

# APPENDIX R

## ACWA Power Waste Management Plan Guideline



## Waste Management Plan

Version 1

05/05/2016



**CONTENTS**

<b>1</b>	<b><i>INTRODUCTION</i></b>	<b>1</b>
1.1	<i>PURPOSE OF THE WASTE MANAGEMENT PLAN</i>	1
1.2	<i>OBJECTIVES OF THE WMP</i>	1
1.3	<i>PHILOSOPHY</i>	2
<b>2</b>	<b><i>LEGAL AND REGULATORY REQUIREMENTS</i></b>	<b>4</b>
2.1	<i>SOUTH AFRICAN REGULATORY REQUIREMENTS</i>	4
2.2	<i>INTERNATIONAL REQUIREMENTS</i>	5
2.2.1	<i>General Waste Management Requirements</i>	6
2.2.2	<i>Hazardous Waste Management</i>	8
<b>3</b>	<b><i>ACWA POWER WASTE MANAGEMENT</i></b>	<b>10</b>
3.1	<i>OVERVIEW</i>	10
3.2	<i>WASTE IDENTIFICATION</i>	10
3.3	<i>PLANNING AND WASTE PREVENTION</i>	14
3.4	<i>WASTE HANDLING BY STAFF</i>	14
3.5	<i>WASTE SEGREGATION</i>	15
3.6	<i>WASTE STORAGE</i>	15
3.7	<i>WASTE TRANSPORTATION</i>	17
3.8	<i>WASTE TREATMENT AND DISPOSAL</i>	19
<b>4</b>	<b><i>ROLES AND RESPONSIBILITIES</i></b>	<b>20</b>
4.1	<i>ENVIRONMENTAL AND SOCIAL MANAGEMENT ORGANISATION</i>	20
4.2	<i>ENGINEERING, PROCUREMENT AND CONSTRUCTION (EPC) CONTRACTORS</i>	22
<b>5</b>	<b><i>COMPETENCE, TRAINING AND AWARENESS</i></b>	<b>23</b>
<b>6</b>	<b><i>DOCUMENTATION</i></b>	<b>24</b>
<b>7</b>	<b><i>REPORTING AND MONITORING</i></b>	<b>25</b>
7.1	<i>CONSTRUCTION PHASE</i>	25
7.2	<i>OPERATION PHASE</i>	25



## Waste Management Plan

Doc No: ACWA – WMP - 01

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8

*ASSESSMENT AND AUDIT*

26

***TERMS AND DEFINITIONS***

CSP	Concentrated Solar Power
EHS	Environmental Health and Safety
EPC	Engineering, Procurement and Construction contractors
GIIP	Good international industry practice
HSEQ	Health, Safety and Quality Manager
IFC PS	International Finance Corporation's Performance Standards
MSDS	Material Safety Data Sheets
NEM:WA	National Environmental Management: Waste Act, No. 59 of 2009
PPE	Personal Protective Equipment
PV	Photovoltaic
WBG EHS	World Bank Group's Environmental Health and Safety Guidelines
WML	Waste Management Licence
WMP	Waste Management Plan

## **1 INTRODUCTION**

### **1.1 PURPOSE OF THE WASTE MANAGEMENT PLAN**

Activities associated with the construction and operation of power producing facilities (thermal power plants (coal, liquid fuel and gas), solar photovoltaic (PV) and concentrated solar power (CSP), transmission and distribution infrastructure, and wind power) will generate various wastes which, if not properly managed, have the potential to impact the environment and pose a risk to public health and workers.

This Waste Management Plan (WMP) describes ACWA Power's approach to waste management and pollution prevention in setting the framework for asset specific actions that will be taken to reduce, segregate, collect, and dispose of wastes to avoid or minimize impacts on the environment, communities, and workers. The Plan has been prepared to comply with the International Finance Corporation (IFC) Performance Standards (PS), the World Bank Group's Environmental Health and Safety Guidelines (WBG EHS) and applicable national South African legislation.

This WMP covers management of non-hazardous waste and hazardous wastes and refers to facilities in South Africa only. The scope of power generation facilities considered includes thermal power generation (gas, liquid fuel, and coal), solar PV and CSP, wind and transmission and distribution projects.

### **1.2 OBJECTIVES OF THE WMP**

The WMP has the following objectives:

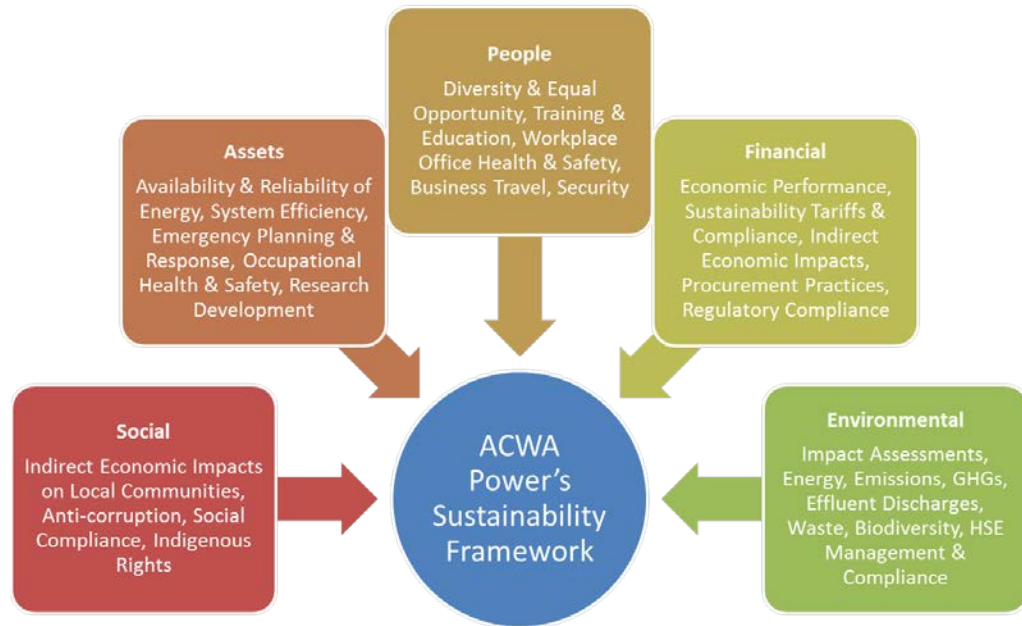
- The management of wastes is done in accordance with applicable South African laws and regulations as well as international best practice (such as IFC PS and WBG EHS);
- Waste minimisation is incorporated into processes;
- Wastes are characterised, classified, and segregated as close to their source as practical;
- Wastes are properly handled, stored, transported and disposed; and

