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# Works Method Statement WMS-01


**Chimney**

**Delimara Power Station**

**Delimara - Marsaxlokk**

## Revision Schedule

Rev.	Date	Details	Prepared by	Reviewed by	Approved by
03	31.05.2017	Review	Roberto Brustia	Mario Sabolo	Mario Sabolo
02	03.04.2017	Review	Roberto Brustia	Mario Sabolo	Mario Sabolo
01	27.03.2017	Review	Roberto Brustia	Mario Sabolo	Mario Sabolo
00	20.03.2017	Draft WMS 01	Roberto Brustia	Mario Sabolo	Mario Sabolo

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## 00. Site description

Delimara Power Station (DPS) is located on the Delimara Peninsula in Marsaxlokk Bay, on the south east coast of Malta. The site is located at an elevation of between 1.8m and approximately 6.0m metres above local sea level (ALSL).

The site comprises operational plant in the centre and south of site, and a workshop, administration buildings and a First Aid Room in the north of site.


Below some pictures of the chimney involved in the decommissioning.



Figure 1: Delimara Power Station - Aerial view



Figure 2: DPS Phase 1 Chimney - Aerial view

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It is anticipated that decommissioning will only start in the third quarter 2017. In accordance with the works programme prepared by the Contractor and DPS-POW-001 - Proposed PoW DPS Phase 1, following mobilisation and site preparation, the first structure to be demolished is the chimney, within the scope of this method statement.

### 01. Description of area - structure

The structures of the chimney to be demolished are the concrete wind shield, the internal steel structures, 2 internal steel flues and their insulation, the L shaped horizontal flue inlet ducting from the boilers' exits to the two flue elbows found inside the wind shield, the insulation and cladding of the flue and supporting steel structures.

No auxiliary metal frameworks are present on the chimney external face.


The chimney is 150m high.



**Figure 3: Chimney side view**


The chimney demolition will be performed in pre-established steps, requiring the previous total clearing of any metal structures and equipment in it that could interfere with the demolition.



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## 02. Safety precautions prior to works

- Switching off or protect all live equipment.
- Part of the road closer to the chimney will be closed during the dismantling, only access for workers will remain accessible at all times.
- Placing an active emergency light after each working day at the top most area.
- The dismantling will involve dropping all demolition waste into the chimney itself. As such, no debris is expected to fall far away from the chimney, thus not requiring any protection of the elements in the vicinity.
- Area just under the chimney will be cleaned following the dismantling of the chimney. Prior to the initiation of works, no such cleaning is required.
- Safety tests and certification of all material and equipment to be used.
- The demolition shall be performed top-down with attention and order and in such a way not endanger the stability of load-carrying and connecting structures.
- Ground operators shall not pass, stand or work in the operating area of the mechanical equipment or suspended loads;
- The area immediately below the works shall be properly hoarded with suitable barriers and the transit and standing of people and vehicles shall be prohibited.
- Before carrying out any demolition operations, the site Supervisor of Works shall carefully assess the possibility that the demolition might cause the immediate or successive collapse of other parts.
- During all the working steps, the dust generated from insulation removal, from concrete demolition and from flyash residue will be collected at the base of the chimney by gravity. Dust containment will be ensured by the side walls of the chimney. A dust suppression system will be in place by means of a fog cannon at the base of the chimney. This fog cannon will produce a fine mist so minimal run off is expected. Any run-off that would be generated would be only water mixed with non-hazardous demolition dust. It is expected that the moisture in the cannon will dry rapidly on deposition, given the prevailing weather conditions expected during works. Nevertheless, any waters that might persist will be collected in the sump that forms part of the storm water reservoir system that caters for the DPS 1 area. Any dust will be allowed to settle and this water shall be directed towards re-use as irrigation.

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### 03. Environmental Issue

- A precautionary approach is being taken, to segregate any hazardous components that might be detected during the course of works.
- Hazmat survey submitted at ERA clearly indicates that the innermost part of the chimney (and not the windshield) are to be considered as non-hazardous. This, however, does not mean that there is no flyash in the chimney. When encountered this must be treated as hazardous waste. The results of the hazardous waste testing will also be presented in a HAZMAT report.
- The environmental monitor will be on site to monitor the dismantling. The internal metal lining will be inspected per segment and it will be decided whether there is any visible flyash deposits. However, the internal walls appear to have no deposits whatsoever as from photos submitted with the application. Should segments be identified with deposits, these will be separated from the rest and temporarily stored in the bunded area, and a methodology for cleaning will be submitted to ERA for their approval.
- No cores are being proposed with respect to the windshield since the concrete is considered to be non-hazardous and inert. As for the top part which looks black, once the scaffolding is erected, the level of contamination will be inspected, a sample will be taken, and if found to be hazardous, the 'black' part will be scraped off, and the remaining concrete re-tested, until it results as inert.
- The insulation of the L-pipe is to be removed first. It will be stored in jumbo bags in the non-hazardous area. Flyash in the L pipe will be removed and stored in jumbo bags within the bunded area. Then the metal will be removed and inspected.
- Details of expected waste to be generated is provided in the Waste Management Plan.
- During the works which need to be carried out in limited wind conditions, the area of demolition will be continually sprayed to limit dust dispersion.
- No works shall be carried out when wind speed is over force 4 and this will be measured through constant monitor of weather forecast and also through an anemometer that will be placed at a height.
- The details of expected waste to be generated is provided in the Waste Management Plan.

