

# **WATER BRIEFING**

## **An introduction to water contamination and environmental governance issues surrounding Rio Tinto's QMM mine in southern Madagascar**



by the Andrew Lees Trust (ALT UK)

May 2020



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## **ACKNOWLEDGEMENTS**

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## 1. INTRODUCTION

### 1.1 The Andrew Lees Trust research and advocacy

Between 2013-2014, Rio Tinto's mine in Madagascar, operated by subsidiary QIT Minerals Madagascar (QMM), exceeded its authorised permissions in the Anosy region where the mine extracts ilmenite, an ingredient of industrial whiteners. It breached an environmental buffer zone designed to protect local waterways, and encroached on to the bed of the adjacent Lake Besaroy in an estuary where local people fish, gather their drinking water and emergency food supplies, and raised concerns of [toxic impact](#).

The Andrew Lees Trust (ALT UK) began an inquiry into the QMM breach in 2016 and subsequently commissioned a number of independent studies by technical experts. This briefing has been written in order to organise key findings from the studies into one place, to introduce the themes and issues that emerge, and help frame discussions about the main concerns and what might happen to address them.

The independent expert studies about the QMM breach, radioactivity levels and water quality are highly technical and do not include some of the wider issues such as local community concerns and experiences, or local governance challenges. Some of these are included in this briefing in order to ensure a broader perspective on the local situation and to place the environmental considerations and events within the social and political context so as to offer an appreciation of the difficulties arising.

Statements made in this document have taken into consideration the extensive technical dialogue between ALT UK and Rio Tinto, including expert analyses, documented Q&A, emails and face to face meetings. However, this briefing is by no means exhaustive on the subject matters in hand; it is not designed to present all the views of Rio Tinto, and it cannot cover all the technical aspects of the exchange between ALT UK and the mining company in detail. However, ALT UK can provide relevant documentation and communications that support and substantiate statements made, as necessary.

**All the ALT UK independent studies and other materials are available [here](#)**

### 1.2 Summary

Research commissioned by the Andrew Lees Trust (ALT UK) has determined that the QMM mine breached its permitted limits, extended operations into a protective buffer zone and encroached onto the bed of the adjacent Lake Besaroy. Subsequent studies demonstrated that waters downstream of the mine are contaminated with elevated levels of uranium and lead, directly linked to the mine's extraction process, and well in excess of WHO safe drinking water guidelines. Since approximately 15,000 people use the lakes and waterways around the mine to fish, gather food products and drinking water, the contamination represents a serious health risk to local populations. The company denies responsibility for the elevated uranium and lead, claiming it is all naturally occurring.

The Anosy region experiences high background levels of Naturally Occurring Radioactive Material (NORM). However, the QMM extraction process concentrates radionuclides, e.g. uranium and thorium, and heavy metals e.g. lead, that are present in the sands, whilst churning the raw material in the mining basin. Radionuclides and heavy metals are therefore present in elevated levels in the mine wastewaters. Rio Tinto has been unable to prove how QMM's wastewater management system is safely removing contaminants generated in the mining basin before the wastewaters are discharged into the local environment.

Local people complain that they have more health issues since the QMM mine operations began, and they also complain of lack of consultation and transparency around the monitoring of QMM's activity.

A number of issues – most specifically the need for QMM to manage its wastewaters and provide safe drinking water to locally affected communities - remain unresolved over what has been a prolonged advocacy campaign by ALT UK and collaborating NGOs. The challenges to resolve these issues require actions not just from the company, which has international commitments on human rights and sustainability, but also the Malagasy Government and other stakeholders.

## 2. WATER QUALITY IN ANOSY AND THE QMM MINE

### 2.1 Context of the ALT UK inquiry

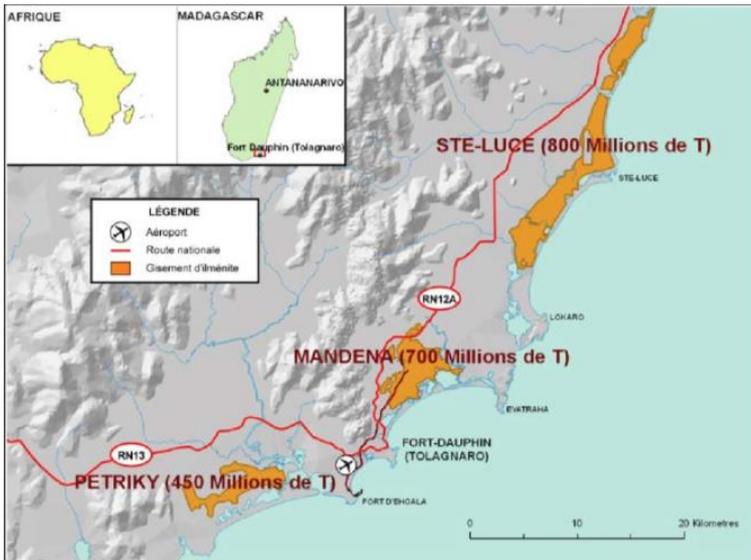


Figure 1. QMM mineral sands mining areas in the Anosy region. Current mine is at the Mandena Site

The Rio Tinto QMM mine along the south eastern coastline of Madagascar is extracting ilmenite, a mineral that yields titanium dioxide (TiO<sub>2</sub>), an industrial whitener used in multiple products from paint to toothpaste.

Extraction began in Mandena in 2009 with a projected project lifespan of 40 years and the removal of 6000 hectares of indigenous littoral forest in one of the poorest and most environmentally sensitive areas of the island. Future expansion of QMM mining operations is planned for nearby St. Luce and Petriky.

Between 2013 and 2014, the QMM mine operations breached an environmental buffer zone (Ozius 2018). The buffer zone

is designed to protect lakes and waterways which, according to Malagasy law, are deemed to constitute a “[sensitive zone](#)” that runs adjacent to the mining operation. QMM operations extended beyond authorised limits and encroached onto the bed of Lake Besaroy.

A principle concern of the breach was whether it had exposed the adjacent waterways to toxic wastewater from the QMM mining basin. Communities situated close to the Mandena mine site rely on the adjacent lakes and rivers for drinking water, food and survival.

### 2.2 Radioactivity and mineral sands in Anosy

The mineral sands in southern Madagascar contain Naturally Occurring Radioactive Materials (NORM) such as uranium and thorium. Zircon and monazite (mineral compounds), which are present in the sands, are also extracted as by-products of the ilmenite extraction process and both contain the radionuclides uranium-238 and thorium-232. QMM only began export of monazite in 2018.

Although uranium occurs naturally in rocks, soils, rivers, lakes, ponds and groundwater, where there is environmental disturbance, such as mining, concentrations of uranium can increase, sometimes to levels that are problematic (WHO 2011). The high quantity of mineral sands being exploited by QMM can also contribute to such concentrations. QMM processes potentially 23 million tonnes of raw material to deliver approximately 750,000 tonnes of ilmenite annually (INSTN, 2012) <sup>1</sup>.

### 2.3 Identifying elevated uranium in waters around the QMM mine

An independent hydrogeology study was commissioned by ALT UK to confirm and understand the extent of the QMM buffer breach (Emerman, 2018a - [see section 5, page 10](#)) and a second, separate study was commissioned to determine the radioactivity levels of the QMM mine. The latter was undertaken by radioactivity specialist Dr Stella Swanson, and published in March 2019.

[A key finding](#) of the Swanson (2019a) study was the **presence of elevated levels of uranium in rivers and lakes adjacent to the mine - 50 times the WHO guidelines for safe drinking water in some places** and where local people fish and draw their drinking water. The finding raised serious concerns about exposure to uranium as a toxic contaminant in the water. Since local people draw their drinking water from natural sources around the mine, Swanson called for the immediate provision of safe drinking water for mine affected communities, in line with WHO guidelines.

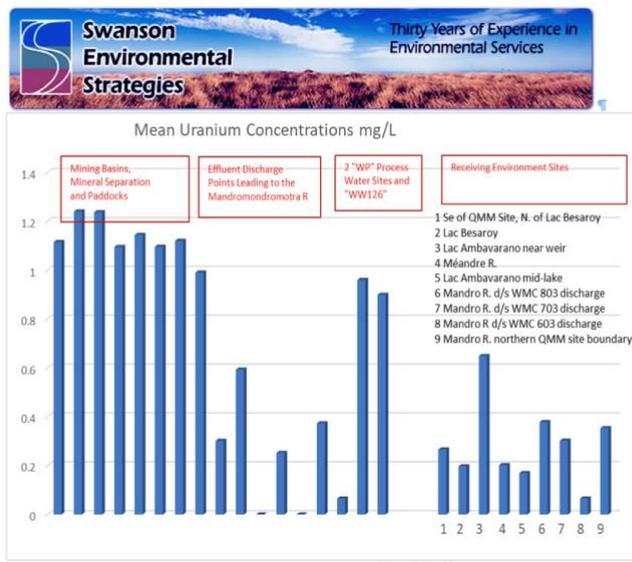
1 [In country research by the INSTN](#) National Institute of Nuclear Science and Technology, 2012

## 2.4 QMM extraction concentrates uranium in the mining pond

Rio Tinto denies the QMM mine is responsible for elevated levels of uranium in waters around Mandena where the mine is situated. It claims the uranium is all naturally occurring (see section 6.2, page 15). The region does experience an unusually high level of NORM. However, as Swanson explains, “while uranium naturally occurs in the ore, once the ore is dug up and processed, uranium is released into the water in larger quantities than if it was left in place on the ground.” (Swanson Memo, 2019a).

When Swanson revisited the QMM water data, she found samples indicated higher concentrations of uranium in the mining basin, ranging from 0.899 to 1.237 mg/L; and in one location between 1.513 to 2.029 mg/L (ibid).

Swanson observes that radionuclides in water, in this case uranium, can enter surface water via discharge of QMM process effluent to the Mandromondromotra River, and from there to Lake Ambavarano, Lake Besaroy, and potentially, even farther to Lake Lanirano, which feeds drinking water to the urban centre of Ft Dauphin.



Overland flow after a heavy rain can also carry soil particles containing radionuclides from the QMM site to adjacent wetlands.

