec-04	28.7	110.0
8-Jun-05	18.0	120.0
22-Dec-05	53.4	262.0
14-Jun-06	32.7	125.0
21-Dec-06	50.1	117.0
26-Jun-07	25.1	111.0
13-Dec-07	24.9	133.0
24-Jun-08	27.3	24.3
23-Dec-08	52.6	71.2
23-Jun-09	37.6	78.3
24-Nov-09	43.8	71.9
14-Jun-10	34.0	74.0
2-Dec-10	19.0	179.0
14-Jun-11	22.0	82.0
7-Dec-11	21.0	133.0
24-Jun-12	23.0	155.0
19-Dec-12	18.0	83.0
25-Jun-13	12.6	63.1
18-Dec-13	13.6	131.3
26-Jun-14	12.6	161.0
18-Dec-14	20.0	61.2
23-Jun-15	21.0	72.4
19-Dec-15	16.6	112.8
Average	31.5	100.3
Standard Deviation:	16.9	46.1

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
23-Jun-15	21.0	72.4
19-Dec-15	16.6	112.8
Average	31.5	100.3
Standard Deviation	16.9	46.1

KENNECOTT URANIUM COMPANY

OCCUPATIONAL RADIATION DOSIMETRY RESULTS / DEEP DOSE

Sweetwater Uranium Project

2015

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								0
ADMINISTRATIVE COORDINATOR	AC-2	103	KENNECOTT URANIUM CO.	M	M	M	M	M	M	M	M	M	M	M	M	0
FACILITY TECHNICIAN	FT-2	104	KENNECOTT URANIUM CO.				M	M	M	M	M	M	M	M		0
																0
CONTRACT EMPLOYEE																
TITLE			**EMPLOYER**													
SECURITY	SEC # 1	49	SECURITAS	1	M	M	M	M	M	M	M	M	M	M	M	1
SITE/MILL LABORER	SEC#5	104	SECURITAS	M	M	M										0
SURVEYOR	SURV		WLC INC.							M/D-1						0
TAILINGS REPAIR WORKER	ACI#1	95	ARCHER CONSTRUCTION, INC.	M	M	M	M	M	M	M	M	M	M	M		0
TAILINGS REPAIR WORKER	ACI#11		ARCHER CONSTRUCTION, INC.		M/D-1		M/D-2		M	M						0
TAILINGS REPAIR WORKER	ACI#12		ARCHER CONSTRUCTION, INC.		M/D-2							M/D-3	M	M	M	0
TAILINGS REPAIR WORKER	ACI#14		ARCHER CONSTRUCTION, INC.				M/D-3	M/D-2	M/D-2			M/D-2				
TAILINGS REPAIR WORKER	ACI#15		ARCHER CONSTRUCTION, INC.					M/D-1								
VISITOR BADGE	D-1	35		M	M	M	M	M	M	M	M	M	M	M	M	0
VISITOR # 1BADGE	D-2	36		M	M	M	M	M	M	M	M	M	M	M	M	0
VISITOR # 3 BADGE	D-3	33		M	M	M	M	M	M	M	M	M	M	M	M	0
RIO TINTO VISITOR - 1	RTV -1		RIO TINTO										M/D-1			
RIO TINTO VISITOR - 2	RTV -2		RIO TINTO									M/D-1				
RIO TINTO VISITOR - 2	RTV -3														M/D-3	
CRANE REPAIR WORKER	CRN		KONE CRANES									M/D-1				
FIRE EXTINGUISHER INSPECTOR	GRN		SIMPLEX GRINNELL			M/D-1										
											M/D-1					
ELECTRICIAN	ELEC		IME				M/D-1					M/D-1				
TAILINGS INSPECTOR	TAIL		TELESTO SOLUTIONS, INC.					M/D-2								
MECHANIC	MECH		WYOMING MACHINERY										M/D-1			
CONTRACT PHOTOGRAPHER	PHOTO													M/D-1		

Employees listed by title (number) to preserve confidentiality

Not on site during month

Dosimeter lost/Dose estimated by Landauer, Inc.

Did not work on site.

Did not work in restricted area.

M = Minimal reporting service of 1 MREM

D-1 - Issued Visitor Dosimeter Badge

D-2 - Issued Visitor-1 Dosimeter Badge

D-3 - Issued Visitor-3 Dosimeter Badge

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

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

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

United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

Certificate of Accreditation to ISO/IEC 17025:2005

NVLAP LAB CODE: 100518-0

Landauer, Inc.

