Activity Hazard Analysis (AHA) — Dewatering and Cofferdam Operations

Overall RAC: **M** · SAMPLE formatted to EM 385-1-1 (15 March 2024) and ENG Form 6206 (SEP 2024) conventions. Adapt every step, hazard and control to actual site conditions; requires competent-person preparation, SSHO review and Government acceptance before the definable feature of work begins (EM 385-1-1 2024, para 2-6). Contracts solicited before 15 March 2024 remain governed by the 2014 edition — verify which edition your contract cites.

JOB STEPS	HAZARDS	CONTROLS	RESIDUAL RAC
Mobilization, utility locates, and plan submittals	Striking underground utilities while installing wellpoints, sumps, or driving cofferdam sheeting	• Obtain dig permits and locate and mark all underground utilities, then physically verify by hand digging or vacuum excavation within 3 ft of the marked location before any mechanical excavation or sheet driving (25-8.f). • Review as-builts and utility owner records with the Competent Person, Excavation before finalizing wellpoint and sheet-pile layout. • Treat unverified marked utilities as energized and reroute wellpoint or sump locations rather than working blind over a marked line.	L
	Starting work without accepted plans and AHA — uncontrolled hazards during first drawdown	• Submit the Excavation and Trenching Plan, developed by the CP, for any excavation 5 ft or deeper and obtain USACE/KO acceptance before beginning work (25-7). • For cofferdams, include a Controlled Flooding Plan covering fall protection, access and egress, and evacuation procedures (25-7.h). • Have every involved employee review and sign this AHA before starting, and hold the preparatory meeting with the AHA already accepted (2-6.d(2), 2-6.d(4)(h)).	L
Set up temporary power, generators, and pump electrical	Electrocution from pump circuits, cords, and connections in a wet environment	• Provide GFCI protection on all 125-volt, 15-, 20-, and 30-amp and greater receptacles supplying temporary power, and on all circuits serving portable tools and pumps (11-8.l(9)). • Use only submersible pumps designed by the manufacturer for wet locations; a Qualified Person must install and test each pump (11-8.m(6)). • Where personnel are or could be in the water during pump operation, equip the pump with a UL 943 Class A GFCI; if the manufacturer prohibits personnel in the water, implement a Hazardous Energy Control Program with LOTO instead (11-8.m(6)). • Bond the neutral to the generator frame and provide GFCI protection on portable and vehicle-mounted generators (11-8.l(1), NFPA 70 445.20(B) and 590.6(A)(3)). • Test all GFCIs monthly, and test portable GFCIs for designed functionality before each use (11-5.e, 11-8.m(2)).	L
	Cords and discharge hoses creating trip hazards and mechanical damage to conductors	• Elevate or route cords and hoses out of walkways, access ramps, and equipment travel paths. • Protect cords passing through work areas from damage and remove damaged cords from service immediately.	L
Install cofferdam sheeting or wellpoint system	Drowning — personnel working on or over water during sheet driving	• Provide inherently buoyant Type III or Type V work vests or better USCG-approved PFDs, properly worn, for all personnel on structures or equipment over or next to water without guardrails (5-8.g). • Stage ring buoys with at least 90 ft of 3/8-inch line at intervals not exceeding 200 ft along the waterfront work area (5-8.g). • Provide a lifesaving skiff with trained launch and operating personnel immediately available where a drowning hazard exists (5-8.l, 5-3.e). • If work is performed from barges or work boats, inspect the floating plant before use and operate it with trained motorboat operators (19-5.a(4), 19-3.b).	M
	Struck-by during handling and driving of sheet piles	• Rig and handle sheets under a designated rigger with tag lines; keep all personnel clear of suspended sheets and the hammer fall zone. • Establish exclusion zones around the crane and driving template and enforce them with physical barriers or a spotter. • Coordinate this step with your pile driving AHA where a pile rig is used (Ch 16).	L

