The Cost of Gold:
Environmental, Health, and Human Rights Consequences of Gold Mining in South Africa’s West and Central Rand
Harvard Law School International Human Rights Clinic
The poor community of Soul City Extension 2 sits near a gold mine waste dump in the West Rand. Mining has produced contaminated water and tailings dams that have threatened the local environment, residents' health, and human rights.

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Tutaev Design
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<tr>
<td>AMD</td>
<td>Acid mine drainage</td>
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<tr>
<td>ATSDR</td>
<td>Agency for Toxic Substances and Disease Registry</td>
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<tr>
<td>CAT</td>
<td>Convention against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment</td>
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<td>CEDAW</td>
<td>Convention on the Elimination of All Forms of Discrimination against Women</td>
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<td>CESC</td>
<td>Committee on Economic, Social and Cultural Rights</td>
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<td>CRC</td>
<td>Convention on the Rights of the Child</td>
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<td>DEA</td>
<td>Department of Environmental Affairs</td>
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<td>DHS</td>
<td>Department of Human Settlements</td>
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<td>DMR</td>
<td>Department of Mineral Resources</td>
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<td>DWA</td>
<td>Department of Water Affairs</td>
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<td>DWS</td>
<td>Department of Water and Sanitation</td>
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<tr>
<td>FSE</td>
<td>Federation for a Sustainable Environment</td>
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<td>GDP</td>
<td>Gross domestic product</td>
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<td>HDS</td>
<td>High density sludge</td>
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<td>IARC</td>
<td>International Agency for Research on Cancer</td>
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<td>ICCPR</td>
<td>International Covenant on Civil and Political Rights</td>
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<td>ICESCR</td>
<td>International Covenant on Economic, Social and Cultural Rights</td>
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<td>IHRC</td>
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<td>LRC</td>
<td>Legal Resources Centre</td>
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This report is based on a combination of fieldwork and desk research. The Harvard Law School International Human Rights Clinic (IHRC) conducted on-the-ground investigations in South Africa in 2014, 2012, and 2010, and updated its information through phone interviews in 2016 and 2015. During that period, IHRC researchers interviewed about 200 people from a variety of spheres. They visited more than 20 communities in the West and Central Rand in order to speak to residents of informal and formal settlements. The researchers also interviewed government officials, especially from the national government, representatives of several mining companies, civil society advocates, scientists, and other experts. (Citations identify interviewees with the title they held at the time of the interview.) While in the West and Central Rand, IHRC investigators went on site visits to observe first hand the environmental effects of mining and the activities that have exposed local residents to its contamination.

IHRC supplemented the testimony it collected with a wide range of other sources. IHRC researchers drew on government and industry documents, scientific studies, news reports, and histories of the region. In addition, they identified and applied the most relevant pieces of South African, international, and regional human rights law, which provide an analytical framework for this report.
The discovery of major gold deposits in the Witwatersrand Basin in 1886 marked a turning point in the history of South Africa. The gold rush that followed sparked an economic boom, which attracted wealthy mining magnates and then national and multinational corporations. It also gave rise to South Africa’s largest city. Since its earliest days, however, the industry has endangered the environment and health of the people who have made the region their home. Ongoing mining activities combined with the legacy of 130 years of operations have caused water, air, and soil contamination in the West and Central Rand, an area encompassing Johannesburg and its surroundings. Residents have been exposed to elevated concentrations of heavy metals and radiation that can contribute to immediate and long-term medical problems ranging from asthma and skin rashes to cancer and organ damage. Furthermore, the local people have been largely excluded from decisions about how to deal with the dangers. The situation has particularly affected impoverished, and frequently black, communities.

Over the past five years, the South African government has taken some noteworthy steps to address the adverse impacts of gold mining, but it has failed to live up to many relevant human rights obligations. Its response to the crisis in the West and Central Rand has generally been slow and insufficient. As a result, mining has not only created environmental and health risks, but it has also prevented community members from realizing numerous human rights. Widespread contamination has raised concerns under the rights to health, a healthy environment, water, and housing, while inadequate community engagement has interfered with the rights to receive information and participate in decision making. To remedy the situation, South Africa should adopt a coordinated and comprehensive program that both mitigates the effects of mining and helps the country meet its responsibilities under domestic, international, and regional human rights law.
This report provides a fresh look at the problems posed by gold mining in the West and Central Rand because it examines them through a human rights lens. It is based on three field trips to South Africa and about 200 interviews conducted by the International Human Rights Clinic (IHRC) at Harvard Law School. The report documents the effects of mining on local residents and assesses efforts to deal with them. While recognizing that industry and community involvement is essential to addressing the situation, the report focuses on the actions of the government, which has a legal obligation to guarantee human rights. The report directs most of its recommendations to the government as a whole because South Africa is better situated to assign tasks to specific agencies.

Part I of the report provides context by laying out the historical background and legal framework. Chapter 1 discusses the history of gold mining in the Witwatersrand and the evolution of human rights in South Africa, while Chapter 2 explains the most relevant provisions of domestic and international law. Part II presents the study’s factual findings and legal analysis. Chapters 3 and 4, which address acid mine drainage (AMD) and tailings, respectively, document exposure pathways, describe potential health impacts, and evaluate government responses. Chapter 5 illustrates and critiques how communities have been given limited information and few opportunities to participate in decisions about mining that affect their lives. Chapter 6 concludes by highlighting the need for a coordinated and comprehensive program to resolve the situation.

Historical and Legal Context
Gold mining has been both a boon and a burden for the West and Central Rand, which makes up a large portion of the Witwatersrand. Mining has played an integral part in the region’s economic growth for more than a century, but from its earliest days, it has caused environmental damage. Because the industry contributed to the establishment and survival of the decades-long apartheid regime, the government had little incentive to regulate mining’s harmful effects during that period.

Since the end of apartheid, South Africa has continued to receive economic benefits from mining, but the industry has operated in a different context. The new government has demonstrated its commitment to human rights though its national constitution and ratification of international treaties. As a result, the effects of mining and the government’s response should now be assessed within a human rights framework.

Environmental Contamination
Gold mining has released highly toxic contaminants into the environment of the West and Central Rand for more than a century. In the process, it has raised concerns under several economic, social, and cultural rights. For the South African government to meet its corresponding obligations, it should take steps to remedy ongoing harm and prevent additional effects in the near term as well as to develop a more complete solution for the future.

The pollution of the region’s ground and surface water with acid mine drainage has implicated the rights to health, a healthy environment, and water. AMD is produced when water and oxygen mix with sulfides exposed by mining activities, and it contains elevated concentrations of heavy metals, which are in some cases radioactive. Community members have indirectly ingested AMD, especially by eating vegetables irrigated with the polluted water, meat from cattle that have drunk from local waterways, and fish from contaminated bodies of water.

Local people have also been exposed through skin contact that has occurred when they have washed clothes or swum in tainted lakes and streams. Residents told IHRC that they suffered from skin rashes after exposure, and studies done in other parts of the world have documented long-term health impacts, such as cancer and organ damage, from the same contaminants.

In recent years, the government has pumped and partially treated the AMD, but this positive step was overdue and a more complete solution has been wanting. A treatment facility that came online in 2014 prevented AMD from decanting, i.e., reaching the surface, in the Central Rand. AMD in the West Rand, however, began decanting in 2002, and the government only assumed primary responsibility for treatment in 2012. The treatment plants have fallen short of a complete solution because they have only neutralized the water, leaving high concentrations of sulfates and other salts that can cause acute health effects and make water unsuitable for such activities as drinking, bathing, washing clothes, and watering livestock.

Desalination, a more thorough treatment process, has been needed to improve water quality and to reduce the strain on South Africa’s limited drinking water supply, which has been used to dilute the neutralized water. Recognizing this need, in May 2016 the government announced a plan to construct desalination facilities, which it said would be fully operational by 2020. The project holds promise, but its success depends on the government implementing it effectively and in a timely manner. The government must also address other major sources of AMD, such as rainwater runoff and underground seepage from mine waste sites.
Inadequate Information and Participation

The government’s poor track record of communicating and engaging with residents about mining matters has been almost as problematic as the adverse effects of mining operations. It has prevented local people from fully exercising two key civil and political rights—the right to receive information and the right to participate in decision making. Community members have complained, for example, that the government (along with industry) has not provided ample warnings about potential risks or advance notice of mining activities or remedial measures. In addition, while contamination levels have been well documented, there has been a shortage of epidemiological studies regarding the effects of mining contamination on human health in the region. The lack of such information has undermined residents’ abilities to protect themselves or advocate on their own behalf. Over the past few years, the government has funded some new scientific research into the health impacts of AMD and tailings, and the World Health Organization (WHO) and North-West University have sponsored a study on uranium exposure in the West and Central Rand. South Africa should be more proactive, however, in collecting and disseminating information to the local population.

In many cases, government agencies have also failed to engage meaningfully with communities about mining issues that could affect them. Residents have reported being left out of discussions related to nearby operations or their own relocation. Frustration at the lack of engagement has led to violence, litigation, and feelings of mistrust. To meet its human rights obligations, the government should increase the participation of community members in decision making. Their participation could produce more effective policies to address the impacts of mining in the West and Central Rand and increase community buy-in for long-term plans.

A Coordinated and Comprehensive Program

South Africa should adopt an overarching program dedicated to realizing the human rights threatened by mining in the region. According to Government of the Republic of South Africa v. Grootboom, a seminal South African Constitutional Court case regarding the right to housing, a “reasonable” program to progressively realize rights should be coordinated and comprehensive. To date, South Africa’s efforts in the West and Central Rand have failed to meet the Grootboom standard. The complex web of responsible government agencies and repeated legislative changes to that organizational structure have impeded the development of a coordinated plan to deal with the negative effects of mining. The limited scope of action, inadequate attention to at-risk communities, and insufficient consideration of environmental concerns have undermined the completeness of any response. A coordinated and comprehensive program to deal with the situation in the West and Central Rand should follow the Grootboom model and address each of these shortcomings.

A holistic perspective could further minimize the harm caused by mining in the region. It would take into account the connection between AMD and tailings, recognize the importance of linking protection of the environment and human health with community engagement, and allow the government better to prioritize tasks and marshal finite resources. Implementation of such an approach would ultimately help minimize the adverse impacts of mining while promoting human rights.

Contaminated dust and soil from omnipresent hills of mine waste have interfered with the enjoyment of the rights to health, a healthy environment, and housing. There are more than 200 such waste dumps, known as “tailings dams,” in the Johannesburg area, and like AMD, they contain elevated concentrations of heavy metals, including radioactive uranium. Contaminated dust has filled the air and blanketed communities, leading to widespread complaints of asthma and other breathing difficulties. In addition, the location of many settlements near or even on top of the tailings dams has endangered residents, who have indirectly ingested food grown in the soil, had skin contact with the toxins, or used mud in traditional medicines. In better studied parts of the world, the contaminants in tailings have been found to cause serious health problems, similar to those from AMD.

Government efforts to minimize the effects of tailings have been largely incomplete, short-term fixes. The government’s most notable accomplishment has been to relocate some residents of the informal settlement of Tudor Shaft, who were at particular risk because their homes stood directly on a radioactive tailings dam. The government has permitted new construction near other dams, however. In addition, it has neither pursued adequate dust control measures, such as irrigation and vegetation of tailings dams, nor ensured that industry has done so. While the massive amount of waste has been daunting, the government has taken inadequate steps to develop a more complete solution to the root causes of polluted dust and soil—i.e., the tailings dams themselves. Mining companies have extracted and removed some heavy metals through remining, but government oversight seems to have been insufficient to minimize the side effects of the process, which both stirs up dust and increases AMD. The government has also left companies to take the lead in designing and evaluating proposals to move tailings from urban dams to isolated mega dumps.
Mitigating the environmental, health, and human rights impacts of gold mining in the West and Central Rand will require a significant commitment from the South African government. The government will need to employ practical and legal fixes, improve interactions with local communities, and adopt an overarching plan that is coordinated and comprehensive. Communities and mining companies should contribute to these efforts, including by bringing to the task an open mind and a willingness to cooperate. The government should play the lead role, however, given the risk of a collective action problem and the inadequate measures taken by industry to date. In addition, the state bears primary responsibility under human rights law for preventing infringement of its people’s rights.

The South African government should take the following steps to address the mining problems in the region and advance realization of the relevant human rights:

**Environmental Contamination**

- Adopt measures to remedy ongoing harm from environmental contamination, such as:
  - Ensuring cleanup of polluted areas,
  - Providing free health screenings and access to medical care for at-risk populations, and
  - Considering a regime to compensate those harmed by the adverse effects of mining;

- Minimize the risks of further harm from acid mine drainage by:
  - Ensuring water treatment plants are adequate to prevent decanting, including during heavy rains and other severe weather events,
  - Implementing plans to upgrade water treatment in the region from neutralization to desalination as soon as possible, but no later than the scheduled 2020 deadline,
  - Monitoring water levels and degrees of contamination,
  - Requiring companies to reduce spillages from pipes transporting mining waste, and
  - Improving control of runoff and seepage from tailings dams, including through better enforcement of existing laws;

- Minimize the risks of further harm from mine tailings by:
  - Ensuring implementation by the government and industry of dust control measures, such as irrigating or planting vegetation on tailings dams,
  - Prohibiting the use of tailings dams for leisure biking and other recreational activities that stir up dust,
  - Relocating residents who live in areas at high risk from mining contamination and who wish to move to a safer environment, and providing them with adequate housing,
  - Requiring a larger buffer between new construction and existing tailings dams,
  - Adequately regulating and overseeing remining operations to minimize the side effects of disturbing old tailings,
  - Working with communities and mining companies to develop and implement a long-term strategy that deals with the prevalence of tailings dams in populated areas, and
  - Ensuring its efforts encompass both privately owned mine sites and legacy mines that have reverted to the state.

**Recommendations**

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  - Ensuring its efforts encompass both privately owned mine sites and legacy mines that have reverted to the state.
Inadequate Information and Participation
- Ensure that the public and especially members of affected communities receive information related to the risks posed by mining, including by:
  - Educating, or requiring mining companies to educate, the local population about the dangers of mining contamination and ways to limit exposure through awareness-raising mechanisms, such as warning signs and community workshops,
  - Encouraging and supporting epidemiological studies of the health effects of mining in the West and Central Rand,
  - Providing advance notice of new mining and remining activities and remediation plans, and
  - Disseminating information in a form that is accessible and understandable to laypeople;
- Ensure that community members have the opportunity to participate in decision making about mining activities that affect their lives, including by:
  - Holding regular meetings with relevant stakeholders, including community members, civil society, and industry, to have constructive discussions about dealing with the problems of mining in the region,
  - Engaging meaningfully, and requiring mining companies to engage meaningfully, with affected residents about specific projects, such as those that involve remining or relocation,
  - Working with communities jointly to design constructive forums for regular contact as well as proper engagement mechanisms for specific projects,
  - Encouraging affected people to take part in these processes and voice individual and community concerns, and
  - Taking community perspectives into account when determining policies.

A Coordinated and Comprehensive Program
- Design, resource, and implement a coordinated and comprehensive program to address the adverse effects of mining in the West and Central Rand;
- Build on the criteria for a “reasonable” program laid out in the South African Constitutional Court case Grootboom;
- Meaningfully engage communities and industry in the design of the program;
- Promote coordination by:
  - Establishing a focal point to lead the design and implementation of the program and to organize the relevant actors,
  - Creating a clear and stable division of responsibility among government entities with jurisdiction over mining matters, and
  - Providing legislative support, including in the form of necessary resources;
- Ensure comprehensiveness by:
  - Taking immediate preventive and remedial actions as well as developing and implementing long-term strategies to eliminate the root causes of the problem,
  - Devoting adequate attention to the needs of the most at-risk communities, and
  - Following a balanced approach that takes into account environmental and health concerns as well as economic benefits;
- Adopt a holistic perspective that:
  - Takes into account the connection between AMD and tailings,
  - Links efforts to protect the environment and human health with those to engage communities, and
  - Provides an overarching understanding of the problem to facilitate prioritization of tasks and marshaling of resources.
PART I: HISTORICAL AND LEGAL CONTEXT
The history of gold mining in South Africa's Witwatersrand region is a story of great riches and high risks. From its earliest days, mining’s profits were integral to the country’s growth. They fueled the economy, sparked the growth of Johannesburg, and helped make South Africa one of the most developed nations on the African continent. Mining operations also endangered the environment and human health. The industry’s initially discriminatory practices, which became intimately connected with the apartheid regime, placed an undue burden on poor, largely black communities.

While many of the promises and problems of gold mining endure, the political situation has changed. After the end of apartheid, the government made an express commitment to human rights, particularly by accepting obligations under the 1996 South African Constitution and several international treaties. Today, mining in the Witwatersrand takes place in a new legal context, which will frame this report’s analysis of the industry’s impacts.

The Origins and Early Effects of Gold Mining in the Witwatersrand
An Australian digger found gold in the Witwatersrand in 1874, and the discovery of a major reef in 1886 attracted a flood of prospectors. Miners’ camps sprung up, followed by the founding of Johannesburg, which would become “South Africa’s City of Gold.” The Witwatersrand, which encompasses the West and Central Rand, would prove to be an exceptionally rich and long-lasting resource for South Africa. By 2013, the region had yielded about 40 percent of the gold ever mined in the world, and when measured by the number of tons of gold-bearing ore it contained, it was the earth’s richest mineral deposit. The Witwatersrand has been difficult to mine, however, because it has very thin gold veins and poor quality ore deposits with a low proportion of gold to ore. Nevertheless, mining magnates and companies eventually made the enterprise profitable with substantial capital investments, and they paved the way for an industry that continues today.

The gold rush changed the natural and sociopolitical landscape of South Africa forever. Discovery of the mineral quickly and irrevocably altered the environment of the region. The Witwatersrand, which means “Ridge of White Waters” in Afrikaans, was named for its abundance of waterfalls, but when mining began, engineers built channels and drained the falls. Water was harnessed for and contaminated by mining, and mounds of waste replaced the natural landscape. Historian Jade Davenport wrote that “the Witwatersrand ... is the most

1. “In the long run, gold production ... was to change the social and economic pattern of South Africa from a patchwork of agricultural and pastoral communities to a predominantly industrial urban society,” J.D. Omer-Cooper, History of Southern Africa (London: James Currey Publishers, 1987), p. 126.
In addition to depleting the environment, the growth of gold mining in the Witwatersrand contributed to South Africa’s troubling history of racial discrimination. Exploiting the “extensive but low-grade” goldfield required not only significant upfront investments, but also imported technology and skilled foreign labor that commanded high wages. Early mining magnates found that the costs they could best control were the wages of their unskilled and semiskilled workforce. In the late nineteenth century, these mine owners implemented a racially discriminatory system modeled on practices at South Africa’s diamond mines. To ensure a steady supply of cheap labor, owners generally hired young, black migrant workers for 18-month periods at minimum wage. The owners compelled the workers to live in segregated, company-owned housing while white people settled in separate residential areas. Davenport explained that “the magnates and white population deemed that a particularly favourable system, as it prevented the incorporation of the black workforce into Johannesburg’s industrial and residential system and, moreover, enabled mine managers to exercise a greater level of control over them.” Such practices would lay the groundwork for apartheid.

The Mining Industry in the Apartheid Era

The South African mining industry, in the Witwatersrand and elsewhere, continued to thrive with the coming of the apartheid era, which began in 1948. According to the country’s Truth and Reconciliation Commission, established after the regime fell in 1994, the mining industry “helped to design and implement apartheid policies.” It also benefited from a labor system that discriminated against black South Africans by paying low wages and allowing unsafe working conditions. The commission wrote, “The first-order involvement of the mining houses and the Chamber of Mines … in shaping the migrant labour system is the clearest example of business working closely with the minority (white) government to create the conditions for capital accumulation based on cheap African labour.” The commission found the mining industry morally culpable for the “hardships” that resulted.

Mining’s relationship to the apartheid government also exacerbated environmental harm because it disincetivized regulation. According to Alan Durning’s 1990 critique of the regime, the government relied on mining, which generated significant tax revenue and export earnings, to cover the costs of racial discrimination policies, segregated facilities, and international trade sanctions. As a result, the government was “loath to touch the mining industry” and treated it like “a sacred cow.” Durning wrote that the regime gave “great freedom to the minerals industry, allowing it to endanger black miners and the environment while protecting it from public scrutiny.” Environmental impacts, including contamination of water and soil with heavy metals, went largely unmonitored. Poor, black South Africans, oppressed by apartheid, felt the greatest burden of the environmental impacts, and they had little political power with which to “counter the industry’s irresponsibility.” Durning concluded, “Apartheid … would have collapsed long ago were it not for the billion-dollar dividends gained by scouring the earth.”

While gold mining remained profitable for decades, in the mid-1980s, it started to decrease in the Witwatersrand and South Africa more broadly for economic, political, and practical reasons. The remains of the abandoned Tudor Shaft mine stand near an informal settlement in the West Rand. Tailings from its operations have long endangered residents in the area. © 2010 Bonnie Docherty/IHRC.
reasons. Domestic and global inflation combined with international sanctions against the apartheid state put significant financial pressure on mining companies. The gold industry’s changing economic situation was exacerbated by labor and anti-apartheid unrest, which had been inflamed by the 1973 Durban labor strikes and the 1976 Soweto student uprising and gained momentum in the 1980s. Furthermore, as the easy-to-reach gold near the surface of the Witwatersrand reef became increasingly exhausted, companies had to dig deeper and deeper mine shafts to extract gold. Gold production in the country recorded a high of almost 7,300 metric tons in 1980, but the annual total declined after that, reaching only about 640 tons in 2006. Abandoned operations left behind environmental damage and attendant risks to humans.

Post-Apartheid South Africa and Its Human Rights Commitments

As the heyday of gold mining began to pass, South Africa experienced dramatic political upheaval that culminated in the end of apartheid in 1994. In the course of its transition to a more just society, the post-apartheid South African government publicly embraced human rights. In 1995, it established a Truth and Reconciliation Commission that was “conceived as part of the bridge-building process designed to help lead the nation away from a deeply divided past to a future founded on the recognition of human rights and democracy.” A primary task of the commission was to “uncover as much as possible of the truth about past gross violations of human rights.” While its investigations focused on the actions of individuals, the commission also briefly examined the role of institutions, including the mining industry, in apartheid. This approach served to “paint the backdrop against which such human rights violations occurred.”

The Constitution adopted in 1996 exemplifies the integral role of human rights in South Africa’s new legal system. The preamble states that the document is designed to “[h]eal the divisions of the past and establish a society based on democratic values, social justice and fundamental human rights.” In addition to establishing the structure of the government, the Constitution contains a Bill of Rights, which it describes as “a cornerstone of democracy in South Africa.” The Bill of Rights enumerates not only civil and political rights, but also economic, social, and cultural ones, and the Constitution is one of few that allows for judicial enforcement of the latter.

Democratic South Africa further demonstrated its commitment to human rights with other national and international steps that were in keeping with these foundational measures. In 1995, it created the South African Human Rights Commission, a national institution that promotes and monitors observance of human rights in the country, including by conducting investigations, seeking redress for violations, and educating people about their rights. The new government also signed or ratified six of the core human rights conventions, which will be discussed in the next chapter, before the year 2000. The country’s Constitution integrates these treaty obligations into domestic law, requiring courts to “consider international law” when interpreting the Bill of Rights.

The Constitutional Court’s judgments interpreting the Bill of Rights and key international treaties exemplify the post-apartheid government’s commitment to human rights. © 2010 Bonnie Docherty/HRRC.
Gold Mining in Modern South Africa

Despite the political transformation of the country, gold mining has continued to influence South Africa since the end of apartheid. In recent years, mining in the country has accounted for more than 10 percent of global gold production and approximately 20 percent of the country’s gross domestic product (GDP).38 A 2005 study estimated that several million people in the Witwatersrand still relied, directly or indirectly, on the industry for their livelihoods.40

As this report documents, the benefits of gold mining have been accompanied by adverse effects. The industry has changed in scale and technology over the past 130 years and government regulation has increased, but mining has continued to damage the environment and endanger local populations. The remains of abandoned “legacy mines” as well as new operations, including the remining of old sites, have contaminated the region. Because the area has been densely populated, largely due to the industry, environmental impacts have posed risks to human health. Disadvantaged communities have borne the greatest burden: as a result of the history of discrimination and apartheid, they have often been located close to mine sites. A critical difference from the early days of mining, however, has been that South Africa has accepted explicit human rights obligations through national and international commitments. This body of law provides a basis for evaluating the long-standing problems of and recent responses to gold mining in the Witwatersrand region.

