CNNC
Rössing Uranium
Working for Namibia

Implementation of Radiation Management Plan

Annual Report for Rössing Uranium Limited

2019

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Abbreviations

Bq	—	becquerels, decays per second, unit for measuring radioactivity
FPR	—	Final Product Recovery
g	—	grams
HSE & PS	—	Health, Safety, Environment and Protection Services
kBq	—	kilo-becquerels, 1,000 Bq
LLRD	—	Long-Life Radioactive Dust
mBq/L	—	milli-becquerels per litre, 10^{-3} Bq per litre
mSv	—	milli-sieverts, sieverts/1,000
µSv	—	micro-sieverts, sieverts/1,000,000
µSv/a	—	micro-sieverts per annum
mSv/a	—	mSv per annum
mg/m^3	—	milligrams per cubic metre, 1/1,000th of a gram per cubic metre
µg/m^3	—	micrograms per cubic metre, 1/1,000,000th of a gram per cubic metre
µg/L	—	micrograms per litre, 1/1,000,000th grams per litre
NRPA	—	National Radiation Protection Authority
NUST	—	Namibia University of Science and Technology
ppm	—	parts per million
PM10, PM_{10}	—	Particulate matter with particle size below 10 microns
RUL	—	Rössing Uranium Limited
RMP	—	Radiation Management Plan
RSO	—	Radiation Safety Officer (statutory role)
SEG	—	Similar exposure group
TLD	—	Thermo-luminescent dosimeter
TEA Lab	—	Trace Element Analysis Laboratory
TSF	—	Tailings Storage Facility
NUI	—	Namibia Uranium Association Uranium Institute
UOC	—	Uranium oxide concentrate
WHO	—	World Health Organisation

1. Introduction

Under the Radiation Protection Regulations1, an annual narrative report to the National Radiation Protection Authority (NRPA) on the implementation of the site Radiation Management Plan (RMP) is mandatory.

Herewith we present the sixth narrative report since the implementation of this regulation. Reports for the years 2013 to 2018 are available to the public on the Rössing website, http://www.rossing.com/reports-research.htm.

As required, this report is accompanied by data presented separately in the prescribed format, which includes:

- average exposure dose records for each similar exposure group (SEG) for the year 2019, for each of the three pathways monitored separately;
- personal dose records for the past year for each employee working at the mine during that year;
- cumulative dose reports for all employees who have left the organisation during the past year;
- a list of sealed sources on the mine with current source activities and the location of each source;
- a list of uranium oxide exports in 2019; and
- a summary of radioactive waste deposited or stored, both mineral and non-mineral in nature.

2. Organisational arrangements

2.1 Organisational re-arrangements and structure

Richard Storrie was appointed Managing Director (MD) in October 2018 and served in this capacity until August 2019. On 16 July 2019, China National Nuclear Corporation became the majority shareholder. Johan Coetzee joined Rössing Uranium as Managing Director in October 2019. At the end of 2019, the Manager Health, Safety, Environment and Protection Services (HSE & PS) no longer reports directly to the MD, but to the General Manager Operations, Liezl Davies. The appointed Radiation Safety Officer (RSO), Dr Bertram Schleicher, continues to report to the Manager HSE & PS, Jacklyn Mwenze. The organisational structure governing Radiation Safety in 2019 is depicted in Figure 1.

In September 2019, Nicco Matengu joined the Radiation Safety section as an Advisor: Radiation Safety, but he resigned from his position on 1 December 2019. The vacant position was advertised externally, and at the time of this writing, Abigail Shidute has filled this role.

In order to promote on-the-job coaching and succession planning, Nelao Endjala has been appointed as an understudy to Dr Bertram Schleicher, which includes continuous coaching and training.

[1] Radiation Protection And Waste Disposal Regulations: Atomic Energy And Radiation Protection Act, 2005 (Act No. 5 Of 2005)

Figure 1: Organisational structure for the Radiation Safety Section, March 2020

2.2 Capacity building

In order to emphasise the importance of radiation protection and the skills needed for effective radiation protection, Rössing continues to support and contribute towards the training programme for Radiation Safety Officers (RSO) offered by the Namibian Uranium Institute (NUI).

Martin Amukwaya and Rauna Haindobo participated in all three of the Radiation-Safety-Officers courses (RSO I to III). Dr Bertram Schleicher co-facilitated the second and third courses, RSO II and RSO III. Nelao Endjala and Dr Bertram Schleicher are members of the Radiation Safety Working Group at the NUI.

To promote academic standards in the field of radiation safety in Namibia, Dr Bertram Schleicher is a member of the industry advisory board of the Department of Mining and Process Engineering at NUST.

3. Occupational exposure protection

3.1 Radiation-dose monitoring results for 2019

In 2019, exposure of workers to radiation was monitored by measuring exposure to external gamma radiation, long-lived radioactive dust (LLRD) and radon decay products. A total of 985 workers in 19 different similar exposure groups (SEGs) were monitored. Extrapolated annual doses for the individual SEGs are summarised in Figure 2. It is conservatively assumed the use of respirators reduces the annual LLRD dose by 90% (respiratory factor).

Our monitoring applied a risk based approach: areas subjected to historically higher levels of exposure were monitored more frequently than areas subjected to lower exposure. In addition, some of the SEGs, which showed similar and low exposures during previous years, were assigned the same dose rates. This so-called graded approach helps focus on key areas in the assessment where the highest doses and risk are to be expected. Figure 3 shows trends of exposure of SEGs from 2014 to 2019.

Overall, the average annual dose for the entire workforce was 1.4 mSv per year, a level slightly higher than the 1.2 mSv per year monitored in 2018. This increase can in part be explained by the higher ore grade mined in 2019. The average annual dose of 1.4 mSv is significantly lower than the legal limit of 20 mSv/a.

