

**AN ANALYSIS OF THE MINAMATA CONVENTION ON MERCURY AND ITS  
IMPLICATIONS FOR THE REGULATION OF MERCURY IN SOUTH AFRICA**

By

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## DECLARATION

I, JAMES CONNOR ROSS, declare that

The research reported in this dissertation, except where otherwise indicated, is my original work.

This dissertation has not been submitted for any degree or examination at any other university. This dissertation does not contain other persons' writing, unless specifically acknowledged as being sourced from other researchers. Where other written sources have been quoted, then:

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As the candidate's Supervisor I agree to the submission of this dissertation.

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## Acronyms List

WHO	-	World Health Organisation
UNEP	-	United Nations Environmental Programme
INC	-	Intergovernmental Negotiating Committee
COP	-	Conference of the Parties
NEMA	-	National Environmental Management Act
NWA	-	National Water Act
NEMICMA	-	National Environmental Management: Integrated Coastal Management Act
NEMWA	-	National Environmental Management: Waste Act
MEC	-	Member of the Executive Council
NEMAQA	-	National Environmental Management: Air Quality Act
AMD	-	Acid Mine Drainage
ASGM	-	Artisanal and Small-Scale Gold Mining
DDT	-	Dichlorodiphenyltrichloroethane

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# CHAPTER 1:

## INTRODUCTION

### 1.1 Rationale for the Study

In order to understand the gravity of mercury poisoning and the consequences it has for both human and environmental health, one must understand that the presence of mercury, even in relatively small amounts, is extremely toxic, particularly in methylmercury form.<sup>1</sup>

The World Health Organisation (hereafter WHO) designates a guideline value of 5 µg/g creatinine (which is used as an indicator of renal health<sup>2</sup>) as the threshold for maximum acceptable mercury levels found in the human body for those who have suffered exposure, while those who have not been exposed generally have mercury levels of around <10 µg/l.

As reported by Oosthuizen, mercury levels of >40 µg/l result in symptoms such as fever, tremors, mood swings, insomnia and acrodynia. When such levels increase to >60 µg/l, additional respiratory symptoms may develop. Furthermore, despite a general belief that mercury levels of less than 40 µg/l are asymptomatic<sup>3</sup>, a Swedish study “reported central nervous system symptoms involving 96 occupationally exposed individuals with a median mercury level in urine of 25 µg/g creatinine. Another study found renal effects in workers with levels >20 µg/g creatinine.”<sup>4</sup>

South African mercury emissions are significant by global standards, some surveys placing us as the world’s sixth largest emitter of mercury<sup>5</sup>. This is due to a number of factors, primary among them being our large reliance of the burning of coal for fuel, which releases the mercury which naturally occurs within the substance. Other sources of mercury within the country include the by-products from gold mining (primarily artisanal), dental amalgams, seafood and

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<sup>1</sup> Zahir F, Rizwi SJ, Haq SK, Khan RH. Low dose mercury toxicity human health. *Environ Toxicol Phar* 2005; 30: 351-360.

<sup>2</sup> <https://medlineplus.gov/ency/article/003475.htm> accessed on 1 November 2016.

<sup>3</sup> ATSDR (Agency for Toxic Substances and Disease Registry). *ToxFAQs: CABS Chemical Agent Briefing Sheet 2006*. [http://www.atsdr.cdc.gov/cabs/mercury/mercury\\_cabs.pdf](http://www.atsdr.cdc.gov/cabs/mercury/mercury_cabs.pdf).

<sup>4</sup> World Health Organization. *Elemental Mercury and Inorganic Mercury Compounds: Human Health Aspects*. Geneva: World Health Organization, 2003.

<sup>5</sup> Scott, G and Mduli, T ‘The Minamata Treaty/Protocol: Potential Implications for South Africa’ (December 2012) Vol. 22 No. 2 *Clean Air Journal*: Page 17 – 19

beauty products such as skin whitening cream.<sup>6</sup> Additionally, at least one example exists of high scale mercury contamination as close to home as the Umgeni River, during the Thor Chemicals saga of the late 1980's.

The dangers associated with mercury illustrate the necessity of international standard for dealing with its proliferation. The need for such a standard has been met with the implementation of the Minamata Convention on Mercury.

The above serves as the rationale for this study. Furthermore, due to the fact that no such comparative study into South Africa's mercury regulation has been undertaken previously, it is hoped that this study would enrich the field of literature on the subject.

## **1.2 Central Research Questions**

The following key question will guide this study's data collection and analysis.

- In what ways (if any) is the pre-existing South African legislation responsible for regulating mercury emissions inadequate in light of the convention?

Furthermore, the following subsidiary questions will be used to address various critical issues related to mercury and its use on a national level;

- In what ways is South Africa reliant on the use of mercury in its industrial processes and is this flexible to change?
- What effects of mercury contamination can be observed within South African society, and if so, what are they?
- Based on the above, what type of new regulatory legislation alterations may need to be enacted?

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<sup>6</sup> Thomas, W 'Through the Looking Glass: A Reflection on Current Mercury Regulation' (2004) Vol. 29 *Columbia Journal of Environmental Law*: Page 146 – 189

### **1.3 Research Methodology**

A comparative research methodology is this study's primary research approach. This will be accomplished by exploring the similarities and differences between the regulations governing mercury emissions within South Africa and those prescribed in the international Minamata Convention on Mercury.

The data has been collected through studying black letter law, the primary sources of which are international and regional conventions, policies, and national statutes. Secondary sources of information include academic books and journals as well as relevant online resources. All data sources are analysed below. The data sources were selected based on purposive sampling<sup>7</sup>

The issue of mercury contamination involves many branches of environmental law concerned with pollution regulation. In light of this, and since there is no Act specifically geared towards regulating mercury emissions, relevant South African Environmental law in this regard will be examined holistically.

Relevant provisions from the varying pieces of national legislation will be analysed against the standards set by the Convention in order to establish their consistency with those standards, or lack thereof.

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<sup>7</sup> "Purposive sampling (also known as judgment, selective or subjective sampling) is a sampling technique in which researcher relies on his or her own judgment when choosing members of population to participate in the study." <http://research-methodology.net/sampling-in-primary-data-collection/purposive-sampling/> accessed on 23 April 2017.



## CHAPTER 2: THE MINAMATA CRISIS

### 2.1 The Contamination of Minamata

The history behind the formation of the Minamata Convention on Mercury is not a happy one, replete with elements of socio-economic marginalisation and oppression, questionable (perhaps at times non-existent) political will to rectify the situation as well as intense physical and psychological suffering on the part of the citizens of Minamata both during and since the catastrophic contamination of their city and widespread degradation of the surrounding Minamata Bay ecosystems. Additionally, the incident has acquired an extra element of notoriety as arguably the event which brought to light a series of ongoing environmental issues in Japan and across the globe.<sup>8</sup>

The Japanese sea-side village located in Kumamoto Prefecture, from whence the Convention takes its name, had a strong legacy of being primarily a fishing village, albeit a poor one. Over the first few decades of the 20<sup>th</sup> century however, while the consumption of fish (particularly shellfish) remained a crucial part of the inhabitants' staple diet, the village started to discard this label as it had begun to rely economically on the presence of a chemical production factory owned by the Chisso Corporation which was established in 1907. This transition was not without controversy, as the effects of the factory on the surrounding environment had begun to take a toll on Minamata's fishermen long before the incident in question arose. As a result of this, the Chisso Corporation had entered into two separate compensation agreements with the fishermen. While this is perhaps not significant in and of itself, it represented a foreshadowing of things to come.<sup>9</sup>

The factory had over time become an integral part of the community's existence, with the quality of life thereof inextricably linked to the Corporation's success or failure. The extent of this is detailed by Timothy who states that Chisso eventually became the supplier of over a

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<sup>8</sup> Participatory Research by Niigata Minamata Disease Victims, and Empowerment of These Victims; REIKO SEKI Journal compilation © 2006 The Japan Sociological Society.

<sup>9</sup> Harada, M. (1972). *Minamata Disease*. Kumamoto Nichinichi Shinbun Centre & Information Center/Iwanami Shoten Publisher.

quarter of all the jobs in Minamata<sup>10</sup>. The industrial socio-economic influence of the Chisso Corporation became particularly significant following its decision to begin producing acetaldehyde, a chemical used to produce plastics and which emits methylmercury<sup>11</sup> as a by-product. This decision proved to be both popular and profitable, particularly in the context of a Japan struggling to feed its own people in a post-World War II landscape.<sup>12</sup>

Following from this, it has become apparent in retrospect that due to the use of mercury as a catalyst as part of its industrial process from 1932 to 1968, the Chisso Corporation was dumping wastewater containing extremely high quantities of methylmercury into the Minamata Bay and surrounding Shiranui Sea, contaminating the sea life therein. The effects of this were not immediately apparent, but symptoms of mercury poisoning began to slowly insinuate themselves into the day to day life of both the human and animal inhabitants of Minamata. At its apex, approximately 200 000 residents are believed to have contracted Minamata Disease, as the symptoms of the contamination came to be known.

In his analysis of events, Allchin states that, 'it started out quite simply, with the strangeness of cats "dancing" in the street--and sometimes collapsing and dying'.<sup>13</sup> As a result of this observation, it was believed for a period of time that it was only the feline population which was at risk from the mysterious affliction, and ultimately led to the local community labelling the first few outbreaks of mercury poisoning as "Dancing Cat Fever".<sup>14</sup> It is now understood that the cat population were among the first to suffer from the soon to be widespread mercury

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<sup>10</sup> Timothy G. S. (2001). *Minamata: Pollution and the Struggle for Democracy in Postwar Japan*. Harvard University Press.

<sup>11</sup> "Mercury occurs in several different geochemical forms, including elemental mercury [Hg(0)], ionic (or oxidized) mercury [Hg(II)], and a suite of organic forms, the most important of which is methylmercury (CH<sub>3</sub>Hg<sup>+</sup>). Methylmercury is the form most readily incorporated into biological tissues and most toxic to humans. The transformation from elemental mercury to methylmercury is a complex biogeochemical process that requires at least two steps: (1) Oxidation of Hg(0) to Hg(II), followed by (2) Transformation from Hg(II) to CH<sub>3</sub>Hg<sup>+</sup>; step '2' is referred to as methylation." - Alpers and Hunerlach, 2000

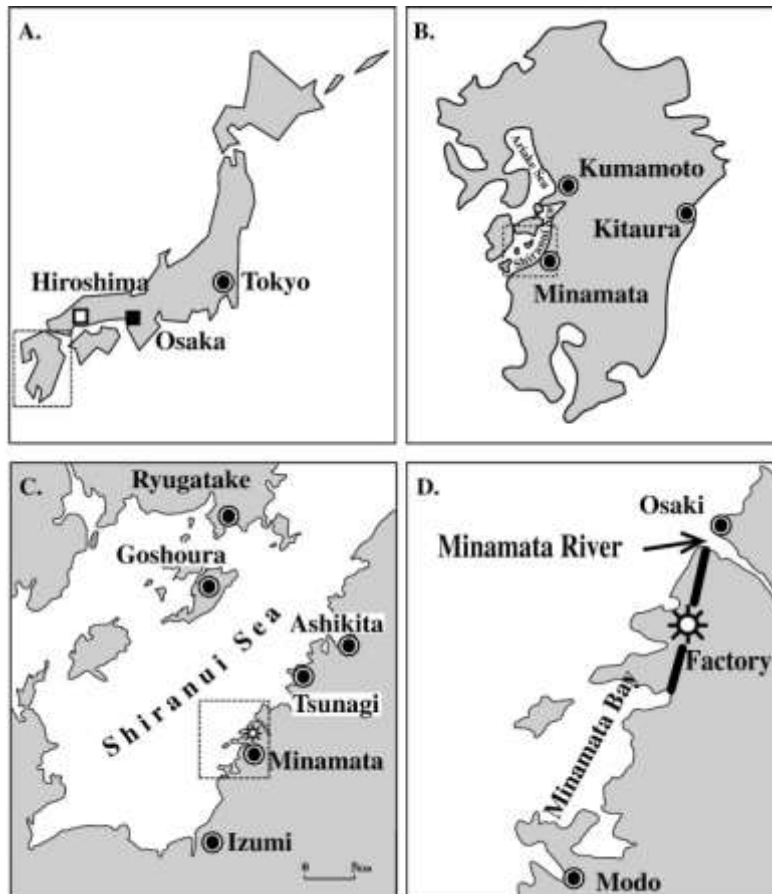
<sup>12</sup> As an aside, it has been argued that the dire economic in which Japan found itself at this time was very influential in promoting another element of Japanese culture which has had a significant negative environmental impact, the whaling industry. According to the Sea Shepherd Conservation Society, a USA non-profit, marine conservation organisation, "The modern day pelagic whaling fleet of Japan is actually the creation of the United States. In 1946, General Douglas MacArthur proposed the creation of a Japanese whaling fleet to secure protein for the conquered Japanese people. He did so in order to cut down on the United States' costs of transporting food to post war Japan." (<http://www.seashepherd.org/commentary-and-editorials/2006/06/27/the-truth-about-traditional-japanese-whaling-375>)

<sup>13</sup> Allchin, D. 'The Poisoning of Minamata' <https://www1.umn.edu/ships/ethics/minamata.htm>

<sup>14</sup> Withrow, S. J., Vail, D. M., Withrow and MacEwen's Small Animal Clinical Oncology, Elsevier: 2007, p. 73-4

contamination simply due to the fact that it was almost solely on scraps of fish and shellfish from the Minamata Bay that these animals survived.