2. Human Rights Framework

South Africa has committed to a multi-layered framework of human rights law. At the national level, it has included a detailed Bill of Rights in its 1996 Constitution. It has accepted international obligations as a state party to key human rights treaties, notably the International Covenant on Economic, Social and Cultural Rights (ICESCR) and the International Covenant on Civil and Political Rights (ICCPR). South Africa has agreed to additional responsibilities by ratifying the African Charter on Human and Peoples’ Rights (Banjul Charter). It has also joined international and regional treaties dedicated to protecting the rights of specific groups, including women and children. Harmonizing multilateral treaties with domestic law, the country’s Constitution requires courts to take international law into account when interpreting the Bill of Rights.42

Many of the human rights that make up this legal corpus are applicable to the problems associated with mining. Environmental and health effects raise concerns under economic, social, and cultural rights, notably the rights to health, a healthy environment, water, and housing. Methods of engagement with the community implicate such civil and political rights as the rights to information and participation in decision making. The need for relief after infringement also implicates the right to a remedy. Human rights law establishes a corresponding obligation to realize these rights fully, and South African jurisprudence calls for the adoption of a coordinated and comprehensive program to achieve that goal.43 The relevant rights and duties, introduced in this chapter, generally appear in multiple South African, international, and regional instruments.44

Economic, Social, and Cultural Rights

Right to Health

The physical and psychological effects of mining pollution on humans trigger the right to health. The right can be divided into a “right to health care and a right to healthy conditions,” the latter being particularly relevant for this report. While focusing on access to health care services, the South African Constitution covers other components under the right to a healthy environment, discussed below.45

International human rights law takes a broader view of the right to health, which is included in the ICESCR.46 The Committee on Economic, Social and Cultural Rights (CESCR), the treaty body for this covenant, explains that the right to health is “not confined to the right to health

42 South African Constitution, § 27. See also Woolman and Bishop, eds., Constitutional Law of South Africa (Cape Town: Juta & Company, Ltd., 2013), 56A-5.
44 Unless otherwise indicated, South Africa is party to all of the treaties discussed in this chapter. See also Woolman and Bishop, Constitutional Law of South Africa, 56A-5 (“The Final Constitution [FC] divides these two elements of the right between FC s 27(1)(a) [the right to have access to health care services] and FC s 24(4) [the right to a healthy environment].” (internal citations omitted)).

care,” but “extends to the underlying determinants of health,” including food, housing, access to safe and potable water, and a healthy environment. According to the CESCR, the right to health calls for “the prevention and reduction of the population’s exposure to harmful substances such as radiation and harmful chemicals or other detrimental environmental conditions that directly or indirectly impact upon human health.” At the regional level, the Banjul Charter enforces “the right to enjoy the best attainable state of physical and mental health.” Other international and regional instruments make clear that rights in this area apply equally to specific groups, such as women and children.

South Africa has corresponding duties to promote the right to health. According to the CESCR, states are obliged to “adopt measures against environmental … health hazards,” including the formulation and implementation of “national policies aimed at reducing and eliminating pollution of … water.” States may fail to meet their duties if they inadequately regulate the actions of third parties, including mining companies, that infringe on others’ right to health. “The failure to enact or enforce laws to prevent the pollution of water … by extractive and manufacturing industries,” for example, may amount to a violation.

**Right to a Healthy Environment**

Mining implicates the right to a healthy environment because it usually contaminates the environment for the short and long term. According to the South African Constitution, this right consists of two elements: first, the right of everyone “to an environment that is not harmful to health or well-being,” and second, the right “to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures.” Although the ICESCR does not reference the right to a healthy environment, its treaty body explicitly recognizes the importance of a healthy environment as an underlying determinant of the right to health. The UN special rapporteur on human rights and the environment, appointed by the Human Rights Council, has also begun to explore the development and content of the emerging right to a healthy environment. The Banjul Charter explicitly protects the right to a healthy environment, stating, “All peoples shall have the right to a general satisfactory environment favorable to their development.” The Maputo Protocol on the Rights of Women in Africa reiterates the right to a healthy and sustainable environment and includes the right to “acceptable living conditions in a healthy environment” under the right to adequate housing.

Several non-binding international instruments share the South African Constitution’s concern about environmental harm and desire to protect future generations. For example, the Stock- holm Declaration from the 1972 UN Conference on the Human Environment asserts that “[t]he discharge of toxic substances …, in such quantities or concentrations as to exceed the capacity of the environment to render them harmless, must be halted in order to ensure that serious or irreversible damage is not inflicted upon ecosystems.” The declaration also says that natural resources “must be safeguarded for the benefit of present and future generations.” Taking a similarly forward-looking approach to environmental protection, a 1990 UN General Assembly resolution states that “men and women … bear a solemn responsibility to protect and improve the environment for present and future generations.” The 1992 Rio Declaration on Environment and Development (Rio Declaration) calls for “equitably meeting developmental and environmental needs of present and future generations.”

Like other rights enshrined in South African, international, and regional human rights law, the right to a healthy environment imposes duties on the state. The African Commission on Human and Peoples’ Rights has held, for example, that the state has an obligation under both the right to health and the right to a satisfactory environment to take “reasonable and other measures to prevent pollution and ecological degradation, to promote conservation, and to secure an ecologically sustainable development and use of natural resources.”

**Right to Water**

Mining’s frequent contamination of local water supplies raises concerns under the right to water, which covers both access and quality. Focusing on the former, the South African Constitution guarantees the right of everyone to have access to “sufficient” water. The international right to water, as interpreted by the CESCR, encompasses elements of both

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49 Ibid., para. 15.
51 For example, the Convention on the Rights of the Child recognizes the right of every child to “the enjoyment of the highest attainable standard of physical and mental health.” The 1992 UN Conference on Environment and Development (Rio Declaration) calls for “equitably meeting developmental and environmental needs of present and future generations.”
52 CESCR, General Comment No. 14, The Right to the Highest Attainable Standard of Health, para. 35.
53 Ibid., para. 51.
55 CESCR, General Comment No. 14, The Right to the Highest Attainable Standard of Health, para. 15. See also ICESCR, art. 12(2)(b).
57 Banjul Charter, art. 24.
Within safe physical reach for all sections of the population and... within, or in the immediate vicinity, of each household, educational institution and workplace. To be of adequate quality, water must be safe, that is, free from “chemical substances and radiological hazards that pose a risk to human health” and “of an acceptable color, odour, and taste” for use. International and national treaties on women’s and children’s rights echo the need for adequate water.

With regard to associated duties, international law requires states to take necessary steps, such as adopting legislation, to prevent third parties, including mining companies, from polluting water resources. A violation of this duty arises from the “failure to enact or enforce laws to prevent the contamination... of water.” The CESCR provides examples of relevant strategies and programs to promote the right to water, one of which is “reducing and eliminating contamination of watersheds and water-related eco-systems by substances such as radiation [and] harmful chemicals.” South Africa’s obligations should be understood to extend beyond the prevention of new contamination to addressing the effects of past contamination.

Right to Housing

Health concerns associated with mining may make the right to housing relevant. The South African Constitution establishes a right to adequate housing, and the ICESCR recognizes the right to housing as part of a right to an adequate standard of living. According to the CESCR, the location of housing in close proximity to contaminated soil, such as that left over from housing, can infringe on the right to housing. The committee found that “housing should not be built on polluted sites or in immediate proximity to pollution sources that threaten the right to health of the inhabitants.” It added that habitability means that adequate housing must protect inhabitants from threats to health and to their physical safety.

The African Commission on Human and Peoples’ Rights has found that the right to housing is implicitly guaranteed under the Banjul Charter’s right to property, right to health, and requirement that states protect the family unit. Treaties addressing the rights of specific groups consider housing to be an important part of adequate living standards.

South Africa has recognized state duties associated with the right to adequate housing. In the Grootboom case, which is discussed in more detail below, the South African Constitutional Court interpreted the right to housing to include “a negative obligation placed upon the state and all other entities and persons to desist from preventing or impairing the right of access to adequate housing.”

Civil and Political Rights

Right to Information

Civil and political rights as well as the previously discussed economic, social, and cultural ones are applicable to an analysis of mining’s impact in South Africa. The South African Constitution provides for the freedom “to receive or impart information,” and the right of access to information is necessary for the exercise of other rights. The ICESCR recognizes the “freedom to seek, receive and impart information and ideas of all kinds,” while the ICESCR is understood to protect the right to information specifically in relation to the rights to health and water. The Banjul Charter and Convention on the Rights of the Child also address the right to information. Under both South African and international law, the right encompasses information from the government and third parties, which could include mining companies.

To promote this right, states are obliged to make information available. According to the Human Rights Committee, the treaty body of the ICCPR, they should “proactively put in the public domain Government information of public interest,” and “make every effort to ensure easy, prompt, effective and practical access to such information.” They should “enact the necessary procedures, whereby one may gain access to information, such as by means of freedom of information legislation.” States must also ensure that people are informed about their rights under the ICCPR, which includes the right to participation in government, discussed below.

The right to information and the related duty to be transparent have been linked specifically to rights associated with environmental protection. The CESCR calls on states to ensure freedom of information legislation.” States must also ensure that people are informed about their rights under the ICCPR, which includes the right to participation in government, discussed below.

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64 CESCR, General Comment No. 15, The Right to Water, para. 13(c)(ii) (noting that “a household includes a permanent or semi-permanent dwelling, or a temporary halting site”). The CESCR notes, in accessibility requires physical, economic, and information accessibility as well as non-discrimination. Ibid., para. 12(c)(ii)(A).
65 Ibid., para. 12(c)(ii)(A).
66 Ibid., para. 12(c)(ii)(A).
67 See CEDAW, art. 14(2)(b) (referring specifically to rural women); CRC, art. 24(2)(b); Maputo Protocol on the Rights of Women in Africa, art. 10.
68 CESCR, General Comment No. 15, The Right to Water, para. 23.
69 Ibid., para. 44(b).
70 Ibid., para. 48.
71 South African Constitution, § 26(1)-(2); ICESCR, art. 11(1).
73 Ibid., paras. 139, 140.
74 Ibid., para. 139.
75 Ibid., para. 139.
76 Ibid., para. 140.
77 Ibid., para. 140.
78 Ibid., para. 140.
79 Ibid., para. 140.
80 Ibid., para. 140.
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196 Ibid., para. 140.
197 Ibid., para. 140.
198 Ibid., para. 140.
199 Ibid., para. 140.
200 Ibid., para. 140.
transparency and dissemination of information in the protection and fulfillment of the rights to health and water. The Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters (Aarhus Convention) provides further insight into the right to information in environmental contexts although South Africa is not party because the treaty is European. The Aarhus Convention requires a state to provide environmental information in its possession to requesting parties and establishes an obligation to collect and disseminate information. Specifically, states have the duty, when there is an "imminent threat to human health or the environment, whether caused by human activities or due to natural causes," to disseminate "all information which could enable the public to take measures to prevent or mitigate harm." Right to Participation

Given that addressing the problems of mining requires policy choices, the right to participation in public decision-making processes applies. The South African Constitution states that "the public must be encouraged to participate in policy-making." Local governments are "to encourage the involvement of communities and community organisations in the matters of local government," and each municipality has an obligation to "structure and manage its administration, and budgeting and planning processes to give priority to the basic needs of the community, and to promote the social and economic development of the community." The ICPPR and other treaties similarly establish the right to take part in public affairs.

An important way to ensure participation is for the government to engage meaningfully with the affected population. In its Occupiers of 51 Olivia Road and Others v. Johannesburg and Others judgment, the South African Constitutional Court described engagement as a "two-way process" and stated the government must make "reasonable efforts" to engage even if the affected people do not initially want to. The Court explained, "Engagement has the potential to contribute towards the resolution of disputes and to increased understanding and sympathetic care if both sides are willing to participate in the process." Although that case dealt with housing evictions not environmental harm, the Constitutional Court has found that meaningful engagement is important for the realization of many rights. In its Schubart Park Residents’ Association and Others v. City of Tshwane Metropolitan Municipality judgment, the Court stated, "Many provisions in the Constitution require the substantive involvement and engagement of people in decisions that may affect their lives. … [T]he exercise of these often competing rights and interests can best be resolved by engagement between the affected people on the one hand and the government on the other." 90

The right to information and the right to participation in decision-making are closely related. Environmental information is key to the realization of the right to information and the right to participate in decision-making. 91

The Court named several areas in which it had recognized that engagement was important to promoting constitutional rights, including "political decision-making, access to information, just administrative action, freedom of expression, freedom of association and socio-economic rights." Schubart Park Residents’ Association and Others v. City of Tshwane Metropolitan Municipality, Case CCT 27/12 (2012) ZACC 23, paras. 43-44 (internal citations omitted). Eric Christiansen wrote, "[S]ince the South African Constitution protects a variety of socio-economic rights (in addition to the right to housing that underlies Olivia Road), it seems somewhat likely that the Court will require such consultation (or some analogous procedure) when the state makes other decisions related to social welfare protections. … Even if such a constitutional requirement does not spread to other categories of socio-economic rights, the occurrence of good faith community consultation in one substantive area of social welfare will influence popular expectations in other areas." Eric C. Christiansen, "Transformative Constitutionalism in South Africa: Creative Uses of Constitutional Authority to Advance Substantive Justice," Journal of Gender, Race & Justice, vol. 13 (2010), p. 611.

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The requirement to engage meaningfully should thus be applied in the context of mining. The right to participation has been invoked in considerations of environmental and health issues. According to the CESCR, states parties to the ICESCR should adopt policies that promote participation in decision-making processes that affect the exercise of the rights to health and water. The UN special rapporteur on the right to water laid out criteria states should meet to guarantee participation is meaningful, including allowing people to determine the terms of participation, ensuring that information is accessible and safe, providing relevant information available, and providing the opportunity to influence decision making. The Maputo Protocol on the Rights of Women in Africa establishes a duty to provide for women’s participation specifically in the context of sustainable development and the right to a healthy and sustainable environment.

Right to a Remedy

Both South African and international law establish a right to a remedy that would pertain to situations in which mining operations led to human rights abuses. The South African Constitutional Court has found that environmental justice is an implicit part of the right to a remedy, see ibid., art. 9.

The right to a remedy is linked to the right to information and participation. 92

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After an environmental right is recognized, the right to a remedy ensures that the right is not a mere paper right. 94

International standards on environmental protection also call for remedies. The Rio Declaration urges states to make available a remedy for environmental grievances. 95

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A "Reasonable" Program to Realize Human Rights

Human rights law requires states to ensure implementation of each of the rights described above. The ICCPR mandates that states parties take immediate measures to "give effect" to civil and political rights.112 The ICESCR, recognizing that greater resources may be needed in some cases, obliges states to "progressively realize" economic, social, and cultural rights.113 Regardless of the right, adoption of an overarching government plan can facilitate achieving its realization.

The Constitutional Court of South Africa addressed this issue in Grootboom, its landmark decision on the right to housing.114 The Court found that the state should formulate and implement "a reasonable programme" that is coordinated and comprehensive in order to achieve progressive realization.115 According to Grootboom, a reasonable program should be a joint and well-organized undertaking.116 The program should be "determined by all three spheres of government in consultation with each other."117 It should "clearly allocate responsibilities and tasks to the different spheres of government and ensure that the appropriate financial and human resources are available."118 Legislative action should be "supported by appropriate, well-directed policies and programmes implemented by the executive."119 Because conditions change over time, "continuous review" is necessary.120

A reasonable program, as envisioned by the Grootboom Court, must also be broad in time and scope. It "must be balanced and flexible and make appropriate provision for ... short, medium and long term needs."121 A program "that excludes a significant segment of society cannot be said to be reasonable."122 It must be sure to address "those whose needs are the most urgent and whose ability to enjoy all rights therefore is most in peril."123 While developed for a specific case, the Court's criteria provide useful guidelines for a program to realize all of the rights related to mining.124

112 [ICCPR, art. 2(2)].
113 [ICESCR, art. 2(1)]. While recognizing that limited resources may slow the process, the principle of progressive realization "imposes an obligation to move as expeditiously and effectively as possible towards that goal." UN Committee on Economic, Social and Cultural Rights, General Comment No. 3, The Nature of States Parties’ Obligations (Art. 2(1)), December 14, 1990, para. 9.3
114 The Court in Grootboom elaborates on how South Africa should implement the principle of progressive realization, but it states more generally that "there is no reason not to accept that it bears the same meaning in the Constitution as in the document [the ICESCR] from which so clearly derived," Grootboom, para. 45.
115 Ibid., paras. 39, 99. See also Sandra Liebenberg, Socioeconomic Rights: Adjudication under a Transformative Constitution (Cape Town: Juta & Company, Ltd., 2010), p. 152.
116 The coordination prong of Grootboom's reasonable program has parallels in the South African Constitution and international law. Article 41 of the Constitution requires different parts of the government to "co-operate with one another in mutual trust and good faith," including by consulting each other on "matters of common interest" and coordinating actions and legislation. South African Constitution, § 41. While interpreted primarily as a tool for preserving a balance of power, not for promoting human rights, this constitutional provision highlights the value South Africa has placed on ensuring that government actions are coordinated. See also Stuart Woolman et al., "Co-operative Government," in Constitutional Law of South Africa, 2nd ed. (Cape Town: Juta & Company Ltd., 2013), pp. 14-17. International bodies have encouraged countries to pursue coordinated efforts specifically to realize human rights, including those applicable to mining. In its general comment on the right to water, the CESCR declares that "steps should be taken to ensure there is sufficient coordination between the national ministries, regional and local authorities in order to reconcile water-related policies." The CESCR notes that "good governance is essential to the effective implementation of all human rights, including the realization of the right to water." CESCR, General Comment No. 15, The Right to Water, paras. 51, 49. The committee uses similar language in discussing a national plan to ensure the right to health. CESCR, General Comment No. 14, The Right to the Highest Attainable Standard of Health, para. 55.
117 Grootboom, para. 40.
118 Ibid., para. 39.
119 Ibid., para. 42.
120 Ibid., para. 43.
122 Grootboom, para. 45.
123 Ibid., para. 44. Statistical success may be insufficient to meet the reasonableness test. Ibid.
PART II:
FINDINGS
South Africa is a water-scarce land. It ranked among the top 40 driest countries in terms of rainfall in 2014, and Johannesburg is the world's largest city not built on a navigable body of water. Given South Africa's limited water supply, the problem of acid mine drainage, a toxic and often radioactive byproduct of gold mining, is especially concerning. AMD forms when water and oxygen combine with sulfide minerals, exposed in open mines and tailings dams, to produce highly acidic water. Over the past 14 years, AMD from flooded mines as well as runoff and seepage from waste dumps has contaminated lakes and rivers in parts of the Witwatersrand. The polluted water decanted (i.e., reached the surface) for several years in the West Rand, beginning in 2002, and it has threatened to do the same in the Central Rand. Residents of the region have been exposed to AMD through ingesting contaminated food, doing laundry, and swimming. Community members told IHRC they associated common skin irritations, such as rashes, dryness, and cracking, with the contaminated water. According to scientific studies conducted elsewhere, the elevated concentrations of heavy metals present in AMD can cause such problems as well as more serious ones, including damage to the kidneys and the nervous system, and an increased risk of cancer. The environmental impacts and potential health effects created by AMD have raised serious concerns under the human rights to health, a healthy environment, and water.

While South Africa has made progress in addressing the situation, it has not fully met its obligations associated with these rights. Its initial slow response to the AMD crisis endangered community members, and the government should now take action to remediate any harm caused by its delay. Over the past five years, two new government treatment plants have largely stemmed the flow of decant; however, as officials have acknowledged, technical limitations have prevented the existing facilities from treating the water sufficiently for discharge into the natural environment. In 2016, the government initiated a project to improve the treatment process, but it is not scheduled to be fully operational for at least four years. South Africa should develop, adopt, and implement a more complete solution that increases plant capacity, enhances the safety of the treated water, and addresses other sources of AMD. Only then can the country meet its long-term duty to ensure full realization of the relevant human rights.

124 The need for additional epidemiological studies of the West and Central Rand will be discussed in more depth in Chapter 5 on Information and Participation.
126 Email from Bashan Govender, Assistant Director, Department of Water and Sanitation, to IHRC, June 2, 2016.
Creation and Spread of AMD

Acid mine drainage is created when water and oxygen mix with iron pyrite and other sulfides found at elevated levels in the ground. The oxidation produces highly acidic water, which dissolves heavy metals exposed by mining.128 AMD is most known for its chemical toxicity, but it can also contain radioactive contaminants, including uranium. Untreated AMD cannot be safely consumed by humans or animals or used for irrigation or other agricultural purposes, and it is unsuitable for anything other than some industrial uses.129

AMD comes from two main sources. First, abandoned mine voids fill with groundwater or rainwater that reacts with unmined, underground ore to form AMD and may eventually decay at the surface. When mines are active, companies continuously pump water out in order to preserve access to the gold reserves, and this pumping helps prevent the accumulation and decanting of contaminated water.130 Second, mine waste, known as tailings, can produce AMD when it comes in contact with water. Rain and surface water runoff from tailings dumps heavy metals from AMD that have solidified among the grasses at the edge of a stream. Elevated concentrations of these metals have been widespread in the West and Central Rand. © 2010 Bonnie Docherty/IRRC.

As companies in the Witwatersrand region began to cease operations, the pumping of ground-water from mine voids was reduced and mines began to flood.131 While neighboring mines could initially deal with the excess water by increasing their own pumping capacities, eventually there were no active underground mining operations to stem the flow.132 As a result, AMD decanted in the West Rand in August 2002 and continued to do so in the years that followed.133 By 2011, toxic water was decanting in the West Rand at a rate of about 15 to 20 million liters a day—or approximately 100 two-liter bottles per second.134 The decanting water flowed into the region’s waterways, especially the Tweevloëstuispruit, which has been used by communities for irrigation, watering livestock, and washing clothes.135 Only the establishment of a government treatment plant in 2012 stopped the decay in the West Rand, although heavy rains overwhelmed the West Rand system periodically from 2014 to 2016.136 A second government plant that came online in 2014 preempted decay in the Central Rand.137

AMD from other sources has adversely affected the Wonderfonteinspruit, part of which passes through the Witwatersrand.138 Rainwater running down tailings dams, seepage from poorly managed tailings dams, and tainted water used in mining operations have all flowed into the Wonderfonteinspruit, which has its headwaters in the West Rand.139 The contamination has stockpiles of ore that can generate AMD, as can seepage from poorly lined waste storage facilities.140 The chemical reactions that produce AMD occur naturally, but mining, such as the deep mining in South Africa, exacerbates the process by uncovering new ore and increasing the quantity of exposed sulfides.141

As companies in the Witwatersrand region began to cease operations, the pumping of ground-water from mine voids was reduced and mines began to flood.142 While neighboring mines could initially deal with the excess water by increasing their own pumping capacities, eventually there were no active underground mining operations to stem the flow.143 As a result, AMD decanted in the West Rand in August 2002 and continued to do so in the years that followed.144 By 2011, toxic water was decanting in the West Rand at a rate of about 15 to 20 million liters a day—or approximately 100 two-liter bottles per second.145 The decanting water flowed into the region’s waterways, especially the Tweevloëstuispruit, which has been used by communities for irrigation, watering livestock, and washing clothes.146 Only the establishment of a government treatment plant in 2012 stopped the decay in the West Rand, although heavy rains overwhelmed the West Rand system periodically from 2014 to 2016.147 A second government plant that came online in 2014 preempted decay in the Central Rand.148

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127 Interview with Francois Durand, Department of Zoology, University of Johannesburg, Pretoria, October 31, 2014.
130 Expert Team of the Inter-Ministerial Committee on Acid Mine Drainage, Water Management in the Witwatersrand Gold Fields with Special Emphasis on Acid Mine Drainage, p. 19 (noting that AMD was initially treated at the water treatment plants and that AMD from underground mines in operation in the West Rand, South Deep Gold Mine, which is expected not to close until 2087, has been operating nearly in the Far West Rand. Gold Fields, “South Deep,” http://www.goldfields.com/ta_vertical/so_south.php (accessed May 1, 2015).
132 It is believed by some that AMD existed in this region millions of years ago, but it went away until large-scale mining operations brought it back. Interview with Henk Coetzee, Specialist Scientist, Council for Geoscience, Pretoria, January 11, 2012; Oelofse et al., “The Pollution and Decantation Threat of Gold Mining Waste on the Witwatersrand: A West Rand Case Study.”
133 Expert Team of the Inter-Ministerial Committee on Acid Mine Drainage, Water Management in the Witwatersrand Gold Fields with Special Emphasis on Acid Mine Drainage, p. 19 (noting that AMD was initially treated at the water treatment plants and that AMD from underground mines in operation in the West Rand, South Deep Gold Mine, which is expected not to close until 2087, has been operating nearly in the Far West Rand. Gold Fields, “South Deep,” http://www.goldfields.com/ta_vertical/so_south.php (accessed May 1, 2015).
136 Mining companies built plants that began to address the problem but did not solve it. At that time, for example, a treatment plant operated by Rand Uranium could treat only 12 million liters per day, and as a result, Uranium water was decanted at 60 million liters per day. Ibid.
137 Skype interview with Mariette Liefferink, CEO, Federation for a Sustainable Environment, July 8, 2016.
144 Expert Team of the Inter-Ministerial Committee on Acid Mine Drainage, Water Management in the Witwatersrand Gold Fields with Special Emphasis on Acid Mine Drainage, p. 19.
come from recent mining and remining activities and from historic operations that left behind tailings dams as well as polluted sediment on the river bed.143

While the precise makeup of AMD varies, scientists have documented its presence in the Witwatersrand.144 Samples taken from the Wonderfonteinspruit have contained levels of arsenic, cadmium, cobalt, uranium, and zinc in excess of natural background concentrations and of regulatory concern.145 The level of uranium, which is chemically toxic and radioactive,146 has exemplified the contamination of the Witwatersrand. For example, a 2009 study of the Wonderfonteinspruit catchment area found that the regional natural background level of uranium was 0.8 μg/ℓ, while the average uranium level at the outflow of the Wonderfonteinspruit catchment was 79 μg/ℓ,147 exceeding the South African legal uranium limit of 70 μg/ℓ for drinking water.148 In 2010, Donaldson Dam, through which the Wonderfonteinspruit runs, was measured to have a uranium content of 62 μg/ℓ (an increase of over 60 percent since 1997 and close to 41 percent since 2003),149 more than double the drinking water standards of the World Health Organization and the US Environmental Protection Agency.150

IHRC observed evidence of AMD in several locations on its three research trips to the West and Central Rand. For example, a culvert emptying into the Tweelopiespruit in the West Rand was marked with a radiation warning sign, and pools in the Central Rand were lined with reddish deposits, characteristic of AMD.151 IHRC saw heavy metal buildups, precipitated iron hydroxides known as “yellow boy,” in or near pipes that were used to carry mine waste. The deposits often accumulated in older steel pipes within six months, and although these radioactive pipes should have been removed to licensed disposal sites,152 IHRC observed some on the side of the road near Robinson Lake. Spills were also a common sight as these pipes corroded, especially at their joints.153 On its 2014 trip, IHRC noted that companies had begun to replace the steel pipes with plastic ones that were less susceptible to blockage and corrosion and thus could reduce leaks. Mariette Liefferink, head of the Federation for a Sustainable Environment (FSE), a local nongovernmental organization (NGO), however, criticized the slow pace of the conversion, which has generally happened only as old pipe sections corroded.154 Furthermore, IHRC found evidence of recent spills in the West Rand, including into wetlands, even from plastic pipes.

