

**END**



1. List the required resources for each high priority control area (e.g. labour, herbicides, and equipment) and the current management practices on the property (e.g. burning, grazing, and utilisation of trees for firewood).
2. Evaluate and select appropriate control methods, considering mechanical, chemical (using registered herbicides) and / or biological control (see Appendix 1 for list of recognised clearing methods). Also evaluate and select the rehabilitation methods to be used after alien vegetation removal.
3. Calculate the control costs for the high priority control areas, based on the methods selected above.
4. Secure a long-term commitment to rehabilitation.

### ***Step 3: Management***

The purpose of step 3 is to compile i) an alien vegetation management plan, useful for a 3 – 5 year period, and ii) an Annual Plan of Operations (APO) for the current year's work.

1. Draw up an APO for high priority control areas (to be updated annually), including a budget of the required resources (labour, herbicides and equipment) for control operations planned during a single year. This APO determines the scale of work to be undertaken in a year and it is very important to ensure that the APO does not include the control of too large an area. A guideline for the budget distribution after year #1 is:
  - a) 75% for follow-up control work and rehabilitation of previously cleared areas,
  - b) 20% for initial control of new area, and
  - c) 5% for an emergency "fire fund".
2. Factors to consider when compiling the APO are:
  - a) Establish an emergency "fire fund" or "flood fund" to cope with catastrophic occurrences (e.g. mass seeding regeneration of wattle after fire, loss of planted grass seed during heavy rains).
  - b) It is advisable to allocate resources (e.g. labour, herbicides, equipment, and transport) to high priority control areas.
  - c) Draw up timetables for control operations, including a contingency / "catch-up" time when operations fall behind (e.g. too wet, labour strikes etc).
3. **NB:** The plan must be flexible and adjusted as progress is made.

### ***Step 4: Implementation***

The purpose of step 4 is to implement the APO compiled in step 3. In order to ensure that implementation is undertaken successfully, it is vital that all staff involved in the alien vegetation removal and rehabilitation are adequately trained. In order to do this, a demonstration site should be established. This site must be easily accessible and located in a high profile area that is representative of other high priority control areas (this will maximise impact of the training and act as a "model" site to advertise the work). The training undertaken must include the correct control methods as well as the correct grass planting (rehabilitation) methods.

The implementation phase must continue until the site is cleared of alien invasive vegetation. As a minimum, this is achieved when less than 5% of the total surface of the site (area initially identified for clearing) is covered by alien vegetation or is covered by no vegetation (bare). When determining the success of the AIVCP, it is important to consider the following:

- Exposed areas / Bare soils have the potential to allow colonisation of alien vegetation. This is the reason that the 5% "allowed for alien vegetation" includes bare / un-vegetated areas.
- A 5% coverage of alien vegetation scattered over a large area (such as a mining site) is allowed as this density of alien vegetation is low enough to allow indigenous vegetation to out-compete alien vegetation. It is important that the 5% coverage of alien vegetation allowed to remain on-site is not concentrated in one area, as this will be a nucleolus for the spread of alien vegetation.

### ***Step 5: Record Keeping***

The purpose of step 5 is to maintain a record of the control programme to determine if the methods being applied are successful or if adaptations need to be made for the following year's APO.

1. Keep simple records of daily operations (e.g. record the labour days, herbicide volumes and equipment required for each operation), as this establishes standards / norms that can be applied for the control work.
2. Monitor progress with the control work (after year #1), recording information on maps (indicating area covered by re-growth and areas cleared). Information recorded to monitor control progress must also include a record of the labour days, herbicide volumes and equipment used for control operations as this information can advise future control. Another useful tool for record keeping is fixed-point photography, recording before control / clearing and after control / clearing photographs.

The information from these records must be fed back into the budget to update and amend the APO for the following year (i.e. the plan for follow-up control operations for re-growth).



## 17.5 APPENDIX 5: CURRENT WASTE MANAGEMENT PROCEDURE



# AfriSam

## AfriSam South Africa Ulco Factory

### Waste Disposal Site

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## 1.0 Purpose

To ensure

1. General waste is disposed of in accordance with legal and company requirements
2. The general waste disposal site is managed as per the conditions of the authorization therefore
3. The potential impacts of the waste disposal site are adequately monitored
4. Waste disposal to landfill is minimised through removal of re-usable/ recyclable materials from the waste stream to be disposed of at the disposal site

## 2.0 Field of Application

1. All persons working for or on behalf of the Company at Ulco
2. All areas and facilities at Ulco from which general waste is collected for recycling/disposal
3. Waste disposal site in the quarry

## 3.0 Legal Requirements

1. Environmental Conservation Act & Regulations
2. Environmental Management Act & Regulations
3. Waste Bill 2009
4. National Water Act and Regulations
5. Health Act and Regulations

## 4.0 Risk Profile

1. Health and Safety: MEDIUM –
  - i) Lacerations from handling waste
  - ii) Exposure to pathogens from waste streams
2. Environmental: HIGH –
  - i) Incorrect/illegal disposal practices
  - ii) Disposal of hazardous waste in general landfill site
  - iii) Inadequate management and rehabilitation of waste disposal site
  - iv) Inadequate monitoring of surface and ground water downstream from the waste disposal site

## 5.0 PPE and Equipment Requirements

1. Gloves
2. Masks
3. Overalls
4. Safety Shoes
5. Authorization for vehicles to enter the mine
6. Contractor access authorization
7. Front end loader

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## 6.0 Roles and Responsibilities

### Method

What	Who
1. Roles & Responsibilities	SHE Manager/ Quarry Manager
2. Management Controls	SHE Manager/ Quarry Manager
3. Contractor Supervision	SHE Manager
4. Waste disposal site control	Quarry Team Leader
5. C Rehabilitation	Quarry Team Leader
6. Monitoring	Quarry Team Leader
7. Recycled materials	Quarry Team Leader
<b>6.1. Wastes disposed of at the waste disposal facility</b> a) Only "general" waste is disposed of at the waste disposal site b) This includes household waste, garden refuse, building rubble	Quarry Manager
6.2. Waste streams not authorised to be disposed of at this facility, are disposed of at an authorised waste disposal facility off-site	Team Leaders
6.3. Re-usable/recyclable materials are stored in designated "cages" at the waste disposal site, pending collection and removal by waste recyclers	Quarry Manager
<b>6.4. Waste sorting and collection</b> a) Household refuse is sorted to separate re-usable/recyclable materials, at source. Receptacles for the collection of re-usable/recyclable materials are provided in the village and at the factory. Recycled material includes glass, plastic, paper and cans b) Garden refuse is placed in specially constructed facilities in the village and at the factory c) Household refuse, re-usable/recyclable waste streams and garden refuse are collected, as per a schedule, by a service provider	All  All  Contractor • Waste collection schedule
<b>6.5. Routine/Scheduled waste disposal</b> a) "Cells"/disposal areas are prepared by the Quarry personnel b) Access to the waste disposal site and recycling cages is controlled. Access is only given in accordance with the waste collection and disposal schedule c) A designated person from the Quarry Section allows access to the waste disposal facility, and is on duty whilst waste is being disposed of	Quarry Manager  Quarry Team Leader Quarry Official  Quarry Official

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<p>d) The vehicle is directed to the correct “cell” to dispose of the general household/office waste</p> <p>e) The waste is offloaded into the cells/designated areas, as per instruction</p> <p>f) Re-usable/recyclable waste is placed in the designated cages</p> <p>g) Quantities of waste disposed of are recorded in a register</p> <p>h) The disposal areas/cells are fenced off and kept locked, to prevent illegal access/scavenging</p>	<p>Quarry Official</p> <p>Contractor</p> <p>Contractor</p> <p>Contractor</p> <ul style="list-style-type: none"> <li>• Records of disposal</li> </ul> <p>Quarry dept</p>
<p><b>6.6. Non routine/unscheduled waste disposal</b></p> <p>a) General waste generated from special events is disposed of by arrangement with the Quarry Manager and service provider</p> <p>b) Waste disposal is carried out as per 6.5</p>	<p>All</p> <p>Contractor</p>
<p><b>6.7. Final sorting and cell closure</b></p> <p>a) Re-usable/recyclable waste still to be found in the general waste stream are separated out and placed in the “recycling cages”</p> <p>b) The “cells” are closed, on a regular basis, to prevent dispersion of light waste materials by wind, as well as retrieval by wild animals</p> <p>c) When a “cell” is full, another is prepared for disposal of general waste</p>	<p>Contractor</p> <p>Quarry Team Leader</p> <p>Quarry Department</p>
<p><b>6.8. Concurrent rehabilitation of waste disposal site</b></p> <p>a) Limestone waste material is used to cover waste disposed of in the “cells”</p> <p>b) When the “cells” are full, the area is covered with limestone waste</p> <p>c) The slopes of the disposal site are profiled and contours are constructed to control storm water runoff from the slopes and to allow vegetation to establish on the slopes</p> <p>d) Topsoil containing a seed bank is spread over the rehabilitated areas, thinly</p> <p>e) Erosion is prevented by placing branches on the slopes to prevent rapid/excessive surface water runoff, excessive wind erosion and to promote vegetation growth</p> <p>f) Storm water drains are constructed “around” the waste disposal site to direct surface runoff away from the waste disposal site slopes</p>	<p>Quarry Manager</p> <ul style="list-style-type: none"> <li>• Rehabilitation Plan</li> </ul>
<p><b>6.9. Collection of recycling materials</b></p> <p>When recycled material is collected by recyclers, they are expected to sign a declaration form to ensure that any waste removed from site is handled, stored and re-used/reprocessed/recycled in an environmentally friendly manner</p>	<p>Quarry Manager</p> <ul style="list-style-type: none"> <li>• Records of collection</li> </ul>

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# AfriSam

## AfriSam South Africa (Pty) Ltd Ulco Factory

### Waste Management

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## 1.0 Purpose

- 1.1. To identify all waste streams generated by the activities of Ulco
- 1.2. To classify all identified waste streams according to the Minimum Requirements Guidelines
- 1.3. To ensure correct collection, storage and disposal of waste streams according to legal and company requirements
- 1.4. To promote re-use and recycling as a means to reduce the requirements for waste disposal
- 1.5. To promote the co-processing of industrial wastes as a means to conserve fossil fuels

## 2.0 Field of Applicability

- 2.1. All activities/processes at the Ulco operation from which waste is generated
- 2.2. All persons working for or on behalf of the company at Ulco
- 2.3. All visitors
- 2.4. All residents of Ulco village

## 3.0 Definitions and Abbreviations

- 3.1. AFR refers to Alternative Fuel and Raw Materials
- 3.2. BUM refers to Business Unit Manager
- 3.3. ECO refers to Environmental Control Officer
- 3.4. SHE refers to Safety, health & environment
- 3.5. PPE refers to Personal Protective Equipment
- 3.6. PCB refers to Polychlorinated Biphenyl
- 3.7. XRF refers to X-Ray Fluorescents

## 4.0 Legal Requirements

- 4.1. Environmental management Act & Regulations
- 4.2. Environmental Conservation Act & Regulations
- 4.3. National Water Act & Regulations
- 4.4. Hazardous Substances Act & Regulations
- 4.5. Waste Act 2009

## 5.0 Risk Profile

- 5.1. Health and Safety: HIGH -
  - i) Fires
  - ii) Exposures if correct PPE is not used
  - iii) Injuries from handling collection bins
- 5.2. Environmental: HIGH-
  - i) Illegal/incorrect handling, storage and disposal
  - ii) Pollution of air, soil and water from incorrect/ illegal storage and disposal
  - iii) Environmental degradation from incorrect disposal activities
  - iv) Negative community health and well-being from odours, air pollution

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<p>8.4. Waste is removed, as per schedule, or by special arrangement, as follows:</p> <ol style="list-style-type: none"> <li>a) General waste for disposal at the on-site landfill site</li> <li>b) Hazardous waste for disposal in the kiln (internalization)</li> <li>c) Hazardous waste for off-site disposal, by registered service providers, to appropriately registered waste disposal sites</li> <li>d) General/hazardous waste for re-use recycling</li> </ol> <p>8.5. Safe waste disposal certificates are received for waste disposed of off-site, and kept as records</p>	
<p><b>9.0. Waste Storage</b></p> <p>10.1. Allocate storage facilities for all types of waste, at designated locations on site</p> <p>10.2. The design, construction and operation of all facilities required for collection, containment and control of waste streams will comply with applicable legislation and company requirements</p> <p>10.3. Waste can be temporarily stored, at designated locations, for a period not exceeding 90 days, prior to disposal/removal for re-use/recycling</p>	<p>BUMS</p> <ul style="list-style-type: none"> <li>• Site plan of designated locations</li> </ul> <p>BUMS Team Leaders</p>
<p><b>10.0. Waste Disposal</b></p> <p>10.1. Waste streams are disposed of in accordance with legal and company standards</p> <p>10.2. Waste streams are disposed of as per Annexure 1</p> <p>10.3. Specific work instructions are implemented for the following:</p> <ol style="list-style-type: none"> <li>a) Asbestos Management</li> <li>b) Fluorescent tube Management</li> <li>c) PCB contaminated oil Management</li> <li>d) Radioactive Sources</li> <li>e) Clinic waste</li> <li>f) XRF tubes</li> <li>g) Liquid effluent treatment at sewage plant</li> </ol>	
<p><b>11.0 Monitoring</b></p> <p>11.1 Volumes of waste disposed of are measured/estimated</p> <p>11.2 Revenue generated from recycling is recorded</p> <p>11.3 Quantities of industrial waste as AFR is measured</p> <p>11.4 Environmental performance, related to waste management is monitored and audited</p> <p>11.5 Deviations from standard are recorded in BMS and investigated to ensure adequate corrective and</p>	

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	preventive action	
11.6	Third Party audits are carried out on service providers to confirm legally compliant and responsible management	
<b>12.0</b>	<b>General</b>	
12.1	No hazardous or process waste may be disposed of by backfilling in the quarry	
12.2	No empty containers (from hazardous materials or cleaning materials) are to be abandoned at workplace areas. These containers must be returned to the workshops for correct disposal	
<b>13.0</b>	<b>Emergency Response</b>	
13.1	In the event of a spillage or pollution, the Emergency Response Plan is activated	
13.2	The incident is recorded in BMS, investigated and corrective and preventive action implemented	
13.3	Reporting of major incidents to authorities takes place as per legal requirements	

#### 14.0 Records

Records generated as a result of this procedure are as follows:

Record	Location/Custodian	Retention Time	Disposition
UEW-003	Technical Asst-Mechanic	3 Years	Shred
Disposal Certificates	Relevant Team Leaders	3 Years	Shred

#### 15.0 Amendments

Date	Rev	Reason for Change	Changed by
2008-09-09	0	Draft Work Instruction	WIS
2008-11-20	01	New Work Instruction	WIS
2009-06-08	02	Deletion of annexure 1	WIS

#### 16.0 Distribution List

7.1. All Users

#### 17.0 Appendices

None

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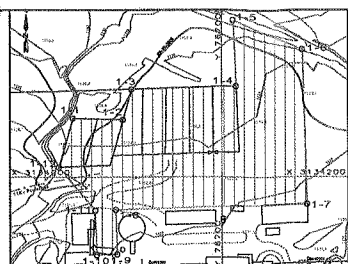
This document is valid on the day of printing 2011/01/18



## **WASTE STORAGE FACILITIES**

1. Tyres (Salvage yard)
2. SPL (In Quarry)
3. SPL store (to be built)
4. Waste oil/washbay (Engineering workshop)
5. Wood Chips (in the future)
6. Pallets
7. Coal char stockpiles
8. Fluorescent Tubes & Asbestos (Old brick store)
9. Waste oil (vehicle garage)
10. Washbay (vehicle garage)
11. Waste (Loco maintenance garage)
12. Waste disposal site (ashoop)
13. Waste Oil (Township)
14. Waste Oil (Township)
15. SPL (not currently used)
16. SPL (Limestone Stockpiles)





**INSERT PLAN OF AREA 1**  
AREA BEHIND BRICK STORE AND SALVAGE YARD

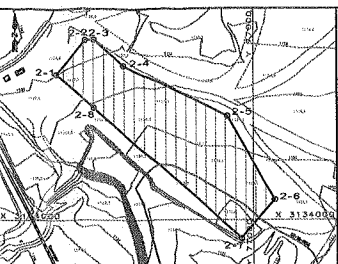
**HARTEBEEST HOEK 94 DATUM (WGS84)**  
SURVEY SYSTEM WG25

**SCALE 1 : 2 500**

THE FIGURE 1-1, 1-2, 1-3, 1-4, 1-5, 1-6, 1-7, 1-8, 1-9, 1-10, 1-11, 1-12 AND 1-13, SITUATED ON THE AREA BEHIND BRICK STORE AND SALVAGE YARD, REPRESENTS 1:2498A.

**CO-ORDINATES:**

1-1	1676 886.5	363 134 162.3	1-7	1676 816.2	363 134 256.8
1-2	1676 792.7	363 134 164.7	1-8	1676 806.7	363 134 258.4
1-3	1676 789.2	363 134 115.0	1-9	1676 803.4	363 134 275.5
1-4	1676 696.1	363 134 234.3	1-10	1676 822.4	363 134 251.1
1-5	1676 689.0	363 134 697.7	1-11	1676 824.1	363 134 232.7
1-6	1676 695.7	363 134 679.3	1-12	1676 826.8	363 134 193.8



**INSERT PLAN OF AREA 2**  
REFRACTORY SPL STORAGE AREA

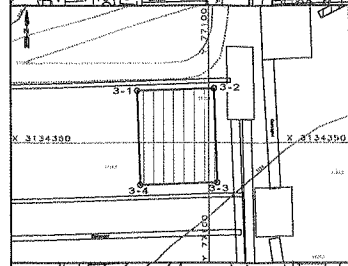
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SURVEY SYSTEM WG25

**SCALE 1 : 2 500**

THE FIGURE 2-1, 2-2, 2-3, 2-4, 2-5, 2-6, 2-7, 2-8 AND 2-9, SITUATED ON THE REFRACTORY SPL STORAGE AREA, REPRESENTS 1:2510A.

**CO-ORDINATES:**

2-1	1677 181.8	363 133 536.0	2-5	1677 023.9	363 133 866.0
2-2	1677 167.7	363 133 522.0	2-6	1676 979.3	363 133 860.4
2-3	1677 187.0	363 133 824.6	2-7	1677 012.2	363 133 817.9
2-4	1677 128.4	363 133 458.8	2-8	1677 131.2	363 133 852.8



**INSERT PLAN OF AREA 3**  
CARBON SPL AREA

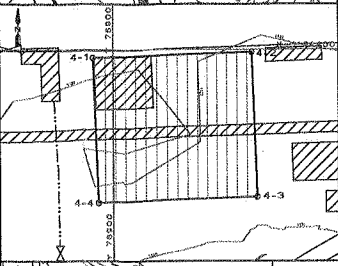
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SURVEY SYSTEM WG25

**SCALE 1 : 1 000**

THE FIGURE 3-1, 3-2, 3-3, 3-4 AND 3-5, SITUATED ON THE CARBON SPL AREA, REPRESENTS 6:1120A.

**CO-ORDINATES:**

3-1	1677 128.3	363 134 229.7	3-3	1677 088.7	363 134 355.7
3-2	1677 097.8	363 134 228.8	3-4	1677 127.3	363 134 358.4



**INSERT PLAN OF AREA 4**  
OILKOL STORAGE FACILITIES AREA

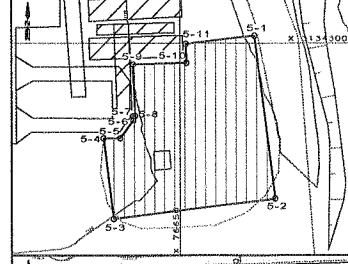
**HARTEBEEST HOEK 94 DATUM (WGS84)**  
SURVEY SYSTEM WG25

**SCALE 1 : 1 000**

THE FIGURE 4-1, 4-2, 4-3, 4-4 AND 4-5, SITUATED ON THE OILKOL STORAGE FACILITIES AREA, REPRESENTS 6:1120A.

**CO-ORDINATES:**

4-1	1678 907.8	363 134 423.4	4-3	1678 853.2	363 134 427.4
4-2	1678 845.3	363 134 423.0	4-4	1678 925.8	363 134 456.0



**INSERT PLAN OF AREA 5**  
WOODCHIP STORAGE AREA

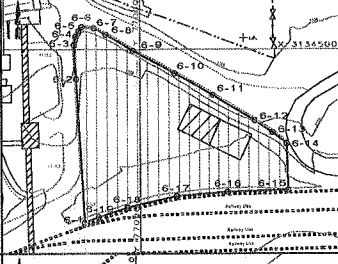
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SURVEY SYSTEM WG25

**SCALE 1 : 500**

THE FIGURE 5-1, 5-2, 5-3, 5-4, 5-5, 5-6, 5-7, 5-8, 5-9, 5-10, 5-11 AND 5-12, SITUATED ON THE WOODCHIP STORAGE AREA, REPRESENTS 6:1201A.

**CO-ORDINATES:**

5-1	1676 625.5	363 134 299.5	5-7	1676 659.4	363 134 314.2
5-2	1676 631.5	363 134 330.4	5-8	1676 659.0	363 134 334.2
5-3	1676 625.2	363 134 324.3	5-9	1676 659.4	363 134 354.2
5-4	1676 625.2	363 134 318.6	5-10	1676 644.8	363 134 320.9
5-5	1676 625.8	363 134 318.6	5-11	1676 644.1	363 134 320.9
5-6	1676 625.4	363 134 315.1			



**INSERT PLAN OF AREA 6**  
OUTDOOR PALLET STORAGE AREA AT PACKING PLANT

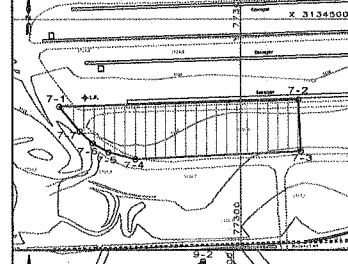
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SURVEY SYSTEM WG25

**SCALE 1 : 1 500**

THE FIGURE 6-1, 6-2, 6-3, 6-4, 6-5, 6-6, 6-7, 6-8, 6-9, 6-10, 6-11, 6-12, 6-13, 6-14, 6-15, 6-16, 6-17, 6-18 AND 6-19, SITUATED ON THE OUTDOOR PALLET STORAGE AREA AT PACKING PLANT, REPRESENTS 6:1201A.