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	Falls from the cofferdam top or template into the excavation or water	• Provide standard guardrails or equivalent Chapter 21 protection wherever personnel or equipment are required or permitted on the cofferdam (25-8.k(2)). • Provide walkways, bridges, or ramps with at least two means of rapid exit, each equipped with standard guardrails (25-8.k(3)).	L
Initial drawdown and pumping operations	Cofferdam overtopping or failure during drawdown	• Where overtopping by high water is possible, the cofferdam design must include provisions for controlled flooding of the work area (25-8.k(1)). • An RPE must plan and direct all pumping, drainage, freezing, or similar groundwater control measures, addressing moisture balance in surrounding soils and effects on adjacent foundations (25-8.c). • Develop, post, and brief evacuation procedures with distinct warning signals for emergency evacuation and for controlled flooding (25-8.k(4)). • Draw down in staged lifts while the CP monitors sheeting deflection, seepage, and boil formation at the base.	M
	Pump or power failure allowing rapid water accumulation	• Provide an emergency power source wherever continuous operation of groundwater control equipment is necessary (25-8.c). • The CP must monitor water control equipment and operations to ensure proper operation (25-8.c, 1926.651(h)(2)). • Maintain standby pumps of equal capacity, staged and plumbed, and establish a water-level trigger for stopping in-excavation work.	L
Excavation and construction work inside the dewatered area	Cave-in of excavation faces destabilized by seepage or drawdown	• Do not permit work in excavations where water is accumulated or accumulating unless the water hazard is controlled (25-8.c, 1926.651(h)(1)). • The CP must conduct documented inspections before each shift, throughout the shift, after every rainstorm, and whenever seepage, fissures, sloughing, or bottom bulging occur (25-5.a). • Classify soil at the start of each shift and as conditions change, and document results for the life of the project (25-5.b). • Use the sloping, benching, or protective systems required by the accepted Excavation and Trenching Plan (25-7, Ch 25).	L
	Hazardous atmosphere in deep, dewatered excavations	• In excavations 4 ft or deeper where oxygen deficiency or gaseous conditions are known or suspected, test the air before each shift or more often as directed by the CP, and log all results at the work site (25-5.c). • Ventilate or evacuate and re-test whenever readings exceed action levels; evaluate confined space applicability for cofferdam cells (Ch 34).	L
	Blocked emergency egress from the cofferdam or excavation	• Maintain both means of rapid exit clear of hoses, materials, and spoil at all times (25-8.k(3)). • Verify egress routes and evacuation signals at each shift briefing against the posted procedures (25-8.k(4)).	L
Discharge management and environmental controls	Erosion, undermining, or flooding at the discharge point	• Discharge through energy dissipaters or onto stabilized surfaces located away from excavation edges, slopes, and cofferdam toes. • Use diversion ditches, dikes, or other means to keep surface water and returned discharge from re-entering the excavation (25-8.c). • Walk the full discharge line each shift to check for leaks, hose failure, and ponding against structures.	L
	Sediment-laden discharge violating water quality permits	• Route discharge through the sediment controls (bags, basins, tanks) required by the project permit before release. • Monitor turbidity or discharge clarity at the frequency the permit requires and stop pumping if controls are overwhelmed.	L

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High-water events and controlled flooding contingency	Rising water overtopping the cofferdam and trapping personnel or equipment	• Monitor weather forecasts and river/tide gauges against the trigger elevations in the Controlled Flooding Plan and stop work at the defined action stage (25-7.h). • Sound the posted warning signal and evacuate personnel and equipment by the designated rapid egress routes before initiating controlled flooding (25-8.k(3), 25-8.k(4)). • Flood the work area in a controlled manner per the design to equalize pressure rather than allowing sudden overtopping (25-8.k(1)). • Drill the evacuation procedure with all crews before first drawdown and after crew changes.	M
	Vessel strike against a cofferdam near a navigable channel	• Protect cofferdams located close to navigable shipping channels from vessels in transit — fendering, warning buoys, lighting, and notice to mariners as required (25-8.k(5), 1926.802(c)). • Coordinate marine traffic notifications with the USCG and the district as required by the contract.	L
System removal, rewatering, and demobilization	Uncontrolled rewatering or ground movement during sheet extraction	• Remove protective systems and sheeting in the sequence planned and directed by the RPE, allowing controlled rewatering to equalize head before extraction (25-8.c). • Keep personnel out of the excavation once pumping stops and water begins to accumulate (25-8.c, 1926.651(h)).	L
	Electrical energy during pump and temporary power removal	• De-energize, verify, and lock out pump circuits before disconnecting pumps and cords (Ch 12, Ch 11). • Have a Qualified Person remove generator connections and temporary wiring.	L
	Struck-by during sheet pulling and equipment loadout	• Maintain exclusion zones under the extraction rig; use tag lines and a spotter for swinging sheets. • Inspect rigging before use and stage extracted sheets on stable dunnage away from the excavation edge (25-8.d).	L