143 Skype interview with Mariette Liefferink, CEO, Federation for a Sustainable Environment, July 8, 2016.
144 Interview with Henk Coetzee, Specialist Scientist, Council for Geoscience, Pretoria, January 11, 2012.
146 Interview with Henk Coetzee, Specialist Scientist, Council for Geoscience, Pretoria, January 11, 2012.
148 Skype interview with Mariette Liefferink, CEO, Federation for a Sustainable Environment, April 21, 2015.
152 Some forms of AMD can be recognized by yellow, orange, or red deposits in streambeds. Expert Team of the Inter-ministerial Committee on Acid Mine Drainage, Mine Water Management in the Witwatersrand Gold Fields with Special Emphasis on Acid Mine Drainage. Such colliquation is common near the source of AMD due to “an abundance of suspended iron hydroxides particles.” The color discrepancy as AMD flows downstream and contaminations precipitate. “As a result, acid waters can also be exceptionally clear and may give the wrong impression of being of good quality.” Bernd Lottermoser, “Acid Mine Drainage in South Africa: Environmental Impacts” (Berlin: Springer, 2007), p. 122.
153 Skype interview with Mariette Liefferink, CEO, Federation for a Sustainable Environment.
154 Skype interview with Mariette Liefferink, CEO, Federation for a Sustainable Environment, January 6, 2012.
Exposure to AMD

People in the West Rand have been exposed to water contaminated by elevated concentrations of heavy metals in the form of AMD. Most of those affected have lived in informal settlements, densely populated and impoverished communities of shacks without running water or electricity. The settlements have often been situated near mining sites because the land has been unusable for other purposes. Exposure to AMD in the Central Rand has been less frequent because there are no major bodies of water and, as of June 2016, decanting had not occurred. Nonetheless, many residents have likely come into contact with AMD in runoff or seepage from the omnipresent tailings dams.

Water scarcity has led some community members to rely on water contaminated by AMD for their needs. A 2011 study found that 26.3 percent of surveyed residents of informal settlements in the Wonderfonteinspruit catchment did not have access to clean tap water for drinking, cooking, bathing, or laundry, while another 1.7 percent of them had an inadequate supply and as a result would use tap water only for drinking and cooking.\textsuperscript{158} A 2015 study of Bekkersdal, a West Rand community, found that 10.14 percent of households used the adjacent Donaldson Dam when municipal water was unavailable or needed to be supplemented.\textsuperscript{157} Residents of the Bekkersdal informal settlement told IHRC that “the [tap] water gets cut off\textsuperscript{159},” and that “when the water gets cut, people go and take water from Donaldson Dam.”\textsuperscript{159} For people in such settlements, the main pathways of exposure to AMD have included ingesting contaminated foods, doing laundry in local bodies of water, and playing in polluted rivers.\textsuperscript{160}

Ingestion

Ingestion has most commonly involved consuming local vegetables, meat, and fish that have been contaminated by AMD.\textsuperscript{161} Toxins can accumulate in the tissues of these food sources, often, ‘‘\textsuperscript{158} Interview with Sanny Mogoje, Bekkersdal resident, Bekkersdal, October 29, 2014.
\textsuperscript{157} S. Liefferink, “Determining Attainable Ecological Quality Requirements for the Upper Wonderfonteinspruit Catchment, Based on Human Community Requirements: The Case of Bekkersdal,” dissertation submitted to North-West University, April 2015, p. 84. The study found that the water used by this community “exceeded the guideline values of national and international standards for the following uses: drinking water, certain industrial activities, watering of certain livestock and crop types as well as aquaculture.” Ibid., p. 6.

\textsuperscript{159} Interview with Lucas Moloto, Bekkersdal resident and Community Engagement Workshop Facilitator, Federation for a Sustainable Environment, to IHRC, June 2, 2016; S. Liefferink, “Determining Attainable Ecological Quality Requirements for the Upper Wonderfonteinspruit Catchment, Based on Human Community Requirements: The Case of Bekkersdal,” p. 84.

IHRC documented the use of polluted water to sustain both crops and livestock. This practice can result in contaminants entering the bodies of people who consume them. In 2014, a community organizer from the West Rand town of Sinopole told IHRC that residents who ingest their meat or milk have been indirectly exposed to toxic and radioactive AMD. In earlier interviews, residents of Khutsong and Bekkersdal, also in the West Rand, reported irrigating gardens and crops with water from the Wonderfonteinspruit and Donaldson Dam, respectively. Khutsong residents said that they believed community members used the Wonderfonteinspruit to water crops had damaged the quantity and quality of their harvest. Lucas Moloto, resident of the Bekkersdal formal settlement and FSE community engagement facilitator, reported that some residents still gardened with Donaldson Dam water in 2016, although the practice had decreased with the installation of better potable water taps.

Exposing individuals who eat them to elevated levels of uranium and other heavy metals. Exposing residents who ingest their meat or milk have been indirectly exposed to toxic and radioactive AMD.

Herdiers have brought a variety of animals to area waterways to drink. Moloto said in 2016 that local people had frequently taken their herds to Donaldson Dam. During its visits to the West Rand, IHRC observed cattle and goats drinking from Donaldson Dam or in the overflow channel that links the dam to the Wonderfonteinspruit. Herdiers told IHRC that they brought cattle, which were used for milk and meat, to drink from the dam three times a day. Although community members reportedly do not consume a large quantity of local meat, several interviewees said that the practice was also common among local commercial ranchers. Residents of Khutsong offered similar accounts of herds drinking from the Wonderfonteinspruit. Such watering of livestock may have exacerbated the threat of exposure to contaminants because animals often stir up heavy metals that have settled at the bottom of water bodies affected by AMD.

Local people have fished in different sections of the Wonderfonteinspruit for many years. For example, Donaldson Dam has been a popular West Rand fishing spot for residents of the Bekkersdal informal settlement. The dam has a recreational side, which requires payment for entry at a gate. While a fence of concrete-covered steel rebar has surrounded the rest of the dam, local people have removed much of it to sell as scrap metal. The gaps in the fence have created easy access to the dam from the settlement. In 2016, Lucas Moloto told IHRC that “residents find it hard to fish in Donaldson Dam because there is relatively constant security surveillance.” Surveillance has been a recent development, however, and fishing used to be more common. The 2015 study mentioned above found that 4.5 percent of Bekkersdal residents fished in Donaldson Dam and others purchased the fisherman’s catch.

In 2014, Moloto said that fishing was particularly important for migrant mine workers, including those from Mozambique, for whom fish is a traditional food. In 2012, a resident told IHRC he sold fish from Donaldson Dam for consumption, and a woman from the community said she had eaten fish caught in the dam.

Cattle drink contaminated water from the channel between Donaldson Dam and the Wonderfonteinspruit. Residents who ingest their meat or milk have been indirectly exposed to toxic and radioactive AMD.

IHRC interview with Mariette Liefferink, CEO, Federation for a Sustainable Environment, to IHRC, June 2, 2016; interview with Bekkersdal residents #5 (name withheld), Bekkersdal, January 7, 2012.

Interview with Bekkersdal residents #1, #2, and #3 (names withheld), Sinqobile, October 29, 2014 (statement of resident #6).

See also S. Liefferink, “Determining Attainable Ecological Quality Requirements for the Upper Wonderfonteinspruit Catchment,” Water Research Commission Report 1214/1/6, p. 143.

A Khutsong resident told IHRC that he regularly fished in the Wonderfonteinspruit, some people fished there for a living, and local residents often ate the fish. Interview with Khutsong residents #1, #2, #3, and #4 (names withheld), Khutsong, March 18, 2010 (statement of resident #3).
Evidence suggests the fish caught in Donaldson Dam have been contaminated. People who fish on its recreational side have been required to release what they catch. According to Lawrence van der Walt, who served as the Donaldson Dam caretaker, the rule was in force because the fish were bottom-feeders that ingested mud in which heavy metals had settled. A 2010 report by the National Nuclear Regulator (NNR) demonstrated awareness of health risks, but stated that fishing in Donaldson Dam did not present an exposure problem because "the public are not permitted to eat the fish." The NNR report failed to acknowledge the illegal catching and consumption of fish. Even though enforcement has recently improved, the prohibition on eating fish, still in effect as of June 2016, has thus had limited impact in practice.

**Laundering**

Many community members in the West Rand have had regular contact with contaminated water while doing their laundry. In June 2016, Lucas Moloto wrote IHRC that some residents of Bekkersdal's informal settlement "washed their clothes in the very immediate downstream of [Donaldson Dam]." The 2015 study of Bekkersdal similarly found that washing clothes was one of the most frequent uses of Donaldson Dam water. These reports demonstrate that a practice IHRC documented on multiple field investigations has continued. In 2014, local interviewees told IHRC that laundering clothes in the channel downstream of Donaldson Dam was especially common among those who lived far from a tap. In January 2012 and March 2010, IHRC itself observed residents of the Bekkersdal informal settlement washing clothing and blankets in the channel, through which flowed uranium-laden water.

For residents of the Bekkersdal informal settlement, use of the channel for laundry seems to have depended on the flow of tap water and the physical accessibility of the taps. In 2014, Sanny Mogoje said, "People wash their clothes in the dam more often when the water gets cut," a common occurrence. While some residents who lived closer to taps relied on them for washing water, others said the taps were too far from their homes. For example, a Bekkersdal resident said in 2012 that she used the water in the Donaldson Dam channel to wash blankets, but she added that she would not drink the water because it was polluted with mining acid.

Residents of Khutsong also told IHRC that they used water from the contaminated Wonderfonteinspruit to do laundry. A 2011 study that surveyed residents of Bekkersdal, Carletonville, Kagiso, and Khutsong found that 4 percent of respondents had used water from the contaminated Wonderfonteinspruit as their main source of water for domestic use and an additional 5 percent had used it exclusively for bathing or laundry.
Recreation

Many residents of the West Rand, especially children, have used polluted streams and rivers for recreational purposes. Although education about AMD seems to have increased and deterred swimming in the contaminated water, Lucas Moloto told IHRC in 2016 that “children of the informal settlement part of Bekkersdal do play and swim downstream of [Donaldson] Dam.” In 2014, Sanny Mogoje gave a similar report, saying, “[I]f we went down [to the channel by Donaldson Dam] right now, we would see two children playing minimum.” Mogoje recalled that his parents forbade him to play in the dam as a child: “They knew it was bad but they didn’t know exactly why it was bad.” He played there anyway.

On several occasions during visits to Bekkersdal informal settlement in January 2012 and March 2010, IHRC observed children playing in the water in the Donaldson Dam channel. IHRC saw children riding toy cars through the shallow water, creating a large spray, and sliding across the slippery water-covered concrete on their stomachs and feet. The splashing of contaminated water into their faces increased the children’s vulnerability to ingesting it. The government was aware of this problem at least as early as 2010. A report published that year by the NNR stated that the NNR “has been led to believe[ ] that swimming takes place” at the Donaldson Dam. The report noted that immersion during swimming was the most common way community members were exposed to radiation.

A boy splashes in the channel downstream of Donaldson Dam. Children there have been exposed to AMD through skin contact and ingestion from the water’s spray. © 2010 Bonnie Docherty/IHRC.

Swimming in contaminated water has not been limited to Bekkersdal. IHRC documented swimming in three other communities during its field investigations. In 2014, for example, a community member told IHRC that “the problem is young children. They will play in the water, use the water.” On previous field visits, IHRC heard reports of swimming in the Wonderfonteinspruit from residents of Khutsong and in a pond near Robinson Lake from residents of a community known as Block A.

Health Impacts

Exposure to the contaminants in AMD—whether through ingestion, laundering, or recreation—can have immediate and long-term health effects. This report does not draw scientific conclusions about causality, and as discussed in Chapter 5, there is a need for further study of the consequences of exposure in the West and Central Rand. Nevertheless, anecdotal evidence of skin irritation and other afflictions among West Rand residents, as well as toxicological and epidemiological studies of the impact of these contaminants in other areas of the world show there is reason for concern.

Immediate Effects

Many West Rand residents have said they believe contact with contaminated water has adversely affected their health. In the 2015 study of Bekkersdal, 11.54 percent of surveyed residents attributed a range of ailments, including diarrhea and skin problems, to the water. About 15.50 percent of children used Donaldson Dam, and those who swallowed water while swimming were particularly vulnerable to these health impacts. Residents interviewed by IHRC ascribed skin irritation and rashes to local water pollution. For example, Sanny Mogoje of Bekkersdal reported that as a child he would get a “heat rash” from Donaldson Dam, which he had to hide from his parents because “they [would] know I had gone swimming.” In 2012, a woman explained that she knew a young girl who had developed “cracking in the face” from playing in the dam’s channel.

Scientific studies on the effects of the contaminants found in AMD are consistent with these findings. According to a 2006 report about the Wonderfonteinspruit catchment, uranium applied to animals has caused skin irritation, severe dermal ulcers, and damaged hair follicles. A publication by the US Agency for Toxic Substances and Disease Registry (ATSDR) similarly reported that animals that had soluble uranium applied to their skin suffered from skin irritation, severe dermal ulcers, and damaged hair follicles.


Interview with Percy Makungs, Bekkersdal resident, Bekkersdal, October 29, 2014.

Email from Lucas Moloto, Bekkersdal resident and Community Engagement Workshop Facilitator, Federation for a Sustainable Environment, to IHRC, June 2, 2016. See also phone interview with Mariette Liefferink, CEO, Federation for a Sustainable Environment, May 10, 2016.

Interview with Sanny Mogoje, Bekkersdal resident, Bekkersdal, October 29, 2014.

Interview with Marieta Liefersrompt, IHRC, October 29, 2014.

218 The full list of effects included: “skin irritation, severe dermal ulcers, or superficial coagulation necrosis, seborrhea, vascularized subepidermal edema and damage to hair follicles and sebaceous glands.” Croteau et al., “An Assessment of Sources, Pathways, Mechanisms and Risks of Current and Potential Future Pollution of Water and Sediments in Gold-Mining Areas of the Wonderfonteinspruit Catchment,” Water Research Commission Report 1214/1/6, p. 155.
skin irritation and “mild skin damage.”209 Other studies have found that oral arsenic exposure can result in such dermal effects as skin darkening (hyperpigmentation), skin thickening (hyperkeratosis), and formation of corns and warts.210 According to the 2015 Bekkersdal study, the arsenic levels found in fish in Donaldson Dam were “likely to cause health issues in consumers.”211

Long-Term Effects

The high concentrations of heavy metals frequently found in AMD can cause more serious health impacts to vital organs and increase the risk of cancer.211 As will be discussed in Chapter 5, there has been limited epidemiological data collected about the long-term impacts of AMD exposure in the West and Central Rand. Several scientific reports conducted elsewhere, however, have documented adverse health effects from uranium, cadmium, cobalt, and zinc as well as the metallurgical arsenic;211 all of which have been found at elevated levels in the Wonderfonteinspruit.212 A primary health risk associated with uranium, for example, is kidney damage and inflammation.213 Long-term exposure to uranium can also target the brain.213

Elevated concentrations of non-radioactive contaminants also pose a threat to human health. Cadmium can lead to permanent damage to the kidneys,214 Additionally, it may adversely affect lung health and make bones brittle.214 Cobalt has been linked to [*[f~h,~.~r effects on the lungs, including asthma, pneumonia, and wheezing.215*] Ingestion of large amounts of zinc over an extended period of time may result in anemia, pancreatic damage, and decreased levels of “high-density lipoprotein cholesterol (the good form of cholesterol).”216 In addition to causing short-term skin irritation, exposure to arsenic can damage the circulatory and nervous systems.217 Finally, arsenic may increase the likelihood of bladder, lung, and skin cancer.217 Although IHRC did not interview individuals in the West Rand who spoke of such health impacts, long-term effects may have yet to manifest themselves widely due to the fact that significant amounts of AMD only began to flow untreated into the waterways when it decanted in 2002.

Effects on Wildlife and Cultural Heritage

AMD has also posed threats to wildlife and cultural heritage in the area. Untreated AMD used to run through the Krugersdorp Game Reserve via the Tseepelispies, and the acidotropically caused hoppomii to go blind.218 More recently, neutralized AMD, which has still high sufficient levels, has flowed into the reserve.219 In 2014, the general manager of operations for Mintails Mogale Gold, Jan Jacobs, told a South African newspaper, “The Tseepelispies is essentially dead. … While some plant species seem to flourish, you won’t find fish or frogs there.”221 Robinson Lake had once served as a recreational body of water next to a golf course, but it became unable to sustain any life, including fish, after Harmony Gold used it to catch AMD decanting to the surface.222 A couple living near the lake noted in 2012 that before the lake dried up, birds could not swim in or drink the water “because they [would] die from it.”223

Some people have contended that AMD in the Tseepelispies has endangered the Cradle of Humankind, a UNESCO World Heritage Site that has fossils of human ancestors dating back millions of years.224 A report issued in 2009 claimed that contaminated water was already flowing beneath the Cradle of Humankind and stated that “the entire area downstream of the [West Rand] decant point has been declared a World Heritage site in order to preserve...
its very important caves and fossil finds for future generations.233 In 2014, Francois Durand, lecturer at the University of Johannesburg, predicted that AMD would destroy the site: “Noth- ing can survive it except for sulfur-eating bacteria. . . . Millions of fossils are at risk. These sites are really close to the river.”231 In 2016, Bashan Govender, an assistant director of the Depart- ment of Water and Sanitation (DWS), wrote to IHRC, “The Cradle of Humankind is fortunately not impacted due to West Rand AMD.” He said the department has been monitoring the groundwater and “the fossils remain secure.”232 The threat could extend beyond fossil beds because the Cradle of Humankind is also a reserve for rare and endangered animals, birds, and plants.230 Potential contamination therefore merits continued and careful monitoring.

In 2016, a pipe released decanting AMD into a culvert that flowed directly into the Krugersdorp Game Reserve, endangering wildlife. Since then, the water here has reportedly been treated, but the sulfate levels have remained unacceptable. © 2010 Bonnie Docherty/IHRC.

Inadequate Measures to Address Ongoing Harm

Under domestic and international law, South Africa is required to protect against infringements of the rights to health, a healthy environment, and water. While, as described in Chapter 2, the specific duties associated with these three rights have been articulated somewhat differently, together they make clear that the government must minimize the environmental and health

Rights and Duties

AMD and its potential health impacts have not only put communities at risk but also raised significant human rights concerns under national and international law. The relevant rights in turn impose obligations on the government to remedy past harm, minimize ongoing harm, and ensure the rights are fully realized in the future. South Africa has made some progress in addressing AMD over the past few years, but its delayed response and the need for a more complete solution call for additional remedial and forward-looking actions.

Human Rights Concerns

In the West Rand, and to a lesser degree in the Central Rand, AMD has threatened residents’ rights to health, a healthy environment, and water. It contains radiation and harmful chemicals, which can infringe on the right to health and the right to water.234 AMD has also interfered with the right—guaranteed by the South African Constitution—to “an environment that is not harm- ful to health or well-being.”235 Residents have been exposed to excessive concentrations of heavy metals and radioactive uranium, which have been blamed locally for skin rashes and are a known source of serious health problems in other parts of the world. If an effective long- term solution is not implemented, future generations, protected by the right to a healthy environment, will also be at risk.

Human rights law protects peoples’ right to use water in specific ways that have been made dangerous by the presence of AMD. Under the right to water, people should be able to obtain water that is safe for domestic purposes, including “washing of clothes [and] food prepara- tion.”236 Although IHRC found little evidence that residents in the West and Central Rand have been drinking the contaminated water, those living in some settlements, notably Bekkersdal, have used it for irrigating gardens, watering livestock, fishing, doing laundry, and swimming. Such activities have left people of all ages, especially children, vulnerable to adverse health effects.

The situation has been made worse by the limited access to quality water. Taps have often been located far away and been an impractical source for tasks that require large amounts of water. Many residents thus have not had physical access “within, or in the immediate vicinity, of each household” to water that is free of “chemical substances and radiological hazards that pose a risk to human health.”237

Finally, inadequate information about the risks of AMD has exacerbated the problem, as will be discussed in Chapter 5 on the right to information.

230 CESCR, General Comment No. 14, The Right to the Highest Attainable Standard of Health, para. 15; CESCR, General Comment No. 15, The Right to Water, para. 12(b).

231 Interview with Francois Durand, Department of Zoology, University of Johannesburg, Pretoria, October 31, 2014.

232 Email from Bashan Govender, Assistant Director, Department of Water and Sanitation, to IHRC, June 2, 2016.

233 Interview with Francois Durand, University of Johannesburg, Pretoria, October 31, 2014.

234 CESCR, General Comment No. 15, The Right to Water, para. 12(b).

235 South African Constitution, § 24(1).

236 CESCR, General Comment No. 14, The Right to the Highest Attainable Standard of Health, para. 15; CESCR, General Comment No. 15, The Right to Water, para. 12(b).

237 Ibid., para. 12.
impacts of mining, including those caused by the contamination of watersheds.236 South Africa’s delayed response to the AMD threat in the West and Central Rand has meant that for many years it has not fulfilled its obligations to remedy harm and prevent further impacts. As a result, local residents have repeatedly been exposed to contaminants that could have serious health impacts, which may worsen over time if not addressed.

The South African government, along with the mining industry, has been aware of the dangers of AMD for decades. In 1937, the government acknowledged the problems of contaminated water in its Mines and Works Regulations, which required mining companies to treat water to a safe quality before it left mine property.237 The scientific community brought the risks of AMD to the attention of the government in the 1950s.238 In the landmark 1951 case Rex v. Marshall and Another, the South African judicial system found criminal liability existed for damage caused by AMD.239 The heightened urgency of the situation was evident in 1998 when Harmony Gold submitted a report to the Department of Mineral Resources (DMR) stating that contaminated water would reach the surface in four years because it was planning to stop pumping a depleted mine.240 As predicted, water began to decent in the West Rand in late August 2002.241 It took several years, however, for the government to take responsibility and begin to address the situation.

In 2006, eight years after the prediction of decanting, the government finally made an effort to organize a response to the situation. The Department of Water Affairs (DWA), now the Department of Water and Sanitation, apportioned 90.4 percent of the responsibility for pumping and treating AMD in the Western Basin among three mining companies.242 (“Basin” is a term used for the “large complexes of interconnected mines” in the region.243) DWA did not assign liability for the remaining 9.6 percent, although that percentage may have encompassed abandoned legacy sites for which the state should have assumed direct responsibility. The government’s strategy of relying on industry actions was not enough to contain the problem, however, and AMD continued to flow from the mine voids.

Water treatment plants built by the industry represented a step forward for the environment, but they were not a panacea. For example, although Rand Uranium treated about 12 million liters of AMD daily, its process left between 11 million and 56 million liters of untreated AMD flowing into the West Rand water system.244 In addition, the treatment plants used neutralization, a common approach to dealing with AMD,245 but one that only partially purifies the water. Neutralization is usually achieved by treating contaminated water with lime, which raises the pH level to become more alkaline and causes the dissolved heavy metals to precipitate and leach out, forming a sludge.246 For this reason neutralization facilities are sometimes called...
high density sludge (HDS) plants. Even after neutralization, however, water still contains high concentrations of sulfates and other salts that remain a concern.251 The precipitated metals are also vulnerable to returning to soluble form if they are re-exposed to acidic water.252 The contaminants in neutralized AMD preclude using the water safely for many activities.253

The South African government’s actions from 1998 to 2010 demonstrate an awareness of the problem, but its limited efforts to respond fell short of the country’s obligations under the rights to health, a healthy environment, and water. Decanting and contamination of waterways in the West Rand continued. As a result, the local population experienced ongoing exposure to contaminants that are known to have significant environmental and health impacts, including from bioaccumulation.