*“The QMM mine definitely releases more uranium into water on the site, thus creating an enhanced source of uranium to the Mandromondromotra River and Lac Ambavarano (Swanson Memo, 2019b)*

## 2.5 Uranium and heavy metal contaminants downstream of the QMM mine

To further determine whether uranium concentrations and other contaminants were migrating into the waterways around the mine, ALT UK organised for water samples to be collected from upstream and downstream of the QMM mine. These were sent to the University of Utah ICP-MS Metals Lab, tested for 46 elements and isotopes, and the results analysed by expert hydrologist Dr Steven Emerman.

The water study results show that “the detrimental impact of the mine on regional water quality is indicated by the increases in uranium, thorium and lead in surface water from the upstream to the downstream side of the mine, which are statistically significant at better than the 99% confidence level” (Emerman, 2019).

The studies by Swanson and Emerman demonstrate surface and groundwater discharges from the Rio Tinto QMM ilmenite mine have resulted in increases in uranium, thorium and lead in surface water from the upstream to the downstream side of the mine.



Rio Tinto has subsequently conceded that *“the mining method may enhance the transfer of uranium and other materials in the suspended solids to the water column as a consequence of churning the sand”* (Rio Tinto, Feb 2020) <sup>2</sup>.

According to the company’s explanations, wastewater from the mine is managed by releasing it into a series of *“flow through holding ponds where its elevated solids levels are naturally reduced through retention time and particle settling”* (ibid). Rio Tinto claims that no further treatment is required to remove the suspended solids and, once these have settled, the water is discharged back into the natural environment.

However, the explanations of the wastewater management process are not in themselves evidence that the *“settling time”* provided by the holding pond system prior to release of water from the mining site is successfully addressing contamination issues. Nor can Rio Tinto/QMM provide evidence that levels of uranium and heavy metals in waters leaving the QMM site into adjacent wetlands and streams are *“under permitted limits”* (ibid).

The company admits that its *“process water may have higher concentrations of minerals and metals than deemed safe by drinking water standards”* (ibid).

Because of the concentrations of the contaminants present in the water are well in excess of WHO safe drinking water guidelines, Swanson and Emerman both recommend the urgent provision of safe drinking water to communities.

Following the release of ALT UK’s water studies in December last year, Malagasy civil society platforms have demanded an [investigation 3](#) and an [audit 4](#) of QMM social and environmental issues.

### 3. HEALTH ISSUES

#### 3.1 Exposure and risks

There are two ways that people can be exposed to radiation: (1) they can be exposed externally to a nearby source of radiation; and/or, (2) they can be exposed internally by radioactive material that has entered the body through inhalation or ingestion.

Internal exposure occurs when radionuclides enter the body via inhalation, drinking water, eating food, or accidentally ingesting soil. The main health effects from exposure to uranium are from its chemical properties. Exposure to high levels of uranium in drinking water for a long time could affect kidneys and bones ([Health Canada, 2019](#)).

Young children, infants and foetuses are particularly vulnerable to lead and low levels of exposure have been linked to damage to the nervous system, learning disabilities, shorter stature, impaired hearing, and impaired formation and function of blood cells ([US EPA, 2019](#)).

Adults exposed to elevated lead can experience increase blood pressure, decreased kidney function and reproductive problems. There are also health risks from untreated water in the study area, e.g. through exposure to nitrate and pathogens.

#### 3.2 Uranium and lead levels in QMM mine waters

Due to radiation monitoring limitations ([see section 6.4](#)) Swanson’s analysis of uranium exceedances were chemical measurements of uranium concentrations in water, rather than radioactivity measurements. Uranium concentrations which are above drinking water quality guidelines are a concern because of the chemical hazard of uranium (Swanson 2019a).

<sup>2</sup> Letter from Rio Tinto to Andrew Lees Trust (ALT UK) Friends of the Earth and Publish What You Pay (PWYP MG and UK), dated February 21<sup>st</sup> 2020

<sup>3</sup> Communiqué of the Plate-Forme Nationale des Organisations de la Société Civile de Madagascar (PFNOSCM), Feb 2020

<sup>4</sup> Open letter to the President of Madagascar, from CRAAD-OI and Collectif Tany, March 2020  
<http://terresmalgaches.info/newsletter/article/newsletter-no-137>

The World Health Organisation (WHO) guidelines recommend a maximum of 0.01 mg/L in drinking water. In Swanson's 2019 review, concentrations of uranium in water in the lakes and waterways around the QMM mine ranged from 0.065 to 0.648 mg/L, and in Lake Ambavarano maximum concentrations were 0.319 mg/L to 1.073 mg/L near the weir.

Emerman's 2019 water study combined water samples previously provided by Rio Tinto with nine new water samples - five upstream of the mine and four downstream. It found that concentrations of uranium in water were 350 times higher downstream of the QMM mine than upstream of it, and that lead concentrations were 9.8 times higher.

The mean concentration of uranium in the downstream water samples was 0.049 mg/L - 63% higher than the WHO guideline of 0.03 mg/L and compared with 0.00014 mg/L upstream. The mean concentration of lead downstream of the mine was 0.0256 milligrams per litre, compared to 0.0026 mg/L upstream and a World Health Organisation (WHO) recommended maximum of 0.01 mg/L in drinking water.

### 3.3 Local peoples' health concerns

Over 90% of rural people living in this region are living in multidimensional poverty, on less than US \$1.90 dollar per day, and are entirely dependent on natural resources for their survival. Any loss or detrimental impact on their environment can have significant effect on food security, health and well-being.

Concerns have been increasing over the last few years with reports of sickness attributed to the presence of the mine and its activity. These have been the subject of local media coverage <sup>5</sup> and public complaint <sup>6</sup> but, as yet, not of any systematic research that has been publicly communicated or recorded.

At a public meeting in December 2019, local people complained to QMM and the National Office for the Environment (ONE) that they have more health issues as a result of the mine's presence. For example, they complain of more diarrhoea and stomach problems than before; they also complained of itching of the skin, coughing and asthma. In particular, they say some respiratory problems have not been experienced before, such as people in their thirties suddenly developing asthma. One local doctor has cited an exponential increase in demand for asthma medicine and an increase in respiratory illnesses.

Given the levels of poverty in Anosy, most rural villagers do not have the means to visit a hospital and/or they may have to travel miles to seek medical advice. As one villager so eloquently explains: *"Give us drinking water for all the fokontany [village], since we are afraid that the water we drink will have a bad effect on our health and if we get sick, we have to go a few kilometres from here and we will have time to die. Otherwise build us hospitals with doctors inside."* Mr Athanase, Antsoaso (April 2020).

Another community representative pleads *"We are asking for potable water for the people living around the mines. .... if it is not too much to ask, we would like the same care as QMM employees receive in matters of health."* Msr Jacquelin, OSC Tolagnaro (April 2020).

### 3.4 Requirement to establish sickness levels and prepare doctors

The National Office for the Environment (ONE)'s monitoring table for QMM dated July 2018 recommended *"an analysis of the findings of the evolution of sickness over the last five years"* and to *"implement a refresher course for doctors in Ft Dauphin on diseases due to radioactivity"* (ONE, Grille de Suivi QMM, July 2018, p16 <sup>7</sup>). The same report registered an *"Increase in the level of radioactivity resulting from the management of radioactive sands"* <sup>8</sup>.

<sup>5</sup> Civil society action relating to water quality in the lake adjacent to the QMM mine are matters of public record. See <https://www.facebook.com/plugins/video.php?href=https%3A%2F%2Fwww.facebook.com%2Fvaovao.kolotv%2Fvideos%2F391208184984339%2F> and requests for drinking water cited at <http://www.andrewleestrust.org/blog/wp-content/uploads/2019/04/Anosy-Civil-Society-Platform-2019-.pdf>.

Local concerns about radioactivity have precipitated meetings and media coverage at the local level, see: <https://youtu.be/ry4McEDLEAc> and <http://www.midi-madagasikara.mg/societe/2018/09/08/region-anosy-hausse-de-la-concentration-de-la-radioactivite-observee/>.

<sup>6</sup> Recording of a public meeting of the ONE, QMM and Antanosy citizens in Ft Dauphin in December 2019

<sup>7</sup> [*"Etablir une analyse des données depuis les cinq dernières années sur l'évolution des maladies; Mettre en oeuvre le programme de remise à niveau des médecins à FTU sur les maladies dûs à la radioactivité et en faire des communications y afférentes"* ONE, Grille de Suivi QMM, 22 July 2018, Page 16 column 1 SAN-5

<sup>8</sup> [*"Augmentation du niveau de la radioactivité consécutive de la gestion des sables radioactifs"*] (ibid)

Requiring health studies and planning for capacity building for doctors to manage radiation related sicknesses would seem to concede that the concerns locals are raising warrant more than generalised assurances given by the company that the QMM mine poses “no health risks”<sup>9</sup>.

Whether plans for local medical capacity building are currently being implemented is unclear, since there are no public communications or reporting to that effect.

While there has yet to be an in-depth health study on the impacts of the mine, available indicators are significant enough to require action, e.g. given uranium concentrations are as high as 1 mg/L in Lake Ambavarano near the weir, so alternative safe drinking water must be provided.

## **4. SAFE DRINKING WATER**

### **4.1 Provision of potable water**

In the absence of robust health studies, and given the elevated levels of contaminants in lakes and rivers in Mandena where local people gather their drinking water, a key action required under WHO guidelines is the provision of alternative sources of safe drinking water (WHO, 2011) for the communities.

Provision of safe drinking water requires Rio Tinto/QMM to accept that management of the risk associated with QMM mine-related uranium concentrations in receiving waters is a priority (Swanson, 2019a). Rio Tinto’s corporate and sustainability pledges also demand that the company recognise the multiple benefits of providing safe drinking water to communities in accordance with its commitment to the management of human rights risks, including risks to water resources, and directs benefits to those affected by mining activities.

The demand for safe drinking water is aligned with the Malagasy state’s national targets. Rio Tinto/QMM providing safe drinking water in Anosy would fall in line with the Malagasy Water Code and national policy, which encourages support from private companies working in-country. It would also manifest Rio Tinto’s desire to be a “responsible operator”<sup>10</sup> in line with its own commitments and water targets.

However, Rio Tinto has rejected repeated calls for the company to provide safe drinking water to mine affected communities. It argues that pathogens, and also nitrate and nitrite chemical compounds are a greater risk to locals’ health and argues that the WHO guidelines on drinking water are conservative.