As the local populace had a similar staple diet consisting of fish and shellfish, this led to widespread mercury poisoning, with effects including paralysis, ataxia, insanity and ultimately death. Another tragic consequence of mercury poisoning was and is the congenital effects it has on foetuses in the womb.



**Figure 2.1:** Maps showing the City of Minamata and surrounding bay area.

**Source:** Minamata disease revisited: An update on the acute and chronic manifestations of methyl mercury poisoning' (2007) Journal of the Neurological Sciences 262 131-144 (accessed online at <http://www.sciencedirect.com/science/article/pii/S0022510X07004558> on 15 September 2015)

The above image<sup>15</sup>, through gradual magnification, provides a clear understanding of the geography and scale of the Minamata Crisis. The panels themselves depict Japan, Kyushu Island, the Shiranui Sea and Minamata Bay respectively. The latter two regions, Minamata Bay and the Shiranui Sea, are themselves roughly 2km<sup>2</sup> and 1200 km<sup>2</sup> respectively. The Bold lines issuing from the Factory in panel describe the likely routes of mercury discharge.

## **2.2 The Biological effects of the Crisis**

The medical side-effects of the Minamata tragedy were explored in detail by Ekino<sup>16</sup> in 'Minamata Disease Revisited' who provides an excellent description of the range and scope of the contamination and a clear definition for Minamata Disease, identifying its symptoms individually through various tests and thoroughly describing each one in turn.

In acute cases of Minamata Disease, the symptoms identified are as follows;

- Visual impairment, with field of vision in particular being affected;
- Hearing impairment, with significant damage sustained to the temporal lobe and as a result those areas responsible for speech discrimination;
- Olfactory and Gustatory<sup>17</sup> disturbances as a result of cortical lesions<sup>18</sup>;
- Cerebral ataxia<sup>19</sup>, with symptoms relating to Dysmetria, Adiadochokinesia<sup>20</sup>, alterations of speech, writing and movement problems all evidenced<sup>21</sup>;
- Somatosensory disturbances and Psychiatric Symptomatology<sup>22</sup>. In such instances the researchers divided the affected in three distinct categories, described as follows;

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<sup>15</sup> Taken from 'Minamata disease revisited: An update on the acute and chronic manifestations of methyl mercury poisoning' (2007) Journal of the Neurological Sciences 262 131-144 (accessed online at <http://www.sciencedirect.com/science/article/pii/S0022510X07004558> on 15 September 2015).

<sup>16</sup> Department of Psychological Medicine, Graduate School of Medical Sciences, Kumamoto University, Honjo, 860-8556 Kumamoto, Japan

<sup>17</sup> Related to the senses of smell and taste respectively.

<sup>18</sup> Essentially damage to the outer layer of the brain.

<sup>19</sup> Inflammation of the area of the brain which controls coordination.

<sup>20</sup> Dysmetria and Adiadochokinesia are both disorders characterised by an inability to perform certain movements, and are related to a lack of coordination.

<sup>21</sup> Tokuomi H. Clinical Investigation on Minamata Disease. A. Minamata Disease in Human Adult. In: Study Group of Minamata Disease, editor. Minamata Disease. Kumamoto: Kumamoto University, 1968: 37-72.

<sup>22</sup> Somatosensory disturbances, as well as the other disorders referenced, describe damage to the ability to experience various sensations, such as taste, smell, pressure and pain.

(1) akinetic mutism or hyperkinesia with severe intellectual and emotional disabilities, (2) ataxia with/without extrapyramidal symptoms or intellectual/personality disabilities, and (3) intellectual/personality disabilities”

- Foetal mercury poisoning, with the result that as children these patients showed signs of psychomotor disturbance, intellectual disability, personality disturbance, epilepsy, along with various neurological symptoms.

These symptoms, including spongiosis<sup>23</sup> of the cerebral cortex evidenced in children born of mothers with Minamata Disease, show the effects of mercury poisoning to be highly neurotoxic, with the developing brain being particularly vulnerable<sup>24</sup>.

Finally, it is reported that despite the residents of the Shiranui Sea area having not been subjected to methylmercury exposure for approximately 30 years, there remain cases of chronic Minamata Disease, with the primary cause of concern being “paresthesia<sup>25</sup> at the distal parts of the extremities and around the lip”.

### Acknowledgement of the Crisis

The battle for the residents of Minamata Bay and the surrounding Shiranui Sea area for recognition of their plight, and for the wrongs wrought by the Chisso Corporation, was a long and bitter one. To simplify matters, the following is a brief timeline summarising the progression of Minamata Disease and its aftermath;

- |            |  |
|------------|--|
| 1932-1968: | Chisso began operating an acetaldehyde plant in Minamata using inorganic mercury as a catalyst. Methylmercury was subsequently released to Minamata Bay over the 36 year period. |
| 1950s:     | Sufferers had begun to emerge, these being residents from the immediate area surrounding Minamata Bay.   |

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<sup>23</sup> An accumulation of fluid.

<sup>24</sup> Berlin. M. ‘Mercury’ L. Friberg, G.F. Nordberg, V. Vouk (Eds.), Handbook on the toxicology of metals (second edition), Elsevier, Florida (1987), pp. 387–445.

<sup>25</sup> A constant burning or prickling sensation.

- 1956: It is during this time Minamata Disease was officially confirmed, the symptoms and widespread nature of the affliction making it impossible to ignore. The cause however remained unknown.
- 1968: The Government of Japan and Chisso finally begin to acknowledge the methylmercury from Chisso as being the cause of Minamata Disease. Chisso Corporation ultimately closed the acetaldehyde plant as a consequence.
- 1969: Government offered a settlement, but the victims of the tragedy were split into two groups, either for or against the proposed sum.
- 1969-89: Due to dissatisfaction with the proposed settlement amount, during this period many victims began to personally take Chisso to court in attempt to procure sufficient compensation.
- 1977: The Japanese Government institute a specific set of criteria for recognition of Minamata Disease.
- 1977-78: Many victims who had not been recognized raised lawsuits against Government, Kumamoto Prefecture and Chisso.
- 2004: Following the string of cases brought by victims of the disaster, the Supreme Court finally denounced the inaction of the National Government, and specifically the Kumamoto Prefecture as having contributed to magnifying the scope of the disaster, ultimately laying complete responsibility at the feet of those involved.
- 2009: A Minamata Relief Law was passed at the Diet<sup>26</sup>, broadening the range of Minamata patients eligible for government relief.
- 2010: Kumamoto district court recommended a revised settlement amount for the afflicted, the majority of which accepted.
- 2010: One group decided to continue their lawsuit seeking more substantial solution.
- 2010: Government announced a policy for the relief of Minamata and Niigata victims based on the Minamata Relief Law and the Settlement recommended by a district court which heard the matter.
- 2010: PM Yukio Hatoyama attended the 54th annual memorial service for the victims of Minamata disease and apologised to Minamata victims.<sup>27</sup>

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<sup>26</sup> The national legislative body of Japan.

<sup>27</sup> Timeline obtained from [http://mercurypolicy.org/wp-content/uploads/2010/06/mercury\\_issues\\_in\\_japan\\_1005111.pdf](http://mercurypolicy.org/wp-content/uploads/2010/06/mercury_issues_in_japan_1005111.pdf) page 5 - page 6. This a paper published by the Profile of Citizens Against Chemicals Pollution (CACP), a seemingly small NGO based in Japan which has as its mission statement; “To provide information with the public and take action necessary for protecting human health and environment from harmful chemicals based on Precautionary Principle and Environmental Justice.”

### **2.3 Concluding Remarks**

Due to a dearth of political will as well as the disparity in economic clout between the complainants and those responsible, those affected by the Minamata Tragedy were made to wait decades for any sort of validation for the trauma they had suffered.

Despite this, the identification of mercury poisoning among the inhabitants of Minamata (the disease/symptoms ultimately receiving the name “Minamata disease”) and the subsequent global attention it received was arguably one of the factors assisting in the formation of United Nations Environmental Programme (UNEP).<sup>28</sup>

While regulations restricting and monitoring the release of heavy metals including Mercury have since come into effect elsewhere, the most recently formulated ‘Minamata Convention on Mercury’ (2014) is a natural legal consequence of this tragedy. The stringent standards set by this convention have since provided a baseline standard against which all national legislation must be measured, and this study will assess the South African legislation in this respect.

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<sup>28</sup> Admittedly perhaps an example of correlation rather than causation, it is nevertheless true that during the 1972 Stockholm Conference on the Human Environment, at the same time that Minamata Disease and Niigata - Minamata Disease were attracting global attention, delegates were made familiar with the case of Japanese junior high school student Shinobu Sakamoto, disabled as the result of methylmercury poisoning *in utero*. The United Nations Environment Programme (UNEP) was established shortly thereafter. Source: Tanaka, H. 9 October 2013. “Minamata disease sufferer pins hope on mercury ban treaty”. *The Asahi Shimbun* (Tokyo, Japan: The Asahi Shimbun Company). [http://ajw.asahi.com/article/behind\\_news/AJ201310090066](http://ajw.asahi.com/article/behind_news/AJ201310090066) (Accessed on 9th November 2014)

## **Chapter 3:**

# **THE MINAMATA CONVENTION ON MERCURY**

## **Introduction**

This chapter deals in broad strokes with the build up to the drafting of the Convention, including the various stages of negotiation, as well as an analysis of the Convention itself and how it operates. A look is also taken into the number of states to have signed or ratified the convention and the significance of those states having done so.

### **3.1 Build-up to / route taken in drawing up the document**

The road to incorporation as a binding international legal instrument for the Convention was (even discounting the vague discussions of the need for such an instrument which followed acknowledgement of the Minamata Tragedy) a long one, spanning roughly 12 years from the time when official preparations for the agreement began. The introduction to the Convention itself gives a brief description of the series of events leading up to its formation.

The first broad step taken was the request by the Governing Council of the United Nations Environment Programme<sup>29</sup> in 2001 for a global assessment of the state of Mercury as a whole and its effect on society, to be undertaken by the Executive Director of UNEP. The factors to be considered in this report included ‘the chemistry and health effects, sources, long-range transport, and prevention and control technologies relating to mercury’.<sup>30</sup>

The assessment in question was duly compiled and reviewed by 2003, with the result being that the Governing Council accepted the potential danger posed by the presence of Mercury and its associated compounds, and on the basis of this began to promote a general global initiative to reduce the dangers in question through various means. Chief among these were the encouraging of governments to set goals and standards for the reduction of mercury, additionally UNEP established ‘technical assistance and capacity building activities’<sup>31</sup> in order to assist in this effort.

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<sup>29</sup> As stated within the Convention text, this body is now known as the United Nations Environment Assembly.

<sup>30</sup> Introduction, Para 1 (pg 3).

<sup>31</sup> *ibid*



As awareness of the health risks associated with mercury increased over the following decade, there were some significant measures taken by individual governments in combating pollution, as well as an increased focus on the development of ‘new or existing international legal instruments’.<sup>32</sup>

Despite this, the Governing Council found that by 2009 the aforementioned measures were inadequate. In light of this the decision was taken to create a binding multilateral agreement, the particulars of which would be formulated by the previously discussed intergovernmental negotiating committee. This “legally binding instrument”<sup>33</sup> was of course the Minamata Convention on Mercury adopted on 10 October 2013 in Japan.

The introduction to the Convention concludes with a brief summary of its objectives and how these might be achieved, a general call to the governments of all states to become parties to the instrument and finally a statement reaffirming UNEP’s belief in the Convention’s capacity for achieving its objectives.

### **3.2 Description of INC1- INC5**

Although the above gives a broad outline of the international zeitgeist leading up to the formation of the Convention, the negotiating procedure itself, during which the technicalities and nuances of the Minamata Convention were formulated, was effected through several dedicated committee meetings. The Committee was titled the “Intergovernmental Negotiating Committee to prepare a global legally binding instrument on mercury” (hereafter INC), with its meetings simply labelled INC1 to INC5 for the sake of clarity.

Although INC1 was conducted in 2010, prior to this an ad hoc open-ended working group met in Bangkok from 19 to 23 October 2009 in order to prepare for the aforementioned committee meeting, which preparation included a set of draft rules of procedure.

The minutia of these meetings, which began in 2010, warrant some revision, if only for the purpose of charting the rationale behind the inclusion of various provisions in the final Convention.

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<sup>32</sup> Introduction, Para 2 (pg 3).

<sup>33</sup> Introduction, Para 3 (pg 3).

