Confronting gold mine acid drainage: art as counter-activity

by

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FORM A

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SUMMARY

Title of mini-dissertation: **Confronting gold mine acid drainage: art as counter-activity.**

Name of student: **Louise Kritzinger**

Supervisor: **Pieter Swanepoel**

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KEY TERMS:

Acid Mine Drainage (AMD): Acid Mine Drainage is an acidic solution of heavy metals and water, resulting from the chemical reaction between iron pyrites found in certain underground rock and oxygen. This chemical reaction is caused by mining activities exposing oxygen to an underground environment.

Environmental art: Art relating to the individual's response, understanding and interest towards the land, including art forms such as Land/Earth art as well as more sensitive art forms such as Eco-art, focussed more on the earth's natural processes.

Exploitation: The exploitation of mineral resources is closely associated with progress and success, but also that of benefiting from something at the cost of something else, in this case exploiting gold at the cost of the ecology of the natural environment.

Gold mining industry: The labour-intensive activity of removing gold from ore, mined from deep within the earth's crust through a system of shafts and stopes.

Installation art: Refers to what is contested as being a medium or process of art, whereby three-dimensional works are designed to influence the perception of a space, often site-specific, within an enclosed space or the outside environment, temporary or permanent. The found object or existing object is often used in installation art for its intellectual value.

Inter-and-trans-disciplinary approach: The utilisation and collaboration of different disciplines as a means to find a solution to a (environmental) problem.

Landscape: A cultural construct, referring not to physical topography, but to an aesthetically processed vision of the environment, mostly arranged and framed by an artist.

Post-industrial environment: Referring to an environment, man-made or natural in a state preceded by industry. Often these environments are characterised as polluted and derelicts sites left behind by large mining industries. The gold-mining industry on the Witwatersrand, is characterised by massive tailings dumps and slimes dams.

Resource curse: A term coined by artist Jeannette Unite, describing the phenomenon of extreme poverty co-existing with valuable minerals in the same region, especially prevalent in Africa.

Technospasm: A term conceptualised by archeo-metallurgist Duncan Miller, as the unsustainable rate of non-renewable mineral resources extraction.

South Africa is known to the world for its vast deposits of valuable minerals, of which gold has played a seminal role in the development of the country's economy. What is left after more than 120 years of mining for this precious metal is a landscape, better described as a derelict post-industrial environment, characterised by pollution and impoverished communities. Environmental degradation caused by mining industries is not unique to the African continent, but is a worldwide phenomenon.

Due to the rapid deterioration of environments caused by mining and industry, new environmentalist attitudes became prevalent by the 1970s in the West, seeking change in attitudes towards the land. Along with earth activists, artists also started to question humankind's destructive relationship towards the land. Apart from the early developments of Land/Earth art during the 1960s, artists have taken on roles of activists, interventionists and collaborators of multi- and interdisciplinary projects since then, in order to remediate and re-cultivate post-industrial sites. Environmental artists find value in what art holistically contributes to society, as opposed to the commodity value of art.

While artists in the West significantly progressed in environmentally orientated art, South African artists focused more on responding to the socio-economic conditions induced by the long-standing Apartheid era. Few South African artists have attempted to engage in environmentally-concerned art, especially related to the mining industry. However, Western attitudes towards the land can be derived from South Africa's landscape depictions since its colonisation by Europeans up to contemporary versions of the South African landscape environment today.

This study provides a historic overview of South Africa's aesthetic relationship with the mining landscape, specifically of the post-industrial sites situated in the Witwatersrand. The aim is to determine the South African artists' contribution towards developing an environmental awareness, and to call for more artists to take part in visual art forms concerning the disruption of the environment, caused by the mining industry.

The study determines the relevance of art as a means to raise environmental issues and whether art may be utilised for post-industrial remediation projects. International examples of Reclamation art projects and its incorporation of science are investigated to find solutions towards contaminated post-industrial sites. These examples are compared to the work of a small number of South African artists who have attempted to engage in the post-industrial mining environment through Earthworks and science.

The researcher's own work is discussed to raise awareness of the adverse effects of Acid Mine Drainage (AMD) caused by the gold-mining industry in the Witwatersrand. A body of installation art produced for this degree was displayed in a gallery space, which presented a platform for audience engagement. Through this body of work and through the examples discussed in this dissertation, the researcher urges South African artists to take up the task of moral responsibility towards the environment for the survival of future generations of life on earth.

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CHAPTER ONE: INTRODUCTION

This study deals directly with the adverse effects of Acid Mine Drainage (AMD)[1] as induced by the gold mining industry in the Witwatersrand of South Africa. The issue of AMD is addressed through the medium of visual art. The researcher's artwork is set to function as an 'eco-vention' and the aim is to alert people to the issue. In so doing these artworks contribute to potentially restore the environment. The researcher practices her own art in a traditional art context, namely a gallery setting, which serves as a platform for audience engagement and public awareness.

The research for this study includes both international and South African artists who have attempted to engage with post-industrial mining environments.

1.1 Background of study

South African academic Wendy Ross (2008:186) indicates a lack of South African artists' involvement in environmental art initiatives in a paper entitled *The Greening of art: ecology, community and the public domain.* Ross' research reveals a knowledge gap concerning artists' involvement with environmental art, and creates an opportunity for further research in this regard. Therefore, the excesses of environments in South Africa that are being affected by pollution, such as the post-industrial sites of the country's gold mining industry, have become the subject of this study.

South Africa is the most industrially advanced state in Africa, mainly because of its considerable deposits of mineral wealth (Eales 2007:197).[2] The country holds the world's greatest goldfield, namely the Witwatersrand[3] Basin, which was discovered in 1886.[4] After

[1] Scientifically Acid Mine Drainage (AMD), is the acidic water, which is high in dissolved heavy metals, surging from disused shafts of abandoned mines (usually coal and metal mines), suffocating streambeds with orange sediment and killing off life at the bottom of the food chain in streams and rivers (Comp 2003:2).
[2] It was discovered in 1924 that South Africa holds the greatest deposits of platinum-group metals on earth in the Bushveld Complex. More than half of the world's resources of chromium, 60 percent of its vanadium and a vast amount of untapped titanium are also held in the Bushveld Complex (Eales 2007:197).
[3] The Witwatersrand Goldfields lie within a portion of the interior plain, known as the Highveld, which contains southern Gauteng and a large part of the Orange Free State (Jeppe 1946:35).

120 years of exploitation, South Africa remains a barren post-industrial environment. Universally, mines follow a predictable pattern from exploitation to depletion to finally abandonment (Bourdon 1995:77). A 2012 report reveals that South Africa's natural environment has deteriorated more rapidly in the past twenty years than any other country in the world (Environmental Performance…2012:[sp]).[5] There are currently more than 6000 derelict mines in South Africa, with which government does not know how to deal (Mine dumps…2008[sp]).

In the past mining companies did not know that their mining activities would result in future environmental predicaments, which would over time poison the underground water of an extensive area with AMD. The affected area reaches from the East Rand Basin through central Johannesburg (Central Basin) to the Far West Rand Basin. Since life depends on water (a commonplace substance often taken for granted as being readily available in a clean and cheap form) (Lee Ray 1995:299), it is disturbing that South Africa is a semi-arid country, which is facing a possible shortage of clean water as early as 2030 (Freshwater programme 2008:1). In an article published in 1923 Geologist Ernest Schwartz predicted that once all mineral deposits in South Africa are exploited, the only remains would be the "enormous debt of the country that will fall upon the shoulders of the impoverished sons of the soil" (Schwarz 1923:221).

The environmental degradation in South Africa is clearly a cause for serious concern despite the fact that political and economic strategies are in conflict with these concerns. This condition, however, is not unique to South Africa, as environmental degradation and pollution are believed to destroy countries worldwide. In their quest for dominance, modern humans have conceptualised and defined nature as "aesthetic real estate", to be manipulated, disrupted and rearranged, in order to establish man's superiority over nature (Grande 1994:54). Despite human inhabitants' apparent disregard for the environment, artists have started questioning humankind's relationship towards the earth. Artists are taking up roles as activists, interventionists and collaborators. Likewise, they are often re-

[4] Approximately 45 percent of all mined gold on earth originates from the Witwatersrand Basin (Tempelhoff 2008c:[sp]).
[5] The study was conducted by scientists from Yale University and Columbia, in collaboration with the World Economic Forum (Environmental Performance…2012:[sp]).

cultivating derelict industrial land, former mining areas and rubbish dumps in order to effect change in the world-view of society.

1.2 Research question

The research question of this mini-dissertation is based on the premise that there is a lack of South African artists who create environmentally-concerned art that specifically relates to the industry of non-renewable resource extraction.

Although a strong historical background exists on Western environmental art developing mainly in America, South Africa does not have a well documented history regarding ecological art discourses (Ross 2008:186). Very little literature exists on the topic, which creates a set of research challenges. Lack of written sources does not mean there is no oral tradition on historical attitudes of sensitivity toward the South African environment or that environmental art is not being produced.

South Africa however has a rich history in landscape depiction, mainly through the medium of painting, which the researcher would argue is a strong foundation to start one's quest into the development of an environmental aesthetic in South African art. In addition, South African artists and theorists have also contributed substantially towards activism, although the discourse has largely been dominated by the response to socio-political conditions of apartheid, specifically regarding issues of colour and gender relating to individual identity (Perryer 2004:6). Curator Khwezi Gule confirms that a situation is still prevalent where other significant issues are excluded from the discourse (Perryer 2004:9).

The research question is to determine whether artists have contributed to create environmental awareness on the disruption of the mining industry and its adverse effects on the surrounding environment. This study will also question whether South African artists have attempted to confront the negative impacts held responsible by the gold mining industry of the Witwatersrand within the limited scope of documented knowledge. For both the above questions it is important to establish, by means of a qualitative study, how artists have proceeded to create such work.

Furthermore, the study will determine whether environmental art is an effective way to raise complicated environmental issues and to establish whether environmental art may be utilised for post-industrial remediation projects. In order to do this, it is imperative to investigate how artists' perceptions and attitudes have changed towards nature, especially since the rise of environmentalism in the West during the 1960s.

The researcher's own practice-led research into AMD in the Witwatersrand will question the nature and history of the environmental problem. The aim is to gain an in-depth understanding of this human-induced problem. Such an understanding will subsequently enable the researcher to draw her own assumptions on the matter.

1.3 Aims and objectives of study

The researcher will aim to demonstrate that a real need exists for contemporary South African artists to become involved in ecologically concerned art that contributes towards the development of an environmental consciousness. Such an involvement will promote an attitude change in the public sphere towards non-renewable resources such as gold.

The researcher furthermore aims to prove that artworks are an effective means of creating awareness, as opposed to other forms of social protest and visual communication. The researcher's own art practice attempts to address this aspect by creating works of art, that are aimed at raising awareness about the AMD caused by the gold mining industry in the Witwatersrand and the effects of heavy metal poisoning on the environment and human health. The researcher will also endeavour to prove that environmental art can be employed as a successful means to rehabilitate polluted post-industrial environments, and to find feasible solutions to complicated matters such as AMD.

1.4 Theoretical framework

Ever since the 1960s, artists, art critics and art theorists within the developed world have all played a dynamic role within the discourse of environmental art, Land art and ecological art. In addition, the sector of environmental aesthetics has slowly grown (Brady 2007b:257). Against the background of environmental aesthetics, ecological aesthetics provides a conceptual and practical framework. Key definitions include: "*Art* is what the artist does, in relationship to the authorising response of art institutions"; "*Aesthetics* is the

philosophy of ideas and physical perceptions that informs experience"; and "*Ecology* is the integrated analysis of communities of organisms, the earth's living systems" (Collins 2004:170).

1.5 Review of literature and visual texts

Land art played its part in the abrupt shift from modernism to postmodernism, predominantly due to the way in which postmodernism categorised both 'nature' and 'culture' as "socially constructed or fictional ideas" (Kastner & Wallis 1998:23). Feminist critique emerged in the late 1960s and must be identified as a seminal force behind the decline of modernist canons, profoundly adjusting the path of post-war cultural discourse and practice (Kastner & Wallis 1998:15). A 1980 essay written by Lucy R. Lippard and titled *Sweeping exchanges: the contribution of feminism to the art of the 1970s*, claims that "feminists are more willing than others to accept the notion that art can be aesthetically and socially effective at the same time" (Lippard 1980:364). Art forms include performance along with interventionist positions towards various social concerns, embracing issues of ecology[6] such as waste treatment, and conducting environmentally conscious actions (Kastner & Wallis 1998:14).

In *Mapping the terrain: New Genre Public Art* (1995) Suzanne Lacy identifies key artists in the field of ecological art who are eco-artists with the community in mind. Engagement and collaboration are critical to this aesthetic language known as "new genre public art", to differentiate it not only in form, but also intent, from what has been known as "public art" (Lacy 1995a:19). New genre art includes installations, performances, conceptual art, environmental art, mixed-media art, along with combinations of different media in order to attack boundaries. Lacy (1995a:43) reviews new genre public art as a call "for an integrative critical language through which values, ethics, and social responsibility can be discussed in terms of art". In terms of the artist's role in a post-industrial environment, the researcher identifies this call as the essence of this study.

[6] Feminist artists drew a clear link between the earth and the female body, with ritualistic performances tied directly to ecology, through gestural works involving the body as an intimate extension of the earth (Kastner & Wallis 1998:34).

Through the years artists developed different ways to interact with the environment. This resulted in a variety of attitudes, ranging from ecological indifference to ecological activism (Auping 1983:94). *Art in the land. A critical anthology of environmental art*, edited by Alan Sonfist (1983), distinguishes two spectrums of artists: at one end are the traditional "earth moving" artists, who make use of bulldozers and dump trucks to create their monumental art pieces in so-called "unoccupied open spaces"; at the other end of the spectrum are those artists who merely touch the surface of the land, changing it as little as possible. These artists are mainly interested in bringing about an awareness of nature and the earth (Sonfist 1983:xi).

Godby (2010), Donovan, Fiske, Beardsley & Kemp (2010), Tufnell (2006), Prigann, Strelow and David (2004), Kester (2004), Kastner and Wallis (1998) Bourdon (1995), Andrews (1999), Grande (1994), Gablik (1991), Beardsley (1984) and Lippard (1983), are seminal sources that discuss the foundations of Land and environmental art. These sources also identify strategies and tendencies on differing ranges of pioneering Earth artists along with more recent examples of ecological artists. These texts enable the researcher to draw essential comparisons and inferences of artists in order to study artists' attitudes towards the environment.

Maskit (2007:324) claims that we need a "mixed aesthetics", which means that we cannot accommodate only talks about preservation, but also talks of restoration. Prigann, Strelow and David (2004) contribute towards the development of a post-industrial aesthetic with their approach to ecological aesthetics, since their book focuses almost exclusively on post-industrial environments and restoration of these environments. This also calls for an aesthetics of sustainability, which Kurt (2004:239) stresses will inevitably be an aesthetics of participation. An aesthetics of participation applies to the researcher's own art practice, which Suzi Gablik labels "connective aesthetics", which is interactive and can only be truly successful through communication, of which listening is a key component (Lacy 1995a:36). This form of 'social aesthetics' refers to what Nancy Holt calls a "necessary aesthetics", which requires art to be integral to society (Kastner & Wallis 1998:33). Berleant (2005:26) prefers to speak of an "aesthetic of engagement". An aesthetic of participation and engagement essentially includes the use of metaphors and the

positioning of symbolic relationships which stimulate viewers' imagination and participation.

The book edited by Sophie Perryer, titled *10 years 100 artists. Art in a democratic South Africa* (2004) provides a starting point into the search for relevant South African artists. Michael Godby's *The lie of the land. Representations of the South African landscape* (2010), is also a source of artists who had engaged with the South African landscape through the course of history, including the mining landscape. Literature, such as *On the mines* by David Goldblatt and Nadine Gordimer (1973), as well as David Robbins' *Wasteland* (1987*)*, contributes toward a unique perspective of the post-industrial landscape of Johannesburg, where the notion of the sublime from within a post-industrial context is revealed.

In the researcher's quest for artists, she attended key exhibitions such as *Water, the [delicate] thread of life* (2011), curated by Marion Dixon, where artworks such as Willem Boshoff's *Walking on Water* (2011) and Karel Nel's *Reflective Field* (2011) were encountered. Strijdom van der Merwe's *Drawing clouds in the Karoo* (2012), also poses strong similarities to the researcher's own work, both in terms of topic and installation as format. In this respect, *Installation art in the new millennium: the empire of the senses* (2003), by Nicolas de Oliveira, Nicola Oxley and Michael Petry, and Mark Rosenthal's *Understanding installation art: from Duchamp to Holzer* (2003) are seminal sources concerning installation art. While Rosenthal considers installation as a medium, de Oliveira et al (2003:14) define it as a process, which has led artists to work in non-traditional materials and methodologies.

The researcher's own practice-led research employs sources directly related to the geological history of gold, such as Carl Jeppe's *Gold mining on the Witwatersrand* (1946) and Hugh Eales' *Riddles in stone: controversies, theories and myths about Southern Africa's geological past* (2007). In addition, scientific information on AMD was derived from numerous scientific reports and newspaper articles.

1.6 Research methodology

The research for this study consists mostly of historical research which is applied to examples obtained from literature. As discussed in the Literature review, the study also contains other areas of visual information, such as exhibitions.

The researcher's qualitative research leads her to employ the method of participant observation, by involving herself with scientist Dr Francois Durand and his co-workers in their AMD research. The researcher intends to aid them in their research, by means of sample collection and by taking photographs, in order to become a co-worker. Through this method, the researcher will be able to gain a closer insight into the motivations and perspectives of the scientists.

Finally, an ethical enquiry relating to the ethical problems associated with AMD and the devastation of the environment is confronted in this study. The enquiry relates to the notion of responsibility and the obligation of the artist towards his/her environment. James Sterba's *Earth ethics: environmental ethics, animal rights and practical applications* (1995), is consulted for this, as well as Aldo Leopold's influential *A sand country almanac* (1966).

1.7 Overview of chapters

Chapter One outlines the main aim of the study, namely to establish that South Africa is a country in need of artists to promote environmental awareness due to the adverse effects of industry on its natural environment. The researcher has shown awareness that South Africa is indeed a country with no substantive body of artists that actively pursue ecological art by profession. As a result it is difficult to give a detailed account of ecological art in South Africa, without drawing heavily from Western art in the field of environmental art and environmental aesthetics.

This chapter provides background on the development of environmental art and environmental aesthetics, which is a relatively new division of philosophical aesthetics. The scope of this study is predominantly on artists working on matters of industry and post-industrial landscapes. The study will not enquire further on the developments of feminism, performance or environmental art that deal with issues other than industry (for example, urban household waste or recycling).

Chapter Two focuses on the historical progression of environmental art, tracking the initial response of the artist towards the land. The focus of the first section of this chapter is on early pioneering artists in the field. Criticism from art critics and environmental aestheticists will be consulted along with arguments put forth by the artists themselves, which will form the basis of the discussion. Examples of South African art that apply to arguments raised in this section will be discussed, namely Earthworks by Strijdom van der Merwe and environmental art by Georgia Papageorge, Clive van den Berg and William Kentridge in collaboration with Doris Bloom. The researcher will relate such argumentation to South African landscape depiction as a source of information on matters of industry. Reference will be made here to examples of early South African landscape painting, such as Hendrik Pierneef as well as to more contemporary works by Alan Crump, David Goldblatt and William Kentridge, which specifically deal with gold mines on the Witwatersrand.

The second half of **Chapter Two** investigates the 'paradigm shift' that took place during the course of fifty years, from the early Earthworks to a much more sensitive approach by artists to be considered as ecological art. The important contribution of science towards art is also examined as it is revealed in the cognitive approach of environmental aesthetics. The artists examined here are a diverse group, involved in groundbreaking scientific research and individuals forming collaborations in inter-and-trans disciplinary fields, along with communities, in order to find the best solutions to real environmental problems. South African artists here include Karel Nel and Jeannette Unite, as artists working alongside scientists.

Chapter Three deals exclusively with the researcher's own work and the selected environmental disruption, namely AMD from the gold mines of the Witwatersrand as the primary source of water contamination in the region. The researcher's artworks are mainly sculptural installations presented in the context of the gallery. The gallery crafts the context for developing environmental awareness, not only by means of the artworks themselves, but also via a catalogue containing written statements on each work. A walkabout for the exhibition is also provided, in collaboration with Dr. Durand. This section offers an occasion to discuss the effectiveness of this kind of art by presenting the viewer with an opportunity for contemplation.

Chapter Four confirms that transformation has taken place in environmental art. Since its inception in the 1960s in America, environmental art has become a movement taken up by artists all over the world, including South Africa. This chapter discusses South African artists who have contributed towards the South African history of environmental art. It is demonstrated that an environmental consciousness is slowly starting to take shape in South Africa. This trend is not only revealed by individual artists, but also by key exhibitions in recent years. This chapter also reveals that despite the rising environmental consciousness, South African artists have mostly failed in recognising and taking up specific and complex environmental issues, especially related to mining, such as AMD. It is concluded that in the wake of political reform and the looming danger of the nationalisation of the mines, the time seems to be readier than ever for South African artists to take up responsibility for the future of their country.

CHAPTER TWO: ENVIRONMENTAL ART

According to Hargrove (1979:210) modern American environmentalist attitudes originated from centuries of adjusting attitudes[7] towards the natural world. Such attitudes are closely associated with developments in the natural history sciences of botany, biology and geology, as well as the arts, specifically in landscape painting, poetry and travel literature of the nineteenth-century.

Lipton and Watts (2007:91) explain that environmental art is a broad term associated with activism. It is a response to the growth of environmentalism. Created in the United States with Thoreau and promoted by Muir during the 1960s,[8] it gathered support and artists along the way to become a movement by the end of the decade. According to Kastner and Wallis (1998:23), the approaches of eco-activist and eco-artist can be traced back to the phenomenon of Earth art or Land art, an essentially American art form, which was initiated by a small number of committed conceptualists disillusioned with the "modernist endgame". They aspired to evaluate the power of the artwork cut off from the "cosmopolitan commodifications" of the white cube[9] gallery system (Kastner & Wallis 1998:12). The term 'Land art' is variably loaded and intricate. It was first used to categorise works that were produced outdoors in nature with natural materials, which grew to incorporate ecological art and environmental art (Bourdon 1995:221). The development of Land art involves several formerly established and diverse art forms, such as Conceptualism and the installation and performance art of the 1960s (Lintott 2007:263). All work mentioned here has as its nucleus the land with the individual's response, understanding, interest or conception, which stems directly from the natural environment or its functioning processes (Wechsler 1983:261).

Ecological art emerged from the environmental art movement and appeared on the horizon as a paradigm shift in how we define what art is. Ecological art proposes solutions

[7] Some of the first appreciative attitudes towards nature can be traced back to the early eighteenth century between 1725 and 1730 in landscape gardening and poetry (Reynolds 1966:328).
[8] Between Rachel Carson's ecological rallying call in *Silent Spring*, published in 1962 and the first Earth Day commemoration in 1970, environmental consciousness was forever altered, as stated by Kastner and Wallis (1998:16).
[9] Brian O'Doherty coined the term "white cube" as the pristine interior of the gallery (Kester 2004:125).

to environmental problems such as urban waste and the loss of biodiversity in the form of restoration, reclamation and the rejuvenation of contaminated and damaged wastelands (Matilsky 1992a:47). Ecological artworks draw attention to human responsibility for the environmental crisis. This crisis was brought on by science and technology and the modern world does not know how to resolve it. Ecological art aims to care for nature through various artistic actions such as eco-ventions. Eco-ventions focus attention on the "non-instrumental" value of nature, which amounts to a respect for nature (Brady 2007a:297). This art form transcends the traditional boundaries found between institutions and offers a holistic, interdisciplinary and trans-disciplinary approach to problem solving with the aim of raising environmental and "human-ecological" consciousness (Strelow 2004:12). These artworks are not only ingrained in nature and the natural sciences, but are often deeply imbedded in the cultural history of a site (Matilsky 1992a:47).

This chapter deals with artists across this broad spectrum of environmental art. The artists range from bold Land artists to current Eco-artists who largely focus on people's relationship within the larger, living ecosystem (Lipton & Watts 2004:94).

This study will demonstrate the different views and approaches by artists in reaction to post-industrial landscapes. Such views range from indifference to those seeking solutions to real-world problems. A historic overview is provided of South Africa's aesthetic relationship with the mining landscape, specifically of the Witwatersrand as well as contemporary artists who have based their work on the region's post-industrial sites. Through this, insight is provided into South African artist's own views on the devastation of The Witwatersrand. It is necessary for the purposes of this study to turn to landscape as a source of information in order to establish how South African artists have perceived the mining landscape through the course of its history, to its current post-industrial state.

2.1 Landscape

Landscape, predominantly a Western concept, is drawn from the human being within the framework of "raw" nature, transformed by man's creative power (Ferriolo 2004:17). According to Mitchell (2002:5), "landscape is not a genre of art, but a medium". Although landscape (in terms of art, such as in "landscape painting") is a natural scene, drawn from the study of nature, it is mediated by culture and has aesthetically been processed and

arranged mostly by artistic vision, so as "to sit for its own portrait" (Andrews 1999:7). Simon Schama moreover believes that "landscape is a work of the mind. Its scenery is built up as much from strata of memory as from layers of rock" (Godby 2010:133). Therefore, the land should be regarded as being distinct from the pictorial term 'landscape', as being natural topography holding physical resources (Arnold1996:39).

At first, nature had no real importance for painting apart from documenting a particular site, which, according to Taylor (1983:2) was not there to be admired but to be conquered. By the middle of the eighteenth century, Englishmen were starting a discourse on nature as a stimulant to the human mind, which had the potential to provoke sublime emotions.[10] Andrews (1999:129) describes uncultivated nature as becoming "aesthetically colonised" into the idyllic transcendent landscape paintings from the nineteenth-century American landscapes. Lipton & Watts (2004:90) note that the industrial era was in its infancy. This "colonisation" was not only accomplished through the medium of landscape paintings, but also through the medium of photography, which was invented in 1839 (Snyder 2002:175).

Mitchell (2002:17) explains that historical narratives generated by landscape fit within the discourse of imperialism, which regards itself as an expansion of landscape as well as an expansion of culture and civilization, within the progressive development of history. This statement is made evident in Watkins' photographs that were commissioned by the California State Geological Survey,[11] for their mining and lumber interests. Watkins made an effort to harmonise nature and industry in his photographs. He wanted to reassure that the 'untouched' West could endure the effects of mass immigration and industrial exploitation (Snyder 2002:189).

This form of landscape depiction was also exported from Britain to the imperial periphery of South Africa, Britain's colonial possession in the 1820s (Bunn 2002:127). As the colonisers of South Africa moved their way up into the interior of the country, artists recorded not only the unfolding 'untamed' landscapes, which were often arranged to be a

[10] Edmund Burke defined the sublime as alluding to the "spiritual uplift beyond rational understanding" that wild nature with its awe-inspiring forces offered (Platt 1992:82).
[11] From 1867 to 1879 the exploration of the western United States was plotted by army surveys and later civilian surveys, which were managed by the growing number of scientists and engineers (Snyder 2002:190).

vision of "pure nature, majestic primal forces of rock and sky" (Kentridge 1999:109), but also the events that took place there. Artists were witnesses to these events whether it was conflict over land, where paintings depicted battle scenes, or scenes of conquest that focused more directly on nature (such as the construction of dams and roads, agriculture or mining operations). Godby (2010:62) explains this as "the process of bringing nature within human control". Even today the struggle over land,[12] its use, exploitation and ownership continues between the people residing in southern Africa (Arnold 1996:39).

