A-CONSULT															DESIGNERS HAZARD/RISK ASSESSMENT
PROJECT TITLE:		430773 MWHT - Knapp Mill - 2No Works Return Tanks										STAGE		Initial	
No.	HAZARD	RISK	RISK LEVEL			DESIGN MITIGATION MEASURE TO BE TAKEN	RESIDUAL RISK RATING			PHASE EFFECTED BY HAZARD	DESIGN MITIGATION ACTION OWNER (INITIALS)	RISK REQUIRED TO BE SHOWN ON DRAWINGS ? (YES/NO)	TARGET DATE:	DATE ACTION TAKEN	ANTICIPATED MEASURE THAT COULD BE APPLIED BY THE CONTRACTOR (OR OTHERS)
			L	C	I		L	C	I						
Construction Risks															
C1	Working at height	Falls	3	4	12	Precast Wall Panels to be used. Erection by using a mobile crane and man lift / construction lift. Tanks to be fitted with manholes. Top edges to be fitted with temp. handrailing when working in copings.	1	4	4	Construciton	A-Consult	No			Fully instructions of involved on-site personnel. Method statements available on site.
C2	Erection of Wall Panels	Walls unstable until completed and tensioned	3	5	15	Design of panel to suit installation method. Design of temporary works (propping).	1	5	5	Design and Construction	A-Consult	No			Fully instructions of involved on-site personnel. Method statements available on site.
C3	Lifting of Precast units	Risk of units falling	3	5	15	Design for lifting anchors according to supplier's guideline.	1	5	5	Design and Construction	A-Consult	No			Safe working procedures to be followed on site - no working under hanging load
C4	Post-tensioning	Risk of anchor slippage	3	4	12	Design with use of A-Consult external anchoring house with approved barrel and wedge-system for anchoring safety.	1	4	4	Design and Construction	A-Consult	No			Check that components and tensioning equipment suits the designed system.
C5	Deep excavation	Bottom of tank wall approx. XX meter below G.L. Risk of excavation collapse	3	4	12	Depth governed by process requirement. Minimize depth and slope.	1	4	4	Design and Construction	Client	Yes			Proper design and completion of slope to deep excavation
Operational Risks															
Op. 1	Anchors at buttress Panels	Ejection of tendons	3	4	12	Design with use of A-Consult external anchoring house with approved barrel and wedge-system for anchoring safety.	1	4	4	Design and Construction	A-Consult	No			Check that corrosion protective grease-compound is placed. No evidence of water in zone. Use of tendon catchers to be considered
Op. 2	Collapse of tank structure	Damage to single tendon/limited tendons	2	5	10	Appropiate redundancy to be allowed in design of tendons, so single/non-critical number failure will not result in collapse	1	5	5	Design	A-Consult	No			Handling and installation of tendons must prevent damage to PE-Sheating. Employ detailed inspection regime during the installation process
Op. 3		Corrosion to tendons	3	4	12	Design tendons and system to eliminate corrosion Adequate protection as per ETAG 013 and supplier's guidelines.	1	4	4	Design / Construction	A-Consult	No			Check for use of grease compound with moisture exhibiting properties at anchor points Employ detailed inspection regime during the installation process
Op. 4		Corrosion to tendons at anchor points	3	4	12	Use of Freyssinet mono-anchor with A-Consult external anchorage system for extra corrosion protection.	1	4	4	Design	A-Consult	No			Check for use of grease compound with moisture exhibiting properties at anchor points Employ detailed inspection regime during the installation process
Op. 5		Passing of water past EPDM-seal	3	2	6	All tanks designed with hoop tension to ensure compression in joints at all service loading scenarios.	2	2	4	Design	A-Consult	No			Employ QA-control procedures (100 % Pre- & Post Pour) during the manufacturing process Fully inspect precast panels for transportation damages before erection
Op. 6	Drilling into/through Wall Structure	Ejection of tendons	3	4	12	Incorporate requirement for pipe penetrations in initial design. Supply information of "no drilling zones"	1	4	4	Design, Construction, Operation	Client/ A-Consult	Yes			Install warning signs on structure "DANGER - INTERNAL TENDONS - DO NOT DRILL" prior to consulting with the supplier of the tank.
Maintenance Risks															
M1	Working over water	Falling into water	3	5	15	Handrailing to be installed around rim if less than 1.1 m above GL or platforms	1	5	5	Design, Operation	Client	No			Safety Procedures for working over water to be followed
Decommisioning Risks															
D1.	Demolition	Unpredictable collapse and injury to operatives	3	5	15	Correct demolition procedure to be defined in O&M Manuals/H&S File. Special attention to tensioned tendons to be taken.	1	5	5	Design, Operation	Client/ A-Consult	No			Assembly guide/manual for A-Consult Anchorage system to be followed

Note: At final review stage all design mitigation measures should have been taken and residual risk level indicated	**Likelyhood (L):** 1 - Rare 2 - Unlikely 3 - Possible 4 - Likely 5 - Certain	**Consequence (C)** 1 - Insignificant 2 - Minor 3 - Moderate 4 - Major 5 - Death	**Index (I)** Likelyhood x Consequence (see also CIRIA SP125) 10-30 - Very high Risk - not acceptable. Apply mitigation. Seek director approval if significant risk remains 6-9 - Medium Risk - Apply mitigation. Seek director approval if risk cannot be reasonably and practically reduced below "this" level 1-5 - Low Risk - May be accepted if all reasonalby practicalbe control measures are in place

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