INC1 ran from the 7<sup>th</sup> to the 11<sup>th</sup> of June 2010, and was held in Stockholm, Sweden. The meeting covered the documents prepared and supplied at the request of the aforementioned Ad hoc work group which had met in Bangkok the previous year. These documents, which can be accessed via UNEP's Minamata Convention website<sup>34</sup>, covered a wide range of issues, from relevant International Trade Law to aspects of other international agreements which may be of use in the formulation of the Minamata Convention, including "materials addressing ... standard articles on final provisions that are typically included in multilateral environmental agreements".

INC2 was held in Chiba, Japan from 24 to 28 January 2011. At this session delegates negotiated the basic structure of the proposed convention, as well as several key areas it was to cover, namely; storage, waste and contaminated sites; artisanal and small-scale gold mining; emissions to air and releases to water and land.

INC3 was held in Nairobi, from 31 October to 4 November 2011. This meeting further discussed the substance of the Convention and how it related to artisanal and small-scale gold mining; storage, wastes and contaminated sites; and awareness raising, research and monitoring, and communication of information. Various administrative issues were also explored by a legal group for the INC which had been established at INC2.

INC4 was held at Punta del Este, Uruguay, from 27 June to 2 July 2012. This session finalised the various issues under debate, allowing for a final draft of the Convention to be prepared for INC5.

INC5, the final meeting of the INC prior to the Convention coming into force and effect, took place from 13<sup>th</sup> to 18<sup>th</sup> January 2013 in Geneva, Switzerland. This represented the last stage of negotiations, and on the morning of the 19<sup>th</sup> January 2013, the final text of the global legally binding instrument was agreed upon.

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<sup>34</sup><http://www.mercuryconvention.org/Negotiations/> accessed on 14 November 2015

### 3.3

#### Summary and Analysis of the Minamata Convention Provisions

Having explored the route taken towards the formulation of the Convention and the foundation laid by the meetings of the INCP, it is now necessary to examine the convention itself, looking at its respective Articles and through this obtaining an insight into the Convention's scope and means of operation. Thus what follows is a relatively brief summary of the relevant provisions<sup>35</sup> of the Convention.<sup>36</sup> The provisions discussed are primarily those which; convey the spirit of the Convention; identify those activities which relate to the emission of mercury; regulate mercury in an international context (i.e. trade); provide obligations for member states to enact programmes aimed at reducing mercury contamination; and methods by which the success of these programmes might be achieved.

#### Preamble

Whilst not itself a Clause to the Convention, the preamble to the Convention provides the justification for the parties' agreement to the instrument and aids in the interpretation of any potential ambiguities therein. The preamble in question takes into account the myriad health risks posed by mercury, obligations imposed by previous international agreements such as the Governing Council's 2009 decision and the United Nations Conference on Sustainable Development, and finally the need for international cooperation in respect of this issue.

#### Article 1

##### Objective

As can be seen from the use of "objective" in the singular, the Convention's stated goal is quite succinct, centres on human and environmental well-being, and reads as follows;

"...to protect the human health and the environment from anthropogenic emissions and releases of mercury and mercury compounds."<sup>3738</sup>

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<sup>35</sup> Those provisions which are concerned with the Bureaucratic operation of the Convention have been omitted for the sake of expediency.

<sup>36</sup> Minamata Convention on Mercury, found at [http://www.mercuryconvention.org/Portals/11/documents/Booklets/Minamata%20Convention%20on%20Mercury\\_booklet\\_English.pdf](http://www.mercuryconvention.org/Portals/11/documents/Booklets/Minamata%20Convention%20on%20Mercury_booklet_English.pdf)

<sup>37</sup> Article 1, Para 1 (pg 6).

<sup>38</sup> These essential core values effectively mirror the aims and spirit of South Africa's own environmental legislation, and are reflected in both s24 of the Constitution as well as in the objectives of NEMA.

It is worth noting that although neither the human or environment aspect is favoured nor given any particular emphasis in terms of the language used to construct the Convention “objective”, the sentence structure hints at a potential hierarchy.

The phrase “human health” is placed before “the environment” in the above sentence. One might infer from this that should a weighing up of interests happen to occur (as often does when dealing with Environmental legislation), human well-being would be given preference over preservation of a given ecosystem.

## Article 2

### Definitions

Although it is not necessary to delve into too much detail regarding this Article, which ranges from subsection (a) to (k), it is vital when interpreting the Convention, and will be referred to in the following analysis when necessary.

Key definitions (which are not of a legal nature) do require attention, however, and can be summarised as follows;

“Artisanal and Small-scale gold mining” implies mining operations at an individual or small enterprise level.

“Best available techniques” and “Best environmental practices” refer respectively to the most effective methods of reducing mercury emissions, and where necessary the release of mercury by means of the most efficient environmental control measures available.

Basic “mercury” is defined as elemental mercury, represented on the periodic table as Hg.

“Mercury compound” is defined as a chemical compound consisting of mercury atoms, while “mercury-added product” refers to any product to which mercury has been added.<sup>39</sup> This last is a subtle yet important distinction, as the level of danger posed by the different forms of mercury varies.

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<sup>39</sup> Article 2, subsections (a) to (f), (pg 7 and 8).

## Article 3

### Mercury Supply Sources and Trade

The above Article is one which holds great significance in the context of what the Minamata Convention is aiming to achieve, as it lays down the basic allowances and prohibitions for the mining, identification and disposal, and import and export of mercury respectively.

Section 1 of the Article defines “mercury” and “mercury compounds” for the purposes of this article, while section 2 establishes the sources of mercury which operate as exceptions to the Article in question.

As the latter is arguably more relevant when assessing the strength of the prohibitions established (in terms of trade), it must be noted that these exceptions are rather wide-ranging in the circumstances, and read as follows;

2. The provisions of this Article shall not apply to:

- (a) Quantities of mercury or mercury compounds to be used for laboratory-scale research or as a reference standard; or
- (b) Naturally occurring trace quantities of mercury or mercury compounds present in such products as non-mercury metals, ores, or mineral products, including coal, or products derived from these materials, and unintentional trace quantities in chemical products; or
- (c) Mercury-added products.

Under this Article, parties to the Convention are prohibited from engaging in any new Mercury mining operations (existing operations may continue for a 15 year period), as well as the import or export of mercury unless such an agreement is in keeping with the Convention<sup>40</sup>. Additionally, parties accept an obligation to identify large stocks of mercury<sup>41</sup>, dispose of excess stocks of industrial mercury, and finally to submit reports in respect of the above in keeping with Article 21.

## Article 4

### Mercury Added Products

This Article deals with the “mercury-added products” referenced in the definitions section above. The Article contains an extensive list of protocols on the matter, but can be summarised

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<sup>40</sup> Export/import is allowed provided that the mercury in question be stored in an environmentally sound manner, or if such import/export is necessary for the protection of human health.

<sup>41</sup> In amounts exceeding 50 metric tonnes.

as imposing an obligation on party States to take various steps or measures towards restricting the import, export and manufacture of mercury-added products.<sup>42</sup>

## Article 5

### Manufacturing processes in which mercury or mercury compounds are used

As with the above section, Article 5 deals with the manufactory and manufacturing processes relating to mercury. In this case the relevant requirements are as follows; states are prohibited from making use of mercury compounds in manufacturing processes<sup>43</sup>; a general prohibition on use in a facility which did not exist prior to the Minamata Convention; and finally there exists an obligation for states to be aware and make note of processes utilising mercury or mercury compounds.

## Article 6

### Exemptions available to a party upon request

This article provides for applications by parties for exemptions to the “phase-out dates” (which will expire 5 years after the request) stipulated in respect of various aspects of the Convention, particularly those listed in Annexure A and Annexure B.

In making such an application the party in question is required to compile a report amply justifying the need for such an extension.

## Article 7

### Artisanal and Small-scale Gold mining

This section of the Convention deals with an aspect of mercury contamination which tends to affect human health on a more individual, localised level than others (such as the burning of coal or proliferation of dentistry products). The aspect in question is artisanal and small-scale gold mining as defined in Article 2.

The Article simply states that parties must strive to minimize and where possible eradicate the use of mercury or mercury amalgams in these practices. In doing so parties are required to report to the Secretariat on the issue, as well as engage in cooperation with other party states

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<sup>42</sup> The exceptions to this are those listed in Annex A or registered in terms of Article 6.

<sup>43</sup> Exceptions to this are listed in Annex B or registered in terms of Article 6.

## Article 8

### Emissions

This article seeks to control and reduce the emissions of mercury and mercury compounds from sources listed in Annexure D, with the recommendation that each party have done so “as soon as practicable but no later than five years after the date of entry into force of the Convention for that Party”

In order to effect this goal, each state is required to utilise modern technological resources in setting a national plan to reduce emissions.

## Article 9

### Releases

The theme of the previous Articles continues in Article 9, with an emphasis placed on the control and reduction of releases of mercury and mercury compounds (“total mercury”) into land and water from sources not previously mentioned in the Convention.

Additionally states are required to identify these sources within three years after the Convention has come into force, and should these sources exceed the maximum allowable emission, measures should be taken<sup>44</sup> and a national plan set in order to meet the relevant standards and goals. Should a National Plan be set, this should be submitted to the Conference of the Parties (CoP) “within four years of the date of entry into force of the Convention for that Party”.

## Article 10

### Environmentally sound interim storage of mercury, other than waste mercury

This Article concerns itself with the environmentally protective storage of mercury or mercury compounds defined in Article 3 “that do not fall within the meaning of the definition of mercury wastes set out in Article 11”.

The means of storage are deemed to be those set out in “the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal” and potentially

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<sup>44</sup> Recommended measures being set out in subsection 5 (a) to (d) of Article 9 of the Convention.

“requirements for interim storage in an additional annex to this Convention in accordance with Article 27”. Parties are encouraged to engage in cooperation in effecting this goal.

## Article 11

### Mercury Wastes

Article 11’s primary concern is the definition of mercury wastes, and the subsequent treatment of mercury waste.

The definitions for the purpose of the Convention are held to be those set out in the Basel Convention, which read as follows;

- Substances or objects;
- (a) Consisting of mercury or mercury compounds;
- (b) Containing mercury or mercury compounds; or
- (c) Contaminated with mercury or mercury compounds<sup>45</sup>

The manner of disposal shall be those stipulated in the Basel Convention, the Parties’ own waste management regulations, as well as in any annex set out by the Conference of the Parties in Article 27.

## Article 12

### Contaminated Sites

In dealing with sites contaminated by mercury, Article 12 suggests that states need to adopt a strategy of identifying and assessing such sites in an “environmentally sound manner”. As such when contemplating action in respect of contamination, steps must be taken by the parties in to safeguard human health and the environment.

Furthermore beyond generally promoting cooperation between parties, the CoP is required to adopt a guideline on management of contaminated sites including factors such as;

- (a) Site identification and characterization;
- (b) Engaging the public;
- (c) Human health and environmental risk assessments;
- (d) Options for managing the risks posed by contaminated sites;
- (e) Evaluation of benefits and costs; and
- (f) Validation of outcomes.<sup>46</sup>

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<sup>45</sup> The exceptions to this are as follows; “overburden, waste rock and tailings from mining, except from primary mercury mining, unless they contain mercury or mercury compounds above thresholds defined by the Conference of the Parties”

<sup>46</sup> Article 12, paragraph 3, (a) to (f) (page 25).



## Article 13

### Financial Resources and Mechanisms

This Article is centred on the methods of raising finances in order to fuel the various programmes and operation necessary for the reduction of mercury. In summary it is stated that the funding should arise from a variety of sources such as bilateral and multilateral funding, relevant governmental policies and states making allowances in their National budgets. Furthermore it is recommended that the private sector become involved through the imposition of taxes.

## Article 14

### Capacity-building, technical assistance and technology transfer

This Article focuses on the use of international cooperation as a vital component in ensuring that parties meet their obligations under the Convention, specifically in this case through;

“regional, subregional and national arrangements, including existing regional and subregional centres, through other multilateral and bilateral means, and through partnerships, including partnerships involving the private sector.”

## Article 15

### Implementation and Compliance Committee

The body established through this Article (a subsidiary of the CoP) has as its objective the monitoring and promotion of compliance and cooperation by the parties with all the provisions of the Convention. The body itself shall be composed of 15 member states with equitable geographical representation given, which will in turn decide on its rules of operation and procedure.

## Article 16

### Health Aspects

The states are through this Article furnished with a responsibility to identify and treat all members of the population suffering from mercury contamination or simply those affected by mercury pollution. In the furtherance of this it is recommended that health guidelines be adopted illustrating the procedures to be taken in the event of mercury exposure, as well as education regarding the dangers of such exposure.

## Article 17

### Information Exchange

Following the theme of Article 14, Article 17 concerns the exchange of information between parties which could assist in the overall reduction of mercury pollution. Particular spheres of information which are highlighted as being of potential value are the following;

- a) Scientific, technical, economic and legal information concerning mercury and mercury compounds, including toxicological, ecotoxicological and safety information;
- (b) Information on the reduction or elimination of the production, use, trade, emissions and releases of mercury and mercury compounds;
- (c) Information on technically and economically viable alternatives to (mercury)
- (d) Epidemiological information concerning health impacts associated with exposure to mercury and mercury compounds, in close cooperation with the World Health Organization and other relevant organizations, as appropriate.