2.1.1 The post-industrial landscape of South Africa's goldfields

The gold discovered in the Witwatersrand in 1886 brought economic wealth to the country. Despite pollution and the physical and health dangers posed to people working on the mines, it would seem that the contribution made by the mines to the country's economy, made their presence in the landscape acceptable (Godby 2010:104). In fact, South Africa was proud of its mines and representations of the mine landscape would often be expressed in heroic terms. This is evident in Frans Oerder's *Landscape with Premier Mine* (Figure 1) and Gwelo Goodman's *Mines and Dam* (1917; Figure 2), where the mines are seen to be naturalised and integrated into the landscape (Godby 2010:105). The iconic images of Hendrik Pierneef's mining landscapes of the Witwatersrand, painted during the 1930s (1931-32; Figure 3), were commissioned for Johannesburg's Park railway station as well as for South Africa House in London. These artworks were proud nationalist representations of the mining and financial capital of the country. In Norma Ingram's panoramas, painted between 1954 and 1956, she cast her view outward from a city building in Rissik Street towards the point where the city met 'nature' (Figure 4), which quite obviously had undergone a significant transformation from its original state[13] (Arnold 1996:44).

[12] Issues include the movement patterns by the country's indigenous people, the settlement of the Cape, the shift of power from Dutch to British rule and the arrival of the 1820 Settlers, the Great Trek, the Mfecane, and now the Apartheid resettlement, which is still ongoing according to Arnold (1996:39).

[13] Before farming and mining started in the Witwatersrand, white-tailed Gnu, Blesbok, Springbok, Hartebeest, Eland and Quagga used to roam the open veldt (Gordimer 1973:[sp]). Grass was the main indigenous vegetation with a few trees among the ridges. According to Jeppe (1946:36) people have planted trees at a considerable rate from the earliest days.

Figure 1: Frans Oerder, *Landscape with Premier Mine*, (s.a.).
Oil on canvas, dimensions unknown.
Sanlam Art Collection
(Godby 2010:104)

Figure 2: Gwelo Goodman, *Mines and Dam*, 1917.
Oil on board, dimensions unknown.
Iziko South African National Gallery.
(Godby 2010:105)

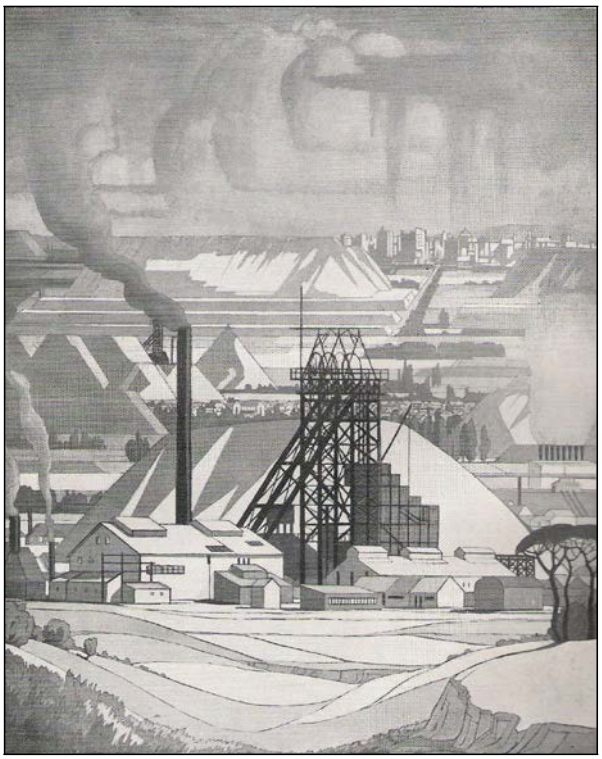

Figure 3: Hendrik Pierneef, *Goudmyn*, 1931-32.
Oil on canvas, dimensions unknown.
South Africa House, London.
(Grosskopf 1945:[sp]).

Figure 4: Norma Ingram, *Johannesburg panorama: looking south-west*, 1956.
Oil on canvas, 63,5 × 75,6 cm.
Museum Africa, Johannesburg.
(Arnold 1996:vii).

Johannesburg has no natural features to speak of since it has created its own landscape out of underground waste and water though the process of deep-level mining. Yet, with the passing of time, the gold mining industry of the Witwatersrand became less important to the South African economy. According to Godby (2010:105), the images of mines "lost their nationalistic character and came to represent, with or without nostalgia, a bygone era." It is due to this shift that alternative perspectives on the mines became possible from conventional representations.

Artworks arose that seem to question the history of landscape representation. For example, William Kentridge combats "the plague of the picturesque", through choosing areas on which industry has left its mark, rather than the traditional *kloof* or escarpment in his naturalistic drawings of the South African veld, with an understanding that the landscape "holds within it things other than pure nature" (Apter 2002:25). Similarly, the watercolours of Alan Crump of the industrial mine landscape are a far cry from the traditional paintings. According to Nel (2011:4), Crump's works shifted from his earlier conceptual art to challenge "the status of traditional watercolour painting with all its inherent historical and colonial baggage". Photographer David Goldblatt also draws on the landscape tradition, but turns it on its head by exposing the signs of avariciousness in his apparently vacant landscapes as an "acute awareness" of South Africa's specific social and historical landscapes (Bedford 2004:126).

Within this setting of degradation along the Witwatersrand, Goldblatt grew up in the mining town of Randfontein and started his career as a photographer (Goldblatt 1982:[sp]). Goldblatt claims that he took photographs "with no clear purpose other than to try and pin down on film some of the things important to me as part of my environment" (Rossouw 2005:22). That environment was "showing visible signs of dying," as the deep-level mines, which had been familiar to Goldblatt as a child, became unprofitable[14] and derelict. Starting in 1965, Goldblatt photographed the rock dumps, ore trains, amputated headgear, tailings wheels, steam hoists, concession stores and everything else that the mines left behind (Figure 5).

[14] A mine is only viable as long as the proportion of gold mined is profitable in relation to the price of gold which is determined by factors such as share indexes and the country's economy (Gordimer 1973:[sp]).

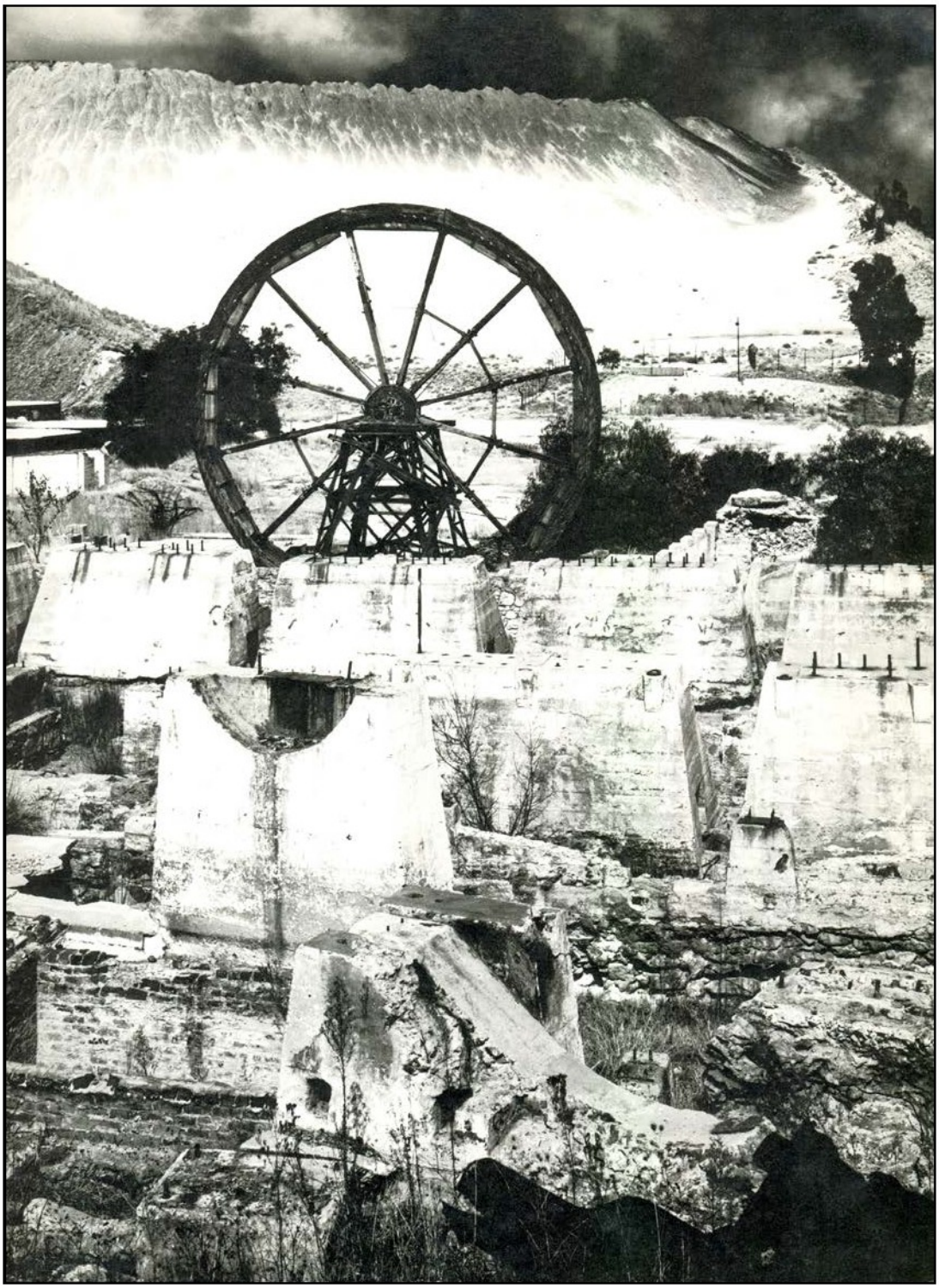

Figure 5: David Goldblatt, *Tailings wheel and mill foundations. Wit. Deep,* August 1966. Black and white photograph, dimensions unknown. (Gordimer 1973:[sp]).

In 1973, Goldblatt collaborated with writer Nadine Gordimer, who also grew up in Randfontein and published *On the Mines.* Within a context of a nostalgic post-industrial environment, Goldblatt and Gordimer were both attracted to the industrial sublime. Gordimer (1973:[sp]) describes that although the landscape was ugly, sometimes "it became perversely, suddenly, the parody of picture-postcard beauty". Comp (2008:72) remarks that places of environmental degradation can be "deceptively beautiful". This clearly corresponds with Immanuel Kant's argument that the presentation of a thing can be beautiful without the thing itself being beautiful (Kant 1987:311). Kant moreover describes the sublime as something which both attracts and repels us. Maskit (2007:332) stresses that the post-industrial might be more closely associated with the sublime than the beautiful.

Dawes (2003:77) compares Goldblatt's more recent *Asbestos* series, which he photographed between 1999 and 2002 (Figures 6 & 7), to the photographs of Robert Misrach,[15] describing the "gleam of tailings dumps" and the looming Mill at Pomfret over a group of children as being "poisonously beautiful". Bedford (2004:126) insists that Goldblatt uses the camera as a weapon against the greed of corporations and its repercussions on the environment, claiming that the images "expose the complex socio-economics of land that persist in post-apartheid South Africa, and raise questions about ownership, control, dispossession and displacement". In the *Asbestos* series, Goldblatt exchanged the subtleties of black and white photography for colour, which he realised, was necessary to reveal the blue colour of the blue asbestos fibres on the mine dumps (Bedford 2004:126).

According to Godby (2002:50), Goldblatt uses the basic idea of photography, seeing that the mechanism of a photograph captures the recorded subject from one time and place and offers it for consideration in another. Apart from this, Goldblatt names the subjects, locations and dates. He explains the social and political context of a setting,[16] and draws attention to deplorable conditions and states, without directly bearing evidence of the terrible events that marked it (Hermange 2004:83). Apart from the photograph of the

[15] American photographer Robert Misrach is famous for his photographs of the "bombed and contaminated deserts of the American West, *Desert Cantos* and *Bravo 20*" (Dawes 2003:77).
[16] The fact that the image was taken on Christmas Day makes for sombre contemplation.

highly carcinogenic blue asbestos[17] lying openly exposed on an abandoned dump in the windy region of the Kuruman Hills, Goldblatt also photographed the people living on the abandoned mining sites. He shows them going about their daily activities, dependent on the contaminated water of an overflowing mine shaft. Here defenceless people are exposed to the careless disregard of large corporations towards their health as well as the environment itself. Goldblatt notes: "Asbestos mining …has killed many and will continue to kill far into the future notwithstanding that mining has stopped" (Dixon 2011:144). Bedford (2004:126) in turn argues that Goldblatt makes us aware of what we may have overlooked. He challenges the viewer to reassess value systems and points of view, not only as individuals but as a society.

Figure 6: David Goldblatt, *Blue asbestos fibres on a tailings dump at the Owendale Asbestos Mine. The mine has closed but its waste remains. One of these fibres inhaled by a susceptible person could cause the fatal cancer mesothelioma.* Owendale, Northen Cape, 26 October 2002.
Pigment inks on cotton paper, 124 × 98cm.
(Bedford 2004:128).

[17] For around one hundred years blue asbestos was actively mined in the Asbestos Mountains and the Kuruman Hills over a distance of almost 450 kilometres (Dixon 2011:144).

Figure 7: David Goldblatt, *Fernando Augusto Luta washes his clothes while Augusto Mokinda (13), Ze Jano (12), and Ze Ndala (10), pose for a photograph in water that has risen from underground in an old abandoned mineshaft at Pomfret Blue Asbestos Mine, The water probably contains blue asbestos fibres.* Pomfret, Northern Cape, 25 December 2002.
Pigment inks on cotton paper, 124 × 89cm. The Goodman Gallery Collection, Johannesburg.
(Dixon 2011:142).

Whereas Gordimer painted the mining landscape of the Witwatersrand with words, Goldblatt exemplified it with his photographs. Alan Crump can be considered their equal, only with watercolour as his medium.[18] In Crump's *Mine Dump and Slime Pool* (1992; Figure 8), the dumps are painted with light strokes of golden hues above the soft pool of the slimes dam, against the backdrop of deep blue of a Highveld sky and its building afternoon clouds. Crump (2009:97) describes the landscape with dumps as "silent, sometimes glistening and malevolent but often artificially beautiful with chemically coloured

[18] According to Sey (2011:68) Crump's output of watercolour stretched over four decades.

umbras of yellow sand". Crump's subtle watercolours are undoubtedly as seductive as Goldblatt's photographs and according to Dixon (2011:132) seem to "capture the allure of gold".

In *Mine Dump and Slime Pool* and *Mine Landscape,* where a particular interest in slimes dams is explored, humans are absent, as in most of Crump's mine landscapes and not unlike Goldblatt's mine landscapes. Nel (2011:4) believes that the human presence is made evident by the scarred and mutilated landscape, pointing towards the underlying theme of his work, namely land, politics and power (Nel 2011:2). The artist speaks of the "notion of a battleground of contested ownership, historical imperialism, exploitation and greed" that characterises the history of Johannesburg. This can be found in the landscape's "many layers, inner and outer skins, the substrata of which need to be interrogated and interpreted" (Crump 2009:97). In *Mine Landscape* (1993; Figure 9), the image presents itself as a ravaged landscape which seems to reveal its substrata of stagnant, cyanide-laced slime dumps as not only the bedrock of the country's economy, but as a site consumed by the exploitation of land, labour and life (Nel 2011:4). It is noted by Caroline Crump (2011:77) that not much was known about the pollution that would be caused by the slimes dams when Crump painted them twenty years ago, or to what extent the pollution would expand in the next decade. She therefore proclaims that Crump's work indicates the ability possessed by artists to anticipate events. I would suggest there is a foreboding element in Crump's discussed landscapes, as hinting the viewer to the environmental crisis that would only become public much later on. It could therefore be said to serve as a warning, although that message is subtle.

William Kentridge, who grew up in the heart of Johannesburg, has expressed a somewhat ambivalent approach towards this environment, for the reason that this ruined landscape is "as much his cultural inheritance as the idyllic Eden was to his forebears" (Cameron1999:49). The devastated landscape of the surrounding mining districts is the main focus of his art, comprising of mine dumps and slimes dams, as well as other signs of civil engineering littering the land, as spaces far removed from the natural or neutral (Coetzee 1999:84).

Figure 8: Alan Crump, *Mine dump and Slime Pool*, 1992.
Watercolour on paper, 56 × 75 cm.
Private collection.
(Dixon 2011:133).

Figure 9: Alan Crump, *Mine Landscape*, 1993.
Watercolour on rag paper, 55 × 71,5 cm. Standard Bank Corporate Collection, Johannesburg.
(Dixon 2011:134).

Kentridge (1999:126) explains that “landscape hides its history”, as “scenes of battles, great and small, disappear, are absorbed by the terrain, except in those few places where memorials are specifically erected, monuments established, as outposts, as defences against the process of disremembering and absorption”. Apter (2002:27) notes that what makes *Colonial Landscapes* (Figure 10) so fascinating is the way in which the landscape, on closer inspection, reveals signs of ecological misfortune, as if the red marks and circles point towards sites of pollution. For example, looking closer at the landscape one would notice that a hill is in fact a man-made dump left over from mining (Cameron 1999:49). Beneath the optical illusion of ‘scenery’, lies the reality of environmental damage inflicted upon the landscape.

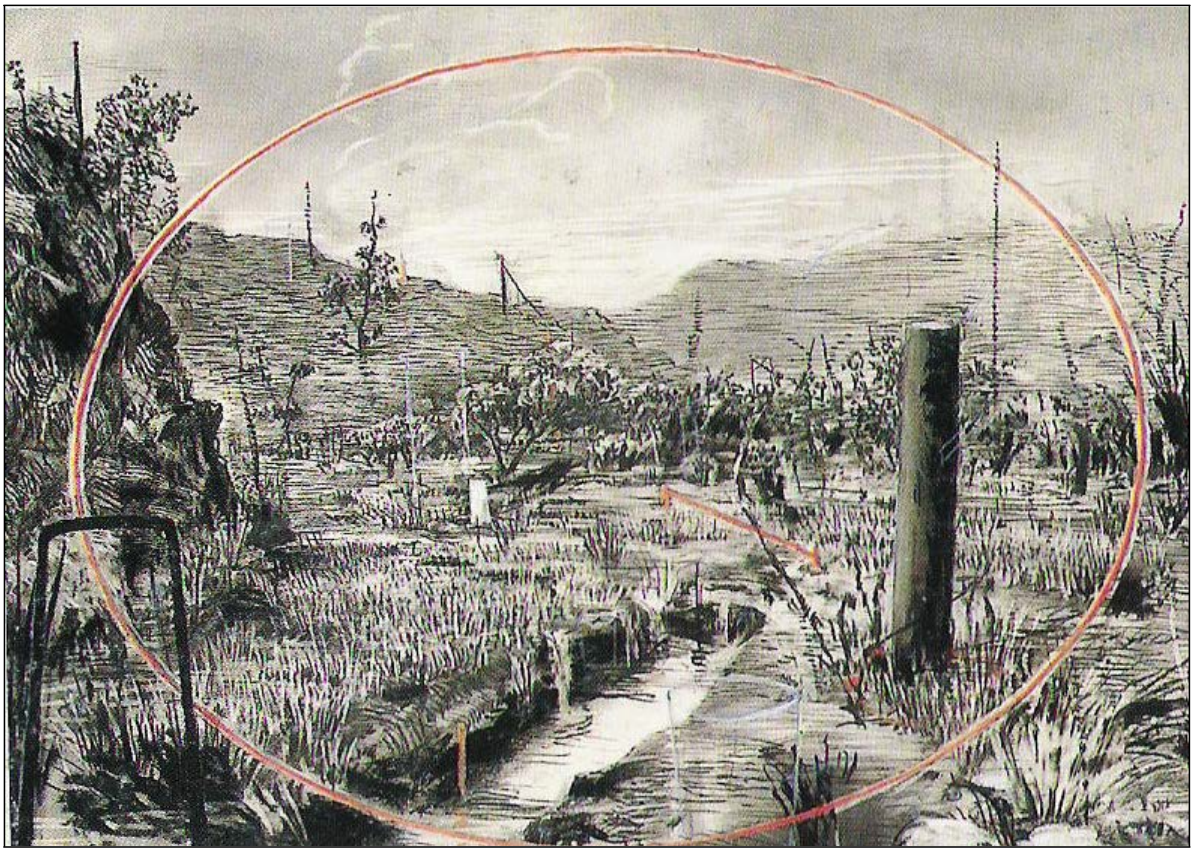

Figure 10: William Kentridge, drawing from *Colonial Landscapes*, 1995-96.
Charcoal and pastel on paper, 120 × 160 cm.
(Cameron, Christov-Bakargiev & Coetzee 1999:22).

Kentridge is captivated with the landscape surrounding Johannesburg, precisely because it contains past events,[19] which have now been "absorbed into the run of daily life" (Kentridge 1999:111). In a geographical drawing made in the burnt winter veld for the 1995 Johannesburg Biennale, in collaboration with Doris Bloom, a massive 150 by 70 metre anatomical image of a heart was drawn with chalk in the austere landscape of Walkerville (Figure 11). By placing a heart in the centre of this estranged landscape, which Williamson and Jamal (1996:46) refers to as a "betrayed geography", one is automatically drawn to the site by the sheer size of the drawing. The heart possibly refers to the landscape that once was the heart of the city's economy but now is left abandoned after being ravaged by industry. Hints to past events can be seen in the yellow dump to the left and geographical lines and blocks marking the area, where old pathways lie fading, almost ghost-like under newer, equally dusty tracks. As the traces are still visible, Christov-Bakargiev (2004:32) suggests they refer to the way events are layered in life and how the past always lingers.

In this mining landscape, the character of Soho Eckstein is depicted in the 1991 film *Mine*, as the capitalist mining magnate, mostly behind the desk of his empire, consumed with making money (Cameron 1999:60). Soho is also depicted in the comfort of his bed, with a tray of coffee on his lap. As he pushes the plunger down, it becomes the mine-lift that the labourers use to travel up and down the mine shaft, plunging through the tray and bed into the stratigraphy of the earth to where the workers are labouring away in the darkness. Faber and Buys (2011:62) note that by means of the coffee plunger, the "dialectic relationship between surface and depth is metaphorically articulated", and that this gesture "binds different areas of merchant capitalism, colonialism, and imperialism, base to superstructure, post-object to whole machine".

[19] The mining landscape in Kentridge's work are in areas where all the mines have turned into derelict sites, along with factories that did not survive recessions of past years, leaving the landscape locked in the past (Kentridge 1999:126).

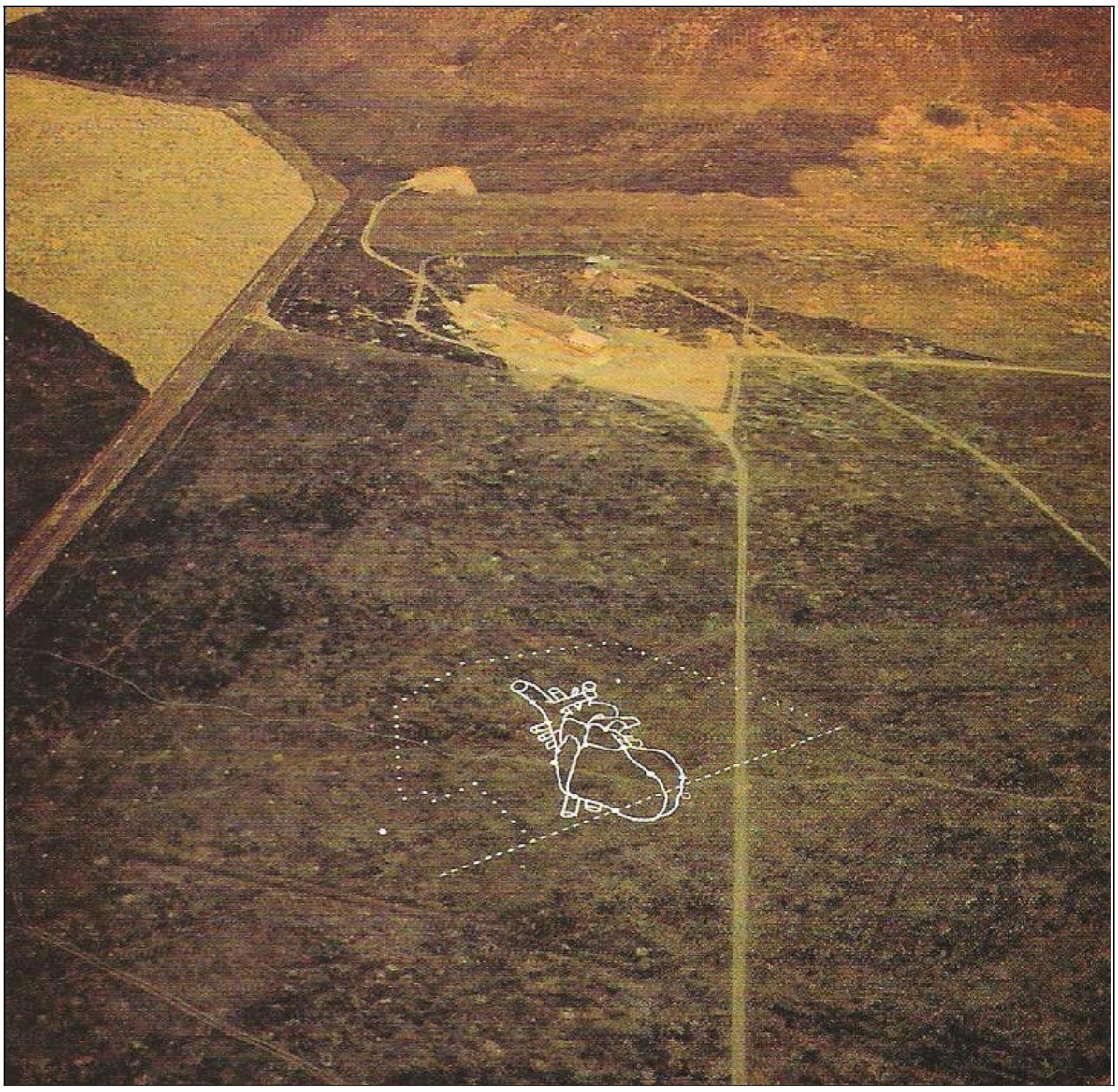

Figure 11: William Kentridge and Dorris Bloom, *Heart*, 1995.
Whitewash drawing, 130 × 70 m.
Walkerville, Johannesburg.
(Kastner & Wallis 1998:71).

However Soho's world is seen to be crumbling away in the film *Stereoscope* (1999), where he is depicted again behind his desk. This time he is not only gaining, but losing objects on opposing sides of the screen (Smith 1999b:2). As Soho's world folds in on itself, he is seen standing in a pool of water in an empty room, with water streaming from his pockets (Figure 12). Crump (2011:77) suggests that this water might in fact be the rising

groundwater polluted by AMD and that the mining magnate is experiencing the "revenge" of his industry, as he finds himself infinitely trapped. On this sombre note, Kentridge's words ring true: "only at the end of a long process which corresponds to the completion of the domination of Africa does the pure landscape emerge" (Kentridge 1999:109).

Figure 12: William Kentridge, *Drawing from Stereoscope, Soho in Flooding Room*, 1999.
Charcoal and pastel on paper, 112,5 × 137,3 cm.
Johannesburg Art Gallery Collection, Johannesburg.
(Dixon 2011:141).

Although Kentridge's art has strong political connections, the representations of devastation in the landscape and the economic powers behind it, is overwhelming. The researcher would argue that these sketches and films, such as *Stereoscope* do make viewers aware of a disturbingly unhealthy post-industrial environment filled with monuments of past-endeavour.