Glenwood, IL

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

IONIZING RADIATION DOSIMETRY

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

2015-01-01 through 2015-12-31

Effective dates

DEPARTMENT OF COMMERCE ★ UNITED STATES OF AMERICA ★

For the National Institute of Standards and Technology

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

Rio Tinto

Internal memo

7 February 2016

To: Total and Removable Alpha Monitoring File

Subject: Total and Removable Alpha Monitoring Assessment

In 2015 removable alpha monitoring was performed in the Mill and Solvent Extraction (SX) Buildings on June 22 and December 16, 2015 and in the Ion Exchange area on June 22 and December 16, 2015. Total alpha monitoring was performed on June 28, June 29, December 22, and December 27, 2015 in the Mill and SX buildings and on June 25 and December 22, 2015 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 4.6 and 78,693 dpm/100 cm^2. The single high reading was taken at the southeast corner of the centrifuge support frame in the Yellowcake Area of the Mill Building. This area is part of the restricted area. Removable alpha contamination in the Mill Building ranged from 1.2 to 163.3 dpm/100 cm^2. The single highest removable alpha contamination measurement was of the Yellowcake operator's office desk, which is in the restricted area.

Total alpha contamination levels in the Ion Exchange area ranged from 12.1 to 2094.7 dpm/100 cm^2. This single high reading was on the elution pump skid. The Ion Exchange area is a restricted area. Removable alpha contamination levels in the Ion Exchange area ranged from 0.5 to 12.9 dpm/100 cm^2. Both the high total and removable alpha readings are below the limits (5000/1000 dpm/100 cm^2) for release for unrestricted use.

Total alpha monitoring of the stored equipment was performed on June 30, December 28 and 29, 2015. Removable alpha monitoring of the stored equipment was performed on June 23 and December 16, 2015. Total alpha readings on the equipment ranged from 2.4 to 35,839 dpm/100 cm^2. Removable alpha readings for the stored equipment ranged from ND to 121.3 dpm/100 cm^2. 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.

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

> ***2.5 Surveys for Surface Contamination in Restricted Area***
>
> *NRC regulations provide no specific limit on surface contamination levels in restricted areas. However, yellowcake or ore dust lying on surfaces can become resuspended and contribute to the intake of radionuclides, which is limited by 10 CFR 20.1204.*
>
> *In ore handling areas, surface contamination is not a problem because of the very low specific activity of the ore. In fact, cleanup attempts by methods such as sweeping are likely to produce a more serious hazard through resuspension in the air than if the ore dust were allowed to remain where it lies. When necessary, cleanup may be performed by hosing down the ore dust into floor sumps or by using vacuum suction systems with filtered exhausts.*
>
> *In leaching and chemical separation areas there is usually little dust and little difficulty with surface contamination.*

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

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

The elevated total and removable alpha readings fall below the 220,000 dpm/100 cm^2 threshold.

Oscar A Paulson

Oscar A. Paulson

Rio Tinto

Internal memo

7 February 2016

To: Radon Monitoring File

Subject: Radon Daughter Monitoring Assessment

In 2015 radon daughter monitoring was conducted on June 10 and December 3, 2015 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, 2015.

At least twelve (12) locations throughout the Mill and three (3) locations around the IX were sampled for radon daughters. In addition, locations in the Security Trailer and Administration Building were sampled for radon daughters as well. Radon daughter concentrations (in working levels) were at low levels, ranging from 0.001 to 0.006 WL in the Ion Exchange area (average: 0.003) and Non-detect to 0.059 WL in the Mill and Solvent Extraction (SX) Buildings (average: 0.016). The ventilation fan operated continuously in the Solvent Extraction (SX) Building. Radon levels varied in the SX building from 0.034 to 0.059 WL, averaging 0.037 WL in June 2015 and 0.056 WL in December 2015. 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 2015 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.

In the third and fourth quarters of 2015 enhanced measurements of Radon-222 decay product activities were made in the Security Trailer. Normally Radon-222 decay product activities are measured via the modified Kusnetz Method using a personal breathing zone sampler generally operating at a flow rate of no greater than 10 liters per minute.

Enhanced modifed Kusnetz Method measurements were made in the Security Trailer in the third and fourth quarters of 2015 at flow rates approximating 400 liters per minute via the following method:

The technical specifications of the method are as follows:

- The method used is the modified Kusnetz Method as described by EPA (EPA, 2011) and elsewhere (e.g. CNSC, 2003), except that a larger sample is collected to increase method sensitivity (decease the LLD).
- The air is sampled for approximately 5 minutes with an F & J Model DFHV-1DS high volume sampling pump at a typical flow rate on the order of 465 liters/minute.
- The sampling filter is an F&J Specialty Products glass-fiber filter with diameter of 10 cm (4 inches).
- The typical elapsed time between the end of the collection interval and the beginning of the counting interval is approximately 60 minutes, with a typical applied hold time correction factor of about 110 in accordance with the standard Kusnetz Method table of correction factors.
- The filters are counted on an Eberline SACR-5 alpha scintillation detector calibrated within the previous six months.