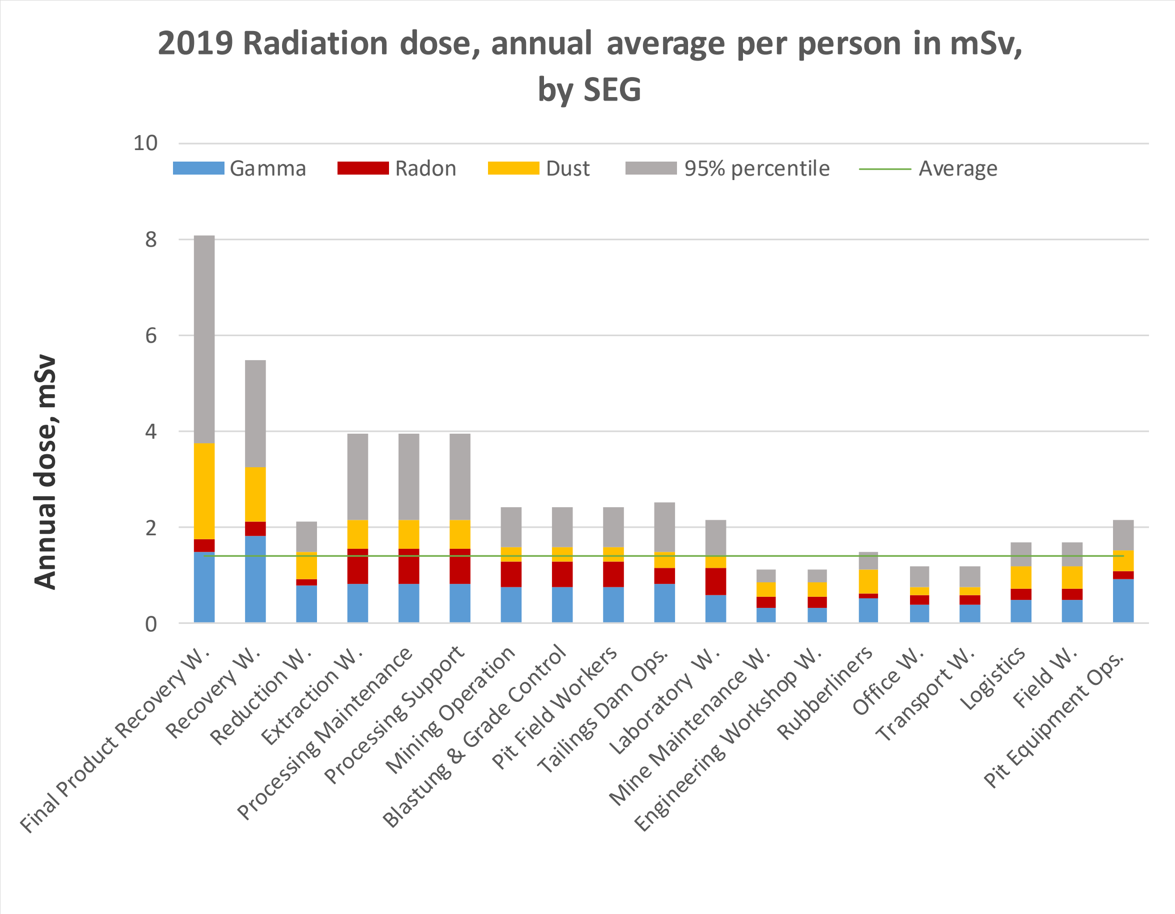

Figure 2: Average radiation dose recorded by pathway and SEG in 2019

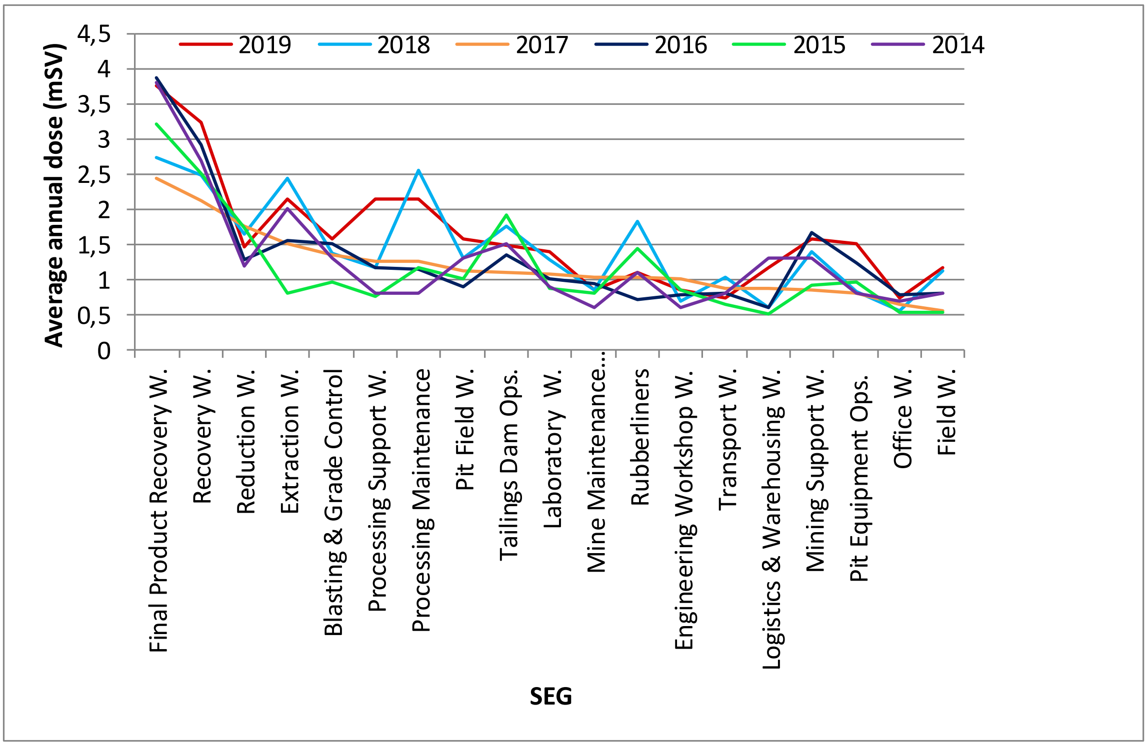

Figure 3: Shows trends in exposure for different SEGs.

3.2 Radiation workers and controlled areas

Workers who are classified as “radiation workers” are at risk to receive a dose of 5 mSv/a or more from all exposure pathways combined. These workers, which belong to the SEGs of Final Product Recovery (FPR) and Recovery Workers (RW), are provided with thermoluminescent dosimeters (TLDs), which are replaced at intervals of three months.

In 2019, the annual total doses recorded were 3.8 mSv/a for FPR workers and 3.2 mSv/a for recovery workers, slightly higher compared to 2.7 mSv/a and 2.4 mSv/a measured in 2018. The highest percentage of the total dose for FPR workers was LLRD with about 54% of the total dose, while gamma and radon contributed 40% and 6%, respectively. The exposure distributions for RW were 35 % caused by LLRD, 56% by gamma and 9% by radon decay products. Figure 4 compares the overall average, total effective doses for FPR and RW from 2010 to 2019, indicating that they have been continually below 5 mSv/a.