2.1.2 Gold tailings as disappearing industrial monuments

The world is scattered with post-industrial sites, of which deep-shaft mines and their gigantic table mountains are significant monuments of the modern age. In one or other form, argues Morris (1980:101) technology has been responsible for the monuments left behind. Previous civilisations have created monuments like Stonehenge, the Pyramids and Alta Mira, while the modern world has managed to produce a mega-dump. Our human presence on earth today is marked by the bulldozer, transforming our landscapes into artificial mounds.

The familiar landscape of Johannesburg has been a space called home for many South Africans, rich or poor, or even for those who only work in the city and take the familiar M1 highway into and out of the city every day. Although a familiar space, Morris (2005:[sp]) notes that "it is also the space of oblivion". The reason for this, he argues, is because the landscape has been so profoundly shaped by means of mining and architectural construction that we assume it to be a "form of second nature". Schenkel (2004:166) makes a similar point when saying, "what remains are neglected, toxic waste deposits that, in their final form, exist in 'nature-like' conformity with the landscape". Maskit's (2007:326) on the other hand believes that, "the less natural a space, the less it can be appreciated as an environment", although "it can still be perceived as art". This matches Martin Schwind's view that every landscape is effectively a work of art, which is comparable to any human creation (Ferriolo 2004:17).

The artist Clive van den Berg seeks to unearth and draw attention to the terrain of Johannesburg's mine dumps. These problematic sites represent one of the most charged sites of "avarice" in Johannesburg to the artist (Williamson & Jamal 1996:52). Van den Berg expresses his concern for the way in which these sites have become 'naturalised', recognised by people as geography, although they are really "manifestations of history". What fuelled his concern was the fact that mining companies were reprocessing the dumps,[20] thus removing them from the landscape. In so doing they were creating an

[20] Due to improved extraction processes, it became possible to reprocess the old tailings dumps for the gold left in them, while most un-mined gold lies under the Brasilias in the newer mines of the Free State (Gordimer 1973:[sp]).

innocently “ahistorical” place by removing the markers (monuments) showing why the city was fashioned (Williamson & Jamal 1996:55).[21]

For the 1995 Johannesburg Biennale, Van den Berg created *The Mine Dump Project* (1995; Figure 13). The artist used lime wash, grass, white-washed stones and braziers on the face of the mine dumps situated next to the Soweto highway and the freeway connecting the city with the airport. On the side of the dumps grass was planted and cut, creating the illusion that the mound was embossed. The stones resembled memorials associated with an area of conflict, while at night the braziers were lit to reveal the shapes punched into the metal as an outline of dots (MacKenny 2004:382).[22]

Seen from the road,[23] due to its elevated position, the blazing shapes illuminated the previously forgotten dumps, branding the image into memory and reminding people that the man-made mountains are monuments to the corporate powers that once owned them (Williamson & Jamal 1996:55). Van den Berg uses the terrain as a space for communication and for: “articulation of narratives which would otherwise remain mute and perhaps even unspeakable” (Morris 2005:[sp]). One could therefore say that Van den Berg is fighting against the erasure of memory and the merging of geography and man-made structures by reclaiming these dismantled sites and their “history for communal memory” (MacKenny 2004:382). Williamson and Jamal (1996:55) concur that for Van den Berg, “the job of art is to remember, to activate the silenced workings of history”.

Georgia Papageorge is also an artist who engages directly with the mine dumps as artificial, highly processed, although impermanent entities (Papageorge [sa]). Using gold as metaphor, Papageorge spent a decade exploring its workings as an equivalent to the fractured South African society in the tense pre-1994 years of apartheid (Papageorge, Mantovani & Reuter 2006[sp]). Between 1980 and 1983 she created her first site installation on the Western Deep Levels Gold Mine in the West Rand due to an event that

[21] Some of the last historic mining sites in Johannesburg will be cleaned up and re-mined by Goldplat in the coming years, which will finally erase the monuments of these sites (Derby 2012:16).
[22] The emblematical outlines of a giant human head, armchair, double bed and staircase underscored the convergence of private and public domains (MacKenny 2004:382).
[23] Some of the people using the roads stopped and would communicate to the people busy on the dump by flashing their lights. The artist claims that the reaction of this “chance audience” was spontaneous, as most people did not know what the work was about (Williamson & Jamal 1996:55).

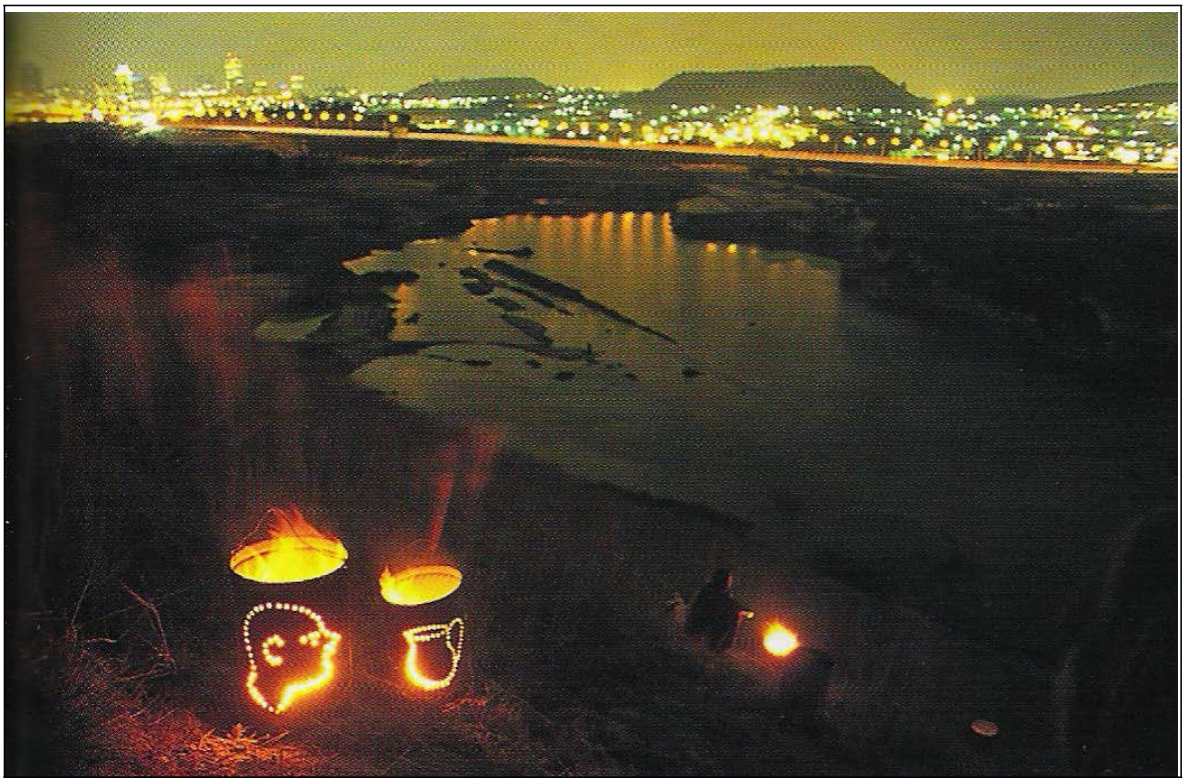

Figure 13: Clive van den Berg, *The Mine Dump Project*, 1995. Site installation with fire, stones and pigment, dimensions unknown. Geldenhuys Interchange and Crown Mines, Johannesburg. (Williamson & Jamal 1996:55).

had occurred two years earlier (Figure 14). On 12 December 1978, her thirteen-year-old nephew[24] disappeared in the triangle formed by the Western Deep Levels Mine, Elandsrand Gold Mine (two Anglo-American mines) and Blyvooruitzicht Gold Mine to the west. The boy was never found. In David Robins' (1987:124) novel *Wasteland* he notes that it is not uncommon especially for children "to be swallowed without trace in some subsidence".

To Papageorge, the site of the Western Deep Levels Mine dump was significant, as not only did it mark one of the richest gold mining areas in the world in the form of the largest man-made mountains on earth, but it was also the place where her nephew had disappeared forever. She was furthermore aware that the dump would in all probability be

[24] Papageorge's nephew, Owen, was the son of her eldest brother who worked on the Elandsrand Gold Mine (Reuter 1995:[sp]).

gone in about twenty year's time, as the dump was reprocessed for gold and uranium (Papageorge [sa]). The artist started to work with poles, which she painted with the cartographical colours of the underlying geology, using them not only within a "Land art context", but as symbols of hope for the missing child. While the vertical planted poles acted as a celebration of the dump's existence above and below the earth's surface through its direct reference to the rock strata below, it also served a ritualistic function. The artist explains that in the late afternoon, just before a Highveld storm, the poles would reflect off the dump against the darkening sky and they would be visible from a considerable distance (Reuter 1995:[sp]). For the artist, the presence of the poles acted as "positives in a negative situation" (Papageorge [sa]).

Figure 14: Georgia Papageorge, *Site Installation, Western Deep Levels Gold Mine*, West Rand, 1980-83.
Photograph by the artist.
(Reuter 1995:[sp]).

The poles remained on the dump permanently and as the years progressed, Papageorge would repaint them as the sun and the corrosive mine dump sand caused the paint to fade and flake away. It also became apparent that the brightly painted poles were in contrast to the slimes pipes and "uprights" on the dumps. The slimes pipes carry the waste residue from the chemically reduced gold reef conglomerate in the form of wet "slimes" to the top layer of the dump. Eventually the fluid hardens through evaporation to become a greyish yellow layer of sediment on the mine dump (Reuter 1995:[sp]). Papageorge's painted poles were an almost exact replica of the "uprights" pertaining to length and size, but no slimes pipe rested on the horizontal beam and the real ones were dark and corroded with rust from the acidic slimes (Figure 15). It would give the impression that the almost identical structures of "hope" and of "detriment" were juxtaposed next to one another, with hope appearing to win the day when conditions were favourable (Papageorge [sa]).

Figure 15: Georgia Papageorge, *Site Installation, Western Deep Levels Gold Mine*, West Rand, 1980-83.
Photograph by artist.
(Reuter 1995:[sp]).

Yet with time and the shifting and reclaiming of the dump, both would eventually vanish, with the only records of the event to be found in the work created by Papageorge afterwards in the form of extended collages, which the artist calls "meditations upon the original art" (Reuter 1995:[sp]). Papageorge believes that in manipulating the processes of the dump's structure, surfaces and residue, by the means of photography, drawing and painting, she "iconize[s] their component parts and make[s] permanent their significance and potential" (Papageorge [sa]).

Although Van den Berg and Papageorge's works have predominantly political undertones and do not attempt to rehabilitate or remediate the site, they nonetheless succeed in directing our attention towards these industrial sites. Lintott (2007:274) insists that Land art contains the potential to alter human behaviour and attitude towards the environment and to "forcefully" focus our attention on environmental matters. Environmental aesthetics can help us to view these post-industrial sites differently, with the aim of making one think about them differently. This means not only regarding post-industrial sites as they are, but as what they might become (Maskit 2007:325). The following section will focus exclusively on artists who have endeavoured to reclaim post-industrial mining sites and their differing views on the subject.

2.2 Reclamation as art

"A used-up site is abandoned, and abandoned places are ruins" (Kelly 1995:142). Humans, as articulated by Devall (1995:160), are inclined to reject the autonomous qualities of land that cannot be utilised for human purposes. People pass by the eyesores of derelict landscapes and pay no heed to them. Maskit (2007:324) explains that before people can engage with these sites, they need to be visible.

Land artists such as Michael Heizer, Robert Smithson, Robert Morris, Herman Prigann and local artist Strijdom van der Merwe have all shown interest in former mining sites.[25] Considered to be an early form of reclamation art, most of these artists aimed to depict the

[25] Michael Heizer and Robert Smithson can be considered as the pioneering members of the Land art movement. Both created colossal Earthworks situated on isolated sites in the West of America, mostly vast, open, semi-desert spaces unmarked by man up until their arrival for the construction of their work (Beardsley 1984:59).

landscape as land completely saturated by civilization, in order to expose them as powerful symbols of industrial and natural reality (Strelow 2007:12). These artists chose sites that had been disrupted by industry, such as quarries, polluted lakes and tailing dumps (Carlson 1986:643). One practical solution for the employment of such distressed places would be "re-cycling in terms of Earth art", as suggested by Smithson (Beardsley 1984:23). According to Herman Prigann, "there is no going back to raw nature…people see that humans have made this landscape" (Miles 2004:206). He argues that by rehabilitating and re-cultivating these devastated landscapes to imitate nature will only conceal the spoils of resource extraction by industry (Prigann 2004b:214). Earthworks by the above-mentioned artists are appropriate examples of man-made landscapes that acknowledged technological use, with the intention to change the way people think and not to recreate faultless landscapes.

However, Lintott (2007:263) stresses that the major issue involved in Land art debates is whether the environmental and ecological costs brought on by its creation is worth it. In 1985 art critic Peter Humphrey argued that, "an earthwork is ethical if and only if what it does to the environment is ethical". This leads one to observe an Earthwork not only as art, but as a 'mark' on the earth, in the same way that mines and slimes dams are judged (Humphrey 1985:8). Robert Morris observed the opposing aspects of large-scale earth-moving of mining to that of Land art: "The act of digging and piling carried out in an organised way and at an intensified scale has produced sunken gardens and ziggurats on one hand and gigantic geographical scars and ore tailings on the other. The forms are basically the same" (Lippard 1983:230). In 1969, Smithson constructed *Asphalt Rundown* (Figure 16), by dumping a truckload of asphalt down the side of a quarry, directly resembling the aesthetic outcome of certain types of industrial pollution.[26] In the same year, Smithson was prevented from dumping broken glass on an island in Vancouver by environmentalists who were concerned that the glass would be harmful to the birdlife in the area (Gablik 1991:140).

[26] *Asphalt Rundown* was only one of numerous pours, such as cement and glue pours, planned or executed during the late 1960s (Maskit 2007:329).

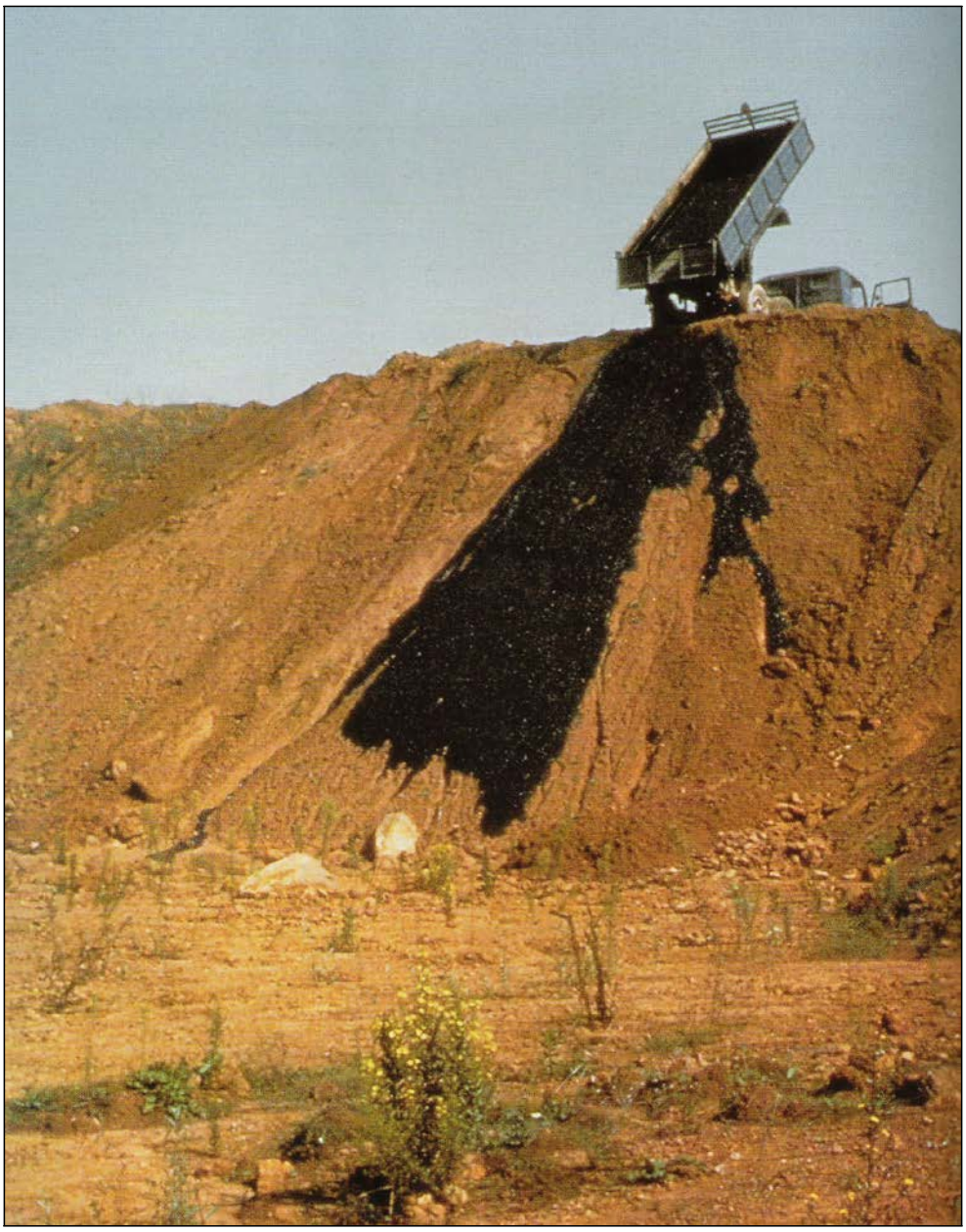

Figure 16: Robert Smithson, *Asphalt Rundown*, 1969.
Asphalt and gravel, dimensions variable.
Rome, Italy. (Kastner &
Wallis 1998:98).

According to Carlson (1986:639), it is no coincidence that the appearance of such works resembles the eyesores generated by industry, mining and construction. Smithson commented that the "process of heavy construction has a devastating kind of primordial grandeur" and that the "actual 'disruption' of the earth's crust is at times very compelling"

(Smithson 1968:46). The artist did not refute industrial activities but acknowledged them as an essential consequence of modern life that humans have developed for themselves. The artist favoured working on industrial wastelands, places where "remote pasts meet remote futures" (Lippard 1983:33). The artist was attracted to the site of *Spiral Jetty* (1970), because it was already ruined by industry, with the industrial wreckage and deserted vehicles of a failed attempt at oil drilling in the area (Beardsley 1984:22).

In Morris' view, reclamation projects make original acts of resource extraction acceptable. Nevertheless he recognises that artists are left with a public relations task when employed by mining companies (Morris 1980:99). He expresses his reservations to what he called the "artist-doctors of sick sites". Morris does not want artists to "beautify" disturbed sites, used by large companies to wipe away technological guilt. He asks: "Will it be a little easier in the future to rip up the landscape for one last shovelful of a non-renewable energy source if an artist can be found – cheap, mind you – to transform the devastation into an inspiring and modern work of art?" (Bourdon 1995:225). In line with this, even Heizer remarked: "I'm not for hire to go patch up mining sites… I don't support reclamation art sculpture projects" but then went on to say: "I love mining sites. My whole family has been in the mining business" (Bourdon 1995:226). [27]

Morris created *Untitled (Johnson Pit #30)* in 1979 (Figure 17),[28] in which he changed a gravel pit into an irregularly shaped, concentrically terraced form. This work strongly resembles an open-cast mining pit, to the annoyance of residents. Morris infuriated them even further by cutting off the tops of the group of fir trees growing along the rim of the pit, leaving only the stumps, which he had treated with bitumen and wood preservative. The mutilated trees comments on the site's previous exploitation (Bourdon 1995:225). By constructing an 'unattractive site' the artist states that "an art resisting commodity status also resists the abuse of natural resources to provide these commodities" (Lippard 1983:230).

[27] Heizer's grandfather ran the largest tungsten mining operation in Nevada in his day, according to Kimmelman (2005:39).
[28] It is estimated that Morris' project exceeded the cost by a small amount than the lowest assessment for conventional reclamation, making art-as-reclamation a viable option (Beardsley 1984:94).

Figure 17: Robert Morris, *Untitled (Johnson Pit #30),* 1979.
Terraced and grassed gravel quarry, tree stumps preserved with tar, 14164 m².
Sea Tac, Washington.
(Bourdon 1995:224).

Smithson, on the other hand, did take exception to the carelessness of industrialists towards the aesthetic values of the landscape (Beardsley 1984:23). In fact, during the early seventies, Smithson contacted industry and offered his services to improve the aesthetic appearance of their reclamation activities (Carlson 1986:639). According to Smithson "art can become a resource that mediates between the ecologist and the industrialist", and that "art can help to provide the needed dialectic between them" (Bourdon 1995:225). Smithson intended to elevate a landscape with low profile, in preference to bringing one down with high profile, although he did not intend to completely disguise the post-industrial character of the site (Carlson 1986:644).[29] As in *Asphalt Rundown*, Smithson attempts to recover post-industrial sites, by not returning them to what they once were, but by constructing something new out of them. In so doing he highlights

[29] Smithson, before his death in 1973, proposed to construct a set of works called *Projects for Tailings*, by creating earthworks from millions of tons of waste tailings produced by mining operations (Carlson 1986:639).

that these sites are part of one's environment, which should not be overlooked. Maskit (2007:330) explains that Smithson helps viewers understand that the history of the site has contributed to the site's post-industrial character: by turning the site into an artwork, he gains the viewers' awareness. Smithson's wife Nancy Holt justified this as follows: "I see it as functional or necessary aesthetics, not art cut off from society, but rather an integral part of it" (Kastner & Wallis 1998:33).

In South Africa, De Beers Consolidated Mines in Namaqualand can be considered to house the first reclamation art project of its kind in South Africa, with Strijdom van der Merwe as the artist (Van der Merwe 2011/12/14). The Diamond coast of Namaqualand is a landscape eviscerated by almost a century of diamond mining,[30] which came to a halt when the economic recession struck in 2007 (Fish 2011).[31] Thereafter it was not economically viable for De Beers to continue mining on the West Coast, despite the fact that there are still diamonds in the area. The country's legislation confirms that a mining company must rehabilitate before leaving a site.[32] In line with this Living Edge of Africa (LEAP) was commissioned by De Beers to find inventive ways of remediation, which then collaborated with Public Eye and Conservation International South Africa (Martin, Whitbread-Abrutat & Frazee 2010:[sp]).[33] Three phases were decided on. The first stage was to re-establish endemic vegetation on the disturbed dunes; the second stage was to introduce abalone farming in the nutrient-rich waters of the ocean in the holes created by mining and the final stage was to construct a large-scale Earthwork with the mining equipment situated onsite (Ngwenya 2010:[sp]). Van der Merwe admits that the landscape is one of the most "disturbed and un-beautiful" he had ever worked in, although he never chooses a landscape based on its beauty (Ngwenya 2010:[sp]). The artist

[30] Around 37 million carats have been recovered from the Namaqualand diamond mines since 1926 (Fish 2011).
[31] It is estimated that over a thousand people in the Kommagas and Hondeklipbaai communities were relieved of duty, placing unemployment at 80 percent and causing people to resort to illegal digging in the abandoned mines (Fish 2011).
[32] The mine waste has caused instability to the substrate on which the natural vegetation grows, and along with low rainfall and strong winds has deterred the replanting of vegetation (Martin et al 2010:[sp]).
[33] The team was inspired by the Eden Project, constructed on a former mining site in Cornwall in the United Kingdom, in which Eden's Post-Mining Alliance contributed towards a workshop in which alternatives were explored to conventional mine closure plans, with sustainable tourism at its core, according to Martin et al (2010:[sp]).

clarifies that, "the landscape impacts on the artist rather than the other way around" (Strijdom van der Merwe 2011:[sp]).

The Earthwork produced out of this initiative is titled *am/pm Shadow Lines* (2010; Figure 18). The work is a circular structure, measuring 100 metres in diameter, with horizontal and vertical lines in the body of the circle. Approximately 7000 tons of mine waste gravel were moved by a crew of five men. They used equipment such as a front end loader, dozer, medium excavator and articulated dump truck provided by the mine (Figure 19) (Ngwenya 2010:[sp]).[34] Van der Merwe created the work to make visible the moving shadows of the winter sun and to trace its movements during the course of the day. The artist stresses that the quietness and slow movement of time in this landscape was significant and that he wanted to reverberate this aspect in the work (Van der Merwe 2011/12/14). Remarkably similar to his more ephemeral works, Van der Merwe claims "the impact lies in the fact that the work creates the idea that it forms part of a natural cycle" (Strijdom van der Merwe 2011:[sp]).

Van der Merwe, like Smithson also attempts to draw the public's attention towards something they might have missed before. The result is a "mediated experience of place that might foster appreciation and even preservation" (Beardsley (2010:xii). This echoes Erzen's (2004:23) argument that aesthetic qualities affect our emotions, which enable us as "intelligent and intentional agents" of the world we inhabit to become conscientious around the welfare of these "qualities" which we perceive.[35] Therefore, the presence of an artwork in the landscape can not only draw attention to a site, but potentially profoundly affect one's emotions, moving one to re-evaluate the landscape and one's own impact on that landscape.

[34] The mining equipment is freely available to the artist because it will never leave the mining site, as it is too expensive to move, thus leaving it to perish and rust (Van der Merwe 2011/12/14).
[35] Since the launch of the project and the completion of the earthwork, De Beers has scrapped the project, according to Jordan (2011:[sp]) and has sold off its mine to a smaller company named Trans Hex (Fish 2011). According to Ngwenya (2010:[sp]), Van der Merwe's Earthwork is inaccessible to the public. According to Jordan (2011:[sp]), a potentially powerful piece of art has subsequently been reduced to a mere curiosity item.

Figure 18: Strijdom van der Merwe, *am/pm Shadow Lines*, 2010.
Crushed diamond mine dump gravel and sand, 100 × 100 m × 2,3 m.
Koingnas, West Coast, South Africa.
(Van der Merwe 2010)

Figure 19: Earth moving equipment implemented by De Beers Consolidated Mine and used for the construction of *am/pm Shadow Lines*, Namaqualand, 2010. Photograph by I. Martin and J. Knight.
(Martin et al 2010:[sp]).

Artist Herman Prigann goes beyond seeking stimulus from industrial waste land, by building nature in as a partner and fellow creator. Prignann does this to fashion aesthetically pleasing but also ecologically functioning places, with contemplative qualities (Strelow 2004:11). One could say that Prigann borders between traditional Earth art and ecological art. This artist redefines industrial landscapes through artistic intervention, by not denying the history of the site, but by integrating it into the design to include industrial, cultural, social and ecological aspects (Dettmar 2004:156). Like Morris and Smithson, Prigann demonstrates how landscapes are being exploited and destroyed. They also demonstrate how to mitigate and instigate re-naturisation processes in the place of these landscapes. At the same time they create "fantastic forms that trigger the imagination" in referral to the site's cultural history as preserved in the materials left behind by the process of resource extraction (Erzen 2004:24). Prigann (2004c:74) states that working artistically in dialogue with nature, creates an "open situation", containing an internal historicity of both growth and decay that exhibits the truth of reality.

The *Rheinelbe sculpture wood*, created from 1997 to 2000 on a former coal mine in Germany is a perfect example. Rheinelbe became a derelict site after the coal mine closed down more than twenty years ago. People abused this non-land by uncontrollable dumping of garbage, disregarding it as a noteworthy landscape with its own ecology. Nevertheless, a new forest started to grow after mining had ceased. Prigann, working together with the International Building Exhibition (IBA), initiated the project as a landmark site to the people of Gelsenkirken living adjacent to the land (Dettmar 2004:130).