The results are as follows:

Measured Working Levels and Lower Limits of Detection for Radon Progeny within the Security Trailer in the Second Half of 2015

Date	Location	Sample Volume (L)	Working Level	LLD[1]	LLD[2]
7/30/2015	Bedroom	2141	0.0018	0.00002	0.0003
7/30/2015	Kitchen	2210	0.0017	0.00003	0.0003
8/10/2015	Bedroom	1968	0.0019	0.00002	0.0004
8/10/2015	Kitchen	1964	0.0013	0.00002	0.0003
8/11/2015	Bedroom	2229	0.0008	0.00002	0.0002
8/11/2015	Kitchen	2095	0.0009	0.00002	0.0002
8/13/2015	Bedroom	2088	0.0013	0.00003	0.0006
8/13/2015	Kitchen	2139	0.0013	0.00003	0.0006
8/19/2015	Bedroom	2054	0.0017	0.00002	0.0003
8/19/2015	Kitchen	2008	0.0021	0.00002	0.0003
8/26/2015	Bedroom	2243	0.0019	0.00002	0.0002
8/26/2015	Kitchen	2109	0.0024	0.00002	0.0002
9/3/2015	Bedroom	2147	0.0004	0.00002	0.0003
9/3/2015	Kitchen	2100	0.0005	0.00002	0.0003
9/10/2015	Bedroom	2175	0.0008	0.00002	0.0002
9/10/2015	Kitchen	2268	0.0010	0.00002	0.0002
12/30/15	Bedroom	2071	0.0008	N/C	N/C
	Kitchen	1901	0.0012	N/C	N/C
Average:			0.0013		

[1]LLD based on applicable equations provided in Cember and Johnson (2009) and Knoll (2000).

[2]LLD based on incorrect equation provided in Appendix B of Regulatory Guide 8.30 (NRC, 2002).
N/C – Not calculated

These values are extremely low and are at background.

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 2015 to monitor radon levels associated with the used ion exchange resin stored in the Number 1 CCD tank. Radon concentrations below the tank varied from 2.3 to 3.8 pCi/L. Radon concentrations on top of the tank varied from 1.9 to 3.2 pCi/L. These values are at background levels since upwind radon concentrations for the facility varied from 2.6 to 3.5 pCi/L during 2015, as shown in the table below:

2015 Radon Concentrations

Quarter	Bottom of CCD#1 (pCi/L)	Top of CCD#1 (pCi/L)	Upwind (Background) (pCi/L)
1st	3.6	2.8	2.9[1]
2nd	2.3	1.9	2.6[2]
3rd	3.1	2.9	3.5[2]
4th	3.8	3.2	3.5[2]
Average	3.2	2.7	3.13

[1] Only the results of one (1) RadTrak used. The second unit was found on the ground on April 1, 2015. 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 0.005 to 0.015 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
16-Jun-15	0.005	0.007
6-Dec-15	0.013	0.015
Average	0.016	0.016
Standard Deviation:	0.011	0.012

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
1ST Quarter 2015	2.8	3.6
2ND Quarter 2015	1.9	2.3
3RD Quarter 2015	2.9	3.1
4TH Quarter 2015	3.2	3.8
Average	2.5	2.9
Standard Deviation:	0.7	0.8