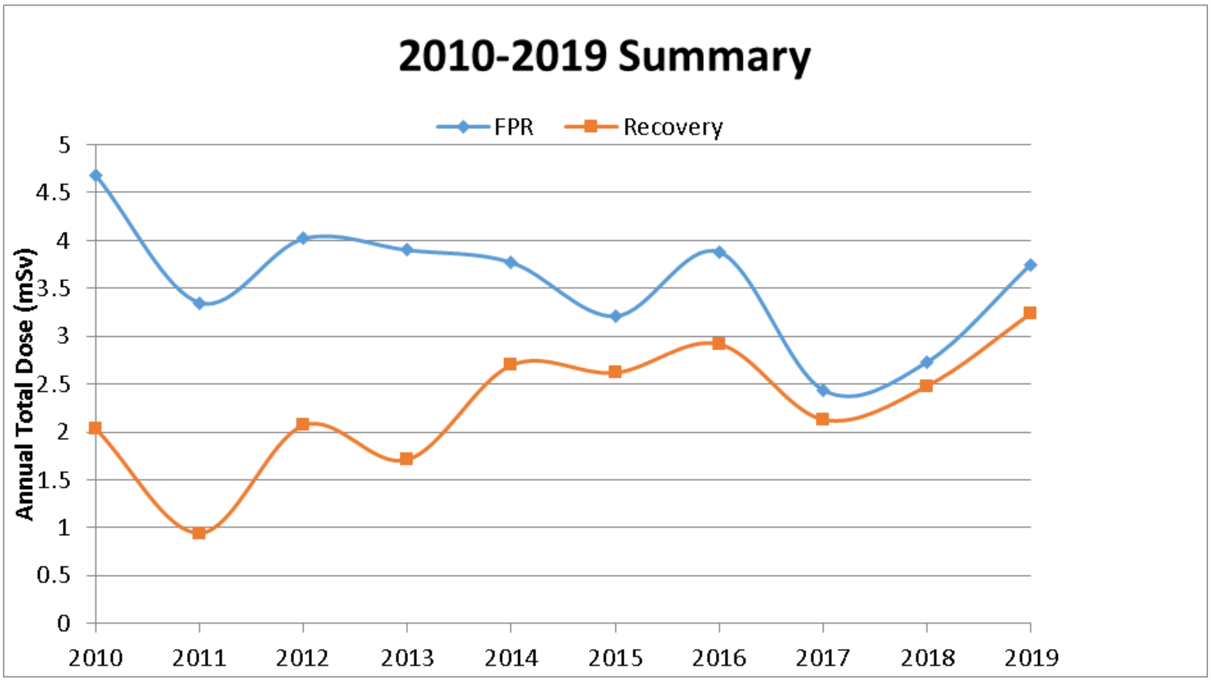

Figure 4: compares the average annual doses for FPR and Recovery workers from 2010 to 2019

The Final Product Recovery (FPR) area is a restricted, controlled area, with access restriction, fingerprint control and contamination checks for exiting persons. To ensure clean working conditions, we have set a target of a maximum average, non-fixed surface contamination of 1 Bq/cm^2 and a maximum average dust inhalation dose rate of 10 µSv/h.

In 2019, our target of 1 Bq/cm^2 non-fixed surface contamination in the FPR area was reached with an average of 0.9 Bq/cm^2. This achievement was a significant improvement compared to the level of 1.8 Bq/cm^2 in 2018. The reduction in contamination was achieved after repair and maintenance work at the end of 2018.

A summary of the average surface-contamination measurements for 2019 is provided in Figure 5.

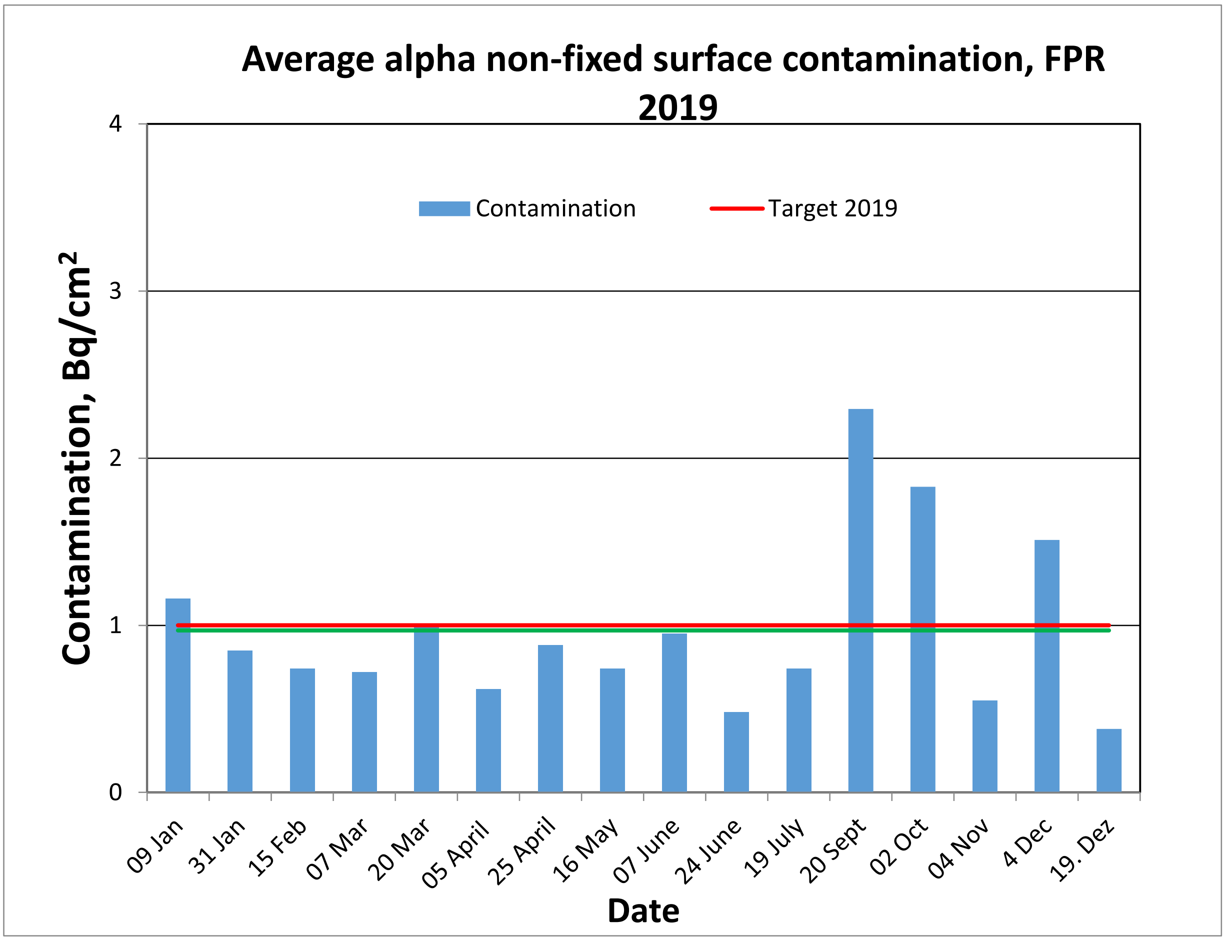

Figure 5: Summary of the average non-fixed surface contamination measurements for 2019

Radiation workers are invited to regularly provide urine for testing of its uranium content. Monthly pregnancy tests ensure that pregnant radiation workers are moved immediately to a less exposed area.

We analysed 14 pregnancy tests of female radiation workers, as well as 23 additional pregnancy tests of females not classified as radiation workers.

In 2019, 1324 urine samples were analysed to determine their uranium concentration, about 50% more than in previous years. To validate the results, our laboratory prepared 30 sample controls which were also sent for analysis.

Because accreditation of the local service provider, the Trace Element Analysis Laboratory (TEA Lab) in Swakopmund, is still pending, samples had to be analysed at the Path Care laboratories in South Africa. Shipment to South Africa delays return of the results to up to three weeks or more; the TEA Lab requires only one week to return test results.