Demolished material, such as foundation blocks, walls and other building remains were employed in strategic places to retain traces of the area's history (Figure 20). Routes and paths were constructed for people, and indigenous vegetation was planted. Prigann leaves everything to change naturally, describing his method as a "natural reflection on transforming the industrial site into a wood" (Dettmar 2004:130). Apart from the wood, a 110 meter high peak was constructed on the southern coal stock of the site. On the hill, a landmark structure was erected from the existing rubble 26 meters in height, titled *Skystairs*, from where the observer has a wide view across the industrial landscape (Figure 21) (Dettmar 2004:132). People visiting the site can experience the work from different viewpoints. They can view the work from the undergrowth of the emerging forest

Figure 20: Herman Prigann, *Rheinelbe sculpture wood,* 1997-2000.
Building remains and natural materials obtained on-site, 50,000 m².
Gelsenkirchen, Germany.
(Dettmar 2004:133).

Figure 21: Herman Prigann, *Rheinelbe sculpture wood (Skystairs)*, 1997-2000.
Building remains and coal, 136m high.
Gelsenkirchen, Germany.
(Gelsenkirchen 2004).

and the paths crossing through it to the height of the peak. The viewers are compelled to view the destruction of industry. This project has taken Earthworks a step closer to creating ethically motivated art by means of social interaction with the environment and its ecology.

2.3 Art & science

The discussion in this section deals with artists who make active use of science in their art, collaborating with scientists and experts from differing fields. Two South African artists are discussed here, working specifically with mine detritus. Following this are international artists who have attempted to restore polluted water systems damaged by industry, through the use of science. This investigation is necessary as the subsequent chapter deals exclusively on the matter of AMD induced by the gold mining industry and its ramifications on the receiving environment.

According to Finke (2004:104), two visions are present at the start of ecological aesthetics: one scientific, one artistic. Leonardo da Vinci stated that, "art is a science and the true-born daughter of nature. But in order to speak we may call it the grandchild of nature" (Sonfist, Becker & Rosenblum 2004:189). According to Lipton and Watts (2004:90) it is sound to assume that the inspiration of nature lies at the core of all artistic practice in all cultures from time immemorial. Hargrove (1979:214) reminds us that it was science and not painting and literature that created favourable conditions for developing appreciative attitudes towards nature. However it was the resulting interplay between art and science that was responsible for appreciative environmental thinking (Hargrove 1979:226).[36] Prigann (2004a:180) points out that art and science have the same root in creativity,[37] as both form ideas about the world, often questioning that which is known to us.

Yet according to Lipton and Watts (2004:90) there exists a widely-held belief that art is purely aesthetic. According to this view art does not have the capacity to change the world. This has led to the diminishing of artists' ability for constructive thought and action.

[36] Hargrove (1979:226) refers here to the establishment of Yosemite during the 1860s and Yellowstone in the 1870s as reasons for preservation in America.
[37] Artist and architect Friedrich Kiesler summarized creativity as "an instinctive search for truth; …a relentless probing into the world beyond; …a pursuit of purpose to the bitter end until the standard status is changed [and] disobedience to conformity" (Grande 1994:70).

Although artists were regarded from the earliest times as the moral voice of society, whose function it was to "reflect society while also questioning its ethics", Boberg (2004:7) reminds us that man ultimately forgot himself as part of nature. In 1983 British painter George Baselitz claimed that the idea of changing or improving the world was unknown to him and that it seemed ludicrous. Society therefore functions, and always has, without the artist. "No artist has ever changed anything for better or worse" (Gablik 1995:77). Sonfist concurs that the original relationship between the artist and society has been lost, as the modern artist has been limited to producing pieces restricted to the gallery context with a strong economic facet hampering the artist's sense of aesthetic experience (Rosenberg 1983:209). Arthur C. Danto describes this situation as the "disenfranchisement of art" (Danto 1986:10).

Although the above argument is to a large extent true, ecological aesthetics is founded on the following notion: Virtually everything, including nature and culture are bound by an infinitely diverse system of relationships. Therefore the term 'ecology'[38] is the "resulting total of multilayered exchanges and relations of infinite diverse existences" (Strelow 2004:11). Felix Guattari calls for "the three ecologies" (the environment, the social and the mental) within an "aesthetic paradigm". The intention is to transmit the human sciences and social sciences from scientific paradigms to "ethical-aesthetic" paradigms (Guattari 2000:24). According to Bourriaud (2002:95) "nothing (no art) will be possible without the deep ecological transformation of subjectivities, without the awareness of the interdependencies on which subjectivity is based". Comprehended in this way, Erzen (2004:24) suggests that "dynamic aesthetics" in itself represents an ecological system. In other words, a work initiated by an artist will later have a life independent from its creator and participation and engagement by others will be required.

The best example of such an approach is the work of artists Helen Mayer Harrison and Newton Harrison. These artists are early pioneers[39] of an ecological art that is conceptual, sculptural, site-specific, and interactive by nature (Lacy 1995:231). The two artists have

[38] Outside of the hard sciences, ecology has acquired a broader meaning not confined to a specific discipline, but a more general "systemic interconnection" of culture and holistic science (Goodbun 2011:38).
[39] The Harrisons started collaborating in the late 1960s, partly under the influence of Rachel Carson's *Silent Spring*, according to Cembalest (1991:98).

worked together since 1970 (Harrison Studio [sa]). They practice an 'eco-aesthetics' according to McGreevy (1987:68) that surpasses the judgement of critics and curators on this category of art, who perceive them as hybrids (being neither artists nor scientists). The artists in turn argue that they try to eliminate the synthetic barriers between medium and discipline. In other words, they are willing to use any technique to advance their goals (Lippard 1983:233).[40] Apart from being art activists, they take on the roles of historians, diplomats, ecologists and ambassadors. "We take up the cultural and the political, the aesthetic and the ecological, all at once. Generally people in other disciplines only take this up part by part" (Cembalest 1991:101).

Projects taken on by the Harrisons have included watershed restoration as a major interest. The Harrisons define a watershed as a reserved bioregion that offers the greatest opportunity for biodiversity, since it consists of many sub-regions, such as estuaries and wetlands, meadows and forests along with other diverse topography (Harrison & Mayer Harrison 1995:200). Some of these visionary projects have given rise to changes in governmental policy, by making use of the knowledge provided by the natural sciences. The aim with this was to expand the dialogue around formerly unexplored environmental issues and thereby find practical solutions (Crawford 2004:311).

Breathing space for the Sava River (1988-1990) is a project that deals specifically with water restoration. In 1988 the Harrisons were invited to view one of the last great floodplains of Europe, the Sava River ecosystem (Leibovits Steinman 1995:232). The river system, clean at its source, was under threat from pollution caused by industry downstream. The artists joined forces with scientists[41] to propose a clean corridor along the length of the river. They introduced wetlands for the natural absorption of pollutants in conjunction with the practice of organic farming along the river's boundary. The Harrisons exhibited their proposal with photo-collages and texts, narrating the river's story and discussing the possible solutions (Sava River [sa]).

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[40] Newton explains that, "in the context of the art world, our works do, in fact behave like works of art. When they're exhibited in City Hall, however, they read as inspired proposals in poetic form, and the art aspect is not discussed" (Adcock 1992:39).

[41] The Harrisons worked closely with a botanist and ornithologist. Together they investigated the river to seek solutions for the formation of a planned nature reserve, talking to the people depending upon it and even to regional bureaucrats (Sava River [sa]).

Even though the Harrisons commit themselves fully towards the projects with which they involve themselves, their proposals are often rejected. The Sava River project was ceased due to civil war in the area in 1991 (Leibovits Steinman 1995:233). Another unsuccessful but relevant example is *The Shape of Turned Earth: A Brown Coal Park for Südraum Leipzig* (1996) for which the Harrisons proposed building a replenished eco-cultural landscape from 300 square kilometres of excavated earth, the result of fifty years of coal mining (Figure 22). The Planning Department in place at the time rejected their proposal and today most of the mining excavations have been filled with water from the rising water table. This has turned the area into just another derelict mining site (The Shape … [sa]).

The artists envisage their projects as "metaconversations", according to Lacy (1995:232), which the artists call the "conversational drift".[42] Seeing that one conversation can lead to others and back to the original[43], they value the impact(s) of their investigations as impossible to measure. According to Kester (2004:86), "they see their role, not as sole authors, but as catalysts, mediators and facilitators of an ongoing process".

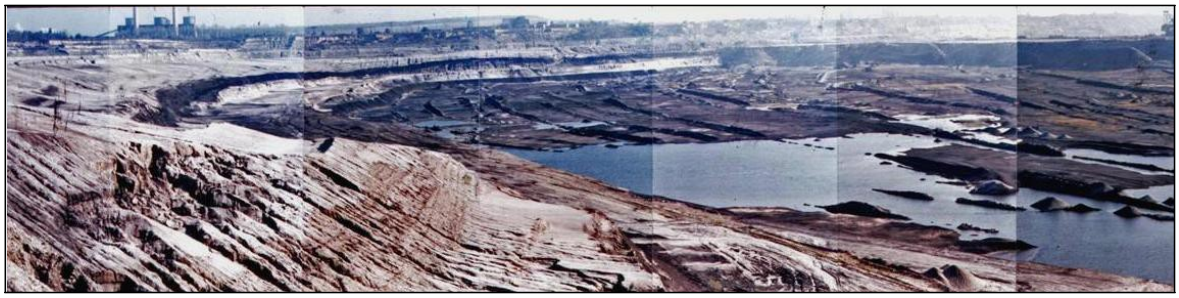

Figure 22: Newton and Helen Mayer Harrison, *The shape of turned earth: a brown coal park for Südraum Leipzig,* 1996.
Excerpt from photographic installation, dimensions unknown.
Witznitz, South Leipzig, Germany.
(The Shape of Turned Earth: A Brown Coal Park for Südraum Leipzig [sa]).

[42] "Conversational drift implies that conversations have a way of drifting, like clouds. Thus often times, they drift away from you and you can find yourself let out of the very conversation that you began. Perhaps it will drift back again …Such events happen to us frequently. Because of this, the larger the work, the more anonymous we become" (Harrison & Mayer Harrison 1995:201).
[43] Other related work (conversations) is often generated by apparently fruitless projects, such as the Drava River (which is a sister river to the Sava) project that was born out of the Sava River project in Croatia (Sava River [sa]).

Local artist Karel Nel is known for his interdisciplinary collaborations that involve extended journeys by the artist, who works with a variety of people on ambitious projects. Nel is interested in science and its relation to art. Although both question the nature of reality, they are considered as opposing disciplines (Smith 1999a:[sp]). Nel has been the artist in residence for the Cosmic Evolution Survey (COSMOS), since the project's inception in 2006. The project involves more than 100 scientists in the quest to map and study galaxy clusters and dark matter in a two-degree-square-area of the night sky (Dixon 2011:100).

Nel is deeply fascinated by the history of the earth and the interdependence of humanity and nature. This interest is inherent in his use of materials, of which dust is possibly the most significant, mostly seen as a material of discard. The artist insists that dust holds within it a magnitude of information, which can be interpreted as the earth's DNA (Greslé 2007:23).[44] This insight has led to a range of different abstract works, which according to Smith (2007:[sp]) "allows the works to mirror the landscapes they reference" where "mark-making dissolves forms into 'particles'" (Smith 1999a:[sp]). These dust particles are derived from locations such as ancient open-cast mines in Swaziland, and most significantly from the yellow mine dump sand from City Deep, one of the oldest gold mines in Johannesburg. The latter can be seen in a work titled *Zero* (2002), forming part of Nel's *Status of Dust* series (Botha 2008:97). In this work a large golden-yellow circle of mine dust sits in the middle of a black carboniferous background. According to Marquis (2003:[sp]) the viewer is forced into a state of "original contemplation", to an "ahistorical" time prior to the emergence of humans or even the continents themselves.

This work is significant in that it refers to the geological history of the earth, which refers to a span of time that humans cannot comprehend. One can contemplate the purpose of gold as the most precious metal on earth and one can question the methods of resource extraction by humans in such a short space of time. One is also given the opportunity to contemplate the future of the earth's geology in a time of rapid resource extraction.

[44] In a work entitled *Cultural Ground,* earth was collected from New York's Central Park, Hyde Park in London and Joubert Park in Johannesburg. Through scientific analysis, it was possible to specify exactly the origins of the otherwise identical-looking dust (Karel Nel 2004:[sp]).

This phenomenon is even more apparent in the work of another local artist, Jeannette Unite, who collects sands and detritus from derelict mines that are "soiled with history". Her palette is made up of mine dump sand, dust and metal oxides, all by-products of the mining industry (Jamal 2012:78). Unite has researched and surveyed South Africa's geographical and geological history for more than a decade by visiting mining museums and archives as well as mining sites around the country and studying the impact of colonialism and globalisation on the landscape (Lamprecht 2010:[sp]). Mining sites visited by Unite includes the first colonial mine, which was a copper mine in Namaqualand initiated by Simon van der Stel in 1685. Unite's sites also includes active and derelict gold, coal, manganese, titanium and platinum mining sites (Unite 2010b:98). Unite's first body of work on mining was titled *Earthscars: A visual mining exploration* (2004), which was a series of drawings based on the artist's alarmed response towards the 40-year old diamond prospecting pits on the Palaeolithic West Coast. Unite determines to cross-examine the levels of distress inflicted not only on the land but on those who had to work in and beneath it. Unite also investigates how mining has contributed to defining South Africa's cultural and social-political identity (Lamprecht 2010:[sp]).

In a more recent exhibition by Unite, titled *Paradox of Plenty* (2011), which revolves around issues of the so-called "resource curse", the viewer is confronted by over 1500 images of the history of mining (Bell (2011:[sp]). These images form part of an installation with Unite's massive *Headgear* drawings and a table with a variety of mineral pigments and pastels concocted by the artist herself, offering demonstrations to gallery visitors (Figure 23). The exhibition took place in the Michaelis School of Fine Art Gallery of the University of Cape Town, which incidentally is named after gold mining magnate, Sir Max Michaelis who was the chief patron to the school. The exhibition also coincided with the 125 year anniversary of gold discovery in Johannesburg. In this exhibition, the artist comments on the environmental impact that is evident through man's consumption of finite metal resources, which in turn is the foundation of the "technospasm"[45] we live in (Paradox of Plenty 2011:[sp]).

[45] Archaeo-metallurgist Duncan Miller (2007:20) termed the unsustainable acceleration of non-renewable resource harvesting as a 'technospasm'.

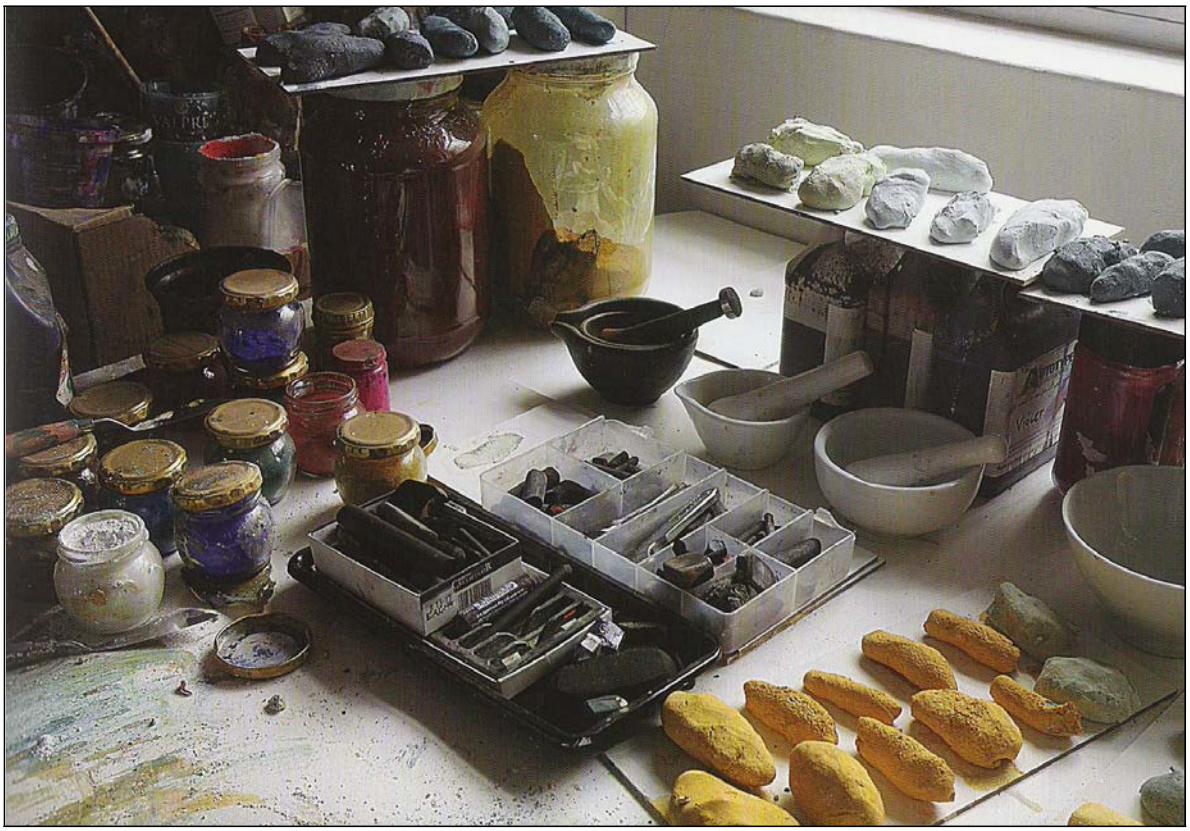

Figure 23: Metal oxides, site-specific sands, metal grindings, mine dump tailings and pigments mixed into paint and handmade pastels by artist Jeannette Unite, Michaelis School of Fine Art Gallery, University of Cape Town, 2011.
(Lamprechts & Powell 2012:7).

Unite is intensely aware of the artist as the end-user of mining extraction. Likewise, the artist is highly aware of the fact that pre-industrial artists had to make their own paints from raw materials. Unite asserts that her unique materials are both subject and object and that her abstract home-made pastel drawings and glass panel landscapes are in effect forged from the actual landscape (Unite 2010b:98). According to Jamal (2012:78), this represents "that point when earth becomes commodity; that point when the commodity is exhausted".

In Unite's quest to re-establish the relation between art and science, she teams up with metallurgists, geo-chemists, paint-chemists and ceramicists to help her develop paint, pastel and glass recipes for her "eco-alchemic" work. What intrigues the artist about alchemy is the opportunity to perceive things (minerals) in themselves, in opposition to the

way they are used (Powell 2012:170). The gold mine sands (Figure 24) collected by the artist contain enough metals, some of which are toxic (like lead, arsenic and cyanide). These metals reveal astonishing colours in a molten state when exposed to extreme temperatures in kilns (Gurney 2012:22). The process of melting her glass panels, mimics the geological processes of the earth, in that the same minerals are used (Figure 25). This results in crusty, rough and often sharp creations that hint at an element of danger (Lamprecht 2012:112).

Figure 24: Gold mine dump waste from Jeannette Unite's studio, Cape Town, 2010. (Unite 2010:99).

Figure 25: Jeannette Unite, *Carbon Imprints*, 2010.
Gold mine dump waste containing carbon, graphite, manganese, iron and titanium, 30 × 30 cm. (Unite
2010:98).

Unite travels widely in especially Africa to visit industrial sites. At the same time she also reaches out to communities by hosting colour workshops, to help local people create their own paints from their immediate surroundings. She was recently hailed by curator of the Harare National Gallery, Raphael Chikukwa as a "story-teller, thinker, archivist, environmental activist, political commentator, teacher and a cultural historian making a unique contribution to the post-colonial discourse through her particular use of materials that define locality" (Bell 2011:[sp]).

Unite's use of site materials in her work, reveals to the viewer the very core of pollution and heavy metal contamination brought on by the gold mining industry. While the artist has not necessarily dealt directly with the effects of such contamination on the health of people and local ecologies, she does make one acutely aware of the economic and social consequences. One could regard Unite's work as a strong reminder of what is left in the ground in a post-mining context, where discarded material, considered as waste, still holds value from a human and more specifically, an artist's perspective.

2.3.1 Heavy metal contamination and AMD as remediation projects

This section will investigate artists who have attempted to deal with heavy metal contamination and AMD caused by industry, and soil and water. Many of these artists implement an interdisciplinary and trans-disciplinary[46] approach.

Mel Chin is an artist who, in the same way as the Harrisons, draws on models outside the arts to generate and expand the definition of art (Lacy 1995a:39). *Revival Field* (Figure 26; 1990-present) is an excellent model of successful multi-institutional collaboration. *Revival Field* is an experimental project, which makes use of plants, known as "hyper-accumulators"[47] to cleanse industrial contaminated soil from a 307-acre toxic waste site[48] near Minneapolis. The cleansing is achieved by the absorption of heavy metals through the vascular system of the plants (Matilsky 1992a:48).

Chin collaborated with a scientist at the U.S. Department of Agriculture, specialising in soil and microbial systems and its potential role in 'green remediation' (Matilsky 1992a:48). Chaney's own proposal in 1983 to make use of plants as remediation agents for contaminated soil was rejected; therefore their collaboration became the first attempt to test Chaney's laboratory work on a large scale (Chin 1995:174). Formally, the work consisted of a cross within a circle, within a square (which also served as the fences). The hyper-accumulators were planted within the circular area to serve as the test site, while the

[46] Trans-disciplinarity is seen as a further development of interdisciplinarity, as not only embracing other disciplines, but collaborating with them (Strelow 2004:15).
[47] Hyper-accumulators have historically been used as a method of prospecting (Chin 1995:174).
[48] The waste site, known as the Pig's Eye landfill, contained high levels of a toxic heavy metal, namely cadmium (Chin 1995:176).

space located between the circle and the square, served as the control (which was unplanted and of equal area as the test site) (Leibovitz Steinman 1995:211).[49]

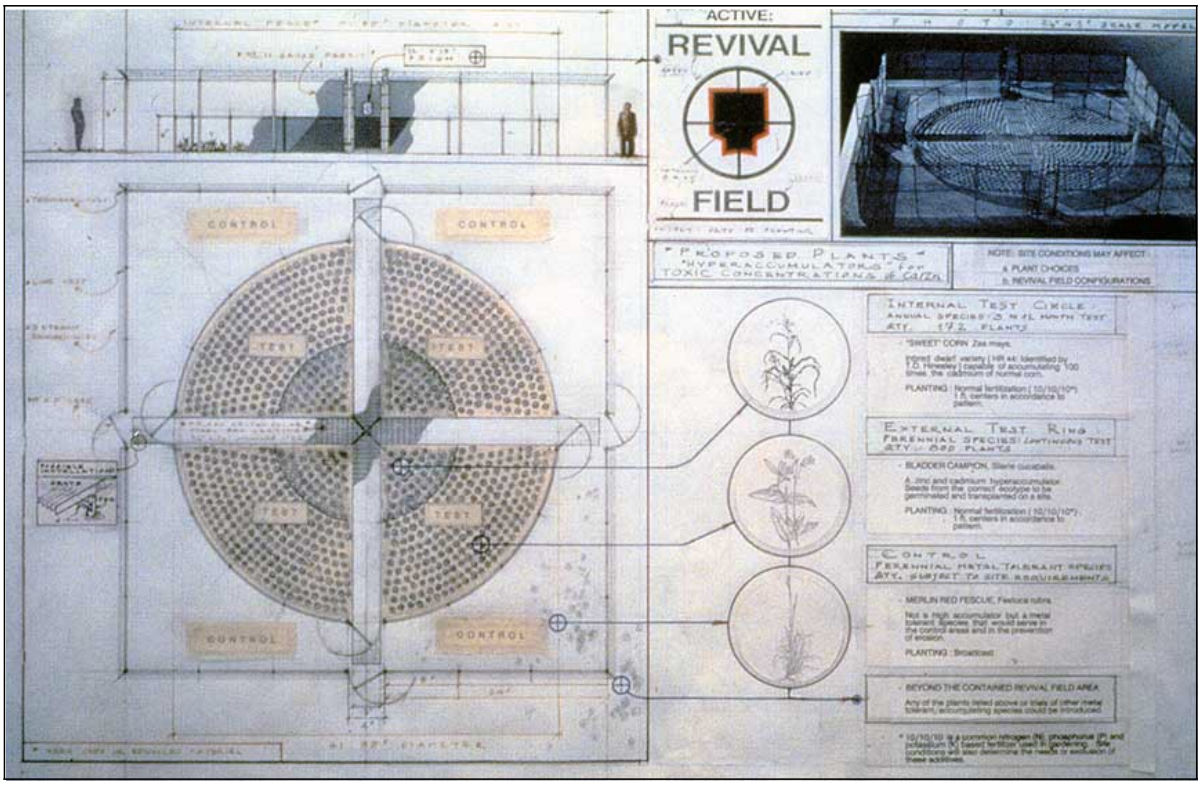

Figure 26: Mel Chin, *Revival Field* schematic drawing, 1990-persent. Graphite, ink and photocopied images on rag board, 70 ×91 cm. (Revival Field: Schematic drawing [sa]).

Chin explained that *Revival Field* was a sculpture in the most traditional sense, apart from the formal design, involving a reduction process (referring to the carving process). In this case the material used is invisible and the chisel consists of biochemistry and agriculture (Figure 27). After completion, *Revival Field* will offer minimal visual effects. The invisible aesthetic will be determined scientifically by the quality of revitalised soil. Finally, the aesthetic will be unveiled by the returning growth to the earth, once the burden of heavy metal contamination is shed (Chin 1995:176). On a social level, *Revival Field* draws

[49] When the plants are harvested, the toxins they contain can be safely removed or mined from the plant (Chin 1995:174).

attention to the problem, similarly to the Harrisons' projects. Chin explains: "I'm trying to extend the dialogue of what art is about and what it can do" (Cembalest 1991:101).[50]

Figure 27: Mel Chin, *Revival Field*, 1990-persent.
Silene cucubalus and Thlaspi caerulescens hyper-accumulators on cadmium contaminated landfill soil, dimensions unknown.
Pig's Eye Landfill, Minneapolis.
(Revival Field: Projection and procedure [sa]).

Buster Simpson started making people aware of the presence of toxins in the water by placing unfired white ceramic plates in sewage outfalls of water bodies in America, such as Love Canal and New York's East River. The plates absorbed the river's pollutants and when finally fired by Simpson, revealed colourful glazes as seen in *When the tide is out the table is set* (1983-84, Figure 28) (Cembalest 1991:100). These glazes are comparable to Jeannette Unite's molten glass pieces. Armed with science as his medium, Simpson

[50] Chin is currently working on a nationwide, multidisciplinary project, called *Operation Paydirt/Fundred Dollar Bill Project.* The project involves national public participation to fund the cleanup operation of lead-contaminated soil in New Orleans (Fundred [sa]).

continued his work on the polluted rivers, this time with the intention of healing or reviving the deteriorating quality of water. Simpson's installation *Hudson Headwaters Purge* (1991; Figure 29), focuses on the effects of acid rain on hydraulic systems. Simpson added limestone disks to the Hudson River, which dissolved and neutralised the water temporarily (Sanders 1992:77). The artist entered the river himself, in a gesture evocative of Native American ceremonial practices, in order to place the disks in the water (Kastner & Wallis 1998:166).

Figure 28: Buster Simpson, *When the tide is out the table is set*, 1983-84.
Heavy metals on ceramic plate after exposure to water and fired in a kiln, 50 × 50 cm.
(Matilsky 1992b:94).

Figure 29: Buster Simpson, *Hudson Headwaters Purge*, 1991. Soft limestone disks, 8 × 61 cm each. Headwaters of the Hudson River, Lake Placid, New York. (Kastner & Wallis 1998:166).

