

	Duvha Power Station Clarifier Cleaning Scope of Work Water Treatment Plant	Doc. no.
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		Pages 9

Recommended by:

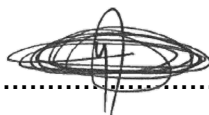
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Description of the service

1.1 Executive overview

The cleaning scope of work for the clarifier is divided into two sections: -

- Online cleaning
- Offline clarifier cleaning.

The purpose of the **Online clarifier** cleaning is aimed at cleaning the top part of the clarifier (peripheral and radial launders and outer launder to recarb, channel from 157 clarifier to demin and potable sump cleaning only) by removing all types of deposits from the structure.

This cleaning is done without draining the clarifier whereby the accumulated scale and algae is removed to prevent the carryover of debris to the systems of production.

The purpose of the **offline clarifier** cleaning is aimed at cleaning all water touch base material of construction such that the corrosion and structural damages of the clarifier can be easily identified when inspection takes place on the component.

1.2 Employer's requirements for the service.

Online clarifier cleaning directed only for big clarifiers.

The online clarifier cleaning focuses at cleaning the peripheral and radial launders only by removing all types of deposits accumulated at the top of the clarifier structure.

The frequency for the clarifier cleaning online is projected to take place once in two months throughout the period of the contract. (This cleaning task is limited to big clarifiers that are in service (Total number of big clarifiers is six)

The cleaning is done without draining the clarifier but closing/isolating the supply water inlet valve of the clarifier and opening the sluice gate leading to the cooling towers.

The duration permissible for cleaning the launders for potable/demineralized water clarifier is limited to four hours per day due to production demand, whereby all radial launders and peripheral launder are to be completed within eight hours in total that is in two consecutive days.

The method of cleaning the launders, shall be the use of high-pressured water system and the appropriate algae growth/deposits removal equipment that is not destructive to the material of construction of the launders.

The moving bridge of the clarifier shall be used as a platform to reached and clean radial launders.

The safety harness shall be used to hook onto the moving bridge while standing on the walking bridge platform.

Wearing of the appropriate PPE as identified on task risk assessment shall be complied with while cleaning the radial launders.

Offline cleaning of the whole clarifier

The offline clarifier cleaning focuses at cleaning all water touch base material of construction such that the corrosion and structural damages of the clarifier can be easily identified when inspection takes place on the components stated below: -

- Peripheral and radial launders
- Clarifier mixing zone on top and underneath the center cone plus impellers
- Clarifier Inlet pipe
- Concrete walls of the clarifier
- Clarifier pockets and associated pipelines
- Outlet launder to the re-carbonizing area
- Re-carbonizing area

Note: The offline cleaning will be done on both small and big clarifiers

The duration permissible for cleaning the big clarifier is limited 14 days and the small clarifier is eight days.

After the permit to work is issued, the contractor is to drain the clarifier using the blow down drain valve.

A pumping mechanism shall apply when water level is low, and the settled sludge content is visible.

A secured and reliable stepping mechanism approved by Eskom shall be used to gain access at the floor of the clarifier.

The method of cleaning the clarifier shall be determined by the contractor and approved by Eskom. The equipment used shall be such that it is not destructive to the material of construction of the clarifier.

Upon completing clarifier cleaning both Eskom personnel and the contractor will conduct quality inspection and thereafter Eskom signs off for task completion.

HOUSE KEEPING

After cleaning of the clarifier, all debris removed from clarifier shall be removed and deposited off at the ash dumping site about 5 km from the power station by the service provider.

Hazards

Drowning

Chemical and biological hazards

Slippery launder surface

Working at heights

Windy conditions

Confined space

Schematic drawing of the sludge blanket clarifier

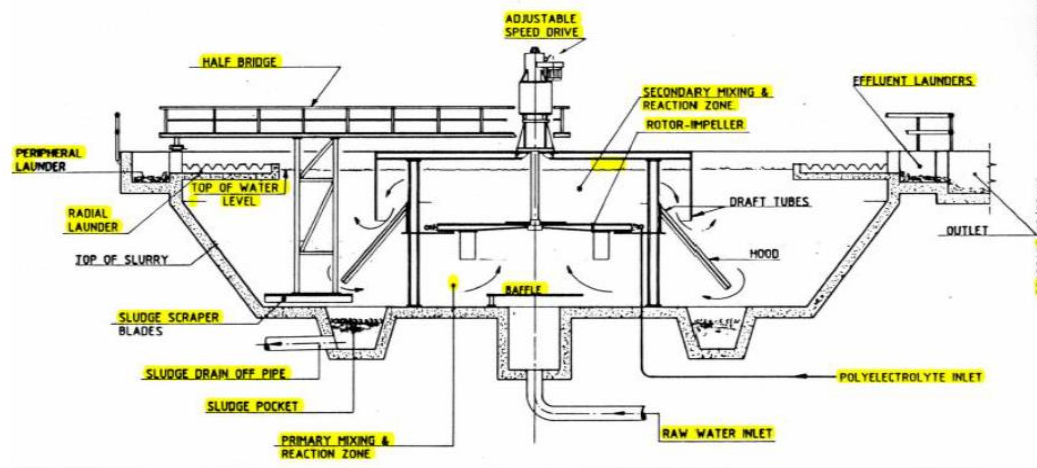


Figure 1: Typical schematic of a sludge blanket type clarifier

Dimensions for big clarifier

Item	Quantity	Size (meters)
Radial Launderers	24 units	6.0 m long x 0.5 m wide
Peripheral Launderers	1 (circumference)	142 m (1 meter deep)
Clarifier diameter	1	45 m
Clarifier inlet pipe	1	800 NB and 75 m long
Clarifier pockets	4	Area = 2 m ² Depth = 1.0 m
Blow down pits with pipes from clarifier pockets	2	Depth = 8 m Length = 6 m Width = 4 m
Clarifier outlet launder to re-carbonizing area	1	120 m long 2.5 m wide 1.0 m deep
Clarifier capacity	1	9.5 Mega liter 8 meters deep
Re-carbonizing area	2	Area = 8 m ² Depth = 1.0 m
Average accumulated sludge after water draining	+/- 1 ton	
Clarifier 157 channel to demin/potable sump	2 off	Length =100m Depth = 3m Width = 0.5 m

Dimensions for small clarifier

Item	Quantity	Size (meters)
Radial Launderers	12 units	3.0 m long x 0.5 m wide
Peripheral Launderers	1 (circumference)	70 m (1 meter deep)
Clarifier diameter	2	20m and 15m (4m deep)
Clarifier inlet pipe	1	300 NB and 5 m long
Clarifier pockets	4	Area =1 m ² Depth = 1.0 m
Blow down pits with pipes from clarifier pockets	2	Depth = 3m Length =3 m Width = 3 m

Requirements

- The service provider shall only execute the cleaning of the clarifier after the plant has complied to plant safety regulations.
- A mini risk assessment shall be done by service provider and its employees, a proof of risk assessment shall be provided to the project manager for record keeping.
- The cleaning crew shall be always supervised by a safety accredited supervisor.
- Incidents/deviation during task performants shall be reported to the project manager as they take place followed by a written report within twenty-four hours.
- A method statement for cleaning the clarifier shall be submitted to the project manager for acceptance if there are deviation to the original submission.

Constraints on how the Contractor Provides Works

- Time constraints or delays in terms of plant availability can be expected, due to operating production requirements. These delays will be communicated to the contractor by the contract manager or employer's representative as they arise.
- Work will be performed in a dusty and noisy environment, on high platforms, confined spaces and in open environment.