A detection (i.e. threshold) limit for uranium in urine is about 5 µg/L, the warning level is 20 µg/L and the action level is 40 µg/L. A summary of the results is shown in Figure 6, indicating that most individual results were below or close to the detection limit, 5 µg/L, and significantly below the warning level.

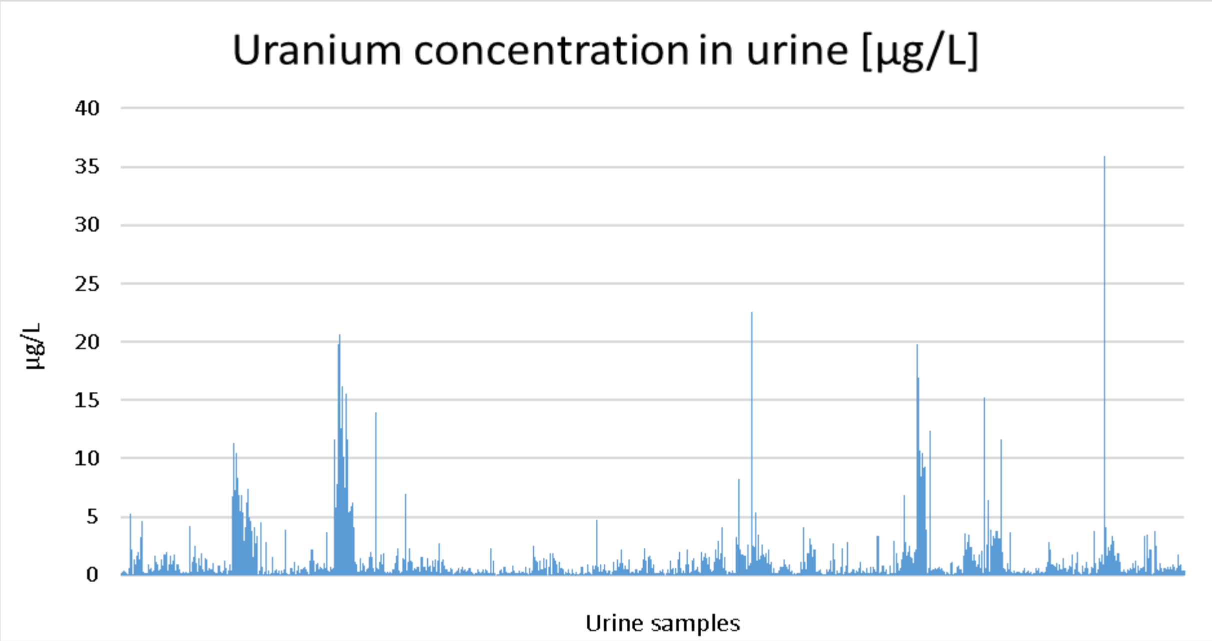

Figure 6: Uranium-in-urine sampling results, 2019.

However, on four occasions, the uranium-in-urine analysis revealed a concentration higher than the warning level. One test result showed 114.8 µg/L, exceeding by far the action level of 40 µg/L (data not shown in Figure 6).

After we received the result exceeding the action level, the worker was immediately informed by the RSO, was brought for a medical examination and transferred to a different work area. Subsequently, the worker was frequently examined, until it was established that his renal function and integrity had returned to normal. The work procedure in the area where the worker had been employed was revised to minimise the possibility that further cases of uranium-in-urine levels would exceed the limit. The NRPA has been informed of this incident.

3.3 FPR stack monitoring

In the FPR area, five stacks are employed, three of which are low-emission, venting stacks from the FPR building and two are from the FPR roasters. As the latter two are fed with exhaust from the uranium roasting process, emissions are monitored and controlled.

Late in the year 2018, an on-line stack emission monitoring system was installed to monitor total particle concentrations. In 2019, isokinetic sampling by external consultants was carried out between 10 and 20 June, and from 8 to 17 July. Sampling results should also serve as calibration factors for on-line monitoring. Some of the results derived from isokinetic sampling, however, seem to be ambiguous and an additional, external consultant has been employed to validate both the results and the sampling procedure. This validation process has yet to be concluded and we are not able to publish results from stack monitoring at this time.

3.4 Radiation awareness training

Radiation awareness training at Rössing was ongoing in 2019. Besides the established Radiation Safety Induction and Refresher Courses, we developed special training modules for persons working at the Final Product Recovery and the Recovery areas. A total of 568 Rössing employees and contractors were trained in several courses.

In order to share information about Rössing's radiation protection programmes with the public, we make many of our reports, fact sheets and booklets available on the Rössing website under the 'Reports-and-Research' tab. Apart from the RMP and RMP implementation reports, we share technical information regarding environmental risk as well as fact sheets and booklets about radiation protection in uranium mining. Information on Radiation Safety is also shared via the Uranium Institute and at mining and trade fairs.

3.5 Communication of monitoring outcomes to employees

One week after personal radiation exposure monitoring, a group report is prepared summarising and explaining the monitoring outcome. This report is shared with the respective team in team discussions where practicable, but in most cases results are shared through email. At the end of the year, all reports are shared with respective teams via emails.

Results of urine sampling are communicated to individuals only if they exceed the warning or action levels or upon request.

All individual exposure dose results and urine sampling results are treated confidentially but are available to the worker via the Rössing intranet. Each employee only has access to their own data. Workers without computer access can receive their uranium-in-urine levels via the Radiation Safety Section.

3.6 Dust levels in FPR

Monitoring programmes radioactive dust in selected FPR areas supplement the personal dust monitoring data. We have established an internal LLRD target of 10 μSv/h without correction for respirator use.

Since installation of the new automated drum filling assembly in early 2018, the dust level in the drum filling area has been significantly reduced. The average dose rate for 2019 was 0.7 mSv/a (as shown in figure 7) compared to 8.1 mSv/a in 2017, without taking the respiratory factor of 90% into account. Employees continue to use half-face respirators in this area.