**CO-ORDINATES:**

6-1	1677 033.1	363 134 801.8	6-11	1676 957.8	363 134 526.0
6-2	1677 026.1	363 134 817.5	6-12	1676 923.4	363 134 541.8
6-3	1677 026.3	363 134 497.3	6-13	1676 921.8	363 134 548.0
6-4	1677 026.6	363 134 492.6	6-14	1676 921.5	363 134 520.4
6-5	1677 026.6	363 134 489.3	6-15	1676 912.1	363 134 582.8
6-6	1677 026.6	363 134 487.6	6-16	1676 912.1	363 134 582.8
6-7	1677 027.3	363 134 487.6	6-17	1676 978.8	363 134 582.1
6-8	1677 027.3	363 134 491.3	6-18	1677 028.0	363 134 582.7
6-9	1677 028.4	363 134 505.8	6-19	1677 024.9	363 134 528.4
6-10	1676 982.5	363 134 514.3			



**INSERT PLAN OF AREA 7**  
COAL CHAR STOCKPILE AREA

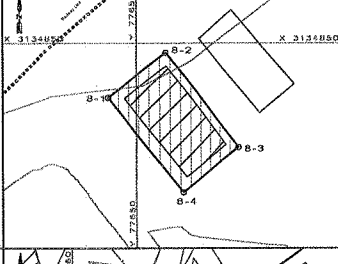
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SURVEY SYSTEM WG25

**SCALE 1 : 2 000**

THE FIGURE 7-1, 7-2, 7-3, 7-4, 7-5, 7-6, 7-7 AND 7-8, SITUATED ON THE COAL CHAR STOCKPILE AREA, REPRESENTS 6:1201A.

**CO-ORDINATES:**

7-1	1677 442.7	363 134 650.3	7-5	1677 404.2	363 134 604.0
7-2	1677 254.8	363 134 583.1	7-6	1677 414.3	363 134 587.1
7-3	1677 253.0	363 134 602.4	7-7	1677 426.5	363 134 587.8
7-4	1677 383.3	363 134 609.4			



**INSERT PLAN OF AREA 8**  
ASBESTOS STORAGE AREA

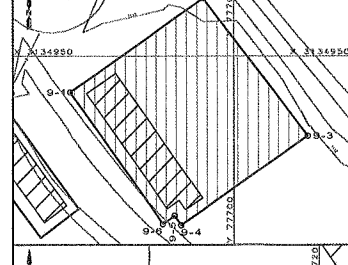
**HARTEBEEST HOEK 94 DATUM (WGS84)**  
SURVEY SYSTEM WG25

**SCALE 1 : 500**

THE FIGURE 8-1, 8-2, 8-3, 8-4 AND 8-5, SITUATED ON THE ASBESTOS STORAGE AREA, REPRESENTS 6:1201A.

**CO-ORDINATES:**

8-1	1677 442.7	363 134 650.3	8-3	1677 440.1	363 134 870.2
8-2	1677 444.5	363 134 851.0	8-4	1677 441.1	363 134 870.4



**INSERT PLAN OF AREA 9**  
GARAGE SPARE USED TYRES STORAGE AREA

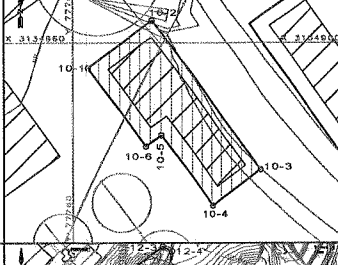
**HARTEBEEST HOEK 94 DATUM (WGS84)**  
SURVEY SYSTEM WG25

**SCALE 1 : 500**

THE FIGURE 9-1, 9-2, 9-3, 9-4, 9-5, 9-6, 9-7 AND 9-8, SITUATED ON THE GARAGE SPARE USED TYRES STORAGE AREA, REPRESENTS 6:1201A.

**CO-ORDINATES:**

9-1	1677 723.1	363 134 627.0	9-4	1677 712.4	363 134 983.0
9-2	1677 728.1	363 134 636.7	9-5	1677 711.7	363 134 981.1
9-3	1677 665.8	363 134 985.9	9-6	1677 714.0	363 134 982.8



**INSERT PLAN OF AREA 10**  
GARAGE OIL STORAGE AREA

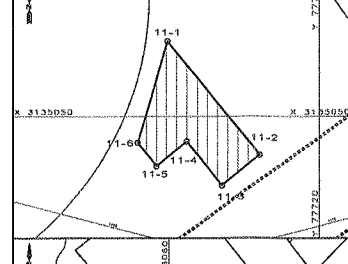
**HARTEBEEST HOEK 94 DATUM (WGS84)**  
SURVEY SYSTEM WG25

**SCALE 1 : 400**

THE FIGURE 10-1, 10-2, 10-3, 10-4, 10-5, 10-6 AND 10-7, SITUATED ON THE GARAGE OIL STORAGE AREA, REPRESENTS 6:1201A.

**CO-ORDINATES:**

10-1	1677 723.5	363 134 954.0	10-4	1677 728.0	363 134 955.4
10-2	1677 721.8	363 134 925.2	10-5	1677 728.0	363 134 921.4
10-3	1677 722.4	363 134 925.8	10-6	1677 746.5	363 134 926.2



**INSERT PLAN OF AREA 11**  
GARAGE METAL WASTE AREA

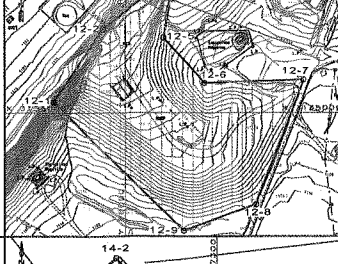
**HARTEBEEST HOEK 94 DATUM (WGS84)**  
SURVEY SYSTEM WG25

**SCALE 1 : 200**

THE FIGURE 11-1, 11-2, 11-3, 11-4, 11-5, 11-6 AND 11-7, SITUATED ON THE GARAGE METAL WASTE AREA, REPRESENTS 6:1201A.

**CO-ORDINATES:**

11-1	1677 711.0	363 134 864.1	11-4	1677 728.4	363 134 821.0
11-2	1677 721.8	363 134 853.0	11-5	1677 732.8	363 134 853.9
11-3	1677 722.6	363 134 855.4	11-6	1677 734.3	363 134 852.0



**INSERT PLAN OF AREA 12**  
GENERAL WASTE DISPOSAL SITE

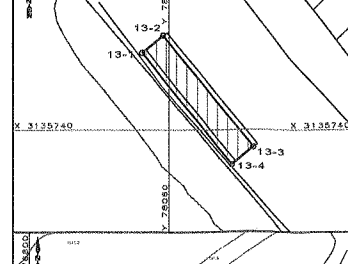
**HARTEBEEST HOEK 94 DATUM (WGS84)**  
SURVEY SYSTEM WG25

**SCALE 1 : 5 000**

THE FIGURE 12-1, 12-2, 12-3, 12-4, 12-5, 12-6, 12-7, 12-8, 12-9 AND 12-10, SITUATED ON THE GENERAL WASTE DISPOSAL SITE, REPRESENTS 1:2498A.

**CO-ORDINATES:**

12-1	1678 441.2	363 134 879.2	12-4	1678 448.2	363 134 815.0
12-2	1678 442.8	363 134 858.7	12-5	1678 449.3	363 134 825.7
12-3	1678 442.0	363 134 784.0	12-6	1678 451.5	363 134 799.4
12-4	1678 442.1	363 134 725.4	12-7	1678 457.8	363 134 725.7
12-5	1678 438.0	363 134 853.5			



**INSERT PLAN OF AREA 13**  
OIL COLLECTION AREA 1 IN VILLAGE

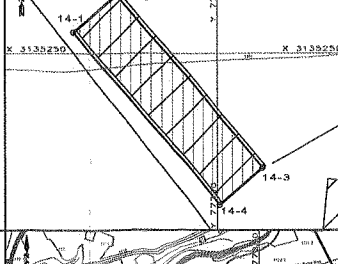
**HARTEBEEST HOEK 94 DATUM (WGS84)**  
SURVEY SYSTEM WG25

**SCALE 1 : 200**

THE FIGURE 13-1, 13-2, 13-3, 13-4, 13-5 AND 13-6, SITUATED ON THE OIL COLLECTION AREA 1 IN VILLAGE, REPRESENTS 1:2498A.

**CO-ORDINATES:**

13-1	1678 022.2	363 135 722.8	13-3	1678 025.4	363 135 761.3
13-2	1678 026.2	363 135 722.4	13-4	1678 025.1	363 135 742.7



**INSERT PLAN OF AREA 14**  
OIL COLLECTION AREA 2 IN VILLAGE

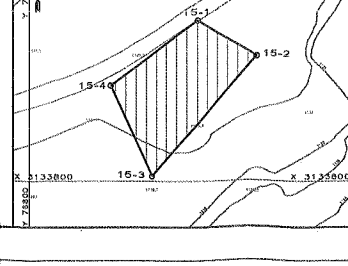
**HARTEBEEST HOEK 94 DATUM (WGS84)**  
SURVEY SYSTEM WG25

**SCALE 1 : 300**

THE FIGURE 14-1, 14-2, 14-3 AND 14-4, SITUATED ON THE OIL COLLECTION AREA 2 IN VILLAGE, REPRESENTS 6:1201A.

**CO-ORDINATES:**

14-1	1677 311.8	363 135 242.2	14-3	1677 291.8	363 135 283.4
14-2	1677 311.8	363 135 242.2	14-4	1677 293.8	363 135 297.8



**INSERT PLAN OF AREA 15**  
THE NEW SPL STORAGE SITE AREA

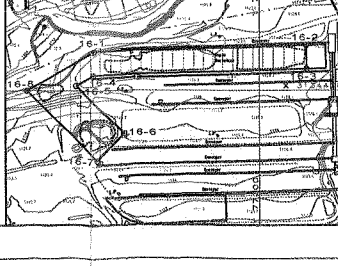
**HARTEBEEST HOEK 94 DATUM (WGS84)**  
SURVEY SYSTEM WG25

**SCALE 1 : 1 500**

THE FIGURE 15-1, 15-2, 15-3, 15-4 AND 15-5, SITUATED ON THE NEW SPL STORAGE SITE AREA, REPRESENTS 2:2418A.

**CO-ORDINATES:**

15-1	1678 791.0	363 133 789.0	15-3	1678 729.0	363 133 797.6
15-2	1678 685.0	363 133 727.4	15-4	1678 729.0	363 133 764.6



**INSERT PLAN OF AREA 16**  
LIMESTONE STOCKPILES AREA

**HARTEBEEST HOEK 94 DATUM (WGS84)**  
SURVEY SYSTEM WG25

**SCALE 1 : 4 000**

THE FIGURE 16-1, 16-2, 16-3, 16-4, 16-5, 16-6, 16-7, 16-8 AND 16-9, SITUATED ON THE LIMESTONE STOCKPILES AREA, REPRESENTS 2:2418A.

**CO-ORDINATES:**

16-1	1677 621.0	363 134 339.8	16-8	1677 625.8	363 134 329.7
16-2	1677 621.2	363 134 329.7	16-9	1677 623.7	363 134 497.0
16-3	1677 621.2	363 134 366.6	16-7	1677 625.3	363 134 399.7
16-4	1677 621.2	363 134 375.8	16-6	1677 621.7	363 134 429.6



## Ulco Factory

### Register: Waste Streams at Ulco

Department	Type	Volume	Classification	Storage	Final Destination	Service provider
Admin/HR	Printer Cartridges	1m <sup>3</sup> /2months	Hazardous	Stationery store	Ink Lady Kimberley recycled	Ink Lady
	Paper packaging	1m <sup>3</sup> /2months	General	Stored in separate bins	Waste Disposal Site sorted for Recycling	Waste Management Service/Provider
Store	Batteries	350 batteries/y	Hazardous	Locked cabin at the store	Returned to suppliers	Various
	Gas containers	Various		Designated gas store	Returned to suppliers	Afrox and others
	Empty Drums	Variable	Hazardous	Store	Caltex	Send back to Supplier
	Containers for hazardous materials		Hazardous	Store	Make unusable - dispose of as hazardous waste	EnviroServe
Club and Guest Houses	Bottles		General	Bins	Sorted for recycling Waste Disposal Site	Service/Provider
	Cans		General	Bins	General waste disposal site - sorted for recycling	Waste Management
Food Waste	Household waste	100m <sup>3</sup> /a	General	General waste bins	General waste disposal site	Waste Management - Service Provider
	Chemicals	400 l/y 400m <sup>3</sup> /y	Hazardous	Stored in a ventilated room	Bulk storage in outside store Disposal off site	University of Free State
	Rags with oil and Vaseline	6m <sup>3</sup> annum	Hazardous	Classified Waste Bin	Incinerated in the Klin	N/A

Department	Type	Volume	Classification	Storage	Final Destination	Service provider	
Quality	Cement cubes	24m <sup>3</sup> annum	General	Collect and store in bins	Returned to process at stockpiles	N/A	
	XRF Bead & tablets	18m <sup>3</sup> annum	General	Classified bucket	Internalised in Kiln	N/A	
	Hazardous waste containers		Hazardous	Store	Returned back to supplier		
	Broken Cement Bags	75 t/a	General	Wire cages at Packing & Despatch	General waste disposal site		
	Old Pallets and Scrap	Variable	General	Pallet Yard at Packing Plant	Re-use and chipping of wood for rehabilitation		
	Plastic	75 t/y	General	Wire cages at Packing & Despatch	Waste Disposal site - sorted for recycling	Contractor	
	Bagfilters (P&D) (Quarry) (Process)	±450 x(dia 150 x 24)	General	Transition area	Internalised in Kiln	N/A	
	Hazardous waste containers		Hazardous	Store	Returned back to supplier	Stores Team Leader	
	Packing Plant	Water treatment	1300m <sup>3</sup>	General	Returned to process	Stockpiles	P&D Maintenance



Department	Type	Volume	Classification	Storage	Final Destination	Service provider
	Sludge					Team Leader
	Flourescent tubes	6m <sup>3</sup>	Hazardous	Crushed in 200 liter drums and sealed.	Off-site disposal	EnviroServe
	Scrap materials	220ty 27,35m <sup>3</sup>		Temporary stored in redundant yard	DAV Steel (Vereeniging)	Ian Botes
	Screened Sewage material	10kg per month	General	Bags	Internalization in Kiln	
	Refractory Waste	690 t/a	General	Temporary stockpile at kiln	Re-processed in kiln	N/A
<b>Production</b>	Contaminated oil	4 m <sup>3</sup> /annum	Hazardous	Oilkol tanks	Removal to Rose Foundation for recycling	Oilkol
	Bag Filters(Process)		General	Transition area behind kiln	Internalised in Kiln	N/A
	Household waste	1300 ty	General Waste	Household waste bins	On-site waste disposal site	Waste management Service Provider

Department	Type	Volume	Classification	Storage	Final Destination	Service provider
Township	Garden & sports field waste	1 150 ty	General Waste	Designated bins around the village	Waste disposal site-composting area	N/A
	Branches	150 ty	General Waste	Designated bins around the village	Used for rehabilitation	N/A
	Building Rubble	40 ty	General Waste	Civil Shop bunkers	General waste disposal site	Civil Contractors
Quarry	Scrap materials	220ty 27,35m <sup>3</sup>	General Waste	Temporary stored in redundant yard	DAV Steel (Vereeniging)	Ian Botes
	Contaminated Sawdust	3m <sup>3</sup> /month	Hazardous	Old oil drums	Destroyed in kiln	N/A
	Explosive Waste	100kg/annum	General	Burnt immediately after use	Destroyed by burning at waste disposal site	N/A
Garage	Used oil	21 150m <sup>3</sup>	Hazardous	Oilkol Bin	Removed by Oilkol	Kiln
	Used oil rags		Hazardous	Refuse oil rag drum	Internalised in Kiln	Kiln
	Oil filters inners	500pc/y	Hazardous	Refuse oil rag drum	Internalised in Kiln	Kiln
	Used grease	800pc/y	Hazardous	Empty grease drum in bags at garage	Internalised in Kiln	N/A
	Contaminated soil	2 tonly	Hazardous	recycle shed	Internalised in Kiln	N/A
Clinic	Used rubber and papers	4 tonly		Recycle shed at garage		
	Air cleaners for disposal	1 tonly	Hazardous	Garage	Internalised in Kiln	Kiln
Clinic	Waste tyres	500 pc	Hazardous	Garage Temporary storage	Returned to supplier	
	Syringe and bandages Sharps Sanitary bins	0,105m <sup>3</sup> 5LX4/year 50L boxX4/year 7,5 L bins pick up by rentokill	Hazardous	Container provided by Steinmed	Incineration	Steinmed

Department	Type	Volume	Classification	Storage	Final Destination	Service provider
Others	Asbestos	Variable	Hazardous	Asbestos waste storage facility - old brick store	Registered Waste disposal site Off-site	EnviroServe
	Bag filters: (P&D) (Quarry) (Process)	-450		Transition area behind kiln	Internalised in Kiln	N/A
	Hazardous Waste containers		Hazardous	Store	Returned back to supplier	Caltex
	Water treatment sludge	1300m <sup>3</sup>		Stockpiles	Re-processed in kiln	N/A
	Fluorescent Tubes	6m <sup>3</sup> /a	Hazardous	Crushed in 200 liter drums and sealed Designated storage facility - old brick store	Disposal off-site at Registered waste disposal site	EnviroServe
	Scrap Materials	220t/y 27,35m <sup>3</sup>		Temporary stored in salvage yard	DAV Steel (Vereeniging) for recycling	Ian Botes
	Dried Sludge	10kg per month	Hazardous	Sewage drying beds	Re-used to produced compost for property gardens	On-site nursery contractor

H:H Indicates extreme hazardous materials and the type of disposal site

H:h Indicates moderate hazardous materials

h:h Non hazardous materials



# ENVIRONMENTAL MANAGEMENT PROGRAMME FOR WASTE MANAGEMENT AT AFRISAM ULCO

## IN SUPPORT OF APPLICATION FOR A PERMIT FOR THE TEMPORARY WASTE STORAGE FACILITIES AND DOMESTIC GENERAL WASTE DISPOSAL SITE AT AFRISAM ULCO

### **A INTRODUCTION**

#### **1 Site Location**

AfriSam Ulco Factory is located 80 km Northwest of Kimberley, 40 km Northwest of Barkly West, 17 km Northwest of Delpoortshoop and 24 km Southeast of Koopmansfontein.

*Refer Annexure 1: 1:50 000 map*

*Refer Annexure 1: orthophoto*

#### **2 Geology of the area**

The largest portion of the limestone deposit being exploited at Ulco for clinker and cement production are of secondary origin. They are geologically very young (approx 31 000 – 21 000 years old –C14 dating on calcite). They rest on what appears to be down faulted Karoo shales which themselves are irregularly intruded by dolerite and dykes.

The chemical distribution of  $\text{CaCO}_3$  and  $\text{MgCO}_3$  is related to the structure of the deposit which reflects the mode, intensity and direction of deposition.

Primary limestone makes up about 30% of the limestone mined for current cement production at Ulco. Currently four levels are being exploited, one being intercalated shale which, being relatively high in alkalis, is discarded. The primary limestone is relatively low in silica content but somewhat marginally high in magnesium content for cement production. A judicious mix of the primary and secondary limestone produces a suitable combination for the production of cement clinker.

#### **3 Topography**

The area can be described as being essentially flat with two prominent base levels, one below the escarpment, which lies West of Ulco, and the Ghaap

Plateau above. The edge of the scarp trends in a North-east South-westerly direction and reaches a maximum exposed height of 100 m some distance South of Ulco. At Ulco and its surroundings, the height of the scarp averages 75 to 80 m, being near vertical except where secondary limestone deposits drape over it such as the Bergville-Harrison quarry area and Gorrokop as well as North of the main tarred road traversing the area.

Beneath the escarpment the land drops gently away from the Ulco township / factory area at a gradient of  $\pm 1:110$  (i.e. 90 m over 10 km) eastwards down to the confluence of the Harts and Vaal Rivers. West of the Ghaap Plateau the land rises at an average gradient of 1:60 (122 m in 7 km) in a westerly direction. Small gently rounded hillocks of up to 15 m in height do occur on the escarpment, which is incised by many intermittent streams, especially at the escarpment edge.

The natural topography of the area has been altered by the surface infrastructure associated with the Ulco operation. The mining activities have lowered the topography of the mined out areas.

#### **4 Soil**

No where on the site or in the surrounding land one can find an abundance of soil. The soil depth over the area varies from 0 cm to a maximum of 30 cm. Over the area of interest, pockets of wind blown sand, sometimes with a limited amount of plant material, constitute the only soil. According to the regional soil map, the whole area falls under the soil type of Fc. Soils designated as Fc are described as "*lime generally present in the entire landscape*".

Over the secondary limestone, the soil is often limited in occurrence to depressions caused by karst features. Over the primary limestone and dolomites comprising of the Ghaap Plateau and escarpment edge, where soil exists, the soils are mainly derived from Kalahari sands containing some humus.

#### **5 Surface Water**

According to the WRC (1990) the Ulco operation falls in the **C92A** Quaternary sub-catchment area. The mine itself lies 9 km North-west of the confluence of the Vaal and Harts Rivers and 3.5 km North of the non perennial Steenbok River, which flows over the Ghaap escarpment at Grootkloof. There are a

number of seasonal stream beds in the vicinity of the mine, which flow during the "rainy season" after a heavy downpour, but only for a short period of time. According to the WRC (1990) Ulco falls within a local endoreic area. A local endoreic area is an area where no runoff normally reaches the river system. Hence it is not expected that any run-off from Ulco would ever reach the Vaal River. Within the main mining area, all surface water is channelled either naturally or by storm water channels to one of two sumps.

## **6 Drainage Density of Areas**

The drainage density of the areas disturbed has not been measured. All storm water from the quarry areas is directed to and collected in 2 sump areas, which prevent the water from leaving the mining areas and allows silt and sediment to settle out of the water. Storm water from the plant area flows onto the land between the plant and the township. Storm water from the old plant and Waste disposal site (Ashdump) area flows out into the adjacent farm, De Puts, as sheet flow water.

## **7 Depth of Water Table**

The average depth of the water table in the vicinity of Ulco is 23 m, with the shallowest being 18 m and the deepest being 84 m (*Ground Water Flow Model for Ulco, 1997, Gerrit van Tonder & Riaan Grobbelaar*)

## **8 Natural vegetation**

A detailed survey of the mine was conducted by the Botany Department of the Mc Gregor Museum in August 2000. 162 plant species were identified at Ulco. Ulco lies on the boundary (transitional zone ) between the Kimberley thorn bushveld (from the Ghaap escarpment eastwards) and the Kalahari plateau bushveld (Ghaap escarpment and plateau). The Kalahari plateau covers 233 909 km<sup>2</sup> and is not represented in any conservation area. The Kimberley thorn bushveld, of which 3.1% is conserved, covers 271 026 km<sup>2</sup>. The summer rainfall for these vegetation types varies from 250 – 550 mm per annum, with Ulco experiencing an annual average rainfall of 385 mm. The Ghaap plateau and escarpment is physiologically and geomorphologically distinct from the plains, therefore the flora composition of these areas is distinct

## **9 Endangered or Rare Species**

Within the surveyed area, 5 species were located which are listed in the Red Data List of Southern African Plants and approximately 18 species are classified as protected (Nature and Environmental Conservation Ordinance

No. 19 of 1974 in Glavovic 1993). Most of these are rare species belonging to the *Asclepiadaceae* and *Mesembryanthemaceae* families. However areas with such species are demarcated to avoid disturbances.

#### **10 Invader or Exotic Species**

Eleven invasive plant species were recorded at Ulco during the survey of which the dominant invaders includes *Prosopis glandulosa* (Mesquite), *Salsola Kali* (Russian Tumble Weed), *Nicotiana glauca* (Wild Tobacco), *Pennisetum setaceum* (Fountain Grass), *Eucalyptus camaldulensis* (Red River Gum) and *Schinus molle* (Pepper Tree).

