

Building Summary Report – Windscale Advanced Gas-Cooled Reactor (WAGR) Turbine Hall

Building Description

WAGR Turbine Hall forms one of the remaining parts of the redundant Windscale Advanced Gas Cooled Reactor complex. The turbine hall housed a steam turbine that generated electricity during WAGR's operational years 1963-1981.

Construction on the facility began in 1958 and continued up to 1963, when the reactor came online. The building was constructed primarily of reinforced concrete, with blockwork and sheet metal cladding to the external walls. Similarly, the roof was constructed of corrugated metal sheets over a metal frame. A considerable volume of asbestos was used in the original building construction as insulation and fire protection, the remains of which will be surveyed and removed prior to demolition works taking place.



Figure 1 - WAGR c.1964. Note visible water vapour from (now removed) cooling towers.

Power generation ended in 1981 and the turbine, generators and ancillary equipment had been removed by the mid-80s, after which the building was repurposed as an engineering test facility. Offices within the building were retained for their original purpose.



Figure 2 - Internal view of WAGR turbine hall c.2019

The reactor in the adjacent building was de-fuelled and removed during a decommissioning campaign in the late 90s/2000s.

The Turbine Hall building is approximately 66m x 40m on plan. External elevations above ground level vary 25m to 30m.

Reason for Demolition

The turbine hall is redundant and serves no purpose. Maintaining the building is both unnecessary and costly, whilst it also puts workers at risk from undertaking avoidable maintenance works. The land occupied by the turbine hall is valuable and will make the subsequent demolition of the remaining WAGR structures easier by providing useful space on which to locate demolition machinery and project accommodation.

Method of Demolition

A full refurbishment and demolition asbestos survey (R&D) has been undertaken on the building and any remaining asbestos removal will take place prior to any demolition works (unless advised by the contractor that removal poses a greater risk than post demolition treatment.). Licensed demolition contractors will undertake all licensable asbestos work.

Most bulk asbestos in the building was removed in the 80s post generation. The building has benefited from multiple asbestos cleans as it was repurposed and modified over the years. Remaining asbestos cement cladding constitutes the bulk of remaining asbestos. This cladding will be carefully removed and segregated, placed into an approved sealed container for transport to an off-site disposal facility.

A new primary access route to the reactor building will be established through an existing opening at the base of the reactor building. Once the new access is available for use, the elevated access corridor will be removed and the opening in the reactor building permanently closed.

Demolition will be progressive using long reach machines. Local exclusions zones will be implemented and managed throughout the works to control risks and minimise impact on adjacent operations. Redundant trenches will be cleared out and back-filled, active trenches will be protected by a suitable and sufficient floor plate.

Any loose radiological contamination of the building will be removed prior to demolition. Where decontamination is not possible, the affected material will be segregated and directed to an appropriate disposal route dependant on classification.

All infrastructure within the vicinity of the area is owned and operated by Sellafield Ltd. Nearby drains will be protected against material ingress and services protected as required.

The turbine hall will be removed to the existing ground floor level and the interface with adjoining facilities made good to re-establish weather tightness.

The contractor for the demolition work has yet to be appointed, however as a requirement of the tendering process they will need to be a member of and accredited by the National Federation of Demolition Contractors. The site will be secured with a temporary 'Heras' type fence to control access and egress during demolition.

Prior to demolition commencing, all small plant items and equipment will be removed. Larger plant, such as pumps or generators will be drained of fluid prior to demolition commencing and be

removed as access improves during demolition works. An internal gantry crane is present and will be removed after the gable is dismantled and access is available. The crane will be moved to ground using a suitable tracked excavator and size reduced.

Environmental Impact

Principal arisings from the demolition the WAGR turbine hall are estimated as;

Material	Quantity (Te)	Skips (20Te)	Expected Chemical Classification	Destination
Asbestos	14	3	Hazardous	Various
Blockwork/masonry	970	49	Non-hazardous	Cyclife, Lillyhall
Concrete	8500	425	Non-hazardous	Cumbria Waste, Lillyhall
Glass	28	2	Non-hazardous	Cyclife, Lillyhall
Metals	1070	53	Non-hazardous	AVS, Flimby
Insulation (non-asbestos)	10	2	Hazardous & Non-hazardous	Various
Transformers	3No.	3	Hazardous	Various

Where demolition arisings can be repurposed for use on the Sellafield site they will be. For example, existing trenches that previously contained the turbine condenser circuit will be backfilled with in-situ crushed compacted concrete, subject to characterisation results and internal approval.

Demolition arisings are expected to be suitable for non-rad free release and will be subject to radiological surveys to confirm this before release from the Sellafield site. Any material found to be radiologically contaminated will be embargoed and sentenced to a suitable alternative disposal route.

The turbine hall is of substantial construction. Removal of demolition risings to off-site disposal and recycling facilities is estimated to require up to ten 20.0Te HGV vehicles per day with sorting and segregating of arisings constraining the rate of dispatch. Materials will be packaged in 40-yard roll on roll off (RoRo skips). HGVs will depart site via main gate and be timed to avoid rush-hour traffic.

Much of the work does not have significant dust generation potential. Concrete removal and crushing has dust generating potential and shall be managed using dust suppression techniques including water sprays. The area around the turbine hall is a heavily trafficked area of the Sellafield site and the majority is paved. Vehicle movements should not generate significant dust even during dry periods.

Demolition activity hours will typically be 0700-1900 Monday-Thursday and 0700-1500 Friday. To minimise the impact to operation of adjacent facilities by demolition exclusions zones, some weekend working will be required on an ad-hoc basis.