Equipment To Be Used

• Submersible pumps rated by the manufacturer for wet locations, with UL 943 Class A GFCI protection (11-8.m(6))

• Wellpoint system, header pipe, sump pumps, and discharge hose with energy dissipaters

• Portable generators with bonded neutral and GFCI protection, plus emergency backup power for continuous groundwater control (25-8.c, 11-8.l(1), 11-8.l(9))

• Sheet piles, driving template, and crane or vibratory hammer (coordinate with pile driving AHA, Ch 16)

• Standard guardrail systems and walkways/bridges/ramps for cofferdam access and egress (25-8.k(2), 25-8.k(3))

• USCG-approved Type III/Type V PFDs, ring buoys with 90 ft of 3/8-inch line, and a lifesaving skiff (5-8.g, 5-8.l)

• Water level and gauge monitoring equipment tied to Controlled Flooding Plan trigger elevations (25-7.h)

• Calibrated multi-gas air monitor for excavations 4 ft or deeper (25-5.c)

Training Requirements

• Competent Person, Excavation: training, knowledge, and experience in soil analysis, protective systems, and 29 CFR 1926 Subpart P (25-3.a)

• Rescue personnel trained on the rescue procedures in the Excavation and Trenching Plan (25-3.b, 25-7.i)

• Pump operators trained to operate pumps according to the manufacturer's instructions (11-8.m(6))

• Skiff crew trained to launch and operate the lifesaving skiff; motorboat operators complete a USCG Auxiliary/NASBLA boating safety course and documented handling training (5-3.e, 19-3.b)

• Users of automatic-inflatable PFDs trained in use and restrictions (5-3.d)

• All involved employees review and sign this AHA before starting work (2-6.d(2))

Inspection Requirements

• CP documented inspection of the excavation, adjacent areas, and protective systems before each shift, throughout the shift, and after every rainstorm or hazard-increasing event (25-5.a)

• CP soil classification testing before each shift and as conditions warrant, documented for the life of the project (25-5.b)

• Air testing before each shift in excavations 4 ft or deeper where oxygen deficiency or gaseous conditions are suspected, with a log kept on site (25-5.c)

• CP monitoring of water control equipment and pumping operations to ensure proper operation (25-8.c)

• Monthly GFCI testing, with portable GFCIs tested before each use (11-5.e, 11-8.m(2))

• Floating plant inspected by a QP before being placed in use and at least annually (19-5.a(4))

• PFDs inspected, maintained, and stowed per the manufacturer's instructions (5-8.g)

• Daily walkdown of discharge lines, egress routes, and posted evacuation signals against the Controlled Flooding Plan (25-7.h, 25-8.k)

Competent / Qualified Person Requirements

• Competent Person, Excavation — develops the Excavation and Trenching Plan and this AHA, inspects each shift, monitors water control equipment, and must always be on site during excavation work; identify by name with credentials in the AHA (25-3.a, 25-4.a, 25-6.c)

• Registered Professional Engineer — plans and directs all pumping, drainage, freezing, or similar groundwater control measures and the cofferdam/controlled flooding design (25-4.c, 25-8.c, 25-8.k(1))

• Qualified Person, Electrical — installs and tests each submersible pump and the temporary power system (11-8.m(6))

• Qualified Person, Floating Plant — performs pre-use and annual floating plant inspections when work is over water (19-5.a(4))

References

• EM 385-1-1 (2024) Ch 25 — Excavation and Trenching

• EM 385-1-1 (2024) 25-8.c — Protection from Water

• EM 385-1-1 (2024) 25-7.h — Controlled Flooding Plan for Cofferdams

• EM 385-1-1 (2024) 25-8.k — Cofferdams

• EM 385-1-1 (2024) Ch 11 — Electrical (pump power and GFCI protection)

• EM 385-1-1 (2024) Ch 19 — Floating Plant and Marine Activities (work over water)

• 29 CFR 1926.651(h) — Specific Excavation Requirements — Water Accumulation (Subpart P)

• 29 CFR 1926.802 — Cofferdams (Subpart S)