## Article 18

### Public information, awareness and education

As indicated by the title, Article 18 emphasises the importance of education, the provision of information to the public, and the use or development of mechanisms “such as pollutant release and transfer registers” for the collection of information in the fight to reduce mercury emissions and address mercury pollution.

## Article 19

### Research, Development and Monitoring

Apart from promoting the three activities listed in the title, Article 19 is yet another section of the Convention dedicated to the sharing of information and international cooperation in general.

## Article 20

### Implementation Plans

Similar to the previously mentioned National Plan, the implementation plan is a strategy which parties would implement in order to provide a means to achieve their obligations under the Convention. Such a plan should be communicated to the Secretariat, and be formulated whilst bearing in mind relevant domestic circumstances and any guidance provided by the CoP on the matter.

## Article 21

### Reporting

This Article reaffirms that each state which is Party to the convention falls under the influence of the CoP, and as a result of this there is an obligation on the parties to submit periodic reports on the efficacy of their efforts to the Secretariat.

Additionally, such a report should include the information required by Articles 3, 5, 7, 8 and 9.

## Article 22

### Effectiveness Evaluation

States that after a period of 6 years (and periodically following that), the CoP will evaluate the effects of the Convention. The factors taken into account in the evaluation include financial and economic, scientific, environmental and technical information, these being based on reports provided by the parties in adherence with their obligations to the Convention.

## Article 23

### Conference of the Parties

This Article is responsible for establishing the CoP and its accompanying powers and obligations. It is this body which through agreement sets periodic targets and goals to be accomplished at international and national levels, as well as being the general authority which holds the duty of enforcing the Convention.

## Article 24

### Secretariat

This establishes the Secretariat for the Convention, whose primary objective is to facilitate meetings and services for the CoP, and to provide assistance to the member states of the Convention. Other duties involve preparing periodic reports for the parties, coordinating with secretariats of relevant international bodies and to enter into administrative and contractual agreements pursuant to the fulfilment of its mandate. The Executive Director of the United Nations Environment Programme shall fill the role of secretariat, unless the CoP decides otherwise.

## Article 25

### Settlement of Disputes

The settlement of disputes in terms of the Convention shall take place by negotiation or other peaceful means. Ultimately there are two options available; with a third fall-back option available should either party not agree with the former two. These are as follows;

- (a) Arbitration in accordance with the procedure set out in Part I of Annex E;
- (b) Submission of the dispute to the International Court of Justice.

Should these fail; “the dispute shall be submitted to a conciliation commission at the request of any party to the dispute”.

## Article 26

### Amendments to the Convention

This Article illustrates how an amendment to the Convention may be made, and sets out the rules to be followed in such a case. The basic procedure is that amendments may be proposed by any party to the Convention, which would then, depending on the outcome of a vote (in order to pass an amendment requires at the minimum a three-fourths majority), be either rejected or adopted at a meeting of the CoP. Following this, the ratification of an amendment would be notified in writing to the Depository.

## Article 30

### Ratification, Acceptance, Approval or Accession

Simply establishing that all states are eligible and capable for ratification, acceptance, approval or accession to the Convention

## Article 31

This Article holds that the Convention shall enter into force 90 days after the deposit of the 50<sup>th</sup> instrument of ratification, approval or accession, and that states which ratify subsequent to this shall have the Convention come into force 90 days from the date of their subsequent ratification.

## Annexures A – E

Due to the nature of the annexes to the Convention (essentially meant to be utilised as reference material), it is sufficient for our purposes to simply identify which annex concerns itself with which issues, and are as follows.

Annex A basically identifies and lists mercury-added products, with Part 1 being those subject to Article 4 Paragraph 1, while Part 2 lists those subject Article 4 Paragraph 3.

Annex B identifies the manufacturing processes utilising mercury or mercury compounds, with Part 1 being those processes subject to Article 5 paragraph 2, while Part 2 lists those subject to Article 5 paragraph 3.

Annex C concerns artisanal and small-scale gold mining, and sets out the objectives or framework for National Action Plans to be made by Parties o the Convention in order to regulate this efficiently.

Annex D simply lists the sources of atmospheric mercury emissions, these being; “Coal-fired power plants; Coal-fired industrial boilers; Smelting and roasting processes used in the production of non-ferrous metals<sup>47</sup>; Waste incineration facilities; Cement clinker production facilities.”

Finally, Annex E is rather extensive, but simply expounds on the arbitration and conciliation procedure available to Parties in the event of a dispute in respect of the Convention.

### **3.4 Signatories to the Convention**

There are at present 128 signatories and 53 parties<sup>48</sup> to the Minamata Convention<sup>49</sup>, which was opened for signature on 10 October 2013.

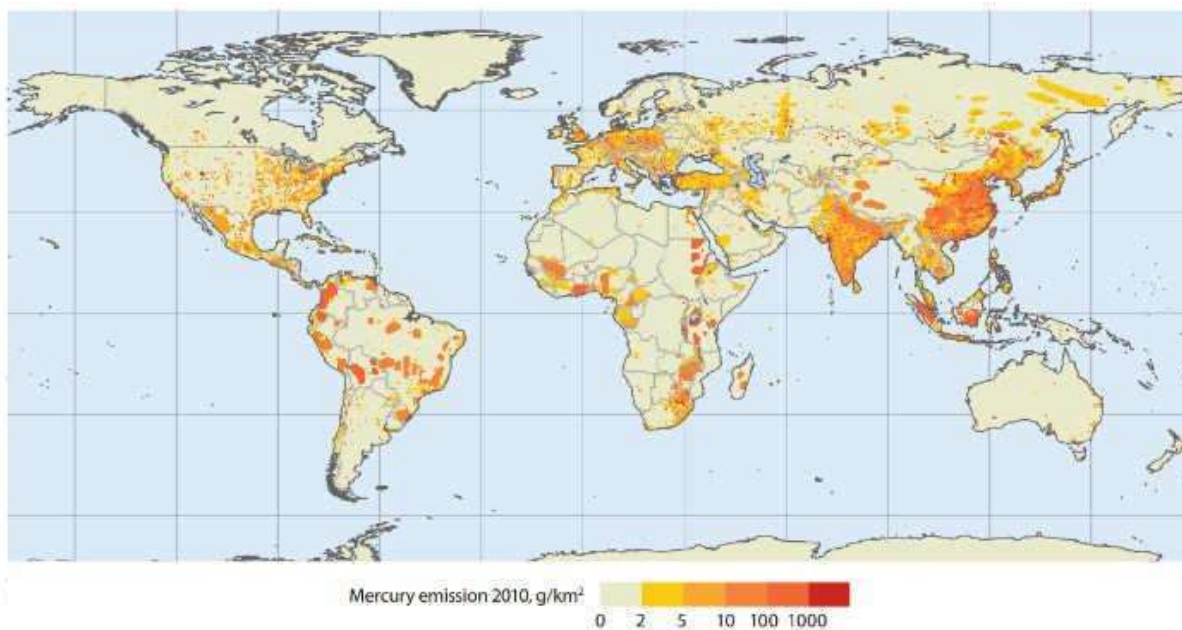
In order to appreciate the importance of each nation’s presence or absence from this list, one would require a basic understanding of their emission rates in a global context. While a definitive ranking of countries’ mercury emissions unfortunately does not exist, the map below compiled by UNEP in 2010 does provide an effective backdrop against which to judge the significance of ratification in select countries.

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<sup>47</sup> These being lead, zinc, copper and industrial gold.

<sup>48</sup> States which have ratified the convention.

<sup>49</sup> <http://www.mercuryconvention.org/Countries> accessed on 31 May 2017.



*Global distribution of anthropogenic mercury emissions to air in 2010.*

**Figure 3.1** A “heat” map indicating the level of mercury emissions from countries around the globe.

**Source:** <http://www.mercuryconvention.org/Countries> accessed on 27 November 2016

From the above, it can be seen that China, India, and the United States are among the largest emitters, at least on an anthropogenic basis, with Europe, Indonesia and South Africa also holding some of the greatest offenders in this regard.

It is heartening then, to know that of the above nations, all are at least signatories to the Convention. China, the undisputed leader in mercury emissions, has gone further and ratified the Convention, while the United States have Accepted the Conventions provisions.

## **CHAPTER 4:**

### **SOUTH AFRICAN NATIONAL LEGISLATION**

#### **Introduction**

As is widely understood, the South African environmental legal system operates by way of a pyramid structure, with overarching, authoritative legislation at the top, and increasingly focused legislation more specifically geared towards different purposes as we near the bottom.

In order to provide an understanding into where the Convention would fit into this hierarchy, what follows is a brief analysis of that pyramid structure, as well as a short description of various Acts and regulations which apply either directly or indirectly to mercury and mercury related products. As the mercury by-products with which we are primarily concerned are almost invariably emitted as part and parcel of industrial waste, many of Acts discussed hereunder are concerned with pollution control. For ease of reference, the applicable legislation has been subdivided into the three spheres of pollution which comprise mercury contamination, these being water, land and atmospheric pollution respectively.

#### **4.1 Framework Legislation**

##### **The Constitution of 1996**

The backdrop to any discussion on South African environmental legislation is inevitably s24 of the Constitution of 1996 (hereafter the Constitution), which states that;

24. Everyone has the right -
- (a) to an environment that is not harmful to their health or well-being; and
  - (b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that -
    - (i) prevent pollution and ecological degradation;
    - (ii) promote conservation; and
    - (iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.<sup>50</sup>

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<sup>50</sup> The Constitution Act 108 of 1996, s 24. h

While s24 is an indisputably well intentioned and inclusive example of legislation, there are inevitably issues which arise when the ideals espoused therein come into contact with practical reality. Of particular cause for concern is clause 24(b)(iii), as the meaning of “sustainable use” of natural resources will vary according to who is asked to define the term.

This is by no means is the only relevant section, as the issues of health and well-being could, without too much of a stretch, be considered to encompass numerous Constitutional rights. For the sake of brevity, however, this chapter’s further examination the Constitution is restricted to s38, the Enforcement of Rights.

Anyone listed in this section is effectively granted *locus standi* and has the right to approach a competent court in circumstances where a right in the Bill of Rights has been infringed or threatened, and request appropriate relief. The persons who may approach a court are-

**S38**

- (a) anyone acting in their own interest;
- (b) anyone acting on behalf of another person who cannot act in their own name;
- (c) anyone acting as a member of, or in the interest of, a group or class of persons;
- (d) anyone acting in the public interest; and
- (e) an association acting in the interest of its members.<sup>51</sup>

This broad array of persons who qualify as having *locus standi* ensures that all members of society have at least the potential to have their environmental rights represented in a court of law, something which without S38(d), the indigent sections of society would presumably find difficult to accomplish. Placing this within context, one must remember that it was the indigent population of Minamata which were hit hardest by the tragedy.

In light of the above, while the Constitution is concerned with the protection of rights and ensuring social justice, it is the “reasonable legislative and other measures”<sup>52</sup> which enforce that justice and therefore the act as the true safeguards against potential mercury contamination. These legislative measures can be found within the following Acts and Regulations.

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<sup>51</sup> The Constitution Act 108 of 1996.

<sup>52</sup> The Constitution Act 108 of 1996 s24(b).



## The National Environmental Management Act

The next rung down in the legislative ladder of environmental legislation is the National Environmental Management Act <sup>53</sup>(Hereafter “NEMA”). This Act constitutes the over-arching authority on environmental legislation in South Africa, and acts as a framework for environmental regulation as a whole, in terms of both legislation and the organs of state which give effect to them. Chapter 1, Section 2 (1) of the Act underlines this point, stating that NEMA applies to state organs “throughout the Republic” and provides the “framework within which environmental management... plans must be formulated”. The spirit or intent of the Act ties in well with the Convention’s focus on the protection of individuals as well as communities as a whole, and is illustrated by s2(2) and s2(3) of the Act, which state that;

### **S 2**

- (2) Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably.
- (3) Development must be socially, environmentally and economically sustainable.

These subsections (along with the lengthy ss 4) highlight the clear need for a balancing of interests while enacting environmental legislation. Section 28 takes the issue further by detailing the liability of those who would purposefully or negligently pollute the environment, stating in ss 1 that;

‘Every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment.’

These “reasonable measures” indicated in ss (1) may include taking steps to;

- (a) investigate, assess and evaluate the impact on the environment;
- (b) inform and educate employees about the environmental risks of their work and the manner in which their tasks must be performed in order to avoid causing significant pollution or degradation of the environment;
- (c) cease, modify or control any act, activity or process causing the pollution or degradation;
- (d) contain or prevent the movement of pollutants or the causant of degradation;
- (e) eliminate any source of the pollution or degradation; or
- (f) remedy the effects of the pollution or degradation.’

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<sup>53</sup> Act 107 of 1998.