3.7 Corrected value

POTABLE WATER QUALITY SUMMARY

2015

Coliform Count Summary

Date	Drake #1 (well head)	Administration Building Water Supply (PWW-1 or PWW-2) (kitchen sink cold tap)
1/6/15	Good	Good
2/2/15	Good	Good
3/9/15	Good	Good
4/6/15	Good	Good
5/4/15	Good	Good
6/1/15	Good	Good
7/6/15	Good	Good
8/3/15	Good	Good
9/1/15	Good	Good
10/5/15	Good	Good
11/5/15	Good	Good
12/1/15	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						
2015						
DRAKE #1						
CHEMICAL ANALYSIS SUMMARY:						
Use Suitability	Domestic *	**DRAKE #1**	**DRAKE #1**	**DRAKE #1**	**DRAKE #1**	**DRAKE #1**
Parameter	Concentration **	01/19/15	02/18/15	04/15/15	7/27/2015	11/4/2015
Ammonia (NH3-N)	0.5	-	-	-	-	-
Arsenic (As)	0.05	0.002	0.002	0.002	0.002	0.002
Barium (Ba)	2	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)
Boron (B)	0.75	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)
Cadmium (Cd)	0.005	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)
Chloride (Cl)	250	3	3	3	3	3
Chromium (Cr)	0.1	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)
Copper (Cu)	1	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)
Cyanide (CN)	0.2	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)
Fluoride (F)	4	0.2	0.2	0.2	0.1	0.1
Hydrogen Sulfide (H2S)	0.05	-	-	-	-	-
Iron (Fe)	0.3	ND (.05)	ND (.05)	ND (.05)	ND (.05)	ND (.05)
Lead (Pb)	0.015	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)
Manganese (Mn)	0.05	0.01	0.01	0.02	0.01	0.01
Mercury (Hg)	0.002	ND (0.0002)	ND (0.0002)	ND (0.0002)	ND (0.0002)	ND (0.0002)
Nitrogen, Nitrate+Nitrite as N		ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)
Nitrite (NO2-N)	1	-	-	-	-	-
Oil and Grease	Virtually Free	ND (5.1)	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)	ND (0.001)
Silver (Ag)	0.1	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)
Sulfate (SO4)	250	52	50	59	53	49
Total Dissolved Solids (TDS)	500	177	174	195	177	178
Zinc (Zn)	5	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)
pH (Standard Units)	6.5 - 8.5	8.32	8.19	8	8.17	8.3
Combined Ra226/Ra228 (pCi/L)	5.0 pCi/l	5	2	4.5	3.9	2.9
Natural Uranium (pCi/L)	pCi/L	ND (0.2)	ND (0.2)	0.3	ND (0.2)	ND (0.2)
Uranium - Suspended	mg/L	ND (0.0003)	ND (0.0003)	ND (0.0003)	ND (0.0003)	ND (0.0003)
Uranium - Total	mg/L	ND (0.0003)	0.0004	ND (0.0003)	ND (0.0003)	ND (0.0003)
Lead 210 (pCi/L)	pCi/L	0.4	0.5	0.7	0.5	-0.2
Total Strontium 90 (pCi/L)	8.0 pCi/l	-	-	-	-	-
Gross Alpha Radioactivity *** (pCi/L)	15.0 pCi/l	1.0 ± 0.8	0.9 ± 0.8	8.6 ± 2.4	4.2 ± 1.9	2.5 ± 1
* This list does not include all constituents in the national drinking water standards.						
** mg/L, unless otherwise indicated						
*** Including Radium 226 but excluding Radon and Uranium						
Note: Since Combined Radium 226/228 was 5 pCi/L on January 19, 2015, the well was resampled on February 18, 2015						
with the result being 2 pCi/L						

KENNECOTT URANIUM COMPANY						
POTABLE WATER QUALITY SUMMARY						
2015						
PWW-1						
CHEMICAL ANALYSIS SUMMARY:						
Use Suitability	Domestic *	**PWW-1**	**PWW-1**	**PWW-1**	**PWW-1**	
Parameter	Concentration **	01/19/15	04/15/15	7/7/2014	11/30/2015	
Ammonia (NH3-N)	0.5	-	-	-	-	
Arsenic (As)	0.05	0.002	0.002	0.002	0.001	
Barium (Ba)	2	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	
Boron (B)	0.75	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	
Cadmium (Cd)	0.005	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	
Chloride (Cl)	250	3	3	3	3	
Chromium (Cr)	0.1	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	
Copper (Cu)	1	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	
Cyanide (CN)	0.2	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	
Fluoride (F)	4	0.1	0.1	0.2	0.1	
Hydrogen Sulfide (H2S)	0.05	-	-	-	-	
Iron (Fe)	0.3	0.08	ND (0.05)	ND (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	49	48	48	
Total Dissolved Solids (TDS)	500	172	180	172	175	
Zinc (Zn)	5	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	
pH (Standard Units)	6.5 - 8.5	8.59	8.23	8.34	8.43	
Combined Ra226/Ra228 (pCi/L)	5.0 pCi/l	1.48	0.94	2.36	2	
Natural Uranium (pCi/L)	pCi/L	0.4	2.3	0.8	0.4	
Uranium - Suspended	mg/L	ND (0.0003)	0.0009	ND (0.003)	ND (0.003)	
Uranium - Total	mg/L	0.0006	0.0044	0.0012	0.0006	
Lead 210 (pCi/L)	pCi/L	0.08	-0.2	-0.06	0.2	
Total Strontium 90 (pCi/L)	8.0 pCi/l	-	-	-	-	
Gross Alpha Radioactivity *** (pCi/L)	15.0 pCi/l	1 ± 0.8	6.3 ± 2	3.4 ± 1.7	1.5 ± 1.2	
* This list does not include all constituents in the national drinking water standards.						
** mg/L, unless otherwise indicated						
*** Including Radium 226 but excluding Radon and Uranium						