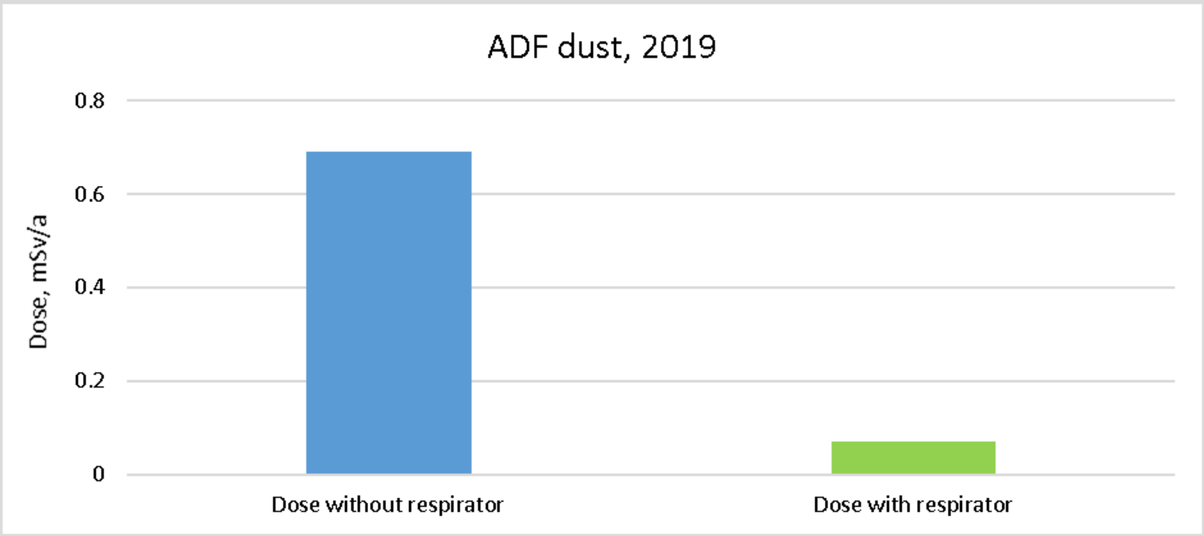

Figure 7: Average dose rate for the automated drum filing area for 2019

4. Medical exposure

Not applicable.

5. Public exposure protection

5.1 Background

The dose limit for public exposure to mining activities at Rössing is 1 mSv per year on average. This dose limit does not factor exposure to background sources, neither natural nor man-made. The natural background radiation in the Erongo Region is approximately 1.8 mSv/a, while an additional dose from mining activities to critical groups in the public can be described as “very low” to “negligible”. It is therefore not possible to measure the public dose[2] directly; it must be calculated from first principles after determining the factors that potentially contribute to this public dose.

At Rössing, the critical population group subject to radiation exposure are the residents of Arandis. No critical group has been identified that would be affected through groundwater contamination, since the direction of water flow from the mine is to the south, towards the Khan River. Nevertheless, groundwater contamination is controlled.

[2] The additional dose to which the public is exposed due to mining-related activities is referred to as the “public dose”. This factor explicitly excludes background-related sources of radiation exposure dose.

5.2 Water monitoring

Exposure through the aquatic pathway could potentially occur through seepage of contaminated water from the tailings storage facility (TSF) into the Khan River aquifer.

Tailings from processing uranium ore at Rössing are stored in a single TSF. The tailings impoundment has a current footprint of approximately 750 ha and a maximum wall height around 100 m. The largest impoundment footprint for the life of the mine has been planned not to exceed 750 ha with an increased wall height and a total storage capacity of 600 million dry tonnes. Fine tailings are pumped and coarse tailings conveyed to the facility where they are mixed and hydraulically deposited into an active paddock. Decant water from the facility is recycled back to the Processing Plant.

Surface seepage from the tailings storage facility is captured in a down-gradient seepage-collection dam. Figure 8 is a photograph of the tailings dam with surface seepage appearing at the toe of the TSF. Figure 9 shows the processing area with a view of the seepage dam visible in the background. This water is recycled back to the processing plant. Process water in the paddock-decant ponds on the storage facility typically has a pH of 2, contains high sulfate concentrations, some dissolved uranium and has a dissolved-solids concentration between 25 g/L and 70 g/L. Percolation towards the base of the TSF results in neutralisation and precipitation of contaminants within the facility.

Figure 8: Rössing's TSF with seepage appearing at the bottom toe of the dam. The view is towards the North. (Photo: Karl-André Terblanche)

Figure 9: Rössing's Processing Plant with seepage dam visible at the top of the image. The view is towards the South. (Photo: Karl-André Terblanche)

A system of monitoring boreholes surrounds the TSF. Quality of the water is tested on a regular basis and analysed to determine chemical constituents. For selected boreholes, Rössing also tests on an annual basis for the radioactivity of the main radionuclides of the uranium and thorium chains. Theoretically, the U-234/U-238 isotope ratio indicates the origin of water resources as naturally occurring or as seepage from the TSF (ratio ≥ 1 or < 1, respectively). This monitoring technique is explained in the RMP and in reports available on Rössing's website[3].

Before 2018, the interface between TSF seepage and natural groundwater was mapped using the U-234/U-238 ratio (U-ratio). Annually, radionuclides were analysed and the interface updated. In the year 2018, a second method focusing on sulfate concentration in groundwater, was introduced to support and validate the U-ratio method.

Sulfate is the main chemical constituent of seepage water and originates from the reaction of sulfuric acid with ore minerals in the uranium extraction process. The sulfate method is based on the assumption that a significant increase in sulfate concentration above natural background values indicates the seepage. Statistics were referenced to determine background from the mean sulfate concentration of unaffected boreholes. By adding three standard deviations, 3000 ppm of sulfate was chosen as the appropriate limit between natural groundwater and sulfate-affected mine water.

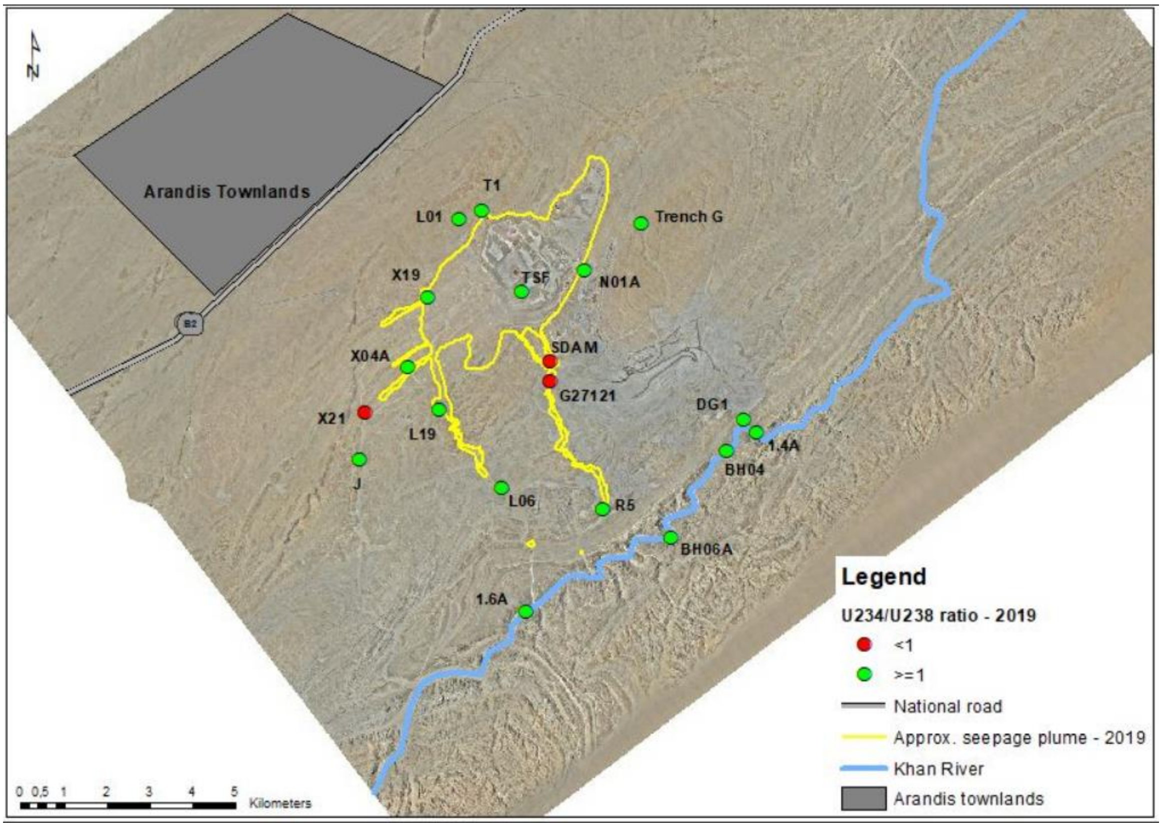

Figure 10: Delineation of the seepage plume based on the sulfate method (yellow line). The two methods do not correlate at X21 and TSF.