Another section of NEMA which prescribes the procedure in cases of contamination is s30, titled 'Control of emergency incidents'<sup>54</sup>. The section places a duty on "responsible persons"<sup>55</sup> to report the matter timeously as well as "contain or minimise" the threat, and grants a relevant authority<sup>56</sup> powers to order rectification of the situation. However where effective rectification by the responsible party is not possible, the relevant authority is obligated to take the necessary steps towards rectification itself. In the event of this, the authority in question is entitled to claim the reimbursement of costs from those responsible. Additionally, should the responsible party/parties fail to fulfil their obligations in terms of this section, they shall be "liable on conviction to a fine not exceeding R1 million or to imprisonment for a period not exceeding 1 year, or to both such a fine and such imprisonment".

On an individual level, s29 of NEMA ensures the 'Protection of workers refusing to do environmentally hazardous work'.<sup>57</sup> The strength of s29(1) and the extent of protection it affords those who utilise it is evidenced by the following subsections, which state that it may be used as a first option by the worker in question<sup>58</sup>, and that no one may influence the workers decision to utilise this protection either through bribery, or conversely intimidation.<sup>59</sup>

#### **4.2 Water Pollution and Accompanying Legislation**

Having discussed the Constitution and NEMA, this section presents those Acts specifically geared towards various forms of pollution control.

The first to be examined is the body of legislation concerned with water pollution. Relevant Acts for this purpose are the National Water Act <sup>60</sup>(hereafter the NWA), the Water Services

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<sup>54</sup> (1) In this section-

(a) '**incident**' means an unexpected sudden occurrence, including a major emission, fire or explosion leading to serious danger to the public or potentially serious pollution of or detriment to the environment, whether immediate or delayed.

<sup>55</sup> Ss(1)(b).

<sup>56</sup> Ss(1)(c).

<sup>57</sup> Ss(1) states that "Notwithstanding the provisions of any other law, no person is civilly or criminally liable or may be dismissed, disciplined, prejudiced or harassed on account of having refused to perform any work if the person in good faith and reasonably believed at the time of the refusal that the performance of the work would result in an imminent and serious threat to the environment."

<sup>58</sup> Ss(3).

<sup>59</sup> Ss(4) and ss(5) respectively.

<sup>60</sup> Act 36 of 1998.

Act<sup>61</sup> and to a lesser extent the National Environmental Management: Integrated Coastal Management Act (hereafter NEMICMA).

### National Water Act

The National Water Act 36 of 1998 provides as part of its purpose the ability to curb freshwater pollution in various ways, which it defines as

‘the direct or indirect alteration of the physical, chemical or biological properties of a water resource so as to make it less fit for any beneficial purpose for which it may reasonably be expected to be used; or harmful or potentially harmful to the welfare, health or safety of human beings; to any aquatic or non-aquatic organisms; to the resource quality, or to property’.<sup>62</sup>

As pollution is the focus, the purpose of the Act as set out in Chapter 1 Section 2 (h) is a valid starting point, which states;

2. The purpose of this Act is to ensure that the nation's water resources are protected, used, developed, conserved, managed and controlled in ways which take into account amongst other factors -

(h) reducing and preventing pollution and degradation of water resources;

This evidences a willingness and intention to combat pollution, but for the specific methods which the Act aims to utilise, one must examine Chapter 3 Part 4 s19, which is similar to s28 of NEMA and focuses specifically on the issue.

‘19. (1) An owner of land, a person in control of land or a person who occupies or uses the land on which;

(a) any activity or process is or was performed or undertaken; or

(b) any other situation exists, which causes, has caused or is likely to cause pollution of a water resource, must take all reasonable measures to prevent any such pollution from occurring, continuing or recurring.

(2) The measures referred to in subsection (1) may include measures to -

(a) cease, modify or control any act or process causing the pollution;

(b) comply with any prescribed waste standard or management practice;

(c) contain or prevent the movement of pollutants;

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<sup>61</sup> Act 108 of 1997.

<sup>62</sup> National Water Act, Section 1

- (d) eliminate any source of the pollution;
  - (e) remedy the effects of the pollution; and
  - (f) remedy the effects of any disturbance to the bed and banks of a watercourse.
- (3) A catchment management agency may direct any person who fails to take the measures required under subsection (1) to -
- (a) commence taking specific measures before a given date;
  - (b) diligently continue with those measures; and
  - (c) complete them before a given date.
- (4) Should a person fail to comply, or comply inadequately with a directive given under subsection (3), the catchment management agency may take the measures it considers necessary to remedy the situation.
- (5) Subject to subsection (6), a catchment management agency may recover all costs incurred as a result of it acting under subsection (4) jointly and severally from the following persons:
- (a) Any person who is or was responsible for, or who directly or indirectly contributed to, the pollution or the potential pollution;
  - (b) the owner of the land at the time when the pollution or the potential for pollution occurred, or that owner's successor-in-title;
  - (c) the person in control of the land or any person who has a right to use the land at the time when-
    - (i) the activity or the process is or was performed or undertaken; or
    - (ii) the situation came about; or
  - (d) any person who negligently failed to prevent -
    - (i) the activity or the process being performed or undertaken; or
    - (ii) the situation from coming about.’

Sub-section 5 and 6 onwards deal with those persons who would incur liability and the costs which may be recovered respectively, which in the spirit of the Act and as one might expect, are quite extensive. The wide-ranging nature of the measures which may be taken by organs of state to prevent pollution and the liability which arises from failure to comply with the Act displays the seriousness with which freshwater pollution is viewed. Furthermore, by allowing indirect and joint and several liability in respect of the long list of persons described under ss(5), the NWA has set a high bar for environmental responsibility among those undertaking activities which have the potential to pollute water sources. Failure to meet that standard could result in enforcement of the severe rectification provisions as described above.

Section 20 of the NWA, titled “Control of Emergency Incidents”, is essentially a more specific incarnation of s30 of NEMA, and comes into operation where a substance either pollutes or has an otherwise detrimental effect on a water resource.<sup>63</sup> Functioning very similarly to s30,

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<sup>63</sup> S20(1)(a)&(b).

s20 requires that those responsible first report the incident, and then following this take all “reasonable steps” to rectify the matter while awaiting instruction from the relevant authority or authorities. Should there be a failure to act, the authority in question shall take the necessary steps, and then recover costs from the aforementioned responsible party. Should there be multiple offenders, all may be held responsible under joint and several liability.

In addition to the above, in terms of Chapter 16 “Offences and Remedies”, any act or omission resulting in pollution of a water source has explicitly been made an offence in terms of the Act, deserving of up to;

“a fine or imprisonment for a period not exceeding five years, or to both a fine and such imprisonment and, in the case of a second or subsequent conviction, to a fine or imprisonment for a period not exceeding ten years or to both a fine and such imprisonment.”<sup>64</sup>

This is a significant deterrent, which if enforced correctly, could give pause even to those who are wealthy enough that a fine is of no consequence.

### Water Services Act

The Water Services Act<sup>65</sup> basically exists to enforce the provision of water and associated sanitation in order to effect the right to water in South Africa. The Act has several facets to it which make it relevant for the purposes of this discussion; particularly considering that pollutants would need to be either removed or prevented entering the water source in order to endure the water provided is fit for human use. Therefore the sections of the Act to be focused on are those regulating the disposal of industrial and trade effluent.

Section 7 and 21 respectively deal with trade and industrial effluent, the most relevant passages in the Act being that;

‘7. (2) Subject to subsection (3), no person may dispose of industrial effluent in any manner other than that approved by the water services provider nominated by the water services authority having jurisdiction in the area in question.’<sup>66</sup>

And;

‘In s 21 it is provided that a water services authority which:

(a) Provides water for industrial use; or

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<sup>64</sup> Section 151 ss(1)(i) of the NWA

<sup>65</sup> Act 108 of 1997.

<sup>66</sup> Water Services Act 108 of 1997 at 15.

- (b) Controls a system through which industrial effluent is disposed of, must make bylaws providing for at least-
- (i) The standards of service;
  - (ii) The technical conditions of provision and disposal;
  - ...

The above would be operational in cases where the disposal of waste and where “water use” as defined in the National Water Act<sup>67</sup> fell under the scope of use under Schedule 1, either as a continuation of an existing lawful use or a section 39 “general authorisation” (which are governed by municipal by-laws), and also where the “water use” exceeded this scope and therefore required a water use license in terms of section 22. One method of determining whether the water use falls under Schedule 1 of the NWA would be examining the volume of effluent disposal. For instance should disposal exceed 2000m cubed of wastewater per day into a water source, a section 22 license would be required.<sup>68</sup>

In addition to the National Water Act and Water Services Act, ancillary legislation also works in various indirect ways to augment the strength of freshwater pollution control. These are, to name a few; the Conservation of Agricultural Resources Act 43 of 1983, the prior Water Act 54 of 1956, the Minerals Act 50 of 1991 (since repealed by the Mineral and Petroleum Resources Development Act 28 of 2002 and subsequently the Minerals and Petroleum Resources Development Amendment Act 49 of 2008).

Although criticisms can be raised regarding pollution control legislation<sup>69</sup>, this framework put in place to enforce water standards is one which seems to cover most of the bases for decent governmental efficiency in this regard.

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<sup>67</sup>The specific sections being NWA s21; “For the purposes of this Act, water use includes (f) discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit”; and s29; “(1) A responsible authority may attach conditions to every general authorisation or licence”. Relevant for our purposes, 29 (c)(ii) further makes reference to the setting of permissible waste water “levels for some or all of its chemical and physical components”.

<sup>68</sup> Kidd, M. *Environmental Law* 2ed (2011) Ch 6 Pg 171.

<sup>69</sup> See the argument for “Integrated Pollution Control” raised in Michael Kidd *Environmental Law* 2ed (2011) Ch 6 Pg 207.

## NEMICMA

This Act is, as is true for a vast amount of South African environmental legislation, committed to creating an effective system of governance conducive to human and environmental health, and through its provisions promotes a “risk averse and precautionary system” which allows for an attitude “shared responsibility” towards our coastal regions.<sup>7071</sup>

Although NEMICMA does cover a much wider range of issues, even those relating to pollution via various mediums, due to the specific nature through which mercury or mercury related chemical generally make their way into the watercourses, and from there the coastal waters, it is s69 which becomes most relevant for our purposes.

The most relevant aspects to this section are ss(1), ss(7) and ss(8), which read as follows;

‘69. (1) No person may discharge effluent that originates from a source on land into coastal waters except in terms of a general authorisation contemplated in subsection (2) or a coastal waters discharge permit issued under this section by the Minister after consultation with the Minister responsible for water affairs in instances of discharge of effluent into an estuary.

(7) The Minister, and in instances of discharge of effluent into an estuary, with the concurrence of the Minister responsible for water affairs, must, when deciding whether or not to issue a general authorisation contemplated in subsection (2) or to grant an application for a coastal waters discharge permit, take into account all relevant factors, including—

(a) the interests of the whole community;

(b) the socio-economic impact...

(d) the likely impact of the proposed disposal on the coastal environment, including, the cumulative effect of its impact together with those of existing point and non-point discharges.

(e) the Republic's obligations under international law;

(8) The Minister may not grant an application in terms of subsection (3) for a coastal waters discharge permit if doing so is likely

(a) to cause irreversible or long-lasting adverse effects that cannot satisfactorily be mitigated;

(b) to prejudice significantly the achievement of any coastal management objective contained in a coastal management programme; or

(c) to be contrary to the interests of the whole community.’

Subsections (9) and (10) provide for review of such decisions and for those involved to make representations regarding these decisions respectively. Additionally ss(11) obligates the organ

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<sup>70</sup> National Environmental Management Act Principles as adapted for the coastal zone of South Africa (taken from DEAT, 2000 cited in Celliers et al. 2009).

<sup>71</sup> Van Wyk, S, ‘A critical analysis of the NEM: ICMA as it pertains to development within the Coastal Protection Zone of Proclaimed Fishing Harbours in the Western Cape’ (2013), obtained from <http://www.aurecongroup.co.za/~media/Files/Downloads>

of state which issued such a permit to report of the status of the authorised discharge every three years. Finally, s79 of NEMICMA provides for a potential penalty of R5 million should there be contravention of the Act.

The above provisions, with their repeated mention of “community interests”, emphasised protection of aquatic systems such as estuaries and specific mention of international law as a factor to be taken into account in decision making, mesh exceedingly well with the spirit of the Minamata Convention. More specifically, they at least partially address the requirements of Articles 8, 9 and 11 of the Convention, being those concerned with the control “emissions”, “releases” and “wastes” respectively. Therefore, with appropriate action on the part of the executive, this legislation in particular, and of course aquatic pollution legislation as a whole, has the potential to be a durable shield against pollution and contamination of the environment not only in respect of mercury, but all forms thereof.

### **4.3 Contamination of Land and Accompanying Legislation**

While the National Environmental Management: Waste Act<sup>72</sup> (hereafter NEMWA), which has as its stated objective “to protect health, well-being and the environment by (the provision of) reasonable measures”, does not focus exclusively on land contamination in terms of the operation of its provisions, it does contain several sections which form an intrinsic part of combating pollution in that medium<sup>73</sup>. For this reason the Act has been subsumed under the “Contamination of Land” part of this chapter, and forms the central pillar of legislation considered below.