KENNECOTT URANIUM COMPANY						
POTABLE WATER QUALITY SUMMARY						
2015						
PWW-2						
CHEMICAL ANALYSIS SUMMARY:						
Use Suitability	Domestic *	**PWW-2**	**PWW-2**	**PWW-2**	**PWW-2**	
Parameter	Concentration **	01/19/15	04/15/15	7/27/2015	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	0.1	0.1	0.1	
Hydrogen Sulfide (H2S)	0.05	-	-	-	-	
Iron (Fe)	0.3	0.11	0.09	0.11	0.12	
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	0.02	
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	39	43	41	
Total Dissolved Solids (TDS)	500	158	165	166	167	
Zinc (Zn)	5	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	
pH (Standard Units)	6.5 - 8.5	8.52	8.37	8.42	8.48	
Combined Ra226/Ra228 (pCi/L)	5.0 pCi/l	3.77	1.25	0.9	1.42	
Natural Uranium (pCi/L)	pCi/L	1.5	1.3	1.5	1.4	
Uranium - Suspended	mg/L	ND (0.0003)	0.0005	ND (0.0003)	ND (0.0003)	
Uranium - Total	mg/L	0.0025	0.0024	0.0023	0.0022	
Lead 210 (pCi/L)	pCi/L	0.6	0.6	-0.2	1	
Total Strontium 90 (pCi/L)	8.0 pCi/l	-	-	-	-	
Gross Alpha Radioactivity *** (pCi/L)	15.0 pCi/l	1.4 ± 0.8	3.6 ± 1.4	2.4 ± 1.5	1.7 ± 0.8	
* This list does not include all constituents in the national drinking water standards.						
** mg/L, unless otherwise indicated						
*** Including Radium 226 but excluding Radon and Uranium						

Rio Tinto

Internal memo

9 February 2016

To: SERP File

Subject: Safety and Environmental Review Panel (SERP) – 2015

During the calendar year 2015 the licensee has not:

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

The Safety and Environmental Review Panel (SERP) issued two (2) Safety and Environmental Evaluations (SEEs) in 2015 to codify changes in management structure and membership in the Safety and Environmental Review Panel (SERP) and codify the duties of the newly hired (April 27, 2015) Facility Technician.

SEE #26 changed the composition of the Safety and Environmental Review panel (SERP) and the reporting for the Sweetwater Uranium Project. The updated organization chart is attached.

SEE #27 codified the duties and training required for the site Facility Technician.