#### **11 Animal Life**

In the ravines on the edge of the escarpment, extending to the actual active quarry areas, a diversity of fauna can still be found, such as Kudu and smaller buck such as duiker. Jackal also frequents this area and possibly caracal. These predators most probably live on the population of rodents that also live in this terrain. In and adjacent to the waste disposal site (Ashdump) there is a large population of dassie's, while baboons are often seen frequenting the dumps. A great variety of birdlife is also encountered including raptors such as the Goshawk and Black Eagle.

#### **12 Regional Climate**

The regional climatic conditions are representative of those of a typical Karoo climate, with a high daily maximum temperature through out the year and a low minimum temperature at night the winter months. The rainy period runs from November through to April with the months with the highest rainy days being December through to March.

#### **13 Land use**

Historically the area around Ulco was used by San inhabitants for resources such as water and food. In the past century, before mining took place in the area, the land was used for grazing of cattle, goats and sheep. Since the start of mining in the area in 1936, the predominant use of the surrounding land (6 km radius from Ulco) remains as grazing (+/- 85%) with the Ghaap plateau been demarcated as a wilderness area, which accounts for approximately 15% of the surrounding land.



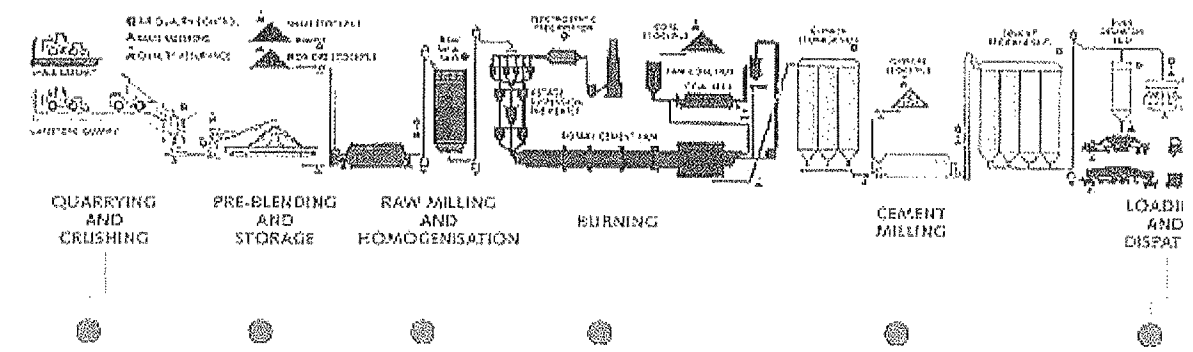
## B THE PROCESS

- 1 The process is a scheduled process in terms of Schedule 2 of the Atmospheric Pollution Prevention Act 45/1965. It has a registration certificate concerning scheduled processes Registration Certificate 65/6 dated 04 March 2004.

*Refer Annexure 8:Registration Certificate 65/6 of 04 March 2009*

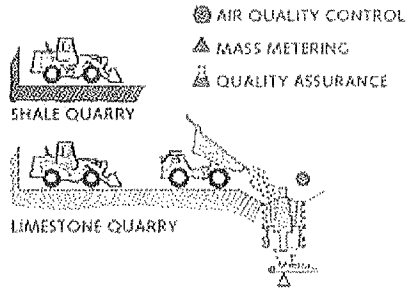
- 2 AfriSam Ulco has been in operation since 1937. In 1984 a new plant was built with the following operating parameters:
  - Kiln clinker production capacity: 4000 tons per day for normal production, and 4400 tons per day during peak production.
  - Kiln stack emission limit: 150 mg/Nm<sup>3</sup>
  - Other air pollution control equipment: 150 mg/Nm<sup>3</sup>
  - Availability of pollution prevention equipment: 96% of operating time per any continuous period of 30 days at the emission limits set in the registration certificate
  - Raw materials input: duff coal, limestone and shale, iron ore, gypsum
  - Waste utilisation: FCC catalysts, HPC catalysts, spent pot liners, tyres, rubber waste, plastic (excluding PVC), waste oil, spent solvents
  - Products: clinker (intermediate), cement (final product)

### 3 Process flow / description



#### Quarrying and crushing

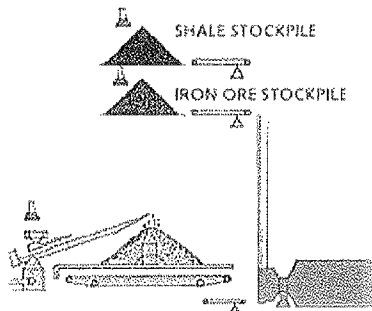
The primary raw material for cement manufacture is calcium carbonate or limestone. This is obtained from the quarry where, after the removal of overburden, the rock is blasted, loaded into trucks and transported to the crusher. A crushing process reduces the rock to stone less than 75 mm in diameter. Most modern cement factories are located close to a source of limestone as about 1,5 tons of limestone is needed to produce one ton of cement.



QUARRYING  
AND  
CRUSHING

**Pre-blending and storage**

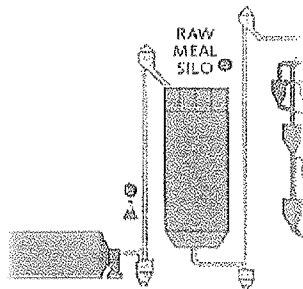
The crushed rock is stored in stockpiles where, by a carefully controlled process of stacking and reclaiming across the stockpile, blending takes place and a uniform quality of raw material is achieved. Systematic sampling and laboratory testing monitor this process. The other raw materials, normally shale, iron ore, coal and gypsum, are also stored in stockpiles.



PRE-BLENDING  
AND  
STORAGE

**Raw Milling and Homogenization**

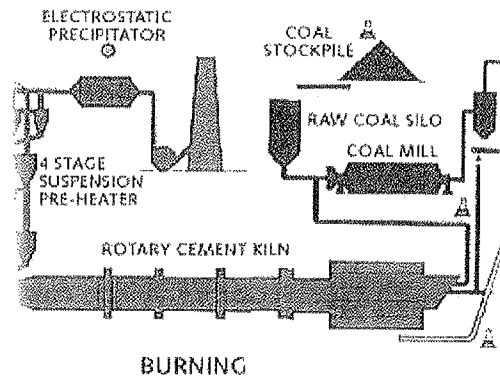
Carefully measured quantities of the various raw materials are fed to mills where a roller mill grinds the material to a fine powder called raw meal. Homogenization takes place in the silo used to store the meal. The raw meal is mixed thoroughly to ensure that the kiln feed is uniform, a prerequisite for the efficient functioning of the kiln and for good quality clinker.



RAW MILLING  
AND  
HOMOGENISATION

### Burning

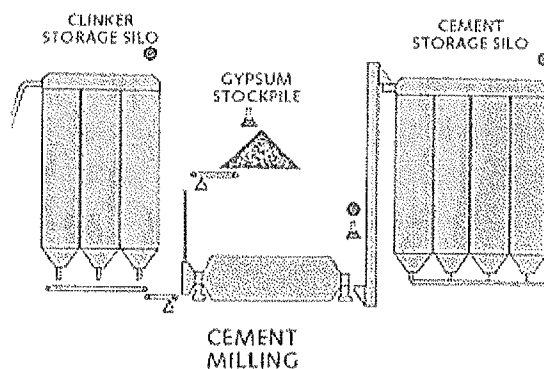
The most critical step in the manufacturing process takes place in the rotary kilns. Raw meal is fed into one end of the kiln, via a preheater system, and pulverised coal is burnt at both ends. The coal, bought in to the operation, is pulverised in the coal milling plant and stored in a silo prior to use. The raw meal slowly cascades down the inclined kiln towards the flame and reaches a temperature of about 1 450 °C in the burning zone, where a process called clinkering occurs. The nodules of clinker drop onto a grate cooler, cooling takes place and the clinker is taken away by conveyors to the clinker storage silo. Some clinker is discharged outdoors on a stockpile to ensure sufficient supply to the cement milling process. The gas leaving the kiln is cleaned by an electrostatic precipitator prior to discharge into the atmosphere. Bag filters are used for pollution control at the coal plant and clinker cooling system.



### Cement Milling

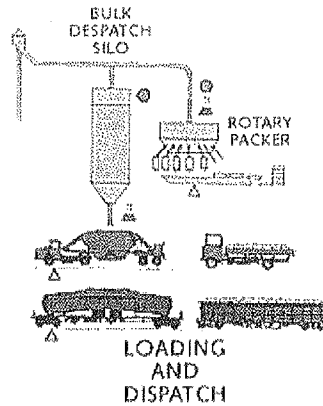
Mills use steel balls of various sizes to grind the clinker, along with a small quantity of gypsum to a fine powder that is then called cement. Without gypsum, cement would flash set when water is added and gypsum is therefore required to control setting times. The cement products manufactured at Ulco include APC, RHC and HSC. The different strength products are manufactured using additives, grinding aids and blaines.

The finished cement is stored in silos where further blending ensures consistency.



### Loading and Despatch

Cement is despatched either in bulk or packed in 50 kg bags and distributed from the factory in rail trucks or road vehicles. The 50-kg bags are palletised. The pallets are covered by a layer of plastic to offer further protection from the elements. Bagged cement is stored outdoors whilst bulk cement is stored in silos for different products.



## C WASTE GENERATION AT ULCO

AfriSam Ulco generates waste streams from the mining and cement manufacturing processes, as well as from the auxiliary activities at site. Both general and hazardous waste is generated.

*Refer Annexure 4: Risk assessment: waste management*

*Refer Annexure 3: Waste inventory*

## D WASTE MANAGEMENT AT ULCO

### 1. AfriSam philosophy for waste management

1. AfriSam is a member of the Association for Cementitious Materials Producers (ACMP), and subscribes to the principles of environmental management of the ACMP. AfriSam (South Africa) also has its own environmental policy which forms the framework for environmental management throughout the company.
2. AfriSam Ulco is an ISO 14001 certified operation. An integrated management system, risk based, is in place to manage identified health, safety, environmental and Quality Assurance risks. AfriSam has an Integrated Management Policy which forms the framework of the management system and continual improvement programme.
3. AfriSam Ulco's philosophy for waste management is to take cradle to grave responsibility for waste generated on site.
4. As a point of departure in its management of waste, AfriSam Ulco adopts the waste hierarchy in its decision-making regarding the final destination of waste streams

## **2. Roles and responsibilities**

1. Waste is generated from activities and processes and maintenance in various departments.
2. It is the responsibility of the business units, where the waste is generated, to correctly handle, store and dispose of the waste.
3. The monitoring of waste management forms part of the ISO 14001 management system, as well as the legal compliance monitoring programme of the operation.
4. Quantities of waste disposed of in various ways and to various waste disposal destinations are quantified.
5. Records are kept in the management system.

## **3. Training for awareness and competence**

1. All personnel receive awareness training regarding the hazards of their work, using the baseline risk assessments completed for the operation. This includes exposure to hazardous substances, including wastes.
2. Personnel are trained in the requirements for waste handling, storage and disposal in the departments in which they work.
3. These requirements are included in the relevant work instructions for different types of work.
4. Business Unit Managers are accountable for responsible management of waste generated from the departments' activities. This includes the correct collection, storage and disposal of the waste streams, using legally acceptable storage facilities, methods and/or services

## **4 Waste collection, handling and temporary storage**

1. The site uses the Minimum Requirements for hazardous waste handling, storage and disposal Guidelines 2nd Edition 1998, issued by DWAF, as the standard for waste management on site
2. Waste streams are separated into general and hazardous waste stream in the workplace areas. Drums are provided for the collection and storage of such waste streams
3. The general waste streams are further sorted to recover re-usable and recyclable materials
4. A contracted service provider collects general waste from the village and plant, for disposal at the general waste disposal site in the Quarry.
5. A dedicated AfriSam Ulco team is responsible for all on site cleaning, housekeeping and process and hazardous waste handling in the plant
6. Process waste is returned to the process at various points as per the work instructions

7. Those hazardous waste streams which can be internalised by destruction in the kiln are collected from the various workplace areas, by the "housekeeping" team, on a scheduled basis, for incineration in the kiln.
8. Shut-down activities generate additional waste streams, and these are managed as per the work instructions for waste management

*Refer Annexure 5: Register of Work Instructions for waste management*

## **5 Description of the temporary waste storage sites**

1. The temporary waste storage facilities at Ulco have been in existence for many years, and form part of the facilities for normal operation of the plant
2. Certain areas have been identified and demarcated, on site, for temporary storage of various types of waste, pending re-use, recycling, disposal or internalisation, according to legal and company requirements

*Refer Annexure 2: Site map showing designated storage facilities*

3. The storage facilities are installed/structured such that there is minimal potential for impact of soil and water (both surface and ground water) from the storage activities i.e. protection from leaching waste into the soil and ground water, bunding, enclosed and secured facilities etc

### **3.1 Area 1 Salvage yard**

This area falls within the area of responsibility of the Engineering Services Department

The area has an unprotected soil bed and is secured into designated storage areas using fencing and locked gates.

- 1 Materials and parts, such as metal components, which are for future maintenance purposes, are stored in this area.
- 2 Scrap metal, earmarked for sale, is also stored in this area, pending collection by the service provider.
- 3 A part of this yard is concreted and bunded so that transformers can be stored here without negatively impacting on soil and ground water quality
- 4 Steel balls used as charge in the mills, are stored here in drums
- 5 Refractory material, removed from the kiln during planned shut downs, is temporarily stockpiled here, pending removal for return to the process at the main limestone stockpiles

- 6 Car tyres, to be used as an alternative source of energy in the process, will be brought to site, on consignment, and stored here ahead of being fed in to the kiln as fuel.
- 7 Skips containing general or hazardous waste, requiring disposal in the kiln, as per authorisation, are temporarily moved to this area which is in close proximity to the kiln
- 8 Skips containing waste to be disposed of off-site can also be temporarily placed here, pending removal by a service provider, as per schedule or on an as-needed basis

### **3.2 Area 2 Temporary storage of SPL**

1. This area falls within the area of responsibility of the Quarry.  
This temporary storage area for SPL has a solid limestone bed. It is bunded with limestone material so as to reduce the inflow of surface water after rain.
2. This temporary storage facility will be replaced by a permanent SPL shed during 2009 (refer Area 17 on site plan)

- ### **3.3 Area 3**
- No carbonaceous SPL is currently used at Ulco, thus this storage area is not required. This area is designated as a temporary storage facility for the potential for future use of carbonaceous SPL as an alternative source of fuel

### **3.4 Area 4 Temporary storage at the Engineering workshops**

- 1 Trackless mobile machinery is parked here at the time of shut downs and major maintenance
- 2 Plant parts, which require repair and/or replacement, are temporarily stored here pending maintenance activities
- 3 Steel material, being used for repairs of plant and equipment, is temporarily placed here. It is removed to the salvage yard or returned to the stores, once work is completed
- 4 A vehicle washbay is located here. The light vehicles and trackless mobile equipment is washed here on an as-needed basis. The effluent water is collected in a sump, where the oil is skimmed off and the liquid effluent is directed to the sewage treatment plant for further treatment
- 5 There is an OILKOL tank located in this area. The facility's floor is concreted and has a sump around it to prevent oil spills from reaching soil and ground water. Used oil and cleaning solvents, collected in the tank, are sold to OILKOL.

- 6 OILKOL collects the liquid waste, when notified that the tank is nearly full.

**3.5 Area 5 Wood chips temporary storage area**

1. This is an area designated for the future temporary storage of wood chips from an exotic woodland area on a local farm - a potential renewable energy source, currently being investigated for use

**3.6 Area 6 Pallet storage area**

- 1 Pallets are returned from customers to Ulco.
- 2 The pallets are offloaded from rail and road trucks and temporarily stored here on an unprotected soil surface.
- 3 They are inspected, repaired or scrapped, depending on their condition.
- 4 Those which are scrapped are shredded in a wood shredder and the shredded wood is taken to the quarry to be used for rehabilitation in the mine.

**3.7 Area 7 Coal char storage**

1. Coal char, a fine form of coal sourced for heat energy at Ulco, is offloaded alongside the coal stockpiles on this unprotected soil surface.
2. The material is then blended with the normal source of coal on the coal stockpiles, prior to off take, on the conveyors, to the process.
3. Coal char is received from time to time, when it becomes available from suppliers
4. Coal char is an alternative form of coal received at Ulco, and is not classified as a waste stream

**3.8 Area 8 Temporary storage area for hazardous wastes**

1. This temporary storage area is a secured enclosed shed, with a concrete floor.
2. Asbestos and fluorescent tube waste is stored here, pending removal from site by a certified service provider, for disposal off site at an appropriate waste disposal facility for such waste streams
3. IT waste, awaiting removal for off site recycling and final disposal, is also stored in this shed



**3.9 Area 9 Temporary waste storage area at the vehicle maintenance workshop.**

- 1 Waste tyres, from trackless mobile equipment, are temporarily stored here, on a concreted surface, pending return to suppliers or off - take by farmers for use as water troughs etc
- 2 Contaminated saw dust and rags are stored in bags in the storage sheds, pending internalisation in the kiln. This storage facility consists of cages and sheds, with roofs and concrete surfaces.
- 3 Empty drums from fuels and lubricants, are stored here, on a concreted surface and protected from surface water runoff, pending return to suppliers or re-use for the storage of grinding charge for the mills
- 4 Used oil is stored in drums in the storage sheds, awaiting transfer to the OILKOL tanks at the main engineering workshops

**3.10 Area 10 Vehicle garage washbay**

1. An oil skimmer removes the oil and grease from the liquid effluent. The liquid effluent is enclosed in the washbay evaporation area, where the water is allowed to evaporate after it has passed through the skimmer.
2. Some of this water is pumped to tanks at the facility, to be used for washing vehicles
3. The waste water from the washing activities is returned to the washbay, for treatment
4. The sludge from the washbay is removed to the limestone stockpiles for internalisation in the process.

**3.11 Area 11 Temporary storage area for wastes from the locomotive maintenance workshops**

1. Waste oil is stored inside the workshop, temporarily, in drums, awaiting removal to the OILKOL tank.

**3.12 Area 12 Domestic waste disposal site – refer Section 7.2**

**3.13 Area 13 Temporary waste oil collection and storage area – village**

1. The waste oil generated from service of vehicles belonging to residents of the village is temporarily stored in secured enclosed facilities, at the Single Quarters in the village, pending removal to the OILKOL tanks on site, as per schedule

- 3.14 Area 14 Temporary waste oil collection and storage area – village**
1. This facility is constructed and managed in the same way as Area 13 above. It is located in Ulco West in the village
- 3.15 Area 15 Temporary storage of SPL**
1. This area has been designated for additional storage of delivered SPL, but is not in use
  2. The construction of the covered shed for SPL (Area 13) will make the requirement for this storage area redundant
- 3.16 Area 16 Limestone stockpiles**
1. SPL is currently crushed and placed on the limestone stockpiles
  2. From here the material is reclaimed for co-processing as an alternative raw material and source of energy
  3. This practice will be terminated on completion of the SPL shed from where the material will be introduced into the process with the limestone being conveyed to the raw mill
- 3.17 Area 17 Shed for temporary storage of SPL**
1. The construction of this shed, by the end of 2009, will ensure compliance with the conditions of the ROD for the use of alternative raw materials and fuels.
  2. The shed is designed to
    - Ensure SPL is stored in a well ventilated covered shed with a concrete floor and bund walls
    - Prevent surface and ground water pollution from spillages during handling of SPL
    - Prevent air pollution resulting from handling and feeding the material into the process
  3. The shed is positioned such that the SPL is introduced into the process at a conveniently located conveyor, which feeds limestone from the stockpiles into the raw mill
  4. Approval of the design of the shed has been obtained from the provincial authorities of the Northern Cape

*Refer Annexure 11: Conceptual design of SPL shed*

## **6 Re-use and recycling of waste**

1. Sorting of re-usable and recyclable general waste streams is done at source

*Refer Annexure 12: photos of recycling drums in village and at plant*

2. Recyclable waste which is separated out at source is stored in clearly marked storage facilities at the domestic waste disposal facility

*Refer Annexure 12: photos of cages for recyclable waste*

3. A recycling contractor collects this recyclable waste from Ulco, on request.
4. Currently glass, cans, hard plastic and paper are recycled at Ulco.
5. A project is being launched, as part of the Social and Labour Plan of the operation, for the extensive re-use of pallet wood, where the pallets are no longer able to be repaired for re-use for product distribution. This project includes conversion of the waste pallet wood into furniture
6. Garden refuse is collected and composted for the propagation of trees for rehabilitation and replacement of alien vegetation
7. Sewage dried sludge is mixed with soil, and the compost is used as compost for gardens in the village
8. Scrap metal is collected and sold to a scrap metal dealer
9. Old oil is collected for recycling and re-use, through the Rose Foundation

## **7 Waste disposal**

### **7.1 Internalisation of waste generated at the operation**

1. Process waste and waste streams generated from maintenance activities are internalised by destruction in the kiln, as per the Record of Decision issued for the use of alternative fuels and raw materials at Ulco, and the authorisation issued by DEAT in the registration certificate for a scheduled process.

*Refer Annexure 8: ROD NNO 25/19 ULC 1/04 issued 02 March 2006*

*Refer Annexure 8: Registration Certificate 65/6 dated 04 March 2004, for Scheduled Process ito Atmospheric Air Pollution Prevention Act — Page 3*

*Refer Annexure 5: Work Instruction ULW 161 : Disposal of plant waste in the kiln*

## 7.2 Disposal of waste to landfill

*Refer Annexure 2: Site map of waste storage Facilities – Area 12*

1. The domestic waste disposal site was authorised by the Department of Minerals and Energy as part of the establishment of the mine and is incorporated as a component of the EMPR approved by the DME

*Refer Annexure 8: I.M. KIM 36/1/29 dated 28/11/1983: Permit for waste disposal site issued to Ulco by Department of Minerals and Energy*

2. In addition the operation has an ROD for exemption from an EIA for the registration of the waste disposal site in terms of Sec 20 of the Environmental Conservation Act

*Refer Annexure 8: ROD NNO 25/19 NC/DEL 2/107/05, for exemption from requirement to register the waste disposal site in terms of Sec 20(5) of the Environmental Conservation Act 1989*

3. An approved EMP is in place and compliance is ensured by means of a work instruction for the management of the waste disposal site.