Treatment of pathogens alone will not remove uranium, thorium, and lead from waters around QMM. The company has rejected a proposal to pilot a programme which would test a household water treatment system to remove uranium, and pathogens. It claims QMM cannot advance potable water initiatives, and is placing the burden of potable water for communities on the cash-strapped Malagasy Government.

### **4.2 Malagasy Government water targets**

The country’s Water Code includes water resource management, water quality monitoring, financing and organisation of the water sector. However, Madagascar has less than half of the finances needed to meet national targets. The Government’s target to achieve 68% drinking water coverage under its commitments to the Millennium Development Goals fell short (achieving 52% access to an improved water source), according to a report by WaterAid (2018).

Less than half the population in Madagascar has access to safe drinking water and rural inhabitants are likely to have much lower access - only 34% in rural areas (WHO/UNICEF JMP report, 2015). Poor access to water and sanitation costs the country US\$567 million per year or US\$25 per person per year. Economic benefits of providing safe water supplies can return US\$3.2 for every dollar invested (ibid).

The Sustainable Development Goals’ (SDGs) targets 6.1 and 6.2 for achieving universal access to safely managed water and sanitation present a significantly increased challenge to the island. The cost of achieving the SDG targets is equivalent to 9.07% of GDP or US\$1.02 billion per year through 2030.

<sup>9</sup> Email from Rio Tinto DC Office (USA) to PWYP UK, Date: Tue, 22 Oct 2019 at 14:14; Rio Tinto AGMs 2019, 2020

<sup>10</sup> Rio Tinto Letter to ALT UK, Friends of the Earth and Publish What You Pay (UK & MG), Feb 21<sup>st</sup> 2020

### 4.3 Rio Tinto water commitments

The lack of safe drinking water supply to Anosy communities would seem, in the immediate analysis, to be a serious contradiction of QMM's commitment to its sustainability agenda.

Safe water management sits within Rio Tinto's policy on water, and is an International Council for Mining and Minerals (ICMM) performance priority to which Rio Tinto is a signatory: (6.2) "*water stewardship practices that provide for strong and transparent water governance, effective and efficient management of water at operations, and collaboration with stakeholders at a catchment level to achieve responsible and sustainable water use.*"

In 2011, in a [powerpoint produced by Dr Elaine Dorward-King](#) (Managing Director at Rio Tinto's Richard Bay Minerals operation in South Africa) it was explained that Rio Tinto had entered into a collaborative partnership with the World Bank and the local water authority in Madagascar, the Jirama. The World Bank would upgrade the local water supply network, and QMM would assist in training and management. This is claimed to be a "*leading example for other Rio Tinto projects.*"

A report by WaterAid (2018) confirms that 2 million US dollars were contributed to the rehabilitation of the Ft Dauphin water treatment plant and construction of a new treatment plant (including a new waste water treatment system). Investments were also made for water supply in the commune of Ampasy Nahampoana, together with road repairs, which may be due to the location of a popular tourist destination.

However, according to inquiries made and data available at the time of the Swanson review (research and analysis during 2018) the communities around Mandena most immediately impacted by the mine, and potentially exposed to any contaminants from the mine, had received none of the major investment into water quality treatment or potable water access in the Anosy region.

Given that Rio Tinto has already undertaken water initiatives in Anosy with the state-owned public utilities provider, Jirama, and the World Bank there is a serious contradiction in the company's position that QMM cannot advance new initiatives for safe water provision to mine-affected communities.

Arguably the company is liable for all costs related to the remediation and mitigation of any contamination of local water ways under Malagasy law, where industrial effluents are regulated by the MECIE Decree and by the Malagasy Water Code, which includes the Polluter Pays principle.

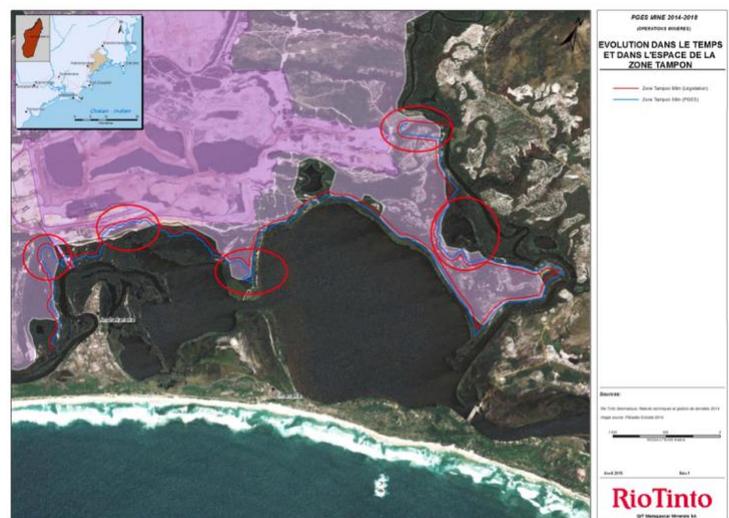
## 5. MINE WASTEWATER MANAGEMENT AND PROTECTION OF LOCAL WATERWAYS

### 5.1 Statutory environmental limits and QMM reductions

The question arises as to why QMM came to breach an environmental buffer zone and expose the local waterways to toxic contaminants from the mine.

Malagasy law requires an 80-metre buffer zone between any investment activity - such as mining - and 'sensitive' areas such as lagoons, marshy areas and wetlands, so as not to disturb the ecological balance. This means an 80-metre area should be left between the lake edge and the mine activity. QMM claims it was unaware of the national 80-metre buffer restriction until 2013.

QMM applied to the Malagasy Government to waive the restriction for their operation and reduce the statutory 80-metre buffer zone to just 50 metres at five "*pinch points*", mostly so they could build a 30-metre wide and 4-metre high "berm", primarily to afford the space needed for the mine anchorage and infrastructure, without which the dredging plant cannot function.



5 "pinch points" indicated on the QMM mine site

Their proposed changes were presented in a 2014-2018 Social and Environmental Management Plan (SEMP), which was approved in 2015 by the Malagasy regulator with the condition that “no mining activities are allowed in the 50m closest to the water body” (Rio Tinto, 2017)<sup>11</sup>.

The reduction of the buffer zone gained the company an additional 14.4 hectares of land and enabled them to access the highest quality and lowest cost deposits of the mineral necessary for the QMM project to remain a going concern. In Rio Tinto’s own words, without reducing the buffer by 30 metres “a 9 percent reserve loss would be incurred and the extraction sequence would be non-optimal” (ibid). In other words, without the additional access to mineral wealth, the project would not be viable.

## 5.2 QMM buffer zone breach and lake encroachment

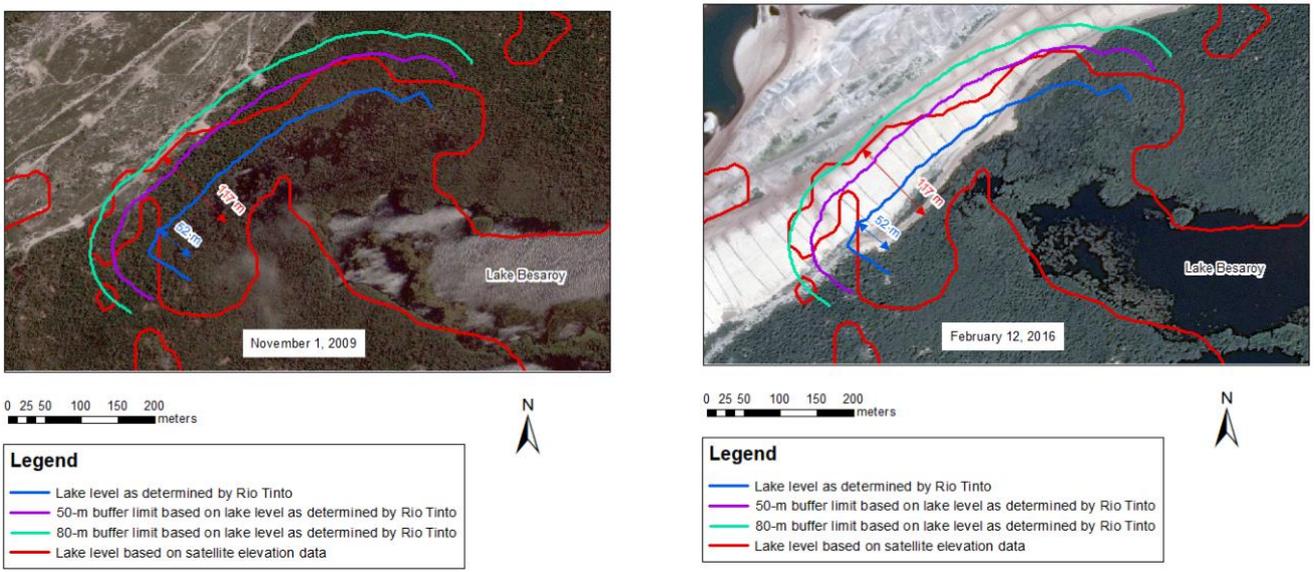
According to a study commissioned by Rio Tinto, following the inquiries raised by ALT UK in 2017, it was determined that between 2013-2014 QMM had already [breached the 50-metre limit](#) and had carried out mining activity (e.g. berm excavation works) within the environmental buffer zone (Ozius, 2018).

Three studies have confirmed the breach of the environmental buffer zone and demonstrate that QMM mine tailings have encroached onto the bed of the adjacent Lake Besaroy. The extent of the breach has been calculated as follows:

- 1) Ozius Spatial (2018): by 102 metres (52 metres onto the lake bed)
- 2) Emerman (2018a): by 167 metres (117 metres onto the lake bed)
- 3) Rio Tinto (2019) : by 90 metres (40 metres onto the lake bed)

**See visuals below, which explain two of these calculations and the reason for their variance. Note Rio Tinto has not provided any satellite or supporting data to substantiate its measurements.**

**Satellite images from Google Earth dated 1st November 2009 and February 12, 2016.**  
Before and after images of the encroachment.



Using an Ordinary High Water Level (OHWL) provided by Rio Tinto (0.6 masl), defined by the **blue line** in both images, the Ozius study measures that mine encroachment has proceeded 52 metres onto the lake bed (**see blue arrow**). Emerman, using a more accurate OHWL (4.6 masl) defined by the **red outline**, demonstrates QMM’s encroachment of 117 metres onto the bed of Lake Besaroy (**red arrow**). The key disagreement between the two studies is about where the lake bed begins, not about the extent of mining activities. Images courtesy of Steven Emerman.