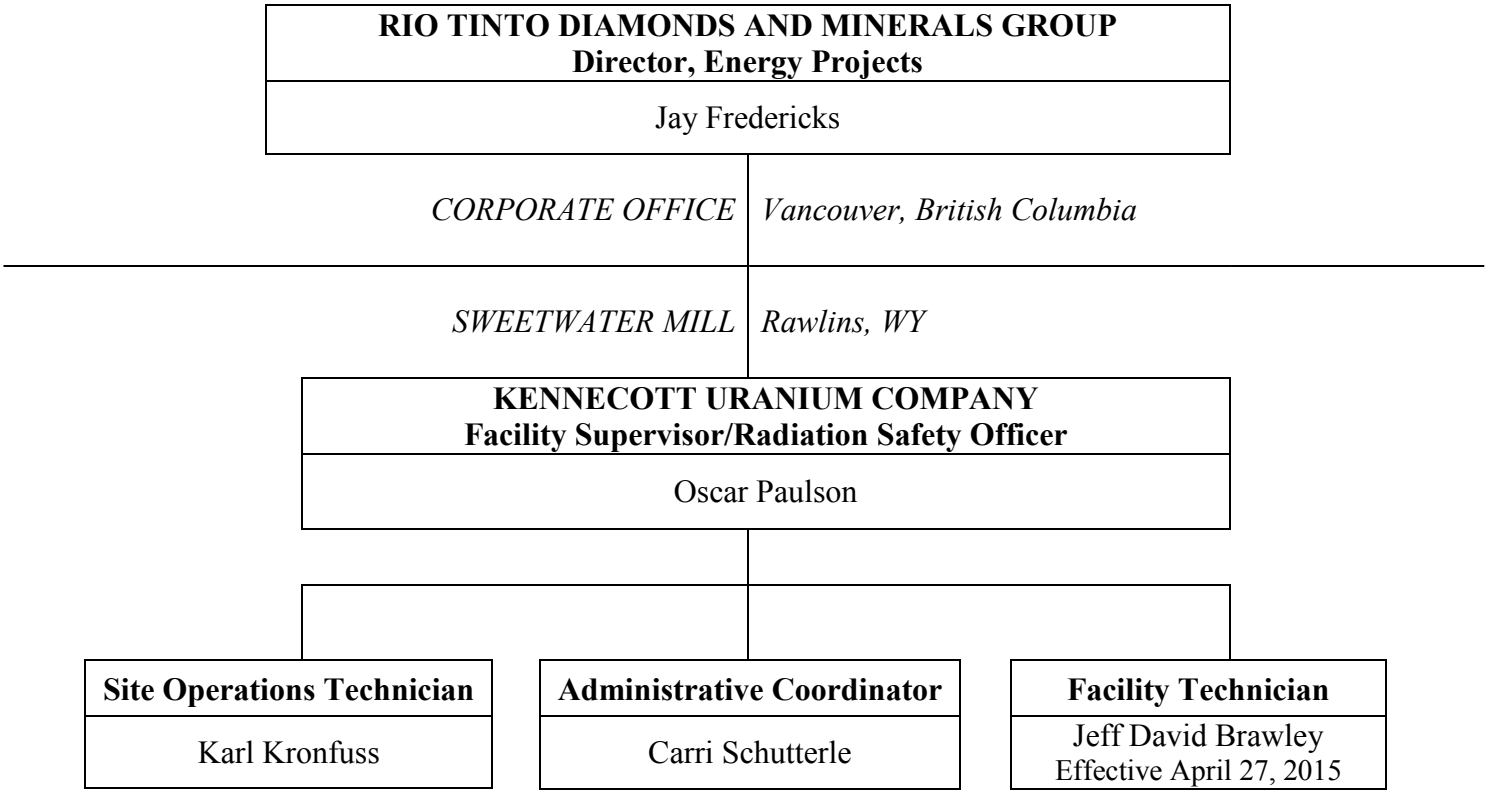
Oscar A Paulson

Oscar Paulson

SERP Review-2015.doc

KENNECOTT URANIUM COMPANY
SWEETWATER URANIUM PROJECT

ORGANIZATION



Rio Tinto

Internal memo

10 February 2016

To: Respiratory Protection File

Subject: Respiratory Protection – 2015

The Site Operations Technician, Facility Technician and Facility Supervisor were the three (3) employees on site that were part of the facility's respirator program in 2015.

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

TITLE	RESPIRATOR PHYSICAL	FIT TEST/TRAINING
Facility Technician	January 2015	January 2015
Facility Supervisor	October 2015	January 2015 and November 2015
Site Operations Technician	May 2015	January 2015 and November 2015

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 A Paulson

Oscar Paulson

Rio Tinto

Internal memo

9 February 2016

To: File

Subject: Releases for Unrestricted Use – 2015

Releases for unrestricted use issued in 2015 were primarily related to the release of equipment, including:

- Toro Dingo (small walk-behind loader)
- Ebara submersible pump

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

Item	Release Date	Maximum fixed alpha dpm/100 cm^2	Maximum removable alpha dpm/100 cm^2
Ebara pump	April 27, 2015	277.2	3.1
Toro Dingo	July 15, 2015	333.4	1.3

ND = Non-Detect

In the course of these releases, no item exceeded 3.1 dpm/100 cm^2 removable alpha (1,000dpm/100cm^2 limit) or 333.4 dpm/100 cm^2 total alpha (5,000dpm/100 cm^2 average limit).

Oscar A Paulson

Oscar Paulson

ReleaseUnrestrictUse-2015

Rio Tinto

Internal memo

From	Oscar Paulson
To	Standard Operating Procedures File
Reference	**Annual Review of Standard Operating Procedures (SOPs)**
Date	30 December 2015
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 2015. 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 10, 2015 to reflect the availability of Archer Construction, Inc. during the winter of 2015-2016 for snow removal.
- SOP-1 the Standard Operating Procedure for the Four (4) Day Work Week was revised on November 19, 2015
- Standard Operating Procedure for Solitary Work Assignment was revised on October 14, 2015
- Standard Operating Procedure -C1- Operation Standards – Isolation – was revised on October 13 and December 29, 2015

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

The following procedures were modified:

- HP-3 Beta Survey – December 29, 2015
- HP-4 Radon Daughter Survey – December 29, 2015
- HP-8 Removable Alpha Radiation Sampling and Alpha Counting – December 29, 2015
- HP-11 Personal Air Sampling – December 29, 2015
- HP-12 In Plant High Volume Particulate Sampling – December 29, 2015
- HP-13 Area Composite High Volume Particulate Sampling – December 29, 2015
- HP-14 Calibration of Equipment
- HP-18 Release of Equipment to Unrestricted Areas
- HP-20 Radiation Work Permit
- HP-42 General Fixed Gauge Procedures
- HP-43 Exploration – Transportation of Non Atomic Energy Act (AEA) Materials, Specifically Naturally Occurring Radioactive Materials (NORM) including Technologically Enhanced Naturally Occurring Radioactive Material (TENORM) and Core Samples Containing Naturally Occurring Radioisotopes – Wyoming and Utah
- TOP-1 General Tailings and Evaporation Impoundment Procedures – December 29, 2015
- TOP-6 General Tailings Impoundment Procedures – December 29, 2015
- EP-10 Radon-222 Sampling – December 30, 2015

- EP-12 General Surfae Water Sampling and Sample
- EP-13 General Ground Water Sampling and Sample Preparation Procedures – December 30, 2015
- EP-13b General Ground Water Sampling and Sample Preparation and Water Level Measurement Procedures – December 30, 2015
- 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 30, 2015

Rio Tinto

Internal memo

7 February 2016

To: Radiation Work Permit File

Subject **Radiation Work Permits**

No radiation work permits (RWPs) were issued in 2015.

Oscar A Paulson

Oscar Paulson

Rio Tinto

Internal memo

7 February 2016

Memo to File

SUBJECT: Dose Assessment / Determination of No Requirement for Individual Monitoring or Dose Calculation at the Sweetwater Uranium Project for 2015

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 2015.

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 2015 of 3.13 pCi/liter was used to represent the background radon concentration for the facility. An equilibrium factor of 0.136 was used.

Item	Average Concentration	Dose
Background Gamma		200.7 mrem/yr (22.9 uR/hr)
Airborne Particulates:		
U-nat	6.2E-16 uCi/ml	0.34 mrem/yr
Ra-226	3.9E-16 uCi/ml	0.22 mrem/yr
Th-230	3.9E-16 uCi/ml	0.65 mrem/yr
Pb-210	1.7E-14 uCi/ml	1.39 mrem/yr
Radon-222	3.13 pCi/l	187.3 mrem/yr

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

Radon-222 concentration based on average of the first, second, third and fourth quarter upwind RadTrak Results. Averages of two (2) RadTrak units were used for each quarter, except the first quarter, for which only the result of a single unit was used since the second one was found on the ground on April 1, 2015.

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

(3.13 pCi/l) / (1E3 ml/l) / (1E6 pCi/uCi) = 3.13 E-09 uci/ml
0.33 WL = 3E-08 uCi/ml (with all daughters present)
[(3.13E-09 uCi/ml) / (3E-08 uCi/ml)] * (0.33 WL) = 0.034 WL for background (with daughters present)

The calculated equilibrium factor for the facility (1993 to 2015) average is 0.136. Given that all daughters are not present and the equilibrium factor is 0.136, the actual background radon daughter concentration is:

(0.136) * (0.034 WL) = 0.005 WL

Occupational Dose

1) Gamma Radiation

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

Gamma Survey Results

Area	Total Dose	Background Dose	Occupational Dose
IX Area	182.3 uR/hr	22.9 uR/hr	159.4 uR/hr
Mill	77.9 uR/hr	22.9 uR/hr	55.0 uR/hr
Tailings	96.4 uR/hr	22.9 uR/hr	73.5 uR/hr

Approximately 33.9 hours are estimated to have been spent in the Mill and Solvent Extraction (SX) buildings by the Facility Technician and 44.4 hours are estimated to have been spent in the tailings impoundment by the Facility Technician in 2015. 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	33.9 hours[a]	55.0 uR/hr	1.9 mrem
Tailings	44.4 hours[a]	73.5 uR/hr	3.3 mrem
Total			**5.2 mrem**

[a] Time spent by Facility 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 2015 even though their use was not required, in part, to confirm these calculations. The highest reported dose for a given individual was one (1) millirem for calendar year 2015, 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 2015. The results are as follows:

Radon Sampling Results

Area	Concentration	Background	Occupational Dose
IX Area	0.003 WL	0.004 WL	0.000 WL
Mill Area	0.037 WL	0.004 WL	0.033 WL

The average occupational radon dose for facility personnel is:

{[(0.033 WL) / (0.33 WL/DAC)] * 33.9 hours} / (2000 DAC hours/ALI) = 0.0017 ALI
(0.0017 ALI) * (5000 millirems/ALI) = 8.5 millirems
Note: Intake in Allowable Limits of Intake (ALIs) rounded to 0.001 ALI

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

The average airborne particulate natural uranium dose at the facility is based on high volume air samples taken in the grinding and precipitation areas of the mill and the tailings impoundment in 2015 and breathing zone samples taken of personnel working in the Mill and SX Buildings and tailings impoundment during 2015.