- Waste management is properly documented.

### 1.3 PHILOSOPHY

Waste management is part of ACWA Power’s Sustainability Framework (see Figure 1.1). ACWA Power has adopted a simple philosophy for waste management which places a strong emphasis on waste minimization (see Figure 1.2.).

**Figure 1.1 ACWA Power Sustainability Framework (Source: ACWA Power Sustainability Report 2014)**



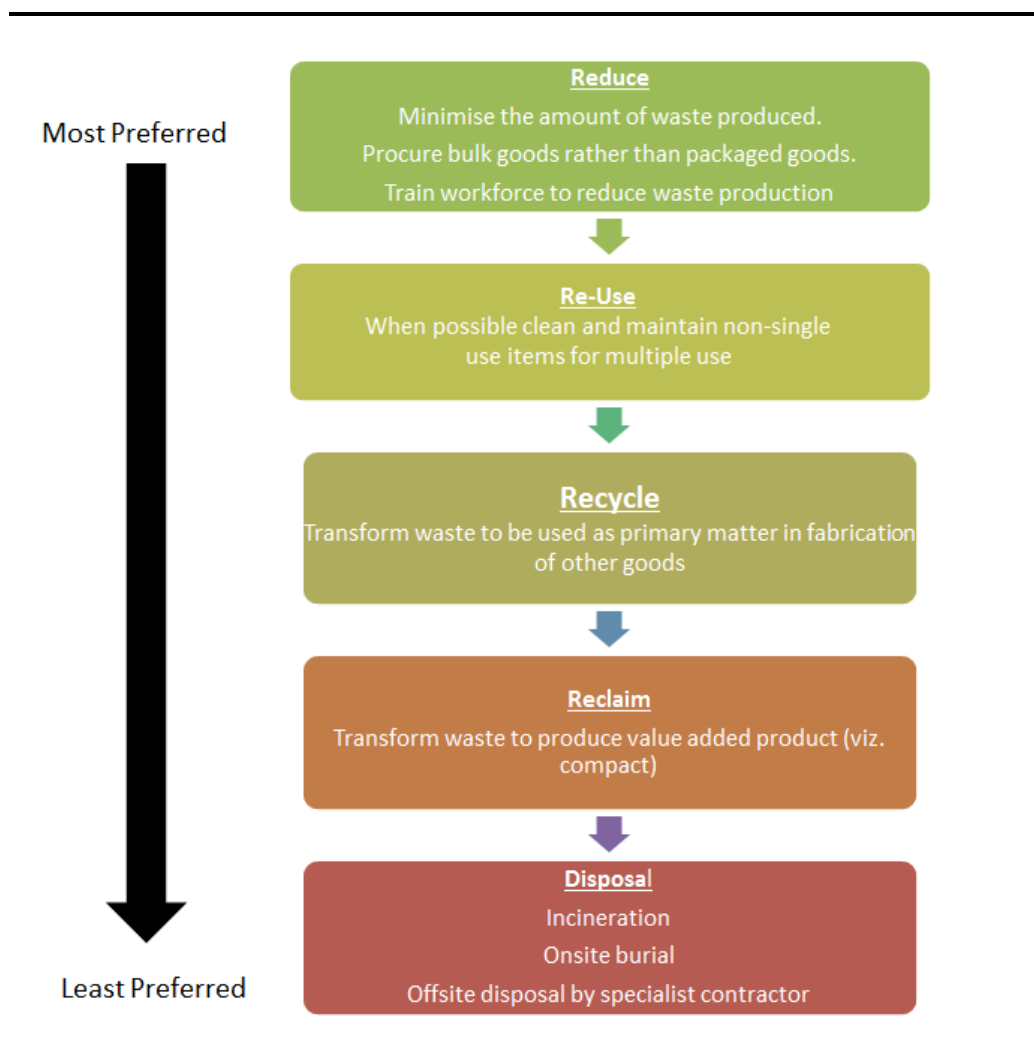
The principles of the waste management philosophy are adopted at all levels within ACWA Power and through all stages of the asset life cycle.

- *Reduce*: If generated, reduce the quantity of waste;
- *Reuse*: Where possible, use items for multiple use;



- *Recycle*: Recycle if waste generation cannot be practicably reduced;
- *Reclaim*: Transform waste to a value added product;
- *Dispose*: If materials or energy are recovered from a waste it is classified as recovery rather than disposal.

**Figure 1.2 Waste Management Hierarchy**



	<b>Waste Management Plan</b>	Doc No: ACWA – WMP - 01 Revision No: 01 Date: 5 <sup>th</sup> May 2016
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## 2 *LEGAL AND REGULATORY REQUIREMENTS*

### 2.1 *SOUTH AFRICAN REGULATORY REQUIREMENTS*

Waste management in South Africa is governed by the National Environmental Management: Waste Act (NEM: WA), 2008 which came into effect on the 1<sup>st</sup> July 2009. The Waste Act supports the waste management hierarchy in its approach to waste management, by promoting cleaner production, waste minimisation, reuse, recycling and waste treatment with disposal seen as a last resort in the management of waste. *Box 2-1* summarises the South African Waste Act definition of waste. The NEM Waste Amendment Act, 2014 classified waste into two classes based on the risk it poses – general waste and hazardous waste, also included in *Box 2-1*.