*Refer Annexure 8: EMP for the waste disposal site*

4. The requirements of the EMP have been included in a work instruction for the management of the waste disposal site

*Refer Annexure 5: Work Instruction ULW 131: Waste disposal site*

## 7.3 Waste disposal off site

1. Certain waste streams cannot be disposed of at the general disposal site in the Quarry. Nor can they be internalised by destruction in the kiln
2. These waste streams are collected and stored in accordance with the Minimum Requirements for the handling and storage of hazardous waste, in designated and secured temporary storage facilities, pending disposal as per legal requirements or on an as-needed basis
3. Where waste streams are required to be removed from site for disposal, the following is ensured
  - a. The use of competent, certified and registered waste disposal service providers

- b. Disposal to a waste disposal facility which is licensed to accept the waste being disposed of there
- c. Receipt of safe waste disposal certificates as verification of responsible final disposal of waste

*Refer Annexure 5: Work Instructions for*

- *Asbestos management (ULW 156)*
- *Fluorescent tube management (ULW 223)*
- *Clinic waste management (ULW 285)*

## **E USE OF WASTE FROM OTHER INDUSTRIES IN THE PROCESS AS ALTERNATIVE RAW MATERIAL OR FUEL**

1. The waste hierarchy is used as the framework for this waste – related activity
2. Ulco has an ROD 25/19 ULC 1/04 dated 02 March 2006 which gives authorisation to the site to use certain waste streams as alternative fuels and resources (AFR) in the process.
3. In terms of the ROD for AFR, the following waste streams, not exclusively, are suitable to be used as AFR:
  - Scrap tyres
  - Rubber
  - Waste oils
  - Waste wood
  - Paint sludge
  - Sewage sludge
  - Plastics
  - Spent solvents
  - Spent pot linings (SPL)
4. Currently only the following is destroyed in the kiln:
  - refractory SPL
  - waste grease, oily rags, contaminated saw dust
  - paint sludge
  - sewage screenings
  - bags from the bag house filters
  - coal char
5. Controls are in place and implemented for the controlled destruction of waste streams in the kiln

*Refer Annexure 5: WI ULW 161: Disposal of plant waste in the kiln*

*Refer Annexure 5: WI 290: SPL management*

*Refer Annexure 5: WI ULW 217: Sewage solid waste*

6. There are opportunities to expand this programme to include
  - broken cement bags
  - plastic waste
  - tyres
  - wood chips as a biomass replacement
7. Because Ulco already has an approved ROD for the introduction of selected waste materials into the process, the requirements of the EIA Regulations have already been met.
8. However, prior to the introduction of a waste stream as an alternative raw material or fuel, the following management process is followed:
  - i. Environmental impact assessment (internal) is carried out internally to identify the potential impacts to the environment of the proposed activity, and consultation takes place with the provincial authorities for approval to proceed
  - ii. Limited public participation is carried out to verify knowledge and understanding of the process and material to be introduced.
  - iii. Trial burns to verify that the material can be successfully used in the process without significant negative impact to quality, health, safety or the community. Local and regional authorities are invited to participate in the trials, and to give comment
  - iv. A report of the results of the trials is forwarded to the provincial and local authorities
9. Baseline and trial monitoring is carried out by third party consultants
10. The results of the trials are carefully considered before decisions are made whether or not to use the waste as an alternative raw material or fuel
11. Details of the handling, storage and co-processing of the waste stream are included in work instructions for each waste stream, as per the conditions of the ROD

*Refer Annexure 4: risk assessment on SPL*

*Refer Annexure 5: WI ULW 290: SPL Management*

*Refer Annexure 4: risk assessment on waste tyres*

*Refer Annexure 5: WI 217: Management of waste tyres at Ulco*

## **F EMERGENCY RESPONSE**

1. An emergency response plan is in place and has been drilled to test its effectiveness
2. Response plans have been developed for various environmental emergency scenarios
3. Reporting requirements are included in the emergency response plan for the site

*Refer Annexure 6: Emergency Response Procedure and Plans*

## **G MONITORING AND MEASURING ENVIRONMENTAL PERFORMANCE AT WASTE STORAGE FACILITIES**

1. Environmental monitoring is carried out as per the conditions of the various permits and authorisations
2. Soil and ground water monitoring is carried out as per a schedule
3. Surface water monitoring is carried out after rains which result in significant runoff of water
4. Dust fall out monitoring on the boundary of the mine includes a periodic composition analysis to establish whether or not the low level dust generated from waste storage facilities is significant
5. No significant environmental impact has been observed as a result of the temporary storage of waste at the site

*Refer Annexure 7: Measuring and monitoring matrix*

## **H MONITORING OF EXPOSURES OF PERSONNEL**

1. All personnel who have the potential for health impact as a result of exposures to harmful substances from the waste handling, storage and disposal activities are monitored for such exposures
  - a) Sewage plant operators: hepatitis B
  - b) SPL workers: fluorides
  - c) Lung functions for all personnel working in dusty environments
2. The above personal monitoring forms part of the medical surveillance programme for employees, to ensure fitness to work

*Refer Annexure 7: Measuring and monitoring matrix*





**17.6 APPENDIX 6: CURRENT EMERGENCY MANAGEMENT PROCEDURE**



# AfriSam

## AfriSam South Africa (Pty) Ltd Ulco Factory & Bloemfontein Depot

### Emergency Preparedness Planning

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Date: \_\_\_\_\_

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2010\Reports\Appendicies\A6 - Emergency Procedures\Emergency Preparedness Planning (ULP-  
042).Docx

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# AfriSam

General Manager

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2010\Reports\Appendices\A6 - Emergency Procedures\Emergency Preparedness Planning (ULP-  
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# AfriSam

## 1.0 Purpose

- 1.1. To identify and analyse potential emergency situations which could be a threat to health, safety of persons, to the environment or to quality of products and services
- 1.2. To ensure that a comprehensive emergency response plan is developed and implemented for all identified scenarios
- 1.3. To minimise loss or damage through timely and effective response to all types of emergencies

## 2.0 Scope

- a) Normal operating conditions
- b) Abnormal operating conditions
- c) All persons working for or on behalf of the operation
- d) Visitors on site

## 3.0 Definitions and Abbreviations

- 3.1. None

## 4.0 Procedure and Responsibilities

### 4.1 Threat analysis

The threat analysis is co-ordinated by the Emergency Co-ordinator

Various scenarios, which could/have the potential to

1. Harm people
2. Pollute the environment
3. Impact negatively on the community/customers
4. Damage plant, equipment and services and product quality

are

1. Identified
2. Analysed
3. Assessed for likelihood of occurrence and severity of consequence

Potential emergencies at Ulco include:

- a) Fire
- b) Explosions
- c) Failing structures and excavations/engulfment
- d) Rail/road accidents
- e) Hazardous substance exposure
- f) Natural disasters – floods and high winds
- g) Injuries
- h) Major injuries/fatality

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- i) Disruption of essential services
- j) Quality Assurance incidents
- k) IT interruptions
- l) Sabotage/armed robbery/terrorism
- m) Civil unrest
- n) Medical emergencies
- o) Rescue from heights/confined spaces
- p) Uncontrolled releases to the environment

## 4.3. Emergency Response personnel

- a) The General Manager or his delegated authority is the overall Emergency controller
- b) The chain of command is clearly defined for management of emergencies
- c) Emergency personnel respond to orders given by the Emergency Controller

## 4.4. Emergency Alarms

Emergency alarms are tested at regular intervals, at designated times, to

- 1. Verify that the alarms are fully functional
- 2. Make all persons on site aware of the nature of the alarms

## 4.5. Emergency Response Plan

An emergency response plan is developed and documented, to include:

- a. Details of alarms for various emergencies
- b. Emergency response contact details
- c. Chain of command during an emergency
- d. Location of Emergency Control Room and Medical Centre
- e. Evacuation routes and assembly points
- f. Responsibilities and duties of
  - i. Emergency control personnel
  - ii. Emergency response teams
- g. Location of emergency response equipment
- h. Crisis communication requirements

## 4.6. Training

- a. All response personnel are fully trained and competent to manage emergencies and perform evacuation and rescue activities, as per their responsibilities
- b. Refresher training is provided to all emergency response teams at regular intervals

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- c. All persons on site are made aware of the emergency response/evacuation requirements during inductions and awareness training
- d. All permanent personnel and contractors are trained in the use of fire extinguishers

## 4.7. Emergency Response Activation

- a. The Emergency Response Plan is activated by the standby official who is informed of the emergency situation by the person on duty in the Operations Control Room
- b. Where required, external services are summoned to assist. On arrival, these external emergency response services personnel will take control of the emergency situation until the situation is brought under control
- c. Crisis communication is managed by the General Manager of the operation, or his deputy
- d. After the emergency situation has been brought under control and personnel have resumed normal working conditions
  - i. A debriefing session/workshop is held with all emergency response personnel and teams
  - ii. Identified shortcomings are addressed by amending/adjusting the emergency response plan
- e. The amended emergency response plan is communicated to all applicable personnel and emergency control personnel
- f. A comprehensive report is compiled and kept as a record

## 4.8. Protection of Assets

- a) Back up discs and other vital information are removed from the emergency location
- b) Safe parking is provided for mobile equipment, close to an emergency assembly point
- c) Vital information, such as phone noises and voices, is preserved during an emergency
- d) Records of telephone calls are kept on prescribed forms

## 4.9. Reporting emergencies

External reporting of major incidents is done immediately when an emergency arises, as per the applicable legal requirements. These reports form part of the emergency record

## 4.10. Replenishment of emergency response equipment

All emergency response equipment used during an emergency is replenished, using checklists. Any emergency response equipment which has been identified as needed, is acquired and added to the list for future use.

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- 4.11. Emergency contact details are updated and/or expanded to be more effective in future eventualities
- 4.12. Risk profiles are amended to include those risks identified during the emergency event

## 4.13. Emergency drills

- a. Testing the effectiveness of response to various emergency scenarios is carried out at regular intervals
- b. Single and multiple scenarios form part of such drills
- c. Risk Assessments of planned scenarios are carried out prior to drills
- d. The drills are recorded on a template designed for this purpose
- e. Reviews of the emergency response plan are carried out after each drill
- f. Required amendments/improvement actions are forwarded to the national emergency co-ordinator, where applicable

## 5.0 Records

Records generated as a result of this procedure are as follows:

Record	Location/Custodian	Retention Time	Disposition
Telephone Calls	Telephonist	5 Years	Shred

## 6.0 Amendments

Date	Rev	Reason for Change	Changed by
2008-07-10	01	New Procedure	WIS
2009-03-10	02	Revision of document	WIS
2010-05-24	03	Revision of document	WIS

## 7.0 Distribution List

- 7.1. All Users

## 8.0 Appendices

None

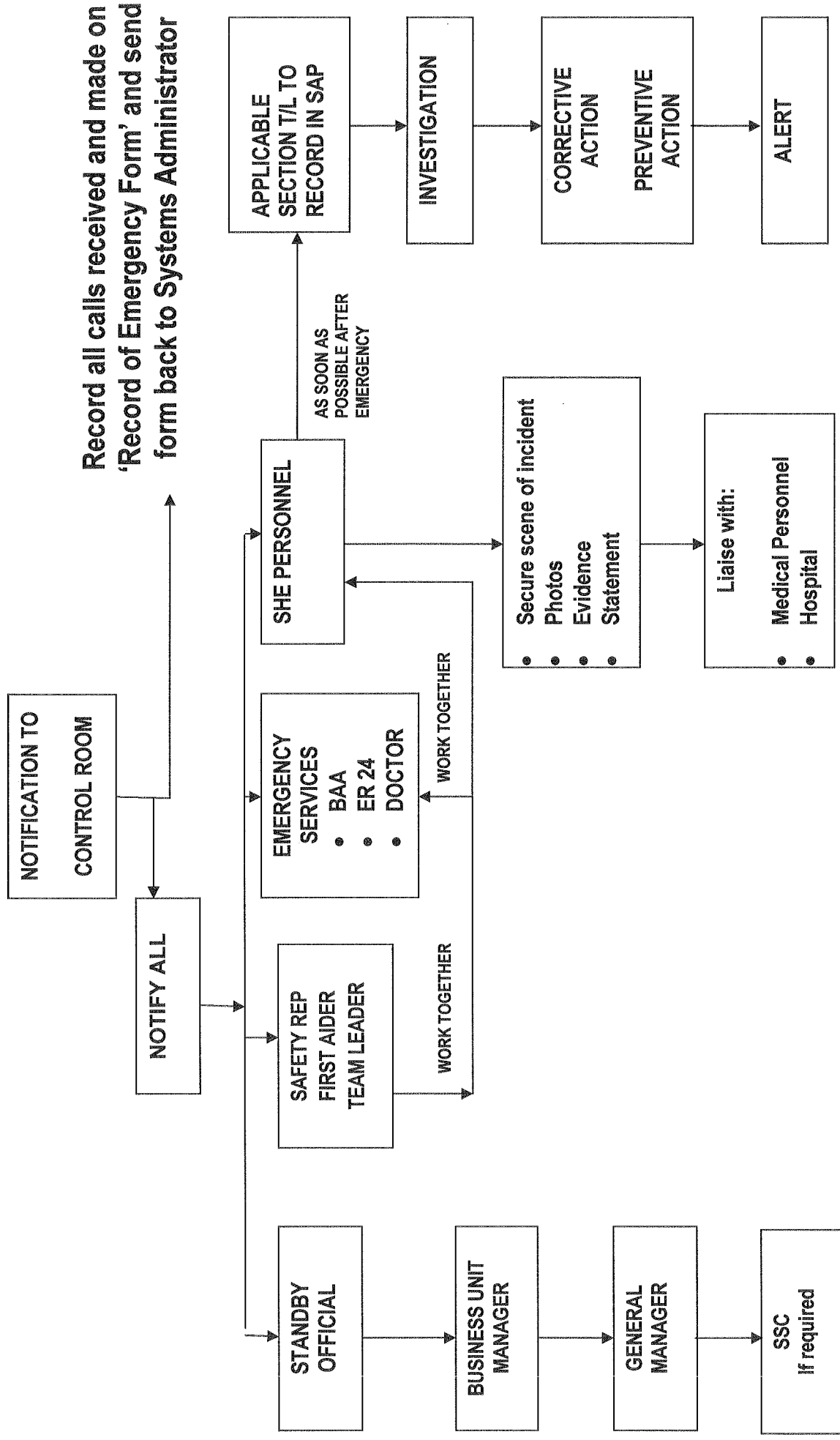
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# INCIDENT (Near Miss, Injury, Fatality, Asset Damage Dangerous Occurrence)



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		Work Instruction



**AfriSam**

**AfriSam South Africa**

**Ulco Factory**

**EMERGENCY RESPONSE PLAN**

Doc No.: ULP-047	Rev No: 03	Date: 2009-10-23	
Compiled by: WIS	Revised by: SN	Authorised by: GM	Procedure

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## Emergency Contact Numbers

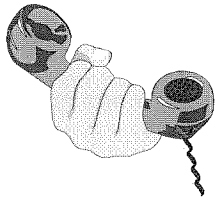
Designation	Office	Resident	Cell
Central Control Room (CCR)	9101		
General Manager	9133	9506	083 309 1348
Maintenance Manager	9132	9504	083 2675658
Process Manager	9150		083 7031622
Administration Manager	9136	9518	082 852 3988
SHE Manager	9120	9516	083 305 8773
SHE Practitioner	9145	9509	083 342 7323
SHE Practitioner	9211	9549	078 802 6964
OHNP (Nurse)	9198	9520	083 443 1244
OMP (Doctor)	9198		082 809 0501
Security Manager	9177	9501	082 461 8830
	9203		084 400 0309
Fire Chief	9145	9509	083 342 7323
Spoornet	9215	9503	
Main Gate	9177		
SAPS	053 561 2021		
Barkly West Hospital	053 531 0661		
Barkly West Ambulance	053 531 0595		
Kimberley Medi-Clinic	053 838 1111		
Netcare	072 534 6724		
ER 24	084 653 7593		
Traffic Department	053 830 4902		

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AfriSam has contracted ER24 for guaranteed response times and medical emergency advice.



Never rush an injured person to hospital yourself! - Contact ER<sub>24</sub>, state clearly:



1. You are calling from AfriSam
2. Location of the emergency (name of AfriSam's site or location off site)
3. Your name and contact number
4. What happened
5. The number of people injured
6. Additional info about risks at the scene (fire, unstable construction, ...)

**Internal emergency numbers:**

	Name	Phone number
Site Manager	Hannes Meyer	9133/ 053-562 9133
Emergency Coordinator	Hannes Meyer	9133/ 053-562 9133
☐ BAA	Call 1 Call 2	9101/9121 053-562 0099
☐ ER 24 Kimberley	Albert	<b>084 124 / 084 6537 593</b>
☐ ER 24 Kimberley	ER Call 1	<b>084 124 / 084 4607 009</b>
⚡ Electricity		9101 / 053-562 0099
💧 Water		9101/ 053-562 0099
☠ Chemicals	Gerhard Klaasen	9122 / 053-562 9122
💣 Security	SW Security – P Swartz W Swartz	9177/ 082 461 8830 9203/ 084 4000 309
Policy: 2432/3/4 or 053 562 0099 10111	Fire brigade: 9101 or 053 562 0099	
💧 Water	CCR	9101 / 053 562 0099
⚡ Electricity	CCR	9101 / 053 562 0099
☠ Chemicals	Klaasen G	9122 / 083 4418 828
💣 Security	SW Security – P Swartz W Swartz	9177 or 082 461 8830 9203 or 084 400 0309
🚓 Police: <b>10111</b>	🚒 Fire brigade	9101 / 053 562 0099

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**ROLES AND RESPONSIBILITIES : INTERNAL**

Overall Emergency Co-coordinator	General Manager
Notification of an emergency	Anyone who identifies
Emergency Controller	Standby Official
Assistant Emergency Controller	Standby Team Leader
Fire Fighting	Fire Chief and Fire Team
Evacuation (General)	Standby Official
Security	Security Manager on duty
Medical Assistance	Occupational Health Nurse
	Occ. Medical Practitioner
Crisis Communication	General Manager
Emergency Support Teams	Administration Manager/ Standby Official
Environmental Pollution Officer	SHE Manager/Standby Official
Customer Complaint	Packing and Dispatch Manager
	Quality Assurance Manager
Stakeholder Concerns	General Manager

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**ROLES & RESPONSIBILITIES:**

**LOST TIME INJURY/FATALITY EXTERNAL NOTIFICATION**

<b><u>WHO</u></b>	<b><u>RESPONSIBILITY</u></b>
1.1. DME immediately	SHE Manager / General Manager
1.2. Report after investigation	SHE Manager
2.1. OHS Manager – SSC	SHE Manager / General Manager
2.2. Report in BMS	SHE Manager
3. SAPS immediately	Standby Official / General Manager
<b><u>MAJOR ENVIRONMENTAL INCIDENT</u></b>	
1.1. DME immediately	SHE Manager / General Manager
1.2. Report after investigation	SHE Manager (see attached)
2. Environmental Consultant – SSC	General Manager
3.1. DEAT	
• Local immediately	SHE Manager / General Manager
• Provincial immediately	SHE Manager / General Manager
3.2. Report after investigation	SHE Manager (see attached)
• Local	
• Provincial	
• National	
4.1. DWAF	
• Catchments Management agency immediately	SHE Manager / General Manager
• Local immediately	SHE Manager / General Manager
• Provincial immediately	SHE Manager / General Manager
4.2. Report after investigation	
• Local	SHE Manager / General Manager
• Provincial	SHE Manager / General Manager
• National	SHE Manager / General Manager
• CMA	SHE Manager / General Manager
5. Communities (where applicable) immediately	General Manager

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<p>6. SAPS</p> <p>7. Relevant Fire Protection Services</p>	<p>General Manager / Standby Official</p> <p>Standby Official / General Manager/ SHE Manager</p>
<p><b><u>ROAD ACCIDENT (ON SITE)</u></b></p>	
<p>1. DME immediately</p> <p>2. OHS Manager (SSC)</p>	<p>SHE Manager / General Manager</p> <p>SHE Manager / General Manager</p>
<p><b><u>RAIL ACCIDENT (ON SITE)</u></b></p>	
<p>1. Spoornet</p> <p>2. Rail Safety Regulator</p> <p>3.1. OHS Manager SSC</p> <p>3.2. Report in BMS</p> <p>4. SAPS (where applicable)</p>	<p>Standby Official /P&amp;D Manager</p> <p>Standby Official / P&amp;D Manager (see attachment)</p> <p>General Manager /P&amp;D Manager</p> <p>P&amp;D Manager</p> <p>General Manager / P&amp;D Manager</p> <p>SHE Manager / General Manager</p>

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## EMERGENCY EVACUATION ALARMS

### A. FIRE ALARMS

- Long continuous fog horn sound
  - Sound continuously until emergency is attended to
- 

### B. EMERGENCY EVACUATION – ALL AREAS

- New emergency alarm
  - Sounds continuously for THREE minutes
- 

### C. ALL CLEAR SIGNAL- ANY INCIDENT

- New emergency alarm
  - Sounds continuously for 30 seconds
- 

### D. EMERGENCY EVACUATION – INDIVIDUAL BUILDINGS

- Hand sirens activated in the building
  - Sounds continuously until all persons have been evacuated and emergency has been attended to
- 

- Emergency “all clear” signal given by Emergency Controller of building

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## Ulco Factory

### Record of Emergency Call/Accident/Incident

Date: \_\_\_\_\_ Time Call Received: \_\_\_\_\_

Name of Person calling: \_\_\_\_\_

Type of Emergency (E.G. Fire, Injury, Etc.): \_\_\_\_\_

Location of Emergency/Accident/Incident: \_\_\_\_\_

Emergency Services Required (E.G. Fire Team, First Aider, Ambulance, Doctor, etc):

Action Taken: (As Required)	<u>Time Called</u>	<u>Time Arrived</u>
Alarm sounded	_____	_____
Fire team	_____	_____
First aider	_____	_____
Ambulance	_____	_____
Doctor	_____	_____
SHE Personnel	_____	_____
Standby Official	_____	_____
SHE Manager	_____	_____

Signature : \_\_\_\_\_

Date : \_\_\_\_\_

**SEND COMPLETED FORM BACK TO SYSTEMS ADMINISTRATOR**

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# AfriSam

## Ulco Factory

### Record of Emergency Call/Accident/Incident

Date: \_\_\_\_\_ Time Call Received: \_\_\_\_\_

Name of Person calling: \_\_\_\_\_

Type of Emergency (E.G. Fire, Injury, Etc.): \_\_\_\_\_

Location of Emergency/Accident/Incident: \_\_\_\_\_

Emergency Services Required (E.G. Fire Team, First Aider, Ambulance, Doctor, etc):

Action Taken: (As Required)

Time Called

Time Arrived

Alarm sounded

Fire team

First aider

Ambulance

Doctor

SHE Personnel

Standby Official

SHE Manager

Signature : \_\_\_\_\_

Date : \_\_\_\_\_

**SEND COMPLETED FORM BACK TO SYSTEMS ADMINISTRATOR**

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## Ulco Factory

### Action list for Emergency Response and Investigation

The purpose of this list is to assist investigators of accidents to obtain required information without losing pertinent evidence. The objective is to find *FACTS*, which will indicate the cause of the accident, in order to implement preventative measures. In so far as is practical, the following steps must be followed when investigating a disabling injury after assistance has been rendered to the injured:

- |  | <b>Action By</b>                            |
|--|---|
| 1. Positions of bodies/equipment (if applicable) must be marked with paint or leave undisturbed  | SHE Practitioner until evidence is compiled |
| 2. Obtain names of persons involved and witnesses.   | SHE Practitioner                            |
| 3. Inform SHE Practitioner, Business Unit Manager, SHE Manager, General Manager, Resident Engineer or Official on standby  | Person reported to                          |
| 4. Cordon area off and ensure that nobody enters area or does anything that will destroy evidence.   | Person reported to/SHE Practitioner         |
| 5. In case of death, or possible death, unconsciousness due to heatstroke, heat exhaustion, electric shock, inhalation of gasses or fumes or incapacitation for 48 hours, report immediately to Dept. of Mineral and Energy Affairs and police in case of death. | SHE Practitioner–Samrass 1 &2               |
| 6. Take statements from persons involved or witnesses, specially noting:   | Investigator/SHE Practitioner               |
| 6.1 Full particulars of person, including name, age, ID number, position in company, employer (if contractor), home address,   | SHE Practitioner                            |

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- training in job, time in job.
- 6.2 Where was person busy and what was he/she?  
doing at time of accident.
  - 6.3 What did he/she see or hear.
  - 6.4 Who else did he/she see in vicinity?
  - 6.5 To his/her knowledge any disturbance of the  
scene.
  7. Arrange for photographs of the scene,  
prepare a sketch noting dimensions and  
beacons. Investigator/SHE Practitioner
  8. Get clarification if circumstantial evidence  
does not agree with statement. Investigator/SHE Practitioner
  9. Statements to be signed by witnesses,  
investigator and two witnesses not connected  
with the event. Investigator/SHE Practitioner
  10. Please note that in case of death or possible  
death, the Department of Mineral & Energy  
Affairs will conduct their own investigation  
regardless, or any other accident reported  
to them, at their decision

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**RESPONSE TO AN EMERGENCY**

**(NORMAL WORKING HOURS AND AFTER HOURS)**

**1. Activate Emergency Response Plan**

<b>A</b>	Emergency Evacuation
<b>B1</b>	Fire Fighting
<b>B2</b>	Fire in IT server room
<b>C</b>	Injury
<b>D</b>	Emergency rescue
<b>E</b>	Sabotage, Arson, Bomb Threat and Civil Unrest
<b>F1&amp;2</b>	Disruption of essential services
<b>G</b>	Environmental pollution Containment and Control
<b>H</b>	Explosion
<b>I</b>	Natural emergency
<b>J1</b>	Exposure to radiation
<b>J2</b>	Exposure to chemical release
<b>K</b>	Medical Emergency
<b>L</b>	Non-conforming
<b>M</b>	Quarry
<b>N</b>	Crisis Communication
<b>O</b>	Failing Structures and Excavation
<b>P</b>	Rail/Road Accidents

**2. MAINTAIN RECORD OF EMERGENCY ACCIDENT/INCIDENT**

Use Action List as guideline for emergency response and investigation

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## **MAJOR ENVIRONMENTAL INCIDENTS:**

### **REPORTING TO DEAT**

#### **NATIONAL ENVIRONMENTAL MANAGEMENT ACT SECTION 30**

#### **EMERGENCY REFERENCE: G**

### **CONTROL OF EMERGENCY INCIDENTS**

The responsible person, after knowledge of the incident, report through the most effective means reasonably available

### **INITIAL REPORTING**

The nature of the incident: 30

1. Any risks posed by the incident to public health. Safety and property
2. The toxicity of substances or by-products released by the incident
3. Any steps that should be taken in order to avoid or minimize the effects of the incident on public health and the environment

### **MITIGATION OF IMPACKS**

The responsible person must as soon as reasonably participate after knowledge of the incident

1. Take all reasonable measures to contain and minimize the effects of the incident
2. Undertake clean-up procedure
3. Remedy the effects of the incident
4. Assess the immediate and long-term effects of the incident on the environment and public health

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## **MAJOR ENVIRONMENTAL INCIDENTS:**

### **REPORTING TO DWAF**

#### **NATIONAL WATER ACT SECTION 20**

#### **EMERGENCY REFERENCE: G**

#### **TO THE DIRECTOR-GENERAL OF DEAT POLLUTION CONTROL**

1. The South African Police sentences relevant fire prevention services
2. The relevant provincial head of department or municipality
3. All persons whose health may be affected by the incident

#### **WRITTEN REPORT**

The responsible person must within 14 days of the incident report to the Director- General

Provincial head of department and municipality:

1. The nature of the incident
2. The substances involved and as estimation of the quantity released
3. Their possible acute effect on persons and the environment and data needed to assess these effects
4. Initial measures taken to minimize impacts
5. Causes of the incident, whether direct or indirect, including equipment, technology, system, or management failure
6. Measures taken and to be taken to avoid a recurrence of such incident

#### **FINAL REPORT**

- To DWAF
- To SAPS
- Relevant Fire Department

Relevant Catchments Management Agency

#### **INCLUDED**

- Nature of incident
- Risks posed to public health, safety and property
- Toxicity of release
- Steps taken to investigate impact
- Preventative measures

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## 17.7 APPENDIX 7: REPORTING REQUIREMENTS IN THE EVENT OF AN ENVIRONMENTAL INCIDENT

### 17.7.1 Reporting of Environmental Incidents in terms of the NEMA

In the event of an incident as defined in the NEMA<sup>6</sup>, the following steps must be taken (as per S 30 NEMA):

**Step 1:** S 30(3) "The responsible person<sup>7</sup> or, where the incident occurred in the course of that person's employment, his or her employer must forthwith after knowledge of the incident, report through the most effective means reasonably available—

- a) the nature of the incident;
- b) any risks posed by the incident to public health, safety and property;
- c) the toxicity of substances or by-products released by the incident; and
- d) any steps that should be taken in order to avoid or minimise the effects of the incident on public health and the environment to—
  - i) the Director General;
  - ii) the South African Police Services and the relevant fire prevention service;
  - iii) the relevant provincial head of department or municipality; and
  - iv) all persons whose health may be affected by the incident."

**Step 2:** S 30(4) "The responsible person or, where the incident occurred in the course of that person's employment, his or her employer, must, as soon as reasonably practicable after knowledge of the incident—

- a) take all reasonable measures to contain and minimise the effects of the incident, including its effects on the environment and any risks posed by the incident to the health, safety and property of persons;
- b) undertake cleanup procedures;
- c) remedy the effects of the incident;
- d) assess the immediate and long-term effects of the incident on the environment and public health."

**Step 3:** S 30(5) "The responsible person or, where the incident occurred in the course of that person's employment, his or her employer, must, within 14 days of the incident, report to the Director General, provincial head of department and municipality such information as is available to enable an initial evaluation of the incident, including—

- a) the nature of the incident;
- b) the substances involved and an estimation of the quantity released and their possible acute effect on persons and the environment and data needed to assess these effects;
- c) initial measures taken to minimise impacts;
- d) causes of the incident, whether direct or indirect, including equipment, technology, system, or management failure; and
- e) measures taken and to be taken to avoid a recurrence of such incident."

<sup>6</sup> S 30(1)(a) In this section "incident" means an unexpected sudden occurrence, including a major emission, fire or explosion leading to serious danger to the public or potentially serious pollution of or detriment to the environment, whether immediate or delayed.

<sup>7</sup> S 20(1)(b) In this section, "responsible person" includes any person who – (i) is responsible for the incident; (ii) owns any hazardous substance involved in the incident; or (iii) was in control of any hazardous substance involved in the incident at the time of the incident.

### 17.7.2 Reporting Water Pollution Incident in terms of the NWA

*Goals and Objectives:* Reduce the significance of the impacts associated with the emergency incident through prompt response and remedial action.

In the event of an incident as defined in the NWA<sup>8</sup>, the following steps must be taken (as per S 20 NWA and Reg 2 of GN704).

**Step 1:** S 20(3) “The responsible person<sup>9</sup>, any other person involved in the incident or any other person with knowledge of the incident must, as soon as reasonably practicable after obtaining knowledge of the incident, report to

- a) the Department<sup>10</sup>;
- b) the South African Police Service or the relevant fire department; or
- c) the relevant catchment management agency”.

**Step 2.** The Department must be notified [Reg 2(c) of GN704] “by the fastest possible means of any emergency incident or potential emergency incident involving a water resource at or incidental to the operation of a mine or the conducting of any activity, furnishing information regarding-

- i) the date and time of the incident;
- ii) a description of the incident;
- iii) the source of the pollution or potential pollution;
- iv) the impact or potential impact on the water resource and the relevant water users;
- v) remedial action taken or to be taken by the person in control of the mine or activity to remedy the effects of the incident”.

**Step 3:** S 20(4) “A responsible person must -

- a) take all reasonable measures to contain and minimise the effects of the incident;
- b) undertake clean-up procedures;
- c) remedy the effects of the incident; and
- d) take such measures as the catchment management agency may either verbally or in writing direct within the time specified by such institution”.

**Step 4:** S 20(5) “A verbal directive must be confirmed in writing within 14 days, failing which it will be deemed to have been withdrawn”.

**Step 5:** Reg 2(d) of GN704] “within 14 days after the date of an incident” the mine must “inform the Department in writing of measures taken to correct and prevent a recurrence of such incident.”

<sup>8</sup> S 20(1) In this section “incident” includes any incident or accident in which a substance – (a) pollutes or has the potential to pollute a water resource; or (b) has, or is likely to have, a detrimental effect on a water resource.

<sup>9</sup> S 20(2) In this section, “responsible person” includes any person who – (a) is responsible for the incident; (b) owns the substance involved in the incident; or (c) was in control of the substance involved in the incident at the time of the incident.

<sup>10</sup> Department of Water and Environmental Affairs

**17.8 APPENDIX 8: CURRENT MONITORING MATRIX.**





## ENVIRONMENTAL MONITORING MATRIX

Parameter	Legal requirements	Standard or other requirement	Equipment	Authority	Responsible person	Frequency of sampling	Location
<b>AIR-QUALITY Stack emissions</b>							
UK 5	Air pollution Prevention Act CAPCO permit	Stack 1 150 mg/m <sup>3</sup>	OP SIS	Annually C&M Contractor	Process Engineering	Continuous	EP Outlet
Cement Mill 5	Air pollution Prevention Act CAPCO permit	150 mg/m <sup>3</sup>	Sick Broken bag detector	Annually	Process Engineering	Quarterly	Finishing Mill 5
Cement Mill 6	Air pollution Prevention Act CAPCO permit	150 mg/m <sup>3</sup>	Sick Monitoring	Annually	Process Engineering	Quarterly	Finishing Mill 6
<b>DUST FALL – OUT</b>							
Mg <sup>2</sup> /day	DEAT Guidelines SA limits	< 0,5/m <sup>2</sup> /day	Manufactured to ASTM D 1739-70 Buckets	HOHL	SHE Practitioner	Monthly	8 Compass points on perimeter
PM & PM10	General guidelines from department of Environmental Affairs and tourism	PM 10 not to exceed 0,18 mg/m <sup>3</sup> PM total not to exceed 0,30 mg/m <sup>3</sup>		HOHL	SHE Manager	Annually	8 Compass points 1 Selected buckets
<b>WATER QUALITY</b>							
A) Sewage plant final effluent outflow	National Water Act 36 of 1998	SABS General Standards for sewage effluent	Independent Lab	University of the Free State	Services Department	Monthly	Outlet to Environment
Total Coli form Count		<100/100l	Wet analysis				
E-Coli count per 100 ml		Sewage <100	E. Coli culture incubation plates	University of the Free State	Services Department	Monthly	Final pond

## ENVIRONMENTAL MONITORING MATRIX

Parameter	Legal requirements	Standard or other requirement	Equipment	Authority	Responsible person	Frequency of sampling	Location
<b>WATER QUALITY</b>							
B) Raw River Water				Supplier certified	Services Dept	Monthly	Final pond
C) Potable Water				Supplier certified	Services Dept	Monthly	Final pond
<b>D) BOREHOLES</b>							
<b>Borehole 1 (CS BH 1)</b>							
EC	National Water Act 36 of 1998	Portable water standards 370.0 mS/m		University of Free State	Quarry Dept	Bi annually	Below coal stockpile
PH		>5.5 – 9.5<					
Sulphate		600.0 mg/L					
Nitrate		88.5 mg/L					
Iron		0.2 mg/L					
Manganese		1.0 mg/L					
Calcium		150 mg/L					
Magnesium		70 mg/L					
<b>Borehole 2 (CS BH 2)</b>							
EC	National Water Act 36 of 1998	Portable water standards 370.0 mS/m		University of Free State	Quarry Dept	Bi annually	Below coal stockpile
PH		>5.5 – 9.5<					
Sulphate		600.0 mg/L					
Nitrate		88.5 mg/L					
Iron		0.2 mg/L					
Manganese		1.0 mg/L					
Calcium		150 mg/L					
Magnesium		70 mg/L					
<b>Borehole 3 (CS BH 3)</b>							
EC	National Water Act 36 of 1998	Portable water standards 370.0 mS/m		University of Free State	Quarry Dept	Bi annually	Below coal stockpile
PH		>5.5 – 9.5<					
Sulphate		600.0 mg/L					
Nitrate		88.5 mg/L					
Iron		0.2 mg/L					
Manganese		1.0 mg/L					
Calcium		150 mg/L					
Magnesium		70 mg/L					

**ENVIRONMENTAL MONITORING MATRIX**

Parameter	Legal requirements	Standard or other requirement	Equipment	Authority	Responsible person	Frequency of sampling	Location
<b>Borehole 4 (AD 1)</b>	National Water Act 36 of 1998	Portable water standards		University of Free State	Quarry Dept	Bi annually	Upstream Waste Disposal Site
EC		370.0 mS/m					
PH		>5.5 – 9.5<					
Sulphate		600.0 mg/L					
Nitrate		88.5 mg/L					
Iron		0.2 mg/L					
Manganese		1.0 mg/L					
Calcium		150 mg/L					
Magnesium		70 mg/L					
<b>Borehole 5 (AD 2)</b>	National Water Act 36 of 1998	Portable water standards		University of Free State	Quarry Dept	Bi annually	Downstream Waste Disposal Site
EC		370.0 mS/m					
PH		>5.5 – 9.5<					
Sulphate		600.0 mg/L					
Nitrate		88.5 mg/L					
Iron		0.2 mg/L					
Manganese		1.0 mg/L					
Calcium		150 mg/L					
Magnesium		70 mg/L					
<b>RAINFALL</b>							
Volume in mm			Rain gauge		HR	07:00 After rainfall	Admin
<b>LAND CAPABILITY</b>							
Surface area disturbed	DME EMPR Chapter 6	Mine plan			MM	Annual survey – Aerial photograph	Quarry
Rehabilitation	DME EMPR Chapter 6	Mine plan			MM	Annual survey – aerial photograph	Quarry
<b>RESOURCE USAGE</b>							
Electricity consumption			Meters	NA	Technical Asst	Monthly	Whole plant
Coal consumption					Quality Manager	Monthly	Lab
Underground diesel tanks		To be established with Caltex			Stores Controller		Quarry Vehicle garage

OCCUPATIONAL HYGIENE									
Radiation sources	Hazardous Substances Act 15 of 1973 National Health Dept	3uSv/h 300 mR/h	Dosimeter	Annually SABS	EM	Dept. of Health - Annually Internally - 6 monthly	In process		
Noise assessment and Exposure	Section 12 of MH & S Act, Act 29/1996	SABS 083-1996 and SABS 1451 part 1	Impulse integrated sound level meter	Annually calibration record kept by service provider	RM	Every second year or when new plant or machinery is erected.	All workplaces where employees are required to work.		
Illumination assessment	Section 12 of MH & S Act, Act 29/1996	Environmental regulations of the OHS Act, Act 85/1996	Candle/Lux digital meter	Annually, calibration record kept by service provider	RM	Every second year or when new plant or machinery is erected.	All Workplaces where employees are required to work.		
Ventilation and Heat stress	Section 12 of MH & S Act, Act 29/1996	Environmental regulations of the OHS Act, Act 85/1996	Micro manometer and whirling Hygrometer	Annually, calibration record kept by service provider	RM	Every second year or when new plant or machinery is erected.	All workplaces where employees are required to work.		
Gravimetric Sampling	Section 12 of MH & S Act, Act 29/1996	Guidelines for Gravimetric sampling	Glair sampling pump	Annually, calibration record kept by service provider	RM	Monthly	All workplaces where employees are required to work.		
<b>OCCUPATIONAL HEALTH</b>									
Medical examination	OHSACT 85 of 1993 & Mine Health and Safety Act 29 of 1996	See reports available at the Clinic	Hearing test booth and audiometer Lung function machine Eye testing machine	Calibration by independent authority	OHS	Yearly	All employees, contractors and temporary workers		
Hexane	Hazardous substances regulations of the OSH Act 85/1993	BEI 5 mg/g creatinine Table 3 of Hazardous substances regulations	Frozen urine sample	Calibration by independent authority	OHS	Annually	Clinic		
Methanol (Formic Acid)	Hazardous substances regulations of the OSH Act 85/1993	BEI < 80 mg/g creatinine Table 3 Of Hazardous substances regulations	Frozen urine sample	Calibration by independent authority	OHS	Annually	Clinic		

Chromium (VI)	Hazardous substances regulations of the OSH Act 85/1993	BEI < 30 ug Table 1 Of Hazardous substances regulations	Frozen urine sample	Calibration by independent authority	C	Annually	Clinic
Cadmium	Hazardous substances regulations of the OSH Act 85/1993	BEI < 10 ug/g creatinine Table 1 Of Hazardous substances regulations	Frozen urine sample	Calibration by independent authority	OHS	Annually	Clinic
Toluene	Hazardous substances regulations of the OSH Act 85/1993	BEI < 2.5 g/g creatinine Table 1 Of Hazardous substances regulations	Frozen urine sample	Calibration by independent authority	OHS	Annually	Clinic
Xylene	Hazardous substances regulations of the OSH Act 85/1993	BEI < 1.5 g/g creatinine Table 1 Of Hazardous substances regulations	Frozen urine sample	Calibration by independent authority	OHS	Annually	Clinic
<b>SECURITY</b>							
Theft incidents		Zero incidents			Security Contractor	As required	All incidents
Check seals on trucks & amount of bags loaded		Zero non - conformances			Security Contractor	All loads	Security main gate
<b>OCCUPATIONAL SAFETY</b>							
TIFR		< 17			All employees	Daily	All employees
DIFR		< 0.8			All employees	Daily	All employees
SHEQ representative inspections	Mine Health & Safety Act 29 of 1996		Visual inspections		SHE Representatives, SHE Practitioner Hod's	As per schedule	All required equipment
Supervisory Control register inspections	Mine Health & Safety Act 29 of 1996		Ladders, slings, portable electrical equipment, pneumatic equipment, PPE, trestles, safety harnesses, hand tools, company tools, earth		Competent personnel	3 Monthly	

				leakage tests				
Supervisory Control register inspections	Mine Health & Safety Act 29 of 1996		Flame proof equipment	Responsible person	Yearly			
Earth test/inspection	Mine Health & Safety Act 29 of 1996		Explosive magazine earth test, stack earth test	Electricians	Yearly			
Fire equipment inspections	Mine Health & Safety Act 29 of 1996		Fire extinguishers, hose reels, systems	SHEQ Reps; SHE Practitioner Accredited contractor	Monthly Yearly			
Vehicle inspections	Mine Health & Safety Act 29 of 1996		Vehicles – LDV, tractors, all mobile equipment	Drivers	Daily			
Lifting equipment inspections/load tests	Mine Health & Safety Act 29 of 1996		Mobile cranes, fixed cranes, crawl beams	Accredited contractor	Yearly			
Passenger Lift inspections	Reg. 17.51 Reg. 17.52	Reg. 17.51 Reg. 17.52	Passenger Lift	Electricians Contractor	Weekly Monthly			
Legal Metrology process	SANS 1841 Quantity control process	SANS 1841 Quantity control process	Packers	Quality Dept	Daily, if and when packer is running		CS Department	

17.9 APPENDIX 9: CURRENT FINANCIAL PROVISION CALCULATIONS.





# Financial Provision Calculations

MINING OPERATION:

**AFRISAM SOUTH AFRICA (PTY) LTD – ULCO CEMENT  
PLANT**

**DMR REF: NC 177 MR**

ON THE FARMS:

**GROOT RIETFONTEIN No. 234, LIME 1 AND LIME 2 OF THE FARM KLEIN  
RIETFONTEIN 215, DIE PUTS 217, PORTION 3 (BERGVILLE) OF THE FARM  
HONDEFONTEIN 216, HARRISON (A PORTION OF DELPORTSHOOP COMMONAGE),  
THE REMAINDER OF VOGELFONTEIN 176, DONDERBOSCHFONTEIN 147 AND  
ZONONDER 175.**

**DIKGATLONG MUNICIPALITY  
NORTHERN CAPE PROVINCE**

DATE:

**JULY 2010**

REPORT COMPILED BY:

**Andrew Nicholson**

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## EXECUTIVE SUMMARY

Historically financial provision at AfriSam South Africa (Pty) Ltd – Ulco Cement Operation has been calculated making use of an internal formula.

The current financial provision value submitted by the mine to the Department of Minerals and Resources (DMR) for mine closure is R 51 543 231. This document aims to satisfy the requirements of Section 41 (3) of the Minerals and Petroleum Development Resources Act, Act 28 of 2002 (MPRDA).

AfriSam requested Umhlaba Environmental Consulting CC to undertake a financial provision calculation for their Ulco Cement Operation making use of the Department of Minerals and Resources (DMR) guideline document for financial provision. The guideline document dated January 2005 was utilised.

Two calculations have been performed;

- The first provides a value based on the closure cost as of July 2010 if the mine needed to be rehabilitated by a third party.
- The second provides a present day value, based on the closure cost as of July 2015 presuming the concurrent rehabilitation activities which have been committed to by Ulco are successfully implemented.

The financial provision values determined are;

- Present day value for closure: **R 52, 721 839**
- Present day value, based on successful implementation of concurrent rehabilitation commitments: **R 45, 653 274**

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# 1 INTRODUCTION

AfriSam South Africa (Pty) Ltd requested Umhlaba Environmental Consulting CC to undertake a financial provision calculation for their Ulco Cement operation making use of the Department of Minerals and Resources (DMR) guideline document for financial provision. Historically financial provision at Ulco has been calculated making use of an internal formula.

The current financial provision value submitted by the mine to the Department of Minerals and Resources (DMR) for mine closure is R 51 543 231. This document aims to satisfy the requirements of Section 41 (3) of the Minerals and Petroleum Development Resources Act, Act 28 of 2002 (MPRDA).

## 1.1 BACKGROUND INFORMATION TO THE ULCO

The AfriSam South Africa (Pty) Ltd Ulco Cement Operation has been operating in the Northern Cape Province since 1936. Mining of the secondary limestone reserves began in 1936, when Union Lime mined it for lime, using two Beckenbach Shaft kilns and nine Spencer kilns for burning the limestone. In 1949, it was decided to mine the low grade limestone material for cement and the company built two wet process kilns (Kiln 1 and Kiln 2) and cement mills for the cement manufacturing process. Subsequently in 1964 two further kilns (Kiln 3 and Kiln 4) were added on to increase the cement production capacity. In 1985, Union Lime Company was purchased by Anglo Alpha.