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 9.0 millirems to the maximally exposed individual (the Facility Technician) from work in both the Mill and tailings impoundment. This is well below the 10% threshold that triggers monitoring and dose calculation.

The maximum measured airborne natural uranium concentration was 6.70 E-13 µCi/ml which was the June 22, 2015 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:	6.70 E-13 µCi/ml
Maximum working hours in one (1) week:	40 hours
Minutes per hour:	60 minutes
Respiration rate:	2.00 E+04 ml/min
PicoCuries per microCurie:	1E+06 pCi/µCi
PicoCuries natural uranium per milligram:	677 picoCuries

Calculation:

[(6.70 E-13 µCi/ml)*(40 hours/week)*(60 minutes/hour)*(2.00 E+04 milliliters/minute)*(1E+06 picoCuries per microCurie)] / (677 picoCuries/milligram) = 0.0475 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 Facility Technician in 2015, 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 9.0 millirems per year for 2015.

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 0.0085 rem/year (0.0017 ALI)
   b) The maximum calculated particulate dose based upon quarterly breathing zone samples is 0.009 rem/year

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

a)	Estimated external dose:	0.005 rem/yr.
b)	Estimated internal dose (particulates)	0.009 rem/yr.
c)	Estimated internal dose (Radon-222)	0.009 rem/yr.
	Total:	0.023 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 2015 using Luxel dosimeters. Due to the proven low dose rates at the facility, use of dosimeters is not required; however, it was done to confirm external exposure data from surveys. The maximum reported dose for any individual from the Luxel® dosimeters was 1 mrem for calendar year 2015. This proves that the external dose estimate based upon surveys is conservative.

Oscar A Paulson

Oscar A. Paulson

Rio Tinto

Internal memo

2 February 2016

To: **NRC File**

Subject: Compliance with 10 Mrem Constraint Limit for 2015

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: 7.28 E-17 uCi/ml	0.040 mrem/yr
Ra-226: 2.95 E-17 uCi/ml	0.001 mrem/yr
Th-230: 3.68 E-17 uCi/ml	0.061 mrem/yr
Total:	**0.103 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 2015 dose from airborne particulate radionuclides was at background levels. The 10 mrem per year constraint limit was not exceeded.

Oscar A Paulson

Oscar Paulson

Rio Tinto

Internal memo

2 February 2016

To: **NRC File**

Subject: Compliance with 40 CFR 190.10 for 2015

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: 7.28 E-17 uCi/ml	0.040 mrem/yr
Ra-226: 2.95 E-17 uCi/ml	0.001 mrem/yr
Th-230: 3.68 E-17 uCi/ml	0.061 mrem/yr
Total:	**0.103 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 2015 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	**195.0 mrem**

This measured exposure is slightly below site background.

Conclusions:

- The 2015 dose from airborne particulate radionuclides and radiation was at background levels. The 25 mrem per year limit in 40 CFR 190.10 was not exceeded.

Oscar A Paulson

Oscar Paulson
Facility Supervisor

Rio Tinto

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Internal memo

From	Oscar Paulson
To	TSCA File
Date	14 December 2015

On December 14, 2015 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:

- Jim McMacken – Security Officer
- Karl Kronfuss – Facility Technician
- Oscar Paulson – Facility Supervisor
- Carri Schutterle – Administrative Coordinator

Oscar A Paulson
Oscar Paulson
Facility Supervisor

Rio Tinto

Internal memo

9 February 2016

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 29 and December 22, 2015.

Emergency fire protection training involved:

- Operation of the electric fire pump
- Operation of the diesel fire pump

Annual fire extinguisher and hose inspections were conducted on March 16, 17 and 18, 2015 by Simplex Grinnell.

Electrical ground integrity testing was performed on March 9, 10, 11, 23, 24, 25, 30 and 31, 2015 by Intermountain 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 6, 2015.
- Driver Training was held on January 7, 2015.
- Task Training was held on January 7, 2015.

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