Waste generating activities are managed through the issuance of a Waste Management Licence (WML). Depending on the capacity and activities being undertaken, a WML is triggered for Category A or Category B activities of the GN R921<sup>[1]</sup> of November 2013 of the NEM: WA, No. 59 of 2009.

According to the specific power generation technology used, ACWA Power assets will be categorised as either Category A or B and as such will apply for a WML through the established process. This will be adopted on an asset by asset basis.

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<sup>[1]</sup> Waste Management Activities in respect of which a Waste Management Licence is required in accordance with Section 20(B) of the NEM:WA, 2008 (Act No. 59 of 2008). Category A and B type activities are available online <http://www.nwpg.gov.za/Agriculture/documents/Environmental%20Quality%20Management/Gn%20No.%20921%20List%20of%20Waste%20Management%20Activities.pdf> (accessed 05/02/2016)

***Box 2-1 South African Waste Act Definition of Waste***

Waste means -

- (a) any substance, material or object, that is unwanted, rejected, abandoned, discarded or disposed of, by the holder of the substance, material or object, whether or not such substance, material or object can be re-used, recycled or recovered and includes all wastes as defined in Schedule 3 to this Act; or
- (b) any substance, material or object that is not included in Schedule 3 that may be defined as a waste by the Minister by notice in the Gazette, but any waste or portion of waste, referred to in paragraph (a) and (b) ceases to be a waste -
- (i) once an application for its re-use, recycling or recovery has been approved or, after such approval, once it is, or has been re-used, recycled or recovered;
  - (ii) where approval is not required, once a waste is or has been re-used, recycled or recovered;
  - (iii) where the Minister has, in terms of section 74, exempted any waste or a portion of waste generated by a particular process from the definition of waste; or
  - (iv) where the Minister has, in the prescribed manner, excluded any waste stream or a portion of a waste stream from the definition of waste.

Under *NEM: Waste Amendment Act 2014*, general waste means waste that does not pose an immediate hazard or threat to health or to the environment, and includes:

- (a) domestic waste;
- (b) building and demolition waste;
- (c) business waste;
- (d) inert waste; or
- (e) any waste classified as non-hazardous waste in terms of the regulations made under section 69, and includes non-hazardous substances, materials or objects within the business, domestic, inert or building and demolition wastes

Hazardous waste means any waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical, chemical or toxicological characteristics of that waste, have a detrimental impact on health and the environment and includes hazardous substances, materials or objects within the business waste, residue deposits and residue stockpiles.

**2.2*****INTERNATIONAL REQUIREMENTS***

This WMP is based on guidance from:

- IFC Performance Standard 3 on Resource Efficiency and Pollution Prevention (2012); and
- World Bank Group Environmental, Health and Safety (EHS) General Guidelines (2007) (Section 1.6 Waste Management).

The EHS General Guidelines provide definitions of general non-hazardous waste and hazardous waste (*Box 2-2*). The management requirements for wastes are described in the following sections.

***Box 2-2 EHS General Guidelines Definitions of Waste***

Waste: Solid, liquid, or contained gaseous material that is being discarded by disposal, recycling, burning or incineration. It can be by-product of a manufacturing process or an obsolete commercial product that can no longer be used for intended purpose and requires disposal.

Solid Waste (non-hazardous). Generally includes any garbage, refuse. Examples of such waste include domestic trash and garbage; inert construction / demolition materials; refuse, such as metal scrap and empty containers.

Hazardous Waste. Shares the properties of a hazardous material (e.g., ignitability, corrosivity, reactivity, or toxicity), or other physical, chemical, or biological characteristics that may pose a potential risk to human health or the environment if improperly managed.

Source: World Bank Group (2007)

### **2.2.1 General Waste Management Requirements**

The EHS General Guideline specifies that waste is to be managed through a waste management system that addresses issues linked to waste minimization, generation, transport, disposal, and monitoring.

#### *Planning*

Facilities that generate waste should characterize waste according to composition, source, types of wastes produced, generation rates, or according to local regulatory requirements. More specifically, waste management strategies should include:

- Review of new waste sources during planning, siting, and design activities;
- Collection of data and information about waste streams;
- Prioritise waste streams;
- Identify opportunities for waste reduction at source, as well as reuse and recycling; and

- Define procedures and operational controls for onsite storage, treatment, and disposal.

#### *Waste Prevention*

Processes should be designed and operated to prevent, or minimize, the quantities of wastes generated. The EHS General Guidelines specify certain strategies that can be employed such as:

- Substituting inputs with less hazardous materials, or with those where processing generates lower waste volumes;
- Undertake processes that create the least waste;
- Instituting good housekeeping and operating practices;
- Instituting procurement measures that recognize opportunities to return usable materials; and
- Minimizing hazardous waste generation by implementing stringent waste segregation to prevent contamination.

#### *Recycling and Reuse*

Recycling plans have the potential to reduce the amount of waste generated. The following should be considered:

- Evaluation of waste production processes to identify waste streams that could potentially be recycled;
- Investigation of external markets for recycling in the region;
- Establishing recycling objectives and track progress; and
- Providing training to employees.

#### *Treatment and Disposal*

If waste materials are still generated after the implementation of feasible waste prevention, reduction, reuse, recovery and recycling measures, waste materials should be treated and disposed of and measures should ensure that there is minimal impact to human health and the environment. Management

approaches should be in line with local legislation and could include the following strategies:

- On-site or off-site biological, chemical, or physical treatment of the waste material to render it non-hazardous prior to final disposal; and
- Treatment or disposal at permitted facilities specially designed to receive the waste.