The practice of adding lime to acidic water to improve the pH of the water is used throughout the world, although it offers only a temporary reprieve. A trans-disciplinary reclamation initiative in the United States managed to develop ideas to find a more permanent solution to the problematic issue of AMD affecting rivers and groundwater in the small town of Vintondale, Pennsylvania, in the United States of America. This is the location of the 35-acre site where a trans-disciplinary collaboration project was set in motion by 'artist/thinker' Alan Comp[51] that was to last more than twelve years, known as AMD&ART.

[51] Although without academic training in the arts, and holding a PhD in history of technology and economics, Allan Comp has shown a long commitment to cultural resources, community engagement and environmental recovery, praised for his orchestration of the AMD&ART project which he initiated along with various other AMD&ART related projects (Berger 2008:xi).

Vintondale, an early twentieth century coal-mining town, is one of many similar towns in the region to be left scarred and abandoned by the very industry that developed it. The last mine in the town closed down during the 1950s. This lead to the decline in the town's ecological and social health, until it became a dump by the 1980s, ravaged by AMD due to the underground and surface mining works left un-remediated (Comp 2003:5). AMD&ART developed out of this need of environmental neglect, following the "unmitigated greed" of American culture to transform this vast stretch of waste-land into an environment for recreation, historical reflection, ecological education and AMD remediation (Comp 2008:66).

Comp (2008:75) states that while a scientific solution may remove AMD from the water, a collaborative, inter- and multi-disciplinary approach that engages the arts and sciences together has the potential to not only clean the water, but also to include the community in a "healing process that continues long after the water is clean". In order to achieve this, a real understanding must first be formed of the history of the problem, with historians, anthropologists, writers, landscape architects, designers, sculptors and other visual artists to engage with science at every stage. It is also necessary to work closely with the community (Figure 30 & 31), and in doing so, "artfully transforming environmental liabilities into community assets" (Comp 2003:1).

Figure 30: AmeriCorps Vista Volunteers busy with wetlands restoration, Vintondale, Pennsylvania, (s.a.).
(Once coal and…[sa]).

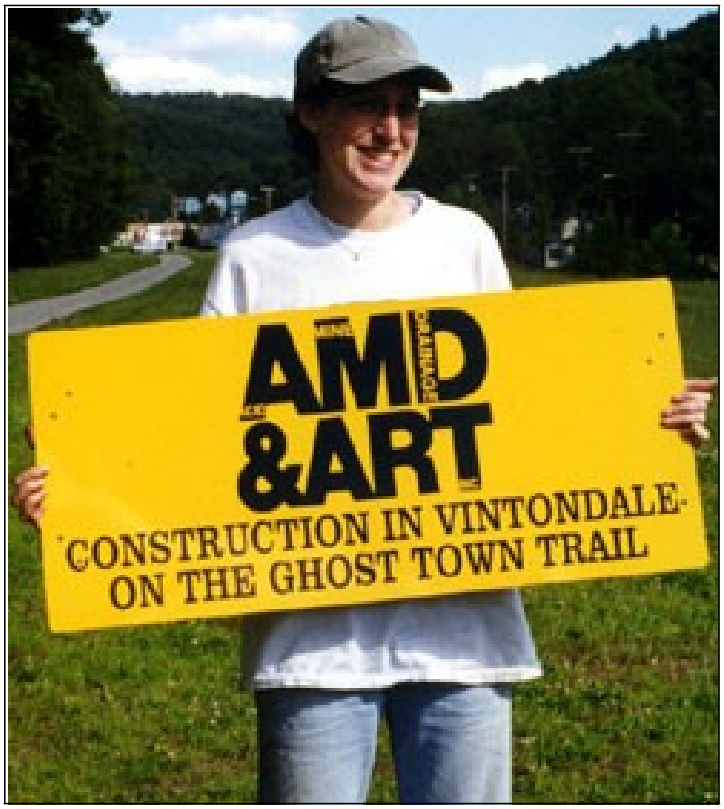

Figure 31: AMD&ART community volunteer in Vintondale, Pennsylvania, (s.a.). (Comp 2003:5).

The consequential design proposal incorporated ideas from every contributing party, giving the final design the significant mark of community perspective (Comp 2003:6). By using 'passive treatment',[52] AMD&ART challenges the idea that treatment systems should be hidden, due to the embarrassment felt by society of the unsightly spectre created at their own hands. AMD&ART maintain that reclamation should be a commemoration, not an artfully implemented amenity, since there is no point in trying to escape and avoid the reality of AMD (Comp 2003:5). It should rather be an unconcealed, evident effort by a new generation to transform site remnants into historical reminders, "ghosts" if you will, that invite reflection (Comp 2003:3).

The design of the site, involves a series of large pools marking the beginning of the treatment system, through which the AMD discharge flows. When it exits into the newly

[52] 'Passive treatment' refers to nature's natural systems, where in this case native plants and limestone were used to absorb heavy metals and neutralize the acidity in the water (Comp 2003:2).

constructed seven acre wetland, with a stable pH and fewer contaminants, it successfully attracts a diversity of birds and other wildlife. Nearby, a native tree arboretum and a recreational area were developed for the town's citizens. Visitors can follow interpretive trails, sketching the history of the site and the science employed in the passive AMD treatment (Comp 2003:7). At the site of the Mine No.6 portal, the opening of the old shaft was closed off with a large black polished granite slab, with life-size etchings of the labourers of the mine obtained from 1930s film footage (Figure 32). The fifteen-by-twenty-foot platform of the old station has been transformed to become the interpretive guide to life above ground, by means of a mosaic map (based on the original 1923 Sanborn Insurance Map of Vinton Colliery) of the entire site to establish a better understanding of the industrial town and its inhabitants (Figure 33) (Comp 2008:67).[53]

Figure 32: Former miners stand at the Mine No 6 portal, with the artist's rendering of a shift change scene from the1930s, Vintondale, Pennsylvania, (s.a.).
Engraving on polished black granite slab, dimensions unknown.
(Once coal and…[sa]).

[53] The 1923 Sanborn insurance map of the site was used; along with images of old company buildings, newspaper headlines and census data (Comp 2008:67).

Figure 33: Vintondale residents explore the Great Map and recognize friends on an etched newspaper clipping, Vintondale, Pennsylvania, (s.a.).
Mosaic of tiles and etched black granite slabs, 456 × 609 cm.
Photograph by Holly Lees.
(Once coal and…[sa]).

Today, AMD&ART is recognised in the United States as a successful model for reclamation. It has proved to be sustainable in its environmentally rational approach to treating AMD. It has won several awards in the country for its contribution not only to successful remediation, but also to the re-conceptualisation of AMD treatment, creating meaningful pathways to more useful reclamation (Berger 2008:xi). AMD&ART as well as the other artists in this section have proved that art can contribute to the remediation of polluted post-industrial landscapes, while also stimulating awareness in people. Yet, some researchers question whether art is at all appropriate for these problems, when there are other knowledgeable fields that are more competent for such projects. The next concluding section will investigate this aspect.

2.3.2 Why utilise art for remediation?

Lacy (1995a:46) raises the imperative question whether art operates differently to direct action. Why is art at all necessary if bioremediation and ecological restoration is doing the

work? (Bonanno, Brookner & Leibowitz Steinman 2004:100). Brookner (1992:9) points out that these types of collaborative projects, involving scientists, engineers and municipal authorities are significant beyond their practical value: "They feed our imaginations with positive images of participation and regeneration".

Bonanno et al (2004:100) add that it is not enough to restore ecosystems. One needs to make the restoration processes visible and understandable by engaging with the public. Thus it could be stated that the presence of art in the environment draws attention to its surroundings. According to Adcock (1992:41), their work carries an "absurdist twist" that underlines the difficulty of discovering ecologically sound solutions to set ecological problems. Artists furthermore aim to connect knowledge, thought and action though mediating and assuring the co-operation of all relevant groups and disciplines. It is the artists themselves who become the catalysts for transformation processes which they initiate, promote and put forward (Strelow 2004:13).

Art's intentionality, when focused on ecological problems, "is received much more willingly by the public", and therefore can be much more educational and appealing than mere practical problem solving, which is without "metaphoric and aesthetically conceived forms" (Erzen 2004:24). Artist Viet Ngo[54] reinforces this view by explaining how important it is for artists to design public infrastructures, since "visual design determines the level of consciousness and identification people have for their surroundings" (Leibovitz Steinman 1995:266). Adcock (1992:41) claims that, "by operating in the domain of art, the Harrisons can, perhaps, more readily teach us about the ecological dimensions of the human condition than they could were they working in the domain of science." This statement summarises the purpose of the artists discussed in this section: They aspire to assemble people from different fields of knowledge to start a conversation, which is the first step to finding a solution, rather than trying to solve intricate problems on their own. In the end art gives us a broader vision of the world and ourselves and becomes "a force for social and environmental transformation" (Grande 1994:14).

[54] Viet Ngo is an artist and qualified engineer, who builds and designs waste water treatment plants for cities and industries. Viet Ngo makes use of the *Lemna System*, which is a system of small floating aquatic plants that filters waste to a fine degree (Viet Ngo 1995:178).

CHAPTER THREE: INSIDIOUS WATERS

This chapter discusses the researcher's own art practice and body of work produced for a gallery setting. In particular, the issue of AMD in the Witwatersrand and the consequences of mining for gold in this geologically significant landscape are explained. The researcher's work is influenced by science and reference is made to scientific reports in the discussion of the work. A walkabout is also scheduled for the exhibition, where the researcher is accompanied by scientist Dr Francois Durand, who assists in the more technical scientific aspects. Examples of artworks produced by other artists dealing with similar issues and materials are also included in the chapter. The fine art disciplines of sculpture, photography and installation are involved in the discussion of the researcher's art practice.

The researcher's work is tied to current real-world events that compel her to enter the relationship between art and morality. By expressing her concerns though art and more specifically, through installation, she gives those concerns a physical form, in the real time and space which it shares with the world. Rudolf Arnheim (1971:56) states that, within the limited span of time and space in the gallery, the work of art "concentrates a view of the human condition".

3.1 Acid Mine Drainage in the Witwatersrand

According to Devall and Sessions (1995:163) developing countries around the world are less concerned with ecological issues, as they tend to focus on economic growth. The mining industry in South Africa is a key sector and one of the country's largest employers. In many developing countries, such as South Africa, raising production rates in the mining of raw materials is often detrimental to the natural environment (Schenkel 2004:162). One of the oldest mining endeavours in the country is the gold mining industry, which has indelibly left its mark on the surrounding landscape. Countless mines, following the west-east course of the 80 kilometre long main gold-bearing reef, extending from Randfontein in the west,[55] through the heart of Johannesburg to Springs in the east, were established. Today, after more than 120 years of mining for gold on the Witwatersrand, these mines

[55] On the West Rand the last active gold mine closed down in 1998 (Mine dumps…2008:[sp]).

have closed due to the exhaustion of payable gold ore reserves, rendering the mines unprofitable (Tempelhoff 2008a:[sp]). Subsequently, all mining activities have been halted, including the expensive operation of pumping underground water from mine shafts to prevent flooding. As such, there are multiple locations such as derelict shafts, slimes dams and inadequate treatment plants where mine water is rising to the surface and escaping into river systems. This water, known as AMD,[56] taints everything in its path red[57] and destroys all aquatic life as it progresses downstream (Tempelhoff 2008a:[sp]).

Today this decant of acidic and noxious water is perceived as a water catastrophe (Mine dumps…2008: [sp]). Well-known water scientist Anthony Turton claims the country faces an environmental crisis comparable to Chernobyl (Jordan 2011b:1). There has, according to Liefferink (2009a:9) been little or no effort to raise awareness of environmental health risks by the relevant mining companies or the government, or for the development of the understanding, skills and capacity required for realising fair and effective partnering in environmental decision making. According to Jordan (2011b:1) more than a year after government's own task team[58] advised emergency intervention, government has not yet approved a plan of action. Even more disconcerting, is government's refusal to accept help and advice from outside establishments.[59]

The researcher's interest in this particular issue was fuelled by the severity of the pollution, which has unfolded unimpeded for over a decade, without her awareness of the situation. Environmental activist Mariëtte Liefferink has played a seminal role in exposing the AMD

[56] Acid Mine Drainage is caused when iron pyrites, which are found along with a number of other minerals in the gold bearing quarts of the Witwatersrand, comes into contact with oxygen-carrying water from cracks formed in the rock, due to mining activities, causing the water to turn acidic. Once this water turns acidic, it dissolves any metal with which it comes into contact. Therefore AMD contains abnormally high concentrations of dissolved metals in addition to its acidic properties (Durand 2009/03/27).
[57] Acidic mine water appears red or orange, due to the high amount of oxidized iron pyrites, along with other dissolved heavy metals (Durand 2009/03/27).
[58] The inter-ministerial committee on AMD consists of a team of experts from the Council for Geo-science, the Department of Water Affairs and the Waste Research Commission (Bega 2012:[sp]).
[59] The Western Utilities Corporation already offered a solution to the problem in 2008, with their proposal to pump the AMD from a central point and purifying the water with new technology to a potable standard, which they proposed to sell to Johannesburg Rand Water (De Lange 2012:16).

crisis and demanding action.[60] Largely as a result of her lobbying, the government has now finally acknowledged the problem (Bega 2011:[sp]). In recent years, numerous press reports and media programmes have exposed the environmental impact of mining on the Witwatersrand, elucidating the situation as a looming environmental crisis.[61] Because of this sense of urgency, the researcher decided to create a body of work that would provide an additional avenue of bringing the issue to the awareness of the public. Despite the newspaper reports, television specials and news broadcasts, many people are not yet aware of the situation. Sanders (1992:77) claims that art has a distinctive potential for raising awareness and initiating the mind-shift needed for the sake of our survival, through its capacity to "symbolise complex abstractions in concrete ways". She stresses that there is never one perfect tactic to effect change, therefore many different approaches are needed to reach a diverse audience.

Even local artists who have attempted to draw attention to the negative impacts brought on by the gold mining industry in the past, have mostly only taken up some of the issues, often times being completely unaware of the dangers that might affect their own health. For instance, Kentridge previously worked as an art director at a mine dump, where they were filming the yellow sands of the tailing as a substitute for the Namibian desert (Kentridge 1999:126). Papageorge has spent a significant amount of her time on top of mine dumps executing her work, ignorant of the inherent dangers posed by the dump (Figure 34). The same can be said of Van den Berg and many others who have come into direct contact with the dumps' toxicity. Unite makes known her awareness of the heavy metals, yet she visits many sites and uses these materials as her palette without gloves or mask, seemingly oblivious of the radioactive component in these materials (Figure 35).

It is therefore the intention of researcher's practical body of work to address the effects of toxicity brought on by AMD of the gold mining industry. The aim is to provide knowledge within an aesthetic experience. By studying the issue of the toxic heavy metals (with emphasis on uranium) released and mobilised by AMD, the researcher hopes to inform the

[60] The environmental activist, Mariëtte Liefferink, has lobbied on the issue for the past twelve years and is also the chief executive of the Federation for a Sustainable Environment (Bega 2011:[sp]).
[61] The researcher first became aware of AMD in the Witwatersrand after watching a broadcast of *Carte Blanche* in 2007, where Liefferink was consulted on the matter.

public of the risks they face by consuming produce that originate from contaminated agricultural areas. By doing this, the researcher is also confronting the mining companies and other responsible parties, by creating contemplative and provocative art. It remains imperative that people become aware of environmental situations as critical as the one in the Witwatersrand. In the words of Jean Rostand: "The obligation to endure gives us the right to know" (Carson 1962:30).

Figure 34: Mine workers carrrying the huge elements of *Suspension* up the steep slopes of the Simmer and Jack Gold Mine dump, south of Johannesburg, at 5.30 am and taking the work down in the late afternoon on 31 October, 1990.
Photographs by Papageorge.

Figure 35: Unite handling her handmade materials without gloves or mask during her *Paradox of Plenty* installation, Michaelis Galleries, University of Cape Town, 2011.
(Powell & Lamprecht 2012:189)

Danél van Tonder from the board of Geosciences is of opinion that in some cases it would cost more to rehabilitate the mining sites than what was earned by the communities that worked for the mining companies (Tempelhoff 2008e:[sp]). Geologist E.T. Mellor already

mentioned this in a presidential address to the South African Association for the Advancement of Science in 1922: "…so few ever attain a material reward in any way adequate to the energy they have put into its pursuit" (Eales 2007:287). According to Brookner (1992:11) "we have denied looking at the destruction we are causing and that we have in effect rejected the responsibility of our own "collective waste", commenting that "as long as we couldn't see the liquids and gasses of industry pouring into our soils and seas and air and the solids of our own consumption piling up, it was okay". Schenkel (2004:146) supports this view by declaring that "for a long time the history of waste disposal was dominated by the bury and forget principle", but now this "business as usual psychology of affluence" and its effects on the human environment can no longer be ignored. Artists are some of the first to have voiced their concerns. Mexican artist Guillermo Gómez-Peña says that we are living in a "state of emergency" (Gablik 1995:75).

Collins (2004:170) notes that the restoration of nature has become a cultural problem for the arts, science and humanities, which ask for an "embodiment of a new consciousness" that needs to take responsibility for the past, as this would inform the actions of the present and future. Philosopher Maurice Merleau-Ponty indicates that it is no longer enough for artists to express their ideas, as they must also arouse the experiences that will "make their idea take root in the consciousness of others" (Gablik 1991:108). Some of the environmental artists discussed in this mini-dissertation have done this very successfully, especially those working in the affected environment. Yet converting post-industrial sites into artworks is not the only viable option for the artist. Artists can still deal with post-industrial sites in other meaningful ways with an aim to create awareness. Strelow (2004:14) reminds us that "ecological aesthetics is a phenomenon involving consciousness raising, provoking a search for definitions in a process of which observing, investigating, experiencing and making oneself understood are typical features".

The above-mentioned points are seminal to the way the researcher has approached the environmental situation in the Witwatersrand and the way she has executed her art. Lacy (1995b:175) identifies four roles artists take up when engaging with social and environmental issues. The researcher however prefers to describe these roles as stages, namely Experiencer, Reporter, Analyst and Activist. An artist can take on the role of Experiencer for situations where there seems to be no immediate solution to urgent

social/environmental problems, in which case the artist acts as witness of the reality taking place. This can be described as the initial stage where the researcher photographed the affected sites. The artist can also take on the role of the Reporter, where he/she collects information with the intention of recounting a situation. In this case it would also be the artist's intention to not only inform the audience but also to effectively persuade them. The researcher aims to achieve this through the use of provocative titles and original works of art.

So far the instinctive, receptive, experiential and observation skills of the artist play a significant role, but there is also the role of Analyst. Social situations are analysed through art, making use of skills associated with scientists, investigative journalists and even philosophers. Often, conventions of beauty are challenged, as visual application may be surpassed by textual properties of a work (Lacy 1995b:176). In the researcher's work, the presence of industrial objects challenges the traditional ideas of beauty. Finally, the artist can take on the role of Activist with the intention of becoming a medium for change. Here the following is of vital importance: Collaboration; moving over to other disciplines; developing work with a multi-layered audience as target; and incorporating those who are not informed in art (Lacy 1995b:177). Rather than merely creating a piece of art for people to admire, one has to grasp the opportunity to engage with an audience. By creating a situation where people are able to reflect on the world with renewed perspectives, the artist opens up the window for change (Phillips 1995:70).

The researcher started to investigate and research the issue of AMD and the elevated levels of uranium produced by the gold mining industry by visiting some of the affected areas with Liefferink and scientists.[62] One of the scientists who have been very supportive of her endeavours is Dr Francois Durand. The researcher was introduced to farmers such as the Coetzee brothers on their farm Blaauwbank near Welverdiend and René Potgieter from Gerhard Minnebron, as well as mining personnel on the affected mining sites. By conversing with a wide range of people with their different perspectives, it became clear that AMD in the Witwatersrand is a highly contentious issue with no simple solution, as the problem consists of historical, economic, geological and scientific components.

[62] These scientists include Dr David Fig, Sue Janse van Rensburg, the National Director of CANSA and her assistant Magdalene Seguin.

Motivated by this field work and the reading of scientific reports and assessments, while also following the media closely for the latest developments on the issue, the researcher decided that science could potentially serve as a key component for her practical body of work. She accompanied Dr Durand and his co-workers on numerous occasions to different affected sites, to assist with the collection of samples as well as photo-documentation. It should be noted at this point that the researcher had become so consumed with the scientific aspect of AMD that she had not given enough consideration to an artistic approach. One could say that she had crossed into the domain of science and had to find her way back into the field of art and aesthetics. Research into art soon became apparent though artists such as Mel Chin and Helen and Newton Harrison. These artists have a significant ability to bring science and art together in seemingly simple ways, although this task in reality is daunting. The researcher's realised that she could only assist and not constructively contribute towards the research[63] that Dr. Durand was conducting. She also recognized that it was not realistically possible to reach as many people as Liefferink, who has been lobbying the issue for a decade. Subsequently the researcher recognised that it was not feasible, due to time constraints, funding and other impracticalities to conduct any kind of reclamation project. The researcher was furthermore not convinced that such a project would be the most suitable avenue to follow, as a result of the problem lying mostly underground, as well as creating art on sites that are mostly off limits to the public. As a result, she decided to return to a more traditional approach of art-making within the context of the gallery.

3.2 The gallery as a site for raising awareness

Although the existence of art predates the gallery or museum (Jacob 1995:51), exhibiting art in an art gallery is a very conventional way for any artist who wants to display his/her art. Andrews (1999:202) explains that the gallery may be seen as a kind of frame for the purposes of aesthetic appreciation. In other words, by drawing attention to the art object by framing it or placing it on a pedestal, the viewer is positioned to focus on the object.

[63] The researcher had set out to closely follow and document a scientific experiment conducted by Dr. Durand and one of his students with rats. The rats were divided into two groups: one group was to consume contaminated water with clean food for a period of time, while the second group was to consume clean water, but eat food irrigated by contaminated water for the same period of time. The experiment was aborted after the food could not be harvested from the selected farm, as the farm was bought by Harmony Gold, which prohibited access to the crops.

Yet, according to Deitch (1983:90), the traditional gallery is a nineteenth-century institution, catering for differing tastes in a wealthy selection of clients. Therefore it is not always the ideal location for bringing about awareness, as the number of potential viewers is necessarily limited.

Prominent environmental and political activist artists have generally chosen not to be represented by art galleries. These artists chose to work with art galleries only when it suited them. Their works exist mostly outside the system of galleries, museums, curators and collectors (Kester 2004:9). Smithson explains: "the artist must come out of the isolation of galleries and museums and provide a concrete consciousness for the present as it really exists, … the artist must accept and enter into all of the real problems that confront the ecologist and industrialist" (Kastner & Wallis 1998:32). However, one of the most famous exhibitions organised by Smithson relating to "the present as it really exists", titled *Earthworks* (1977), was shown in Virginia Dwan's gallery in New York. This exhibition included work by all the important American artists of the Earthworks movement,[64] and was according to Tufnell (2006:12) the first exhibition to review the work made in and about the landscape by the artists. The artists literally transplanted whole sections of earth from where it existed in the landscape into the gallery space, which was a completely different context. Second-hand sources such as photographs and video documentation were also used to verify earthworks constructed in remote locations that were not easily visited by the public (Baker 1983:74).

For many ecological artists it is equally important to express their thoughts on natural and political systems within the museum/gallery context as it is to do outside of it (Kastner & Wallis 1998:360). Helen Mayer and Newton Harrison are a good example of this, collaborating as a team with others, but always bringing their findings into the gallery space. Their art includes written texts of their conversations, drawings, photographs, mapmaking, installations, and performances as well as the actual improvements of the environment that are the subject matter of their work (Leibovits Steinman 1995:231). *The*

[64] The artists included Smithson, Heizer, Walter de Maria, Dennis Oppenheim, Robert Morris and others (Tufnell 2006:12).

Lagoon Cycle (1970-1983),[65] which was one of their very first projects together, is an excellent example of previously unattainable material brought into the domain of art (Wechsler 1983:267).

In the same way that the Harrisons expressed their work in different mediums, the researcher also found that it was difficult to keep to one discipline. She started out working with the photographs that she had taken from the many site visits, which were the only visual evidence she had of what was taking place in the Witwatersrand. It seemed a logical course to follow, as artists such as Richard Misrach and David Hanson, have successfully photographed scenes of ecological disaster, which had a major impact on audiences visiting their shows in galleries. Yet the 'disaster element' in the researcher's photographs seemed curiously lacking. Only the tip of the iceberg was truly visible and the researcher had no access to photographing the landscape from the air, which would have revealed more in terms of the scale of the pollution than one is able to capture on the ground. Photographer Munem Wasif from Bangladesh notes that he experienced a similar problem when photographing a fresh-water shortage in a part of the country, where the topography he was working with was covered in water, yet it was undrinkable brackish water (Wasif 2012:32). In the end Wasif did not photograph the water itself, but the people living there and the effects it had on them, making for a series of emotive photographs.

The researcher cannot deny the effectiveness of Wasif's series of photographs, and she is reminded strongly of Goldblatt's photographs of miners drilling away in mine shafts while the foreman's wife sweeps the mine dust from a porch within the desolate landscape of the East Rand. Nevertheless, the researcher would find it one-sided to focus only on the lives of people. After all, while the human species is able to move and survive elsewhere, it is the local ecology that does not have the luxury of relocating. The researcher therefore decided to refrain from drawing on the sentiment of the human face but look for other avenues of expressing the issue. It soon became clear that these other avenues were

[65] *The Lagoon Cycle* was an immense research project, involving the study of the *Scylla serrata* lagoon crabs from Sri Lanka and their breeding cycle. In a laboratory of the University of California, tank systems were designed to replicate lagoon conditions. The Harrisons were the first researchers to successfully breed the crabs in artificial conditions, where previous scientists had failed, through the simulation of a man-made monsoon, stimulating the crabs to mate. This research led to the development of an inexpensive aquaculture for a commercially viable farming system as a possible alternative food resource (Hall 1983:25).

also riddled with problems, such as the media, which has played a prominent role in releasing images of the unfolding crisis in the Witwatersrand to the public. Collins (2004:170) reminds us that an art which engages environmental issues "will have to compete with a highly sophisticated and capitalised culture of image production with almost total control over the venues of media".

3.2.1 The second-hand image in the media and gallery

Cézanne once stated that "… our sight is a little weary, burdened by the memory of a thousand images…We no longer see nature; we see pictures over and over again" (Andrews 1999:177). According to Grande (1994:12) the modern urban artist will often envision his/her work within the language of the media. In other words, an artist will often feel that he/she must compete with the media's images, as the media has a head start, affecting one's daily life sooner than works of art can. The researcher faced exactly this type of problem when comparing her photographs with those of images placed in newspapers and even television programmes. This type of media imagery, according to Grande (1994:11) penetrates one's conscious thoughts and can potentially lead one away from a direct awareness of reality. Alan Sonfist agrees that "people are relying on art-media illusions to create their realities" and that artists have to try to "counterbalance" this kind of structure (Rosenberg 1983:200).

Today's art-going public is for the most part urban, whose vision is over-stimulated by visual imagery from the media, where we "codify and process our responses to images, then we throw them away in preparation for the next. As a result, when we look at a painting, sculpture, an installation or a video, our patience is minimal" (Grande 1994:72). Gablik (1991:99) concurs, claiming that modern aesthetics is part of a modern world where objective and detached views force viewers to remain in a mode where one's gaze is "that of the detached observer". Thus, according to Grande (1994:72), we have been converted into consumers of art, rather than spectators and it could be added, in no way different from the consumption of our mineral resources. It is Susan Sontag's view that we have developed an appetite for images, where events are valued only for their photographic interest, describing this type of imagery as a form of "mental pollution" (Ross 1994:191). Rosenberg (1983:202) points out that reality and reproduction have become indivisible and that this creates a special set of problems for art.