To address any harm that AMD caused by its delayed response, the South African government should take several remedial measures, to which affected individuals are entitled under the human right to a remedy.254 For example, the government should ensure cleanup of contaminated areas and arrange for epidemiological studies to identify any health impacts. It should provide free health screenings for at-risk populations and access to care for immediate and long-term effects due to the contamination. It should also consider a compensation regime for harm that can be linked to AMD. Finally, the government should guarantee that the harm caused by its weak response is not repeated.

Need for a More Complete Solution

Over the past five years, the South African government has moved beyond primary reliance on industry and increased its own efforts to address the problems of AMD in the region. As of June 2016, the government had neutralization (HDS) plants operating in both the West and Central Rand and another in the East Rand was undergoing trials and scheduled to start full operations imminently.255 The plants have helped stem further decanting in the region. Despite these commendable steps, the government has been slow to implement a more complete solution to AMD. It needs to take additional actions, including implementing the order to build a desalination plant and addressing runoff and seepage, in order to ensure a safe and adequate water supply and fully meet its human rights obligations.

In 2010, 12 years after the initial prediction of decant and eight years after it occurred in the West Rand, the government began to be more proactive in its response to water contamination in the region. Its increased involvement may have been inspired, at least in part, by a


254 Email from Baphehla Gounder, Assistant Director, Department of Water and Sanitation, to HRC, June 2, 2016. According to Gounder, the West Rand plant, in the Krugersdorf-Randfontein area, was pumping and neutralizing about 32 million liters per day, and the Central Rand plant in Germiston was treating 32 million liters per day. The East Rand plant, near the town of Springs, was designed to treat around 110 million liters per day.

255 The TCTA collaborated with industry to meet these goals in a relatively expedient and cost-effective manner. In early 2012, the TCTA partnered with Rand Uranium (subsequently acquired by Sibanye Gold) to upgrade the company’s treatment facility in the West Rand

2009 report that predicted AMD would decant in the highly urban Central Rand in the near future.256 In March 2010, DWA announced that it would make a R6.9 million subsidy available over three months to help Rand Uranium and Mintails expand their treatment efforts,257 but the funds were insufficient and quickly depleted.258 In 2011, the companies estimated to Parliament that they had spent between R40 million and R60 million treating AMD and indicated that they would be unable to sustain expenditures of this magnitude in the long run.259

The government also commissioned its own study of AMD in the region. In September 2010, a government-appointed Inter-Ministerial Committee assigned a team of experts to assess the problem.260 The resulting report, entitled Mine Water Management in the Witwatersrand Gold Fields with Special Emphasis on Acid Mine Drainage (AMD Report), recommended that AMD intervention measures be taken in the Western and Central Basins “as a matter of urgency.”261 It also warned of the potential shortcomings of neutralization as a treatment method, noting that “[n]ow the medium to long term [neutralization] may not be sustainable as it could result in excessive salt loads on the receiving water bodies, which will require the release of clean water for dilution.”262 The South African Cabinet received the AMD report on February 9, 2011.263

Two months later, Minister of Water and Environmental Affairs Edna Molewa called on the Trans-Caledon Tunnel Authority (TCTA), a state-owned entity responsible for water resources, “to implement the immediate and short term actions recommended in the AMD Report.”264 In particular, she tasked it with overseeing and implementing the installation of pumps to move water from mine sites to treatment plants, the construction of “an on-site mine water treatment plant in each basin,” and the “Installation of infrastructure to convey treated water to nearby watercourses.”265 The highest priorities included mitigating and containing decant in the West Rand, and lowering the underground water levels in the Central Rand to prevent decant.266

The TCTA collaborated with industry to meet these goals in a relatively expedient and cost-effective manner. In early 2012, the TCTA partnered with Rand Uranium (subsequently acquired by Sibanye Gold) to upgrade the company’s treatment facility in the West Rand
and tripled the pumping capacity to about 30 million liters of AMD per day.267 As of 2016, the TCTA co-managed the plant with Sibanye Gold; the TCTA bore two-thirds of the cost, and Sibanye Gold one-third.268

In the Central Rand, the TCTA worked with DRD Gold and Central Rand Gold. The former provided land and infrastructure for a treatment plant, while the latter supplied pumps.269 Without the industry’s help, it would have cost about R600 million more to build the HDS plant in that area, according to DWS official Bashan Govender.270 Nevertheless, while these mining companies have been willing to help the TCTA neutralize the water, they have expressed reservations about the cause of AMD being attributed to their specific operations.271

While the HDS plants have been essential to addressing the urgent problem of decanting AMD, they have not constituted a complete solution for two reasons: the limits to their capacity and their level of treatment. By the end of 2012, the plant in the West Rand could prevent normal water flows in the region from decanting, but it could not handle the increased water flow caused by heavy rains in March 2014.272 A similar problem arose in April 2015 and from March to May 2016.273 DWS’s Govender told IHRC in 2016 that “as soon as we hit a heavy rainfall situation, we revert back [to decant]. Work is under way … to address the increased AMD flow during periods of high rainfall.”274 In particular DWS was considering increasing the West Rand plant’s capacity from 32 million liters per day to 50 million liters per day, a proposal that should be implemented.275

The need to improve the quality of treated water has presented an even more serious, long-term problem. Similar to those established by the mining companies, the TCTA facilities have neutralized rather than purified the water through desalination. Because the treated water has ceased being acidic and has contained lower concentrations of heavy metals, it has met most regulatory specifications.276 It has not been potable, however, and has had a high level of salinity, mostly in the form of sulfates. According to 2014 government data, the plants have reduced sulfates from an average of 4,344 mg/l to 2,400 mg/l.277

268 Email from Bashan Govender, Assistant Director, Department of Water and Sanitation, to IHRC, June 2, 2016.
269 Ibid.
270 Interview with Bashan Govender, Assistant Director, Department of Water and Sanitation, Pretoria, October 30, 2014.
271 Email from Bashan Govender, Assistant Director, Department of Water and Sanitation, to IHRC, June 2, 2016.
272 Decant from the rains flowed into the area at a rate of approximately 30 million liters per day, but the plant’s capacity was 27 million liters per day. Tancott, “Excess AMD in West Rand a Big Problem,” Infrastructure News; Wolmarans, “Joburg under Threat from Acid Mine Drainage,” The Citizen.
273 Email from Bashan Govender, Assistant Director, Department of Water and Sanitation, to IHRC, June 2, 2016 (regarding 2015); email from Mariette Liefferink, CEO, Federation for a Sustainable Environment, to IHRC, June 13, 2016 (regarding 2016).
274 Email from Bashan Govender, Assistant Director, Department of Water and Sanitation, to IHRC, June 2, 2016.
276 Email from Bashan Govender, Assistant Director, Department of Water and Sanitation, to IHRC, June 2, 2016.
Such a sulfate level can cause serious problems for water users. South African water quality standards from 2015 stated that a concentration of more than 500 mg/l can result in acute health effects, and an earlier industry assessment found that one above 600 mg/l can cause diarrhea to which humans may not adapt. According to 1999 government water quality objectives, which remain in effect, a sulfate concentration of more than 1,000 mg/l was “not acceptable” for domestic uses, such as bathing and washing clothes, and more than 2,000 mg/l was “not acceptable” for watering livestock. Another set of still relevant government guidelines determined that a sulfate concentration of more than 1,000 mg/l was “completely unacceptable” for drinking, food preparation, and laundry, and “poor” for bathing. The residents of the West and Central Rand, who have used neutralized AMD for all these activities, have thus been exposed to unhealthy water.

<table>
<thead>
<tr>
<th>Water quality variable</th>
<th>Average water quality across all three basins</th>
<th>HDS plant effluent standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulphates</td>
<td>4344 mg/l</td>
<td>2400 mg/l</td>
</tr>
<tr>
<td>pH</td>
<td>4</td>
<td>6-9</td>
</tr>
<tr>
<td>Iron</td>
<td>768 mg/l</td>
<td>&lt;1 mg/l</td>
</tr>
<tr>
<td>Aluminium</td>
<td>35 mg/l</td>
<td>&lt;1 mg/l</td>
</tr>
<tr>
<td>Manganese</td>
<td>127 mg/l</td>
<td>&lt;3 mg/l</td>
</tr>
<tr>
<td>Uranium</td>
<td>0.2 mg/l</td>
<td>0.05 mg/l</td>
</tr>
</tbody>
</table>


The shortcomings of the neutralization process have raised concerns about South Africa’s drinking water supply as well as undermined water quality. Water from the treatment plants in the Central and East Rand has flowed into Vaal river system, just below the Vaal Dam, which is a major source of drinking water. In order to prevent environmental damage from the sulfates remaining in the neutralized water, clean water from the dam has had to be diverted to dilute the incoming water. This practice is unsustainable. In 2015, South Africa experienced its worst drought since 1982, which meant that less clean water was available to dilute the neutralized water that had been released into the Vaal river system. Ironically, a comparable problem can arise if climate change produced greater “flash rainfall,” as some people have predicted. In that case, the HDS plants would need to treat additional AMD caused by intense rainfall over short periods of time, and more Vaal Dam water would be needed for dilution purposes.

As the growing population of South Africa increasingly depends on the Vaal Dam for its drinking water, competition for use of the dam may also result. Vaal water has been used to supply not only the Johannesburg area, but also the Limpopo region, which has experienced water shortages despite its large river system. DEA reported that 52 villages in Limpopo were without water in 2013. To complicate matters, the West Rand Treatment Plant has released its neutralized but still sulfate-laden AMD into the Tweelopiespruit, which runs into the Limpopo river system, via the Crocodile River. Bashan Govender of DWS told IHRC in 2014 that “even though we’re neutralizing, it’s not the optimal solution.” He recognized that the combination of neutralization and dilution “can’t continue, and that’s why we have a long-term solution—and that’s desalination.”

In May 2016, the minister of water and sanitation directed the TCTA to implement the “long term solution” to AMD mitigation in the Witwatersrand, i.e., desalination. The project aims to produce potable water and increase water supplies in the region. DWS stated, “The pinnacle of this approach is that a polluted resource once considered with contempt, now becomes a commodity contributing to security of the availability of water resources in the Vaal River System.” The desalination plants are scheduled to be operational by 2020 and expected to treat 190 to 240 million liters of AMD per day. Water users will cover one-third of the cost, which the government has predicted will be between R10 billion and R12 billion. Industry will be responsible for the rest although the National Treasury plans front R600 million per year before recovering it from mining companies. The project has the potential to be a major step toward addressing the long-standing AMD problem in the region, but it will need to be implemented effectively and in a timely manner.

While the government has been dealing primarily with AMD created beneath the surface of the West and Central Rand (as well as the East Rand), it should also address other sources of AMD, including runoff and seepage. For example, AMD formed when rainwater comes in contact with tailings has entered the streams, rivers, and groundwater of the region. “The dumps are vulnerable to both water and wind erosion,” explained an industry official. “After a rainstorm, you can see the red ponds laying on top of the tailings dams.” The official added that since many tailings dams contain water in “paddocks,” rainwater at “uncontrolled” tailings locations presents even greater risks. Salt crusts covering tailings dams, the footprint of removed dams, and polluted riverbanks have exacerbated the situation. Because they are highly soluble and have reportedly contained up to 1,100 mg/kg of uranium, they have disolved quickly in rain and contaminated surface water. A more complete solution to the AMD problem should therefore not only ensure desalination of AMD but also address the water contaminated by tailings deposits, which are discussed in the next chapter.

Human rights law recognizes that fully realizing economic, social, and cultural rights takes time. The South African government’s slow response to the AMD crisis, however, delayed efforts to deal with the problem and allowed harm to continue. Greater involvement, most notably through the creation of new treatment plants with industry assistance, has represented significant progress, but, as discussed above, the government should take responsibility for remedying past neglect. It also needs to allocate necessary financial resources and ensure timely implementation of a more complete solution. By taking these steps, South Africa could better meet its obligations under human rights law and help the residents of the West and Central Rand enjoy their rights to health, a healthy environment, and water.
Gold mining in the West and Central Rand has generated massive quantities of solid mine waste, known as tailings, which companies have deposited in dumps across the area for more than a century. Because Johannesburg and its environs developed alongside the mining industry, residential areas have been built among the large hills of waste. Tailings consist of very fine particles, so dust blown from the dams has often reached neighboring communities. In addition, the soil in these tailings dams has contained high concentrations of heavy metals, such as uranium, that contaminate the environment.

Local people have been unable to escape the effects of the widespread tailings. In particular, they have inhaled and ingested dust, consumed contaminated foods, come in contact with polluted soil, and used traditional medicines made of tailings. Residents have reported suffering from respiratory problems and skin and eye irritations that could be attributable to this exposure. Scientific studies suggest they could face more serious, long-term impacts, such as organ damage and increased likelihood of cancer. Thus, like acid mine drainage, the tailings found in the West and Central Rand have raised concerns under the rights to health and a healthy environment. The proximity of many homes to tailings dams has also threatened residents’ right to adequate housing.

South Africa has responded to the tailings problem with a hands-off approach that is inconsistent with its human rights obligations. It has relocated residents living on a highly radioactive dump to safer homes, but it has elsewhere allowed construction of new housing projects near tailings dams. It has also insufficiently addressed the danger of contaminated dust. Longer-range efforts to reduce the prevalence of contaminated waste, notably remining operations and the proposed removal of tailings to mega dumps, have been largely driven by industry. To promote realization of human rights, the government should take immediate steps to address the situation and actively collaborate with industry and communities in the design and implementation of a plan to help eliminate the underlying problem in the future.

Creation and Spread of Tailings

Mining brings ore to the surface to be refined, and because the ore does not consist exclusively of economically valuable minerals, processing it creates waste. For 130 years, this waste has been piled into large tailings dams in the West and Central Rand. There were an estimated 220 tailings dams in the Johannesburg area in 2014,299 and the large hills have dominated much of the landscape in and around the metropolitan area. Many of the dams have been abandoned, the legacy of mines once owned by now-defunct companies. Some, however, have remained in active use, being remined and removed by modern companies. The color of tailings dams varies according to their mineral composition; some are red, while others are yellow or white in color.

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According to another estimate from 2004, there were 270 tailings dams in the Witwatersrand Basin, covering an area of 400 square kilometers. Oelofse et al., “The Pollution and Destruction Threat of Gold Mining Waste on the Witwatersrand: A West Rand Case Study,” p. 617 (citing a 2004 AngloGold Ashanti study).
Mine tailings in the region have contained high concentrations of heavy metals, such as cadmium, cobalt, lead, uranium, and zinc, as well as the metalloid arsenic. While all of these contaminants have endangered the environment and human health, uranium, which is also radioactive, has been of particular concern. Tailings dams in the West Rand and Far West Rand reportedly contained an estimated 100,000 tons of uranium in 1998. A 2006 study published by South Africa’s Water Research Commission found that the average uranium concentration in the dumps was two orders of magnitude above natural background levels.

The location of the tailings dams has exacerbated the problems caused by their contaminants. Johannesburg was founded as a result of a nineteenth-century gold rush. As the city grew, townships, especially those inhabited by black mine workers, were built among the tailings dams, and these hills of waste have become part of the urban sprawl. In addition, indigent people and migrant workers in the West Rand established informal settlements of improvised, corrugated metal shacks on or adjacent to tailings dams. Certain white communities in the region have been situated within a few hundred meters of tailings dams, but black and coloured communities have comprised most of the settlements in close proximity to tailings dams.

After 1994, the post-apartheid government committed to providing “decent, well-located and affordable shelter for all” through its Reconstruction and Development Programme (RDP). In its haste to build homes, however, the government constructed several RDP housing projects close to tailings dams. “I think the intention, the political drive was to provide houses as soon as possible—just churn them out,” said Angelo Mathee, director of the Environmental Health Research Unit of the South African Medical Research Council (SAMRC). “Not all are close to mine dumps, but Johannesburg has a unique situation. Unfortunately the vacant land available was mostly next to mine dumps.”

In West and Central Rand communities such as Soweto and Soweto, only a road has separated residential neighborhoods from tailings dams. Informal settlements have also been situated in close proximity to tailings. Until recently, some of the shacks in the Tudor Shaft informal settlement were located directly on a hill of mining waste.

This large tailings dam, which was being reminned in 2014, was situated near the Afrikaner community of Mindalore in the West Rand. © 2014 Bonnie Docherty/IHRC.

Homes were under construction at the foot of a tailings dam near Meadowlands in the Central Rand in 2014. The government should require a greater buffer between new residences and waste dumps. © 2014 Bonnie Docherty/IHRC.
IHRC documented new construction of housing projects near tailings during its visits. In 2014, IHRC drove past a housing construction site at the foot of a tailings dam near Meadowlands in the Central Rand. In 2010, it observed a retirement village, called Amberfield, being erected across a highway from Sand Dump No. 20, the largest tailings dam in the West Rand. At the time of this report’s publication, Amberfield remained uninhabited in large part because of the threat of contamination. Tailings have regularly infiltrated local communities. As described in the previous chapter, runoff from tailings dams has created AMD and washed through residential areas. Tailings dust has filled the air in many communities in the vicinity of tailings dams. Some settlements, including Tudor Shaft in the West Rand, have been located so close to tailings dams that residents could not avoid contact with the contaminated soil. This combination of factors has left residents throughout the region vulnerable to exposure and negative health impacts.

### Inhalation and Ingestion of Dust

The fine materials of tailings have been easily blown about by the wind, which has blanketed surrounding communities with clouds of dust. "When it’s windy, this whole area gets white dust," a resident of Mindalore told IHRC in 2014. This largely Afrikaner community has faced the threat of contamination. A 2010 NNR study identified radon gas as a key source of radiation exposure to residents because of its potential to accumulate within homes built on or near contaminated soil. As those in Tudor Shaft, National Nuclear Regulator’s "Surveillance Report of the Upper Wonderfonteinspruit Catchment Area," p. 12. Because the ambient radiation is not visible, IHRC did not itself document this threat.

Tailings have exposed communities in close physical proximity to tailings dams to ambient radiation. A 2010 NNR study identified radon gas as a key source of radiation exposure to residents because of its potential to accumulate within homes built on or near contaminated soil. As those in Tudor Shaft, National Nuclear Regulator’s "Surveillance Report of the Upper Wonderfonteinspruit Catchment Area," p. 12. Because the ambient radiation is not visible, IHRC did not itself document this threat.

For more information on Amberfield, see Mara Kardas-Nelson, “There’s No Place Like Home,” Mail & Guardian, November 26, 2010, http://mg.co.za/article/2010-11-26/there’s-no-place-like-home (accessed March 12, 2016). By 2016, the tailings dam across from Amberfield (Sand Dump No. 20) had almost completely removed and remixed, but the homes still faced a risk of structural damage and collapse due to sinkholes because the development had been built on top of an old mine. Phone interview with Mariette Liefferink, CEO, Federation for a Sustainable Environment, May 10, 2016.

For more information, see Chapter 3 on Acid Mine Drainage. Local residents have observed runoff from tailings ponds. See, e.g., interview with Davidsonville residents #1 and #2 (names withheld), Davidsonville, January 10, 2012 (statement of resident #2). Mining officials have also been aware of the problem. Skype interview with Mark Bruin, Chairman, Mintails Ltd., November 6, 2014.

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There have also been allegations that tailings from West Rand mine dumps have been used to create bricks, which have then been sold at a premium, and used in the construction of homes throughout the area. See, e.g., Lehupeni Mamburu, "Tailings Dams and Radioactive Bricks: Acid Water in Gauteng," Business Day Live, December 8, 2019, http://www.bdlive.co.za/articles/2019/12/08/tailings-dams-and-radioactive-bricks-acid-water-in-gauteng (accessed March 12, 2016); interview with Mindalore resident (name withheld), Mindalore, November 1, 2014. Regarding the reports of radioactive bricks, Werner Elselen of the Department of Environmental Affairs said in 2015, "Thankfully, it turned out it was not the case." Other sources, however, have contended that brickmaking using material from tailing dams has continued. Phone interview with Werner Elselen, Deputy Director of Reactive Administrative Enforcement, Department of Environmental Affairs, April 21, 2015, Sheree Bega, “Mindalore Left to Choke on Toxic Mine Dust,” Saturday Star, March 28, 2015, http://www.environment.co.za/poisoning-caroni gens-heavy-metals-mining/mindalore-left-to-choke-on-toxic-mine-dust.html (accessed March 13, 2016).

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Interview with Tudor Shaft resident #2 (name withheld), Tudor Shaft, January 7, 2012.

Interview with Mindalore resident (name withheld), Mindalore, November 1, 2014.
Tailings Dams and Communities in Central Rand

community in the West Rand sits next to a tailings dam that was then being remined.\textsuperscript{216} Residents of other communities adjacent to tailings dams in the West and Central Rand offered similar accounts.\textsuperscript{217} Ruth Masango of Meadowlands said in 2014 that the situation had grown worse in her neighborhood,\textsuperscript{218} and IHRC had already documented significant problems there in 2012. At that time, another woman from the community told IHRC that when the wind comes, “you can’t even see where you’re walking” because of the dust.\textsuperscript{219} Although the dust problem has been most acute during the windy season in August and September,\textsuperscript{220} inhalation has not been limited to those months.\textsuperscript{221} IHRC researchers visited the region in January, March, and October, and on each field visit they observed clouds of dust emanating from tailings dams.

\textsuperscript{216} Ibid.
\textsuperscript{217} See, e.g., interview with Sinpoble residents #1, #2, and #3 (names withheld), Sinpoble, October 29, 2014 (statement of resident #2); interview with Noordgesig resident #1 (name withheld), Noordgesig, January 10, 2012; interview with Godfrey Makomene, Meadowlands community leader, Ruth Masango, Meadowlands resident, and Pertha Seavaranere, Meadowlands resident, Meadowlands, October 28, 2014 (statements of all three); interview with Bosmont residents (names withheld), Bosmont, January 9, 2012.
\textsuperscript{218} Interview with Godfrey Makomene, Meadowlands community leader, Ruth Masango, Meadowlands resident, and Pertha Seavaranere, Meadowlands resident, Meadowlands, October 28, 2014 (statement of Ruth Masango).
\textsuperscript{219} Interview with Deborah Matswee, Meadowlands resident, and Meadowlands resident #4 (name withheld), Meadowlands, January 9, 2012 (during August and September, “everyone is coughing”); interview with Block A resident #4 (name withheld), Block A, January 8, 2012 (during August and September, “we mainly get the dust in August.”); interview with Noordgesig resident #1 (name withheld), Noordgesig, January 10, 2012 (during the windy months, August through September, there’s a hell of a lot of dust that blows over this place.”).
\textsuperscript{220} Interview with Godfrey Makomene, Meadowlands community leader, Ruth Masango, Meadowlands resident, and Pertha Seavaranere, Meadowlands resident, Meadowlands, October 28, 2014 (statement of Ruth Masango).
Many of the people whom IHRC interviewed reported that they could not escape the dust. In 2014, for example, Charlie Sowa of Sinopile said, “The wind blows dust into our homes.”322 A Mindalore resident described a similar situation in his community, adding that local women had to wear masks while doing household chores, since “dust is there, I don’t even cook because you eat dust.”333

A resident of Davidsonville told IHRC that “dust gets in the lungs.”324 Angela Mathee of the SAMRC, was doing a study of the effects of dust in certain communities in the region. She said that on windy days, “[y]ou just feel that crunchy soil in your mouth and we started to wonder what’s happening there.”325 These descriptions echoed similar complaints in 2012 from three Central Rand communities: Crown Mines, Diepkloof, and Maddingville. For example, a teacher at the Crown Mines campus of Central Johannesburg College explained that during the dry season, “the dust … gets in your mouth and between your teeth.”326 Stella Adams of Diepkloof said, “When the wind is there and dust is there, I don’t even cook because you eat dust.”327

Cultivation and Consumption of Contaminated Food

While dust has affected a broad swath of the region, those living in closest proximity to the tailings have faced additional problems from contaminated soil. In many areas, soil contamination has made the cultivation of small-scale vegetable gardens both difficult and hazardous. On each of its three field investigations, IHRC documented failed efforts to plant gardens near tailings dams. A Tudor Shaft resident told IHRC that “dust gets in the lungs.”328 Angela Mathee of the SAMRC, was doing a study of the effects of dust in certain communities in the region. She said that on windy days, “[y]ou just feel that crunchy soil in your mouth and we started to wonder what’s happening there.”329 These descriptions echoed similar complaints in 2012 from three Central Rand communities: Crown Mines, Diepkloof, and Maddingville. For example, a teacher at the Crown Mines campus of Central Johannesburg College explained that during the dry season, “the dust … gets in your mouth and between your teeth.”330 Stella Adams of Diepkloof said, “When the wind is there and dust is there, I don’t even cook because you eat dust.”331

Although dust affects a broad swath of the region, those living in closest proximity to the tailings have faced additional problems from contaminated soil. In many areas, soil contamination has made the cultivation of small-scale vegetable gardens both difficult and hazardous. On each of its three field investigations, IHRC documented failed efforts to plant gardens near tailings dams. A Tudor Shaft resident told IHRC in 2014 that vegetables would not grow in Tudor Shaft because the soil was too acidic.332 In 2012, another resident of Tudor Shaft, who was unemployed and in the community, said he had planted vegetables over the course of several years without success. He explained that crops would not grow “because the soil is full of chemicals.”333 Two years earlier, he had told IHRC, “I tried to plant some vegetables, but they don’t grow in this soil. I tried to plant cabbages, potatoes, and carrots.”334 Other interviewees in Tudor Shaft and neighboring Soul City similarly attributed their crops’ failure to take root to poor soil quality.335 Because vegetable gardens can serve as important sources of food and income, the obstacles to growing crops have had a significant impact on residents without jobs.336 Even when plants have survived, they may have been unhealthy due to the toxicity and radioactivity of the soil. A 2012 study of a school in the Johannesberg area showed that growing vegetables near tailings dams can cause the crops to absorb heavy metals such as lead and mercury, although scientists concluded that the elevated levels in that specific community were still within “acceptable limits.”337 Chris Busby, who conducted a widely publicized and controversial study of Tudor Shaft in 2010, found radiation at the tailings dam in the settlement was 15 times greater than normal background levels in the region.338 According to Mariette Liefferink of FSE, the process of bioaccumulation had concentrated uranium and other heavy metals in vegetables grown in the settlement and thus posed potentially severe health threats to residents.339 Demonstrating government awareness of a problem, a 2010 National Nuclear Regulator study of radiation risks identified traces of radiation in spinach plants grown in a Tudor Shaft vegetable garden and noted that ingestion was one source of “potential exposure.”340 The consumption of vegetables contaminated by mining waste has likely exposed residents of Tudor Shaft and perhaps other communities to significant levels of toxicity and radiation.