### 2.2.2 *Hazardous Waste Management*

Hazardous wastes should always be segregated from non-hazardous wastes.

If hazardous wastes cannot be prevented, then management of hazardous waste should be based on the following principles:

- Understanding potential impacts and risks associated with hazardous waste as part of the project life cycle;
- Ensuring that contractors handling, treating, and disposing of hazardous waste are licensed and follow good international industry practice; and
- Ensure compliance with local legislation.

#### *Waste Storage*

Hazardous waste should be stored to prevent or control accidental releases to air, soil, and water resources in area location where contamination of non-hazardous waste with hazardous waste. Furthermore, they must be stored appropriately to reduce exposure to sunlight, wind and rain as well as minimise the potential for contamination of the environment.

In addition, hazardous waste storage activities should also be subject to special management actions including behaviour of employees.

#### *Transportation*

All waste containers designated for off-site transportation should be secured and labelled with the contents and associated hazards, be properly loaded on the transport vehicles before leaving the site, and be accompanied by appropriate documentation.

*Treatment and Disposal*

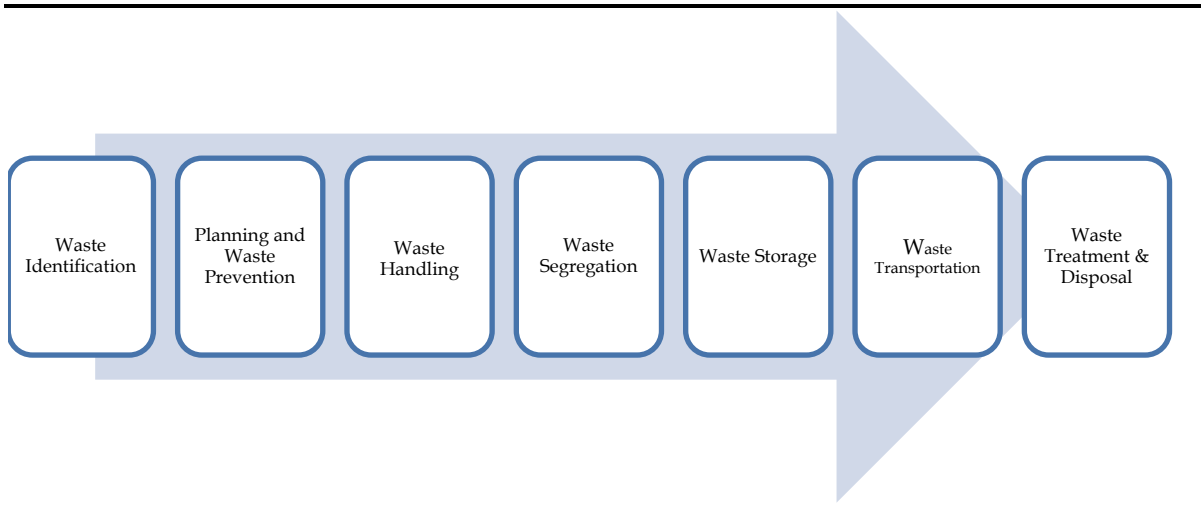
In addition to the recommendations for treatment and disposal applicable to general wastes, the following issues specific to hazardous wastes should be considered. In the absence of qualified commercial or government-owned waste disposal operators (taking into consideration proximity and transportation requirements); project sponsors should consider installing on-site waste treatment or recycling processes. Finally, constructing facilities that will provide for the environmental sound long-term storage of wastes on- or at an alternative appropriate location up until external commercial options become available.

### 3 ACWA POWER WASTE MANAGEMENT

#### 3.1 OVERVIEW

In line with IFC PS 3, ACWA Power will avoid the generation of hazardous and non hazardous waste materials. Where waste generation can not be avoided, ACWA Power will reduce the generation of waste and recover and reuse waste in a manner that is safe for human health and the environment, as outlined in *Figure 3.1. Appendix A* outlines a summary of the actions contained within ACWA Power’s waste management process.

**Figure 3.1 Overview of the Waste Management Process**



#### 3.2 WASTE IDENTIFICATION

A critical component of the waste management process is the identification and designation of the waste as hazardous or non-hazardous. Waste will be identified, classified, and managed as non-hazardous or hazardous waste. *Box 3-1* provides a summary of the definitions that ACWA Power uses in defining waste.



***Box 3-1 ACWA Power Waste Definitions****Non Hazardous waste:*

Non-hazardous waste includes garbage and refuse. For example, domestic trash and garbage; inert construction and demolition materials; refuse, such as metal scrap and empty containers and residual waste from industrial operations, such as boiler slag, clinker, and fly ash.

*Hazardous Waste:*

Hazardous waste is waste that is toxic, flammable, corrosive, radioactive, explosive or otherwise dangerous. This includes motor oil, diesel fuel, gasoline (petrol), paint, solvents, dry cell and vehicle batteries, pesticides, infectious or medical wastes from hospitals and clinics, metallic and/or oily sludges or solvents, and asbestos materials.

According to the World Bank Group EHS General Guidelines, hazardous waste shares the properties of a hazardous material (i.e., ignitability, corrosivity, reactivity, or toxicity), or other physical, chemical, or biological characteristics that may pose a potential risk to human health or the environment if improperly managed.

There are a number of different waste streams generated during the construction and operation of thermal power plants (including gas, coal and liquid fuel), solar power plants, wind power plants and transmission and distribution infrastructure. *Table 3.1* illustrates the typical waste streams generated during construction and operation of these assets.