**Rio Tinto admitted to a 90-metre breach with 40-metres of encroachment in its March 2019 report, two years and two independent reports after the issue was first raised.**

<sup>11</sup> Internal Memo, Rio Tinto 3 October 2017 – Update QMM mining Boundary with Water Bodies

According to Rio Tinto's March 2019 response to Emerman's evaluation of the QMM buffer breach<sup>12</sup>, QMM had stacked mine tailings (reject sands) to create a "berm" and these tailings had entered into the lake.

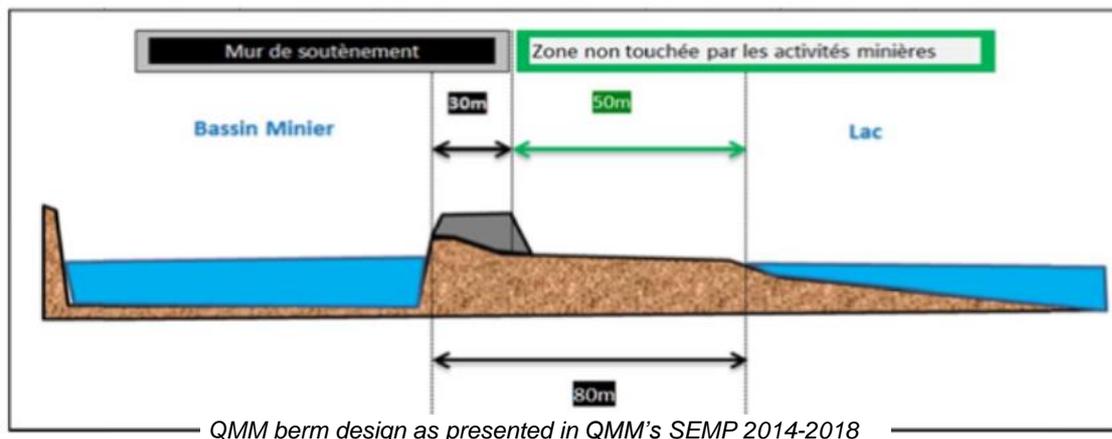
Because mine tailings contain monazite, which contains radionuclides (uranium-238 and thorium-232) they would normally be buried at depths of approximately 15-metres, according to Rio Tinto/QMM (Swanson, 2019a). The fact that mine tailings were used for surface construction of the berm where the encroachment occurred means that they entered Lake Besaroy.

The berm, or "*mur de soutènement*" (retaining wall), as QMM refer to it in their Social and Environmental Management Plan (SEMP) 2014-2018, can be considered a dam in that QMM claims its purpose is also to prevent water transport between the mining basin and the lake (see diagram below).

The QMM breach and the encroachment onto the lake bed compromised the dam function of the berm to contain QMM mining basin waters and keep mine tailings away from the local water systems where villagers fish and gather drinking water.

Where the mine has already encroached the lake, the berm is not protecting the lake at all because the berm is sitting on the bed of the lake.

**Figure 4-6 : Coupe de la zone tampon**



### 5.3 The QMM berm and dam safety requirements

It is not only the QMM breach that has raised questions about the presence of elevated radionuclides and other contaminants in the local waterways. The ability of the berm structure to protect the waterways has been questioned by hydrogeologist Dr Steven Emerman, who has explained that any rise in the water in the mining basin above the lake or river level would result in significant seepage.

Emerman (2018b) calculated the probable seepage and overflow rates from the QMM mine to be "*unacceptably high*", compared with international safety guidelines that require annual probabilities less than 0.1% for an event resulting in environmental damage and significantly less than 0.01% for an event resulting in the loss of one human life<sup>13</sup>.

The annual probabilities of seepage from the four QMM mining basins were found to be 0.29 -1.22%, 0.51-2.08%, 0.44-1.82%, and 0.18-0.78%, for water level rises of 1-2 meters. Annual probabilities of overtopping were found to be 0.17-0.31%, for water level rises of 6-8 meters (ibid).

<sup>12</sup> Rio Tinto, March 2019. Formal response to the report entitled Evaluation of a Buffer Zone at an Ilmenite Mine operated by Rio Tinto on the Shores of Lakes Besaroy and Ambavarano, Madagascar

<sup>13</sup> The (U.S.) Federal Emergency Management Agency recommends that, if the failure of a dam would be expected to result in the loss of at least one human life, the dam should be designed to accommodate the Probable Maximum Flood (PMF), which is significantly rarer than even a 10,000-year storm.

Emerman deemed the QMM berm structure unfit for purpose and observed that the safety criterion used by QMM for the dam is “*similar to the criterion that would be used for the design of storm drains at a shopping mall parking lot*” (ibid).

Emerman also observed, “*if the mining basins are closed simply by filling with sand, radionuclides will be mobilized into the groundwater system and seepage will be a constant occurrence. If radionuclide-enriched water is being discharged into the environment without treatment, then existing safety protocols and infrastructure are completely irrelevant.*”

As the Anosy region experiences cyclonic weather, fluctuating rainfall and tidal influxes, the concerns relating to the seepage and overflow rates were raised with Rio Tinto.

#### **5.4 QMM's absence of a lake protection structure**

QMM argued in 2018 that it is only temporarily mining this area, and that the area of the mining basin is “*much smaller in volume than the neighbouring lakes*”<sup>14</sup>. They said, therefore, that they are not required to observe or apply internationally recognised safety criteria for a dam.

The company referred to the stacked materials on the QMM site as a “*berm*.” They argued that “*designating them as ‘dams’ as a semantic alternative to ‘berms’ does not fundamentally alter the expected function and associated risks with the structures*” (Rio Tinto, March 2019). The function of the structure - to stop the flow of wastewater from the mining basins into the estuary - would nevertheless fall under the definition of a dam, and thereby be subject to specific regulations.

Rio Tinto's engineering advisers' SRK Consulting defined the “*berm*” as “*a temporary embankment*” (SRK Memo, August 2018), but when Rio Tinto published its [mine tailing and storage facilities notice](#) in 2019, the QMM mine is rated as having “*no embankment.*”

By according a status of “*no embankment*” the company is concluding there is no lake protection feature separating the mining basin and its potentially toxic wastewaters from the local estuary. However, QMM's Social and Environmental Management Plan (SEMP 2014-2018), on which mine operations were based and approved by the Malagasy Government, shows a requirement for a lake protection structure.

Reviewing the situation in March 2019, Dr Emerman warned: “*There is nothing that prevents flooding of the estuary with radionuclide-enriched water except for Rio Tinto hoping that it doesn't rain too much.*”

#### **5.5 Overflow incidents: livelihood (fishing) and water quality concerns**

Due to heavy rainfall, two overflow incidents have already been reported since 2018, contradicting Rio Tinto's assertions that QMM is able to maintain the water levels in the mining pond 1-metre below the surrounding water table, and that “*overtopping (is) an unlikely risk*” (Rio Tinto, March 2019)<sup>15</sup>.

Antanosy fishermen reported the appearance of dead fish washing up from a local lake circa December 2018 following one overflow incident from the mine. The dead fish became the subject of a request from a local civil society platform for a full enquiry by the government.

As a result, research was undertaken by the Centre for Environmental Research (CNRE), with collaboration from the ONE and the regional environmental monitoring committee, the Committee de Suivi Environnementale Regional (CSER). The findings of water analysis were presented at a public meeting in Anosy by the CNRE, the ONE and QMM in April 2019. The Power Point presentation had no mention of any measurements of uranium or lead. The CNRE focused on phenols and posited that the death of the fish could be caused by the presence of “*brownish water*” that overflowed from the mine's “*artificial swamps*”<sup>16</sup> during a high rainfall event.

<sup>14</sup> Rio Tinto/QMM initial response to ALT UK's report into the buffer zone at QMM operations received 30<sup>th</sup> May 2018 (Emerman study) undated and unsigned, but with logo (circa Sept 2018)

<sup>15</sup> Rio Tinto Formal response to the report entitled Evaluation of a Buffer Zone at an ilmenite Mine operated by Rio Tinto on the Shores of Lake Besaroy and Ambavarano, Madagascar, March 2019

<sup>16</sup> In this instance the “artificial swamps” appear to refer to the QMM paddocks – a series of mine tailings ponds that are considered part of the “restoration” process and water management for the mine operation.

The CNRE also posited that acidification in natural swamps was most likely to blame for the fish deaths<sup>17</sup>. However, in its conclusions the CNRE said “*the phenomena of acidification and accumulation of metals in QMM basins requires deeper studies.*” In its recommendations, it called for “*Rigorous monitoring of heavy metal concentration levels in mining basins that may impact the natural environment.*”

## 5.6 Mine overflow incidents reinforce concerns and force changes

It is important to highlight that the CNRE report mentioned above has not been shared publicly. A written request to Rio Tinto to have QMM release this report has so far been ignored.

The overflow incidents reinforce questions over the adequacy of QMM’s wastewater management system to protect local waterways, and highlight 1) the challenges presented by the volatile weather conditions in this region and 2) concerns relating to heavy metal contaminants. They also vindicate Emerman’s concerns and predictions about overflow risks.

Following continued exchange and concerns raised by ALT UK, in January 2019 the company declared it was pulling back its future operations from the lake front at Mandena and that [QMM would observe the statutory 80-m buffer limit](#).

Also, according to a November 2019 report by QMM’s Independent International Advisory Panel (IIAP), the overflow incidents have resulted in QMM raising the boundaries between the mine’s paddocks (“rehabilitation lagoons”) and neighbouring bodies of water in order to prevent a recurrence of overflows. Such action may also be an attempt by QMM to avoid sanctions following the ONE’s Sept 2019 table de suivi (monitoring report), which has demanded “*drastic action*” from QMM (see also Annex 3).