[3] "Water quality monitoring at Rössing Uranium mine using isotope techniques", and "Using alpha recoil as a tool for contamination control in the Khan River aquifer".

At certain sampling points, the two monitoring approaches lead to ambiguous results (see points for U-ratio and yellow line for sulfate method in Figure 10). The greatest inconsistency was observed at the TSF, where seepage water was sampled and a natural origin was indicated by the U-ratio.

However, the laboratory reports show high errors for the analysed U-234 and U-238 concentrations, what results in an even higher uncertainty of the U-ratio.

Therefore, the sulfate method is currently used to delineate the seepage-groundwater interface. In order to minimise uncertainties, Rössing is investigating the use of stable isotopes to identify affected and unaffected groundwater as a third method to determine the position of the interface. The first results will become available in 2020.

5.3 Dust monitoring

The public dose from dust inhalation can be calculated through measurements of the concentration of dust in the air. The size of particles inhaled correlates inversely to the potential health risks. Small particles, i.e. less than 10 micrometres in aerodynamic diameter, pose the greatest risk, because they are able to enter the lungs as inhalable dust.

Several dust monitoring stations have been placed at strategic locations around the mine site. Here the concentration of dust particles smaller than 10 microns is measured in 15-minute intervals. This dust is referred to as “particulate matter smaller than 10 microns”, or PM_{10} for short. The locations of PM_{10} stations include, among others, Arandis, the Rössing TSF and the western mine boundary.

The PM_{10} sampler at Arandis provides the PM_{10} dust concentration (Figures 12 and 13), wind speed and wind direction in intervals of 15 minutes. This justifies the allocation of a dust concentration as mining related (if the wind blows from the mine) or identifies it as background (when the wind is blowing in any other direction). This principle is illustrated in image 14.

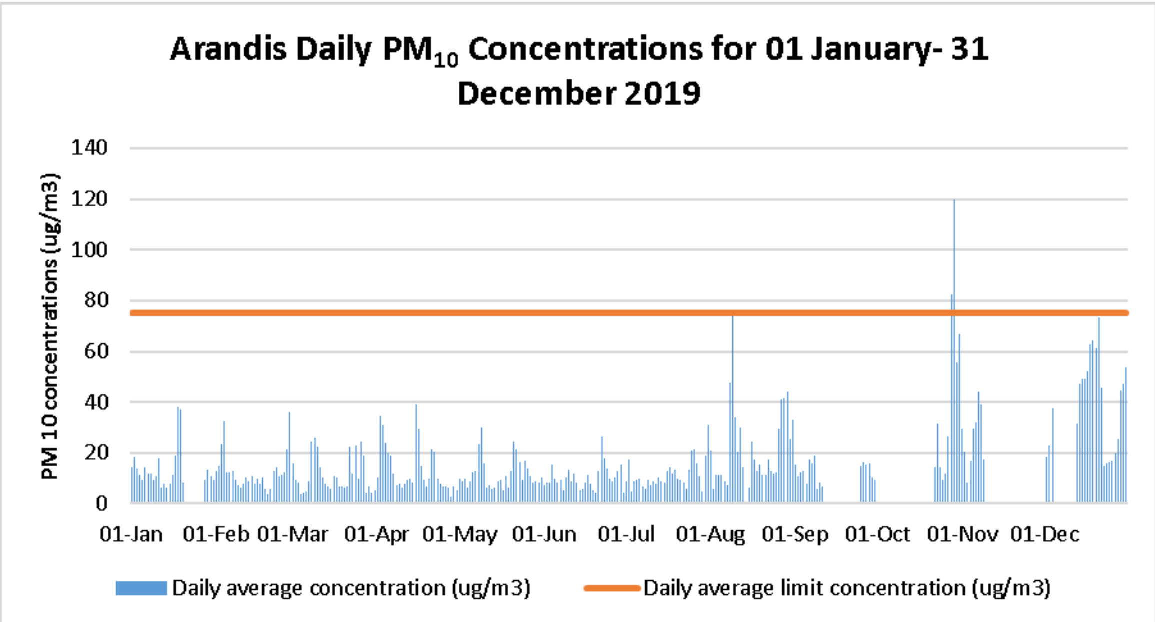

Figure 11: PM_{10} concentration at Arandis, measured in intervals of 15 minutes, 2019

The overall average PM_{10} dust concentration measured was on average 16 µg/m^3, which is below the WHO guideline value for outdoor air quality of 20 µg/m^3 when averaged over one year (Figure 13). The 2019 value is slightly lower than the average dust concentration in 2018, which was 18 µg/m^3. Figure 13 shows the PM_{10} dust concentration in Arandis from 2014 to 2019. The dust concentration varies slightly over the years, but is always below the WHO guideline.