**Table 3.1 Typical Waste Types Per Power Asset Technology**

Asset Phase	Thermal Power Generation (coal, gas, oil)	Solar (PV and CSP)	Wind Power (onshore)	Transmission and Distribution
Construction	<p><i>Site clearance activities:</i> excavated material: soil, rock cuttings and vegetation material. Solid construction waste: surplus or off specification concrete, wooden pallets, steel cuttings/filings, steel plates, structural steel, wooden pallets;</p> <p><i>Hazardous waste:</i> used paints, engine oils, hydraulic fluids, waste fuel, spent mineral oils and cleaning fluids, spent solvents from equipment cleaning, waste from cleaning of accidental spillages or leakages of hazardous waste containers and spent batteries.</p> <p>Sewage sludge</p> <p><i>Domestic waste:</i> putrescible waste, paper, plastic, glass, aluminium cans etc.</p>	<p><i>Site clearance activities:</i> excavated material, cleared vegetation. Broken solar PV panels Fluorescents Obsolete electronics</p> <p>Sewage</p> <p><i>Recyclable Waste:</i> scrap iron and steel from solar frames, copper wire, electric cabling, and electrical conduit.</p> <p><i>Reusable waste:</i> clean drums, pails, boxes, wooden pallets, plastic and glass bottles, hardware.</p> <p><i>Non-hazardous waste:</i> packaging materials, glass, concrete, dried paint containers, kitchen waste, shredded paper and cardboard.</p>	<p><i>Site preparation activities for site preparation and access roads:</i> excavated material, soil, rock cuttings and vegetation material. Obsolete electronics</p> <p><i>Recyclable Waste:</i> scrap metal copper wire, electric cabling, and electrical conduit.</p> <p><i>Reusable waste:</i> clean drums, pails, boxes, wooden pallets, plastic and glass bottles, hardware.</p> <p><i>Non-hazardous waste:</i> packaging materials, glass, concrete, dried paint containers, kitchen waste, shredded paper and cardboard.</p>	<p><i>Solid waste generation:</i> steel, excess cables <i>Recyclable Waste:</i> scrap metal copper wire, electric cabling, and electrical conduit.</p> <p><i>Reusable waste:</i> clean drums, pails, boxes, wooden pallets, plastic and glass bottles, hardware.</p> <p><i>Non-hazardous waste:</i> packaging materials, glass, concrete, dried paint containers, kitchen waste, shredded paper and cardboard.</p>
Operation	<p><i>Ash:</i> burning of coal will result in the generation of fly ash, bottom ash, and ash from the economiser hopper as grit; Flue gas desulphurisation residue;</p>	<p><i>Recyclable waste:</i> Broken solar panels Fluorescents, obsolete electronics</p> <p>Sewage</p>	<p><i>Reusable waste:</i> plastic and glass bottles, hardware; obsolete electronics;</p> <p><i>Non-hazardous waste:</i> kitchen waste, plastics, shredded paper and cardboard.</p>	<p><i>Domestic waste generated by the operations workforce:</i> paper, plastics and putrescible waste.</p> <p><i>Waste materials:</i> steel, excess cables</p>



## Waste Management Plan

Doc No: ACWA – WMP - 01  
Revision No: 01  
Date: 5<sup>th</sup> May 2016

Asset Phase	Thermal Power Generation (coal, gas, oil)	Solar (PV and CSP)	Wind Power (onshore)	Transmission and Distribution
	Sludge from the treatment of Heavy Fuel Oil (HFO) (usually combusted);  <i>Hazardous waste:</i> paint, engine/transformer oil, hydraulic fluids, waste fuel oil, spent solvents, oily waste, contaminated chemicals and oil containers, waste from cleaning of accidental spillages or leakages of hazardous waste containers.  <i>General refuse:</i> food waste, paper and plastic packaging, aluminium cans and waste paper;  Sewage sludge effluent;  Waste water.	<i>Reusable waste:</i> plastic and glass bottles, hardware  <i>Non-hazardous waste:</i> kitchen waste, plastics, shredded paper and cardboard.		associated with routine and non-routine maintenance.  <i>Hazardous waste:</i> contaminated containers used for the storage of PCBs, pesticides and herbicides, and other wastes that have chemical leaching properties.

### 3.3 *PLANNING AND WASTE PREVENTION*

In line with IFC PS 3, opportunities to prevent the creation of waste or the type of waste generated will be identified for each asset. This will lead to a reduction in the amount of waste generated or the creation of non-hazardous waste instead of hazardous waste. Where waste cannot be recovered or reused, ACWA Power will treat, destroy or dispose of it in an environmentally sound manner that includes the appropriate control of emissions and residues resulting from the handling and processing of the waste material. This is discussed in the following sections.

Where possible ACWA Power will:

- Substitute inputs which are less hazardous or with those that lead to lower waste volumes;
- Institute procurement measures that recognize opportunities to return usable materials; and
- Minimize hazardous waste generation by implementing stringent waste segregation to prevent contamination.

### 3.4 *WASTE HANDLING BY STAFF*

Non-hazardous and hazardous wastes will be handled so as to reduce the risk to workers. The use of Personal Protective Equipment (PPE) is critical in the handling of various waste types. In order to protect workers from the adverse impacts that could occur from contact with wastes, ACWA Power has put in place measures to ensure that personnel handling wastes are trained in the use of PPE for handling waste.

*PPE for Handling Non-Hazardous Waste*

PPE required for handling non-hazardous waste will include the following:

- Coveralls;
- Safety glasses or chemical splash goggles;
- Gloves;
- Hearing protection;
- Safety boots (chemical-resistant with steel toe and shank);
- Hard hat; and
- Face shield.

### *PPE for Handling Hazardous Waste*

PPE required for handling hazardous waste will include the following:

- Full-face or half-mask, air purifying respirators (IOSH approved);
- Coveralls;
- Gloves (chemical resistant);
- Hearing protection;
- Safety boots (chemical-resistant with steel toe and shank);
- Hard hat;
- Face shield; and
- Escape mask.