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#### 04. Works methodology

In terms of phasing the demolition of the chimney, it is anticipated that first the ducts and metal pipework connecting the chimney to the boilers will be removed. Secondly, the flue pipes will be lowered to the ground, after which the insulation and cladding will be removed from the flue pipes. In this way, no internal structures within the chimney will interfere with the demolition. Then, the chimney structure itself comprising the reinforced concrete bodywork will be demolished, starting from the upper part up to 30 metres above ground level. The final 30 metres will then be demolished using a long reach crawler excavator.

Before commencing any work a Risk Assessment and safe work method statement (RA-SWMS) shall be submitted to Enemalta and ERA. The RA-SWMS will be signed by the contractor's H&S representative and shall be followed throughout during project execution. The RA-SWMS shall be updated during the course of the works and made available to Enemalta upon request.

The demolition of the chimney will be carried out by using two different techniques depending on the working level: first of all, the chimney will be lowered to a level of + 30.00m from the ground by applying the top-down method and using a self-elevating platform.

The platform-based demolition will be carried out by using radio controlled mini electrical excavators (remote-controlled demolition robots type Brokks®), equipped with a clamp and a pneumatic hammer.

The demolition will be carried out by keeping a safety zone towards the the inner side of the chimney, where staff - properly equipped with safety anchorage devices – are not allowed to stand during the demolition. A secondary protection will be provided to prevent accidental falls of items or equipment.

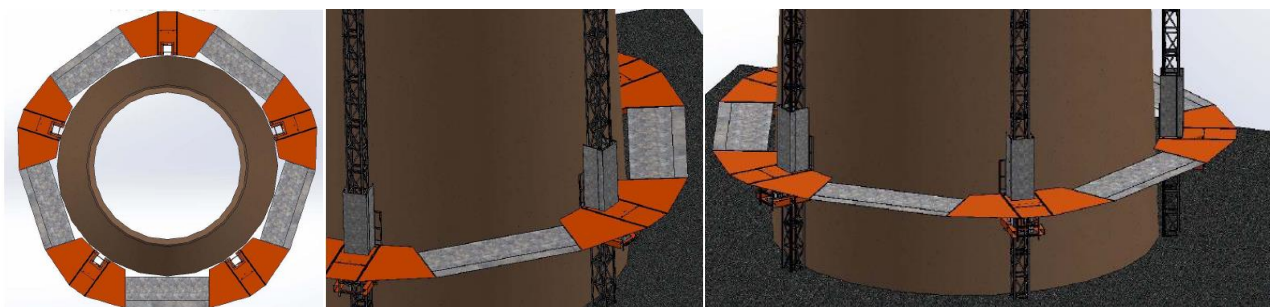

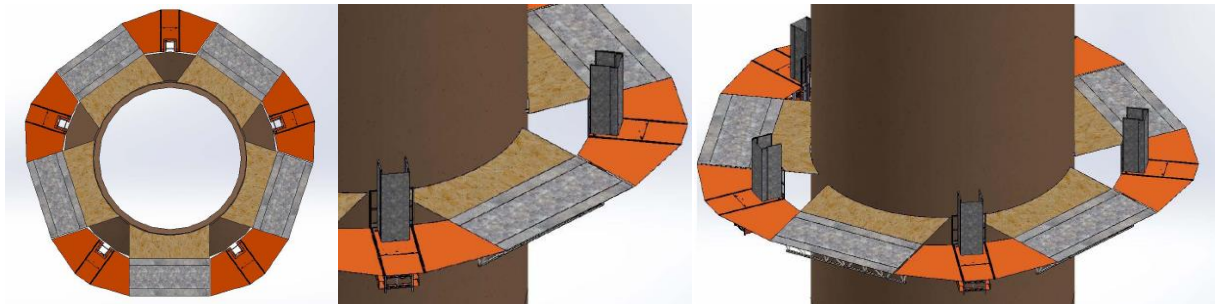


Figure 4: Platform Lower Level view

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**Figure 5: Platform Upper Lever View**

Then, the bottom 30m will be fully demolished with the traditional demolition technique by using a long boomed crawler excavator.