### New Strategy

Following the significant research and advocacy that has taken place for over more than three years to question QMM environmental stewardship around the Mandena waterways, Rio Tinto now appears committed to a significant review of its water management. Its 2019 Strategic Report states:

*“QIT Madagascar Minerals (QMM) operations present a significant risk from a water and broader environmental perspective due to their location, the nature of the surrounding environment and the mining process. So, we have committed to reviewing our current practices and infrastructure to develop and implement an improved site water management approach by 2023.” Rio Tinto Annual Report, 2019, p67.*

## 6. RIO TINTO/QMM’S ASSERTIONS AND ISSUES ARISING

### 6.1 Rio Tinto’s position on the QMM buffer breach

When in 2019, at its AGM, the company publicly admitted QMM had breached the buffer zone, the Chair, Simon Thompson, explained to shareholders that it was a “*mistake.*” Rio Tinto has attempted to publicly assuage concerns about the impacts of the QMM buffer zone breach, and the presence of uranium levels in water, by quoting the Madagascar Government’s environmental regulator, the National Office for the Environmental (ONE), who they claim has deemed the QMM buffer zone breach to be “*of no significant concern*”<sup>18</sup> and the impact of the breach to be “*negligible*”<sup>19</sup>.

Despite repeated written requests since 2018 by ALT UK and Publish What You Pay (PWYP) (MG and UK), the company has failed to produce any reports to evidence how the ONE analysis of negligible impact was achieved. At face to face meetings locally in Tana and in Anosy between QMM, the ONE and the PWYP MG representative, the latter’s requests to see any assessments or reports by the ONE about the breach continued to prove futile.

<sup>17</sup> PowerPoint presentation, Centre for Environmental Research (CNRE), principal results, slide 3

<sup>18</sup> Rio Tinto memo to ALT UK received 24<sup>th</sup> September 2018 (four days after the company claims that the ONE made a ‘site inspection’ to review the breach.

<sup>19</sup> Rio Tinto March 2019 report on the Buffer breach. Also quoted at 2019 Rio Tinto AGM by the Chair.

In [November 2019](#), in response to a journalist from Mongabay who asked the company for the ONE assessment information, a Rio Tinto spokesperson said “*We are not aware of any formal inspection report.*” At the Rio Tinto [2020 AGM](#) the company avoided a direct question raised by PWYP MG about the absence of a technical assessment of the QMM breach by the ONE. ALT UK has concluded that no such studies exists and that Rio Tinto’s assertion of “*negligible*” impact is based on nothing, or at most a cursory visual inspection by the ONE <sup>20</sup> (See also [section 7.2, page 17](#)).

## 6.2 Rio Tinto’s position on the uranium levels in water around the QMM mine

At its AGMs in [2017](#), [2019](#) and [2020](#) the company claimed that the QMM mine poses “*no risk*” to the environment or communities in Anosy. Rio Tinto has repeatedly denied the QMM mine is responsible for uranium and lead contaminants in the lakes and waterways around Mandena.

At the 2019 AGM, Rio Tinto’s Chair responded to questions from ALT UK about the uranium levels in water surrounding the mine by saying “*uranium in local water was a natural occurrence and had been there since before QMM started the mine and would be there afterwards.*” He claimed that QMM had been monitoring the mine since the operations began and had not found radioactivity elevated above the background levels that exist; he added that all the studies showed there was low risk to public health.

The assertions of no or low risk to public health are made by Rio Tinto/ QMM in the absence of any available health studies that provide a meaningful baseline against which can be measured the impact of the mine on local populations after extraction activities began. They are misleading, as is the insistence that by using only water in the extraction process QMM is not contaminating the environment.

Rio Tinto’s CEO, Jean Sebastian Jacques said “*...there was no evidence that further radioactivity uplift was linked to QMM operations.....we don’t add anything we just extract the sand.*” (Rio Tinto AGM, 2019). This was explained in more detail in a letter dated 28<sup>th</sup> June 2019 from Rio Tinto, in response to further enquiries by ALT UK: “*The separation process uses mechanical and magnetic methods of separation without the use of chemical agents, and approximately 5 per cent of the mined sand is retained. The other 95 per cent of the sand that is returned to the environment after the separation process is not enriched with radionuclides or other industrial waste.*”

Again, at its [2020 AGM](#) the company again asserted that the QMM extraction process uses only water and no chemical agents, implying there was no risk of contamination.

## 6.3 Obfuscation, avoidance and delay

Rio Tinto’s repeated assertion that the QMM extraction process does not use chemicals is irrelevant and obfuscates the issue of water contamination from uranium and lead. As explained [in section 2 above](#), it is the churning of the sands, the extraction process itself, that generates concentrations of radionuclides such as uranium and thorium and heavy metals in the mining pond, the wastewater from which is then discharged into the environment.

Rio Tinto’s assertions have been contradicted by QMM’s own water data, analysed by Swanson (Memo, 2019b), and also by the company’s subsequent concession (Feb 2020 letter) that the extraction process may enhance the presence of uranium and other materials in the mining pond ([see also 2.5 above](#)). Moreover, no data or water management reports have been provided by Rio Tinto/QMM or by the ONE that demonstrate how water leaving the QMM site is “*safe to the community and the environment*” <sup>21</sup>.

In terms of radiation measurements, the company avoids reference to Swanson’s findings in her study that determined “*The general conclusion drawn by INSTN <sup>22</sup> that the risk of exposure is “minimal” for members of the public is not consistent with the conservative findings of this report, particularly with respect to lack of any information on the ingestion pathway. Furthermore, the complete lack of any data for the food ingestion pathway prevent general conclusions*” (Swanson, 2019a).

<sup>20</sup> Note that the formal assessment of “*no significant concern*” was provided by QMM just 4 days after the ONE site visit, not providing any time for a serious technical investigation (ref: footnote 18 above).

<sup>21</sup> Letter from Rio Tinto to ALT UK, Friends of the Earth and PWYP MG and UK, Feb 21<sup>st</sup> 2020

<sup>22</sup> National Institute of Nuclear Science and Technology

Swanson observed that QMM's complete lack of relevant monitoring data for ingestion pathways e.g. via water, food, and soil, was "unacceptable", especially "given the reliance of local people on surface water for drinking water and the use of locally produced foods" (ibid).

In answering the question of whether pathways of radionuclide exposure are managed to internationally recognised standards for the protection of local citizens, Swanson explained that she "did not receive information which would indicate that QMM consistently is using good practice with respect to control of gamma, dust, or ingestion pathways" (ibid).

Despite Swanson's clear caution and criticisms, the company has referenced her study (2019a) to claim the mine poses "no risk to health" <sup>23</sup>. With no targeted health studies, and no measurement of QMM's ingestion pathways impact, there is no scientific basis on which the company can generalise that QMM mining activity has no health impacts. The company's unfounded claims delay the urgent actions required, in particular for the provision of safe drinking water (see also section 9).

#### 6.4 Unacceptable monitoring

The company's assertion that they have regularly monitored the mine and that QMM set up a radiation monitoring plan after the initial baseline surveys (Rio Tinto, 2020), is contradicted by the lack of monitoring around exposure limits and ingestion pathways (Swanson, 2019a).

Swanson observed in her study, "To the knowledge of the author, there is no over-arching monitoring plan and no explicit connection between the results of environmental monitoring and management of radiation dose to the public" (ibid).

When the ALT UK began its inquiry only one study related to QMM radioactivity was publicly available (INSTN, 2012) and focused largely on worker exposure. According to Swanson (2019a), studies by PARC Scientific PTY in 2013 contained gaps and results should have triggered more investigation. Studies by INSTN in 2017 commenced only after issues were raised by ALT UK at the Rio Tinto 2017 AGM. A new radiation study (see below) to address monitoring gaps was launched in 2019, following Swanson's recommendations. In reality, QMM was expected to advance "further studies" some years previously, based on a World Bank Integrated Growth Poles Project (PIC) observation of "measurements that indicate a higher level of radioactivity in areas that have been mined" (World Bank, PIC IAP, 2014) <sup>24</sup>.

Failures of QMM to ensure the necessary internal and external monitoring of its activity, and to fulfil recommendations and expected standards of external bodies, such as the World Bank, reflect a wider concern that governance around the QMM mine and its operations has been weak. In particular processes to ensure accountability and transparency, which are already a challenge in a country that features 158<sup>th</sup> on the global transparency index, have not been in place or have been compromised.

In order to address criticisms and recommendations raised in Swanson's review (2019) Rio Tinto has commissioned a new, external radiation study by an Australian company, [JBS&G](#).

Although welcome, the new study should not delay urgent action. Rio Tinto must advance the provision of safe drinking water immediately. There is no rationale for doing nothing while waiting for the new radiation study conclusions (circa 2021) when 1) all the available data and studies indicate contaminants above WHO safe drinking water levels and 2) according to Rio Tinto the JBS&G study will not be measuring heavy metals (e.g. uranium and lead) <sup>25</sup>.

Measuring radiation levels is essential but it is the concentrations of uranium and lead that are an immediate concern regards water quality.

<sup>23</sup> Email from Rio Tinto DC Office (USA) to PWYP UK, Date: Tue, 22 Oct 2019 at 14:14 and Rio Tinto AGMs 2019, 2020

<sup>24</sup> Report of the International Advisory Panel Integrated Growth Poles Project (IGP2) Projet Pôles Intégrés de Croissance (PIC) July 2014. The Rio Tinto QMM mine has been part of the World Bank World Bank Integrated Growth Poles project which contributed 35million \$USD for the construction of urban infrastructure in Fort Dauphin and the new Ehoala Port.

<sup>25</sup> Rio Tinto says: "The purpose of the study, undertaken by JBS&G, is to determine the levels of radioactivity in the surrounding communities and calculate the radiation doses to people, as a result of mining operations. The study aims to apply a defensible scientific method to collect sufficient spatial and temporal data to estimate doses to within an acceptable level of uncertainty. The study is not an occupational radiological or an environmental contamination study e.g. heavy-metals" (Rio Tinto letter, Feb 2020).

## 7. LOCAL GOVERNANCE AROUND QMM

### 7.1 Relations between the local regulator (ONE) and QMM

Local communities complain that consultations about QMM activity are not taking place as expected. The relationship between QMM and the Malagasy regulator, the National Office for the Environment (ONE), is regarded as “*compromised*” according to a local deputy, now the Regional Governor of Anosy.

The concerned official, Mr Hatrefindrazana Jerry, made a public complaint about lack of consultations by the ONE regarding QMM activity to the Minister of the Environment in 2018 <sup>26</sup>. The complaint was triggered by the lack of consultation around the transportation of monazite through the town of Fort Dauphin in 2018. Monazite is considered highly radioactive and locals complained that only selected individuals were invited by the ONE and QMM to validate approval for this new QMM export activity.