In 1985, Anglo Alpha began mining primary limestone reserves and commissioned a fifth kiln (UK5), with a capacity to produce 4500 tons of clinker per day. The old lime kilns and cement kilns were decommissioned in 1992. Anglo Alpha has changed name a number of times and as of June 2007 is now known as AfriSam (South Africa) (Pty) Ltd.

The mine is located 80 km north-west of Kimberley, 42 km north-west of Barkley West, 17 km north-west of Delpportshoop and 24 km south-east of Koopmansfontein. The Mine and all the towns mentioned above are accessible along the R31 between Kimberley and Kuruman. See Figure 1.

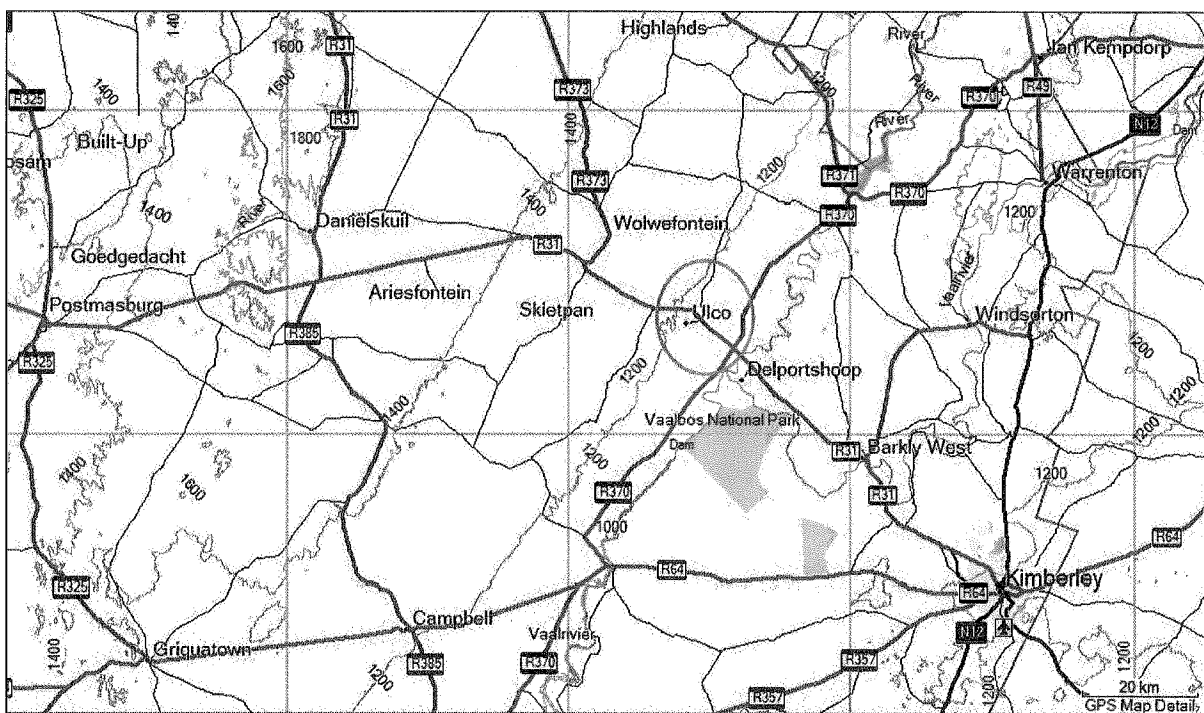


Figure 1: Regional locality plan of the AfriSam Ulco Mine

Figure 2 provides an indication of the mining right area versus the mining environment area. It is important to note that the mining right area covers an area of 16366 hectares shown in red, however, the mining environment area, which is the area over which has been impacted by the historic and current mining activities, is approximately 550 hectares and is shown in blue.

Figure 3 provides an overview of the main area which has been disturbed by the Ulco mining activities. Figure 4 provides an indication of the infrastructure associated with the current cement plant.

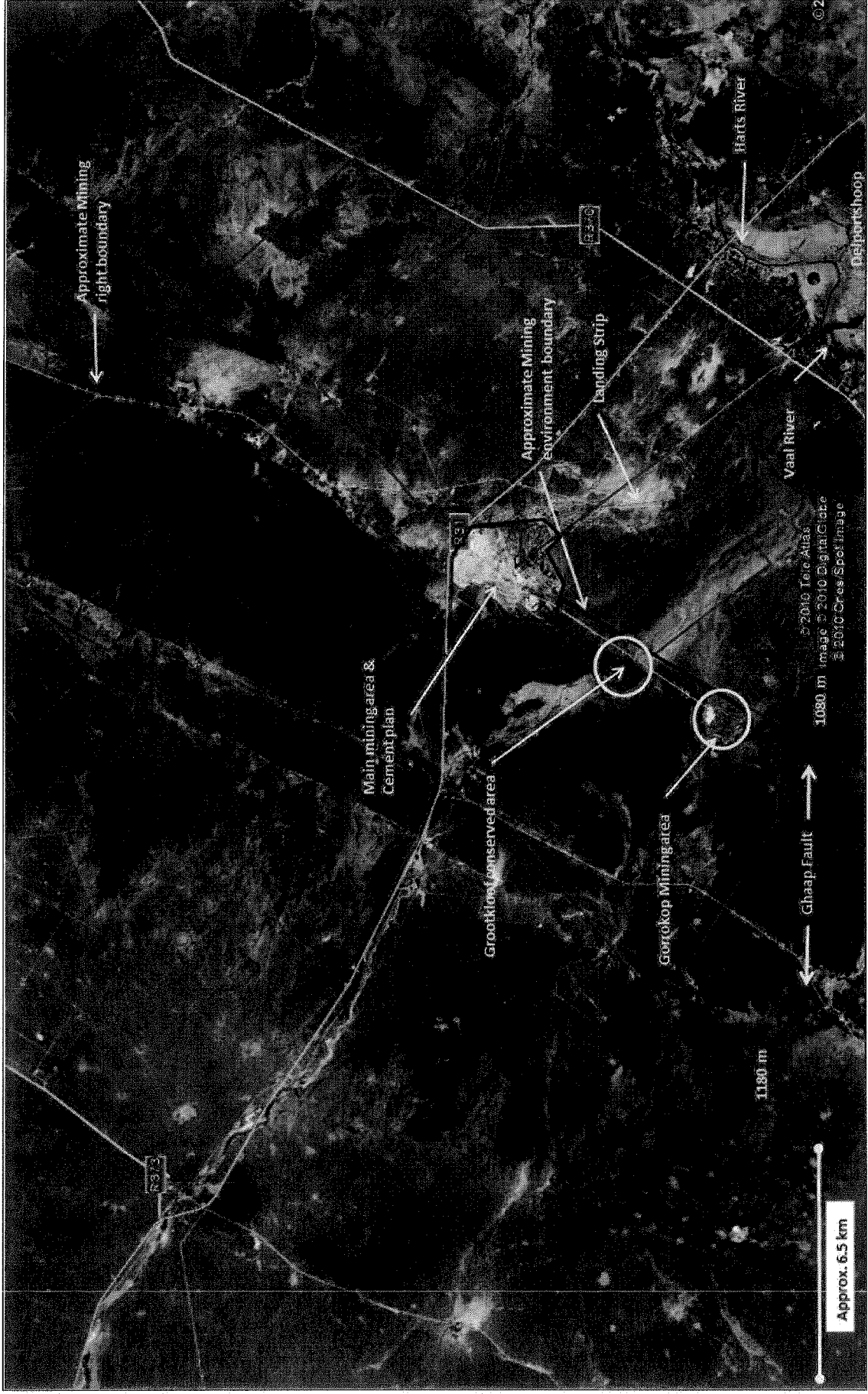


Figure 2: Indication of the Mining right area v the Mining Environment Area.



Figure 3: Indication of the areas associated with the main disturbed area associated with the Ulco mine.

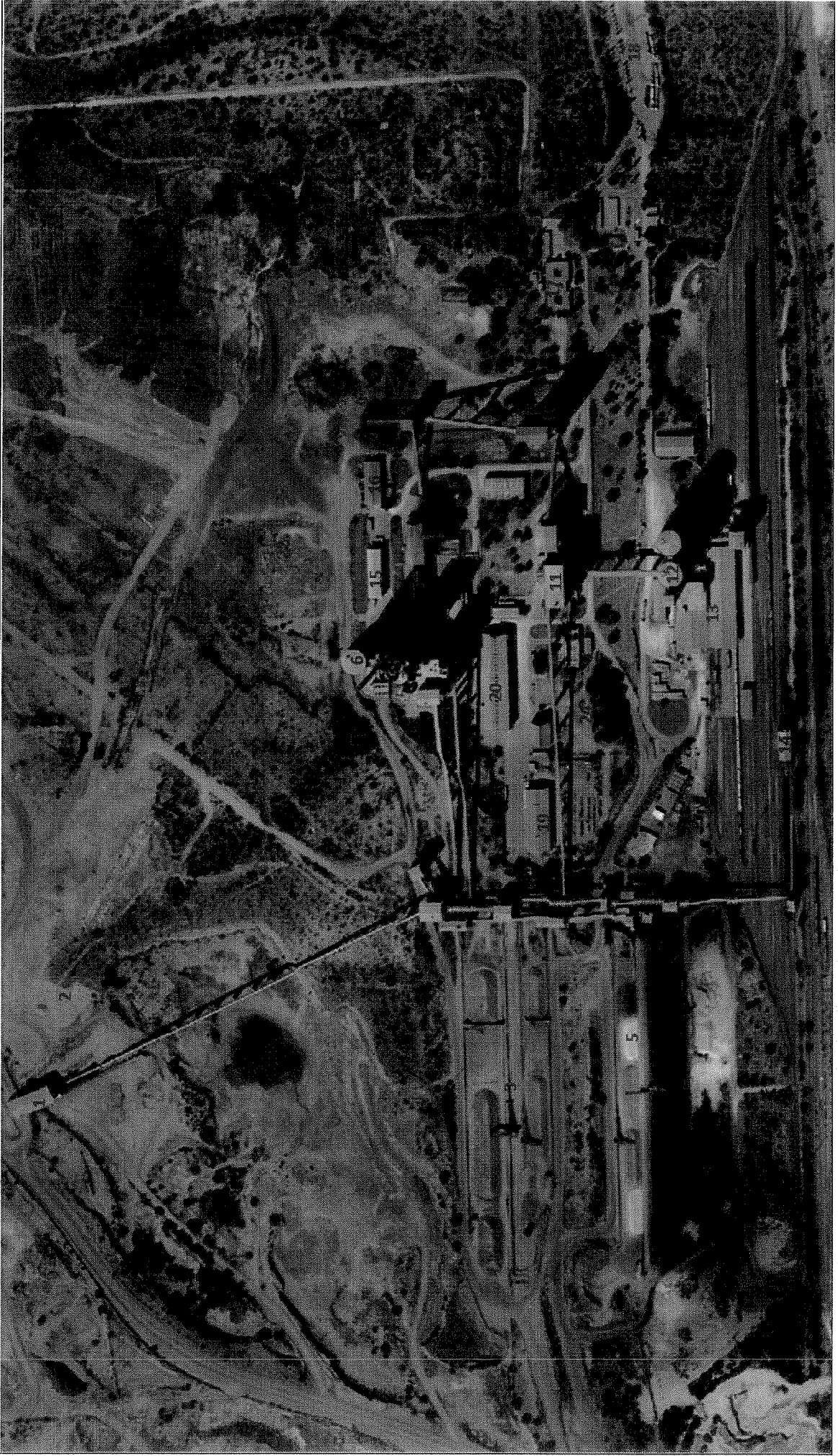


Figure 4: Indication of structures associated with the existing plant.

## 1.2 BACKGROUND INFORMATION TO THE CURRENT MINING ACTIVITIES:

In July 2010, the extent of disturbance resulting from historic mining activities is approximately 460 hectares.

The following minerals are being mined at Ulco through open cast mining activities:

- Primary and secondary limestone,
- Shale and Dolerite.

The following additional minerals must be transported to the site for successful manufacturing of the product (cement).

- Iron ore,
- Coal, and
- Gypsum.

- **Mining activities:**

Primary and secondary limestone is mined in multi-bench open cast quarries using modern drilling and blasting techniques. The chemical composition of the limestone throughout the quarry area is known. Limestone is then mined in such a way so as to ensure that the correct chemical composition of limestone is stockpiled, resulting in the correct quality of the final product. The limestone is crushed to less than 75 mm and transferred from the primary crusher via a conveyor and stacked onto homogenising limestone stockpiles.

- **Raw milling:**

Depending on the chemical composition of the limestone, additives of iron ore, shale and / or dolerite are added to the milling process to obtain the correct chemical composition. The limestone, iron ore, shale and / or dolerite are milled until they are fine enough to be conveyed by air to a homogenising raw meal silo.

- **Clinker production:**

The raw meal is transported to the cyclone pre-heater where the temperature of the material is raised to 900°C by the time the material passes through the calciner. In the calciner, limestone (predominantly  $\text{CaCO}_3$ ) breaks down and releases carbon dioxide ( $\text{CO}_2$ ),  $\text{CaCO}_3 + \text{heat} \rightarrow \text{CaO} + \text{CO}_2$ .

The heated material is then passed through the coal fired rotating kiln, where the temperature is raised to 1 400°C. At this temperature, various minerals start to fuse together to form calcium silicate crystals, known as clinker. This semi molten material is cooled as rapidly as possible in a cooler and stored either in the clinker silo or on the open-air stockpile.

- **Cement Milling:**

Clinker, gypsum and additives are combined in the two cement ball mills (rotating tubes filled with steel balls). The amount of gypsum added to the cement alters the cements setting time, with the settling time increasing with the increase in gypsum. The purpose of the additives included at this stage is to reduce the clinker factor of the final product, thereby reducing the  $\text{CO}_2$  emissions per ton of cement produced. Once milled, the cement is stored in homogenising silos to obtain the most consistent products possible.

- **Packing and dispatch:**

Depending on the requirements of the customer the final cement is either loaded into road or rail bulk tankers, or is packet in 50kg bags and palletized. The palletized material is wrapped in plastic to prevent moisture contamination of the cement.

The supporting infrastructure required to ensure the successful manufacturing of cement includes:

- Storerooms
- Workshops
- Quality assurance laboratory
- Administration offices
- Railway lines and sidings
- Security structures
- Waste dump
- Housing and recreational areas
- Sewage plant
- Water purification plant



## 2 CALCULATING FINANCIAL PROVISION

51(b)(v) Financial provision in relation to the execution of the environmental management programme which must include:

- (aa) the determination of the quantum of the financial provision contemplated in Regulation 54; and  
(bb) details of the method providing for financial provision contemplated in Regulation 53.

54(1) The quantum of the financial provision as determined in a guideline document published by the department from time to time, include a detailed itemisation of the actual costs.:

In order to calculate the Financial Provision for the operation, the author referred to the DMR **“Guideline Document for the Evaluation of the Quantum of Closure Related Financial Provision Provided by a Mine”**, Revision 1.6, published in January 2005, (DMR, 2005). The author has opted to calculate financial provision using the “Rules-based” assessment.

The guideline document is based on determining the amount of infrastructure and areas of disturbance within the mine, and then allocating the areas to a defined component as documented within the guideline document. **Table 1** below provides an indication and explanation of the components used by Umhlaba to undertake the financial calculation. An additional component has been added in order to more accurately calculate the final value.

**Table 1: Components used in the calculation of financial provision.**

COMPONENT AS PER GUIDELINE	EXPLANATION
1. Dismantling of processing plant and related structures (including overland conveyors and power lines)	This will include; <ul style="list-style-type: none"> <li>Processing plants associated with the mining</li> <li>The conveyors</li> <li>The transfer stations associated with the conveyors</li> </ul>
2A. Demolition of steel buildings and structures	This will include; <ul style="list-style-type: none"> <li>All steel buildings associated with the crusher and the plant such as workshops and stores.</li> </ul>
2B. Demolition of reinforced concrete buildings and structures	This includes: <ul style="list-style-type: none"> <li>All silos</li> <li>Reinforced concrete structures associated with the crusher and the cement plant.</li> </ul>
3. Rehabilitation of access roads	The only access road at Ulco is the one from Ulco to Gorrokokop. All other haul roads are within areas of general disturbance and rehabilitated in accordance to general disturbance requirements.
4A. Demolition and rehabilitation of electrified railway lines	Not applicable for Ulco
4B. Demolition and rehabilitation of non-electrified railway lines	This includes the private railway siding at Ulco.
5. Demolition of housing and/or administration facilities	This includes all administration buildings associated with the mining area and the plant.
6. Opencast rehabilitation including final voids and ramps	Where sloping is required as a result of mining activities, it has been allocated this component. Due to the nature of the topography and the manner in which mining is conducted not all mining areas are allocated this component. Where no sloping is required the area has been allocated to general surface rehabilitation.
7. Sealing of shafts adits and inclines	Not applicable for Ulco
8A. Rehabilitation of overburden and spoils	Not applicable for Ulco. As and when small amounts of overburden are generated, it is use immediately in concurrent rehabilitation.
8B. Rehabilitation of processing waste deposits and evaporation ponds.	Not applicable for Ulco
8C. Rehabilitation of processing waste deposits and evaporation ponds (polluting potential)	Not applicable for Ulco

COMPONENT AS PER GUIDELINE	EXPLANATION
9. Rehabilitation of subsided areas	Not applicable for Ulco
10.A General surface rehabilitation – Remnants of infrastructure and undesirable objects	<p><i>“The Master rate allows for the shaping of material to a depth/thickness of about 500 mm. An extra over allowance in the unit cost of 50 percent has been made to cover the removal and/or destruction of surface infrastructure remnants and/or other undesirable objects such as trees, foundations, concrete slabs, etc”</i></p> <p>As and when there are general areas which also require the removal of remnants of infrastructure this component has been allocated.</p>
10.B General surface rehabilitation – No surface infrastructure / remnants of undesirable objects	<p>In all the general surface rehabilitation areas where there is no surface infrastructure or other undesirable objects that would require removing, such as the quarries which do not require sloping, the master rate used by Ulco excludes the additional 50% increase.</p> <p>This component will also be allocated to areas requiring revegetation only.</p>
11. River diversions	Not applicable for Ulco
12. Fencing	Not applicable for Ulco – Once rehabilitated non fencing will be required.
13. Water management	Not applicable for Ulco. There will be no long term sources of pollution associated with the mine. Once rehabilitation is complete, there will be no water management requirements.
14. 2 to 3 years of maintenance and aftercare	The whole of the historically disturbed area (460 hectares) will require maintenance and aftercare.

### 3 PRESENT DAY CLOSURE OPTIONS:

It is important to appreciate that Ulco has a life of mine of approximately 30 years within its current mining environment. This life of mine can be extended through the implementation of mining activities to the north of the R31. Hence there could potentially be limestone reserves to sustain Ulco for over 100 years.

Due to the long life of mine remaining, no detailed closure planning has been completed. The information provided below is based on the highly unlikely scenario that the mine closes immediately. It represents the closure thought process of 2010.

Before mining took place, the land was suitable for low intensity grazing. Due to the rural location of the site, much of the surrounding land is undisturbed and represents what Ulco would have looked like if it were not for the mining operation.

Ulco will close the mine whereby all infrastructure and basic services that have been developed by the mine, which will continue to be of benefit to the local / provincial community after the mine has closed, will be left. All buildings / infrastructures that have been determined as having no socio-economic benefit after the life of the mine will be demolished and the rubble buried in old excavations within the mining area.

The aim for all disturbed land created as a result of the Ulco operations will be to rehabilitate the land back to a state to where it blends in with the surrounding land (grazing land) and is acceptable to all relevant interested and affected parties.

This overall closure of Ulco mining operation will be achieved by implementing the following general closure objectives:

- Removing all buildings that have no socio-economic use after the life of the mine. In 2010 this includes all building associated directly with mining and processing activities. During the life of the mine, all decommissioned mine buildings will be removed. Until they are removed, the cost of such removal will be catered for within the financial provisions, for the mine. Buildings will be stripped of salvageable material then demolished, and the rubble will be buried within depressions within the

mining area, such as the old quarry and the subsided area. All concrete foundations will be broken up and buried under at least 500mm of overburden / topsoil.

- All buildings that have been identified as having socio-economic benefit will be left in accordance to Section 44 of the Minerals and Petroleum Resources Development Act. In 2010, this includes all the buildings and infrastructure which constitutes the Ulco village and all staff houses. The services which support the village will also be retained. This includes a sewage works, potable water purifying plant and reticulation system, roads, shops, schools, clinics, sports facilities, airstrip and electrical sub stations.
- Sloping of final benches within the quarries will first and foremost consider safety risks. After satisfying the safety risk, consideration will be given to a number of other factors which include:
  - Aesthetics & creating habitats for fauna and flora
  - Resembling the natural topography of the greater area giving specific consideration to the Ghaap fault.
  - Indigenous grass and trees will be planted in all disturbed areas. A limiting factor of encouraging grass to grow over the disturbed area is the lack of topsoil. Recent experiments of the Harrison area have proved it possible to grow grass by contouring with foliage without any additional topsoil.
  - Erosion will be managed by establishing drainage channels.
  - All alien vegetation will be removed on site and a management plan will be implemented to ensure the continued eradication of alien vegetation.

The socio-economic impacts of mine closure will be dealt with in the social and labour plan for the mine. As the mine draws closer to closure, emphasis will be placed on the following socio-economic initiatives:

- Training & Multi-skilling workforce
- Where possible relocating employees to other AfriSam operations
- Working with local authorities to promote alternative job creation schemes
- Providing advice on alternative professions
- Setting up financial assistance for sustainable projects

### 3.1 CLOSURE REQUIREMENTS PER AREA

Below is a description of the closure requirements for each defined area for Ulco as demarcated in **Figures 2, 3 & 4** above. It has been broken up into current day liability and future liability. Future liability takes into account the concurrent rehabilitation commitments that will take place during the **next 5 years** of the operation.

For each of the identified rehabilitation requirements, they have been allocated the number of the applicable component as described in **Table 1** above. For example, for the removal of steel structure around the crusher, it has been preceded with a **2A**. The areas assigned to each component are then used in **Section 4** when undertaking the calculation.

The size of areas has been obtained by making use of digitised mine plans from 2009, and using autocad computer package to calculate the relevant areas. This process was completed with the assistance with the AfriSam head office personnel. A copy of the mine plan used for the determining of the areas has been provided in **Appendix 1**.

It must be stressed that the areas provided are estimations to within a 10% accuracy.

It is the information provided below which is used to populate the spread sheet to determine financial provision requirements in Section 4.

#### **1. Intended areas to be left intact at the end of life of mine:**

The following areas / infrastructure is deemed to have a potential positive socio-economic benefit and will therefore be maintained during the life of the mine with the understanding at the end of the life of mine they will remain for the benefit of future use. No financial provision allocation will be provided for these areas;

- Ulco villages – The houses, road network, associated shops, schools, clinic and sports and recreational facilities of the Ulco villages will be left intact at the end of life of mine.
- Services that support the village – This includes the sewage plant and associated sewage pipelines, the water purification plant and associated pipelines, the electrical transmission network and associated sub stations and the airstrip.