## 05. Works description


First of all the two L-shaped horizontal inlet ducting will be removed, cleaned from flyash. After that, the holes will be blocked so when the concrete wind shield is being demolished, no dust emanates from these holes. A plastic shield will be used to cover the holes where there were the openings generated to the removal of the L-shaped flues.

When the L-shaped horizontal inlet ducting will be removed we start with the lowering of the steel flues as explained below, followed with the removal of insulation and cladding once lowered to the ground.

The chimney demolition is performed in three steps:

- The **first** step consists in removing all auxiliary metal frameworks and chimney pipes inserted into the chimney main body.

The chimney pipe and the internal metal frameworks will be removed by cutting and lowering each portion at ground level using strandjack as per image below. Once lowered to the ground, the insulation and cladding will be separated from the metal flue. This is shown in Figure 7: Details of Steel flue lowering.

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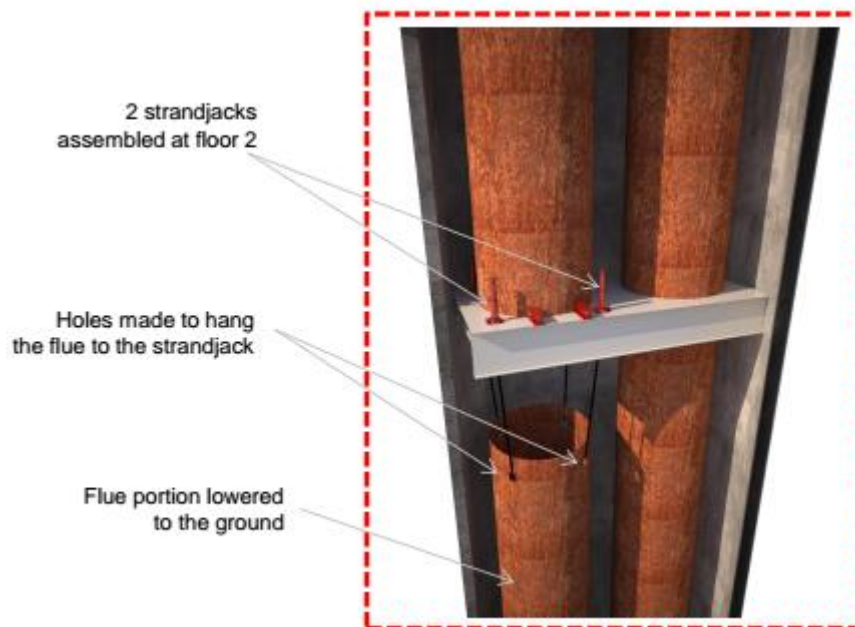



Figure 7: Details of Steel flue lowering

- The **second** step consists in demolishing the chimney stack from the top up to +30m from the ground level with the top-down technique, using a platform bound to the chimney, similar to Figure 7: Photo of chimney platform.
- The demolishing technique uses as load-bearing elements square lattice towers supporting the platform and entirely made of steel. The proposed system does not require any truck cranes for its high level assembly, with consequent optimization of costs and time. After reaching the chimney top, the chimney stack will be demolished top-down by using radio controlled mini excavators located on the platform as depicted in Figure 8: Radio controlled mini excavators located on the platform below.



Figure 6: Photo of chimney platform



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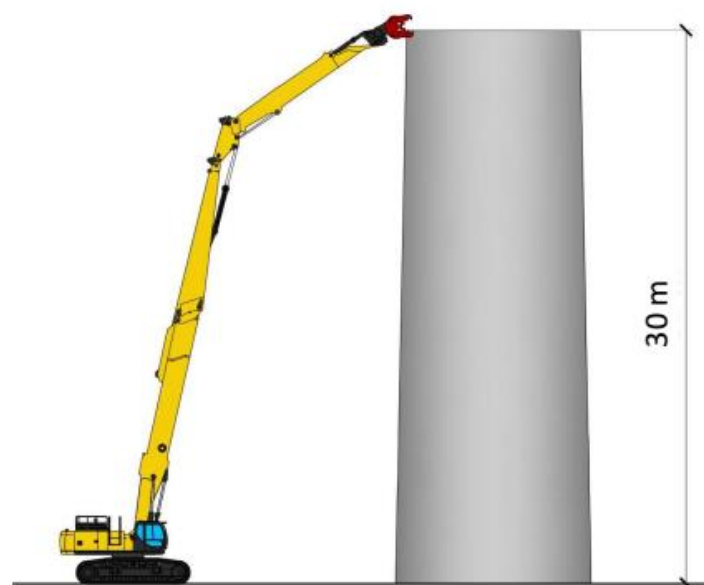
Insulation and cladding are present on two internal steel flues. This will be removed once the flues are lowered to the ground.