Taking these facts into account, the researcher found it difficult to decide whether the use of any kind of photographic image would be effective for the message she needed to deliver to the viewer. Ross (1994:189) claims that the narrative element of images cannot be ignored. These images have the distinct ability to tell ecological stories. These "images of ecology" can be implemented to activate the support of the public for the restoration of native and global ecologies (Ross 1994:193). It should nevertheless be noted that we have undeniably become accustomed to seeing images of a dying planet: We envisage billowing smokestacks, devastated rainforests, oil-drenched marine animals and fish floating belly-up. Media coverage of environmental disasters that have caught our attention through the decades include incidents such as Love Canal, Three Mile Island, Chernobyl, Bhopal, the recent mega oil-spill by BP off the US coast and Fukushima. These 'negative images' are often juxtaposed with 'positive images' of pastoral sereneness and beauty. In other words, while one might be confronted by floating fish poisoned by AMD from the Donaldson Dam (Figure 36) in the newspaper, or an aerial photograph taken of a sinkhole (Figure 37), there could be a full-page colour advertisement of an orchid growing in a faraway rainforest on the opposite page. All these images present themselves as sources of information. Yet, as Ross (1994:195) points out, 'information' is not the same thing as 'knowledge'. Ecologists are apprehensive of images as a medium of information, because of audiences' fixed assumptions that they are either good or bad (Ross 1994:198). Kester (2004:88) reminds us that we have to interpret these images that are produced by hegemonic cultural systems as predisposed by political ideologies.

Most of the images discussed refer to those published by media, while many artist photographers work with "apolitical homilies" concerning the modern industrial environment (Bright 1992:65). Western photographers such as Richard Misrach, John Pfahl, Lewis Baltz and David Hanson, have all been acknowledged in the art media as contributing to expressions of a contemporary environmentalist consciousness (Bright 1992:68). While Hanson's aerial study of hazardous-waste sites throughout America,[66]

[66] From more than forty thousand sites, Hanson demarcated sixty-five sites, some located in remote wilderness. Exhibited in a gallery, his photographs were accompanied by geological survey maps and texts; a strategy to make people aware of the realities of those sites, and especially the health problems posed by them (Gablik 1992:49).

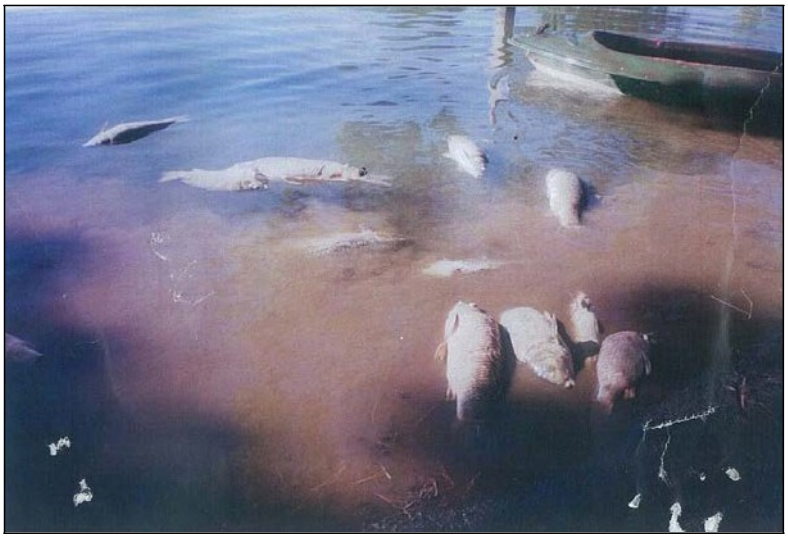

Figure 36: Destruction of aquatic biota at the Donaldson Dam, Westonaria, (s.a.).
Media photograph
(Liefferink 2008/08/28).

Figure 37: Footage of a sinkhole in the mining town of Blyvooruitzicht, Far West Rand, 1964.
Media photograph.
(Eybers 2010:14).

titled *Waste Land* (1985-86) made for a powerful awareness campaign, Richard Misrach managed to shock the viewer to his/her core in his *Desert Cantos* series. In *Desert Canto VI: The Pit* (1987; Figure 38), the photograph is accompanied by text unveiling the chain of events that led to the death of 4390 animals in an atomic test experiment conducted by the military in the Nevada desert. In the space of the gallery, Misrach confronts the viewer with devastation not meant for the public eye, as opposed to Hanson's distant aerial perspective. Misrach's work is a series of large format photographs of decaying dead cattle and horses, partially buried in a mass grave among other waste such as oil drums (Rinder 1989:[sp]).

Figure 38: Richard Misrach, *Dead Animals/1* from the sequence *Desert Canto VI: The Pit*, 1987.
Ektacolour Plus print, 40 × 50 inches.
Fraenkel Gallery, San Francisco.
(Sanders 1992:78).

These blatant images of 'shock' are meant to alert the viewer to unacceptable environmental problems taking place elsewhere. However, artists have been criticised for merely glorifying what they depict, captivating viewers with the spectacle of nature's destruction in sublime fashion (Bright 1992:68). Conversely, Barrett (2011:666) insists that these images are essential in order to cultivate and retain an awareness of our relationship with nature. Whereas the experience of these images removes us from our comfort levels and stir up emotions bordering on terror, anxiety and shame, it might eventually lead to the improvement of environmental management practices. Davis (1996:89) however points out that one has to be careful not to leave visitors to galleries and museums confused and depressed, as this may overwhelm them with feelings of hopelessness. Davis believes that they must leave with a sense of hope, but also of urgency for meaningful change. Newton Harrison stresses the following: "Without urgency the vision stays on the gallery walls" (Huges 2008:35). One could therefore say that artists could put forward a very particular experience to the viewer in terms of the way they decides to present their work.

As most of the researcher's photographs possessed only a mild amount of 'shock value', which could better be described as curiously disturbing, she decided to use photography only as a component of a larger body of work, which consists of sculptural installations. The researcher also decided not to place too much emphasis on the 'shock value' that could possibly alienate the viewer, but rather to use photographic images which would potentially attract the viewer, while still evoking elements of discomfort and alarm. To do this she decided to bring elements of the site to the viewer in order also to account for a more convincing experience. Sonfist claims that, "only by going back to the direct sources can we create art situations to make an alternative structure for people to perceive. Eventually, people will start looking at the real world, instead of looking at the media, in order to perceive the world" (Rosenberg 1983:200).

Because viewers mostly look at secondary sources of information they do not confront the direct sources of the problem. The researcher can confirm that her photographs of the sites and her actual experiences there are not always comparable. For example, the sulphurous smell in the air she experienced while photographing the water treatment plant and the sound of water decanting into streams are unique to the direct source. Misrach commented on this aspect by saying that he could not capture in his photographs the

"constant stirring sound; …and the smells, from the gasoline stench to the chemicals in the air. That's what you can't see" (Sun 2012:[sp]). Van der Merwe's photographs of his work constructed at site-specific locations, displayed in galleries and even his artist books are often misconceived as being purely decorative. Law-Viljoen (2006:77) speculates that it can possibly be attributed to the second-hand experience of his work. This could perhaps explain why the artist has in his most recent exhibition (*Drawing clouds in the Karoo*, April 2012), opted for a more installation-orientated presentation of his work in the gallery. By moving away from the display of isolated art objects on gallery walls, and taking into account a broader sensory experience, Van der Merwe makes a shift from exterior intervention to interior installation.

3.3 Installation in the gallery context

Whether one is confronted in the gallery context with images, texts or sculptures, we are in what Clark (2010:366) describes as the "familiar world of art objects", a world apart from the direct site and one's experiences there. The way the artist chooses to convey those experiences is the challenge that has to be taken up by him/her. Being a trained fine artist in the discipline of sculpture, the researcher's exhibition installations have a strong sculptural component.

Sculpture is unlike painting and two-dimensional works of art, in that it incorporates mass. According to Berleant (2005:25), it changes the space around it so that the viewer enters into the act of regarding the work. Although traditional sculpture is a very old branch in the visual arts, it is also regarded as one of the plastic arts, as it involves a diverse range of materials, which can be modelled and assembled, but also worked by removal such as carving (Sculpture [sa]). With the shift initiated by modernism to almost complete freedom in materials and processes, post-modern sculpture now engages a broad field of activities. Rosalind Krauss elaborated on post-modern sculpture in her idea of "sculpture in the expanded field", claiming that "sculpture is rather only one term on the periphery of a field in which there are other differently structured possibilities" (Krauss 1979:38). However, sculpture and installation are two different entities. Whereas sculpture is a singular object, installation consists of multiple sculptural objects or none. Rosenthal (2003:25) maintains that installation art "multiplies and magnifies the medium of sculpture".

One of the most popular materials used in installation art, is the found object. Artist Marcel Duchamp can be credited for the concept of shifting focus away from the act of crafting a creation to the emphasis on art's intellectual basis (De Oliveira et al 2003:14). A found object can be defined as an existing object, which is often a mundane mass-produced object and frequently sourced as a second-hand or discarded item. New identity is bestowed on the object by means of conceptualisation and/or alteration by the artist (Atkins 1997:99). These works are mostly placed in a gallery or museum, which is the space or stage the viewer will use to contemplate the object, i.e. in a different context from its past location and history (Found art [sa]). Berleant (2005:25) stresses that the interior volume of a gallery or museum is designed for people and "invites them to occupy it". It is this enclosed space that the artist will utilise and manipulate to create a specific environment when constructing an installation. At the first International Dada Fair in Berlin in 1938, Duchamp installed 1200 sacks of coal that hung from the roof of the exhibition space. This compilation of coal sacks shared the space, already saturated by traditional artworks of other artists, while some of the sacks even contained some of the exhibited art. This caused a confusion of aesthetics between the traditional art pieces and the mundane coal sacks (Rosenthal 2003:36).

Duchamp's coal sacks are a good example of what installation is considered to be: created for a particular space (interior or exterior) by the ensemble of objects that are to be experienced as a whole, as opposed to a group of distinct art objects (Atkins 1997:105). The term Neo-conceptual is often associated with installations and non-traditional formats in works of art, such as new media, sound, virtual reality and performance (Atkins 1997:76). The most significant aspect of installation art is its unique ability to transform the perception of space. It is this 'immersive' nature offered by installation, which persuades the viewer to enter the space and interact through all of the senses and perceive multiple meanings (Rosenthal 2003:27).

It is within the realm of sensory perception, that Walter de Maria's *New York Earth Room* (1977) was constructed. The artist covered the entire gallery in nearly two feet of earth, so that gallery visitors were scarcely able to enter the interior space of the gallery (Andrews 1999:203). Although visitors could not make their way through the gallery, they were able to gaze at the vast amounts of black soil which stretched before them from room to room,

not dissimilar to the viewing of a landscape, but in contrast to the pristine white walls of the gallery. One should think that the smell of freshly turned earth would also have influenced the experience of a city audience. It is this "heightened perception", based on the philosophy of Merleau-Ponty that provides an unlimited and fluid space of experience, even within the walls of a traditional gallery. Merleau-Ponty (1962:250) states that, "this maximum sharpness of perception and action points clearly to a perceptual ground, … a general setting in which my body can co-exist with the world".

An artist, who has combined relocated material and image within the gallery space, is Kevin Kelly with his 'diorama-like' presentations of industrial sites. Kelly's dioramas are reminiscent of those found in Natural History Museums.[67] In *Reconstructed landscape #1* (1988-89; Figure 39), Kelly displays a large format painting of an open-pit mining site near Black Lake in Québec. The artist placed half a ton of steel filings on the gallery floor in front of the image, which were extracted and imported from the site in the painting. By doing this, Kelly establishes clear links between the distant site and the industrial raw material, which the gallery visitor has the opportunity to experience close up. Grande (1994:190) suggests that strong feelings of "environmental dislocation" are aroused, as the work is as literal as it is explicit: even in faraway wilderness, such as Canada's Arctic, the landscape is being exploited for its resources on a large scale, driven by pure profit. Kelly's work also confronts the viewer to contemplate the direct source of the materials, instruments and commodities we depend on and purchase daily, as they all have their origins in the natural environment. Maskit (2007:329) explains that "by bringing those sites to us, they remind us that we are part of the social and economic system that is responsible for the condition of those sites." Within the environment of the installation the viewer shares the same space with the object/material and according to Erzen (2004:23) can be regarded as one of the objects. Erzen insists that the viewers are not passive outsiders to the interactions and processes of the world.

[67] Dioramas embody an aesthetic attitude established in the nineteenth century, where the sublime landscape would represent its 'pure' subject frozen in time, as an object of deception to the museum visitor (Grande 1994:192).

Figure 39: Kevin Kelly, *Reconstructed Landscape #1*, 1988-89.
Oil on linen, 1 metric ton of steel filings, 300cm × 1000cm.
Surrey Art Gallery, British Columbia.
(Grande 1994:191).

Andy Goldsworthy is also closely drawn to specific sites, especially areas such as Cumbria in the northwest of England, where he creates most of his work. Goldsworthy wants to remind people of their original role as part of the history of their particular landscapes (Bearsdley 2010:xii). Goldsworthy is drawn to quarries, where he began his installation project for *Roof* (2004-2005; Figure 40). The artist collected discarded slate, which was considered to be unmarketable in the quarrying process. Goldsworthy claims that he finds those things that are marginalised, the unwanted excess, appealing to work with (Fiske 2010:73). He considers mining and quarrying as being a large-scale subtractive process of human mark-making, stating that "leaving a hole is not like levelling a hill". Donovan (2010:28) suggests that the black holes at the centre of the domes in *Roof*, as well as many of his ephemeral pieces, may represent man's blindness towards nature's intimate

place in culture. In essence such blindness suggests a hole not only in our vision, but of our knowledge and awareness.

Figure 40: Andy Goldsworthy, *Roof*, 2004-2005.
Installation of 425 tons of slate from Buckingham, Virginia, 22.6 × 46.1 × 13.1 m.
National Gallery of Art, Washington DC.
(Fiske 2010:170).

The researcher considers the extensive tailing dumps that cover the Witwatersrand as one of the most significant aspects of the gold mining industry. There are 380 mine dumps and slimes dams in and around Gauteng (Bega 2012:[sp]). Robbins (1987:49) describes these mine dumps as “grotesque hills”, broken with erosion and neglect (Figure 41). Ignoring them would be to ignore the very source of the problem, as eroding tailings dumps and

dams allow for significant seepage into groundwater.[68] To reference these iconic markers of industry, the researcher decided to recreate a mine dump by importing sand into the gallery space. Rosenthal (2003:23) explains that the construction of an installation as a significant medium offers the "broadest possibilities for investigation and expression". Right from the outset, the researcher consciously decided not to bring significant amounts of the toxic waste from the sites into the gallery (apart from a small quantity site specific AMD), as that would recreate another toxic site at the cost of her own and others' health. What sets the cocktail of chemicals in the AMD from the Witwatersrand apart from the rest of the world is that it contains high amounts of uranium and other radioactive materials which accumulate to dangerous levels in sediment. The space would therefore in effect remain contaminated long after the material itself has been removed.

Figure 41: A gold dump being recycled by DRDGold, West Rand, 2012.
(*The Citizen CitiBusiness* 2012:18).

[68] Twenty-four tons of dissolved uranium enters the environment from unlined tailings dumps alone every year and a further ten tons of particle bound uranium becomes mobile through wind and is washed into waterways through rainfall. More than 100 000 tons of uranium exists on the tailings deposits in the area (Coetzee et al 2002:4).

Artists such as Unite and Nel not only imported toxic materials into gallery spaces, but also incorporated these into artworks displayed. Examples of such artworks are Nel's *Ground Zero* and Unite's *Carbon Imprints*. Sonfist followed an approach of "non-hierarchic scatter" by bringing these physical materials into the context of the gallery (Sonfist, Becker & Rosenblum 2004:204). Sonfist's journey though America to collect toxic elements found in the landscape is revealed in a work exhibited in 1988, titled *USA Element Selection: Natural Toxic Elements* (Figure 42). The artist stated: "as I wandered though America seeking its beauty, I found its toxic reflection" (Sonfist et al 2004:199). The toxic 'objects' were placed in the gallery space on a grid, positioned on the floor with the contour line of a travel map surrounding them. The map presents all the toxic sites throughout the United States, juxtaposed ironically with a map on the opposing wall that shows the country's National Heritage Sites (Sonfist et al 2004:199).

Figure 42: Alan Sonfist, *USA Element Selection: Natural Toxic Elements*, 1988.
Mixed media with natural elements selected across the United States, 180 × 300 cm.
Gallery/location unknown.
(Sonfist et al 2004:199).

Sonfist's work shares commonalities with Willem Boshof's *Psephos* (1994-1995), which comprises a cross section of South African pebbles, created specifically for BHP Billiton (formerly Gencor), a huge mining company. Boshoff thought it appropriate to refer to the stones in the way the Ancient Greeks did, as not only a product of the earth,[69] but a voting system that, according to the artist, "remains the basis for democracy today" (Siebrits 2007:22). Boshoff wanted the mining houses to reflect on their role as custodians of South Africa's natural resources, by tactfully reminding them that their ownership of mineral rights does not extend to owning the land the minerals were found in (Siebrits 2007:22).

Other artists such as Papageorge and Judith Mason worked with site materials and objects found there as a means to make an authentic connection with the site. Papageorge created art pieces especially for the gallery, as "meditations upon the original art" (Reuter 1995:[sp]). Her collages are often gigantic (reminiscent of the original size) and consist of photographs, drawings, actual gold reef rock, rusted bolts, food tins and other materials gathered from the sites, "incorporating all that has gone before" and becoming singular works of art in their own right (Papageorge et al 2006:[sp]), as opposed to making use of only documentations of the original work.

Judith Mason crafted a rather 'shrine-like' construction titled *Tombs of the Pharaohs' of Johannesburg* (1987; Figure 43). Mason created an assemblage from salvage material she collected from Crown and Rand Mines. The objects she collected revived fragments of history in her mind. This inspired her to compare mine dumps to pyramids, mineshafts to rock-carved tombs and the Randlords to Pharaohs.[70] The weathered first-aid stretchers she found with the cracked straps and flaking paint are reminiscent of decaying Egyptian coffins, over which she painted the mouldering bodies of the men that would have worked on the reef before meeting their end in what would have been a variety of accidents or occupational diseases. The artist maintains that she sought to portray an episode in history "with dignity and aggressiveness and pathos and the trivial woven into as intact a composition as I could manage" (Van Rensburg, Mason & Freemantle 2008:128).

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[69] Early in his career (1988-1991), Boshoff embarked on a 10 000 kilometre journey in order to collect 190 different soil samples from all the regions of South Africa, called the *Gaia project* (Siebrits 2007:8).

[70] One is reminded of Nadine Gordimer's (1973:[sp]) description: "The forms were as austere as Egypt's; but these pyramids of tailings entombed no lost civilisation".

Figure 43: Judith Mason, *Tombs of the Pharaohs' of Johannesburg* (Triptych), 1987.
Mixed media, 250 × 200 × 150 cm.
Tatham Art Gallery, Pietermaritzburg.
(Van Rensburg, Mason & Freemantle 2008:25).

Unlike the artists discussed above, the researcher was not in a position to fully utilise site-specific materials to contribute to the authenticity of the installations. It was therefore imperative for her to find the most effective means to reach her audience. According to Erzen (2004:23), perception and communication have aesthetic bases and therefore create potential for engagement. Lacy (1995a:37) explains that the audience needs to be brought into the construction of the work, in other words, the work should activate the viewer into becoming a participant and even collaborator. David (2004:50) notes that by communicating with the world, the viewers in effect communicate with themselves. Through constructing art one is essentially already initiating a point of engagement, so that the aesthetics of art objects can enter the role of, what Berleant terms, a "social aesthetics". According to Berleant (2005:25) traditional aesthetics can guide the gallery visitor into the social environment in that he or she considers and appreciates sculptural form (this includes installation), and the space itself. This requires one's time and mobility, which translates into human activity. From an ideal point of view, Russian literary theorist Mikhail Bakhtin argues that a work of art should be viewed as a type of conversation, presenting different meanings and interpretations for the viewer to contemplate, in a process of dialogue (Kester 2004:10). Grande (1994:223) cautions that the viewer's engagement is not a given. In order to establish a dialogue, the artist is responsible for securing the attention of the viewer.

3.3.1 The industrial found object

It remains central to the researcher's work to connect with the viewer on a physical level, through not only the use of traditional sculpture, but also through the found object, with emphasis on its industrial character. For this reason the researcher started looking into the photographic material and notes for significant objects encountered on her many site visits. The standard 210 litre oil barrel turned out to be the omnipresent object; either lying discarded in the landscape or utilised in some way (Figure 44). This unlikely 'culprit' was encountered on the researcher's very first site visit to the water treatment plant operated by Harmony Gold in Randfontein, under somewhat ironic circumstances. The location revealed a dilapidated system of pipes which was supposed to divert water flowing into a treatment pond towards another section of the plant. Yet water was flowing unimpeded from the crumbling brick wall of the pond towards a nearby stream, causing a substantial

amount of erosion in the process. Because of this dilemma, a disused Shell[71] oil barrel was used to keep the connection of pipes in place (Figure 45). The researcher found this situation ironical, as she had managed to capture in a single photograph two environmental culprits, with the one unknowingly aiding the other in its task. The barrel represents itself as a container of mass consumption of non-renewable resources, but also as container of waste, including that of radioactive material. Atkins (1997:107) notes that the use of discarded objects, inevitably comments on the "throwaway" frame of mind of consumerism.

Figure 44: Discarded oil barrels utilised as a fence at the Harmony Gold treatment plant, Randfontein, 2008.
Photograph by the artist.

[71] Not only does Shell have a dubious environmental record, but the company has strong intentions to exploit the gas reserves underneath the Karoo with questionable methods.

Figure 45: A disused Shell drum prevents a system of pipes from collapsing, Harmony Gold treatment plant, Randfontein, 2008.
Photograph by the artist.

It came to light that the barrel can be utilised just as effectively in the gallery space, as it was functionally implemented within a mining landscape. Artists Christo and Jeanne-Claude have been prolific with the use of oil barrels in their work, due to their size, low cost and unique sculptural effect (Barrels [sa]). Christo used old rusted barrels as far back as 1962 in a small gallery (Figure 46), where visitors were greeted at the entrance by a column of stacked barrels, while inside, an entire room was filled with stacked barrels, creating a claustrophobic effect (Barrels [sa]). In 1999, the artists created an indoor installation of 13000 barrels in the Gasometer in Oberhausen (Figure 47). The structure was an astounding 26 metres in height and 68 metres wide, with the barrels painted in vibrant industrial colours, which created a powerful visual experience (The Wall [sa]).

Figure 46: Christo, *Wall of Oil Barrels,* 1962
Rusted oil barrels, dimensions unknown.
Galerie J, Paris
(Barrels [sa]).

Figure 47: Christo, *The Wall*, 1998-99
13000 painted oil barrels stacked in
steel frame, 26 × 68 × 7,23 m.
Gasometer in Oberhausen, Germany.
(The Wall [sa]).

The researcher decided to utilise used oil barrels[72] as a repetitive component in the gallery for their sculptural as well as textural effect. By placing a found object in the gallery space, brought in from the 'real' world, the aim was to create a mind shift in the viewer to regard art not only as what Gablik (1995:74) refers to as "specialised objects" to be enjoyed, but as contemplative objects. Through the use of second-hand drums, one is made conscious of their history, of their being in another time and place as well as the whereabouts of their contents. Atkins (1997:99) stresses that the found object as an artwork is imbued with meanings derived from its allocated function and past use. Therefore, viewers look at the used drums and see the colours of their exterior and the hints of printed dates and logos, which suggest specific large international companies. The viewer is presented with the patches of rust, dents and grazes and even tangible remnants of the drums' past location (such as the dirt still clinging to the oily areas). Within the refined setting of the gallery, these drums might appear ugly and even inappropriate, but they refer unromantically to what is 'out there' in the industrial landscape of the Witwatersrand.

The barrel in the researcher's work replaces the role of the traditional frame and pedestal. Conversely, the barrel becomes a frame for traditional sculpture and photography. Hepburn (2004:46) explains that the ontology of art objects sets a periphery around the object presented for aesthetic contemplation. This is done through certain conventions, which set them apart from the background: physical boundaries of the picture frame, pedestal or plinth, but also the contextual and conventional framings that place the presented object within the art gallery/museum and art discourse. The viewer is confronted by unconventional materials, combined with traditional mediums, which are presented in an installation format.

In the installation piece, titled *Drainage* (Figure 48), 19 photographs were selected from the researcher's site visits for the compilation of one work. By not placing the flat image of the conventional photographs on the wall, as would be expected, she opted for the barrel as an alternative display and framing device. The barrels are cut in half, so that the viewer has to gaze down on the photographs, which are placed inside the barrels, framed by its

[72] Although it was not possible to remove property from the specific sites, the researcher bought used oil barrels from a drum reconditioning dealer in the Vaal Triangle, an area which has close connections to the mining industry from a manufacturing perspective.

Figure 48: Louise Kritzinger, one of 19 photographs from *Drainage*, 2012. Discarded steel drum, digital photograph on paper, Perspex disc and light bulb, 45 × 45 × 47cm. Photograph by the artist.

circular format. All the images selected were of pollution residue on the ground and the water in streams, taken mostly from an elevated position. Thus the viewer assumes the same position of the artist when taking the photographs. Due to their large format, the photographs reveal interesting shapes and textures, while remaining ambiguous. Therefore, the viewer is encouraged to move between the barrels and explore the photographs individually. Perspex disks are placed on top of the photographs as a supporting mechanism, while the photographs are lit from underneath, in order to function as a light box, while the reflective surface of the Perspex is reminiscent of water. The positioning of photographs on different levels inside the barrels indicates a metaphorical water level (referencing the rising levels of AMD in the water table). While the photographs on the periphery represent a high water level, the photographs closer to the

middle descend in a spiral until the centre barrel is reached at the lowest level. This spiral sequence represents a vortex of water being sucked down a drain. Seen from the elevated position of the loft in the gallery, this facet of the work is revealed (Figure 49), as the placement of the oil barrels represents the shape of a drainage hole. Thus the viewer is encouraged to look at the installation from various perspectives, much in the same way that the environmental problem has many viewpoints. Julian Hochberg states that, "how one casts his gaze around the world depends upon his knowledge of the world, and on his purposes – i.e. on the information that he seeks" (David 2004:50).

Figure 49: Louise Kritzinger, *Drainage* viewed from above, 2012.
Discarded steel drums, digital photographs on paper, Perspex discs and light bulbs, 430 × 430 × 47cm. Photograph
by the artist.

The title of this work, *Drainage*, refers to the drainage of acidic mine water from mine tailings and underground operations decanting into aquifers, rivers and dams.[73] The physical shape and structure of the drums become metaphorical, bearing a resemblance to shafts, drainage ponds, sink-holes and pipes, all of which form part of the structure of the industrial landscape. People often forget that the Witwatersrand[74] is a very significant watershed, situated on high ground, dropping sharply to the north and gradually to the south. Water flowing from the northern side will drain to the Indian Ocean, while water from the south side drains toward the Atlantic (Goldblatt 1982:i). Therefore, when water pollution occurs in the Witwatersrand the effects are far reaching.