### **3.5 WASTE SEGREGATION**

Non-hazardous waste will be physically separated from hazardous wastes. Non-hazardous waste will be segregated by type (plastics, glass, metal and biodegradable) in order to achieve the following:

- Maximize the possibilities for waste recycling or reuse;
- Minimize the possibility of contamination of non-hazardous wastes by hazardous wastes;
- Ensure that waste is properly contained to avoid release of hazardous substances to the environment;
- Ensure the proper management of each specific waste type; and
- Prevent mixture of incompatible wastes that could result in chemical reactions.

### **3.6 WASTE STORAGE**

All ACWA Power sites have a scrap yard for storing obsolete or redundant materials for re use and/or ultimate recycling. Site managers will encourage their teams to make use of the scrap yard before ordering new materials.

Wastes will be collected in bins, appropriately labelled and colour-coded for easy identification and evacuation. *Table 3.2* provides an example of the colour coding system implemented at each site.

**Table 3.2 Example of Bin Colour Coding System**

Waste Stream	Colour Code
Metals	Blue
Food Waste	Yellow
Glass	Green
Cardboard and Paper	White
Contaminated Waste	Red
Chemical and hazardous Liquids	Brown
Medical Waste	Orange
Plastics and Packaging	Purple
Used Batteries	Black
Cans	Grey

Orientation labels such as ‘This End Up’ will be used for all containers bearing liquid wastes during all handling, storage, transportation and disposal activities. The core characteristics of approved containers are as follows:

- Waste containers will be colour-coded and labeled for easy identification;
- Food and perishable wastes will be sealed in bin bags and containers covered at all times to reduce odour and restrict access by vermin and scavengers;
- Chemicals, and any other hazardous liquids will be contained in compatible, appropriately sealed and labeled containers to prevent reaction with containers and spillage during handling;
- Waste containers will be kept on pallets or other space buffers to prevent contamination in the event of a spill;
- All waste containers will be maintained in good condition and stored with appropriate secondary containment.

Minimal requirements for waste storage facilities followed at each asset site include:

- Locate in safe areas with limited chance of exposure to hazards and accidents;

- Facilities are to be enclosed with appropriate secondary containment to prevent spreading of waste and contamination of surrounding areas;
- Facilities are to be lined to prevent contamination of soil and ground water;
- Facilities are to be covered to prevent being washed off and spread by rain which could lead to contamination of soil, contamination of ground water; and air pollution via wind-borne odours and dusts;
- The entire area will be sealed off and operated with limited access;
- Safety signs will be used to indicate potential hazards and restricted access;
- Sufficient capacity will be maintained to contain anticipated types and volumes;
- Waste chemicals will have Material Safety Data Sheets (MSDS) close by for easy identification and for emergencies;
- All hazardous waste (e.g., fuel, oil, used oil, paints, chemicals and contaminated soil) shall be stored in impervious containers in bunded areas of 110 percent capacity of the stored material to prevent contamination in case of accidental release;
- Effluent from the washing-down of concrete mixing and handling equipment will be contained within a bunded area of 110 percent capacity of the stored material. Effluent will be treated as hazardous waste;
- Chemical toilets must be provided for all employees, and located at convenient locations throughout the site. Toilets must be replaced by a registered contractor.

Facilities will be provided for temporary accumulation and consolidation of waste. Waste storage will be on short-term basis. Some materials may be stored on a longer-term basis until volumes accrued are sufficient to support a selected waste management option.

### 3.7

#### **WASTE TRANSPORTATION**

Waste stored on site will be periodically removed and transported to licenced and approved waste treatment or disposal facilities. Vehicles transporting

waste must be capable of transporting waste safely. Vehicles must be loaded correctly and must have the appropriate labelling and warning signs attached to the vehicle. Appropriate firefighting and spill response equipment must also be transported with each vehicle to contain, manage and remove accidental spillages.

Waste Manifest Forms must be completed for hazardous and non-hazardous waste removed from the plant. In line with South African requirements, the Waste Manifest forms must include the following:

- Information supplied by the Generator (ACWA Power):
  - Unique consignment identification number;
  - If applicable, the South African Waste Information System (SAWIS) number;
  - Generator's contact details (contact person, physical and postal address, phone, fax and email)
  - Physical address of the site where the waste was generated (if different to above)
  - Emergency contact number
  - Origin/source of the waste (activity)
  - Classification of the waste and MSDS;
  - Quantity of waste by volume (m<sup>3</sup>) or weight (tonnes)
  - Date of collection/dispatch;
  - Intended receiver (waste manager); and
  - Declaration (confirm content of the consignment is fully and accurately described, classified, packed, marked and labelled and in all respects in proper condition for transportation in accordance with the applicable laws and regulations)
- Information to be supplied by the Waste Transporter:
  - Name of transporter;
  - Address and telephone number of transporter; and
  - Declaration acknowledging receipt of the waste
- Information to be supplied by the Waste Manager (Consignee):
  - Name address and contact details,
  - Receiving waste management facility name, address and contact details
  - Waste management facility licence number
  - Date of receipt
  - Quantity of waste received by weight (tonnes) and volume (m<sup>3</sup>);
  - Type of waste management applied (re use, recycling, treatment, disposal);



- Any discrepancies in information between the different holders of waste (related to waste quantity, type, classification, physical and chemical properties)
- Waste management reporting description and code in terms of the National Waste Information Regulations, where applicable;
- Details on any waste diverted to another waste management facility and details of the facility;
- Certification and declaration of receipt and final management of waste.

Copies will be required to be retained and remedial action should be taken if copies are not available.

### 3.8

#### *WASTE TREATMENT AND DISPOSAL*

ACWA Power will ensure that the disposal of waste generated by activities does not have an adverse impact on the environment or on public health and that the removal and treatment methods are aligned with the risk that the waste poses to the environment. Detailed records will be maintained documenting the type and quantity of waste which has been stored, transported, treated, recovered or disposed in order to main chain of custody documentation. There is to be no burning of waste from construction work and workers' housing.