322 Interview with Charlie Sowa and Marcus Gaywe, Sinopile residents, Sinopile, October 29, 2014 (statement of both residents). Interview with Matholesville resident #1 (name withheld), Matholesville, January 9, 2012.
323 Interview with Mindalore resident (name withheld), Mindalore, November 1, 2014.
324 Additionally, in 2010 IHRC visited a home in Kagiso, the ceiling of which was collapsing because so much dust had accumulated between it and the roof.
325 Interview with Maxina Berg, Matholesville resident, Matholesville, January 9, 2012.
326 Interview with Davidsonville residents #1 and #2 (names withheld), Davidsonville, January 10, 2012 (statement of residents #2).
327 Interview with Robin Park residents #1 and #2 (names withheld), Robin Park, January 12, 2012. Many other interviewees echoed the impossibility of keeping tailings dust out of the home. See, e.g., interview with Godfrey Makomana, Maddingville community leader, Ruth Masango, Maddingville residents, and Pertha Sassawane, Maddingville residents, “Ruth Masango, Ruth Masango, Ruth Masango,” Sowetan, October 29, 2014 (statement of the Ruth Masango residents) (“When you go home” all year long); interview with Nooordgezis resident #2 (name withheld), Nooordgezis, January 13, 2012. (There is nothing you can do. When wind blows, that dust is all over.”); interview with Davidsonville resident #4 (name withheld), Davidsonville, January 10, 2012 (Dust comes right through the closed windows.”); interview with Davidsonville residents (names withheld), Bromont, January 9, 2012 (Tailings dust gets into houses, “you can feel it on all the furniture.”)
328 Interview with #1 (name withheld), Tudor Shaft, November 1, 2014.
329 Interview with Angela Mathews, Director, Environmental and Health Research Unit, South African Medical Research Council, Johannesburg, October 31, 2014.
330 Interview with Central Johannesburg College lecturer #1 (name withheld), Central Johannesburg College, Crown Mines campus, January 9, 2012. Interview with Matholesville resident #1 (name withheld), Matholesville, January 9, 2012; interview with Stella Adams, Diepkloof resident, Diepkloof, January 9, 2012.
331 Interview with Tudor Shaft resident #1 (name withheld), Tudor Shaft, November 1, 2014.
332 Interview with Tudor Shaft resident #3 (name withheld), Tudor Shaft, March 17, 2010.
333 Interview with former Tudor Shaft resident (name withheld), Tudor Shaft, March 17, 2010.
334 For example, a Soul City resident said that due to mine-related contamination, the soil in his settlement was unsuitable for growing vegetables. Interview with Soul City resident #1 (name withheld), Soul City, January 14, 2012. See also interview with Tudor Shaft resident #10, Tudor Shaft, March 17, 2010; interview with Soul City resident #4 (name withheld), Soul City, January 14, 2012; interview with former Tudor Shaft resident (name withheld), Soul City Extension 2, January 14, 2012.
335 Interview with former Tudor Shaft resident (name withheld), Tudor Shaft, March 17, 2010.
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337 Interview with former Tudor Shaft resident #1 (name withheld), Tudor Shaft, November 1, 2014.
338 Interview with Tudor Shaft resident #3 (name withheld), Tudor Shaft, January 7, 2012.
339 Interview with Tudor Shaft resident #3 (name withheld), Tudor Shaft, March 17, 2010.
Residents of Tudor Shaft informal settlement lived in shacks on top of a radioactive tailings dam, until they were relocated in 2011. The rest of the community has remained at the foot of the dam, where gardens and playing children have been put at risk. © 2010 Bonnie Docherty/IHRC.

Direct Contact with Soil

People living in settlements on or near tailings dams reported that they have also routinely had skin contact with soil from the dumps. Children have been especially at risk. In 2014 a Tudor Shaft resident told IHRC, “Children play in this soil, and the soil is radioactive.” Similarly, Nomzamo Zondo, from the Socio-Economic Rights Institute (SERI), said, “Kids spend half the day outside ... running around, causing the dust to rise up.” SERI, a Johannesburg-based NGO, estimated that as of October 2014 about 1,800 people lived in the more than 445 shacks in Tudor Shaft, and that half of them were children. IHRC heard comparable accounts in 2012 from residents of Matholesville in the Central Rand and Block A and Soul City in the West Rand.

In addition to touching the soil, children have been prone to ingesting it. Echoing the concerns of other parents in Tudor Shaft, one father told IHRC in 2012, “The children play and eat it. They don’t know. You have to watch them all the time.” The 2010 NNR study of Tudor Shaft and nearby communities recognized this threat to children, finding that “[a] likely exposure for the children would be ingestion of soil as children were playing on the ground with toys.”

Use of Traditional Medicines

Traditional medicines have served as another pathway of exposure to tailings. On each of its research visits, IHRC found evidence that some residents of the region, particularly women and children, ate small blocks of baked river sediments sold at local shops. In many cases, the pica reportedly consisted of tailings. Local people have also used the tailings in order to create traditional medicines, which are known collectively as muti. While geophagy, the practice of eating soil, is more common elsewhere in Africa, immigrants have brought it to the West and Central Rand. In a survey conducted in a Johannesburg hospital, the SAMRC found that about 20 percent of pregnant women, and almost a third of pregnant women born outside of South Africa, said they ate soil.

For adults as well as children, the possibility of skin contact with tailings has been greater during the rainy season. One Tudor Shaft resident, who had previously worked as a miner, told IHRC in 2012 that after heavy rains, floodwaters had risen high enough to bring contaminated water and sediment into the homes of Tudor Shaft. A man from Davidsonville said, “If you go through this whole park area, there’s a lot of slime coming down from the mines. That’s in the rainy season and in the winter there’s dust.”

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Some local women also use contaminated soil as a skin treatment. IHRC researchers observed several women with the clay-like soil smeared on their faces in 2014 and 2012. A South African woman, Turow Shaft resident, explained what happened during menstruation: “My grandmother used to use it to cure my acne. She said that it works really well to cure pimples and other people in my area are using it.” She added, “I don’t think it can be bad for me.”

Health Impacts

Expert studies of sites in other parts of the world have found that the tailings can cause severe immediate and long-term health problems. While this report does not draw scientific conclusions about causality, the prevalence of symptoms among residents of the West and Central Rand combined with toxicological and epidemiological research elsewhere has raised serious concerns. As discussed more in Chapter 5, additional studies focused on this region should be done to gain a better understanding of the specific situation. The evidence has strongly suggested, however, that local exposure to contaminated tailings could have had adverse effects on human health or increased the risk of such harm occurring.

Immediate Effects

Respiratory Problems

The community members whom IHRC interviewed frequently referred to respiratory problems when they were asked about the effects of tailing dust. Residents of at least 10 communities in the West and Central Rand said that they believed that dust had caused breathing difficulties or given them or their family members chronic coughs or sinus irritation. In 2014, for example, two brothers living in Sinquobile said that they had been healthy until mining activities stirred up dust the previous year. At the time of their interview, both boys reported having developed severe lung problems, including bronchitis. Charlie Sowa, also from Sinquobile, joked that dust was such a problem that “[people] would cough, and that is how we say hello.” Sowa and Ruth Masangano told IHRC that tailings dust caused severe respiratory problems in 2014. IHRC also collected testimony of widespread breathing problems on its earlier missions. For example, one interviewee, from Noordgesig in the Central Rand, told IHRC that many people in the area, including his whole family, suffered from asthma. A resident of Turow Shaft said that the dust “damages our lungs when we breathe it in—people are coughing a lot.”

Numerous people across the West and Central Rand also reported having suffered from significant sinus irritations. In 2014, a Minauke resident said that in his community, “[people’s noses] are bleoding, and throats and sinuses are affected.” Several teachers from the Crown Mines campus of Central Johannesburg College in the Central Rand complained in 2012 of having sinus problems from the dust. One, who described the clouds of dust as “appalling,” told IHRC, “I’ve never in my life suffered from sinus problems, and now every day my sinus are bad and I have itchy eyes.”

Some medical research suggests there is a correlation between tailings dust and respiratory problems. For example, Professor Clark Lantz, deputy director at the University of Arizona’s Southwest Environmental Health Science Center, concluded that tailings dust can cause or exacerbate respiratory problems such as asthma and bronchitis, particularly in children and the

358 See, e.g., interview with Sinqobile residents #1, #2, and #3 (names withheld), Sinqobile, October 29, 2014 (statement of resident #3). The boys’ grandmother told IHRC that “[the government] found strategies to avoid answering” all of her families concerns. Ibid.

elderly. Dr. Robin Green, a South African expert on childhood asthma, told IHRC in 2012 that it is “hard to prove” that mining-related pollution causes asthma and expressed doubts there is a link, but he added, “We’re long overdue for some research. I think we need to know.”

Eye and Skin Irritation Residents of at least six communities told IHRC they believed that contact with contaminated tailings had caused eye or skin irritation. Ruth Masango, who lived in Meadowlands, reported in 2014 that the dust from the tailings dams had irritated her eyes, and she had to wear glasses to protect them, especially when it was windy. Pertha Sesawanane of the same community said that rashes often appeared “when it’s dusty” and typically lasted four to five days. In 2012, IHRC documented a range of additional cases of skin problems, including psoriasis and ichthyosis, particularly among children.

Long-Term Effects Exposure to toxic and radioactive tailings also has the potential to contribute to other more serious health problems. As noted in the previous chapter, ingestion of elevated concentrations of heavy metals can have significant long-term impacts, such as kidney damage and a greater likelihood of cancer. The uranium in tailings has presented risks in the West and Central Rand; an NNR study found that radiation was of particular concern in Tudor Shaft. Pre- and post-natal exposure to contaminants such as arsenic, cadmium, and lead can end up enduring in a child’s health, including neurological damages, skin lesions, and cancer. For example, a 2008 study of children in Rochester, NY, showed that low levels of lead exposure can lead to a decline of around five IQ points. While this figure may not seem significant, if it affected all children there would be “a 57 percent increase in the number of children categorized as mentally deficient.” Despite uncertainty about the full extent and severity of the health consequences of tailings in the West and Central Rand, existing research and testimonial evidence has raised serious concerns and demonstrated a need for rigorous new epidemiological studies in the area.

Rights and Duties The problems of tailings, like those associated with AMD, have threatened the human rights that the people of the West and Central Rand are entitled to enjoy. In addition, the government response has fallen short of meeting the legal obligations associated with these rights. Effectively dealing with tailings is a monumental task given the number of waste dumps in the region. Even if one takes that challenge into account, however, the government’s actions have been insufficient. It moved some members of a particularly at-risk community, but that was only a partial fix for one situation. To deal with the broader problem, South Africa should take immediate steps to improve mitigation of ongoing harm and work actively toward implementing a more complete solution for the future.

Human Rights Concerns The prevalence of tailings in the West and Central Rand has raised concerns under the rights to health and a healthy environment. The tailings have put people at risk from ingestion of radioactive and chemical substances such as radiation and harmful chemicals, a kind of exposure that the international right to health seeks to prevent. Furthermore, despite the protections laid out in the South African Constitution, mining waste, whether in the form of dust or soil, has created conditions that may be unacceptably “harmful to health or well-being.” The dust blanketing communities has interfered with residents’ welfare and presented a health hazard that seems to serve as a catalyst for various respiratory problems and skin diseases. It has contributed to immediate and long-term health threats. Toxicity and radioactivity have impeded the ability of Children, who have lived and frequently played on tailings dams, have faced especially serious health risks. Pre- and post-natal exposure to contaminants such as arsenic, cadmium, and lead can end up enduring in a child’s health, including neurological damage, skin lesions, and cancer.
to grow healthy food, an “underlying determinant[] of health.”388 When children have played in the contaminated dirt outside their homes, their particular rights have been vulnerable to infringement. Due to the scale of the problem and the inadequate response thus far, tailing in the region could also endanger future generations to whom the right to a healthy environment applies.389 Residents’ limited access to information about these risks has implicated the right to information, which is discussed below in Chapter 5.

Tailings and in particular contaminated soil have further implicated the right to housing. According to the Committee on Economic, Social and Cultural Rights, “[s]ufficient housing must … protect [inhabitants] from … threats to health,” and “housing should not be built on polluted sites nor in immediate proximity to pollution sources that threaten the right to health of the inhabitants.”390 Yet until relocated in 2011, some residents of Tudor Shaft lived directly on a radioactive tailings dam, and many communities have remained in the near vicinity. Furthermore, as discussed above, the post-apartheid government has also increased the risk of additional harm by allowing the construction of new homes very near to tailings dams.391

Inadequate Measures to Address Ongoing Harm

Although the mining waste that has accumulated over the past 130 years cannot be eliminated overnight,385 greater efforts could be made to suppress toxic dust and to remove or buffer communities from contaminated environments. The government, however, has taken few steps either to implement such measures itself or to ensure adequate implementation by industry, and thus has fallen short of meeting its human rights obligations.

Dust Control

The government has underutilized dust control measures that could reduce the adverse effects of tailings in the West and Central Rand. While irrigation and vegetation do not prevent exposure to contaminated soil or address the underlying problem of omnipresent tailings dams, they can help suppress the dust that permeates homes and causes respiratory problems. IHRC observed some sprinklers and plants on tailings dams in the region, but they were not widespread. Liefferink said dust control had not improved by 2016.386 The government has neither systematically implemented such measures at unclaimed legacy sites for which it should assume responsibility, nor has it ensured that mining companies have taken adequate steps to minimize dust originating from their operations.387

384 South African Constitution, § 24(2).
386 See, e.g., Mariette Liefferink, presentation to the South African Institute of Mining and Metallurgy, p. 11; interview with Angela Mathieu, Director, Environmental and Health Research Unit, South African Medical Research Council, Johannesburg, October 31, 2014.
387 Interview with James Welsted, Senior Vice President of Investor Relations, and senior official of metallurgy and engineering, Johannesburg, October 31, 2014.
388 Phone interview with Mariette Liefferink, CEO, Federation for a Sustainable Environment, May 10, 2016.
While theft of equipment has exacerbated the problem and may have deterred installation of sprinklers, greater efforts could have been made to take advantage of irrigation systems.

Grass and other vegetation have also helped to suppress dust in the West and Central Rand. A Department of Mineral Resources official said in 2016 that vegetation has been a more common dust control tool than irrigation and the department has required it as part of mine rehabilitation plans. In some cases vegetation has grown naturally, but in others it has been planted, especially by mining companies. In 2014, a senior mining official told IHRC that his company had planted grass on a part of the property, “...the tailings dams,” particularly with barley, a nitrogen fixer that could help other native vegetation grow. An AngloGold Ashanti official told IHRC in 2012 that vegetation on tailings dams can help “take up pollutants from the environment” although “you need a very specific type of vegetation to plant on the side of the tailings [dams]” because the tailings are acidic.

Vegetation has proven an effective means of dust control in some places. In 2015, a resident of Mindalore described it as “the number one solution to capping the mined area.” He explained that vegetation “binds the soil particles together through the plant root system and breaks the wind velocity and lift capacity. It also prevents soil erosion and the spread of the uranium and other more toxic heavy metal contamination to the flood plains and waterways which provide our drinking water and irrigation systems for our farm production of animals and vegetables.”

One interviewee, who had been a long-distance runner, told IHRC that she developed sinus problems when she moved to a home in Kagiso that was less than 100 meters from a bare tailings dam. When IHRC revisited the site in 2012, two years after interviewing her, it found plantings covered part of the dam, and her mother reported that she was no longer having trouble breathing.

Several community members, however, told IHRC that vegetation had been inadequate and poorly maintained. Nolan Borman, a resident of Noordgesig, said in 2012, “On some dumps they put grass, but they’re not putting sufficient grass.” According to a resident of Bram Fischerville, “There should be grass covering the dust. There was grass.”

The use of plants to suppress dust from tailings dams presents certain challenges that can be difficult to overcome. An AngloGold Ashanti official explained that his company had vegeated some tailings dams only partially “because there’s a challenge of the slope.” Another obstacle is the composition of tailings. “You can’t get anything to grow in [the dirt], partly because of its chemical characteristics, and because of its physical characteristics. There is no water-holding quality,” said Werner Eiselin, deputy director of reactive administrative enforcement at the Department of Environmental Affairs (DEA).

In addition, the government’s Working for Water program has potentially interfered with the use of vegetation as a dust control measure. The program has sought to increase employment and protect the region’s water supply by hiring South Africans to remove alien plant species that could adversely affect biological diversity, the local ecology, and water security. Non-native plants generally pose a threat to the environment, but many of the species best able to grow on tailings, including vetiver and acacia, have been considered invasive and thus removed. While it is unclear whether the program’s work on the tailings dams in the balance has benefited or harmed the environment, critics of the program point out that the plants helped suppress dust and their removal has exacerbated the dust problem.

A resident of Mindalore wrote IHRC in 2015 that after the Working for Water program removed vegetation on dams near his community, “there has been a noticeable increase [in dust], worse than ever. The vegetation would act as a windbreak.”

802 Two people who lived in the Snake Park settlement mentioned that the pumps used for watering a nearby tailings dam were stolen about five years ago and had not been replaced as of January 2012. Interview with Snake Park resident #2 (name withheld), Snake Park, January 15, 2012 (“There used to be an irrigation system, but someone from the community stole the pumps.”); interview with Snake Park resident #3 (name withheld), January 15, 2012 (stating that irrigation of one tailings dam had stopped after the water pump was stolen five years ago).

803 Interview with George Jackson, Fleurhof resident, Fleurhof, January 9, 2012 (“We fought for the tailings to be grassed. My drive used to be white from the dust during August and the windier months.”); interview with Meadowlands residents #1, #2, and #3 (names withheld), Meadowlands, January 10, 2012 (statement of resident #1) (stating that some mining companies had planted grass, which had ameliorated the dust problem). One man said that people (he did not know whom) had laid topsoil over the tailings and planted grass or trees. Interview with Meadowlands resident #3 (name withheld), January 8, 2012 (“People came and put topsoil and grassed. My drive used to be white from the dust during August and the windier months.”).

804 Phone interview with Mosa Mabuza, Deputy Director-General of Mineral Policy and Promotion; Andreas Moatshe, Chief Director of Mine Environmental Management; and Sibongile Malie, Director of Mineral Policy Development, Department of Mineral Resources, June 9, 2016 (statement of Andreas Moatshe).

805 Skype interview with senior official of mining company in the region (name withheld), December 4, 2014.

806 Interview with AngloGold Ashanti official (name withheld), Johannesburg, January 13, 2012.

807 Email from Mindalore resident (name withheld), to IHRC, April 19, 2015.

808 Ibid.

809 Interview with Kagopec Extension 8 resident #4 (name withheld), Kagopec Extension 8, March 20, 2010.

810 Interview with Kagopec Extension 8 residents #3, #4, and #5 (names withheld), Kagopec Extension 8, January 8, 2012 (statement of resident #3).

811 Interview with AngloGold Ashanti resident (name withheld), Johannesburg, January 15, 2012.

812 Email from Mindalore resident (name withheld), to IHRC, April 19, 2015.

813 Ibid.

814 Interview with AngloGold Ashanti official (name withheld), Johannesburg, January 13, 2012.

815 Ibid.

816 Ibid (suggesting that the government “apply vegetation and put in sprinklers” as a short-term solution to the tailings dust problem).

817 See, e.g., ibid.; phone interview with Werner Eiselin, Deputy Director of Reactive Administrative Enforcement, Department of Environmental Affairs, April 21, 2015.

818 Phone interview with Mariette Liefferink, CEO, Federation for a Sustainable Environment, Johannesburg, January 13, 2012 (stating that there has been a noticeable increase in dust). Interview with Mariette Liefferink, Federation for a Sustainable Environment, Johannesburg, April 21, 2015.

819 Phone interview with Mariette Liefferink, CEO, Federation for a Sustainable Environment, April 21, 2015.

820 Interview with George Jackson, Fleurhof resident, Fleurhof, January 9, 2012. See also interview with Kagopec Extension 8 resident #3 (name withheld), January 15, 2012 (“The white people ride motorbikes (on the tailings dams) and make the dust worse.”).


822 Vetiver, for example, “has a deep-rooted structure,” and can “grow in hostile environments.” Interview with Mindalore resident (name withheld), Mindalore, November 1, 2014.

823 See, e.g., ibid.; phone interview with Mariette Liefferink, CEO, Federation for a Sustainable Environment, April 21, 2015.

824 The resident continued, “But the vegetation is growing fast and coming back with a vengeance. Hopefully our ‘reponsible and clever’ authorities will forget about the superficial plant-creation program for a while, that being the case we will have cleaner air.” Email from Mindalore resident (name withheld), to IHRC, April 19, 2015.

825 Ibid.
Relocation

The government’s most notable accomplishment in addressing the dangers of tailings in the region has been to relocate community members who lived directly on the tailings dam in Tudor Shaft. The families’ new homes presented fewer health risks, but the relocation project was narrow in scope and failed to provide a satisfactory, long-term living situation for the affected households.

While the dangers faced by the residents of Tudor Shaft had existed for years, the government took significant action against a backdrop of outside pressure. The informal settlement was created in 1996 when the local government forcibly relocated hundreds of people to this site from another informal settlement a few kilometres away.

An abandoned mine building at the site is dated 1934, predating the settlement by more than 60 years. After the media and NGOs publicized the dangerous living conditions in Tudor Shaft and other parts of the Wonderfonteinspruit, the NNR conducted a study of radiation risks from tailings dams in the region.

Its 2010 report concluded that areas in the West Rand, including Tudor Shaft, were “high radiation risk areas,” but that “the level of radiological risk is acceptable and is within the NNR limits for this category of hazard.”

A peer review of NNR’s study commissioned by FSE subsequently alleged that calculation errors had led to an underreporting of radiological risk. In February 2011, after the release of the review, NNR recommended the relocation of the residents of Tudor Shaft living directly on the settlement’s mound of tailings and asked the Mogale City municipality to execute it.

The municipality moved those families to a section of a neighboring informal settlement known Soul City Extension 2.

The relocation program was an insufficient solution to the dangers presented by tailings in the region. First, relocation did not extend to families living on the foot of, but not directly on, the Tudor Shaft tailings dam. In 2014, one Tudor Shaft resident expressed his frustration with the government’s failure to take further action.

He told IHRC that community members have been afraid of “sickness” from the tailings dam, and that they “all must try [to get] out of this place” and be moved “to a proper shelter.” In particular, the resident emphasized concern for the children who would grow up next to the tailings dam, play in the contaminated soil, and potentially develop illnesses that could linger throughout their lives.

Disillusionment and fears were not new. During interviews conducted by IHRC in 2012, multiple residents of Tudor Shaft said they wished to be relocated to escape the soil contamination in the settlement.

“We should move where I can plant cabbage, beetroot, and everything …” said one father. “Give us a better place where we can stay—like a person.”

Other residents of Tudor Shaft reported that they had repeatedly asked local officials to relocate them but were generally met with responses of “next year, next year.”

Despite reports that the government was building new homes for the members of the community, as of July 2016 there had been no additional relocations since the initial one.

Second, while the people moved to Soul City Extension 2 found healthier living conditions than in their old settlement, they were still vulnerable to exposure to tailings dust. IHRC observed that their new homes were located near another tailings dam, although not as close as those remaining in Tudor Shaft. Many of these individuals told IHRC that the government had promised them formal housing to replace their shacks. FSE’s Lieferek said in July 2016 that she was unaware of any of the relocated households leaving Soul City Extension 2.

Finally, the government’s relocation of the most at-risk residents of Tudor Shaft did not begin to address the larger issue, namely the proximity of many settlements in the West and Central Rand to tailings dams. The government appears not to have initiated comparable relocations of other communities situated near tailings dams. Moreover, instead of advancing the rights of people exposed to the harms by moving them away from the contamination, the government, as discussed above, has allowed the construction of new homes adjacent to waste dumps in the West and Central Rand, thus contravening its human rights obligations.