- The railway line to Ulco. The rail siding area for the cement plant activities will be demolished.
- Grootkloof conserved area – This will remain a conserved area beyond the closure of the mine.

Any area that falls outside the mining environment (physical area which has been disturbed by the mining and cement production activities) of Ulco but within the mining right area will not be subjected to financial provision allocation by Ulco.

**2. Gorrokop Mining Area:**

This limestone quarry is located approximately 5.4 km South of the main mine and extends over approximately 35 hectares. It was previously mined for its high grade limestone. There is no infrastructure at this quarry and currently no active mining is taking place. The area has been fenced off and left in a dormant safe state. Due to the distance of the quarry to the cement plant it will not be economically viable to recommence mining activities.



**Photograph 1: Gorrokop Mining Area – February 2010**

**Overall closure goal:** The haul road to the mining area will need to be ripped. The current disturbance will need to be shaped to blend in with the surrounding landscape. This can be achieved through blasting and shaping with a bulldozer. The final slopes along the Ghaap fault should be similar to the natural landscape. Once slopes the area can be left to natural re-establish indigenous vegetation

**Concurrent Rehabilitation Commitment:**

YEAR	REHABILITATION PLAN
2010	<ul style="list-style-type: none"> <li>▪ Undertake a detailed site visit to finalise rehabilitation requirements</li> <li>▪ Obtain a surveyed plan of the current status of the site. This plan will require contours to a 0.5m definition.</li> </ul>
2011	<ul style="list-style-type: none"> <li>▪ Develop a closure tender document which details the closure requirements for contractors to tender on. This should include cut and fill volumes as determined from the surveyed plan.</li> <li>▪ Obtain quotations from contractors to undertake the shaping exercise.</li> <li>▪ Approve tender</li> </ul>
2012	<ul style="list-style-type: none"> <li>▪ Implement closure activities as detailed within the tender document.</li> </ul>
2012 – onwards	<ul style="list-style-type: none"> <li>▪ Implement monitoring to ensure that site remains free of erosion and alien vegetation establishment</li> </ul>

- **Current closure liability:**
  - 6. To shape and slope an area of approximately 15 hectares
  - 10.B. To revegetate an additional area of approximately 20 hectares
  - 3. To rip and rehabilitation approximately 108 000m<sup>2</sup> of haul road
- **Future liability:**
  - None

**3. Grootkloof Conserved area:**

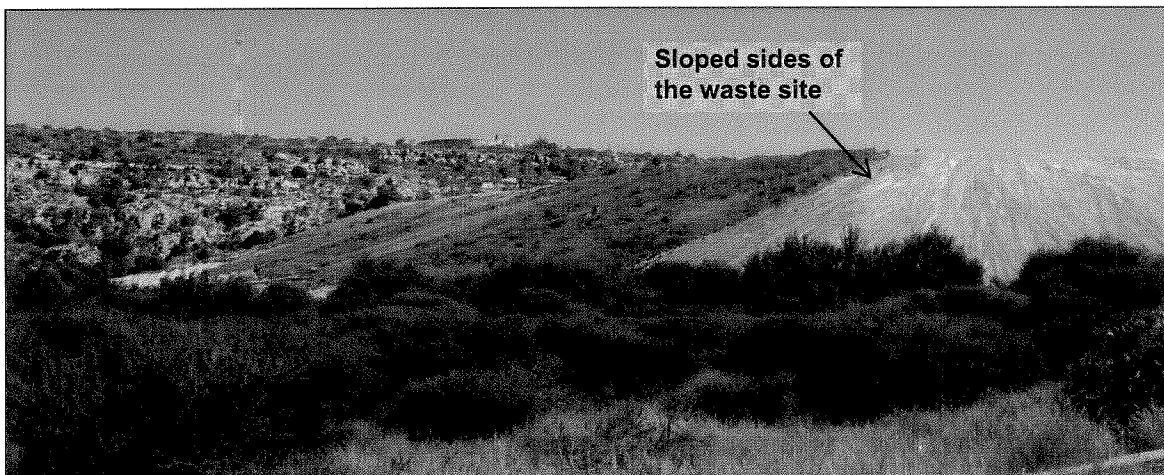
This area is a 70 hectare piece of land which has been demarcated as a protected area by the mine. It has not been impacted by past mining activities.

**Overall closure goal:** This area will remain a nature reserve and be protected by Ulco. To ensure its pristine environment is not threatened it will be managed for the removal of alien vegetation and to ensure erosion is controlled.

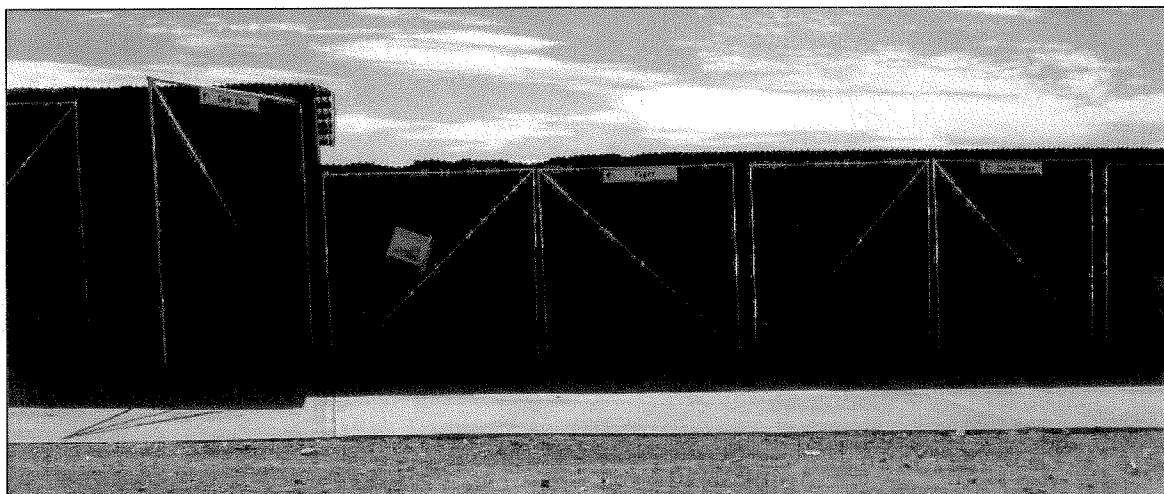
- **Current and future closure liability:**
  - None

**4. Waste disposal site:**

The waste disposal site is legalised through a waste disposal license. This site is actively used for the disposal of domestic waste that cannot be recycled. Recyclable material will be temporarily stored within the recycle centre before been dispatched from site. The area has been sloped and is in the process of being revegetated. Some areas still require revegetation.



**Photograph 2: Rehabilitation – June 2006**



**Photograph 3: Recycling centre – June 2006**

**Overall closure goal:** The waste disposal will represent a re-vegetated small hill which blends in with the greater natural topography of the area. The hill will have slopes which can support natural vegetation growth and do not suffer from erosion.

**Concurrent rehabilitation commitment:** To continue to revegetate the slopes of the waste dump site by disposing of garden refuse down the sides of the waste dump.

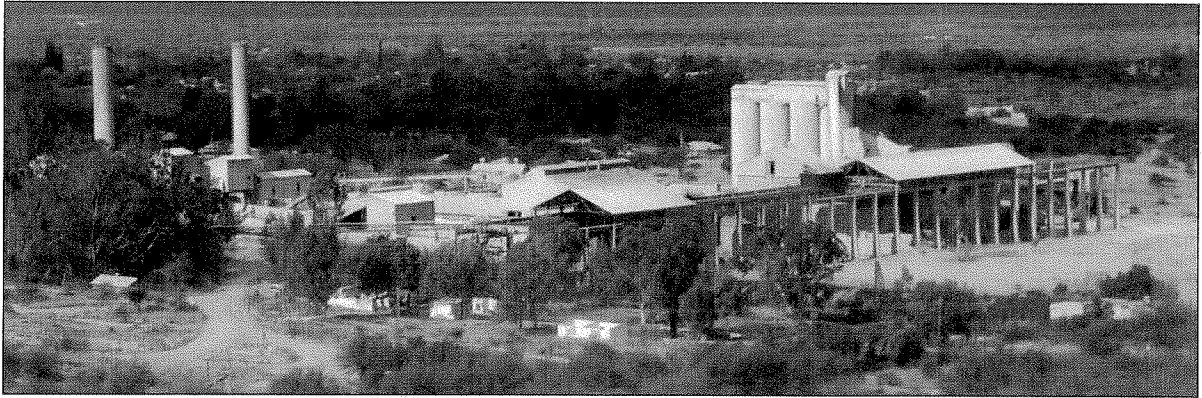
- **Current closure liability:**

The area is already sloped and hence in to achieve the closure objective,

- 2.A. The recycling centre will require removal - steel structure of 217m<sup>2</sup>
- 10.B. Approximately 5.7 hectares will require re-vegetation
  
- **Future liability:**
  - 2.A. The recycling centre will require removal - steel structure of 217m<sup>2</sup>
  - 10.B. Approximately 5 hectares will require re-vegetation

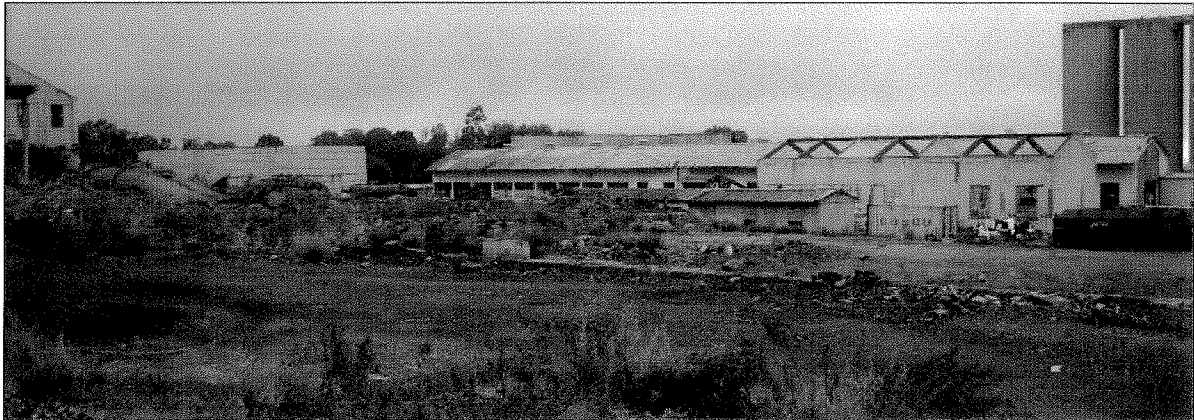
**5. Decommissioned Plant:**

The old plant is in the process of being dismantled and removed (see photographic evidence below). This process began in 2006. All salvageable material has been removed. The final removal of the remaining infrastructure on site has been delayed until the vehicle workshop can be moved to its future location adjacent to the stores. This will be completed in 2010.



**Photograph 4: Old plant – May 2004**





**Photograph 5: Old plant – January 2010**

**Overall closure goal:** Remove all remaining salvageable infrastructure and equipment and demolish remaining infrastructure. Rubble generated is to be buried in existing excavations within the mining area. The old plant footprint will be re-vegetated so as to provide grass and tree species which are ideal for grazing either by cattle or game.

**Concurrent Rehabilitation Commitment:**

YEAR	REHABILITATION PLAN
2010 - 2012	<ul style="list-style-type: none"> <li>▪ Continue with the removal of concrete infrastructure.</li> <li>▪ All material with a salvage value to be sold</li> <li>▪ All inert material to be buried within either the subsided / slough area or the old quarry</li> <li>▪ All waste to be disposed of as per waste management plan</li> </ul>
2013 – 2014	<ul style="list-style-type: none"> <li>▪ Using an old site layout plan, all areas which hazardous material such as oils or diesel stores must be noted.</li> <li>▪ Conduct soil sampling and water sampling for signs of historic pollution in all areas where there potential could be signs of historic pollution</li> <li>▪ Areas where historic pollution is noted will be cleaned / rehabilitated in the appropriate manner.</li> </ul>
2015	<ul style="list-style-type: none"> <li>▪ Implement a revegetation programme over the flattened area.</li> <li>▪ Implement monitoring programmes</li> </ul>

• **Current closure liability:**

- 2.B. Breakdown the remaining concrete structure on site –
- 4 x silos of  $70.77\text{m}^2 = 285\text{m}^2$
- 8 x silos of  $66.5\text{m}^2 = 532\text{m}^2$
- 1 x silo of  $1963\text{m}^2$
- 1 x silo of  $427\text{m}^2$
- 1 x silo of  $322\text{m}^2$
- Total of concrete structures in old plant =  $3529\text{m}^2$
  
- 10.A. Implement general surface rehabilitation over the flattened area of 23 hectares

• **Future liability:**

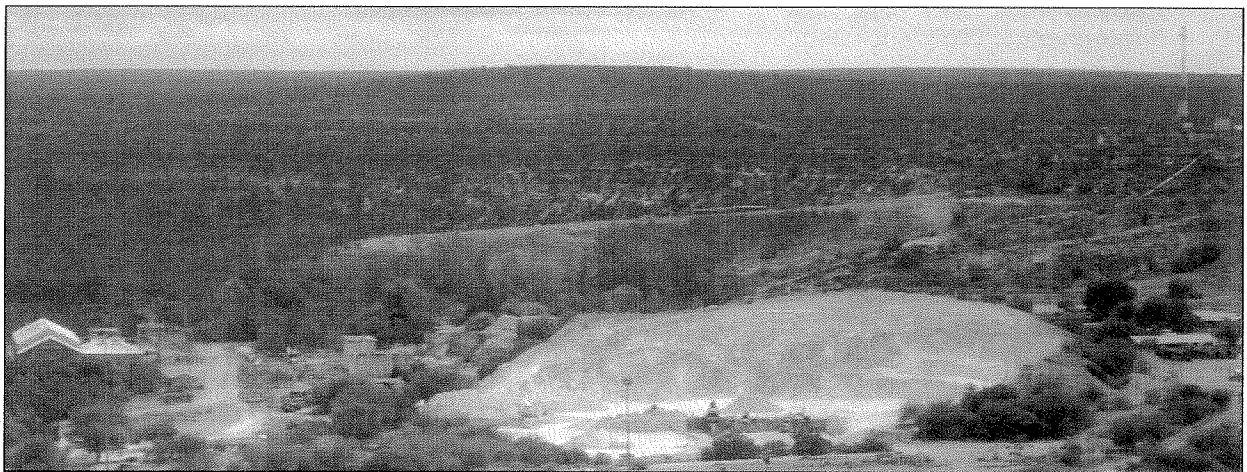
- None

**6. SAQ Dump:**

The SAQ dump was initially regarded as a waste product to the mine, however through research and innovative ideas Ulco identified the dumps potential to be sold as agriculture lime to the farming industry. The volume of the dump in 2004 was surveyed as been  $440\,665\text{m}^3$  in February 2010 this had been reduced to  $324\,145\text{m}^3$ . Based on the historic removal rate the dump will be fully removed by 2025.



Photograph 6: SAQ Dump – May 2004



Photograph 7: SAQ Dump – January 2010

**Overall closure goal:** The goal is to remove the SAQ dump to return the land back to flat land. Once the natural topography has been re-established the land will be scarified and re-vegetated with a variety of grass and tree species which would support grazing for cattle and game.

**Concurrent Rehabilitation commitment:**

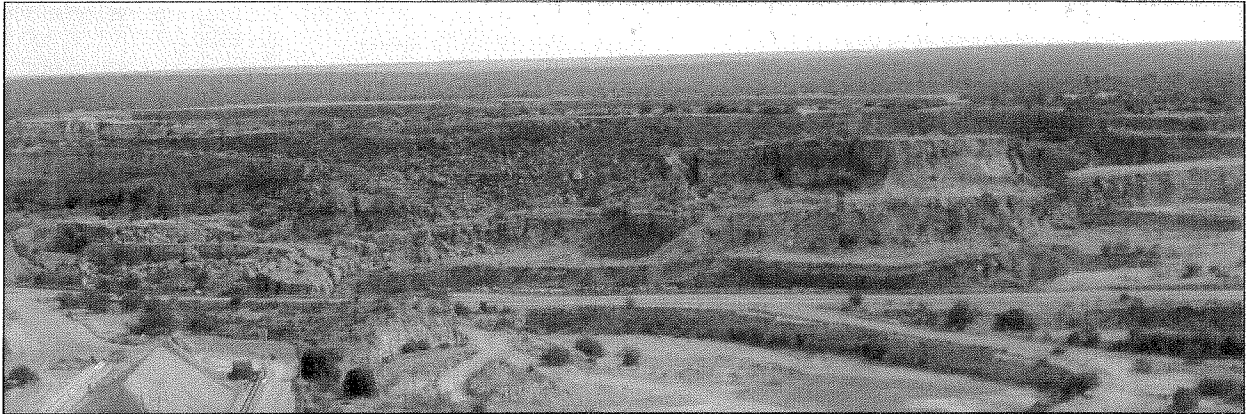
YEAR	REHABILITATION PLAN
2010 – 2015	<ul style="list-style-type: none"> <li>▪ Continue with the removal of the dump.</li> </ul>

- **Current closure liability:** If mining ceased, the dump remaining would be sloped and vegetated. Hence the current liability includes
  - **10.B.** Re-vegetation of an area of approximately 4 hectares
  - **1.** Removal of a small processing plant of approximately – 125m<sup>3</sup>
- **Future liability:**
  - **10.B** Within 5 years, a third of the dump would have been removed (based on historic removal rates) however, the full area would still require revegetation (4 hectares).
  - **1.** Removal of a small processing plant of approximately – 125m<sup>3</sup>

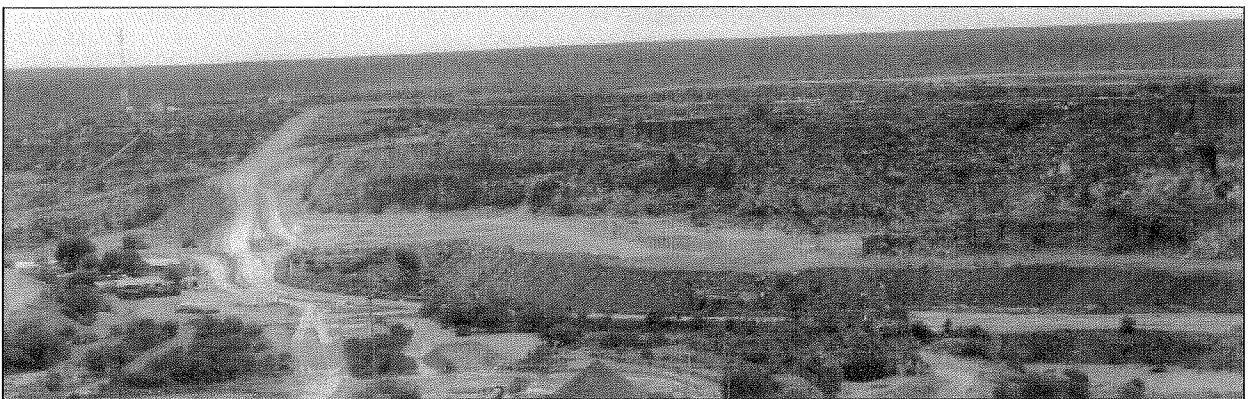
**7. Subsided area:**

Historic development of a quarry within the current subsided area resulted in a major slip of material rendering the area unsafe for ongoing mining operations. The slip occurred in 1992. Subsequent to the slip occurring, Ulco have stabilised the area through the backfilling of the quarry area with inert rubble and overburden. The area has been monitored for ongoing slippage with the last recorded movement taking place in 2004.





**Photograph 8: subsided area – May 2004**



**Photograph 9: Subsided area – February 2010**

**Overall closure goal:** To stabilise the subsided area with backfilling. Once stable the area is to be investigated into the possibility of implementing future mining. If future mining is possible this is to be indicated on the mine plans and implemented. If future mining is not possible, the area is to be sloped to blend in with the natural topography and re-vegetated with indigenous grass and tree species that could sustain grazing for either cattle or game.

***Concurrent rehabilitation plan:***

YEAR	SUBSIDED AREA REHABILITATION PLAN
2010 - 2011	<ul style="list-style-type: none"> <li>• Commission a geotechnical investigation into the feasibility of mining the subsided area.</li> <li>• Continue to refill the depression of the subsided area adjacent to the stockpiles. Refilling to take place using inert rubble and overburden.</li> </ul>
2012 - 2014	<ul style="list-style-type: none"> <li>• If geotechnical investigation is positive, include the mining of this area on the mine plans and commence with mining activities.</li> <li>• If the geotechnical investigation is negative, slope and profile the high walls to blend in with the surrounding topography</li> <li>• Continue refilling the depression until level with the haul road adjacent to the stockpiles.</li> </ul>

- ***Current closure liability:*** If mining ceased, the area would need to be sloped and vegetated. Hence the current liability includes
  - **6.** Sloping and rehabilitation of existing disturbance – similar to that required of an open cast quarry, the area of current disturbance is 22.1 hectares
- ***Future liability:***
  - **10.B.** If the geotechnical report provides positive results with regard to the safe mining of the area. The subsided area will be mined away and the remaining area will require general revegetation. – 22.1 hectares of general revegetation.

**8. Primary quarry:**

Primary limestone is extracted from this quarry to act as one of the raw materials used for cement production. In 2010 the extent of the primary quarry is approximately 28 hectares.

**Overall closure goal:** To mine in a manner where the primary quarry does not resemble a hole in the ground rather forms an escarpment similar to that of the Ghaap plateau.

**Concurrent rehabilitation plan:**

YEAR	PRIMARY QUARRY REHABILITATION PLAN
2010 - 2015	<ul style="list-style-type: none"> <li>On going mining activities in accordance to the mine plans</li> </ul>
2010 - 2011	<ul style="list-style-type: none"> <li>Commission a geotechnical report to investigate the feasibility of mining the subsided area through to the primary quarry. If possible, amend the mine plans to indicate the new long term design of the primary quarry.</li> </ul>

- Current closure liability:** If mining ceased, the current quarry would need to be sloped and vegetated. Hence the current liability includes
  - 6. Sloping and rehabilitation of existing disturbance – similar to that required of an open cast quarry, the area of current disturbance is 28 hectares
- Future liability:**
  - If the geotechnical report provides positive results with regard to the safe mining of the subsided area. The subsided area will be mined away into the primary quarry leaving one face along the Ghaap plateau and not a hole in the ground, hence the amount of sloping will be reduced and the amount of general revegetation would increase.
  - 6. 10 hectares of sloping similar to that required for open cast operations and
  - 10.B 18 hectares of general revegetation.

**9. Secondary limestone & Dolorite quarry:**

The secondary and dolorite quarries represent the largest area of disturbance on the mine (+/- 189 hectares). These quarries are all active and are the source of the raw material for the ongoing production of cement. It is within the secondary quarry where the infrastructure associated with the mine is located (crusher, administration facilities, explosive magazines, oil store, diesel tanks etc)

**Overall closure goal:** At the end of life of mine the secondary quarry will be shaped to allow free flow of water, covered with available topsoil and vegetate with indigenous vegetation. The external benches will be sloped to an angle of repose and shaped. These external benches will be blended in with the natural topography. All mining related infrastructure will be broken down and removed.