The platform will be dismantled when the chimney will be 30m high.




**Figure 8: Radio controlled mini excavators located on the platform**

- The **third** step will be carried out by using a crawler excavator equipped with a long boom and a hydraulic clamp as shown in **Error! Reference source not found..**



**Figure 9: Long reach crawler excavator equipped with a long boom and a hydraulic clamp to dismantle last 30m of the chimney**

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These three steps are depicted in the Figure 10: 3 Steps of Chimney Dismantling below:

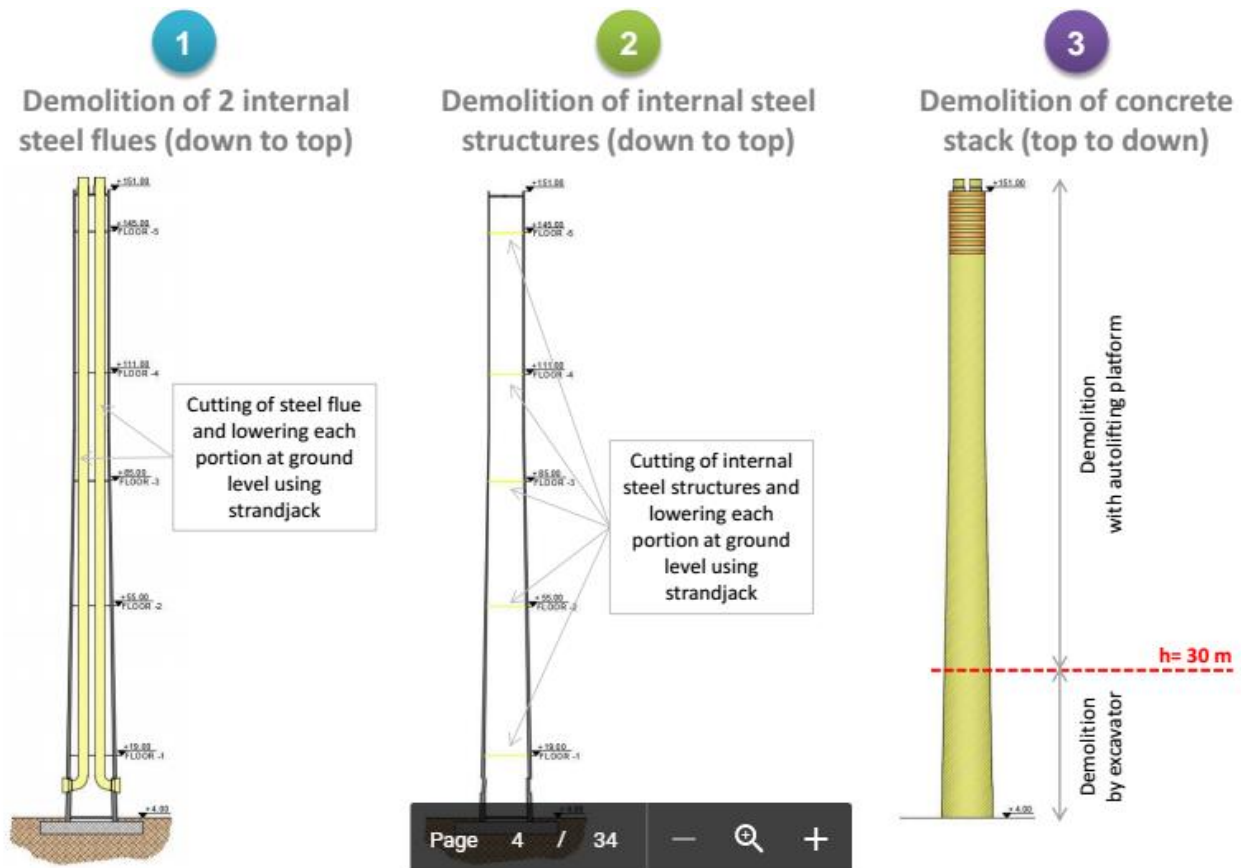



Figure 10: 3 Steps of Chimney Dismantling

06. Timeframes		
Steps	Time	
Platform installation	25	Days
Demolition of the chimney stack from the top up to +30m	150	Days
Platform disassembly	10	Days
Demolition of the chimney stack from +30m to ground level	20	Days
Waste disposal	120	Days

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<b>07. Personnel and machinery earmark for use</b>
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Description	Number	
Demolition platform	01	Unit
Excavators	02	Units
Machine operator	02	-
Helpers	02	-