If the generated waste is considered hazardous, in line with IFC PS 3, ACWA Power will adopt good international industry practice (GIIP) alternatives for its environmentally sound disposal while adhering to the South African requirements. When hazardous waste is disposed by third parties, ACWA Power will use contractors that are reputable and legitimate enterprises licenced under South African regulatory authorities. ACWA Power will ascertain whether licenced disposal sites are being operated to acceptable standards and will maintain regular inspections to ensure that this remains.

## 4 ROLES AND RESPONSIBILITIES

### 4.1 ENVIRONMENTAL AND SOCIAL MANAGEMENT ORGANISATION

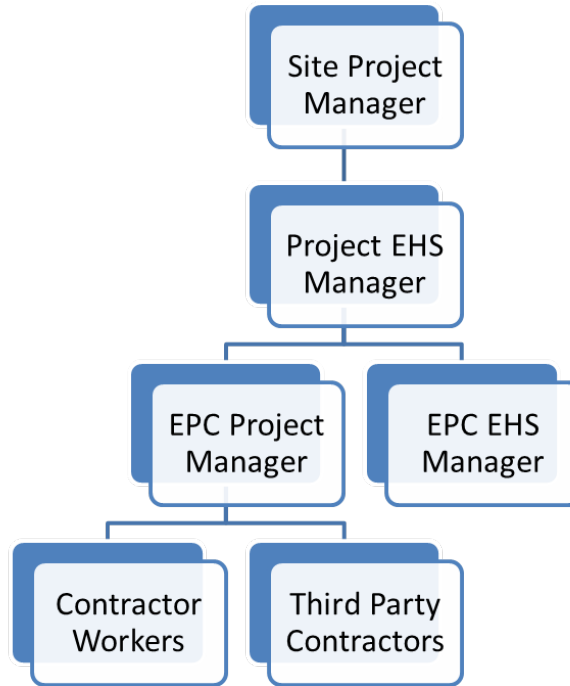
Overall waste management responsibilities for the Project resides with the Project Company staff who will ensure that the Project activities, design, engineering, procurement, construction, installation, and operations adhere to the requirements presented in this Plan.

The roles and responsibilities within the Project Company for the implementation of the WMP are presented in *Table 4.1*. Representative organograms are included in *Figure 4.1* and *Figure 4.2* showing the system that will be employed at ACWA Power assets during the construction and operation phases of the asset life cycle.

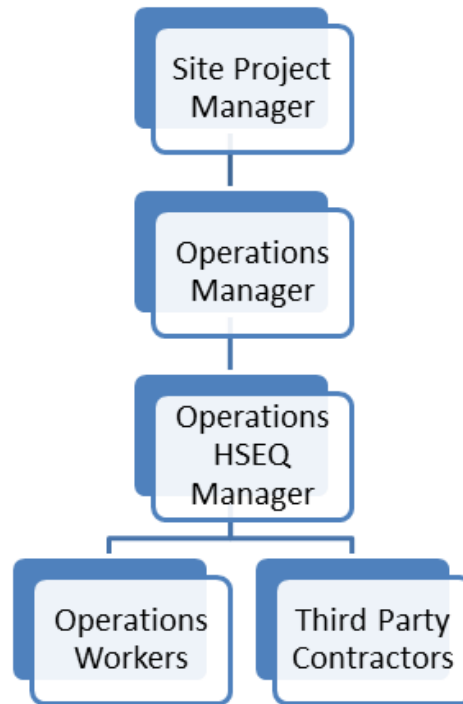
***Table 4.1 Responsible Parties and Roles and Responsibilities***

<b>Responsible Parties</b>	<b>Roles and Responsibilities</b>
Project Company (ACWA Power) Site Manager	<ul style="list-style-type: none"> <li>Review monthly and annual waste reporting</li> <li>Review waste related outcomes and work with Health Safety and Environment Officer to identify necessary improvements</li> <li>Ensure operational personnel have management systems in place to support environmental commitments</li> </ul>
Project Company Health, Safety, Environment and Quality (HSEQ) Manager	<ul style="list-style-type: none"> <li>Responsible for staffing, planning and day-to-day execution of the management measures described under this WMP during the construction and operation phases of this Project.</li> <li>Confirm that training regarding Waste Management is included in induction training for all employees and contractors</li> <li>Deliver monthly reports to Project Site Manager</li> <li>Oversee WMP annual reporting</li> <li>Liaise with contractors regarding waste management issues</li> <li>Schedule weekly inspections during construction and resolve any issues</li> <li>Receipt of monthly submissions of hazardous waste register from contractors</li> <li>Ensure a waste management auditing program is in place</li> </ul>
Contractors (Construction and Operations)	<ul style="list-style-type: none"> <li>Responsible for following the procedures and requirements indicated in construction and operational sections of this WMP.</li> </ul>
All persons	<ul style="list-style-type: none"> <li>All persons employed by Project Company or under service contract for Project Company (e.g. contractor, transporter etc.), are responsible for good practice waste management at the Project Site.</li> </ul>

*Figure 4.1 Environmental and Social Organisation of the Project during Construction*



*Figure 4.2 Environmental and Social Organisation of the Project during Operations*



**4.2 ENGINEERING, PROCUREMENT AND CONSTRUCTION (EPC) CONTRACTORS**

All EPC contractors are responsible for following the procedures and requirements indicated in construction and operational sections of this WMP.



## Waste Management Plan

Doc No: ACWA – WMP - 01

Revision No: 01

Date: 5<sup>th</sup> May 2016

### 5 *COMPETENCE, TRAINING AND AWARENESS*

Training/awareness on waste management will be provided by the facilities HSEQ Manager to the entire personnel and key contractor's personnel. This training will include appropriate information and awareness on waste management.