The lack of transparency and consultation seems borne out by the failures around the ONE’s reporting around the QMM breach. QMM’s breach of the buffer zone violated authorised permissions granted by the Malagasy Government for QMM’s SEMP 2014-2018, and would normally be subject to sanctions under the national mining code (Décret MECIE Article 34).

Furthermore, the encroachment onto the bed of Lake Besaroy without prior authorisation failed to observe the state restrictions to private ownership within natural public areas (*domaines publics naturels*) in Madagascar of which reserved lands (*pas géométriques*), such as river beds, are included. Malagasy law requires permissions from the local authority for extractive activities within these reserved lands. No evidence that such permissions have been sought or were secured has yet been provided by Rio Tinto/QMM. Also, there have been no public consultations or explanations for the ONE’s lack of sanctions, or the “*temporary exemption*” <sup>27</sup> that has been accorded with regard to the QMM buffer breach.

The ONE in Anosy has been in receipt of approximately 30-40,000 USD per annum to monitor the mine’s environmental performance. While these sums are insufficient to provide for the necessary expert studies e.g. for examining the breach impacts, they do arguably create substantial reliance on QMM for the functionality of the local ONE office in Anosy, and consequently present a conflict of interest.

### 7.2 Advocating change in governance

In the local context, with low literacy levels and poor access to education, rural communities most affected by the mine do not have the time, resources or capacity to take the company to task when it fails to observe its obligations or respect their rights. Nor can they rely on the state regulatory bodies.

As Eryck Randrianandrasana of PWYP MG explains: “*Our national regulatory bodies do not have the capacity to monitor and measure QMM’s performance against realistic indicators and I have seen that local QMM consultation processes are not transparent. Local people and Malagasy civil society have no means to hold the company to account when they do not adhere to approved commitments.*”

In order to bring these issues to the attention of the authorities and wider stakeholders, [a briefing paper](#) was developed jointly between Andrew Lees Trust and Publish What You Pay (UK and [MG](#)) and provided detailed references and questions arising from the current relationship between ONE and QMM. The briefing paper and [a letter](#) were sent to the Ministry of the Environment and the Ministry of Mines and Energy in August 2019, signed by over 10 civil society organisations in Madagascar with support from 20 international agencies.

<sup>26</sup> The issue was reportedly raised in a radio broadcast during the news by the then local Deputy for Ft Dauphin, Hatrefindrazana Jerry, when he criticised QMM and ONE in a public speech in August 2018 to the Minister of the Environment saying that there was a compromise between QMM and ONE because the majority of the public is not aware of any consultation and *reported* that he himself had not been consulted.

<sup>27</sup> QMM’s Independent International Advisory Panel (IIAP) members were told during their November 2019 visit that “ONE, in conjunction with other members of the monitoring committee, had granted a temporary exception to QMM ahead of time, subject to eventual repairs of any damage to the buffer. The exception was allowed on the grounds that the risks of damage were slight and that the body of water potentially affected was already formally “classified as low-priority from a public safety point of view.” It should be noted that there is still no understanding of the impact of this damage regarding water quality/seepage from the mining basin or why this water is classified “low priority” when it is source of drinking water for communities.

The Minister for the Environment responded to the letter with a promise of an investigation, but there has been no public reporting of an investigation or outcomes of internal inquiries. However, it is noted that the local ONE representative in Anosy was replaced immediately, after almost 20 years in post.

Additionally, following the intervention, the most recent monitoring report of the ONE in Anosy appears more exigent of QMM with demands for “*immediate*” and “*drastic*” actions <sup>28</sup> and some threat of sanctions if a number of expected actions are not met (for original content in French, see Annex 3).

Following advocacy by ALT UK and PWYP UK/MG, one of the external panels that advises QMM, the Independent International Advisory Panel (IIAP), which is populated with ex-officials from Malagasy Ministries and the World Bank, endorsed the call for public access to the ONE report/s and a change in the current formula for funding the ONE monitoring and evaluation processes (IIAP, 2019).

## 8. CONSULTATION AND COMMUNICATIONS

### 8.1 Consultation with local communities

Madagascar is signed up to the United Nations Charter of Human Rights and Malagasy people have rights to information as well as rights to safe drinking water. Communities are required under Article 41 of the Malagasy Water Code to be involved in open consultation processes about water supply <sup>29</sup>.

Currently QMM is falling short in delivering to Rio Tinto standards, and to commitments to which Rio Tinto is signed up at the international level. For example, Rio Tinto’s commitment to the Mining Principles of the International Council for Mining and Minerals (ICMM) demands (4.1): “*Assess environmental and social risks and opportunities of new projects and of significant changes to existing operations in consultation with interested and affected stakeholders, and publicly disclose assessment results.*”

Multiple events around the QMM mine have affected local stakeholders but have not generated the expected processes. These include the following events/actions by QMM: -

- a) construction of a weir in the estuary next to the mine, which caused serious flooding, destroyed agricultural fields, raised the Ordinary High Water Level of Lake Besaroy, and seriously impacted the breeding grounds and thereby stocks of local fish species by changing the interaction of salt and fresh water in the estuary;
- b) berm construction that breached the buffer zone by at least 90 metres in places and encroached onto the bed of Lake Besaroy in the “*domaine publique*”;
- c) reduction of the buffer zone from its statutory limit to just 50 metres, which compromised the protection of the sensitive zone of lakes and waterways;
- d) discharge of mine wastewaters, which have contaminated local lakes and waterways with elevated levels of uranium and heavy metals from the mining process;
- e) overtopping of mine wastewaters from mine ‘paddocks’;
- f) transportation of radioactive monazite through the town of Fort Dauphin.

All the events listed above, including those explained in this report, would have required consultation processes to be triggered, public disclosure of all the related risk assessments and, where necessary, remedial actions <sup>30</sup>.

Rio Tinto needs to ensure equitable inclusion of local stakeholders and affected communities. This includes developing local staff and community capabilities in communications, social engagement and environmental monitoring skills in order to increase understanding among community members, contribute to informed and inclusive decision making, and provide independent monitoring of the mine’s radiation levels and other impacts of QMM operations over the project lifetime, and beyond.

Demands by Malagasy civil society to the Government of Madagascar for investigation into the water issues and an audit of the social and environmental impacts of the mine have yet to be acted upon. (See also section 2.5, p7 above).

<sup>28</sup> ONE ‘table de suivi’ of QMM, September 2019. See also Annex 3 extracts.

<sup>29</sup> Lovy, 2012. A Critical Look at Governance in the Water, Sanitation and Hygiene Sector in Madagascar. Water and Sanitation for All.

<sup>30</sup> Consultations should cover air, water, biodiversity, noise and vibration, health, safety, human rights, gender, cultural heritage and economic issues, be gender sensitive and inclusive of marginalised and vulnerable groups (ICMM)

## 8.2 QMM's flawed communications and social engagement processes

As with consultations, QMM communications have been the subject of complaint and criticism as far back as 2001 and are well documented. Locally, the company's social engagement processes have been the cause of repeated conflict and protests in the region (Huff, 2016; Franchi et al., 2013; Kraemer, 2012; Kill et al, 2016; Huff, 2017; Huff & Orengo. 2020). The compensation process, which followed compulsory land evictions to make way for QMM's infrastructure in 2005-2007, highlighted multiple failures of QMM to communicate in appropriate and equitable ways with citizens (ALTUK/PANOS, 2009; Harbinson, 2007).

The Andrew Lees Trust has challenged Rio Tinto about QMM communications and social engagement practices for over two decades. A promise to disclose new social engagement protocols, supposedly put in place after ALT UK made formal complaints about QMM and its NGO partner Asity's behaviour in 2017 towards the Antsofso community (ref: QMM's biodiversity offsetting programme), was never honoured. An unsatisfactory one sheet summary was provided two years later.

Access to data and documentation is below expected accountability standards. Rio Tinto does not have clear protocols in place for the release of data. For example, ALT UK has experienced prolonged delays for response to questions and agreed data release from Rio Tinto, necessitating persistent pressure and follow up such as would be impossible for local Antanosy villagers to maintain. Multiple questions and requests for reports and information remain outstanding after more than three years of 'dialogue' with Rio Tinto HQ about the QMM breach and related radioactivity and water quality issues.

The IIAP reported from its November visit that QMM was making advances in its communications. However, recent filmed interviews suggest that the company is still failing to address shortcomings in the implementation of QMM policies. For example, QMM's local NGO partner (Asity), that is responsible for managing QMM's biodiversity offset programme, has demonstrated contempt for villagers who face famine due to the impacts of the programme on their food security, calling the villagers "parasites."

Reports from community members over the last few years suggest that communications around QMM activity remain woefully inadequate. For example, local people who attended the CNRE water research presentation in April 2019, and also the ONE public meeting in December 2019 on QMM environmental reporting, complained that they could not understand much of the content in the presentations. This is because data and findings were not presented in language or using visual aids that made the information

accessible for local citizens. Most importantly, those responsible failed to answer local peoples' pressing questions.



A billboard in Ft Dauphin (insert) demonstrates the guesswork required to understand the most basic visual communication from QMM - in this case on the subject "*What are our products for?*" The billboard's written language is not even in Malagasy. No one who has been shown this image as part of the ALT UK inquiry has been able to identify the meaning of all the symbols on this billboard, including a top mining executive from Rio Tinto. In a region of low literacy rates, visual communications are essential but must be pre-tested for effectiveness.

## 8.3 Communications about radioactivity

Rio Tinto/QMM has yet to begin a structured education and information campaign to help people understand radioactivity or the radiation exposure risks around QMM. Radioactivity is a highly emotive subject and "*difficult to communicate to non-specialists*" (WHO, 2012). Given the QMM billboard example above, the need for specialist input would seem imperative.

However, the company insists QMM can manage the radioactivity communications and has ignored recommendations to engage specialists to help build QMM capacity and develop tools to communicate radioactivity for non-literate, rural audiences and other stakeholders <sup>31</sup>.

Local radio programmes broadcast in 2018 by QMM when the company started exporting monazite to China, which involved trucking the mineral through the main town, were not understood. When asked about radioactivity, the representatives in the QMM information centre in Ft Dauphin explain that “radioactivity is everywhere; it’s in bananas”. The overriding message is that radioactivity is all “natural.”