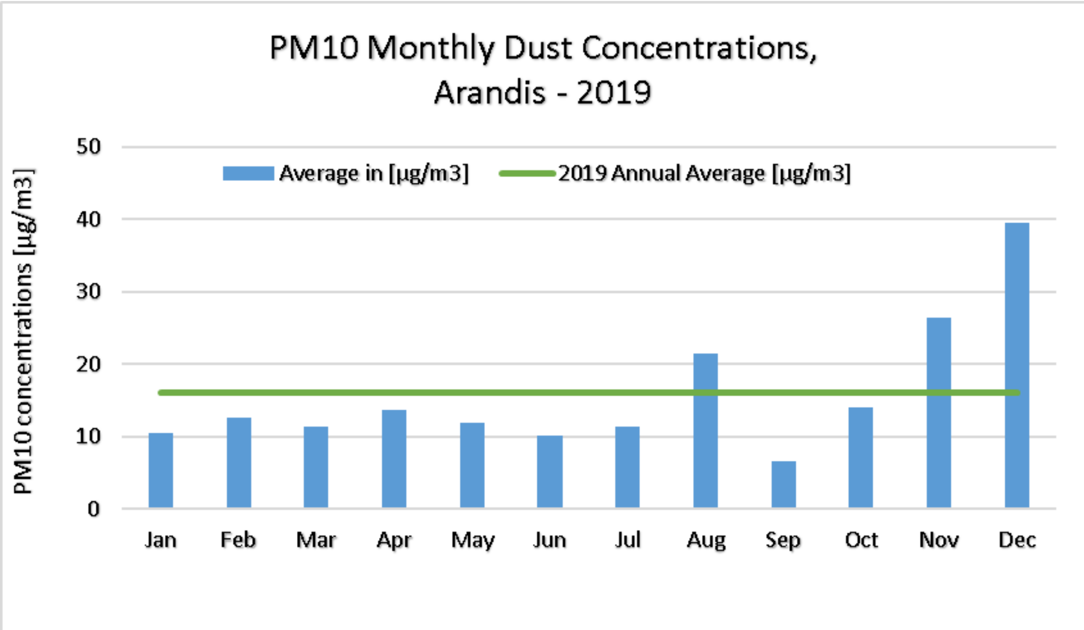

Figure 12: Arandis PM_{10} concentrations averaged per month, 2019

To establish an acceptable upper limit of the annual dose by mine dust, it is assumed that all PM_{10} dust in Arandis is ore dust coming from the mine. We further make the realistic assumption that the ore dust is in secular equilibrium, the particles have an aerodynamic diameter of 5 µm on average, and that the ore dust contains 400 ppm uranium. A PM_{10} concentration of 16 µg/m^3 of such ore dust corresponds to an annual dose of about 19 µSv per year, i.e. 0.019 mSv per year.

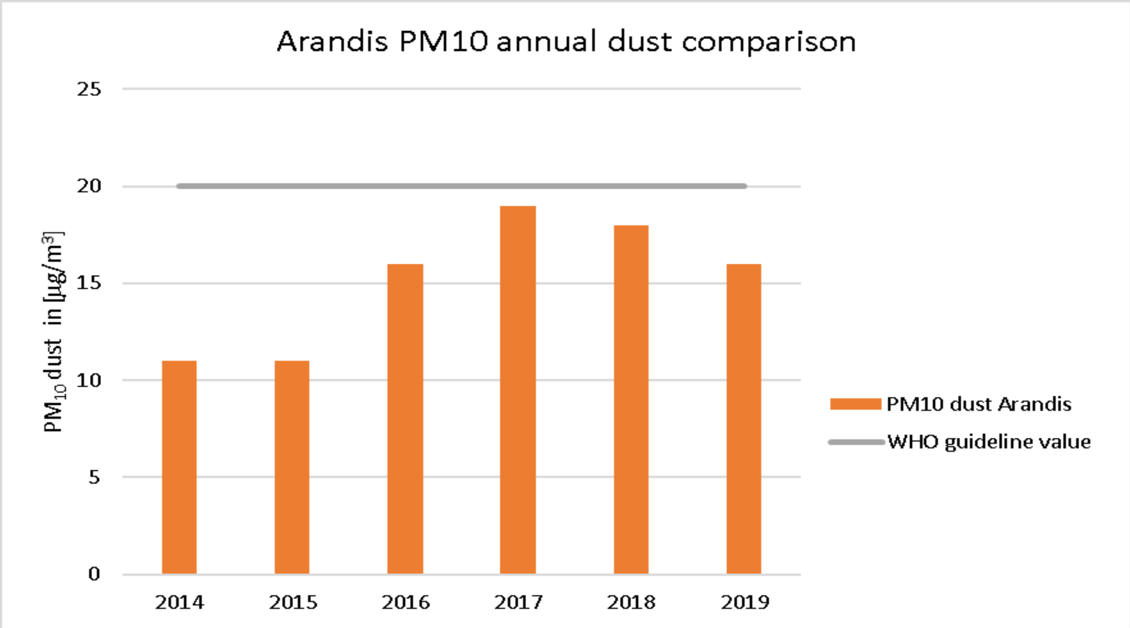

Figure 13: Arandis PM_{10} annual dust comparison over the years.

The legally acceptable annual dose limit for the public is 1 mSv per year, meaning all the PM_{10} dust in Arandis assumed to be radioactive ore dust may legally only contribute to about 2 per cent of the legal limit. Therefore, it can be asserted that the contribution of potential radioactive dust to the public dose is negligible.

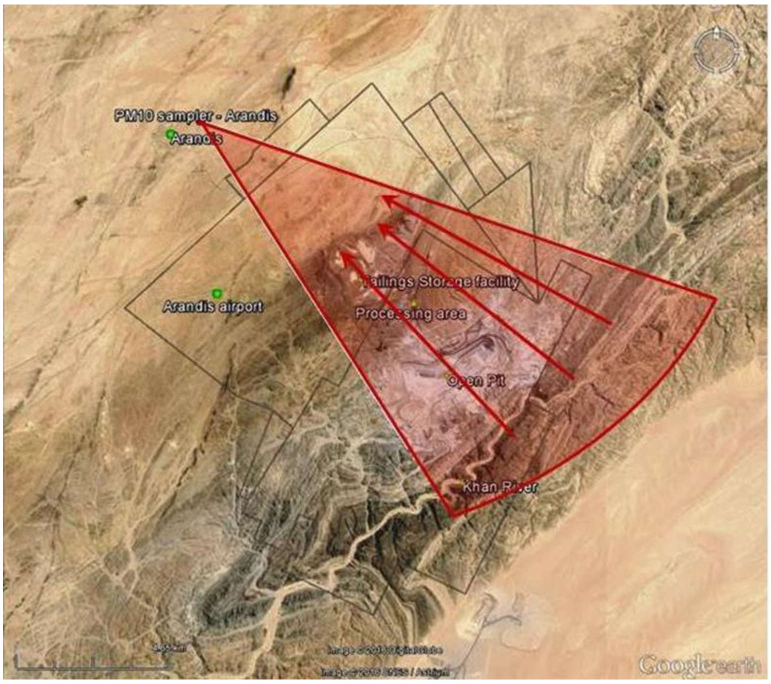

Figure 14: A satellite image showing those wind directions at the mine that could result in radioactive dust exposure at Arandis.

In 2019, our monitoring established that the wind blowing in the south-south-easterly and east-south-easterly directions (that is, wind coming from the direction of the mine) towards Arandis was less than 14 per cent as depicted in Figure 15. This wind monitoring produced the same result as that measured in 2018, when 14 per cent of the wind in Arandis came from the mine.

5.4 Radon monitoring

As there have been no changes in mining operations that could produce a measurable increase of the radon emitted from the site, no new radon measurements were performed in 2019. The average radon concentration at Arandis is measured at the radon station operated by the Uranium Institute and owned by the Ministry of Mines and Energy. The station is located at the Arandis NamWater reservoir some six metres above ground level. Between 2011 and 2014, the average radon concentration measured there was found to be 21 Bq/m^3, consistent with background radon concentrations found in the 2011 SEA report [4]. However in 2019 the Ministry of Mines and Energy reported that the ambient average concentration of radon between Rössing and Arandis was 17 Bq/m^3. This measurement produces an average dose of 0.4 mSv/a, which is below the worldwide average public exposures due to radon of 1.1 mSv/a as suggested by UNSCEAR, 2000 [5].

