Komati Ash Dam Project

What is an ash dam?

- An ash dam is basically a barrier constructed to contain the ash slurry. An ash dam is a place to safely store ash which as a by-product produced during the coal combustion process.

What is ash and how is it produced?

- Ash is an inherent constituent of coal, when the coal is burnt, the residue that remains behind is called ash.
- Coal fed to the boilers is first pulverised into a fine dust, mixed with air and blown into the furnaces where it ignites and burns. This ash needs to be removed to maintain the efficiency of the combustion process.
- There are 2 types of ash formed:
  - Coarse ash
  - Fly ash dust

- There are two ash collection points:
  1. Course ash falls out of the draught to the bottom of the combustion chamber and into the ash hoppers.
  2. The lighter fly ash is extracted from the boiler from the top and then fall into the precipitator ash hoppers.

Why does a power station need an ash dam?

- A power station needs an ash dam for the storage of ash produced after the coal combustion process.
- An ash removal plant is installed to extract ash from the boilers. It is important to remove this ash as it would collect in the furnace chamber and affect the process efficiency and foul the equipment.
- Accumulation of ash in the boiler can negatively impact on boiler operation or even shut down of the unit. Therefore a reliable system which can handle large quantities of ash removal and storage needs to be installed.
- Hence a designated storage area is required; historically at Komati this would be a wet ash dam.

Coal combustion

\[ \text{Coal} \rightarrow \text{Ash} + \text{Water} \]
Ash slurry being pumped to the ash dam

Why a dam and not a dump?

- Komati makes use of the wet ashing system as opposed to the dry ashing process as per original design.
- Wet ashing produces less dust and uses more water, but this water is recovered and recycled on the plant making wet ashing the preferred choice for Komati. It is economical for Komati to continue with a wet ashing system.
- The costs to retrofit a dry ashing plant will be three times that of the wet ashing process.

What is causing Komati to build another ash dam?

- Eskom is currently re-commissioning Komati Power Station. The existing ash facilities do not have sufficient deposition capacity for ash disposal over the planned life of the station and a new facility is therefore required.
- The current ash dam has a storage capacity able to support the station for the next 18 months only, hence a new facility is required for the full station lifespan.
- After disposing of the ash for a specific period at one location, it gets filled up and then the disposal point has to be shifted to a new location. The old site is then rehabilitated by covering with a layer of earth and vegetation would be planted as part of the rehabilitation process.
- Rehabilitation of the ash dams at power stations is done on an ongoing basis on sections that will no longer be used for ashing.

Where would this ash dam be on the station property?

- The site is situated south of the power station and west of the existing ash dams. The property is owned by Eskom. The capacity of the site was not reported on, other than it is less than 13.5 Mm³. The ash dam is close to the power station ie within 3 km of the premises.

The current ash dam area

A rehabilitated ash dam. Once the ash dam reaches a certain height (which is not reported), rehabilitation will be carried out by putting on a layer of top soil and sowing various grasses. In the foreground is the grassy plateau of a rehabilitated ash dam. In the background is the Hendrina Power Station.

Ash dam being pumped to the ash dam.
Komati Power Station Location

What are the technical specifications of the dam?

- It is important to identify an adequate area near the plant where the ash dam may be built. The total area requirements depend on the plant life taking into account the ash content in the coal being used and the plant utilization factor.
- At Komati there exists a wet ashing system, in this disposal method a bund must be constructed around the ash disposal area to contain the slurry within. The ash slurry is disposed of in the pond where ash settles down and water is allowed to flow out of the pond so that it can be recovered.
- The maximum height of the ash dam would be 3.4m and it would cover an area of approximately 410,663 m² / 41 ha with a capacity of 13,497,548 m³
- Natural topographical low: 1612.65 masl
- Ash dam topographical high: 1660.05 masl

What control systems does it have?

- The ash dam facility is equipped with penstocks and subsurface drainage to enable drainage and recovery of the effluent water to an ash water return dam normally situated below the ash dam.
- A solution trench will be provided along the toe of the dam to collect run-off water from the dam surface and slopes to transport water around the sides of the dam to the ash water return dams.
- A pumping system at the ash water return dams is then utilized to pump effluent water back to the power station for ashing purposes.

Thank you

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Acknowledgement
- Seshni Pillay (Research & presentation) Common Plant
- Andre Kreuiter (Technical information) CED- Ash dam Specialist