This appears to be a failure of QMM to respect its SEMP commitments that require “An information program relating to the actual ranges of the level of radioactivity in the mining sector will be developed by Rio Tinto QMM and communicated to community stakeholders and the villagers concerned” <sup>32</sup> (ONE/CSER, 2012).

#### 8.4 Communicating risk transparently

The ONE/CSER’s expectations and Swanson recommendations (2019a) are more in line with the WHO guidelines that advise “communicating radiation risks clearly and effectively includes identifying target audiences (e.g. public, policy makers and decision makers) and tailoring the messages to them” (WHO, 2002). In particular, “risk communication requires the description of the likelihood of harm and its severity.”

Given the high natural background radiation levels experienced in the region, the risk of incremental exposure around the mine site should not be ignored and needs to be communicated clearly. For example, villagers collecting wood from forests close to the mine site may expose themselves to higher levels of dust radiation pathways which, together with other exposures – via water and soil, could take their exposure limit over the annual allowance of 1 mSv/year (Swanson, 2019a).

Following the issues raised with the Minister for the Environment in August 2019 (see section 7.2), it would appear that the ONE is also more mindful of the need to respect rights and responsibilities and has recommended that QMM “clearly establish the difference between prudent communication and transparency. Intensify communications Consider the production of communication supports adapted to different targets and collaborate with other entities for dissemination (supports adapted to children for schools, STD, CTD...)” <sup>33</sup> (ONE, Sept 2019).

#### 8.5 Rights and responsibilities

Failure to provide any educational basis upon which local people can begin to understand the reality about radioactivity in their environment is both negligent and risks creating greater problems in the long term. Local people are considered stakeholders in QMM and the regional development and therefore party to all monitoring exercises around QMM’s activity. How can they legitimately be included in monitoring processes without even basic educational tools with which to address the issues?

Before commencing the independent radioactivity review by Swanson (2019a), ALT UK insisted on a commitment from Rio Tinto to communicate the findings to local communities. A communications component was articulated as a distinct phase within a framework agreement, which prioritised the rights of local communities including rights to information. The company has not yet honoured this commitment.

While the pressing issue of Covid-19 will be seen and is recognised as a priority for local people in Anosy, existing issues that also pose a risk to human health in the longer term must not be ignored. These include water contamination and radiation exposure.

<sup>31</sup> ALT UK communications advisory paper to Rio Tinto, 2019. Also, Swanson 2019a recommendations.

<sup>32</sup> [“Un programme d’information relatif aux portées réelles du niveau de radioactivité dans le secteur minier sera développé par Rio Tinto QMM et communiqué aux intervenants du milieu et aux villageois concernés”] ONE/CSER Anosy, 2012. Page 39, 2.2.3.3.2

<sup>33</sup> [“Revoir l’approche de communication par rapport à ce sujet en considérant les points critiques: bien établir la différence entre communication prudente et transparence. Intensifier les communications Envisager la production de supports de communication adaptés aux différents cibles et collaborer avec les autres entités pour la diffusion (supports adaptés aux enfants pour les écoles, STD, CTD...)”] ONE table de Suivi de QMM, Sept 2019

## 9. WHAT NEEDS TO BE DONE

Some actions have begun as documented in the sections above, and in **ANNEX 2**.

### 9.1 Further action needed

#### 9.1.1 Rio Tinto/QMM must:

1. Acknowledge the elevated uranium levels and other heavy metals (e.g. lead) in the QMM mining basin and manage its discharge to avoid contamination of the adjacent lakes and waterways.
2. Immediately provide alternative safe drinking water to affected communities.
3. Acknowledge risks of the mining basin waters to leach or overflow into adjacent lakes and waterways and undertake remedial action.
4. On an ongoing basis, increase and improve the quality of monitoring of the impacts of the QMM mine on the environment, especially with regard to radiation ingestion pathways.
5. Ensure full transparency of the review process for managing mine waters; also, inclusive and open consultation for the development and implementation of water management approaches and long-term reporting on water quality across all sites.
6. Ensure respect and adherence to the 80-metre statutory buffer zone limit across the current and future mining sites.
7. Co-create (with locals and international experts) an inclusive, participatory communications strategy to answer local peoples' questions and concerns about radioactivity and the impacts of the mine on the local environment, food security and citizens' health.

#### 9.1.2 The Malagasy Government can:

1. Urgently review the MECIE Decree. Article 9 of the Establishment Agreement requires QMM SA to carry out impact studies on the natural, human and environmental environments in general in accordance with the national legislation in force and in particular with respect to the Environmental Charter and Decree No. 95-377 of 23 May 1995 on Ensuring the Environmental Suitability of Investments (Mise en Compatibilité des Investissements avec l'Environnement [Décret MECIE])<sup>34</sup>. This decree is founded on the notion of sustainable development recognising the needs of the present, while safeguarding the needs of future generations. According to the current mining code and under specific arrangements afforded under the Décret MECIE, the mining company can and is encouraged, if not expected, to pay the ONE to carry out evaluations of its operations, despite the obvious conflict of interests and potential to undermine local governance process. This can be reviewed to decouple funding from monitoring activity and reporting outputs, all of which should be made publicly accessible.
2. Reinforce local capacity as well as external partnerships to better manage the extractives industry in Madagascar, especially with regard to environmental monitoring and evaluation, compliance with Social and Environmental Management Plan/s (SEMP/PGES) and the observance of human rights.
3. Seek support to improve and strengthen facilities and capacity of its national research institutions such as the National Institute for Nuclear Science and Technology (INSTN) and the Environmental Research Centre (CNRE).
4. Work with international partners and donors to develop the capacity of community and other local stakeholders to monitor extractives, e.g. water quality monitoring projects; and create the political space for improved community engagement and whistleblowing mechanisms where extractives fail to comply with authorised permissions and obligations.

#### 9.1.3 Other agencies, actors, partners and civil society can:

##### **Deepen and reinforce the inquiries and hold the company to account.**

1. The QMM project has been a driver in the regional development plan in Anosy, which has received significant funding through the World Bank Integrated Growth Poles Initiative (PIC). The QMM breach occurred prior to the end of 2014 during the PIC funded programme, and the World Bank must therefore review the ways in which QMM failed to adhere to its

<sup>34</sup> See [http://eitimadagascar.org/wp-content/uploads/2014/06/decret\\_2004\\_167\\_guichet\\_unique\\_ONE1.pdf](http://eitimadagascar.org/wp-content/uploads/2014/06/decret_2004_167_guichet_unique_ONE1.pdf)

environmental standards and take steps for remedial actions in the situation. This may include the investment needed into safe drinking water supplies to affected communities.

2. The Independent International Advisory Panel (IIAP) and the Biodiversity and Natural Resource Management Committee (BNMRC) to QMM are claimed by Rio Tinto to provide international oversight to the QMM operation. If that is the case then these issues must be a priority for ongoing investigation by the IIAP and BNMRC, as well as undertaking advocacy for mitigation and monitoring of remedial actions.

### **Build capacity and offer external supports**

3. Encourage the company to invest in relevant experts to increase the capacity of QMM teams as well as local communities and stakeholders. For example, engage communications specialists with experience of providing accessible and participatory tools for local communities to learn about radioactivity.
4. The company must open its doors to external independent measurement and review of the radioactivity issues on an ongoing basis and with experts and laboratories that can muster the necessary capacity to meet international standards. Where these do not exist in country they must be sought and integrated into a coherent monitoring plan that can build QMM and other local capacity on radioactivity issues. It is noted that new Rio Tinto radiation studies are underway, but questions remain as to when and how the studies will be shared across all stakeholders. All relevant and supporting data must be made available for scrutiny in order to ensure transparency and objectivity, and citizens and stakeholders aided to understand the findings in accessible ways.
5. The recommendations by Swanson clearly outline the steps required to improve monitoring performance and communications around the radioactivity questions, and the company must rapidly demonstrate its advance of improvements, and share transparently all data and reporting that ensues. The company must communicate the findings in open and accessible ways for local people and civil society, *“with particular focus on transparency, empathy, and the building of trust”* (Swanson 2019a), and should be supported in this process by local government and international actors.

### **Promote transparency**

6. The challenges and the issues in hand require commitment to full disclosure and public access to relevant data and documentation, monitoring and evaluation reports, including from the ONE and external providers.
7. Local civil society, national and international agencies can all play a part to maintain pressure on the company and the Malagasy Government to promote open and democratic processes, access to information, clear and transparent communications, and the inclusion and empowerment of local communities.