South Africa’s efforts to address the ongoing harm caused by tailings in the West and Central Rand have to date been inadequate to meet its human rights obligations. The government has not ensured widespread adoption of measures to suppress dust, and its relocation of Tudor Shaft residents, while essential, benefited only that community. As a result, contaminated tailings continue to endanger the health and safety of the population and the steps to remedy the situation, comparable to those IHRC recommended for dealing with AMD. For example, it should require cleanup, commission studies, provide for health screening and medical care, and consider compensation. The government should also help prevent repetition of the problem by ensuring greater use of measures to mitigate dust, relocating other at-risk communities to adequate housing, and prohibiting the building of new homes in toxic areas.

Need for a More Complete Solution

Short-term fixes and remedial measures have an important role to play in reducing the adverse effects of mining, but the West and Central Rand also needs a more complete solution...
that addresses the prevalence of contaminated tailings in close proximity to densely populated neighborhoods. Industry has approached the problem through remining operations and proposals to transport tailings to remote mega dumps. In contrast to its increasing involvement in treating AMD, however, the government has not engaged significantly in the development of a long-term solution to the tailings problem. The government should take action on this front in order to help realize the human rights of the region’s residents.

Remining

Remining in South Africa has been a for-profit enterprise that has had positive and negative effects on the environment. Rather than digging deeper into existing mines, which has largely become prohibitively expensive, companies have reprocessed waste from earlier operations. They have used more efficient modern technology in order to extract gold left behind by older and cruder equipment. The financial gains of remining have incentivized companies to process and remove tailings, which has in turn helped consolidate waste and eliminate tailings dams in populated areas. As an AngloGold Ashanti official explained, “The idea is to reprocess and then relocate those dams to more stable, much more suitable areas.” In addition, because uranium has become profitable to extract, remining has had the capacity to produce cleaner tailings by removing that radioactive element. According to Mariette Liefferink of FSE, Sibanye Gold’s remining and removal of Sand Dump No. 20, one of the world’s largest tailings dams, which had been located across from the Amberfield development, was “quite a success.” Liefferink reported that by 2016, grass was growing on natural soil in its footprint.

Remining in South Africa has had the potential to reduce some risks posed by tailings, but it has had other shortcomings from an environmental and health perspective. The process of remining has exacerbated the health threat posed by tailings because disturbing the waste increases dust and radiation exposure. Commenting in 2014 on the increase in remining in the area, Angela Mathee of the SAMRC said, “At this moment, I think exposure levels are probably higher than they have been for a long time. … During that processing time, people are highly exposed.” The same year, IHRC heard reports of multiple West and Central Rand communities, such as Mindalore and Riverlea, experiencing adverse effects from nearby remining. By 2016, the remining of a tailings dam near Riverlea was nearing completion and the tailings were almost gone, but during the processing, “the community suffered significantly from the dust.” The nature of remining has made it difficult to avoid an increase in dust. An AngloGold Ashanti official told IHRC that remining “makes it challenging for concurrent rehabilitation because if you plan to dig it up, how much vegetation do you plant?” When a tailings dam is being remined, he said, “you can’t really do containment [of contamination] because there’s always an exposed area of the dam.” In addition, because uranium has become profitable to extract, remining has had the capacity to produce cleaner tailings by removing that radioactive element. According to Mariette Liefferink of FSE, Sibanye Gold’s remining and removal of Sand Dump No. 20, one of the world’s largest tailings dams, which had been located across from the Amberfield development, was “quite a success.” Liefferink reported that by 2016, grass was growing on natural soil in its footprint.

This remining operation, shown in 2014, had almost completely eliminated Sand Dump No. 20 by 2016. While such reclamation has helped address the tailings problem, it must be done carefully because the process stirs up contaminated dust. © 2014 Bonnie Docherty/IHRC.

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Remining by itself cannot eliminate the threats to the environment and human health. Although some companies have been extracting uranium in addition to gold, remining does not remove all threats from the tailings. It also leaves behine a crust of salts on which few plants can grow, and the sites of former tailings dams cannot always be returned to a usable state. In addition, some companies may abandon remining projects if the grade of gold is too low to be profitable, which leaves communities exposed to the open and unreimediated mine tailings. Because remining has been a for-profit venture, the government has not been engaged directly in the practice itself. It could consider encouraging additional reprocesing of tailings in order to decrease contamination, although only if the process is performed carefully to minimize the harms discussed above.

The government has recently sought to promote remining of legacy mines through a proposed amendment to the Mineral and Petroleum Resources Development Act (MPRDA). The new law, still being debated as of June 2016, would allow DMR to grant “reclamation permits” for unclaimed mines. Mosa Mabuza, deputy director-general of mineral policy and promotion at DMR, explained, “Our intention is to be able to deal with the legacy of dumps.” Owners of abandoned mines or waste dumps would have two years to apply for reclamation permits that would grant them the right to remine the remaining material for residual gold. If the owners failed to apply for a license within that period, mining rights to the tailings would expire. The amendment aims to capitalize on the potential profitability of remining to incentivize and expedite operations. While the amendment, if adopted, could help eliminate more old tailings dams, the government will still need to formulate a plan for any legacy sites that remain unclaimed.

Several companies have investigated the possibility of creating mega dumps. Mark Brune, chairman of Mintails, told IHRC in 2014 that his company had proposed a mega dump of up to one billion metric tons. He suggested that the dump be “coordinated by the government with a toll charge for companies depositing into it, which builds up a trust to close it.” This approach would allow the government to repurpose the tailings once the mine is still active in the region. Brune also suggested that the mega dump could be used as a site for biofuel production or other revenue-generating activity. Such use would provide money to help maintain the facility, and allow the dump to somewhat mitigate the environmental impact of mining waste. As of May 2016, severe financial constraints had prevented Mintails from pursuing the proposal further.

Sibanye Gold has also been developing a remining and mega-dump project, the West Rand Tailings Retreatment Project (WRTRP). The plan has called for remining existing tailings for gold and uranium and then moving the remaining material into one “central deposition site” at the company’s West Witwatersrand operations. According to James Wellsted, senior vice president of investor relations at Sibanye Gold, the WRTRP would benefit local communities and the environment. Unlike some existing tailings dams, the new facility would be “properly constructed” so as to contain the contaminants, and harmful uranium and sulfur would be removed. The project could cost approximately R8 billion. Sibanye Gold concluded an internal feasibility study on the WRTRP and began the process of obtaining the necessary permits in the summer of 2015. Since then, the company has commissioned a stakeholder survey, which is part of the requirement to develop an environmental impact assessment for the project. In May 2016, Wellsted wrote IHRC that the company was working to obtain permits and secure financing, and that it expected to take the proposal to its board of directors for approval in the next six months.

Mega dumps have the potential to contribute to environmental protection. NNR wrote to IHRC that although it would require a safety assessment report before approving such a facility, “[i]n principle, the NNR would support the idea of a mega dump because it does lead to consolidation of some sources of exposure and hence it become[s] easier to manage and may lead to a decrease in exposure to some members of the public.”

The West Rand tailings dumps are located in the West Rand Mining District, a major mining area in South Africa, and they contain a significant amount of radioactive material. In 2015, the National Nuclear Regulator, to IHRC, May 27, 2015 (enclosing “NNR Response to Harvard University Questions,” May 2015).

See AngliGold Ashanti (name withheld), Johannesburg, January 13, 2012. We’re looking to sterilize the tailings before we put [them] back again.”

Phone interview with Werner Eistean, Deputy Director of Reactive Administrative Enforcement, Department of Environmental Affairs, April 21, 2015.

Interview with Mosa Mabuza, Deputy Director-General of Mineral Policy and Promotion at DMR, explained, “Our intention is to be able to deal with the legacy of dumps.”

Interview with James Wellsted, Senior Vice President of Investor Relations, and senior official of metallurgy and surface operations (name withheld), Sibanye Gold, Libanon, October 27, 2014 (statement of senior official).

Presentation and tour by Mariette Liefferink, CEO, Federation for a Sustainable Environment, West Rand, October 27, 2014 (discussing a company that had begun remining in one area, but abandoned it after finding that the concentration of gold in the tailings was too low for the project to be profitable).

Phone interview with Mosa Mabuza, Deputy Director-General of Mineral Policy and Promotion; Andreas Moatshe, Chief Director of Mine Environmental Management; and Sibongile Maile, Director of Mineral Policy Development, Department of Mineral Resources, June 9, 2016 (statement of Mosa Mabuza).


Email from James Wellsted, Senior Vice President of Investor Relations, Sibanye Gold, to IHRC, May 9, 2016.

Ibid. A senior official at another mine in the region described Sibanye Gold’s plan as “a fantastic project.”

Phone interview with head of energy division at a mining company in the region (name withheld), December 4, 2014.


Email from James Wellsted, Senior Vice President of Investor Relations, Sibanye Gold, to IHRC, May 9, 2016.

Wellsted added that Sibanye Gold would “involve the community at the appropriate times.”

Interview with James Wellsted, Senior Vice President of Investor Relations, Sibanye Gold, to IHRC, May 9, 2016.

Phone interview with Mosa Mabuza, Deputy Director-General of Mineral Policy and Promotion; Andreas Moatshe, Chief Director of Mine Environmental Management; and Sibongile Maile, Director of Mineral Policy Development, Department of Mineral Resources, June 9, 2016 (statement of Andreas Moatshe).
to meet that goal. In addition to implementing the enhanced short-term fixes and remedial measures described above, the government should play a more active role in developing a long-term strategy to address tailings. It should evaluate and regulate industry proposals, including remining operations and mega-dump construction, for safety and effectiveness. It should also, if necessary, consider other proposals for supplementary or alternative approaches. The government should then operationalize the chosen options itself or in partnerships with stakeholders, and increase oversight and monitoring of industry efforts to minimize exposure to tailings and the harm that results. It should ensure any solution encompasses both privately owned mine sites and legacy mines that have reverted to the state.

A number of issues must be resolved to make mega dumps effective from a health and environmental perspective. First, the new dumps must be carefully capped and sealed to prevent the spread of contamination. Second, tailings should not be moved to a location where they will simply affect other people. Stella Adams, a resident of Diepkloof, said, “They shouldn’t move the dump from me and dump it in your yard. If that happens, someone else will suffer. How can you take my rubbish and dump it in your yard?” Third, the expense of moving the tailings and then maintaining the dump sites in perpetuity must also be taken into account. A mining official recommended establishing a permanent trust that would pay for ongoing costs associated with the projects. Finally, stakeholders should agree on predetermined, sustainable land use for the former sites of the relocated tailings dams. Liefferink said, “Sustainable land use does not mean you have to restore it to pre-mining conditions. New land use can be wind farms, solar panels, industrial facilities, landfills, or graveyards.”

In interviews with IHRC, industry representatives called for more active government involvement in the planning of mega dumps and other projects to deal with contaminated mining waste. According to Sibanye Gold officials, the national government has contributed little in this area and the local government has been challenging to work with. Mark Brune of Mintails told IHRC in 2016, “[I]t is in the interest for the government to take a more proactive role in coordinating disposal in a manner that is technically up to date and in an economically and environmentally sustainable manner.” In 2014, a senior official at a different company said long-term plans “depend on the proactive role of the government” because industry is financially “ailing.” Another mining official warned that the “responsibility [of remediation] will fall to the state at some point.” Because the environmental liability in the region exceeds the value of gold remaining, mining companies will eventually leave or cease to exist. Therefore, that official predicted, the window for formulating an effective remediation plan aided by mining companies is “within the next 10 years.”

Despite the challenges of dealing with tailings dams, South Africa must strive for full realization of the human rights to health, a healthy environment, and housing. At this point, however, the government has left industry to take the lead on the design and implementation of steps...
5. Information and Participation

The inadequacy of measures to involve local people in mining-related matters has exacerbated the problems created by acid mine drainage and tailings. Residents of the West and Central Rand have often been poorly informed about environmental health risks due to insufficient warnings and inadequate scientific studies. They have had little notice of new operations or mitigation efforts. In addition, community members have frequently been left out of policy-making processes. The situation has interfered with their ability to protect themselves and led to violence, litigation, and feelings of mistrust. It has also infringed on residents’ human rights to receive information and to participate in decisions that affect their lives.

The government has contributed to the situation by failing to meet its obligations to promote these rights. While it has recently supported new research to fill a long-standing gap in epidemiological information, it has been slow to do so and it could have done more. It has also made several key policy decisions without engaging or even notifying residents in advance. Attitudes may be changing, but industry, too, has a weak record of informing or working with communities. Going forward, the government should take steps to ensure that its representatives and mining companies provide residents with greater access to pertinent information and the opportunity to participate in decisions about mining.

Limited Access to Information

Communities in the West and Central Rand have for many years had limited access to information about the impacts of mining. Information can take a variety of forms including in situ warnings, scientific studies, and advance notice of proposed projects, but they have all been insufficient. The dearth of information available to the people affected by mining has impinged on their awareness and understanding of the situation and thus magnified the threats they face. It has also deprived them of data necessary to identify better protections for the environment and their health.

Warnings

Residents of the region have not always received the most basic information about the dangers of specific sites. While government agencies and mining companies have posted signs and constructed fences around some hazardous areas, such warnings have not been present in all locations and have often been poorly maintained. In 2014, several people from Sipinbule complained that there were no barriers separating their community from a mine site across the street. “Kids are playing really close. There’s no sign. There’s nothing,” said one member of the community. The same year, Sanny Mогоjo told IHRC that neither government nor industry had alerted the people of Bekkersdal to the contamination of Donaldson Dam and its channel. “People don’t know about the problems … The water looks like a nice

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472 For example, during its multiple visits to the region, IHRC observed warning signs at Robinson Lake and by a pipe that at one point released untreated AMD into the Tweelopiespruit near the Krugersdorp Game Reserve. 473 For example, the contaminated tailings dams IHRC visited rarely had warning signs or barriers. IHRC also saw unfenced open mine pits next to the Tudor Shaft informal settlement that endangered children who played in the area. In the Central Rand, IHRC observed many people following a well-worn path over a tailings dam into the community of Meadowlands and saw no barrier or sign to discourage them. 474 See, e.g., interview with Charlie Sowa and Marcus Garvey, Sipinbule residents, Sipinbule, October 29, 2014 (“They promised they would make a fence, but they did not. Kids play over there [in the mine area].”). 475 Interview with Sipinbule residents #1, #2, and #3 (names withheld), Sipinbule, October 29, 2014 (statement of resident #1). Earlier that year, DMR suspended Mintails’ mining operations in part because of a failure to install warning signs around the perimeter of the site near Sipinbule. “Shabangu Suspends Mintails Mine,” Independent Online, January 17, 2014, http://www.iol.co.za/business/companies/shabangu-suspends-mintails-mine-1633182#.VYPp3vlVhBc (accessed May 6, 2016).
breaks in the fence and no community warning signs during its earlier field trips to Bekkersdal. Theft has been a major hurdle to maintaining signs and barriers because local people steal them for scrap metal. Nevertheless, the government and industry should continue and increase efforts to provide effective warnings to the people living in the area.

Scientific Studies

Existing evidence of pollution has been sufficient to justify such in situ warnings, but community members need additional scientific information to know the full extent of prior and potential health impacts. Scientists have produced many reports documenting the elevated levels of contamination in the Witwatersrand. The studies conducted so far, however, have provided an incomplete picture of the situation: there have been few attempts to determine whether the health effects attributed to the same contaminants elsewhere in the world have occurred in the region’s communities. In 2016, Angela Mathee of the South African Medical Research Council found many gaps in the fence surrounding Donaldson Dam have given Bekkersdal residents easy access to the contaminated body of water. Local people have stolen the concrete-covered rebar to sell for scrap metal, and the government has not adopted a better solution to cordoning off the dam.

The situation at Donaldson Dam exemplifies the inconsistency and inadequacy of information provided to the public. In March 2010, IHRC observed signs within the Donaldson Dam recreation area, visible only to those who paid admission, cautioning people not to use the dam for drinking, swimming, watering cattle, or washing clothes; the signs were gone in January 2012. In 2016, Lucas Moloto sent IHRC a photograph of a sign posted by the Gauteng Provincial Government at the entrance to recreational area that read in three languages:

- For your own health:
  - Do not swim in this water
  - Do not drink this water
  - Do not use this water to wash your food

The notice represented a step toward better communication, but Moloto reported finding no comparable signs on the community side of Donaldson Dam or near its adjacent overflow channel. This absence is significant because residents have had easy access to the polluted dam through holes in the concrete and rebar palisade around the dam’s recreational area. Moloto documented at least three large gaps in the barrier in 2016, and IHRC found many places to go swimming. [The government and industry] should put up posters, fences. Right now there is easy access,” he said.476

Signs posted in 2010 alerted paying visitors to the Donaldson Dam recreational area about the hazards of contaminated water. These notices had disappeared by 2012, and Bekkersdal residents accessing the dam’s other side through a broken fence have not received comparable warnings. © 2010 Bonnie Docherty/IHRC.

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© 2010 Bonnie Docherty/IHRC.

Large gaps in the fence surrounding Donaldson Dam have given Bekkersdal residents easy access to the contaminated body of water. Local people have stolen the concrete-covered rebar to sell for scrap metal, and the government has not adopted a better solution to cordoning off the dam. © 2010 Bonnie Docherty/IHRC.

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Council described “paucity … of research information on the health consequences of mining in South Africa.” The same year, the World Health Organization said, “To date, there has been little epidemiologic research on the exposure of these populations and their risk of cancer and other adverse health outcomes.” Echoing that assessment, Mariette Liefferink of the Federation for a Sustainable Environment told IHRC, “There is a significant reticence to doing epidemiological studies. We have studies in mining areas—they are not in dispute and are well-established—but … there has not been a causal link [made] between mine waste, including radioactive metals, and human health.” Evidence of human exposure to dust and contaminated tailings combined with accounts of potentially related illnesses warrant such epidemiological research in the region. As Liefferink said, filling this “gap in information is extremely important to do.”

The lack of hard data can lead to speculation, which often creates fear, and weakens community efforts to protect themselves. A member of the Greater Westonaria Concerned Residents Association described being uncertain about the effects of dust. She noted in 2014 that she had observed a higher rate of cancer in Bekkersdal, and said, “Somehow, someway, I think the mining is part of the problem. … I don’t know if it’s actually because of the mines, but I think there is a link.” Further studies could help communities determine which fears are justified and how to address the environmental and health effects of mining.

Advance Notice of Mining Projects

In many cases, local people have not been informed in advance of mining projects that directly relate to their lives. Parliamentary Gareth Morgan, shadow minister of water and environmental affairs, told IHRC in 2012 that “[t]he most common email I get from communities about mining is that there is a mine going in down the street from me and nobody told me about it.” The case studies of Sinqobile and Tudor Shaft illustrate this problem.

Residents of Sinqobile said they were unaware of Mintails’ plans to commence open-cast mining at the Princess Pit across the street, and they were surprised when blasting began in 2013. One community member told IHRC in October 2014, “They gave us no warning. And they did it all through the night. We were never told when they were blasting. Children would be out playing, and we wouldn’t be warned.” Several residents showed IHRC researchers large cracks in their walls and said they feared their homes would collapse. Angry about the failure to be notified and the damage caused by the blasting, the people of Sinqobile took to the streets. For two weeks in January 2014, they burned tires and staged protests. As discussed below, the rioting subsided only after the government and industry reached out to the community. But even in late 2014, one resident said, “People are angry. They’ve had enough. And they don’t know anything. They aren’t told anything.”

The government similarly failed to provide timely notice of pending relocation efforts to the people of Tudor Shaft. In 2011 the Mogale City municipality moved the most at-risk residents of Tudor Shaft, along with a few from adjacent Soul City, to Soul City Extension 2 to reduce their exposure to mine tailings. Unlike the mining activities in Sinqobile, the relocation project likely benefited the affected residents, and some of them told IHRC that their living conditions had improved. Nonetheless, these individuals confirmed that no one had communicated with them about the possibility of moving during the planning stages. Multiple residents told IHRC that they first learned about the relocation when their local ward committee told them to prepare to move. The Socio-Economic Rights Institute has advocated for this community’s housing rights. According to Nomzamo Zondo, SERI’s director of litigation, “The community felt that they were not consulted. … [I]t felt more like they had been evicted. It was as if all of a sudden, I come home, my shack has an ‘X’ on it, and I’m going.” Although Tudor Shaft residents may have had an option to stay, the inadequacy of the government’s notice exemplifies the failure to inform community members even of efforts to help them.

Risks of Limited Information

Inadequate access to information about the effects of mining has prevented the people of the West and Central Rand from gaining a proper understanding of the risks they face. In 2014, Sanny Mogoke of Bekkersdal told IHRC that “[i]gnorance is very high” in the community. Some residents may have unknowingly exposed themselves or their children to sources of contamination that they had not been aware of. A resident noted in 2012 that “there is a mine going in down the street from me and nobody told me about it.” A resident of the nearby community of Grassy’s used to swim in the channel downstream of Donaldson Dam as a child, and said, “Just today I learned that the water is contaminated.” Those with a greater awareness of the potential harm have also been disadvantaged by the insufficiency of information. They need additional scientific data and advance notice of proposed projects in order to advocate for their own interests before decisions are made.

Inability to Participate in Decision Making

Community members have also been left out of decisions about policies that affect the environment and their health, a corollary to the lack of notice of new projects discussed above.
Many people told IHRC that the government and industry have seldom engaged them in discussions about new mining activities or plans to respond to ongoing threats. The inability to participate in decision making has denied communities the chance to influence efforts to protect them from the impacts of mining.

Residents interviewed by IHRC expressed frustration that the government and industry have made minimal efforts to consult with communities on mining-related matters, let alone meaningfully engage with them. In 2014 Percy Makunga, who had lived in the Bekkersdal area for more than 30 years, told IHRC that there was very little opportunity to speak to mining companies. He argued that the mining companies “should come to us and ask us [what we want],” but instead they go to the local government which is “not to be trusted.” According to Makunga, officials have told residents, “The land belongs to the government. It doesn’t belong to you, and the mining resources belong to the government, not to you.” They don’t consult us.”

Discussing the mining project near Sinqobile, Charlie Sowa said, “We feel like we have to strike in order for our voice to be heard.”

Illustrating the problem, after the most at-risk residents of Tudor Shaft were relocated with minimal notice in 2011, the remaining residents were left out of a decision about how to deal with the residual contamination in their settlement. The government decided to reduce the threat of radiation and heavy metals by removing the tailings dam adjacent to Tudor Shaft’s remaining homes, and Mintails agreed to conduct the operation to dispose of the material. The decision-making process involved weighing the pros and cons of multiple options. According to an affidavit from the litigation that resulted, the National Nuclear Regulator and the local municipality determined that removal of the tailings dam would be “the most appropriate and effective manner” of reducing radiation exposure because they believed relocating the whole community was “not a viable option” from a resource perspective. An official from a mining company operating in the region told IHRC that relocating the remaining residents might have been “easiest,” but he said he understood that some people would not want to leave their community. He explained that the chosen solution of “[m]echanically mining and moving [the tailings dump] does liberate the dust,” but noted that it could be “done within two weeks so you wouldn’t have the exposure of living by it for years.”

The plan seemed to be well intended, but it made assumptions about what the local people wanted. Tracy-Lynn Humby, a law professor at the University of Witwatersrand, described the residents as “passive receptors of scientific, media, civil society and government scrutiny and action.” Due to the lack of community involvement, they became aware of the plan only when bulldozers arrived to remove dirt in 2012. Some residents immediately expressed...
their concerns to FSE’s Liefferink, who had advocated for their interests in the past. She in turn joined with the Legal Resources Centre (LRC) to file suit to halt the project.414

While remining had the potential to help the community, the project reached a stalemate in large part because of the flawed process behind it. In an interview with IHRC in 2014, a Tudor Shaft resident said he would welcome remediation efforts in principle, but that he was upset about the inability of residents to participate in the decision making. He said that the local government and mining companies are “supposed to ask the community and listen to our concerns,” but he neither had done so.415 A study of community engagement in the region reported that residents “found the idea that they could participate in change regarding the environment frankly laughable.”416 Other opponents of the project, including FSE and LRC, criticized both the failure to discuss the health risks with the residents of Tudor Shaft in advance and the lack of an adequate environmental impact assessment.417 According to the Globe and Mail, “About half of the soil was removed, but environmentalists were alarmed that it was being done without risk-assessment studies or consultations, and they obtained a court order to suspend it.”418

Due to ongoing litigation, the project was still on hold in July 2016. The Department of Environmental Affairs had recently completed a risk assessment report, and the parties in the FSE suit were discussing possibilities for mediation.419 According to Mariette Liefferink, FSE wanted the court to shut down the project and the government to clean the site up properly. Such cleanup would entail consultation with the community, a risk assessment, removal of tailings, and remediation that would leave healthy water and soil.420 SERI has represented Tudor Shaft residents in a second suit, which has been separated from the FSE suit and calls for relocation.421

Obstacles to participation, exemplified by the events in Sinqobile and Tudor Shaft, have arisen at other times in different communities. Some of the residents of the West and Central Rand whom IHRC interviewed in 2012 said that the government had not engaged with them to discuss ways to address contamination from tailings dams. “There has been no consultation,” a resident from Riverlea told IHRC. “When we ask the government, they say we had a meeting. But the government didn’t consult us and didn’t give us any notice. We need notice about the meetings.”422 Peter Swartz of Matholesville similarly said, “The government doesn’t come to the community.”423 People from several other communities also complained that government did not reach out to residents.424 Such failures to engage have prevented community members from meaningfully participating in decision making about both future mining operations and efforts to address past harm. The exclusion has left many residents feeling frustrated, angry, and disempowered.425

Rights and Duties
National and international human rights law guarantees the people of the West and Central Rand the right to receive information and the right to participate in decision making, and it imposes on South Africa the duty to ensure that they can exercise these rights. Many community members interviewed by IHRC, however, described being ill informed and poorly consulted about matters related to mining. The government and industry have taken some steps to improve the situation through new scientific research and community meetings, but their actions have been limited. Inadequate engagement has led to violent protests and litigation and thus worsened the plight of residents, whose rights associated with the environment and health have already been put at risk.