3.3.2 Water and sand as natural mediums

With the core of the researcher's exhibition content revolving around the uncontrolled flow of polluted water, she decided that water should be present in the exhibition. The water used for the exhibition work is stained to resemble the corrosive orange to rusty red colour of AMD[75] and is employed in various installations as either running or still water. Only in one work is a small quantity of real AMD used, as would be elaborated on later. By making use of this fluid medium, the researcher hopes to stimulate sensory awareness in the viewer. Our senses are the core of perceptual experience that according to David (2004:50) occurs through direct exploration of our surrounding environment. While traditional aesthetics has been restricted by its intellectual assertions from implementing the full range of sensation, Berleant (2005:27) suggests that all our senses can provide aesthetic satisfaction. Thus, apart from the visual aspect of the work, the researcher includes sound and smell as engagement mechanisms. By using vigorously bubbling water, the medium entices the viewer to touch it. Gallery visitors, in the researcher's experience, have an urge to touch art that presents evident textual qualities. Hearing

[73]Two important water sources are affected: The Tweelopiespruit has its source near the Robinson Lake, from where it continues through the Krugersdorp game reserve on the way to the Cradle of Humankind Heritage Site, eventually flowing into the Crocodile River with its tributary, the Rietspruit, and finally debouching into the Hartbeespoort Dam. Near Carletonville and Merafong the Wonderfonteinspruit meets Potchefstroom and joins the Mooi River before flowing into the Vaal River (100 years… 2008:1).

[74] The "Witwatersrand" owes its name to the series of parallel ridges, extending over a distance of approximately fifty six kilometres (with a break of three kilometres), forming a watershed between the branches of the Limpopo and Crocodile Rivers to the north and the branches of the Vaal and Orange Rivers to the south (Jeppe 1946:35).

[75] In a larger human perspective, Comp (2003:2) describes AMD as "the orange, silent signature of dying communities, lost biodiversity, lost opportunity, the emblematic colour of slow death".

indistinct sounds coming from another room in the gallery, the viewer should become curious as to the sound's whereabouts. In this way the viewer is invited to become a participant by reacting and moving through the space.

In the installation work titled *Affluence / Effluence* (Figure 50) an arrangement of six red-coloured drums acts as surrogate pedestals for the small golden 'traditional' sculptures hanging suspended above them. The sculptures[76] are supported by cables from the roof, appearing to hover above the barrels, filled with water bubbling fountain-like at the surface, indicative of AMD surging up from an old mine shaft. Superficially, the gushing water appears to be about to spill over the brim of the barrel.[77] This, as well as the mechanical sound of six pumps, pumping water simultaneously, is reminiscent of the constant noisy humming of industry, creating an atmosphere of unrest and even anxiety. The pumps are also connected to a timer, causing some of the pumps to cease operation every few minutes. This causes the water from the top container to drain back into the barrel through the feeding pipe, which creates a vortex accompanied by a sucking noise as the water recedes. This high-pitched noise can also be rather unsettling to the unsuspecting viewer.

Underneath the industrial topography of the Witwatersrand exists a complex geology, including limestone structures, known as karst systems such as dolomite aquifers, which are susceptible to corrosion. The acidic mine water has extensively eroded three massive voids in the Witwatersrand, known respectively as the Central, Eastern and Western Basin Mine Void. The saturated void in the West Rand already started to decant from a mine near Krugersdorp in 1998. The eastern and central voids are in danger of decanting in the near future, which will have severe repercussions considering that they sit beneath the inner cities of Johannesburg and Boksburg respectively. If the situation is left unimpeded, 350 million litres of AMD a day is expected to escape and run freely on to the surface and sub-surface (Bega 2012:[sp]).

[76] A discussion of these sculptures will follow later on.
[77] This illusion is created by inserting a flat, shallow container into the barrel that is slightly smaller in diameter, so that the water flows back into the barrel after decanting from the container.

Figure 50: Louise Kritzinger, *Affluence / Effluence*, 2012.
Steel oil barrels, tainted water, electric pumps and chromed Polymer resin.
490 × 175 × 138 cm.
Photograph by the artist.

After more than a century of mining in the Witwatersrand, the top 20 cm of surface soil in and around[78] heavily mined sites is polluted and sterile as a result of the poisonous underground mine effluent pushing up to the surface, according to Dr. Suzan Oelofse (Tempelhoff 2008c:[sp]). As the water from the Wonderfonteinspruit catchment makes its way towards the lower-lying mining towns, running underground and occasionally reaching the surface, it poisons the very ground that it passes through. The disappearance of plant and animal species along with crops withering without explanation must be regarded as the signals of sickness in the land organism (Leopold 1966:250). Carson (1962:61) warns that we are dependent on healthy soil in order to survive, as we grow our food in the substrate. Farms in the path of the effluent of contaminated mine water suffer crop failures and anomalies in the livestock. There is a considerable health risk to especially humans and animals. Water from boreholes, dams and streams polluted by mine water is absorbed by vegetation, which in turn is eaten by livestock, from which we produce dairy

[78] This type of soil pollution is not only restricted to the affected site, but the plume of contamination can stretch as far away as 10 kilometers (Tempelhoff 2008c:[sp]).

products and meat for human consumption (Radiological impacts… 2007:[sp]). Uninformed consumers are exposed to radioactive contamination of livestock products such as milk and meat as well as agricultural produce which contains radiological doses above regulatory limits (Liefferink 2009a:14).[79] Mogale City environmental manager Stephan du Toit believes that, "this is a problem that affects everyone - those who make money and those who are affected by those who make money" (Mine dumps…2008:[sp]).

This statement is closely linked with the title of a sculptural piece, titled *Everybody Lives Downstream* (Figure 51). One has to remember that the Vaal Dam provides water via Rand Water to 12 million people in Gauteng and parts of four other provinces (Mine dumps…2008:[sp]). People ingest this water daily and they also purchase food off the shelves in supermarkets many kilometres from where the produce was derived. Strongly related to this work is *Yield* (Figure 52), raising the same issue. The title refers to the pro-

Figure 51: Louise Kritzinger, *Everybody Lives Downstream*, 2011.
Steel and concrete castings, 100 × 50 × 47 cm.
Photograph by the artist.

[79] Vegetables such as mushrooms as well as root vegetables such as carrots have higher doses of uranium, because they are grown in peat which has retention and accumulation properties, especially if there is still soil residue present (Depleted Uranium… 2001:15).

duce generated by not only agriculture, but also the amount of gold extracted by the gold mining industry. The work moreover refers to the amount of energy released by an atom bomb when discharged, such as those dropped over Hiroshima and Nagasaki. According to Piet Schoeman, a former geologist at Gold Fields (Tempelhoff 2008b:[sp]), the uranium used to construct those bombs was derived from the Blyvooruitsicht mine.

Figure 52: Louise Kritzinger, *Yield*, 2012.
Polymer resin and sand, 300 × 200 × 24 cm.
Photograph by the artist.

This installation consists of a long, narrow heap of building sand that represents a tailings dump. On top of the tailing, a monoculture of cauliflower heads is arranged in neat rows. The cauliflowers are cast in a white polymer resin medium, lending them the appearance of the actual vegetable, but also of clean edible foodstuff. The lack of colour also plays with the bleached-out colour of sterility, which is the result of soil contamination. The viewer is encouraged to walk around the flat installation and inspect the crop which,

superficially, appears to be perfectly cloned specimens of each other. Upon closer scrutiny differences are observed in the cauliflower located at the centre of the crop (Figure 53). These anomalies are revealed as malignant bumps within the florets. What makes the discovery even more sinister is that they share the same colour of the cauliflower, lending it a cover of disguise. Cancer is a feared disease world over because of its ability to remain hidden inside the body, spreading unnoticed, until it is too late. This aspect is central to the title of the exhibition, namely *Insidious Waters*, alluding to the AMD which has been spreading and rising around us, without being noticed, until reaching the current state of environmental crisis. The installation dump is essentially confronting the viewer with food that is supposed to provide health benefits, but instead has become a threat to health. In areas where informal settlers have made their homes adjacent to or on top of dumps, food crops, which would feed the inhabitants of the settlements, are actually grown on top of these dumps.

Figure 53: Louise Kritzinger, A close-up of the cauliflower in the centre of the crop of *Yield*, 2012.
Polymer resin, 45 cm × 48 × 24 cm.
Photograph by the artist.

According to Carson (1962:193), the natural environment contained hostile elements such as uranium even before there was life. Yet, over a considerable time, life managed to evolve and adjust to these destructive forces. As a result, only the most resistant managed to survive. Carson (1962:194) states that the first recognition of malignancies came with the age of industry during the last quarter of the nineteenth century.[80] Nevertheless the twentieth century has been the father of countless new cancer-causing chemicals, affecting not only a limited occupational group, but also the general population.

In addition to the vast amounts of gold deposits on the Witwatersrand, it is also ranked fourth in the world as a reserve of uranium (Eales 2007:197). Uranium (U) is a radioactive and chemo toxic heavy metal, which is dangerous to all forms of life due to the impact of radiation from uranium-isotopes[81] and its decay elements (Lindemann 2008:1). Uranium intake through drinking water is considered a serious health concern, for it results in the accumulation of uranium in bone, liver and kidney, while uranium induced diseases can occur up to 25 years after exposure (Lindemann 2008:13).

In *Affluence / Effluence*, the viewer is confronted with two binary oppositions, namely that of splendour and of financial security represented by the golden sculptures. This is contrasted with the barrels of tainted water, representing the cocktail of heavy metals mobilised by AMD (lead, zinc, nickel, copper, cobalt, arsenic, cadmium, manganese, uranium and polonium). Because toxic waste is often stored (and disposed of) in barrels, it is as though each drum is boiling with a toxic broth.

While the toxic materials are regarded as waste, what is presented above this bulk of waste is the epiphany of purity and rarity in an elevated position of superiority. Instead of displaying the golden sculptures on a pedestal clad in purple velvet as would perhaps be expected of precious objects, in this work, the barrels function as pedestals. A contrast is set between the roughness and size of the found objects and that of the petite sculptures, which are intricately detailed, shiny and smooth. While the rusted barrels appear to be in a

[80] This was a time when Pasteur was demonstrating the microbial origin of infectious diseases, while others were discovering the chemical origin of cancer (Carson 1962:194).
[81] There are three different types of isotopes derived from natural Uranium, namely U-238, U-235 and U-234 (Lindemann 2008:2).

state of deterioration, the sculptures are just out of reach of the ominous water, which could potentially destroy it. They remain safe; in order to retain their status as precious objects and eternal sculptures, as metaphorically, their material is intended to last through the ages (Sculpture [sa]).

Gold has been an object of desire in virtually all civilisations and has been sought from the earliest times. According to Jeppe (1946:1), the first historical reference of gold can be found in the 6th Dynasty (3000 B.C), from the Upper Nile region. Gold became known for its use as currency as far back as the 12th century BC, between Egypt and India (Jeppe 1946:1).[82] Whether being used for ornamentation, coinage or trade, this sensuous yellow metal established its value in being virtually imperishable,[83] with a low melting point[84] and high density, giving it a feeling of solid worth;[85] being the most malleable and ductile of all metals,[86] and of course being very rare and difficult to extract from its host rock (Eales 2007:266).

Gold, as described by Robbins (1987:21) "is at once the symbol and the reality of the deepest urge of the Witwatersrand. …a metal which had caused more insatiable greed in humanity than any other". Yet, it is essentially a senseless metal: serving mostly as the decoration of wealthy women, while the rest is simply displaced from underneath the earth to vaults across the globe as investment holdings, as a way of quantifying wealth. The researcher encases her sculptures in a layer of yellow chrome, which turns them into golden objects of desire (Figure 54). Due to their small size and intricate detail, they allude to the appearance of highly polished jewellery. Yet looking past the veneer of gold, one becomes aware of their peculiar shape. They seem to take on the form of vegetables, while at the same time appearing grotesque and deformed, due to their tumour-like bulges.

[82] Ancient civilizations, including Egypt and Rome, made use of slave labour to keep mining costs to a bare minimum, forcing women, children and the elderly to work under horrific conditions (Bourdon 1995:77).
[83] Gold does not dissolve in nitric, hydrochloric or sulphuric acids or tarnish or corrode away when exposed to air (Eales 2007:266).
[84] Gold melts down at 1063 °C, making it easy to smelt using primitive technology (Eales 2007:266).
[85] Gold is nineteen times the weight of water and nearly twice the weight of lead (Eales 2007:299).
[86] Gold can be beaten into thin gold leaf sheets or drawn into wire (Eales 2007:266).

These malformations represent malignant cancerous growths found in humans projected onto the food source,[87] which is the root of the cancer.[88]

Figure 54: Louise Kritzinger, a vegetable sculpture from *Affluence / Effluence,* 2012.
Chromed Polymer resin, 15 × 18 × 13 cm.
Photograph by the artist.

Ironically, the golden lustre of the sculptures not only resembles gold, but also pyrite,[89] which is abundant in the gold ore of the Witwatersrand. Pyrite's un-oxidised form resembles the sheen of gold, otherwise known as 'fool's gold' (Eales 2007:328). It is ironic that it is the pyrite which is the cause of the AMD and great destruction, and which shares its appearance with gold. The sculptures illustrate this aspect: a gold-mania of greed,

[87] Six different kinds of vegetables are represented in this work, all of which are known to grow in the affected agricultural areas, namely maize, carrots, onions, garlic, sweet potato and mushrooms.
[88] Water scientist, Dr Anthony Turton was dismissed from the CSIR after a visual presentation on the critical state of the country's water systems entitled *Water quality as a driver of anger*. Turton included images of a three-year old girl, severely deformed by her radioactive environment and left abandoned by her parents because of this (The spy… 2009:[sp]).
[89] Pyrite is a mineral in which iron and sulphur are chemically combined (Eales 2007:328).

exploitation and conquest for entities that essentially pollute and lead to self-destruction as an aftermath. According to Greek philosopher Phocylides, who lived during the sixth century BC, "…gold is the source of crime, the plague of life, and the ruin of all things…" (Eales 2007:287). The researcher's entire exhibition therefore urges the viewer to question whether all this toil and destruction has been worth it, or whether it has just been another victory gained at too great a cost. It would seem that we have been fools in sacrificing and compromising our water for a piece of jewellery and bar of currency which is inedible, yet poisonous enough to lead to our destruction.

One of the researcher's sculptural pieces titled *Dissolve* (Figure 55) confronts this issue by again using a chromed vegetable, in this case an onion. The work was constructed by creating the illusion of looking down a shaft, with water at the bottom and sand at the surface, within an old rusted drum. The interior represents a metaphorical stomach with real AMD collected from the Tweelopiespruit, which also represents stomach juices, as they both share a low pH.[90] Litmus paper[91] is provided, in order for the viewer to interact with the sculpture by dipping it into the water, thus performing a litmus test. The onion is placed in the centre of the stomach on a fork, similar to a rotisserie and again the viewer is encouraged to take part, by turning the handle and dipping the onion into the water. One is left to imagine how to digest something made of metal, which is not considered edible. Should the onion and fork stay in the water for an extended period it would start corroding, which is suggested by the title. The viewer has to confront the truth about AMD and heavy metal contamination, which is an uncomfortable truth to swallow and digest.

A short-term solution implemented by the gold mining companies to remove heavy metals from the water and in an effort to protect pumps and pipes from the corrosive properties of AMD, is to add alkaline mediums like lime and caustic soda to the water, which increases the pH. This process results in precipitation,[92] which causes many heavy metals to be deposited in solid form, rather than their previous state of solution at the bottom of a body of water. This process also causes the formation of a salt or ester of sulphuric acid

90 The pH is a logarithmic scale measuring the intensity of acidity or alkalinity. The pH of clean water is seven, which is the neutral point on the scale, with a measure below seven being acidic and above seven being alkaline (Lee Ray 1995:300). AMD has a pH between two and three.
91 Litmus paper is the paper used for the testing of acids and alkalis (Soanes 2002:658).
92 To precipitate also implies to "cause (something bad) to happen unexpectedly or prematurely" (Soanes 2002:890).

(sulphates), which again builds up in the sediment at the bottom of the contaminated water body and the soil adjacent to it, in the form of yellow and white salt crusts (Durand 2009/03/27). Regrettably, this is a detrimental resolution, according to hydrologist Garfield Krige, as the water remains toxic: no contaminant is effectively removed, leaving the water with high levels of sulphates, not fit for human or agricultural use (Bega 2012:[sp]).

Figure 55: Louise Kritzinger, *Dissolve*, 2010.
Steel barrel, chromed Polymer resin, polycarbonate, silicone rubber, sand and water, 98 × 45 × 45 cm. Photograph
by the artist.

After viewing a specimen of the build-up of these heavy metals and salts, derived from a stream in the Krugersdorp nature reserve, the researcher found its physical properties attractive because of its roughness in texture and morphic shape (Figure 56). This clump of encrustation not only consisted of minerals, but also of fragments of vegetation, small aquatic animals and anything else that ended up at the bottom, becoming fossilised by the sulphates. The researcher decided to compose an installation titled *Precipitation Objects*. The work depicts a whole range of sculptural specimens, including petrified aquatic life and plants, but also more mundane objects, as AMD affects everything in its path. The

sculptures were firstly cast in resin, thereafter it was dipped in various solutions, consisting of a fusion of resin, with salt, rust, sand, organic matter and yellow sulphuric powder. The build-up of material distorts the initially accurately rendered sculptural form, transforming it into an amoeba-like shape. The accumulation of materials is not consistent, and not all the sculptures are equally saturated with material, leaving some areas of the original sculpture exposed, while others are left intentionally underdeveloped (Figure 57). This refers to the processes a sculpture needs to undergo before a final result is realised.[93]

Figure 56: Clump of built up metals and minerals that forms in the sediment of streams due to AMD, such as the one running into the Krugersdorp Game Reserve where this sample was collected, Bleloch Geological Museum, University of the Witwatersrand, 2011. Photograph by the artist.

[93] This installation has a very different feel to the other installations, in that it appears less polished and resolved, for the reason that nothing is ever finished: at any given moment in time, and especially geological time, we are in the middle of processes and cycles that are continuous.

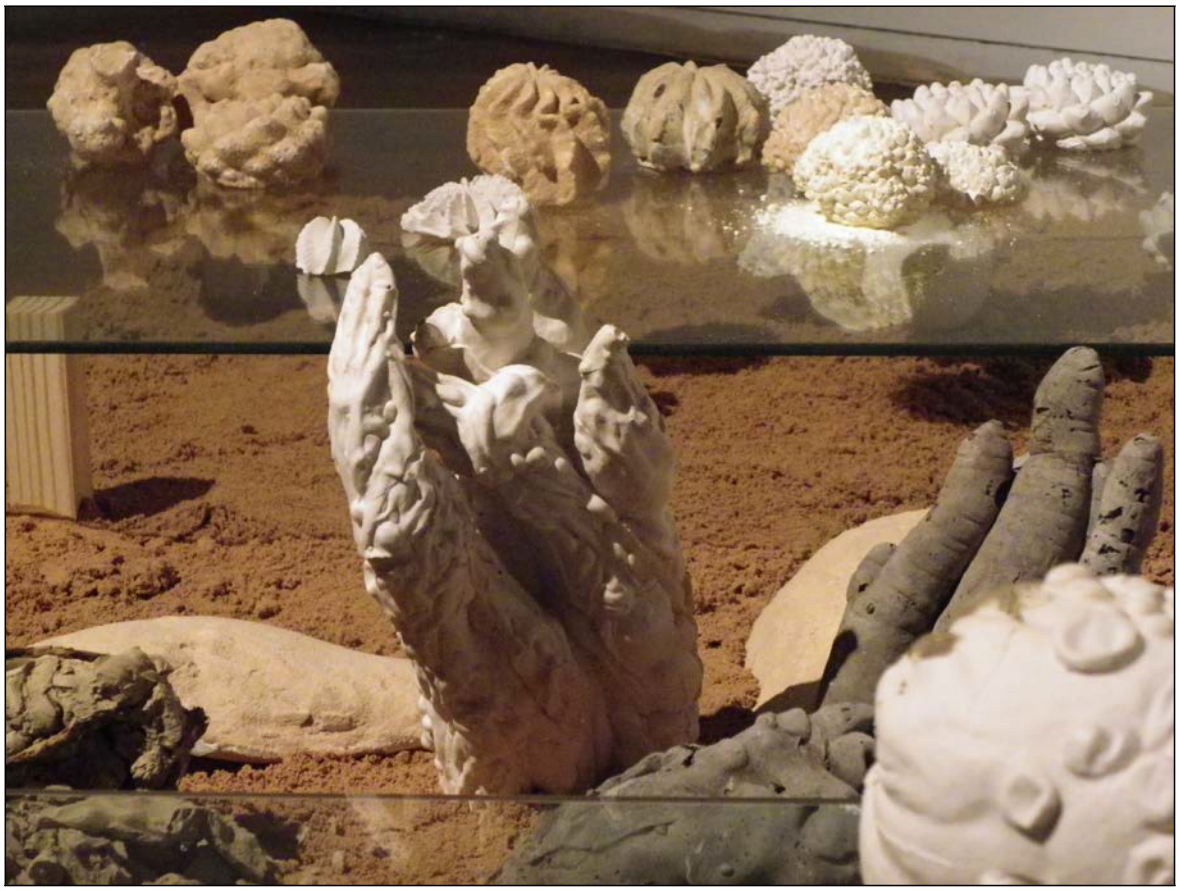

Figure 57: Louise Kritzinger, *Precipitation Objects I*, 2012.
Concrete, Polymer resin, concrete, sand, sulphur powder and glass, 100 × 200 × 25 cm.
Photograph by the artist.

This process suggests on the one hand the passage of time (geological time), where minerals take millions of years to form, and on the other hand the short time humans have taken to remove minerals from the earth and convert them into commodities. Geochemist Marian Tredoux (2012:100) stresses that humans are not exempt from the Second Law of Thermodynamics. Despite the most thorough recycling, eventually the extracted minerals from previously concentrated ore deposits will be scattered irrecoverably across the crust of the earth. Robert Smithson made note of this phenomenon in his influential article, *A Sedimentation of the Mind: Earth Projects* (1968). According to the concept of entropy[94] and its processes, everything is destined to return from a low degree of disorder to eventual total disorder. Entropy only proceeds in one direction, similar to time, and is an

[94] Entropy is defined phenomenologically by the Second Law of Thermodynamics as an expression of disorder and randomness (Entropy [sa]).

irreversible process (Entropy [sa]). Smithson declared the idea of the 'timeless art object 'to be essentially finished, arguing for emphasis on the processes of artistic intervention in synchronization to the earth's natural and destructive processes (Kastner & Wallis 1998:27). The artist regarded himself as taking on the "persona of a geologic agent where man actually becomes part of that process rather than overcoming it" (Brady 2007a:290).

Paradoxically, the human species seeks to reverse the process of entropy for the sake of improved quality of life, which Jonas (1984:163) describes as "greater consumption of greater varieties of goods at greater ease". For example, the natural process of radio-active elements is to slowly decay into its decaying elements, such as lead,[95] which is one of the final decay elements in the process.[96] Human endeavour to enrich radio-active elements, such as uranium,[97] has resulted in the acceleration of the decay process, which in turn causes the amount of radiation to increase significantly. Humans are therefore effectively speeding up the clock of the earth's disintegration as expressed in the crumbling clay object in *Precipitation Objects I* (Figure 58). This statement is directly related to the limited amount of time we have left to find a feasible solution for the AMD crisis, which is expanding every day.

In *Precipitation Objects* an assortment of sculptures are displayed on the floor of the loft. Viewers have to ascend a narrow staircase to the loft in order to reach the installation. As a result the approach is from beneath in contrast to entry to the other installations (Figure 59). There is a brief moment of suspense before the viewer enters the room, head first, because the content of the room is not visible from the bottom of the staircase. The fist observation is the smell: due to the small size of the room the artist stimulates the olfactory sense of the viewer by filling the room with the faint smell of sulphur, which is the very distinct smell given off by sulphates. This smell is rather unpleasant, similar to that of rotting eggs. Therefore, some viewers might be inclined to leave the room immediately.

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[95] Decay products of uranium include elements such as thorium, protactinium, radium, radon and polonium as well as lead (Lindemann 2008:2).
[96] Radioactive elements have very unstable nuclei, causing them to transform into other elements through the emission of charged particles, known as radioactive decay or radiation (Lindemann 2008:2).
[97] The first atom bomb was derived from the isotope uranium-238 that was converted to plutonium, in order to sustain the fission process (Lindemann 2008:3).

Figure 58: Louise Kritzinger, crumbling clay object from *Precipitation Objects I*, 2012.
River clay and steel wire, 15 × 36 × 20 cm.
Photograph by the artist.

Figure 59: Louise Kritzinger, *Precipitation Objects II*, 2012.
Concrete, Polymer resin, sand, salt and glass, 70 × 200 × 30 cm.
Photograph by the artist.

As the work is located on the floor, the viewer has a level view of the objects on entrance. Once inside, the tables are turned. The objects are presented in groups, resting either on rectangular shaped layers of sand and salt, or placed on sheets of glass slightly raised from the floor surface. The use of glass in the installation brings up the same visual qualities of the glass casing in which the AMD specimen was viewed as a museum artefact. It also evokes the reflective qualities of water, while the sand is reminiscent of sulphate sedimentation. The sculptures' variation in size and texture as well as their indistinct form should evoke a certain degree of curiosity. The viewer is obliged to abandon his/her elevated position of comfort for a closer look. By minimising the distance between art object and viewer, a more intimate relationship can be forged and yet again the viewer is tempted to touch and even handle the objects.

3.4 Installation for reflective activity

Given the serious nature of the AMD situation in the Witwatersrand and surrounding regions, the notion of responsibility seems inevitable. One has to question who is responsible for more than a century's devastation and who is going to be left responsible for remediation and mitigation? Gold mining companies can no longer deny that they are not accountable for the pollution of water, as it has been estimated that the gold mining industry is responsible for at least 47 percent of all waste generated in South Africa (Tempelhoff 2008a:[sp]). It was already concluded in a study completed in 1964[98] that pollution and not the deficiency of water, would be the most severe outcome of mining in respect of the Wonderfonteinspruit (Liefferink 2009b:12). However, to date government and mining companies have been more interested in studying the problem than in finding feasible solutions. Numerous scientific studies have been conducted within the Wonderfonteinspruit catchment through the years, but much has remained confidential to both the mining industry and regulators.[99] The rehabilitation of land and water has largely fallen on the shoulders of South African taxpayers as mining companies are yet to admit their moral responsibility (Dixon 2011:143).

[98] Farmers in the Oberholzer irrigation area brought the pollution of the creek to the attention of the authorities as early as the 1950s (Liefferink 2009a:2).
[99] The documents containing the history of the Wonderfonteinspruit would surpass five meters if piled in a stack (Liefferink 2009b:3).

The researcher decided to put the issue of responsibility on the table, through an installation titled *A Pyrrhic Victory* (Figure 60), constructed mostly from steel. This structure is large, with an overall length of over three metres and a height of two metres. Connected to the central beam are six pan-like basins hanging from steel cables. The structure's design is based on the framework found above mine shafts, known as shaft heads or headgear. According to Bell (2011:[sp]), these engineering marvels are the iconic symbols of the gold mining industry and a source of patriotic pride.