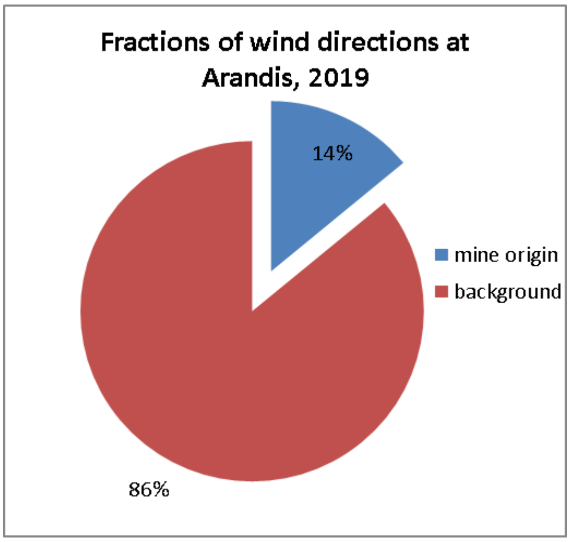

Figure 15: Fraction of wind directions, with wind coming from mine in blue.

[4] H Liebenberg-Enslin, J van Blerk, ID Kruger, Strategic Environmental Assessment (SEA) for the Central Namib 'Uranium Rush' Radiation and Air Quality Theme Report, 2010.

[5] Mwananawa, N. 2019. Advanced Air Quality Management for the Erongo Region –Strategic Environmental Management Plan (SEMP), Ministry of Mines and Energy.

6. Safety and security of sources

6.1 Sealed source register

The status of the sealed sources remains unchanged. All the sources on site are stored in the Radiation Storage Facility. Refer to Table 1 for a complete list of sources held at the mine. The license issued for use and operation of all our sources is SSL/113/13, which will expire in June 2020.

Table 1: List of sealed sources at Rössing Uranium (radionuclide of all sources is Cs-137)

Serial Number	Activity (GBq)	Location	Use	Comment
27255 N	37,9	Radiation Store	Level	Not in use
004/12	32,3	Radiation Store	Level	Not in use
H500081140	38,7	Radiation Store	Level	Not in use
005/12	32,6	Radiation Store	Level	Not in use
70682	0,2	Radiation Store	Level	Not in use
2771	13,5	Radiation Store	Level	Not in use
PA 304	0,3	Radiation Store	Density	Not in use
PA 299	0,3	Radiation Store	Density	Not in use
PA 301	0,3	Radiation Store	Density	Not in use
PA 302	0,3	Radiation Store	Density	Not in use
PA 298	0,3	Radiation Store	Density	Not in use
PA 297	0,3	Radiation Store	Density	Not in use
2772	13,5	Radiation Store	Level	Not in use
2770	13,5	Radiation Store	Level	Not in use

Three low-activity calibration sources are kept at the Radiation Safety Laboratory (Table 2).

Table 2: List of calibration sources at Rössing

Nuclide	Type of source	Half-life (years)	Initial activity (kBq)	Date of manufacture	Time elapsed (years)
Cs-137	Beta	30	3	2011/12/13	7
Th-230	Alpha	75 000	1	2011/12/16	7
Nat U	Alpha	4.5 billion	1.4	2017/01/09	13

6.2 Sealed source checks

Every 6 months, the sealed sources are inspected and tested for leakages.

6.3 X-ray generating equipment

The Rössing chemical laboratory uses two analytical x-ray units, as per registration and license EPR/113/01/12, which will expire in 2021.

7. Transport of radioactive material

7.1 Transport and export of UOC

With the authorisation TRM/113/01/18/ET, Rössing transported uranium oxide to overseas converters. A total of 1,520 tonnes of uranium oxide of chemical composition U_3O_8 (whose content was 1,289 tonnes of uranium) were exported in 2019, and is summarised in Table 3.

Table 3: List of UOC shipments from RUL in 2019

Shipping Date	Country of Final Destination	Quantity of Exported (kg)	Quantity of Contained Element (kg)
7 March 2019	USA	229,356	194,494
15 February 2019	France	138,041	117,059
27 March 2019	France	255,739	216,867
15 May 2019	France	170,906	144,928
15 May 2019	France	124,141	105,272
29 May 2019	France	143,030	121,290
29 May 2019	France	84,931	72,022
28 June 2019	Canada	102,763	87,143
28 June 2019	Canada	89,149	75,598
23 July 2019	Canada	182,020	154,353
15 September 2019	Canada	73,309	62,166
		1,520,077	1,289,025
Total in Tonnes		1,520	1,289

8. Emergency preparedness and response

Although no uranium-spill drill was conducted in 2019, Rössing has a procedure, *JK60/PRD/009-Uranium Oxide Spillage* in place for emergency response to uranium spills. This procedure is reviewed on a regular basis. In 2019 a team of six RUL Protection Officers, who accompany the product from the mine to the port, have received basic radiation training on identification and detection of uranium using a dosimeter.

9. Disposal of radioactive waste

9.1 Disposal of contaminated non-mineral waste

In 2019, a total of 2,538 tonnes of contaminated waste were deposited on the TSF. The cumulative total of stored non-mineral contaminated waste is 30,810 tonnes.

9.2 Mineral waste

Both tailings material and waste rocks deposited without processing are regarded as mineral waste. In 2019, we deposited 8,006,059 tonnes of tailings onto the TSF, which now holds a cumulative amount of roughly 444 million tonnes of tailings material. We deposited 13,289,588 tonnes of waste rock onto the Waste Rock Dumps bringing the cumulative total of waste rock material deposited to roughly 979 million tonnes of material. The exposed surface area of the TSF remains unchanged at 1,377 ha.

10. Research

In 2014, Rössing began to conceptualise a study to establish whether potential links exist between workforce exposure to occupational risks, notably radiation exposure, and adverse health conditions.

The research was explained in detail in the Implementation of Radiation Management Plan 2017. A public report explaining the results of the health study is planned to be published in 2020.

More information and updates on the Rössing health study are published on the Rössing website, http://www.rossing.com/reports-research2.htm. This site is also used to share detailed information with the public regarding Rössing's performance. Environmental impact assessments and closure plans, environmental and biodiversity management plans and discussion of some frequently asked questions about the mine's management of health and environmental issues are also published on the site. Rössing's RMP and its annual reports to the NRPA are presented here for public information.

11. Conclusions

The monitoring results show that radiation exposure at Rössing Uranium is very low. The monitoring data for the public clearly indicates an annual dose below 1mSv per year, which is the legal public limit.

We will continue making relevant Radiation Safety information available to the public. This will help the stakeholders like communities to put risk into perspective and to address concerns to the relevant persons at Rössing.

Awareness of the risks related to radiation remains a focus, and awareness sessions facilitated by trained experts for all workers remain an important and deliverable programme.

In addition to the regular monitoring activities described above, we decided to especially focus on:

- Internal and external training for all Radiation Safety team members;
- Continuing an understudy programme ;
- Further reduce levels of uranium dust in the Final Product Recovery (FPR) area;
- Intensify radon monitoring on site and public monitoring in general;
- Suppress jarosite formation;
- Continue radioactive dust survey at the mine.