Information
The obstacles residents have encountered to receiving information about the effects of mining have threatened to contravene the right to information. According to emerging international norms, to realize that right, the government should ensure both the collection of data with which to assess potential harm and the dissemination of information to those most at risk.426 While collection seems to have been improving, shortcomings have continued. South Africa has also not fully met its duty under domestic and international law to make “information of public interest” available.427 In many cases, community members have not been given sufficient warning of a dangerous site or notice of a pending operation.

Responding to the dearth of research, in 2015 the WHO’s International Agency for Research on Cancer (IARC), in conjunction with the Mine Water Research Group (MWRG) of South Africa’s North-West University, initiated a study of uranium exposure from mines in and around Johannesburg. It commissioned FSE to assist with the collection of about 1,500 hair samples from 10 at-risk communities as well as control samples from three communities identified by the MWRG.428 The WHO explained that “[t]his pilot should be critical in opening the door to further research in order to assess the potential of [uranium] as a risk factor and to develop possible strategies to prevent uranium contamination in the affected areas.”429 FSE’s Mariette Liefferink described the project as “a wonderful victory because even though it is just a screening, at least we will be able to see how to build on it. … Then we can follow up with epidemiology.”430 FSE submitted the hair samples in March 2016, and as of July, testing was ongoing.431

The South African government, which should not rely exclusively on the research of international organizations, has recently taken some steps to facilitate better data gathering through its support of epidemiological studies of communities in the region. Mary Guluman at the

410 Ibid., p. 103.
411 Interview with Tudor Shaft resident #1 (name withheld), Tudor Shaft, November 1, 2014.
412 Dugard, MacLeod, and Alcaro, “A Rights-Based Examination of Residents’ Engagement with Acute Environmental Harm across Four Sites on South Africa’s Witwatersrand Basin,” Social Research, pp. 931, 949.
414 Skype interview with Mariette Liefferink, CEO, Federation for a Sustainable Environment, July 8, 2016.
415 Phone interview with Mariette Liefferink, CEO, Federation for a Sustainable Environment, May 10, 2016.
416 Skype interview with Mariette Liefferink, CEO, Federation for a Sustainable Environment, July 8, 2016.
417 Interview with Rosenda resident #1 and #2 (names withheld), Rosenda, January 9, 2012.
418 Interview with Matholesville resident #1 (name withheld), Matholesville, January 9, 2012.
419 Interview with Matholesville resident #1 (name withheld), Matholesville, January 9, 2012.
420 Skype interview with Mariette Liefferink, CEO, Federation for a Sustainable Environment, May 10, 2016.
421 Interview with Rosenda resident #1 and #2 (names withheld), Rosenda, January 9, 2012.
422 Interview with Tudor Shaft resident #4 (name withheld), Tudor Shaft, January 7, 2012; interview with Tudor Shaft residents #5 and #6 (names withheld), Tudor Shaft, January 7, 2012 (statement of resident #5) (saying “you don’t find the government”).
National Institute for Occupational Health (NIOH) has been leading an investigation into the health effects of dust in the Central and East Rand. Her team reported in 2016 that they expected to release the results later in the year.529 Guzman told IHRC that “[o]ne part of our research was to assess the toxicological effects. The next is to do epidemiological studies in schools and in communities around [the area].”530 Her study was using “an internationally accepted questionnaire” to document such symptoms as coughing, asthma, and lung diseases.531 NIOH is part of the Department of Health, and the study was commissioned by the Mine Health and Safety Council, which advises the minister of mineral resources.532 At the time of her IHRC interview in 2014, Angela Mathee of the SAMRC also had initiated a mining health and safety study,533 and she was collecting data in June 2016.534 Mathee has done prior investigations into dust contamination, but the new study represented the “first time we will combine exposure data with actual health data.”535 The SAMRC conducts research “of its own accord … or on behalf of the State.”536 The role of government entities in these studies will help South Africa meet its obligation to ensure data collection about matters of public interest.

The leaders of both studies noted the importance of disseminating the results of their research to the people affected. Guzman told IHRC that she planned to hold workshops bringing together communities, the Mine Health and Safety Council, and mining companies, as she has for past studies. She said, “We communicate the information, hopefully in an understandable manner, and then people can ask questions. … We ask some government agencies [to come, and] hopefully get some interest.”537 Mathee said she expected to “develop quite a close relationship with the community” during the course of her study. She added that “[o]ur usual practice has been to educate the local people about a study’s findings through ‘oral feedback or mini feedback reports’.”538

Despite these researchers’ sensitivity to the importance of sharing findings with the community, the government has to date had a poor track record of disseminating information about mining to the people of the West and Central Rand. In 2014, Lucas Moloto of Bekkersdal told IHRC that the “government wouldn’t ever come to communities and enlighten [us].”539 FSE’s Liefferink confirmed that the government agencies that deal with mining pollution rarely reach out to affected communities to raise their level of awareness or educate them about exposure risks.540 She said in 2015 that “many of those communities are so ill-informed … [and] hopefully get some interest.”541 Mathee said she expected to “develop quite a close relationship with the community” during the course of her study. She added that “[o]ur usual practice has been to educate the local people about a study’s findings through ‘oral feedback or mini feedback reports’.”542

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is systematic risk to these communities because of government failure to engage them.”549 Even without additional epidemiological studies, the government could do more to inform residents about known contamination and the dangers of exposure.550 The right to information also applies to material held by third parties,551 but the government has neglected to ensure that mining companies share their knowledge, and not all mining companies have been forthcoming. A member of the Greater Westonaria Concerned Residents Association complained in 2014 that mining companies “don’t even … come and educate people about the effects they are causing.”552 Sanny Mogobe of Bekkersdal said, “Let the mines and municipality come to the community and teach us about these issues so that we can take an interest.”553 Angela Karuki, a research associate at the South African Human Rights Commission, said, “[Mining companies] give you this blank look when you talk about human rights,” including the right to information. She added that “we are drilling it into them that they are functioning in a community, they have implications, and they have a role and they need to take it more seriously.”554

While adequate mechanisms for information-sharing have not yet been put in place, IHRC found some evidence of growing industry appreciation for developing open relationships with the community. In 2012, officials from multiple mining companies expressed skepticism about holding discussions with community members, contending in part that the issues required too much expertise.555 In 2014, by contrast, several company officials noted the value of reaching out.556 For example, Mark Bruce of Mintails told IHRC that “communication is 90 percent of the solution” to mistrust, and that “transparency is key. Communities have to understand what we are doing. … We need to lay it on the line—wants and all, these are the challenges.”557 This evolution in rhetoric represents progress, but the need for effective implementation through dissemination of accessible information remains.

The government bears primary legal responsibility to ensure residents receive information, yet so far it has largely neglected its duty to “proactively put in the public domain Government information of public interest.”558 The main conduit of information about mining contamination in the region has been neither government nor industry, but civil society. Among the

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529 Email from member of Mary Guzman’s research team, National Institute for Occupational Health, June 2, 2016.
530 Interview with Mary Guzman, Manager, Toxicology Section, National Institute for Occupational Health, Johannesburg, October 29, 2014.
531 Ibid.
533 Interview with Angela Mathews, Director, Environmental and Health Research Unit, South African Medical Research Council, Johannesburg, October 31, 2014.
534 Email from Angela Mathews, Director, Environmental and Health Research Unit, South African Medical Research Council, to IHRC, June 2, 2016.
536 Interview with Mary Guzman, Manager, Toxicology Section, National Institute for Occupational Health, Johannesburg, October 28, 2014.
537 Phone interview with Mariette Liefferink, CEO, Federation for a Sustainable Environment, April 21, 2015.
538 Ibid.
539 Information should also be disseminated in a form that laypeople can understand. For example, while environmental impact assessments are critical, without explanation they can be too technical for the general public to grasp. In addition, most settlement residents likely be unacquainted with the assessments or less, such as language or Internet availability, to accessing them.
540 Interview with Angela Karuki, Research Associate, South African Human Rights Commission, Braamfontein, November 1, 2014. Karuki acknowledged that industry may have become more aware of human rights, but added that “in really not much has actually changed.” See also interview with Janet Love, Commissioner, Yuri Ramkissoon, Senior Environment Researcher, and Angela Karuki, Research Associate, South African Human Rights Commission, Braamfontein, January 12, 2012 (statement of Yuri Ramkissoon) (saying that the mining industry in South Africa had failed to address ongoing issues that impact communities, such as “a lack of participation of and prior informed consent, and a lack of planning from a human rights perspective”).
541 These officials generally requested anonymity during 2012 interviews with IHRC.
542 A representative of one company operating in the region said, “We could certainly improve our relationships with the community.” Skype interview with senior official of mining company in the region (name withheld), December 4, 2014. Officials from Sibanye Gold told IHRC in 2014 that, whereas the company used to leave community engagement to the municipal government, it has started to do direct outreach (e.g., Sibanye Gold, Johannesburg, October 30, 2014) to the community.
543 Interview with Mark Bruce, Chairman, MetalTwo, Johannesburg, October 30, 2014.
544 Skype interview with senior official of mining company in the region (name withheld), December 4, 2014.
546 Interview with members of Greater Westonaria Concerned Residents Association, Bekkersdal, October 29, 2014.
547 Interview with Sanny Mogobe, Bekkersdal resident, Bekkersdal, October 29, 2014.
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553 Interview with Mark Bruce, Chairman, MetalTwo, Johannesburg, October 30, 2014.
554 UN Human Rights Committee, General Comment No. 14, Freedoms of Opinion and Expression, para. 19.
community members IHRC interviewed, a large portion of those who were aware of the risks of mining attributed their knowledge to Mariette Liefferink and her staff at FSE. For example, Lucas Moloto, who later joined the organization as a community engagement facilitator, said he first learned about the problems in Bekkersdal through FSE reports, the media, and research institutions.548 Although not all companies operating in the West and Central Rand have a good relationship with FSE, a few companies in the region have collaborated with and/or provided funding to the organization.549 Gold Fields, for example, has worked with FSE to inform communities that have been affected by mining pollution about the potential health and environmental impacts.550

School children in Bekkersdal attend a presentation by Mariette Liefferink of the Federation for a Sustainable Environment. Local people have received much of their information about the dangers of mining from civil society, rather than the government or industry. © 2010 Bonnie Docherty/IHRC.

While it has been encouraging that certain companies have supported raising public awareness of mining issues, the significant reliance on FSE has presented problems of practicality and principle. The organization cannot single-handedly educate all of the affected communities in the West and Central Rand. It has also been troubling that the government and industry have not done more direct educational outreach and in the process developed personal relationships with communities.551 According to Percy Makunga of Bekkersdal, mining officials “send Mariette [Liefferink] to come and teach us about tailings dams and acid mine drainage, but do not come personally.”552

The government’s failure to ensure the accessibility of information relevant to gold mining in the West and Central Rand has exacerbated the adverse impacts of AMD and contaminated tailings. Without proper warnings about health threats, local people have been unprepared to minimize their exposure or lobby for greater environmental protection. To meet its human rights obligations going forward, South Africa should continue to encourage and support epidemiological research. A better understanding of the problem could both help the government identify residents who should receive remedial help, including health care, and inform the design of measures to prevent future harm. The government should also take steps to guarantee that community members have adequate notice of the risks they face as well as the information they need to advocate on their own behalf.

Participation
Residents of the West and Central Rand have also encountered hurdles to exercising their right to participate in decisions relevant to mining in the region. The South African Constitution states that “the public must be encouraged to participate in policy-making,” and Constitutional Court jurisprudence requires the government to promote participation by engaging meaningfully with affected communities.553 The government’s efforts have often been inadequate, however. For example, the government met with the people in Sinquobile about a mining project only after they began to protest, and it did not include residents of Tudor Shaft in planning for either relocation or the removal of tailings from their settlement. In such cases, the government has not lived up to its human rights obligation to facilitate community involvement and to ensure industry does the same. While engagement would not necessarily eliminate differences of opinion among stakeholders, the failure to give communities a voice has exacerbated tensions and in some instances caused a backlash that has impeded efforts to address environmental and health threats in a timely fashion.

Approaches to Engagement
Critics have challenged the effectiveness of the government’s mechanisms for directly engaging with the community. For example, a quarterly forum has brought together representatives from government, industry, and civil society, but according to Lucas Moloto of Bekkersdal, residents of local settlements described these meetings as “talk shops.” She said, “They have been in existence for more than 15 years, and the same issues that arose 15 years ago still arise today. [Government officials] are trying to show participation in the community. For example, a quarterly forum has brought together representatives from government, industry, and civil society, but according to Lucas Moloto of Bekkersdal, residents of local settlements described these meetings as “talk shops.” She said, “They have been in existence for more than 15 years, and the same issues that arose 15 years ago still arise today. [Government officials] are trying to show participation in the community. For example, a quarterly forum has brought together representatives from government, industry, and civil society, but according to Lucas Moloto of Bekkersdal, residents of local settlements described these meetings as “talk shops.” She said, “They have been in existence for more than 15 years, and the same issues that arose 15 years ago still arise today. [Government officials] are trying to show participation in the community.

An official at the Department of Mineral Resources said that his department has improved its engagement with the community over the past decade. DMR official Mosa Mabuza explained that when the Mineral and Petroleum Resources Development Act came into effect in 2004, the attention paid to the social and environmental effects of mining increased. “One of the key principles contained in [the MPRDA] is management of the relationship with the community where mining takes place,” Mabuza said. “Engagement with communities is a critical requirement.”556

548 Interview with Lucas Moloto, Bekkersdal resident and Community Engagement Workshop Facilitator, Federation for a Sustainable Environment, Bekkersdal, October 29, 2014.
549 A representative of one of these companies said that there is “a lot of misunderstanding around the risks associated with mining” and NGOs, like FSE, can “provide education around the mines on what the key environmental issues are.” He added that an NGO “also gives credibility; people would be less likely to believe the mining companies.” This interviewee appreciated NGOs’ value as watchdogs, and added, “They are important to have because they can flag issues in the industry that they’re not comfortable with.” Skype interview with senior official of mining company in the region (name withheld), December 4, 2014.
550 Interview with Lucas Moloto, Bekkersdal resident and Community Engagement Workshop Facilitator, Federation for a Sustainable Environment, Bekkersdal, October 29, 2014.
551 For example, a resident of Bekkersdal told IHRC, “Mining companies don’t come into the community. We don’t get information from them.” Interview with Bekkersdal resident #5 (name withheld), Bekkersdal, January 7, 2012.
552 Interview with Percy Makunga, Bekkersdal resident, Bekkersdal, October 29, 2014.
553 South African Constitution, § 195(1)(e); Schubert Park Residents’ Association, paras. 43-44.
554 Interview with Lucas Moloto, Bekkersdal resident and Community Engagement Workshop Facilitator, Federation for a Sustainable Environment, Bekkersdal, October 29, 2014.
555 Phone interview with Mariette Liefferink, CEO, Federation for a Sustainable Environment, Bekkersdal, October 29, 2014.
556 Phone interview with Mosa Mabuza, Deputy Director-General of Mineral Policy and Promotion, Andreas Masabane, Chief Director of Mine Environmental Management; and Sibongile Make, Director of Mineral Policy Development, Department of Mineral Resources, June 9, 2016 (statement of Mosa Mabuza).
While acknowledging that the government has had failures, Mabuza highlighted certain areas that he considered successes. For example, he praised the requirement that mining companies produce a five-year social and labor plan before receiving a license. In such a plan, a mining company commits to using some of its revenue to promote community development, such as through the construction of a school or health facility. The needs of the community are determined through discussions with local councilors who “might engage with community members with opportunities post mining.” Other parties have developed alternative approaches to engagement over the past few years. Moloto contrasted the government forum described above with “community engagement meetings” that Gold Fields and FSE started to convene around 2013. He explained that the meetings, held in communities in the environs of Gold Field’s South Deep Mine, have been designed to empower local people and “to help to mitigate or avoid pollution.” Generally, a preliminary session with FSE and about 20 community leaders is followed by a second meeting with FSE, Gold Fields, and a larger number of community members, who have the chance to ask questions. Moloto praised the initiative, saying, “It is a very good step. It should be applauded.”

In 2016, Liefferink described the results of the FSE-Gold Fields model as “very encouraging.” She said, “The first meetings were just shouting and anger and threats of burning down mines. Suddenly it all changed.” After a survey showed that the community had little trust in Gold Fields, the company “worked hard to establish trust with the communities.” They have since responded to many of the communities’ requests, including by building a school, elderly housing, and a clinic. “I now actually applaud Gold Fields because we’ve seen tangible investment in the community,” Liefferink said.

Another mechanism for engagement has involved industry (Gold Fields and Sibanye Gold), the local municipality, and community organizations and has sought to advance the socioeconomic development of Westonaria, which is part of the West Rand. Moloto, who has been helping to plan roundtables for this process, told IHRC that he believed, “If concerted effort of the three parties is aligned and all are treated equally, then there is guaranteed success in attaining most of the development goals identified.” Liefferink, who has not been a major player in this initiative, said, “We need to make sure that aspirations are implemented,” but she supported such efforts by mining companies to “work together to develop sustainable end land uses and to give communities sustainable and viable work opportunities post mining.” The government could consider these approaches as possible models for further reform. Whatever approach it takes, the government should ensure that community members have a seat at the table in the design of engagement mechanisms as well as in the decision-making processes that affect their lives.

Violence in Sinqobile

While progress seems to have been made in some areas, inadequate efforts to ensure community participation in decisions about specific projects have had serious, counterproductive consequences. For example, in Sinqobile, the failure of the government and industry to engage meaningfully with local residents about the Princess Pit mining operations led to two weeks of violence. In early January 2014, community members held protests, and police responded as the unrest escalated, “turning the quiet township into what looks like a war zone.” According to resident Charlie Sowa, “Tires were burning in the streets. People were getting shot with rubber bullets.” Responding to the riots, the minister of mineral resources and the mayor of Mogale City eventually met with the community. Mineral Resources Minister Susan Shabangu told journalists that “she was satisfied that all processes, including public consultations, [had been] conducted,” but residents disputed that in interviews with IHRC as well as the media. A few days after her visit, the minister suspended mining operations because DMR found that Mintails had not taken sufficient steps to prevent unauthorized access to the site. DMF lifted the suspension in February 2016.

After the protests ended, the government and industry reportedly took some steps to improve engagement. Commenting in November 2014 on the events in Sinqobile, Mark Bruné of Mintails said, “The relationships were not doing well last year. There was a series of civil unrest that led to mobs from communities storming the mining sites, burning vehicles, … There was a real separation between local counselors and the DMR, communities and ourselves.” Bruné recognized that Mintails was not “blameless” for the incident and said the company has since sought to develop a “social license to mine” as well as a legal one. “By taking that on board, we have started to reestablish those relationships,” he said.

Since the riots, Mintails has participated in two forums—at the local municipality and district levels—that have brought government officials, Mintails representatives, and community members together on a regular basis. Sylvan Montshonyane, stakeholder relations manager at the company, explained in 2016 that these mechanisms sought to “identify challenges
faced by the community specific to the mining operations” and to address socioeconomic concerns.577 Mintails has also created an internal unit to manage community relations at Sinopible and beyond and to ensure “the company is more responsive to the needs of the communities around the mining operations.”578 In May 2016, Montshonyane wrote to IHRC that Mintails had “established a very good working relationship and open communication with the key stakeholders” and “improved cordial relations and regular consultations” with the community.579

While the shift in attitude and the establishment of new engagement mechanisms have been positive signs, many people have remained unsatisfied with the situation in practice. Eight months after the riots, residents of Sinopible expressed their dissatisfaction to IHRC. One community leader said that despite resident complaints, “nothing has been done as yet.” He explained that many residents “feel that the mine is not 100 percent honest.”580 Charlie Sowa, also from Sinopible, told IHRC that he still believed that “protesting is the only thing we can do, but other people can be put in danger.”581 In 2016, Liefferink criticized the forum with government and Mintails officials as “very politicized” and said that FSE had not been invited to participate.582

**Tudor Shaft Litigation**

The failure to consult with Tudor Shaft residents before the operation to remove tailings similarly exacerbated existing tensions and led to litigation, whose value has been debated. Nicosi Nathi Sithole of SERI, which has represented residents in one lawsuit, told IHRC in 2014 that engagement with the people of Tudor Shaft had not improved since the suit was filed. “The problem in most cases is that they [i.e., the government] do not want to consult with communities,” Sithole said.583 Six months later, DEA official Werner Eiselen expressed frustration that the litigation was blocking progress on reclamation and remediation. He told IHRC that the plaintiffs “are not playing ball in a constructive manner. They ended up in court is perhaps the laborious way of going about this whole issue, because it doesn’t serve the big picture, it doesn’t help anyone at the end of the day.”584 In October 2014, a Tudor Shaft resident was critical of the government’s failure to consult, but he also seemed frustrated at the impasse that had developed. He told IHRC that litigation “so far can’t get anything for the community.”585 Regardless of whether removal of tailings, relocation of residents, or a third option would be the best approach to addressing the contamination in Tudor Shaft, the lack of meaningful engagement during the decision process contributed to litigation, thus making the situation more confrontational and producing a stalemate instead of a solution.

The inability of community members to participate in decision making has increased tensions, decreased trust, and in some cases slowed efforts to address mining contamination. While

577 Ibid.
578 Ibid.
579 Ibid.
580 Interview with Sinopible residents #1, #2, and #3 (names withheld), Sinopible, October 29, 2014 (statement of resident #2).
581 Interview with Charlie Sowa and Marcus Garvey, Sinopible residents, Sinopible, October 29, 2014 (statement of Charlie Sowa).
582 Phone interview with Mariette Liefferink, CEO, Federation for a Sustainable Environment, May 10, 2016. 
583 Interview with Nomzamo Zondo, Director of Litigation, and Nkosinathi Sithole, Be Just Fellow, Socio-Economic Rights Institute of South Africa, Johannesburg, October 31, 2014 (statement of Nkosinathi Sithole).
584 Phone interview with Werner Eiselen, Deputy Director of Reactive Administrative Enforcement, Department of Environmental Affairs, April 21, 2015.
585 Interview with Tudor Shaft resident #1 (name withheld), Tudor Shaft, November 1, 2014.

mining companies are partly responsible, the government has the primary obligation to promote participation. It should work with communities to design constructive forums for regular contact as well as proper engagement mechanisms for specific projects. The government should ensure that community members can participate in decision making at all stages of the mining process, from proposals for new operations to remediation of contaminated sites. Greater community involvement could enhance efforts to minimize the environmental and health impacts of mining. Community members would bring first-hand knowledge of the situation on the ground, which could inform the design of more effective solutions.586 In addition, they would be more apt to “buy in” to a plan they participated in developing.587 By enabling local people to exercise their rights to both information and participation, the government would fulfill its legal duties and empower historically disempowered communities.
The persistence of the environmental and health problems discussed in this report has largely been attributable to the want of a coordinated and comprehensive government program to mitigate them. Such a program is essential to minimizing the negative impacts of mining effectively and efficiently because the problem is multi-dimensional and dealing with it requires many agencies with different areas of expertise. South African and international law require the adoption of a program to realize the rights discussed in this report, which have been threatened by the presence of acid mine drainage and contaminated tailings in the region.

In its Grootboom decision from 2000, South Africa’s Constitutional Court identified the elements of a so-called “reasonable programme” for progressive realization. The government has failed to meet most of the Court’s criteria when dealing with mining in the West and Central Rand. A complex regulatory regime and frequent restructuring have led to an insufficiently coordinated response. A narrow scope of action, failure to address the needs of those most at risk, and limited attention to environmental concerns have contributed to the incompleteness of government action to date.

Given the severe and ongoing nature of the situation, the government should take immediate steps to rectify the inadequacies of its efforts. In particular, it should develop and implement a national-level program dedicated specifically to reducing the adverse effects of mining in the West and Central Rand. If coordinated and comprehensive, this program would help South Africa protect its communities and their environment, meet the country’s legal obligations, and promote realization of human rights.

**A Coordinated Program**

The first requirement of a reasonable program is that it be coordinated. According to Grootboom, the program should “clearly allocate” responsibility and involve the executive and legislative branches of government “in consultation with each other.” The plethora of executive agencies with overlapping areas of responsibility and the legislature’s frequent amendments to mining laws, however, have interfered with the development of a coordinated program to address mining’s effects in the West and Central Rand.