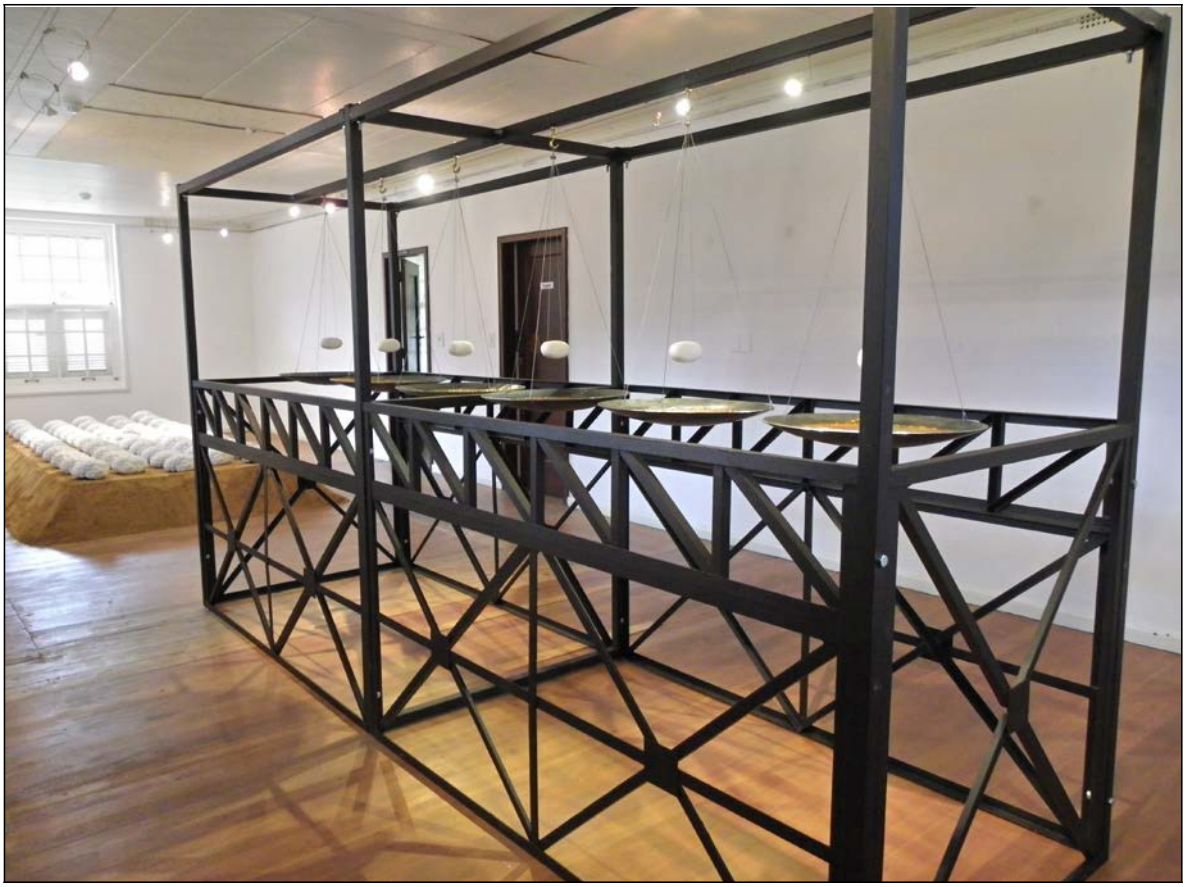

Figure 60: Louise Kritzinger, *A Pyrrhic Victory*, 2012. Steel, water, golden powder and soap, 330 × 110 × 200 cm. Photograph by the artist.

Unite has worked extensively on these colossal structures in the landscape. She is renowned for her *Headgear* drawings (Figure 61), which are massive in scale and required the use scaffolding for their execution. These drawings have been displayed in spaces

such as Christopher Till's Turbine Hall space in central Johannesburg, which resonates with the city's industrial history. Due to the size of the drawings, they take on the real-life dimensions of industry, competing with the architecture of the building itself (Lamprecht 2010:[sp]). Unite draws on the 'nostalgia' of the mining infrastructure in the changing industrial landscape which has in many ways shaped our cultural and social heritage (Thurman 2010:[sp]). Archival headgear photographs illustrate influences of German, Welsh and Cornish engineering during the past 150 years (Unite 2012a:12). The structures that remain are monuments to the hype of Johannesburg's gold rush, which according to Unite (2012b:64) represent the pride and arrogance, which has driven humanity's greed for minerals.

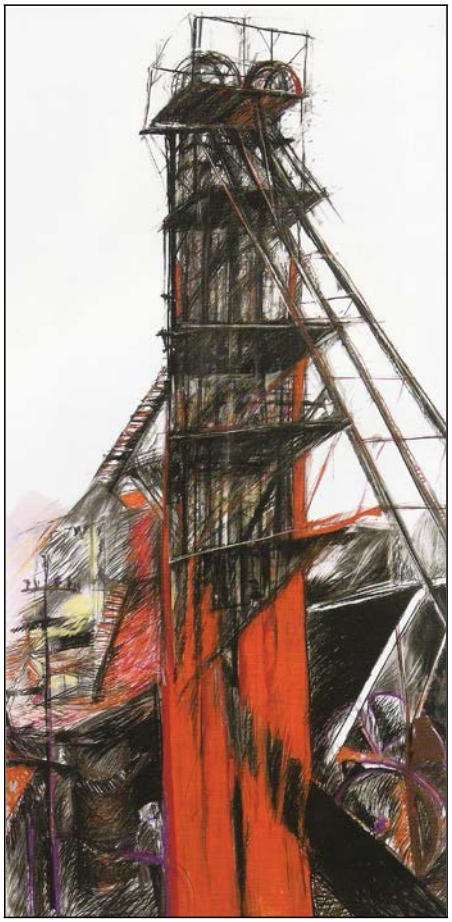

Figure 61: Jeannette Unite, *Headgear: 6 Metres Under*, 2008.
Mixed media drawing on archival cotton rag paper with handmade pastels, including carbon, charcoal, iron oxide, titanium and yellow ochre, 245 × 83 cm.
Collection of Charlton Hood.
(Unite 2012b:61).

Metal oxidation and corrosion are presented as a leitmotif throughout the researcher's exhibition, giving rise to nostalgic notions, but more importantly to those of negligence and indifference. In *A Pyrrhic Victory*, the basins in the structure suggest the country's initial gold rush, with the primitive hand tools, consisting mainly of picks and pans. These tools were ineffective at getting to the Main Reef, which could only be reached by the capital and technical resources of huge mining conglomerates (Gordimer 1973:i).[100] Boshoff has alluded to these technological tools in an installation titled *Walking on Water* (2011, Figure 62), which comprises solar-powered robotic insects moving about on a dry glass pane with the word 'water' displayed underneath. This work deals with humanity's dependence on technology and the incessant drive for progress to improve modern society's already grandiose lifestyles.

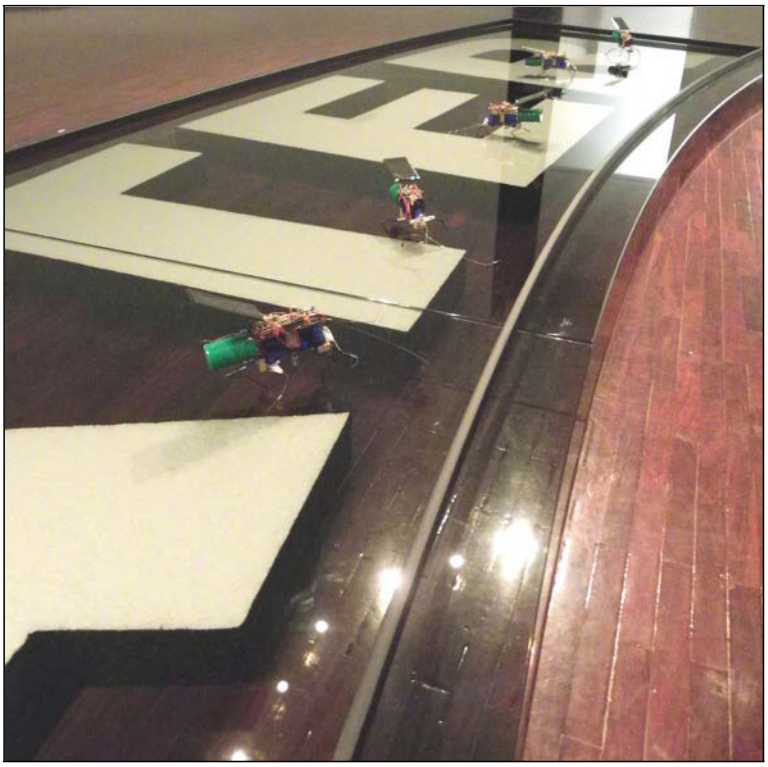

Figure 62: Willem Boshoff, *Walking on Water*, 2011.
Glass, polystyrene letter cut-outs, electronic parts making up 11 robots and one solar light source, 245,5 × 110,9 × 10 cm.
Standard Bank Gallery, Johannesburg.
Photograph by the researcher.

[100] It was realised early on (1880s) that the Main Reef was long as well as deep, with declining values as the seam descends (Jeppe 1946:22).

Crump (2011:67) notes the absence of water in the installation, hinting towards its insecure state in a world where our 'dirty' lifestyles give rise to sullied and depleted water supplies. Boshoff argues that behind the drive of progress lies literacy and technology, which are also the main components of the work. Boshoff turns to cultural theorist, Marshall McLuhan, who proposes that man is the "product of the tool". Marshall plays with the notion that humans created the 'word', while the 'word' in turn created humans (by means of text, speech and the media). In *Walking on Water*, Boshoff suggests that when the planet's most precious resource has been obliterated, only the word itself will survive. This notion is further stressed by the little solar 'waterbots'[101] that will outlive humans, as an end product of our human efforts. Yet, they appear pathetic in their aimless scramble across the slippery glass (Dixon 2011:107).

The water used in *A Pyrrhic Victory* is silent and still in comparison to the vigorously moving water in *Affluence/Effluence*, represented as a small pool of water inside the suspended basins. Due to the motionlessness of the water, its reflective properties come into play: the hard geometric lines of the framework are reflected and this enforces the structure's dominance. The viewer's own reflection bounces off the surface should he or she move close enough. Nel also investigates the use of water as metaphor in installation with his work *Reflective Field* (2011; Figure 63). The refractive nature of water and light is explored through a large four-metre vessel containing a ton of water. Due to the size of the work, it appears overwhelmingly physical, yet Nel and Scoville (2008:4) point to its symbolic qualities resulting from its reflective and absorptive properties. Nel states that "different perceptions of reality become visible, or invisible, at different times". It is the artist's intention that the viewer questions his/her being and place here on earth and in the universe, with the vessel as a source of information on which to contemplate (Dixon 2011:103).

[101] The robotic insects are indicative of a community of semi-aquatic insects which are able to walk on water due to the hyrdrofuge hairs on their legs and abdomens, enabling them to stay clear of the actual water surface (Crump 2011:67).

Figure 63: Karel Nel, *Reflective Field,* 2011.
Carbon Silicate vessel, engraved mirror, water and light, 400 x 200 x 45 em.
Standard Bank Gallery, Johannesburg.
Photograph by the author.

Above each basin of the researcher's installation hangs a standard 200g bar of white soap. Although the basins are located in the centre of the rectangular cage-like structure, the upper half of the framework is intentionally left open, making it possible for the viewer to reach out and touch the soap and water (Figure 64). Because the soap is juxtaposed with a basin of water, it appears as though it is intended for washing up. Engraved on each bar of soap is a major gold mining company name, with the last two bars of soap reserved for the government and shareholder respectively. The major gold mine companies involved are *Harmony Gold, GoldFields*, *AngloGold Ashanti* and *DRDGold*. This work also has strong links to the work titled *Everybody Lives Downstream*, in which two basins are used with the one decanting into the other, clearly displaying gold lumps as the source of the contamination. Distorted vegetables protrude from the bottom of the basin, again alluding to the effects of contamination. The vegetables are cast in concrete, which combined with steel, is the primary construction material used in the industry.

Figure 64: Louise Kritzinger, a closer viewpoint of *A Pyrrhic Victory* from the viewer's perspective, 2012.
Steel, water, golden powder and soap, 330 × 110 × 200 cm.
Photograph by the artist.

Carson (1962:29) claims that in an era dominated by industry, cost is seldom challenged if there is money to be made. Government is inclined to turn a blind eye on the expanding environmental crisis with its long-term consequences, while supporting the short-term benefits of the country's mineral resources. The price, at which a commodity trades, is determined by what users are prepared to pay for it. Tredoux (2012:98) emphasises that there are hidden costs, estimated at up to 99.9% of the "reversed energy", which is dumped into the receiving environment. This cost is more severe when a country is a major producer of ore, but a minor manufacturer of goods. Unite (2012b:62) notes that a common phenomenon in regions with excessive riches below the surface, is that there tends to be extreme poverty above the surface. This condition is known as the "resource curse", with Africa being its greatest victim. Although the Witwatersrand Goldfields are the largest in the world, the gold values are of a comparatively low grade. As a result enormous amounts of rock must be moved. These mines are the deepest in the world, extending down four kilometres into the earth (Derby 2012:16). The bars of soap bearing the names of the major gold mining companies are directly related to this aspect. For this reason they are placed at the centre of the work.

In the long run the guilty parties are not easily distinguishable. Lacy (1995a:33) recalls the familiar line "I see the enemy and it is I". Comp (2008:65) reminds us that "in any historical perspective, the enemy is ourselves, all of us, as a nation: the values we held at one time created these problems by allowing mining with little thought of reclamation". The inhabitants of Gauteng have all contributed in one way or another to the conditions prevalent in the region today. Gordimer (1973:vii) states that, "the money, technological advance and economic power the Witwatersrand mines brought up from the darkness flows into human activities removed from them in nature and time". Today, the offspring of white miners work in different kinds of industry, own businesses and live in the industrial towns, still bearing the original names of the farms prior to the discovery of gold (Gordimer 1973:vii). The researcher is also an example of this: had her great great grandfather on her mother's side not moved to the Witwatersrand to work on the mines, her great grandfather and grandfather would not have been farmers in the area. She would not have grown up in the industrial town of Olifantsfontein close to the East Rand. It could be speculated that her father would not have been able to afford her tertiary education had he not bought shares in gold mining companies. Therefore, she also relates to the bar of

'shareholder' soap, which refers to a large majority of people that might form part of the audience.

Norton (1995:129) stresses that the heaviest risk in upcoming environmental problems will not be on the "present actors", but rather on the future generations. They will have to face the consequences of decisions made in which they had not participated. Likewise, they will most likely not benefit from the currently prevailing trend of wastefulness. Norton (1995:137) claims that humans feel a natural obligation towards their offspring, but none whatsoever to the generations that succeed them. In the technocratic market-driven world we live in today, with its encouragement of false needs and destructive desires, we fail to realise that our vital material needs are almost certainly less demanding of the earth's resources than that of our excessive needs (Devall & Sessions 1995:159). Kentridge proposes a "collective acknowledgement of the damage we have inflicted on our surroundings", because what remains is guilt, complicity and indirect responsibility (Christov-Bakargiev 2004:33).

A Pyrrhic Victory attempts to confront these issues. What is needed at this stage of the responsibility argument is to pause for a moment of self-reflection, with water as a contemplative medium. What the viewer experiences with *A Pyrrhic Victory* is the stark linear configuration of industry, whereas the delicate twine of cable suggests a more fragile side to the installation. The hovering basins allude to this fragile element, as they resemble balancing scales, indicative of our future that hangs in the balance. Another fragile element is the soap, which is soft and white compared to the frame. The viewer is able to smell the soap, a material used for cleaning. The viewer can make two possible deductions from the use of soap in the installation: it can be viewed as a medium to wash one's hands with in the basin of water provided, on a metaphorical level as a means of washing away guilt; or it can be regarded as a metaphor for the cleaning and remediation that is needed for the rehabilitation of the water and soil in the Witwatersrand.

By walking around the work, touching the coldness of the steel, peering at one's reflection in the water and possibly reaching out to break the surface of the water, one has the time to contemplate its meaning. Lacy (1995b:180) suggests that at least some viewers will carry the artwork over time as memory, effectively extending the experience of the work

beyond the exhibition. By presenting every visitor before they leave with a bar of soap engraved with the exhibition title, the researcher hopes to extend their experience of the exhibition.

CHAPTER FOUR: CONCLUSION

By reflecting environmental concern for especially mining pollution, this study determined the need for South African artists to become involved in environmentally orientated art, specifically in the post-industrial environment. When speaking of the environment, one unavoidably speaks of human interventions in the landscape and not a pre-industrial notion of 'untouched' nature. Moreover, the preoccupation with land is of inextricably linked with aesthetics, politics and economics (Jamal 2012:80). When the first factory smokestacks were erected in the early nineteenth century, Arcadian landscape scenes were created by the Romantics that glorified the vast inexhaustible reserves of nature (Grande 1994:54). Today, contemporary art inspired by nature is often perceived to be nostalgic and as having a post-industrial longing for a non-existent mythological place (Lipton and Watts 2007:90). Since humans have devastated and exhausted our natural resources, a romanticised view of nature is no longer available. Meanwhile, "nature remains oblivious, yet intensely affected by human endeavour" (Grande 1994:5).

An investigation was launched into historical South African landscape painting depicting mining scenery which reflected the contested and exploitative pursuits of colonialists. Landscape painting in South Africa, has been one of the most dominant forms of artistic expression. Even today, as indicated by Godby (2010:62) artists continue to draw on the genre, although interrogating the traditional colonial styles of representation, as seen in the work of Kentridge and Crump. Goldblatt also contributed towards depicting mining scenery in his photographs. He revealed the truth about that landscape in a visually arresting series of photographs during the course of his career.

As explained in the second chapter, environmental art includes an almost boundless range of permanent and temporary works in a variety of scale and media and as a wide array of landscape (Beardsley 2010:xi). To highlight this issue, a number of contemporary South African artists were selected for this study. These artists deal specifically with the post-industrial landscape of the Witwatersrand. They contributed towards creating an awareness of the disappearing mine landscape, by including features such as mine tailings and shaft heads in their work. These artists were discussed in relation to the

environmental art by Western artists whose works stand as memorials to industrial disruption of the landscape (Beardsley 1984:26), and as incitements to consider the need for resource development policies.

Prigann's reclamation art illustrates how Earthworks as reclamation progressed by incorporating science. As a result, finding practical solutions towards remediation has become an important component in contemporary reclamation works. The relationship between art and science was discussed in terms of the artist's ability to collaborate with scientists and people from other disciplines. Water and soil contamination was specifically investigated and examples were included of artists who applied visionary approaches to unite community and experts to find solutions for real-world problems. These international examples set important precedents for environmental remediation in a country such as South Africa that still needs to develop in this field. Two South African artists who were actively collaborating with scientists were discussed. Nel and Unite directly implements toxic waste to create their art. In so doing, they create an awareness of toxins lying discarded in the post-industrial sites in our everyday surrounds. Prigann (2004a:182) explains: "we shape the world, and the world takes on the shape of our imagination. There are no destroyed landscapes in the sense of any finality. In time exists the re-appropriation through succession". This section revealed that artists can become active agents in the rehabilitation of devastated post-industrial environments, and that there is always a need for such agents in an ever-widening post-industrial landscape. Although critics question the purpose of artists who deal with remediation projects falling outside their field of expertise, it was shown that artists play a seminal role in initiating such projects and contributing by means of creativity towards environmental and social change.

Chapter three dealt with the specific issue of AMD in the configuration of the researcher's own art practice. Apart from the possibility of the extinction of humankind by nuclear war, the greatest problem of our age is the contamination of the environment, which we share with other living organisms. AMD contamination specific to the Witwatersrand not only ends up in the region's water supply, but accumulates in the tissues of plants and animals. This can alter the very material of genetics "upon which the shape of the future depends" (Carson 1962:25). Evidently the enormity of the environmental problem the West Rand is facing is not something an artist can transform alone. Yet, it is worth pursuing for the sake

of public awareness and the drive for new paradigms of environmental governance in South Africa. Crump (2011:72) reminds us that all the water existing on earth "is the same water that has always been available and the only water that ever will be available".

The body of work created for the gallery context comprised mainly large installation works, although parts consisted of traditional mediums such as sculpture and photography. The researcher's work was discussed on the one hand in terms of traditional aesthetics relating to traditional disciplines in fine art. On the other hand her work was discussed in terms of contemporary notions derived from installation art. The aesthetics of "heightened perception", based on the philosophy of Merleau-Ponty was consulted as a multi-sensory opening of one's perceptual faculties to the world (Erzen 2004:23). Other artists, (especially South African artists), were referred to throughout the discussion of the researcher's work on display in the gallery setting. Similarities, not only in content but also in terms of medium have been borne in mind. These artists have utilised site-specific mining detritus, often toxic, while others have made use of the reflective qualities of water.

A strong focus in the researcher's work is that of moral responsibility toward one's environment, which she believes art should encompass. She has aimed to express this in aesthetic terms. The supposition that art is something separate from the life that sustains people, and only a luxury, is, according to Májozo (1995:89), a false notion. Májozo insists that artistic expression plays a seminal role in changing our relation to the world. Articulating humanity's relation to nature remains ever critical. The researcher stresses that the only challenge for the artist lies not in the "transformation of their ideas into matter, but making their ideas in fact matter" (Májozo 1995:88). This however is not easily accomplished, as nature and culture have fallen into a state of "ecological emergency" and as the facts, censored by the mass garbage of information, cannot make an impact on their own; art needs to step up to the occasion (Boberg 2004:8).

Reyner Banham comments on Misrach's photographs as follows: "Educational and moral values alone do not make great art" (Bright 1992:69). In turn Morris (1980:101) believes that artists who are deeply committed to social causes often make the worst art. Kester (2004:11) argues that in some cases, the very status of a work as 'art' is brought into question, should it appear identical to social or political activism. Furthermore, Kester

(2004:140) questions how artists can be considered competent to take on complex environmental and ethical causes, when they have been trained in the conventional arts, with the focus on art history and the developing of craft skills. Gablik (1991:144) suggests that when artists learn to incorporate their own needs and talents with that of others, we may not necessarily have better art, but possibly better morals, intentions and principles. Ngwenya (2010:[sp]) in addition proposes that we make an effort to share in mixed and mutual activities, as this will break down barriers. This would lead to the realisation that not only do we share the same dreams and fears, but we also seek the same resolutions regarding our future prospects.

In the researcher's own experience she can categorically confirm that she was not able to contribute towards scientific research conducted on AMD. However, by working and conversing with scientists and people in different fields, she has gained valuable insight. She furthermore realised that they shared common goals, such as seeking solutions to the problem, although their methods (and occupations) differed. She was able to draw from those experiences she had shared with Dr Durand and his co-workers. This enabled the researcher to convey her findings with an audience, who, in turn, might potentially share their experiences of the exhibition with others.

The researcher is unable at this point to verify as to whether her exhibition has changed people's perceptions towards the environment and whether her message on the ramifications of AMD has made an impact. However, Devall and Sessions (1995:159) remind us that, "there is no grand solution which is guaranteed to save us from ourselves". Environmental art does not necessarily offer a solution (Cembalest 1991:100). Lacy (1995b:174) points out when there is no quick solution to problems, artists can only offer the service of empathy, as witnesses of world events.

Kentridge admits that his art is distanced, although it is politically concerned. He also admits that he does not seek solutions to existing problems. One may assume that this could be the reason for Kentridge's success. By exemplifying the dilemma and creating uncertain endings, Jamal (2002:25) claims his work becomes appealing to the troubled conscience. Dixon (2011:116) suggests his art reveals reality in a way intended to generate a response upon which to correct our actions towards the environment. Morris

(Lippard 1983:230) in turn argues that what differentiates art from all other organised human activity is that it presents the freedom to "experience" and question, which makes it possible to project visions into society.

However, Finke (2004:107) warns that if we do not take up and solve real-world problems, our future may be compromised, hence calling for a moral responsibility in terms of cultural change. Newton Harrison agrees with this, saying that, "our time of grace if over. …We are going to have to make vast changes in our consciousness and behavioural patterns, because if we don't, we won't be here" (Adcock 1992:45). In a time of increasing environmental anxiety, these issues can no longer be ignored. This includes not only the post-industrial environment of the Witwatersrand, but also the ongoing global rush to secure rights to mineral commodities, particularly on the African continent.

The future of South Africa's mineral rights also hangs in the balance, due to the references made by politicians about land restitution through state intervention (Gurney 2012:26). Should mines in South Africa be nationalised for the sake of equitable resource distribution, the risk for more severe environmental ills would be overwhelming. The researcher argues that it is imperative for South African artists to become morally responsible for the sake of the future. Through visual and aesthetic awareness one can hope to educate and inform in order to initiate a change in the public's perception of their environment.

This study demonstrated that South African artists have been involved in advocating issues relating to the environment all along. It would be unjust to draw the conclusion that South African artists have been absent in this regard. Yet it should be noted that most of the art discussed here was created in the past decade. The researcher maintains that South Africa needs more artists to create environmentally orientated work that especially relate to the mining industry, despite that fact that there have been developments in environmental art in recent years. These exhibitions and artworks dealt with environmental destruction from a universal perspective, rather than engaging in a specific localised South African issue. For example, in the travelling exhibition *Ecotopian states* (2010), a whole group of artists collaborated. Although a diverse selection of visually interesting environmentally conscious art was created by the artists, issues relating to

mining were not taken up. In her solo exhibition *Magnetic attraction* (June 2012) Jacki McInnes chose the catastrophic acceleration of planetary destruction as her subject matter (Hunter 2012:1). It would also seem that art festivals that take place throughout the country are becoming conscious of environmentally-based art in their support to artists who use these festivals as a platform to raise awareness. Nevertheless, the researcher believes that complicated and illusive issues relating to industry, such as AMD, have rarely been taken up by South African artists.

The only exhibitions that have come close to issues relating to mining and AMD have been *Water, the [delicate] thread of life* (2011), curated by Marion Dixon as well as Van der Merwe's recent exhibition in Johannesburg (*Drawing clouds in the Karoo*, 2011). Van der Merwe's exhibition included an installation of small mechanised wooden hammer devices, indicative of the "nodding donkey" structures in oilfields. These little apparatus' filled the entire exhibition space, each lighting different sections of Karoo maps on the floor. This work directly confronts the oil company Shell's propositions to mine for shale gas in the Karoo, through the environmentally destructive method of hydraulic fracturing (Tully 2012:72). The researcher commends Van der Merwe for this initiative, in a time of political threat of mine nationalisation and the lifting of the moratorium on fracking exploration. The researcher furthermore remains perplexed that especially local artists working at the Nirox Foundation in the Cradle of Humankind (which is under severe threat by AMD) (Tempelhoff 2008d:[sp]), have not attempted to engage this imperative issue.

Heizer once remarked that, "the work I'm doing has to be done, and somebody has to do it. Where in the hell are all the artists? I mean we live in an age of obligation" (Auping 1983:95). While the nature of Heizer's Earthworks is environmentally questionable, he makes a valid statement which is directly related to the future of our collective wellbeing. Moreover, Jonas (1984:101) insists that "the work of art exists after all for [people] only, for their sake, and only as long as such are around. The greatest masterpiece becomes a mute piece of matter in a world without [them]". From this it is clear that the production of art, although orientated towards environmental matters, can only be perceived and understood by humans. It therefore remains for the artist to realise his or her importance in society.

As an artist, the researcher realised the necessity of addressing issues as urgent as AMD in the Witwatersrand. She carefully considered the methods and materials that would most effectively deliver the message to a human audience. By presenting the work in the form of installation, she hopes to draw and sustain the attention of the viewer, to not only view the work, but take an active part in decoding the messages presented by each work. The viewer is encouraged to, above all, take the time to think and contemplate the meaning of the work. Through the activity of reflection, the viewer becomes an active participant in the installation. The outcome of viewer participation can not be predicted, but as an artist the researcher can only hope that it would lead to more reflection, in a time and space outside of the gallery.

The investigation into South African artists concerned with environmental and ecological issues relating to post-industrial pollution in this mini-dissertation has mostly been limited to that of the gold mining industry. Therefore, room for further research into other areas of industry is encouraged. The focus of such research would be a more comprehensive overview of South African artists who engage with pollution in post-industrial environments as well as even presently-mined environments.

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