#### Waste Management Regulations

Prior to examining NEMWA itself, however, one must first take cognisance of the Waste Classification and Management Regulations of 2013<sup>74</sup>, the purpose of which is defined under the regulations as being; to “regulate the classification and management of waste to give effect to the provisions of the Act”.

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<sup>72</sup> Act No. 59 of 2008

<sup>73</sup> Particularly in Part 8 of Chapter 4, which came into effect on the 2 May 2014.

<sup>74</sup> Published in Gazette No. 36784 of 23 August 2013, along with the ‘Norms and Standards for the Assessment of Waste for Landfill’ as well as the ‘Norms and Standards for the Disposal of Waste to Landfill’.



In light of this, Section 2 states that “No person may commence, undertake or conduct a waste management activity listed in this schedule unless a licence is issued in respect of that activity”.

Exceptions are provided under s4 (1), which holds that “Wastes listed in Annexure 1 of these Regulations do not require classification in terms of SANS 10234”.<sup>75</sup> It almost goes without saying that mercury related waste would not fall into any of the categories listed in Annexure 1, and indeed (2)(a)(iii) makes this clear through specifically identifying “business waste **not** containing waste or hazardous chemicals” as one of these. Similarly 2(a)(viii) lists “excavated earth material **not** containing hazardous waste or hazardous chemicals” as not requiring a license, implying that business waste or excavated earth material which did would require such a license.

This aside, there is potential wiggle room for those generating mercury waste, with s9(1) providing for application to be made to the Minister in terms of s19 of the Act in order to have a specific “waste management activity” classified as one which does not require a licence. There are certain requirements which must be met for such an application to succeed however, outlined in ss(2) which reads as follows;

- (1) ‘A motivation to the Minister in terms of sub-regulation (1) must demonstrate that the waste management activity, including associated storage and handling, can be implemented and conducted consistently and repeatedly in a controlled manner without unacceptable impact on, or risk to, the environment or health.’

Although it is possible for such an application to be made, due to the particularly high risk associated with mercury contamination, the likelihood of this classification being granted is remote.

## NEMWA

Moving onto the analysis of NEMWA, which as stated contains provisions for the remediation of contaminated land, it can be seen that the Act defines “contamination” as;

- ‘the presence in or under any land, site, buildings or structures of a substance or micro-organism above the concentration that is normally present in or under that land, which substance or micro-organism directly or indirectly affects or may affect the quality of soil or the environment adversely.’

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<sup>75</sup> the latest edition of the South African National Standard Globally Harmonized System of Classification and Labelling of Chemicals (GHS)

Although this overview will centre primarily on the “contaminated land” sections, it is noted that the Act contains requirements for the storage of waste which operate in concert with those prescribed under the above regulations. These are the s21 “general requirements”, which prescribe that

- ‘Any person who stores waste must at least take steps, unless otherwise provided by this Act, to ensure that—
- (a) the containers in which any waste is stored, are intact and not corroded or in any other way rendered unfit for the safe storage of waste;
  - (b) adequate measures are taken to prevent accidental spillage or leaking;
  - (c) the waste cannot be blown away;
  - (d) nuisances such as odour, visual impacts and breeding of vectors do not arise
  - (e) pollution of the environment and harm to health are prevented.’

These provisions, the drawing of attention to which may perhaps seem strange in isolation, become relevant in a South African context (particularly a KwaZulu-Natal context) when one bears in mind the past and ongoing negligence which characterises the Thor Chemicals saga, which will be explored in the following chapter.

The next part of the Act to be explored, s26, contains the general prohibitive provisions regarding pollution. It might be said that this section holds a definite relationship to the precautionary principle<sup>76</sup> promoted in NEMA, in that it declares that;

- ‘26.( 1) No person may—
- (a) dispose of waste, or knowingly or negligently cause or permit waste to be disposed of, in or on any land, water body or at any facility unless the disposal of that waste is authorised by law. Or
  - (b) dispose of waste in a manner that is likely to cause pollution of the environment or harm to health and well-being.’

S26(2) provides exceptions to the above rule, the only applicable exception being if “ the most environmentally and economically feasible” waste management plan was utilised.

Sections 35 through to 40, describe in depth the administrative procedure as well as the steps to be taken in the event that a contaminated land issue arises. The first of these is s35, which

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<sup>76</sup> The precautionary principle simply states that in the event that any action or process carries a risk of causing harm to the public, and in the absence of scientific consensus, then the burden of proof falls of those responsible for the action to show that it is in fact not harmful.

simply confirms that these sections apply in all cases of contaminated land, regardless of whether the Act had commenced at the time<sup>77</sup>, the land upon which it arose<sup>78</sup> as well as the activities<sup>79</sup> and persons<sup>80</sup> which brought about the contamination.

S36 is titled the “Identification and notification of investigation areas”, and s36(1) provides that the Minister or the Member of the Executive Council (hereafter referred to as the MEC) in respect of any given area may, after due consultation, identify an investigation area provided that it meets the following requirement;<sup>81</sup>

“...land on which high-risk activities have taken place or are taking place that are likely to result in land contamination (or) land that the Minister or MEC ... on reasonable grounds believes to be contaminated.”

The manner in which the Minister or MEC would become aware of such an area in order to make such an identification would be through the enforcement of s36(5), which holds that;

“an owner of land that is significantly contaminated, or a person who undertakes an activity that caused the land to be significantly contaminated, must notify the Minister and MEC of that contamination as soon as that person becomes aware, of that contamination”.<sup>82</sup>

It is therefore obvious that notifying the authorities is obligatory, and there do exist provisions within the Act which enforce this. For instance, in such a case s67(1)(b) makes it an offence to contravene or fail to comply with section 36(5), and s68(2) in turn states that those in contravention of s67(1)(b) are liable to “a fine not exceeding R5 million or to imprisonment for a period not exceeding five years, or to both a fine and such imprisonment”. This is in addition to any other legislative consequences which may arise through the application of NEMA.<sup>83</sup> Therefore as can be seen, the Act does create a significant threat for those who would not comply simply with the notification requirement of the Act, never mind the actual remediation order. This is a powerful tool in the hands of environmental authorities, and should prove useful in reacting timeously to any mercury related contamination, the recording of which would be done through a register of contaminated land kept by the Minister.

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<sup>77</sup> S35(a).

<sup>78</sup> S35(b).

<sup>79</sup> S35(c).

<sup>80</sup> S35(d).

<sup>81</sup> Additionally s36(6) allows for the Minister to issue a written notice to an individual identifying such an area, the validity of which would once again hinge on the existence of reasonable grounds for the Minister’s belief in the presence of contamination.

<sup>82</sup> S36(5).

<sup>83</sup> Gilder, A. and Brand, J. ‘The law applicable to contaminated land in South Africa’ at <https://www.ensafrica.com/news/The-law-applicable-to-contaminated-land-in-South-Africa?Id=1411&STitle=environment%20newsflash>

S37 follows on from the above and is titled “Consequences of identification and notification of investigation areas”. This section provides the Minister or MEC to direct the person responsible for having conducted the high risk activity which either caused or may have caused the contamination to undertake the necessary site assessment<sup>84</sup> as a prelude to any potential remediation.

The results of the Site Assessment Report then determine whether the Minister or MEC would designate the area as contaminated and make an order requiring remediation accordingly. The remediation itself is undertaken by the designated officials, with the person responsible for the contamination ordered to bear the costs of such remediation. This ultimately ensures that such a person would suffer a penalty as a result of their actions, but remain sufficiently divorced from the procedure itself so as not to be able to affect the substantive operation thereof.

S38 is a relatively simple area of the Act, which simply provides for the “Consideration of compiled site assessment report” by the relevant authorities, following which an order would be made in line with the following section.

Ultimately, should the processes listed above reveal the existence of contamination; this will culminate in the issuing of an s39 order to remediate the contaminated land in question. This type of order and the section which empowers its issuing bears a significant resemblance to s28 of NEMA as well as s19 of the NWA as discussed above, and is essentially the mirror legislation for land pollution.

One last relevant section to note in the contamination of land provisions is s40, which concerns the transfer of contaminated land, and more importantly the responsibilities which accompany such a transfer. Should a person wish to transfer contaminated land which they own, such a person is obligated to inform the purchaser of the contamination. Furthermore, if the land has been deemed as “remediation site” in line with the provisions discussed above, the seller is obligated to inform the Minister or MEC, and thereafter comply with any conditions which these authorities may specify.

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<sup>84</sup> This “Site Assessment” would investigate whether the health of the environment and/or public has been affected by potential contamination, as well as the nature of the contamination.

Failure to comply with these legislated obligations would result in the same penalty provisions applying as those detailed above in respect of s36(5), being “a fine not exceeding R5 million or to imprisonment for a period not exceeding five years, or to both a fine and such imprisonment”.

#### **4.4 Atmospheric Pollution and Accompanying Legislation**

The method by which issue of atmospheric pollution is dealt with in South African legislation is relatively simple, and particularly straight-forward by comparison with the above areas of water and land contamination.

As held in S21 of the National Environmental Management: Air Quality Act (hereafter NEMAQA), the emission of substances which have the potential to cause atmospheric pollution are regarded as listed activities in terms of the Act.

The consequences of such a listing are detailed in s22 of NEMAQA, which provides that;

No person may without a provisional atmospheric emission licence or an atmospheric emission licence conduct an activity—

- (a) listed on the national list anywhere in the Republic; or
- (b) listed on the list applicable in a province anywhere in that province.

The details of the listed activities and what constitutes compliance is slightly less straightforward and involves a tentative understanding of the technical terms associated with the measurement of various chemical levels and composition in an atmospheric context. The list itself, in which mercury and its associated compounds are continuously mentioned, is found in the Regulations set out in *Government Gazette* Volume 537, No. 33064 published on 31 March 2010, under the title ‘*National Environmental Management: Air Quality Act (39/2004): List of activities which result in atmospheric emissions which have or may have a significant detrimental effect on the environment, including health, social conditions, economic conditions, ecological conditions or cultural heritage*’.

The prevalence of mercury with cement production (which is itself a listed activity in terms of the above regulations as well as having been listed under Annexure D of the Minamanta Convention) further requires a mention of s32, wherein either the Minister of MEC may

prescribe various measures for the control of pollution either in respect of specific machinery and instances, or in a general overarching sense<sup>85</sup>. Such measures may further include preventative<sup>86</sup> or reactive measures<sup>87</sup>.

A practical example of mercury contamination via dust pollution can be seen in the case study conducted at the Department of Botany of Sri Krishnadevaraya University of a cement factory operated by Panyam Cements and Mineral Industries Ltd., located at Bugganipalli near Bethamcharla, Kurnool district, Andhra Pradesh, India. The study itself was concerned with measuring the bio-accumulation of mercury in the flora surrounding the factory, and subsequently found that the analysis of samples taken indicated that an area with the radius of 5km from the factory could be categorised as polluted, while levels of mercury were found in various species of plants up to 12km distant from the factory.<sup>88</sup>

Finally, S35 of NEMAQA takes similar steps in respect of the control of offensive odours, once again providing the Minister or MEC to take such steps as they deem necessary to control and prevent the prevalence of such.

It is further worth noting that s35(2) makes mention that the occupier or owner of any premises must take all “reasonable steps” to prevent unwelcome emissions, an obligation which can be seen as a continuation of s19 of the NWA and s39 of NEMWA.

#### **4.5 Concluding Remarks**

As was established in the introduction to this chapter, there is no one piece of South African legislation specifically geared towards the control of the emission of mercury and its by-products or contamination caused thereby. Despite this, the abovementioned Acts and regulations all contain mechanisms by which the issue of mercury emissions may be addressed. Furthermore, most of these go some way towards meeting several key standards set by the Minamata Convention, as set out below;

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<sup>85</sup> S32 (a)

<sup>86</sup> S32 (b)

<sup>87</sup> S33 (c)

<sup>88</sup> <http://www.iisc.ernet.in/cursci/apr25/articles12.htm> Accessed on 30 September 2016.

- S24 of Constitution as well as s2 of NEMA mesh exceedingly well with the objectives of the Convention, placing the utmost importance on protecting both human and environmental health;
- S69 of NEMICMA, s7 and s21 of the Water Services Act, s2 of the Waste Management Regulations as well as s21 and s22 of NEMAQA regulate industrial emissions and the requisite authorisations for same. It follows that even though these regulations do not specifically set standards for mercury emissions, these standards could easily be introduced into the existing framework. Although mercury is a listed toxic substance under NEMAQA, and therefore emissions are restricted, there is not a blanket ban as envisioned under Article 5 of the Convention. Despite falling short, these provisions are nevertheless useful in minimising the output of mercury into the environment, thereby achieving at least partial compliance in line with Article 8 of the Convention;
- Through s28 of NEMA, s19 of NWA, sections 35 – 40 of NEMWA and s35 of NEMAQA, South African legislation has already achieved compliance with Article 11, “Mercury Wastes” and Article 12, “Contaminated Sites” of the Convention. In fact, the aforementioned Acts go further than required by Articles 11 and 12, the legislation on contaminated sites particular having a more stringent procedure for assessment and rectification than that suggested by the Convention;
- Section 21 of NEMWA regulates the storage of waste, the general standards for which comply with the standards set by Article 10 of the Convention;
- Although the Convention does not make suggestions as to whether there should be punitive measures in place to deal with illegal emitters of mercury and the severity thereof, Articles 8 – 12 do require that states take “steps” to minimise the emission of mercury. Seen in this context, the penalty provisions detailed under the NWA, NEMICMA, NEMWA and NEMAQA can be seen as an effective tool for compliance.