**Concurrent Competency**

The web of government entities governing mining in the region, combined with their failure to communicate and cooperate, has complicated efforts to protect the environment and human health from AMD and tailings. “Environment in South Africa is a concurrent competency,” explained Grant Walters, director of environmental impact and pollution at the Department of Environmental Affairs. He estimated in 2014 that about nine national and provincial bodies played a role in the regulation of mining, and said that “there is no hierarchy among them.”

A draft of an internal Department of Water and Sanitation policy paper on water management,

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6. A Coordinated and Comprehensive Program

The persistence of the environmental and health problems discussed in this report has largely been attributable to the want of a coordinated and comprehensive government program to mitigate them. Such a program is essential to minimizing the negative impacts of mining effectively and efficiently because the problem is multi-dimensional and dealing with it requires many agencies with different areas of expertise. South African and international law require the adoption of a program to realize the rights discussed in this report, which have been threatened by the presence of acid mine drainage and contaminated tailings in the region.

In its Grootboom decision from 2000, South Africa’s Constitutional Court identified the elements of a so-called “reasonable programme” for progressive realization. The government has failed to meet most of the Court’s criteria when dealing with mining in the West and Central Rand. A complex regulatory regime and frequent restructuring have led to an insufficiently coordinated response. A narrow scope of action, failure to address the needs of those most at risk, and limited attention to environmental concerns have contributed to the incompleteness of government action to date.

Given the severe and ongoing nature of the situation, the government should take immediate steps to rectify the inadequacies of its efforts. In particular, it should develop and implement a national-level program dedicated specifically to reducing the adverse effects of mining in the West and Central Rand. If coordinated and comprehensive, this program would help South Africa protect its communities and their environment, meet the country’s legal obligations, and promote realization of human rights.

**A Coordinated Program**

The first requirement of a reasonable program is that it be coordinated. According to Grootboom, the program should “clearly allocate” responsibility and involve the executive and legislative branches of government “in consultation with each other.” The plethora of executive agencies with overlapping areas of responsibility and the legislature’s frequent amendments to mining laws, however, have interfered with the development of a coordinated program to address mining’s effects in the West and Central Rand.

**Concurrent Competency**

The web of government entities governing mining in the region, combined with their failure to communicate and cooperate, has complicated efforts to protect the environment and human health from AMD and tailings. “Environment in South Africa is a concurrent competency,” explained Grant Walters, director of environmental impact and pollution at the Department of Environmental Affairs. He estimated in 2014 that about nine national and provincial bodies played a role in the regulation of mining, and said that “there is no hierarchy among them.”

A draft of an internal Department of Water and Sanitation policy paper on water management,
which was leaked to the press, stated, “Institutional roles and responsibilities are fragmented, overlapping or vaguely defined.”

At the national level, the bulk of the responsibility has rested with three departments whose missions have sometimes been at odds. The Department of Mineral Resources has approved mining permits and enforced licensing terms. The Department of Environmental Affairs has ruled on appeals filed by affected parties regarding those mining licenses and their terms and has been empowered to respond to any situation that has threatened to cause “serious damage to the environment.” The Department of Water and Sanitation has granted water use licenses. While the agencies’ roles in mining regulation have been intertwined, their goals have diverged. Focusing on economic growth, DMR has sought “to enable a globally competitive, sustainable and meaningfully transformed minerals and mining sector to ensure that all South Africans derive sustainable benefit from the country’s mineral wealth.” DEA, by contrast, has defined its mandate as “[giving] effect to the right of citizens to an environment that is not harmful to their health or wellbeing, and to have the environment protected for the benefit of present and future generations.” DWS, which has also been concerned with human health, has described itself as the “custodian of South Africa’s water resources,” and as “striving to ensure that all South Africans gain access to clean water.” These distinct mandates have led to conflicting priorities and different approaches to addressing the problems associated with mining.

Further complicating the governance system, the mandates of several other agencies have touched on mining and its effects. High levels of radioactivity from mine waste have triggered the involvement of the National Nuclear Regulator because under the 1999 National Nuclear Regulator Act, nuclear facilities can be classified as “nuclear installations.” NNR has described itself as a “public entity” with the duty “to provide for the protection of persons, property and the environment against nuclear damage through the establishment of safety standards and regulatory practices.” Dust from the tailings dams can violate air quality standards and has falls primarily under the authority of municipal governments and provincial departments. Relocation of communities vulnerable to nearby contamination has had the potential to implicate both municipal bodies and the Department of Human Settlements (DHS), whose mission is “to facilitate the creation of sustainable Human Settlements and improved quality of household life.”

As a result of the concurrent competency, a single action or situation can lead to the involvement of multiple government agencies. In 2016, Bashan Govender of DWS explained that a “mine that irrigates its facilities with mine waste water to prevent dust fallout” had to comply with DMR and DEA requirements. It also needed DWS authorization to use water for that purpose. Similarly, if a mine waste facility failed, he said, “DMR [would] respond to this in terms of mine health and safety issues, whilst from the DWS perspective, the risk of water pollution would become pertinent.”

In some cases requiring multiple approvals, the agencies’ mandates have caused them to compete. According to the Saturday Star, the leaked DWS policy paper found that DMR’s mandate to promote mining was “incompatible” with DWS’s obligation to protect water. Suggesting that the proponents of mining frequently won out, the policy paper said, “Mining authorizations often appear to be granted for mines that are in mine-water-sensitive areas. Mining authorizations appear to be granted on an ad hoc basis without the necessary consultations among the relevant government departments.” Consistent with DWS’s mandate, the policy paper called for greater attention to be paid to water pollution. It stated: “It is especially pertinent that the ultimate socio-economic benefit of mining be assessed against potential long-term water resource impacts and that [this] outcome guide the decision on whether to authorize mining activity in sensitive areas.”

The government’s response to the contamination in Tudor Shaft exemplifies both the complexity of the system and the problems caused by its deficiencies in the West Rand. In 2011, NNR recommended relocating selected community members, and Mogale City municipality assumed responsibility for the process. A year later, excessive radioactivity led to the further involvement of NWR, while threats to the environment attracted DEA’s attention. Given the concerns about the living conditions of the remaining residents, representatives of civil society, academia, and government have argued that NWR should have also played a role in finding a solution.

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593 NEMA, No. 107 of 1998, as amended through December 14, 2014, § 43(1) (“Any person may appeal to the Minister for an order by the National Environmental Management: Air Quality Act, No. 39 of 2004, § 36(1).
605 Interview with Werner Eiselen, Deputy Director of Reactive Administrative Enforcement, Department of Environmental Affairs, April 21, 2015.
606 For an overview of the events in Tudor Shaft, see generally Hustny, “Environmental Justice and Human Rights on the Mining Wastelands of the Witwatersrand Gold Fields.” Revue générale de droit.
607 Phone interview with Werner Eiselen, Deputy Director of Reactive Administrative Enforcement, Department of Environmental Affairs, April 21, 2015.
608 See interview with Nonzimbo Zondo, Director of Litigation, and Nkosinathi Sithole, Be Just Fellow, Socio-Economic Rights Institute of South Africa, Johannesburg, October 31, 2014 (statement of Nonzimbo Zondo), Professor Angela Mathie said she believed that DHS should have been more involved both in relocation and in setting policies regarding safe levels of radioactivity. Interview with Angela Mathie, Director, Environmental and Health Research Unit, South African Medical Research Council, Johannesburg, October 31, 2014. Grant Walters and Werner Eiselen of DEA agreed, adding that DEA’s mandate does not extend to social and economic issues. Issie Millimani (materials handling, condition or temporary store or permanently dispose of radioactive material which is intended to be disposed of as waste material”). See also Fourth Respondent’s Answering Affidavit from Sonny-boy Bapela, “Laying Down the Law on Mine Water,” Saturday Star.
609 See interview with Werner Eiselen, Deputy Director of Reactive Administrative Enforcement, Department of Environmental Affairs, April 21, 2015.
Each agency brought different expertise to the situation, but poor coordination impeded development of an effective and efficient solution to the problem. In 2014, DEAs' Eiselen told IHRC that Tudor Shaft was a case in which “cooperative government has failed miserably.” He contended that the different agencies had made decisions without communicating with each other.606 NGOs alleged that national and local government actors dodged responsibility by deferring to each other’s expertise. A lawyer from the Legal Resources Centre explained that the departments all “blame each other and there is no cohesive plan. No one wants to set the precedents, so they pass the buck, in the hope of a better outcome.”607 The reports of the failure to communicate and cooperate in the specific case continued, “We need them [the government departments] to work together … in resolving this whole thing.”608 The reports of the failure to communicate and cooperate in the specific case of Tudor Shaft illustrate the problems of inadequate coordination within the executive branch.

Frequent Legislative Changes

While legislative changes to the regulatory regime are not inherently problematic, in this case their frequency has further interfered with efforts to develop a coordinated program. Since 2003, Parliament’s restructuring of mining and environmental management has shifted the responsibilities of governmental agencies multiple times.609 The adjustments have in turn required that regulations be revised. DMR’s Mosa Mabuza said that amendments have been necessary “to streamline mining license requirements.”610 Grant Walters of DEA, however, criticized the frequent changes for interfering with implementation of an effective program of environmental remediation and enforcement.611 For example, DEA has had to issue three versions of its Environmental Impact Assessment Regulations since 2006, “and these are not minor changes. They are substantial changes.”612 He added that law reform can require increased funding and new training for every department.613

607 Interview with Werner Eiselen, Deputy Director of Reactive Administrative Enforcement, and Grant Walters, Director of Environmental Impact and Pollution, Department of Environmental Affairs, Pretoria, October 30, 2014 (statement of Werner Eiselen).

608 Ibid.; phone interview with Werner Eiselen, Deputy Director of Reactive Administrative Enforcement, Department of Environmental Affairs, April 21, 2015.

609 Interview with lawyer (name withheld), Legal Resources Centre, Johannesburg, October 31, 2014.

609 Interview with Nomzamo Zondo, Director of Litigation, and Nkosinathi Sithole, Be Just Fellow, Socio-Economic Rights Institute of South Africa, Johannesburg, October 31, 2014 (statement of Nomzamo Zondo).

610 Interview with Nomzamo Zondo, Director of Litigation, and Nkosinathi Sithole, Be Just Fellow, Socio-Economic Rights Institute of South Africa, Johannesburg, October 31, 2014 (statement of Nomzamo Zondo).

611 The report is consistent with the amendment of the MPRDA and the expansion of NEA's scope to cover mining activities. These changes were slated to come into effect over a period of time: some in 2013 and some in 2014. The MPRDA was amended in 2005, and NEA has been amended almost a dozen times since it was promulgated in 1998. See MPMDA, No. 58 of 2002, as amended through December 7, 2014, p. 1, introductory paras.; NEA, No. 107 of 1998, as amended through December 14, 2014, p. 1, introductory paras. Further proposed amendments to the MPMDA were in Parliament as of June 2018. See phone interview with Mosa Mabuza, Deputy Director-General of Mineral Policy and Promotion; Andreas Motale, Chief Director of Mineral Management; and Sibongile Maile, Director of Mineral Policy Development, Department of Mineral Resources, June 9, 2018 (statement of Mosa Mabuza).

612 Phone interview with Werner Eiselen, Deputy Director-General of Mineral Policy and Promotion; Andreas Motale, Chief Director of Mine Environmental Management; and Sibongile Maile, Director of Mineral Policy Development, Department of Mineral Resources, June 9, 2018 (statement of Mosa Mabuza).

613 Interview with Werner Eiselen, Deputy Director of Reactive Administrative Enforcement, and Grant Walters, Director of Environmental Impact and Pollution, Department of Environmental Affairs, Pretoria, October 30, 2014 (statement of Grant Walters).


The regulatory instability has also adversely affected local communities. It has exacerbated the challenges of assisting residents of the region. DEA official Werner Eiselen contended that “legal form of helping people in the West and Central Rand is completely hampered by this administrative mess.”615 In addition, the amendments to existing laws have created uncertainty among civil society advocates. For example, an LRC lawyer told IHRC in 2014 that she was “completely confused” about the revisions. She said, “The [Mineral and Petroleum Resources Development Act] was amended in 2002 and 2008. In 2008 it was amended with [the National Environmental Management Act (NEMA)]. … [NEMA] was amended again this year so no one knows where we are. They left different departments in charge.”616 According to this lawyer, NGOs have not been the only ones affected by the lack of clarity. She said, “Everybody is in a state of confusion, including the industry.”617

While the amendments may have been well-intended reforms, the frequent changes have compounded the administrative problems within the executive branch.618 They have also suggested the need for better coordination across branches of government. Coordination between the executive and legislative branches, required by Grootboom, could help the government settle on a structure for dealing with mining that minimizes the need for further regulatory changes and provides administrative stability.

A Comprehensive Program

Under South African law, a reasonable program to realize the human rights endangered by mining in the West and Central Rand must be comprehensive as well as coordinated. According to Grootboom, to fit that criterion, the program should encompass short- and long-term actions, help those with the most urgent needs, and be “balanced.”619 South Africa’s efforts to decrease the harm in the region have fallen short on all three counts.

Limited Scope of Action

The response to the situation in the West and Central Rand has not been comprehensive in scope. Grootboom requires the government to provide for short-, medium-, and long-term needs.620 Despite a slow start, the government has recently made progress in dealing with some pressing needs, most notably in the form of water treatment plants to neutralize and stop the decant of AMD and the relocation of some Tudor Shaft residents. It has neglected, however, to ensure systematic implementation of other interim measures, such as controlling dust through irrigation or vegetation.

As described earlier in this report, long-term planning has been even more limited. As of mid-2016, the government had just begun to take concrete steps toward desalination of contaminated water, which is necessary to protect South Africa’s environment and water resources.
supply.623 It had also played a minimal role in the development of plans to address the under-lying cause of dust, i.e., the omnipresent tailings dams. Industry has driven discussions of moving the polluted soil to isolated mega dumps.623

Inadequate Attention to At-Risk Communities

The government’s response to the adverse effects of mining in the West and Central Rand has also fallen short because it has not adequately addressed the needs of those who face the greatest threats. Grootboom states that a reasonable program must be sure to address those who are the most affected and whose ability to enjoy all rights therefore is most in peril.624 The people most affected by mining contamination in the region have belonged to disadvantaged communities. As discussed in Chapters 3 and 4, residents of informal settlements, such as Bekkersdal and Tudor Shaft, have faced especially high health risks from AMD and polluted tailings, respectively. Those living in relatively poor formal settlements, including Sinqobile and Riverlea, have experienced breathing problems from dust stirred up by mining and remediation activities. The impacts of mining have not been limited to such communities. Minalore, for example, a middle-class Afrikaner town, has also been exposed to contaminated dust. Members of poor and disempowered communities have borne the brunt of the burden, however, and their already difficult living conditions have exacerbated the impact of the pollution. In most cases, these residents have had few options to relocate; had limited capacity to protect themselves from contamination, such as by using alternative water sources; lived in poorly constructed homes that allow AMD and dust to enter; and been less likely to have access to good medical care. With the exception of moving a small number of residents from Tudor Shaft, the government has not adequately addressed the preventive and remedial needs of these people.

Imbalanced Approach to Mining Regulation

The structure created by the 2014 amendments to NEMA seems to be biased toward the mining industry. As the amendments are implemented, this imbalance could create obstacles to environmental protection and in turn interfere with realization of the human rights to health, water, and a healthy environment. Despite the widespread impacts of mining waste, including in the West and Central Rand, the 2014 rules reduced the regulatory role of environmental experts and granted greater authority to DMR.625 According to DEA’s Werner Eiselen, “DEA has been moved out of the picture in respect to mining.” He explained that while DEA can express opposition to a project and DMR should consider its views, DMR is not bound to heed DEA’s advice.626 Eiselen told IHRC he has been troubled by the development: “There are some concerns about [this arrangement] because the objective for DMR, its reason for existence, is to ensure economic growth and exploit natural resources. Protection of the environment and pollution control are not on their radar screen, I don’t know how … [environmental protection] will happen. … I’m not optimistic.”627 Without adequate input from environmental experts, the adverse effects of mining in the West and Central Rand could linger or even increase.

Part of the rationale behind the 2014 amendments, known as the “One Environmental System,” was to simplify and expedite the licensing process by placing most of the steps under the authority of one agency.628 Mosa Mabuza of DMR praised the system for setting a 300-day limit on the government’s consideration of mining license applications.629 His colleague Andreas Moatshe said that while the approval process used to take a long time, there was an “advantage to having government departments collaborate. It is going very well, and we expect … henceforth to improve service to the community.”630 Improving coordination related to mining regulations could arguably have additional benefits. Sibongile Malele, DMR’s director of mineral policy development told IHRC, “Protection of the environment and human health needs collaboration between all stakeholders.”621

Werner Eiselen of DEA had a different opinion of the efforts to simplify licensing. He acknowledged that the old system could be slow because “you have two different agencies fighting over a matter,” but he noted that there were important benefits to having advocates for both the environment and economic development. He said, “I don’t see how it actually can work if you have everything in one place. It’s great for someone who wants to start mining quickly, but very bad for environmental protection.”631 Even though the changes streamlined the licensing process, a representative of at least one mining company had reservations about DMR’s increased role. He told IHRC, “I think everything should fall under the [DEA].”632 Regardless of how the legislation allocates responsibilities, it should ensure that the environmental perspective is adequately taken into account in any comprehensive program to deal with mining’s impacts.

Elements of a Reasonable Program

A reasonable program, modeled on that described in Grootboom, would represent the most efficient and effective solution to dealing with the impacts of mining in the West and Central Rand. While South Africa has taken some steps toward addressing the harm from the industry, it should strive for a program that is more coordinated and comprehensive.

To enhance coordination, such a program should establish an administrative focal point for design and implementation. Whether a committee or an individual, this focal point should bring a balanced view and organize the actions of all relevant players, including government officials, community leaders, and experts in environmental protection and health. This individual or committee would work with mining companies to ensure that their activities are conducted in a manner that minimizes environmental harm and complies with all relevant laws and regulations.

620 Email from Bashan Govender, Assistant Director, Department of Water and Sanitation, to IHRC, June 2, 2016.

621 For further discussion, see Chapter 4 on Talings.

622 Grootboom, para. 44. The Constitutional Court quotes and rephrases this part of the Grootboom holding in its judgment in the Treatment Action Campaign case. It finds that a government policy denying HIV-positive mothers access to an antiretroviral drug that could prevent transmission of the disease to their babies was unreasonable. The Court explains, “[I]t must be kept in mind that this case concerns particularly those who cannot afford to pay for a medical service. … There is a difference in the positions of those who can afford to pay for services and those who cannot. State policy must take account of these differences.” Minister of Health vs. Treatment Action Campaign (2000) 2 ZACC 15, 2002 (2) SA 721, 2002 (16) BCLR 1050 (CC), paras. 68-70.

623 See National Environmental Management Laws Amendment Act, No. 25 of 2014, p. 2, introductory paras., declaring that the amendments intend, inter alia, to make DMR “the competent authority for environmental matters in so far as they relate to prospecting, exploration, mining or production of mineral and petroleum resources” as well as the licensing authority for purposes of the National Environmental Management: Waste Act; ibid., s. 17 (granting DMR the power to implement NEMA and grant environmental authorizations for prospecting, exploratory mining or operations); and prohibiting further legislative amendments unless the Proposed Amendments are approved by DEA, DMR, and DWA. See also Department of Environmental Affairs, “Government’s One Environmental System Commences” (discussing changed responsibilities).

624 Phone interview with Werner Eiselen, Deputy Director of Reactive Administrative Enforcement, Department of Environmental Affairs, April 21, 2015.

625 See National Environmental Management Laws Amendment Act, No. 25 of 2014, p. 2, introductory paras., declaring that the amendments intend, inter alia, to make DMR “the competent authority for environmental matters in so far as they relate to prospecting, exploration, mining or production of mineral and petroleum resources” as well as the licensing authority for purposes of the National Environmental Management: Waste Act; ibid., s. 17 (granting DMR the power to implement NEMA and grant environmental authorizations for prospecting, exploratory mining or operations); and prohibiting further legislative amendments unless the Proposed Amendments are approved by DEA, DMR, and DWA. See also Department of Environmental Affairs, “Government’s One Environmental System Commences” (discussing changed responsibilities).

626 Phone interview with Werner Eiselen, Deputy Director of Reactive Administrative Enforcement, Department of Environmental Affairs, April 21, 2015.

627 Ibid.

628 Department of Environmental Affairs, “Government’s One Environmental System Commences.” See also phone interview with Werner Eiselen, Deputy Director of Reactive Administrative Enforcement, Department of Environmental Affairs, April 21, 2015 (under the old system, “[i]t [was] difficult for the [license] applicants and from a business development perspective because the timeline [was] so long to get authorization.”).

629 Phone interview with Mosa Mabuza, Deputy Director-General of Mineral Policy and Promotion; Andreas Moatshe, Chief Director of Mine Environmental Management; and Sibongile Malele, Deputy Director of Mineral Policy Development, Department of Mineral Resources, June 9, 2016 (statement of Mosa Mabuza).

630 Ibid. (statement of Andreas Moatshe).

631 Ibid. (statement of Sibongile Malele).

632 Phone interview with Werner Eiselen, Deputy Director of Reactive Administrative Enforcement, Department of Environmental Affairs, April 21, 2015.

633 Skype interview with senior official of mining company in the region (name withheld), December 4, 2014.
entities, communities, industry, and civil society. Legislative support would be necessary at every stage in order to provide structural stability and earmark necessary resources.

To be comprehensive, the program should ensure that the government not only pursues immediate preventive and remedial actions, but also articulates strategies for eliminating problems in the long run. It should devote special attention to meeting the needs of the most vulnerable communities. The program should emphasize mitigation of environmental and health concerns without neglecting the need for economic growth.

Efforts to improve the situation in the West and Central Rand would benefit further from a holistic perspective that informs the coordinated and comprehensive program just described. Such a perspective would illuminate how the various issues raised in this report intersect. It would take into account the connection between AMD and tailings and how proper storage of tailings can reduce the flow of AMD. It would recognize the importance of linking efforts to protect the environment and human health with those to engage communities; such integration would increase community support for any actions, improve relations among the relevant players, and potentially lead to the design of more successful plans. By giving the government an overarching understanding of the problem, a holistic view would also help it better prioritize tasks and marshal its financial and human resources. Ultimately, adoption of a national program that meets these standards would enable South Africa to minimize the adverse effects of mining on communities in the West and Central Rand and advance the realization of residents’ human rights.

Acknowledgments

Bonnie Docherty, senior clinical instructor and lecturer on law at the Harvard Law School International Human Rights Clinic (IHRC), was the lead researcher and writer of this report. Harvard Law students from IHRC contributed significantly to the research and writing of this report and joined Docherty on each of the field investigations. The 2014 team consisted of Daniel Carpenter-Gold, Jennifer Garnett, and Kurt Krieger. The 2012 team consisted of Maia Levenson, Ruchi Parekh, and Misty Wright. The 2010 team consisted of Kyle Dandelet and Giovanni Mejia.

Other members of IHRC also made important contributions to the project. Meera Shah, then clinical advocacy fellow, co-supervised the 2012 project and field research trip. Cara Solomon, communications manager, conducted interviews on the 2012 trip. Clinical Professor Tyler Giannini, co-director of IHRC and the Human Rights Program, edited and reviewed the report. Additional assistance was provided by Katherine Talbot, IHRC program coordinator, and clinical students Mana Azarmi, Ben Collins, Michelle Ha, and Shannon Smyth.

IHRC is grateful to Mariette Liefferink, CEO of the Federation for a Sustainable Environment (FSE), for her informative tours of the region, endless patience with our questions, and helpful comments on the report. IHRC greatly appreciates the interpretation and logistical assistance provided by Tsholofelo Barnard, also of FSE. IHRC further wishes to thank Frank Winde, chairperson of Geography and Environmental Studies at the School of Basic Sciences, North-West University, for reviewing the scientific segments of the report.

Finally, IHRC expresses its gratitude to the many individuals who shared their experiences and expertise during interviews for this report.
The Cost of Gold: Environmental, Health, and Human Rights Consequences of Gold Mining in South Africa’s West and Central Rand

Gold mining has brought risks as well as riches to South Africa’s West and Central Rand. This region, encompassing Johannesburg and its environs, contains one of the largest gold deposits on earth. The extraction of this resource has left a dangerous legacy.

Based on more than 200 interviews and in-depth desk research, The Cost of Gold illuminates the environmental and health consequences of gold mining. In particular, it shows how the industry’s adverse effects have compromised South Africans’ human rights.

Gold mining has contaminated water, soil, and air with elevated levels of heavy metals, including uranium. Local people have been exposed to acid mine drainage when using local waterways for agriculture, laundry, or recreation. Residents have also inhaled dust from toxic and radioactive mine waste dumps, known as tailings dams.

While the government has taken some noteworthy steps to address the situation, its response has generally been slow and insufficient. It has not fully met its obligations to ensure that South Africans in the West and Central Rand can exercise their rights to health, a healthy environment, water, and housing.

The government has also failed to engage adequately with affected residents, thereby infringing on their rights to information and participation. Community members have received limited warning of the threats they face and been denied a voice in decisions regarding new mining operations and efforts to address the impacts of old ones.

The Cost of Gold calls on the South African government to adopt a coordinated and comprehensive program to deal with the crisis in the West and Central Rand. Such a plan should both mitigate the environmental and health effects of mining and help the country meet its responsibilities under national and international human rights law.