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## ANNEX 1

### Timeline: QMM Buffer Breach, Radiation and Water Quality Issues

2013/14	QMM Breach occurred 2013-14 (Ozius, 2018). Note: breach occurred before end of World Bank funded PIC programme, WB environmental standards apply
2014	QMM new Social and Environment Management Plan (SEMP) submitted to the ONE to reduce the buffer zone limit from 80-metres to 50-metres
2015	QMM's 2014-2018 SEMP approved by the ONE
2016	ALT UK advances QMM buffer breach research and alerts Friends of the Earth
2017 April	Rio Tinto (RT) AGM. ALT UK raises questions on buffer breach and radioactivity
2017 May	Meeting with RT's CEO and Senior Management Team (SMT) members and ALT UK – agreement to advance independent studies on buffer breach and radioactivity
2017 July/Aug	ALT UK identifies radioactivity expert. RT and ALT UK commence negotiations on a legal contract to release QMM monitoring data: 6 months to finalise. [Release of data was agreed for April 2018 but water data did not arrive until August 2018]
2018 Jan	RT contract Ozius for a study of the QMM buffer breach
2018 Apr	ALT UK has access to Ozius report/data which shows the QMM buffer breach; RT denies it has exceeded boundary permissions on the buffer zone
2018 Apr	ALT UK contracts Emerman to do evaluation of the buffer breach and analyse Ozius data /report. Ongoing exchange on buffer issues between ALT UK and RT
2018 July	ALT UK requests to see the report by the Malagasy regulator, the ONE, on its analysis of the buffer breach. Swanson's radioactivity review in process.
2018 Sept	ALT UK publishes Emerman's report confirming QMM's violation of the buffer zone RT/QMM continue to claim compliance with the QMM SEMP
2018 Oct	Joint letter from ALT UK and PWYP to RT on the ONE /QMM governance issues
2018 Oct	ALT UK lobbies RT again on QMM breach. RT sends technical team to Anosy
2019 Jan	RT announce changes to the QMM plan and re-instates an 80-metre buffer zone
2019 Mar	RT response to Emerman study: RT/QMM finally admits QMM buffer breach
2019 Mar	ALT UK publishes Swanson findings on radioactivity levels.
2019 Apr	RT AGM. RT explain buffer breach was "a mistake." ALT UK demands safe drinking water. RT deny QMM mine creating elevated uranium levels
2019 Jul/Aug	ALT UK commences new studies to address water contamination issues
2019 Aug	PWYP/ALT UK briefing and letter on the breach and ONE-QMM relations
2019 Sept	RT meets with Friends of the Earth, PWYP UK and MG, and ALT UK who demand safe water for communities, propose water treatment pilot, and raise questions on governance and transparency as well as communications on radioactivity
2019 Nov	RT announces it will start a new radiation study using external consultants JBS&G RT letter rejects water treatment proposal saying "premise may be misleading" (elevated uranium levels) – and insist focus should be on pathogens/nitrates
2019 Nov	Joint letter from ALT UK/PWYP MG and UK /Friends of the Earth rebutting RT's position and reinforcing need to advance water treatment and provision of safe drinking water
2019 Nov	Emerman report on water sample analysis is finalised. Reports by Emerman and Swanson (Memo) shared with RT to substantiate argument that uranium and lead contamination linked to QMM operations
2019 Dec	Update from RT: new radiation study underway by JBS&G
2019 Dec	ALT UK publishes new Emerman water report and Swanson memo
2020 Jan	Follow up questions and lobbying of RT by ALT UK, PWYP MG and UK, and Friends of the Earth
2020 Feb	RT respond to ALT UK new water studies: continue to refute link between QMM extraction and contamination. No advance on safe water provision RT alert that first water data from JBS&G study will be delayed
2020 Mar	ALT UK, PWYP MG and UK and Friends of the Earth push back on RT's response to Emerman's water study
2020 April	RT AGM. RT fails to answer questions from PWYP MG on assessment and reporting for status of "negligible" impact of breach. RT claims QMM only uses water for extraction. No advance on safe drinking water provision
Current	Awaiting response to issues raised and questions in the rebuttal letter from ALT UK, PWYP MG and UK, and Friends of the Earth to Rio Tinto sent in March 2020

**Note:** the above timelines represent key events/landmarks during the research and advocacy process. However, regular exchanges occurred between ALT UK and Rio Tinto between 2017-2018. This decreased significantly after ALT UK published the Swanson review and her findings of uranium in water, in March 2019. Since meeting in September 2019, Rio Tinto's CEO and SMT members committed to only one meeting per year with ALT UK, PWYP (MG and UK) and Friends of the Earth to follow up on issues.

## ANNEX 2 Outcomes of Research and Advocacy as of April 2020

### Rio Tinto

The company has previously made a number of admission/concessions and changes. These are documented on the ALT UK website: **Impacts of ALT UK Research And Advocacy (from May 2017- to May 2019)**

Most recently:

1. Rio Tinto has advanced a new radiation study by JBS&G and has committed to sharing the data and results transparently through a peer review process.
2. Rio Tinto has undertaken remedial work on raising the mine's paddocks (named "rehabilitation lagoons") to prevent recurrence of wastewater overflows.
3. Rio Tinto appears committed to a significant review of its water management. In its 2019 Strategic Report on sustainability it states: "*QIT Madagascar Minerals (QMM) operations present a significant risk from a water and broader environmental perspective due to their location, the nature of the surrounding environment and the mining process. So, we have committed to reviewing our current practices and infrastructure to develop and implement an improved site water management approach by 2023*" (Rio Tinto 2019 Annual Report, page 67).

### Governance

4. The Ministry of Environment announced in August 2019 there would be an investigation into the ONE and QMM relations in Anosy. Although there was no public process as such, the National Office for the Environment (ONE)'s local representative in Anosy was replaced.
5. The QMM Independent International Advisory Panel (IIAP) endorsed the joint call for public access to the ONE reports. They have also added their voice to the call for a change to the current formula of corporate funding of the ONE monitoring and evaluation processes (email Calderisi, Feb 2020 and IIAP Report, Nov 2019). This will reinforce the call for changes in QMM-ONE relations and practices.
6. The latest monitoring table of the ONE in Anosy appears more exigent of QMM. Tabled in their September 2019 report, and also highlighted by Rio Tinto at their 2020 AGM, the ONE has issued warnings and demanded "*drastic*" actions from QMM.
7. The ONE has introduced the threat of sanctions if actions required of QMM are not delivered. This may promote improved compliance ([see relevant extracts from the ONE report, Annex 3 below](#)).
8. Rio Tinto has claimed, and there is eyewitness account, that some remedial action of the QMM berm and paddocks (settling ponds) has been undertaken.
9. Malagasy civil society platforms have taken up the governance and water issues and lobbied the Madagascar government, including demanding a social and environmental audit of the mine.
10. The ONE has made a change to its technical committee for environmental surveys of QMM by introducing a civil society 'observer'. It is an opportunity to allow civil society to have a view on the environmental monitoring process and to make comments or contributions as necessary.

### What is still outstanding

11. Provision of safe drinking water to local communities.
12. Improved management of wastewater from the mine. Transparency on water quality.
13. How the Swanson report findings will be communicated to local communities and how local people can be included in and become educated about radioactivity governance e.g. regards exposure to incremental doses (there are multiple questions outstanding on communications strategy).
14. Data sharing from new radiation monitoring exercise by JBS&G. First results were due March 2020 but have been delayed. The company promises to share results but there are no details of the process yet. For example, will all data be available, not just the conclusions?
15. Still no transparency on the ONE assessment of the buffer breach. Rio Tinto admits that they never had sight of any technical assessments carried out by the ONE (Mongabay, Nov 2019).
16. Responses to ALT UK's multiple technical questions and requests for documents outstanding since 2017.

### ANNEX 3 Extracts of the ONE 'Table de Suivi' (monitoring report) September 2019

Key issues (French translation of extracts below) from the from the National Office for the Environment (ONE) monitoring report on QMM from September 2019 were raised by ALT UK, PWYP MG and UK, and Friends of the Earth in a letter to Rio Tinto in March 2020, including:

1. Mention of a “*major*” environmental incident but no detail. Also mentioned are concerns about the storage of monazite not being in compliance with the Social and Environmental Management Plan (SEMP), and such that the ONE requires QMM to take “*drastic and immediate action*”.
2. Observations with regard to the treatment of contaminated soil for which the ONE has recommended “*improved performance*.”
3. A 2018 overflow incident is reported and improvements in water quality management expected, in particular following complaints in lack of conformity, and with some problems persisting and requiring “*drastic action*” from QMM.
4. The ONE highlights non-conformity by QMM in the modification of the surface water quality of bodies of water and swamps downstream from wastewater treatment plants. The ONE demands that “*water quality downstream needs to be corrected if company is to avoid sanctions*.”
5. With regard to communications on radioactivity, the ONE has recommended that QMM establish the “*difference between prudence and transparency*.”

Note: PGES is the Programme de Gestion Environnementales et Sociales – the French version of the Social and Environmental Management Plan (SEMP).

Page 4 : “ Le stockage des sacs de monazite au MSP n'est pas conforme aux dispositions du PGES Monazite Existence de fuites en plusieurs points des pipelines au niveau du MSP. Prendre de mesures drastiques dans l'immédiat

Page 4 : 12,8 tonnes des sols contaminés ont pu être traités ; La quantité de sols traités en 2018 a diminué de 38% par rapport en 2017 par manque de réactif pour l'analyse des TPH du sol. Améliorer la performance

Page 6 : Q-1 : Modification de la qualité physico- chimique et microbiologique des eaux souterraines suite à un déversement accidentel de produits polluants *Qualité des eaux souterraines* : Application -des mesures générales requises, -des mesures relatives aux sols, -des mesures relatives aux régimes hydriques. Mettre en œuvre un programme de suivi de la radioactivité dans l'eau dans le PGES 2019-2013. Présenter les résultats dans le bilan 2019 et soyez très vigilants

Page 7 : Q-3 : Modification de la qualité des eaux de surface, des milieux, due aux effluents des stations de traitement d'eaux usées ; *Indice de la qualité des eaux (effluents)*. Existence de plainte sociale par rapport au STEP 1. Persistance de la non- conformité des STEP 1 et 2 : Attention !!! la non- conformité au niveau du STEP 2 semble persister. Prendre des mesures drastiques immédiatement

Page 7 : Q-4 : Modification de la qualité des eaux de surface des plans d'eau et des marécages en aval des usines de traitement des eaux usées - Non-conformité relative aux paramètres Conductivité, Turbidité, Nitrates, Coliformes totaux, entérocoques, E coli, germes anaérobiques sulfite-réducteurs ou ASR. Faites les efforts et les investissements nécessaires pour que ces non conformités ne se reproduisent plus à l'avenir sous peine de sanction au prochain suivi

Page 21 : Prévoir la poursuite de la mesure du taux de radioactivité ambiante via ONE/INSTN pour 2019. Revoir l'approche de communication par rapport à ce sujet en considérant les points critiques : bien établir la différence entre communication prudente et transparence. Intensifier les communications Envisager la production de supports de communication adaptés aux différents cibles et collaborer avec les autres entités pour la diffusion (supports adaptés aux enfants pour les écoles, STD, CTD, ...)

Page 21 : SAN-5 : Augmentation du niveau de la radioactivité consécutive de la gestion des sables radioactifs *Niveau radioactivité dans le site minier* : comme l'exportation de monazite est un projet qui vient d'être démarré, c'est la collecte de données par rapport à la santé de la population auprès du SDSP qui doit être fait. L'analyse est nécessaire au moment des évaluations périodiques pour voir les éventuels changements. accès d'information avec les personnels médicaux du CHRR Fort-dauphin, CSBII Ampasy et MMM, école paramédicale ISPAFOR réalisées (PPT sur la valorisation des sables contenant de la monazite avec Augmentation de la superficie des zones contrôlées au niveau de la mine. Mettre les rapports des réalisations relatives au plan de gestion de la radiation dans le bilan.

Page 22 : Stockage de la monazite au niveau du MSP non conforme au PGES Monazite. Prendre des mesures drastiques immédiatement et envoyer un rapport de mise en œuvre des mesures correctives.