

# **WASTE DISPOSAL BY LANDFILL**

## **AN OVERVIEW OF LANDFILL OPERATIONS AND BEST PRACTICES**



**Cleansing and Solid Waste Unit**

**DSW**

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# WHY LANDFILL?

- 'Disposal of waste on land'
- Oldest form of waste disposal
- Other waste management options ultimately rely on landfill
- Best Practicable Environmental Option (BPEO) for disposal of waste for the foreseeable future



# DSW LANDFILLS

- 3 landfills in the eThekweni Municipality operated by DSW :
  - Bisasar Road Landfill Site situated in central Durban
  - Mariannhill Landfill Site situated in the west
  - Buffelsdraai Landfill Site situated in the north

# BISASAR ROAD LANDFILL SITE

- Situated 10 km north of the Durban CBD
- One of the busiest sites in Africa
  - 3500 TO 5000 tons of MSW daily
- Landfill footprint of 44 Ha



# MARIANHILL LANDFILL SITE

- New generation landfill opened in 1997 – located to 'textbook standards'
- 500 – 700 tons of MSW daily
- Registered national conservancy - arguably first world wide

# BUFFELSDRAAI LANDFILL SITE

- New regional site commissioned in May 2006
- 100 Ha landfill footprint
- Design life of 75 years





# **BUFFELSDRAAI LANDFILL SITE**

**WELCOME - SIYAKWAMUKELA - WELKOM**

**HOURS: EVERY DAY ( MONDAY - SUNDAY )**

**ACCOUNT CUSTOMERS.....07h00 - 15h30**

**CASH CUSTOMERS.....07h00 - 15h30**

**ENTRY RESTRICTED ! AKUNGENI NOMA UBANI ! BEPERKTE TOEGANG !**

**\* FOR GENERAL WASTE DISPOSAL AND FOR SITE BUSINESS PURPOSES ONLY**

**\* ABAZOLAHLA UDOTI KANYE NALABO ABEZE NGOMSEBENZI KHUPHELA**

**\* SLEGS VIR ALGEMENE AFVALWEGDOENING EN TERREINWERKE BEDOEL**

**Permit Holder: Durban Water & Waste  
3 Prior Road, Durban**

**Responsible Person : J. Parkin M.Sc Eng.**

**Telephone (Office Hours) 031 3118820**

**Emergency (After Hours) 083-259-3687**









# LANDFILL SITE OPERATION

- The operation of a landfill site can be compared to a large earthworks operation
- Waste is placed and compacted typically using purpose built landfill compactors and dozers
  - To prevent moisture ingress (increase run-off) and minimise leachate generation
  - To maximise airspace and improve stability
- Landfill equipment will typically include water tankers for dust suppression and road making equipment for upkeep of internal road networks





# TYPICAL LANDFILL OPERATIONS









# PROBLEMS ASSOCIATED WITH LANDFILLS

- Liquid and gaseous emissions as a result of degradation of organic waste matter
- Leachate - Potential for pollution of groundwater
- Landfill Gas ( $\text{CH}_4$  and  $\text{CO}_2$ ) - Explosion and fire hazard and green house gas emissions