## **Chapter 5:**

### **Prevalence of Mercury in South Africa**

#### **Introduction**

While the Minamata crisis was caused by the direct dumping of mercury by-products into the environment, most examples of mercury proliferation and contamination in a South African context have arisen as a result of indirect causes.

These sources of mercury contamination and the steps taken to address the issue, or lack thereof, are explored in this chapter. While this is not an exhaustive examination of all sources of mercury and their effect on the environment, it should somewhat illustrate the level of responsiveness and urgency with which instances of mercury contamination are treated.

#### **5.1 Acid Mine Drainage**

The spectre of Acid Mine Drainage (hereafter AMD) and the far reaching consequences which it holds for both human and environmental health make it one of the leading pollution-related issues facing South Africa today. This is particularly true for a country in which mining is one of the central pillars of the economy.

This blight poses a threat to the environment in a number of different ways, and does not restrict itself to the contamination of a single element. Therefore although the most direct and immediate effect it has on the surrounding ecology is perhaps in terms of water pollution, AMD falls under the purview of legislation ranging from the NWA to NEMICMA and NEMWA.

AMD occurs as a result of mining operations which utilise gravity drainage as a method of avoiding the accumulation of vast amounts of water which would otherwise be present in such mines. Specifically it is when such water flows over or through sulphur bearing materials present in mines, causing the formation of acidic solutions including mercury by-products.<sup>89</sup> These acidic solutions then proceed to run off into streams and other surface water sources, or else filter down through to the subterranean water table, allowing for pollution on a massive geographical scale relative to the size of the contamination's source.

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<sup>89</sup> <http://www.dwa.gov.za/Projects/AMDFSLTS/> accessed on 20 February 2016;



As described simply by the United States' Environmental Protection Agency,

“Mine drainage is formed when pyrite, an iron sulfide, is exposed and reacts with air and water to form sulfuric acid and dissolved iron. Some or all of this iron can precipitate to form the red, orange, or yellow sediments in the bottom of streams containing mine drainage. The acid runoff further dissolves heavy metals such as copper, lead, mercury into ground or surface.”<sup>90</sup>

Although AMD causes pollution by various heavy metals, the disproportional amount of mercury utilised in gold mining, both industrial and artisanal, make this issue even more relevant in the context of preventing mercury contamination within South Africa.

In terms of how this operates in a South African jurisprudential sense, the issue of liability in respect of AMD has been addressed by Kidd in his article ‘Poisoning the Right to Water...’<sup>91</sup>. This issue of who is to be held liable for AMD has formed the crux of three significant cases in the past decade, these being; *Minister of Water Affairs and Forestry v Stilfontein Gold Mining Co Ltd and Others*<sup>92</sup>; *Kebble v Minister of Water Affairs*<sup>93</sup>, and *Harmony Gold Mining Co Ltd v Regional Director: Free State, Department of Water Affairs and Forestry*<sup>94</sup>.

These cases have also been subject to review in the journal article ‘How (Not) to Silence a Spring: The Stilfontein Saga in three parts’<sup>95</sup>, and provide useful insight into why AMD is such a tough problem to solve, both in a physical and legal sense.

The reason AMD has become such a contestable issue is the cost it implies. In order to prevent the drainage from a mine tainting the surrounding water table and water sources in general, it is required that that water be pumped out of the mine and disposed of correctly, both while the mine is operational and long after it has closed down. The responsibility of doing so for an indeterminate time period is one which many parties seek to avoid, and thus directives issued in terms of s19 of the NWA has become a bone of contention.

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<sup>90</sup> <http://www.sosbluewaters.org/epa-what-is-acid-mine-drainage%5B1%5D.pdf>

<sup>91</sup> Kidd, M ‘Poisoning the right to water in South Africa: What can the law do?’ (2011) *International Journal of rural Law and Policy*.

<sup>92</sup> *Minister of Water Affairs and Forestry v Stilfontein Gold Mining Co Ltd and Others* 2006 5 SA 333 (W)

<sup>93</sup> *Kebble v Minister of Water Affairs* 2007 SCA 111

<sup>94</sup> *Harmony Gold Mining Co Ltd v Regional Director: Free State, Department of Water Affairs and Forestry* 2006 SCA 65

<sup>95</sup> Kotze, L J, Lubbe N ‘How (Not) to Silence a Spring: The Stilfontein Saga in three parts’ (2009)16 *SAJELP* 49

This issue was illustrated by the scenario discussed in the journal article ‘How (not) to Silence a Spring: The Stilfontein Saga in three parts’ by L.J Kotze and N. Lubbe, which is referred to below.

In the *Stilfontein Gold Mining* case, a section 19 directive had been issued to the respondents that they proceed with pumping water out of the mines in question in order to avoid tainting surrounding water resources as well as nearby active mines. It eventually became apparent, however, that the respondents had failed to do so. Eventually this culminated in the high court application to hold the respondents in contempt over their refusal to comply with the s19 directive. The respondents, although not disputing the potential pollution risk, raised five defences to the application, these being that;

“the matter was not urgent and ought to be struck of the roll; the directive was, in material parts, unintelligible and therefore not capable of being complied with; the nature of Goldstein J’s order was such that contempt proceedings were inappropriate; the first respondent was, due to its financial status, unable to comply with the directives<sup>96</sup>; and the second to fifth respondents had resigned as directors of the first respondent.”<sup>97</sup>

The judge dismissed these one by one for various reasons<sup>98</sup>, holding that the s19 directive was valid and enforceable; therefore the respondents had indeed been in contempt of court and were ordered once more to comply.

The case of *Kebble v Minister of Water Affairs* is a continuation of the case above, and is the appeal of the directors of Stilfontein Gold Mining Company against the above judgement. The judgement in this case represents an unfortunate backslide in willingness to enforce the directives discussed above, the judge in this case holding that they are substantially “vague” and stating that the appellant had not completely ignored the order as he was seemingly satisfied with Mr Kebble’s contention that if forced to do so “SGM’s ability to pay other

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<sup>96</sup> This is a particularly important defence to note, as it represents one of the major roadblocks in enforcing the upkeep of abandoned mines by previous owners.

<sup>97</sup> Para 338 F-H

<sup>98</sup> Kotze L J, Lubbe N ‘How (Not) to Silence a Spring: The Stilfontein Saga in three parts’ (2009) 16 *SAJELP* Page 56 - 61

amounts required for the rehabilitation of the environment would be jeopardized” (these “other amounts” are not given further explanation). The appeal was consequently upheld.

The Harmony Gold Mining case has a slightly different focus to those above, but the issue remains an s19 directive ordering the dewatering of defunct mines connected to active mines by the owners of the latter. Harmony appealed an order to aid in dewatering three upstream mine shafts, the directive specifically stating that Harmony is obliged to “collect, remove and treat water, maintain dewatering infrastructure, and to share equally the costs resulting from these activities”. The appellant argued that the directive was in fact made beyond the scope granted by s19, “The crux of the argument... was that the measures referred to in this section could not be taken beyond the boundaries of Harmony’s land”<sup>99</sup>. The court was thus forced to interpret s19, and chose to do so in a liberal fashion, stating that;

“The legislature intended by the term ‘reasonable measures’ to lay down a flexible test dependent on the circumstances of each case. On the facts here it was in my view a reasonable anti-pollution measure to take steps to prevent groundwater from the defunct mines reaching the active ones. The constitutional and statutory anti-pollution objectives would be obstructed if the measures required of the persons referred to in s 19(1) were limited to measures on the land mentioned in that subsection. If the choice were between an interpretation confining preventive measures to one’s own land and a construction without that limitation it is clear that the latter interpretation would be consistent with the purpose of the Constitution and the Act and the former not.”<sup>100</sup>

The above set of judgements seem to indicate an increased willingness to place environmental health over financial interests. In the words of Kotze and Lubbe “Despite the lamentable outcome of *Kebble*, the trilogy fortunately is also indicative of a tentatively emerging and deepening ‘green’ trend in our courts”<sup>101</sup>. This mind-set is crucial in the efforts to lay the foundations of responsible environmental policy, and in order to prevent environmental and human tragedy of the sort which led to the drafting of the Minamata Convention.

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<sup>99</sup> Kidd M, *Environmental Law* 2ed (2011) Ch 6 Pg 168

<sup>100</sup> Para 32-33

<sup>101</sup> Kotze L J, Lubbe N ‘How (Not) to Silence a Spring: The Stilfontein Saga in three parts’ (2009) 16 *SAJELP* Page 77

## **5.2 Thor Chemicals Saga**

A more direct source of mercury contamination than Acid-Mine Drainage, and one which is more pertinent due to its geographical proximity, can be found in the contamination of the Umgeni river area which came to light in around 1989.

Thor Chemicals, owned by the British company Thor Holdings, ran a large scale mercury reclamation plant in Cato Ridge, KwaZulu-Natal. The reclamation process made use of industrial waste imported into the country for this purpose. This plant was opened after Thor relocated from England to South Africa following public concern and threats of prosecution over the levels of mercury found in the air and employees' urine.<sup>102</sup>

Initially there was little concern regarding the factory's activity. In fact, in a brazen letter written from to the United States Environmental Protection Agency in 1986, a representative of Thor Chemicals states that while they believe that the plant in Cato Ridge "is the world's largest, continuously-operating recovery plant for processing Mercury..." the environmental impact is "nil".<sup>103</sup>

Suspicious were first raised on 14 July 1988 after the Umgeni Water Board, while monitoring the water quality of the Umgeni River, found that mercury levels were over 1000 times higher than the standard set by the World Health Organisation for drinking.<sup>104</sup> While this issue had been traced back to the Thor plant, the Department of Water Affairs and Forestry<sup>105</sup> took no investigative action.<sup>106</sup>

This failure to act led to an unnamed official in the Umgeni Water Board tipping off the press about the water quality report, which culminated in Greenpeace investigating using soil and water samples from around the Thor factory. The findings indicated that Thor was responsible for sediment contamination around 8000 times higher than the threshold for the U.S classification of 'hazardous waste'.<sup>107</sup>

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<sup>102</sup> <http://www.independent.co.uk/news/mercury-poisoning-victims-win-pounds-13m-in-landmark-case-1266578.html> accessed on 20 September 2016.

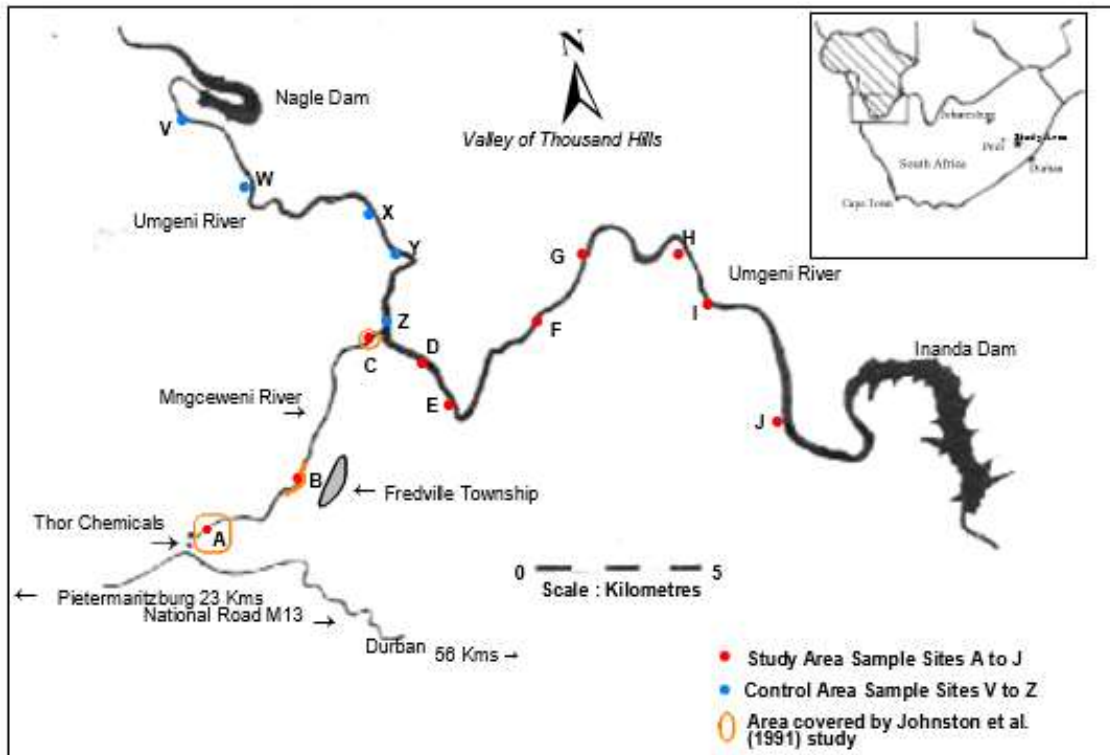
<sup>103</sup> Kockott F, Wasted Lives: Mercury Waste Recycling at Thor Chemicals (Amsterdam, Greenpeace International and Earthlife Africa, 1994)

<sup>104</sup> *ibid*

<sup>105</sup> This being the relevant enforcement agency at the time of the incident.