**Concurrent rehabilitation plan:**

YEAR	SECONDARY QUARRY REHABILITATION PLAN
2010 - 2015	<ul style="list-style-type: none"> <li>On going mining activities in accordance to the mine plans</li> </ul>
2010 - 2015	<ul style="list-style-type: none"> <li>Sloping (to angle of repose, 35° - 40°) of final benches on the exterior of the mining area (adjacent to the R31 – 100m away from the pipeline running adjacent to the road). See <b>Figure 3</b> for an indication of the final benches that will be shaped in the following 5 years.</li> <li>Once sloped the benches will be shaped</li> <li>Covering final shaped slopes with topsoil and vegetation</li> </ul>

- Current closure liability:** If mining ceased, the current quarry would need to be sloped and vegetated. Hence the current liability includes
  - 6. Sloping and rehabilitation of existing disturbance – similar to that required of an open cast quarry, the area of current disturbance is 66 hectares
  - 10.B. General rehabilitation of disturbed area which does not require sloping to the extent of approximately 121 hectares. This includes all internal haul roads

**1. Demolition of processing plant and related structures**

- The conveyor to the stockpiles - 822.5m<sup>2</sup>

**2A. Demolition of steel buildings and structures**

- The crusher house - 976m<sup>2</sup>
- The vehicle parking garage – 249m<sup>2</sup>
- Total area of steel buildings - 1225 m<sup>2</sup>

**2B.** Demolition of reinforced concrete buildings and structures. The following aspects of the crushing plant has reinforced concrete:

- Crusher structures - 976m<sup>2</sup>
- Explosive magazines – 109 m<sup>2</sup>
- Screen bases and conveyor support structures - 822m<sup>2</sup>
- Total area of concrete approximately - 1907m<sup>2</sup>

Demolition of the following administration buildings

- **5.** The quarry offices and associated buildings - 460m<sup>2</sup>

Around the administration building there is an area of approximately 4 hectares that would be subjected to general surface rehabilitation requirements outside of the rehabilitation of the main mining area.

- **10.A** The general surface rehabilitation - 4 hectares

- **Future liability:**

- In 5 years there will be no change between current liability and future liability. Although some slopes will be rehabilitated, new slopes will be generated during the next 5 years.

**10. Old quarry:**

The old quarry area resulted from historic mining activities and represents an area of 15 hectares. Currently water falling within the secondary limestone mining area is directed into this quarry and the sides of the quarry are been sloped with inert rubble and overburden generated during the mining activities.

**Overall closure goal:** The old quarry will represent a natural depression within the mining area where runoff can be directed. The sides will be sloped and it will for a wetland / pan for future use.

**Concurrent rehabilitation plan:**

YEAR	OLD QUARRY REHABILITATION PLAN
2010 - 2015	<ul style="list-style-type: none"> <li>• On going backfilling of the final benches to generate a safe slope as and when either overburden or inert rubble is available.</li> </ul>

- **Current closure liability:** If mining ceased, the current sides of the quarry would need to be sloped and vegetated. Hence the current liability includes

- **6.** Sloping and rehabilitation of existing disturbance – similar to that required of an open cast quarry, the area of current disturbance requiring sloping is 15 hectares

- **Future liability:**

- **6.** During the life of the mine, the current final faces of the old quarry are slowly being sloped with the backfilling of inert rubble hence in 5 years it is anticipated that the amount of area requiring sloping would have reduced to 10 hectares.
- **10.B** The sloped 5 hectares would require revegetation.

**11. Stockpile Area:**

The stockpile area covers an area of approximately 17.6 hectares, which includes haul roads adjacent to the stockpiles. Stockpiles are an integral part of the cement production.

**Overall closure goal:** At the end of life of mine the stockpiles will be removed, all infrastructures associated with the stockpiles will be dismantled and removed. Once the natural topography is exposed, the area will be ripped, covered with available topsoil and vegetated.

**Concurrent rehabilitation plan:**

No concurrent rehabilitation is possible over the stockpiles as they are an integral part of day to day cement production.

- **Current and future closure liability:** If Ulco stopped cement production the stockpiles would not be required. It is assumed that the stockpiles would be processed prior to stopping cement production hence in terms of rehabilitation it would require the removal of the infrastructure and the revegetation of the site.

1. Demolition of conveyors and steel structures
  - 1. The stacker and reclaimers and the conveyors associated with the stockpiles –4298 m<sup>2</sup>
  - 10.A. General rehabilitation of the stockpile area – 17.6 hectares

## 12. Cement Plant Area:

The cement plant area covers an area of approximately 37.3 hectares and contained the infrastructure required to take the raw materials and generate cement for dispatch. See **Figure 4** for an indication of the buildings and infrastructure associated with the plant.

**Overall closure goal:** At the end of life of mine the Cement plant and associated infrastructure will be demolished and the area will be scarified and rehabilitated and revegetated. Concrete rubble will be buried within a depression within the mining area.

### *Concurrent rehabilitation plan:*

Efforts to reduce the amount of exposed area within the cement plant will be implemented during the life of the mine. This will be achieved by vegetating bare surfaces. However this concurrent rehabilitation will have no bearing on the cost of both current and future rehabilitation liability associated with the plant.

- **Current and future closure liability:** If Ulco stopped cement production the closure goal would have to be achieved. The table below provides a categorisation of the various buildings within the cement plant (See **Figure 4**) into closure components and provides an indication of the area of each component.

BUILDING / INFRASTRUCTURE	FP ALLOCATION	AREA / EXTENT
Transfer stations / proportioning plant / conveyors	1	7834 m <sup>2</sup>
Raw Mill Area	2.B	2037.9 m <sup>2</sup>
Coal mill structure	2.B	450.8 m <sup>2</sup>
Raw Meal Silo	2.B	538.1 m <sup>2</sup>
Pre heater tower	2.A	513 m <sup>2</sup>
Kiln	2.A	315.3 m <sup>2</sup>
Cooling tower area	2.A	2199 m <sup>2</sup>
Conveyor to clinker silo and open air clinker dispatch	2.B	1249 m <sup>2</sup>
Clinker Silo	2.B	835.4 m <sup>2</sup>
Cement Mill structure	2.B	2384.2 m <sup>2</sup>
Conveyor to cement silo's	1	612.4 m <sup>2</sup>
Cement silos	2.B	1203 m <sup>2</sup>
Packaging plant	2.A	7768.9 m <sup>2</sup>
Electrical Sub-stations	2.A	2294 m <sup>2</sup>
Pallet recovery yard	2.A	685 m <sup>2</sup>
Railway lines & siding	4.B	24 000 m
Tippler	2.A	405.2 m <sup>2</sup>
Administration offices	5	1442.4 m <sup>2</sup>
Process control room and Quality assurance Laboratory	2.A	628.2 m <sup>2</sup>
Stores sheds	2.A	4240 m <sup>2</sup>
Crane workshop	2.A	456.6 m <sup>2</sup>
Maintenance workshops	2.A	2718.4 m <sup>2</sup>
Security control area	5	277 m <sup>2</sup>
General Rehabilitation of the whole area.	10.A	37.3 Hectares

The table below provides a summary of the areas within the cement plant allocated to the various components associated with the financial provision requirements.

COMPONENT INCLUDED IN CALCULATION	TOTAL AREA OF DISTURBANCE WITHIN THE CEMENT PLANT
1	8446 m <sup>3</sup>
2.A	22 224 m <sup>3</sup>
2.B	8699 m <sup>2</sup>
4.B	24 000 m
5	1718 m <sup>2</sup>
10.A	37.3 Hectares

#### 4 COSTING OF FINANCIAL PROVISION

In order to calculate the Financial Provision for the operation, the author referred to the DMR "**Guideline Document for the Evaluation of the Quantum of Closure Related Financial Provision Provided by a Mine**", Revision 1.6, published in January 2005, (DMR, 2005). This is the latest guideline document available on the DMR website. The author has opted to calculate financial provision using the "Rules-based" assessment.

The following costing has provided 2 scenarios, namely, the present day closure cost in July 2010 and the future closure (closure costs in July 2015) based on the presumption that the concurrent rehabilitation commitments described are adhered to and implemented.

##### 4.1 MULTIPLICATION AND WEIGHTING FACTORS:

A summary of the multiplication and weighting factors used in calculating the financial quantum, are summarised below:

###### *Risk Class and primary material/saleable by product:*

The operation is a cement limestone mine with a cement plant. According to **Table B.12** of the guideline (DMR, 2005), cement limestone mine is classified as a **Primary Risk Class B (Medium risk)**

###### *Area sensitivity*

- Biophysical: **Medium**

Reasons: The surrounding area is best described as a mixture of natural and exotic fauna and flora. The area is a mix of both disturbed and undisturbed area.

- Social: **Low**

Reasons: The local community are not within sighting distance of the mining operation and the surrounding area is lightly inhabited.

- Economic: **Medium**

Reason: The area has a balanced economic development where a degree of income for the local communities is derived from the area and the economic activity could be influenced by indiscriminate development.

According to the guidelines (DMR, 2005), the most serious impact sets the overall impact for the site. In this case, the overall impact is considered **medium**.

###### *Weighting factor 1:*

- Nature of terrain: **Flat**

Reason: The natural lie of the land is flat.

###### *Weighting factor 2:*

- Proximity to urban area: **Peri-Urban**

Reason: The mine lies within 150km of Kimberly

##### 4.2 DEGREE OF DISTURBANCE REQUIRING REHABILITATION

In order to determine the closure costs, the degree of disturbance and / or size of the area affected have been assessed. This information was obtained from;

- Extensive use of the 28<sup>th</sup> September 2009 surveyed mine plan. Areas were obtained from the digitised mine plan using autocad. This was performed at AfriSam head office with the assistance of Annelizle Botha.

- A site visit from 19th to 22nd July 2010 to confirm extent of infrastructure.
- The generally accepted closure methods as presented within the DMR financial provision guideline document have been extensively referred to when determining the applicable costing.

**Table 2** provides an indication of the extent of disturbance based on October 2009. The motivation behind the allocating of areas included within the table are provided in Section 3 above.

**Table 2: Extent of disturbance that will require rehabilitation (July 2010)**

COMPONENT AS PER GUIDELINE	TOTAL EXTENT	MOTIVATION
1. Dismantling of processing plant and related structures (including overland conveyors and power lines)	13 691.5 m <sup>3</sup>	SAQ Dump plant - 125 m <sup>3</sup> Conveyor to stockpiles – 822.5 m <sup>3</sup> Stockpile area – 4298 m <sup>3</sup> Cement plant – 8446 m <sup>3</sup>
2A. Demolition of steel buildings and structures	23 666 m <sup>2</sup>	Recycling center – 217 m <sup>2</sup> Quarry – 1225 m <sup>2</sup> Cement Plant – 22 224 m <sup>2</sup>
2B. Demolition of reinforced concrete buildings and structures	14 135 m <sup>3</sup>	Old plant – 3529 m <sup>3</sup> Quarry – 1907 m <sup>3</sup> Cement Plant – 8699 m <sup>3</sup>
3. Rehabilitation of access roads	108 000 m <sup>2</sup>	Access road to Gorrkop – 5.4km long, average 20m wide.
4A. Demolition and rehabilitation of electrified railway lines	0	Not applicable for Ulco
4B. Demolition and rehabilitation of non-electrified railway lines	24 000 m	Railway lines associate with the cement plant
5. Demolition of housing and/or administration facilities	2178 m <sup>2</sup>	Quarry area – 460 m <sup>2</sup> Cement Plant – 1718 m <sup>2</sup>
6. Opencast rehabilitation including final voids and ramps	146.1 ha	Gorrokop – 15 Ha Subsided Area – 22.1 Ha Primary Quarry – 28 Ha Secondary Quarry – 66 Ha Old Quarry – 15 Ha
7. Sealing of shafts adits and inclines	0 m <sup>3</sup>	Not applicable for Ulco
8A. Rehabilitation of overburden and spoils	0 ha	Not applicable for Ulco
8B. Rehabilitation of processing waste deposits and evaporation ponds.	0 ha	Not applicable for Ulco
8C. Rehabilitation of processing waste deposits and evaporation ponds (polluting potential)	0 ha	Not applicable for Ulco
9. Rehabilitation of subsided areas	0	Not applicable for Ulco
10.A General surface rehabilitation (including remnants of infrastructure)	81.9 Ha	Old Plant – 23 Ha Quarry area – 4 Ha Stockpile area – 17.6 Ha Cement Plant – 37.3 Ha
10.B General surface rehabilitation (excluding remnants of infrastructure)	150.7 Ha	Gorrokop Area – 20 Ha Waste dump – 5.7 Ha SAQ dump area – 4 Ha Secondary Quarry – 121 Ha
11. River diversions	0	Not applicable for Ulco
12. Fencing	0 m	Not applicable for Ulco
13. Water management	0 ha	Not applicable for Ulco
14. 2 to 3 years of maintenance and aftercare	460 ha	Total extent of the disturbed area subject to rehabilitation will require after care.

Table 3 provides an indication of the extent of disturbance based on July 2015, assuming the successful implementation of concurrent rehabilitation as proposed in Section 3.

**Table 3: Extent of disturbance that will require rehabilitation after 5 years of concurrent rehabilitation (July 2015)**

COMPONENT AS PER GUIDELINE	TOTAL EXTENT	MOTIVATION
1. Dismantling of processing plant and related structures (including overland conveyors and power lines)	13 691.5 m <sup>3</sup>	SAQ Dump plant - 125 m <sup>3</sup> Conveyor to stockpiles – 822.5 m <sup>3</sup> Stockpile area – 4298 m <sup>3</sup> Cement plant – 8446 m <sup>3</sup>
2A. Demolition of steel buildings and structures	23 666 m <sup>2</sup>	Recycling center – 217 m <sup>2</sup> Quarry – 1225 m <sup>2</sup> Cement Plant – 22 224 m <sup>2</sup>
2B. Demolition of reinforced concrete buildings and structures	10 606 m <sup>3</sup>	Quarry – 1907 m <sup>3</sup> Cement Plant – 8699 m <sup>3</sup>
3. Rehabilitation of access roads	108 000 m <sup>2</sup>	Access road to Gorrkop – 5.4km long, average 20m wide.
4A. Demolition and rehabilitation of electrified railway lines	0	Not applicable for Ulco
4B. Demolition and rehabilitation of non-electrified railway lines	24 000 m	Railway lines associate with the cement plant
5. Demolition of housing and/or administration facilities	2178 m <sup>2</sup>	Quarry area – 460 m <sup>2</sup> Cement Plant – 1718 m <sup>2</sup>
6. Opencast rehabilitation including final voids and ramps	86 ha	Primary Quarry – 10 Ha Secondary Quarry – 66 Ha Old Quarry – 10 Ha
7. Sealing of shafts adits and inclines	0 m <sup>3</sup>	Not applicable for Ulco
8A. Rehabilitation of overburden and spoils	0 ha	Not applicable for Ulco
8B. Rehabilitation of processing waste deposits and evaporation ponds.	0 ha	Not applicable for Ulco
8C. Rehabilitation of processing waste deposits and evaporation ponds (polluting potential)	0 ha	Not applicable for Ulco
9. Rehabilitation of subsided areas	0	Not applicable for Ulco
10.A General surface rehabilitation (including remnants of infrastructure)	58.9 Ha	Quarry area – 4 Ha Stockpile area – 17.6 Ha Cement Plant – 37.3 Ha
10.B General surface rehabilitation (excluding remnants of infrastructure)	150.7 Ha	Subsided Area – 22.1 Ha Waste dump – 5 Ha SAQ dump area – 4 Ha Secondary Quarry – 121 Ha Primary Quarry – 18 Ha Old Quarry – 18 Ha
11. River diversions	0	Not applicable for Ulco
12. Fencing	0 m	Not applicable for Ulco
13. Water management	0 ha	Not applicable for Ulco
14. 2 to 3 years of maintenance and aftercare	460 ha	Total extent of the disturbed area subject to rehabilitation will require after care.

### 4.3 THE FINANCIAL PROVISION CALCULATIONS

The value for financial provision, as calculated in **Table 4** and **5** below, is the financial provision that would have been required in 2005 (as this is the year that the guideline document and master rates were determined). To determine a suitable financial provision for present day costs, the provision must be adjusted for inflation. The inflation rates were taken from the following website; [www.statssa.gov.za](http://www.statssa.gov.za).

The base CPIX inflation as of January 2005 was 78.4. The latest base inflation figure for June 2010 is 111.5. This represents a **42.22%** increase in cost since January 2005 through to June 2010.

**Table 4** indicates the calculations performed to arrive at the quantum, and shows the Rand value estimated for rehabilitation as of **July 2010**.

**Table 4: Financial provision calculation as of July 2010**

Background Information								
AfriSam South Africa (Pty) Ltd - Ulco Cement Plant is classified as a "cement limestone mine" with an associated cement plant which places the mine as a Category B mine (Medium Risk Mine). In terms of area sensitivity the mine falls within the category of medium sensitivity. There is limited information available for determining financial provision, hence the rules based approach will be followed. Ulco is located over flat ground and located within a peri urban area.								
CALCULATION OF THE QUANTUM - End of life of Mine								
Mine:	AfriSam South Africa (Pty) Ltd - Ulco Cement Mine			Location:	Dikgatlong Municipality			
Evaluators:	Umhlabi Environmental Consulting CC			Date:	Jul-10			
No.	Description	Unit	A Quantity	B Master Rate	C Multiplication factor	D Weighting factor 1	E=A*B*C*D Amount (Rands)	
1	Dismantling of processing plant and related structures (including overland conveyors)	m3	13691.5	6.82	1	1	93376.03	
2 (A)	Demolition of steel buildings and structures	m2	23666	95	1	1	2248270	
2(B)	Demolition of reinforced concrete buildings and structures	m2	14135	140	1	1	1978900	
3	Rehabilitation of access roads	m2	108000	17	1	1	1836000	
4 (A)	Demolition and rehabilitation of electrified railway lines	m	0	165	1	1	0	
4 (A)	Demolition and rehabilitation of non-electrified railway lines	m	24000	90	1	1	2160000	
5	Demolition of housing and/or administration facilities	m2	2178	190	1	1	413820	
6	Opencast rehabilitation including final voids and ramps	ha	146.1	96700	0.52	1	7346492.4	
7	Sealing of shafts adits and inclines	m3	0	51	1	1	0	
8 (A)	Rehabilitation of overburden and spoils	ha	0	64400	1	1	0	
8 (B)	evaporation ponds (non-polluting potential)	ha	0	82700	1	1	0	
8 (C)	evaporation ponds (polluting potential)	ha	0	240200	0.76	1	0	
9	Rehabilitation of subsided areas	ha	0	55600	1	1	0	
10 (A)	General surface rehabilitation	ha	81.9	52600	1	1	4307940	
10 (B)	General surface rehabilitation	ha	150.7	35000	1	1	5274500	
11	River diversions	ha	0	52600	1	1	0	
12	Fencing	m	0	60	1	1	0	
13	Water management	ha	0	20000	0.6	1	0	
14	2 to 3 years of maintenance and aftercare	ha	460	7000	1	1	3220000	
15 (A)	Specialist study	Sum				1	0	
Sum of 1 to 15							28879298.43	
1	Preliminary and General		3465515.81		weighting factor 2 1.05		3638791.60	
2	Contingencies						2887929.84	
Subtotal 2							32518090.03	
VAT (14%)							4552532.60	
2005							Grand Total	37070622.64
Adjusted for inflation of 42.22% from January 2005 to June 2010							Total for 2010	R 52 721 839.51



**Table 5** indicates the calculations performed to arrive at the quantum, and shows the present day Rand value estimated for rehabilitation as of July 2015. This presumes that the concurrent rehabilitation commitments described in Section 3 are implemented.

Background Information								
AfriSam South Africa (Pty) Ltd - Ulco Cement Plant is classified as a "cement limestone mine" with an associated cement plant which places the mine as a Category B mine (Medium Risk Mine). In terms of area sensitivity the mine falls within the category of medium sensitivity. There is limited information available for determining financial provision, hence the rules based approach will be followed. Ulco is located over flat ground and located within a peri urban area.								
CALCULATION OF THE QUANTUM - End of life based on implementing 5 year concurrent rehabilitation commitments								
Mine:	AfriSam South Africa (Pty) Ltd - Ulco Cement Mine			Location:	Dikgatlong Municipality			
Evaluators:	Umhlaba Environmental Consulting CC			Date:	Jul-10			
No.	Description	Unit	A	B	C	D	E=A*B*C*D	
			Quantity	Master Rate	Multiplication factor	Weighting factor 1	Amount (Rands)	
1	Dismantling of processing plant and related structures (including overland conveyors)	m3	13691.5	6.82	1	1	93376.03	
2 (A)	Demolition of steel buildings and structures	m2	23666	95	1	1	2248270	
2(B)	Demolition of reinforced concrete buildings and structures	m2	10606	140	1	1	1484840	
3	Rehabilitation of access roads	m2	108000	17	1	1	1836000	
4 (A)	Demolition and rehabilitation of electrified railway lines	m	0	165	1	1	0	
4 (A)	Demolition and rehabilitation of non-electrified railway lines	m	24000	90	1	1	2160000	
5	Demolition of housing and/or administration facilities	m2	2178	190	1	1	413620	
6	Opencast rehabilitation including final voids and ramps	ha	86	96700	0.52	1	4324424	
7	Sealing of shafts adits and inclines	m3	0	51	1	1	0	
8 (A)	Rehabilitation of overburden and spoils	ha	0	64400	1	1	0	
8 (B)	evaporation ponds (non-polluting potential)	ha	0	82700	1	1	0	
8 (C)	evaporation ponds (polluting potential)	ha	0	240200	0.76	1	0	
9	Rehabilitation of subsided areas	ha	0	55600	1	1	0	
10 (A)	General surface rehabilitation	ha	58.9	52600	1	1	3098140	
10 (B)	General surface rehabilitation	ha	175.1	35000	1	1	6128500	
11	River diversions	ha	0	52600	1	1	0	
12	Fencing	m	0	60	1	1	0	
13	Water management	ha	0	20000	0.6	1	0	
14	2 to 3 years of maintenance and aftercare	ha	460	7000	1	1	3220000	
15 (A)	Specialist study	Sum				1	0	
Sum of 1 to 15							25007370.03	
1	Preliminary and General		3000884.40	weighting factor 2 1.05			3150928.62	
2	Contingencies						2500737.00	
Subtotal 2							28156296.65	
VAT (14%)							3942161.81	
2005							Grand Total	32100460.47
Adjusted for inflation of 42.22% from January 2005 to June 2010					Total for 2010		R 45 653 274.87	

#### 4.4 CONCLUSION:

Making use of the DMR guideline document for calculating financial provision, the 2010 financial provision requirements is as follows;

- Present day financial provision closure requirement of **R 52,721,839**
- Anticipated present day financial provision closure requirement for 2015, based on the presumption that concurrent rehabilitation activities are successfully implemented is **R 45,653,275**

The process of evaluating the financial provision requirements must be reassessed in 2011.

## 5 APPENDIX 1: PLAN USED TO DETERMINE AREAS OF DISTURBANCE