All training must be registered and records kept of all individuals and employees who have completed training. Training must be completed annually to ensure waste management procedures are continuously up to date.



## Waste Management Plan

Doc No: ACWA – WMP - 01

Revision No: 01

Date: 5<sup>th</sup> May 2016

### 6 *DOCUMENTATION*

All relevant documents related to collection, containment, onsite storage, transfers, delivery, offsite storage, analysis, treatment, disposal and certification of materials and wastes shall be maintained by the Project HSEQ Manager from the point of generation to final disposition for easy tracking and audit purposes.

## 7 *REPORTING AND MONITORING*

### 7.1 *CONSTRUCTION PHASE*

The EPC Contractor will undertake the following monitoring, inspection and procedures during construction:

- Inspections will be carried out examining documentation, processes and implementation of procedures to establish degree of compliance to this plan. Non-compliances will be identified and reported. Inspections will be scheduled by the ACWA Power HSEQ Manager and will occur every fortnight; and
- Waste matters will also be captured under management walkthroughs and sites visits.

The HSEQ Manager should produce a Waste Management Report every month which must include:

- Proof of disposal documentation;
- Incident reports from any non-compliance; and
- Log and photo evidence of inspections.

### 7.2 *OPERATION PHASE*

The Project Company will undertake the following monitoring, inspection and procedures during operations:

- Inspections will be carried out of contractors and their selected approved third party contractors to ensure that their activities with respect to waste management are in compliance to the conditions of this plan. Inspections will be scheduled by the HSEQ Manager and will occur monthly; and
- Waste matters will also be captured under management walkthroughs and sites visits.

The HSEQ Manager should produce a Waste Management Report every three months which must include:

- Proof of disposal documentation;
- Incident reports from any non-compliance; and
- Log and photo evidence of inspections.

## 8 ASSESSMENT AND AUDIT

Internal and external audits will be conducted on the waste management practices. Depending on the Environmental Authorisation granted, the construction and operational activities will be audited on a periodic basis.

Waste Management Reports will be included as part of the audit and the frequency of the audit will be asset specific.

Internal audits are also recommended; during construction it is recommended that the Waste Management Reports are audited every three to six months and on an annual basis during the operational phase. The audits will assess compliance with the specifics of the WMP as well as all reporting procedures.



**APPENDIX A**

**Table A.1 Summary of Waste Management Actions**

<b>Issue (description of the issue/ obligation)</b>	<b>Responsible Person</b>	<b>Actions and activities</b>	<b>Frequency/duration</b>	<b>Records/Evidence of compliance</b>
Waste Identification (section 3.2)	EPC EHS Manager and EPC Project Manager during construction	During construction identify the waste according to ACWA Power’s waste definitions. Segregation to be based on the initial sorting (as discussed below).	Throughout the duration of the construction phase.	Fortnightly inspections with the ACWA Power HSEQ Manager and documented through photo logs and disposal documentation included in the monthly Waste Management Report.
	ACWA Power HSEQ Manager during operation	Maintain waste identification protocol as established during the construction phase	Throughout the duration of the operation phase.	Monthly inspections and site walk through visits. Reporting as part of the quarterly Waste Management Report.
Waste Handling (section 3.4)	EPC EHS Manager and EPC Project Manager, plus all staff during construction	Use provided PPE for waste handling activities; specific PPE for hazardous and non-hazardous wastes	Throughout duration of construction activities	Fortnightly inspections and site walk through during the construction phase and reporting in the monthly Waste Management Report.
	ACWA Power HSEQ Manager, plus all staff, during operation		Throughout duration of project operation.	Quarterly reporting containing photo logs from site walk through and inspections
Waste Segregation (section 3.5)	EPC EHS Manager, EPC Project Manager, plus all staff during construction	Non-hazardous waste to be physically separated from hazardous waste.	Throughout duration of construction activities	Fortnightly inspections and site walk through during the construction phase and reporting in the monthly Waste Management Report.
	ACWA Power HSEQ Manager, plus all staff during operation		Throughout duration of project operation.	Quarterly reporting of Waste Management Report containing photo logs from site walk through and inspections
Waste Storage (section 3.6)	EPC EHS Manager and EPC Project Manager, plus all staff during	Redundant waste to be stored at on site scrap yard for re use and / or recycling. Individuals	Throughout duration of construction activities	Fortnightly inspections and site walk through during the construction phase and reporting in the monthly

**APPENDIX A**

<b>Issue (description of the issue/ obligation)</b>	<b>Responsible Person</b>	<b>Actions and activities</b>	<b>Frequency/duration</b>	<b>Records/Evidence of compliance</b>
	construction ACWA Power HSEQ Manager, plus all staff, during operation	to make use of the scrap yard before ordering new materials. Waste to be collected in bins, appropriately labelled and colour coded. All waste containers to be maintained in good condition and stored with appropriate secondary containment.	Throughout duration of project operation.	Waste Management Report. Quarterly reporting of Waste Management Report containing photo logs from site walk through and inspections
Waste Transportation (section 3.7)	EPC EHS Manager during construction	Waste stored on site will be periodically removed and transported to licence and approved waste	Throughout duration of construction activities	Disposal documentation as included in the monthly Waste Management Reports. Visual inspection and site walk through.
	ACWA Power HSEQ Manager during operation	treatment/disposal facilities. Waste Manifest Forms for hazardous and non-hazardous to be completed and made available for audit.	Throughout duration of project operation.	Disposal documentation as included in the quarterly Waste Management Reports. Visual inspection and site walk through.
Training	ACWA Power HSEQ Manager during construction and operation	Provision of waste management awareness training to entire personnel and key contractor staff.	On an annual basis and as needed for new staff.	Annual records of training.