<sup>106</sup> An incomprehensible lack of initiative from the Department particularly when one considers that the Umgeni River system is also ultimately the primary source of drinking water for the heavily populated Durban Metro.

<sup>107</sup> Bethlehem L, Goldblatt M, 'The Bottom Line, Industry and the Environment in South Africa', Butler M, Chapter 8, Pg 199 'Lessons from Thor Chemicals: The Links between Health, Safety and Environmental Protection,



**Figure 5.2.1:** A map of the Umgeni River in relation to the Thor Chemicals plant and surrounding area.

**Source:** The 2002 study by GJ Barratt and J Combrink into the mercury levels of the river system.<sup>108</sup>

The investigation subsequently gained momentum and urgency when Earthlife Africa, an NGO which had been campaigning to expose the pollution, began to receive reports of Thor’s factory workers “going mad”. Pressure from concerned groups, as well as protests both in South Africa and the United States<sup>109</sup> eventually led to the South African government ordering Thor to suspend all operations in April 1990.<sup>110</sup>

In 1992, following the deaths of three factory workers, the British government charged Thor for violation of the Machinery and Occupational Safety Act. Thor pled guilty and were fined R14 500.00. Although Thor Chemicals settled civil suits against them by the dozens of factory workers for a combined R17 million, this fine of R14 500.00 remains the only action taken against Thor Chemicals by either the British or South African governments.<sup>111</sup>

<sup>108</sup> ‘An assessment of the degree of mercury (Hg) bio-transformation in two river systems following discharges from a mercury recovery plant’ (2002) GJ Barratt and J Combrink, Department of Environmental Health, Technikon Natal, Durban, South Africa.

<sup>109</sup> These protests were to halt the continued export of mercury from the U.S to the Thor Chemicals plant.

<sup>110</sup> Kockott 1994.

<sup>111</sup> Fondaw C, (2001) ‘Thor Chemicals and Mercury Exposure in Cato-Ridge, South Africa’, University of Michigan Environmental Justice Case Studies.

Thor ultimately announced in 1992 that they would close the plant in 1996. A tour of the plant in 1994 by the Department of Environmental Affairs found 10 000 drums of mercury improperly stored at the site, and an environmental impact report conducted at the time concluded that lethal mercury waste was still leaching into the water table.



**Figure 5.2.3:** The abandoned remains of the Thor Chemicals Factory.  
**Source:** The Mercury, 2012

As of 2012, approximately 3000 tons of mercury waste remained on the site, with no plan in place for the environmentally sound disposal thereof. While the chairman of the Thor group, Des Cowley, stated in 2012 that R110 million had been set aside for the eventual clean-up<sup>112</sup>, no further information in respect of this “clean-up” has been forthcoming in the subsequent four years..

The international response to the Thor contamination was reminiscent of the fallout from the Minamata tragedy, as the European community resolved to ban hazardous waste exports to 68 former colonies as a result. This was further reinforced by the ratification of the Basel Convention<sup>113</sup> by all industrial countries by 1994.

It is worth noting that under Article 3 of the Minamata Convention, ‘Mercury Supply Sources and Trade’, the South African government would be obligated to take immediate action in respect of any such clean-up operations. Furthermore, there may be an obligation on the

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<sup>112</sup> Carnie, T ‘Decades of Waste not Cleared Up’, 2012, The Mercury.

<sup>113</sup> The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their disposal.

government under Article 16, 'Health', to fully investigate any lingering contamination among the local populace and put in to place relevant treatment plans.

### **5.3 Small-scale and Artisanal Gold Mining**

Although modern commercial mining operations do not make use of mercury<sup>114</sup>, in artisanal and small scale gold mining (ASGM), use of the element remains commonplace.<sup>115</sup> ASGM is in essence the act of subsistence mining make using of minimal or no machinery. The number of people supported by this activity is estimated to be around 100 million worldwide.<sup>116</sup> This number would include approximately 10-15 million miners, equating to 90% of the worlds gold miners, and producing 15% of the world's annual gold production.<sup>117</sup> Furthermore, Mercury Watch, an organisation concerned with monitoring ASGM and the use of mercury therein, has estimated that;

"Artisanal scale gold mining is the single largest demand for mercury in the world. An estimated 1400 tons of mercury were used by Artisanal scale gold mining miners globally in 2011"<sup>118</sup>

The harm which can arise and has arisen as a result of mercury use in ASGM should at this point be easy to anticipate. The effects of mercury use in gold mining in the western mountain ranges of California can still be seen today. Approximately 220 million pounds of mercury was used in this fashion from the mid-19<sup>th</sup> century to mid-20<sup>th</sup> century, and the bio-accumulation of methyl-mercury in river life remains a threat to human and environmental health in the region.<sup>119</sup>

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<sup>114</sup> Despite this, the presence of mercury in gold amalgams is effectively unavoidable, with a certain amount of mercury being released atmospherically by contemporary gold separation processes. Schroder H. H. E, Van Der Linde A, Strydom N B 'The emission of mercury from gold-reduction works in South Africa' (1982) *Journal of the South African Institute of Mining*

<sup>115</sup> As per the United States' Environmental Protection Agency, mercury is combined with material containing gold which forms a mercury-gold amalgam. This is then heated, vaporising the mercury while the gold remains. <https://www.epa.gov/international-cooperation/artisanal-and-small-scale-gold-mining-without-mercury>

<sup>116</sup> <https://www.icmm.com/en-gb/publications/working-together-how-large-scale-mining-can-engage-with-artisanal-and-small-scale-miners> accessed on 5 January 2017.

<sup>117</sup> <http://www.miningfacts.org/communities/what-is-artisanal-and-small-scale-mining/> accessed o 6 May 2017.

<sup>118</sup> <http://www.mercurywatch.org> accessed on 5 November 2016;

<sup>119</sup> Alpers C N, Michael P. Hunerlach, Jason T. May, And Roger L. Hothem, 'Mercury Contamination from Historical Gold Mining in California' (2005)

This bio-accumulation or bio-magnification effect of mercury explains why the element poses such a long term threat to the ecosystems which it contaminates. In short, due to the persistence of the substance, it will build up, or bio-accumulate, in the organisms of those ecosystems. In much the same way that DDT<sup>120</sup> contamination operates, the concentration of mercury and methyl-mercury in these organisms will therefore typically increase as it travels along the food chain, leaving predatory species such as large fish and their predators particularly vulnerable.<sup>121</sup>

The failure to enact responsible environmental programmes aimed at minimising the use of mercury in ASGM has resulted in this type of contamination becoming prevalent in various parts of south-east Asia, Western and Southern Africa, and South America.<sup>122</sup>

In South Africa the issue of ASGM has been somewhat curtailed by comparison due to all informal mining having been declared illegal under the Precious Metals Act<sup>123</sup> and the South African Mineral and Petroleum Resources Development Act<sup>124</sup>. Despite this, the lure of “easy” money still compels some to contravene these acts, usually through illegally mining at decommissioned sites in the Witwatersrand basin. In addition to the environmental damage, as well as economic cost<sup>125</sup>, this causes, there are severe risks which accompany such operations, seen nowhere more clearly than in the deaths of 80 illegal miners in the abandoned Harmony gold mine in 2009.<sup>126</sup>

As discussed in Chapter 3, Article 7 of the Minamata Convention, titled ‘Artisanal and Small-scale Gold mining’ places a requirement signatories to the Convention to put in place measures to minimise the use of mercury in ASGM.

This requirement under Article 7 is fairly ambiguous and, as is the norm when it comes to international conventions, the manner in which compliance is achieved is left to the individual states. In this respect, there are those who have criticised the South African government’s

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<sup>120</sup> Dichlorodiphenyltrichloroethane (DDT) is an insecticide notorious for its large-scale environmental impact.

<sup>121</sup> Mason, R.P., Reinfelder, J.R. & Morel, F.M.M. ‘Bioaccumulation of mercury and methylmercury’, *Water Air Soil Pollution* (1995).

<sup>122</sup> <http://www.mercurywatch.org>.

<sup>123</sup> The Precious Metals Act No. 37 of 2005.

<sup>124</sup> South African Mineral and Petroleum Resources Development Act of 2002.

<sup>125</sup> It has been estimated that the illegal mining industry costs South Africa approximately R7 billion annually.

‘The truth about South Africa's illegal mining industry’, *Rand Daily Mail*, 27 March 2017,

<https://www.businesslive.co.za/rdm/business/2017-03-27-the-truth-about-south-africas-illegal-mining-industry/> accessed on 17 April 2017.

<sup>126</sup> ‘Deadly accident puts illegal mining under spotlight’, *Mail & Guardian Online reporter and Sapa*, Sapa-AFP02 June 2009



approach of a blanket ban. These critics argue that legalising at least some forms of ASGM would allow for regulation to be put in place, thereby minimising the environmental and economic fallout of the “industry”.<sup>127</sup>

#### **5.4 Concluding Remarks**

Although the examples covered in this chapter are not an exhaustive list<sup>128</sup>, they do provide a general idea of the type of mercury related threats to the South African environment and population. Using these instances as a barometer for governmental response, it seems that the South African environmental authorities have adopted a reactive as opposed to a proactive approach to enforcement.

As has been stated above, if or when South Africa does eventually ratify the Minamata Convention, this modus operandi would no longer be sufficient in light of the various articles which require definitive measures to be put in place. Specifically, Article 3, Article 7 and Article 16 all require such plans to be enacted, and furthermore necessitate the submission of progress reports in respect of Articles 3, 5, 7, 8 and 9 to the Secretariat for review.

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<sup>127</sup> Nhlengetwa K, ‘Why it doesn't make sense that all informal mining is deemed illegal’ 13 April 2016, University of Witwatersrand.

<sup>128</sup> Further sources of mercury contamination and proliferation include the burning of coal, as well as more insidious sources such as dental products and skin whitening creams.

## **CHAPTER 6:**

### **Conclusion**

South Africa was one of the first countries to become a signatory to the Minamata Convention, having signed same on the 10<sup>th</sup> October 2013, immediately following INC 5. Despite the initial enthusiasm, South African has not ratified the Convention, and there is no indication of when the country intends to do so.

This inaction is, however, not uncommon when one considers the slow moving nature of International Law, and accordingly it must be anticipated that sooner or later the government will become a party to the Convention.

When this occurs, it will be necessary to evaluate the existing law and ascertain whether new legislation and/or policies would need to be enacted in order to meet the obligations imposed by the Convention. This has already been addressed somewhat in the conclusion to Chapter 4 of this study, and accordingly the following legislative areas require attention.

Article 7 of the Convention requires states to enact plans to minimise the use of mercury in ASGM. As stated above, South Africa's approach of a blanket ban is less than adequate, and accordingly there is a need for new programmes to be implemented to address the problem. These programmes would ideally focus on education and cooperation with affected communities, and in this way also somewhat satisfy the requirement to educate the community under Article 18.

Article 8 concerns atmospheric emissions of mercury. As previously noted, NEMAQA is an ideal piece of legislation which may be used to address this issue. Should it be found that the standards set by NEMAQA are inadequate in light of the Annex D of the convention, new regulations could easily be introduced to bring the existing legislation up to speed.

No National Action Plan of the kind envisioned under Article 9 exists, and accordingly this would need to be addressed going forward. Such plans should focus on the issues involving mercury identified under chapter 5, as well as atmospheric emissions of the type which would be regulated by NEMAQA. Furthermore, the National Plan should identify any areas of the

population suffering from mercury contamination and adopt guidelines for steps to be taken in the event of mercury exposure, as dealt with under Article 16.

Similarly to Article 8, Articles 10 – 12 are addressed by existing legislation, namely NEMA together with NEMWA and the NWA.

From the above it can be seen that, commendably, the structures necessary to enforce obligations under the Convention are for the most part already in place. Any shortcomings may be easily addressed either through the introduction of new regulations to supplement the existing Acts, or through bi-lateral treaties in order to satisfy issues relating to trade such as those under Article 3.

As long as South Africa is economically reliant on gold mining and the use of coal, mercury is going to be present in the industrial sphere of the country, and therefore the presence of mercury and the emission of its by-products cannot be eradicated.

In light of this, achieving a complete prohibition of the type envisioned by the Convention is an impossibility. More importantly, however, it is within reach to achieve compliance with the stated objective of the Convention, being “...to protect the human health and the environment from anthropogenic emissions and releases of mercury and mercury compounds.” As established in this study, the Convention has remarkable synergy with the spirit of the South African Environmental Law framework, making ratification of the Convention not only possible, but desirable.

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