# LANDFILL DEGRADATION PROCESSES

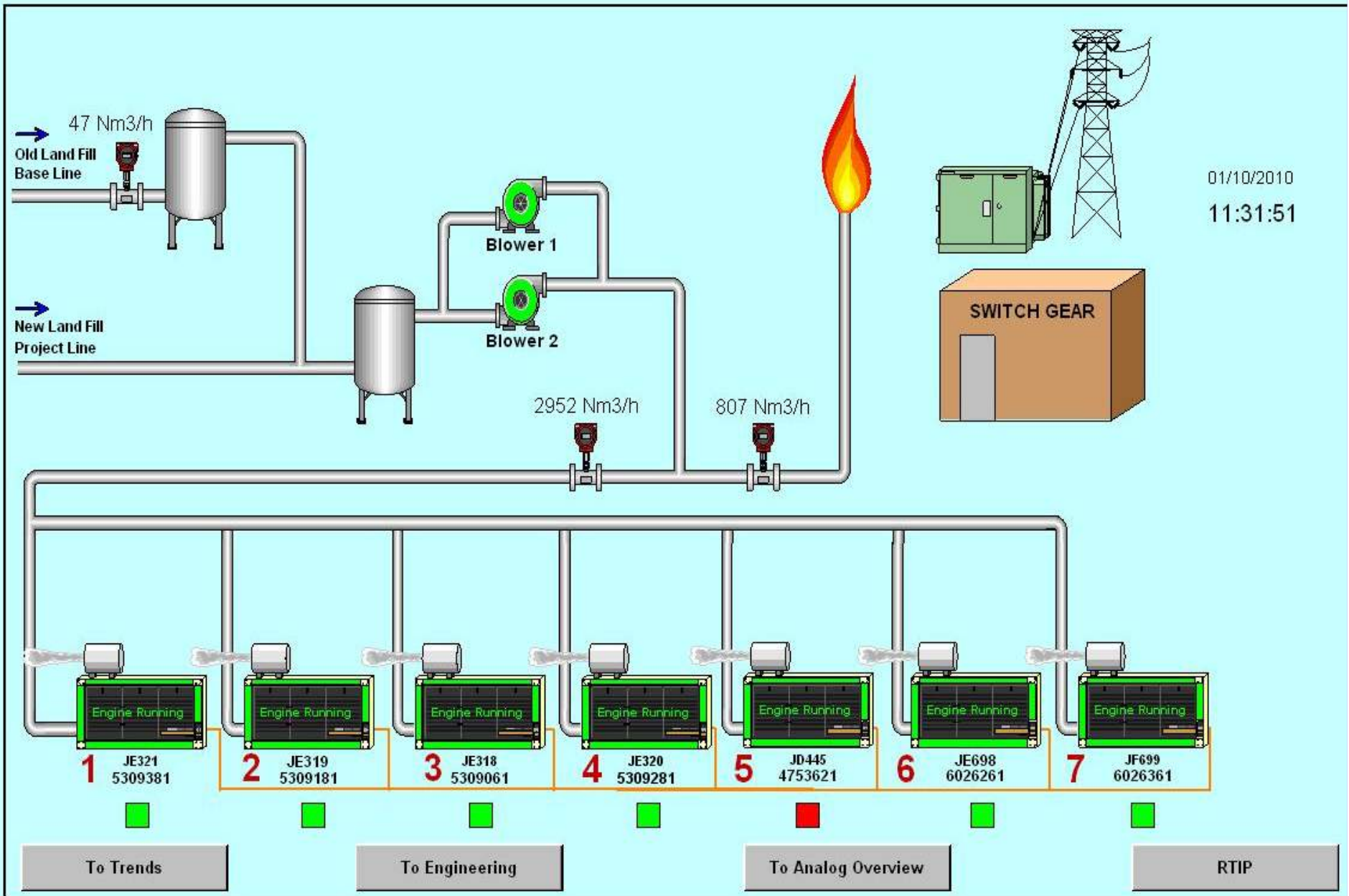
## Landfill Gas

- Arises as the end product of waste degradation
- Consists primarily of methane and carbon dioxide, together with a number of trace components
- Changes in gas composition over time due to sequence of waste decomposition

# FLARING











# PROBLEMS ASSOCIATED WITH LANDFILL EMISSIONS

## Leachate

- Potential watercourse and groundwater pollution if released uncontrolled to the environment
- Typically consists of high levels of ammonia (toxic) and organic matter (creation of septic conditions)







# ODOUR MANAGEMENT SYSTEM

*The OMS provides the landfill operator with a real-time visual prediction of the odour plume every ten minutes thereby enabling the implementation of mitigation strategies.*





# MARIANNHILL LANDFILL SITE

## A CASE STUDY

### *Closed Loop Design*

- Is a recognised conservancy
- Provides an educational base to schools
- Leachate is treated in a sequencing batch reactor and used for dust suppression and irrigation
- Vegetation in areas demarcated for landfill is rescued and re-used once cells are completed
- LFG to electricity



# Plant Rescue Unit (PRUNIT)

- Economically and environmentally successful
- Provides indigenous vegetation to the buffer zone, rehabilitated cells and the ongoing rehabilitation of Bisasar Road Landfill
- Low cost remediation of several old, defunct 'dump' sites within the eThekweni Municipal Area







# MANAGEMENT TOOLS

Wind Breaks for Wind Scatter



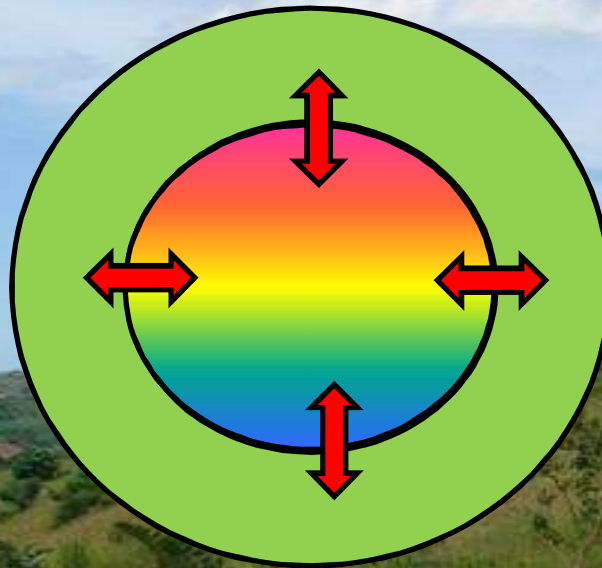






# MANAGEMENT TOOLS

## Closure Rehabilitation



# ENVIRONMENTAL ASSET CONCEPTS





# ENVIRONMENTAL ASSET





ENVIRON

ET





# ENVIRONMENTAL ASSET CONCEPTS

Topsoil















## Landfill Gas



# Reforestation / Tree Preneur







ANY QUESTIONS?

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[www.landfillconservancies.com](http://www.landfillconservancies.com)