

Heavy Weather

Thank You  
Walter Kemp

**ATTACHMENT A  
SAFETY HAZARD ANALYSIS / DIVE PLAN**

Date: 05/06/09 UCC Project Number: 01-07204.97

Client Company Name: Exelon Nuclear Corporation Facility Name: Oyster Creek Nuclear Generating Station

Work Location at Facility: Condensate Storage Tanks UCC Project Manager: Phil McDermott

Dive Supervisor: Mark Marquis UCC Project Safety Coordinator: Frank Tarver

Site Emergency Contact / Phone: Control Room / 911

**Job Task/Objective:**

- Diving support for cleaning and inspection activities in the Oyster Creek Condensate Storage Tank (CST):
- Equipment mobilization and set-up.
  - Perform as-found FME/debris inspections in CST's as directed by the Plant.
  - Perform U/W vacuuming of CST floor as directed by the Plant.
  - Perform visual inspection of CST floor plating <sup>mm 5/6/09</sup> *Walter Kemp*
  - Perform final FME swim-thru in CST prior to installing hatch covers to close the system.
  - Equipment break-down and demobilization.

**Man-Loading and Responsibilities:**

- **Project Manager/Dive Supervisor (1):** Directly responsible for overseeing and directing the project. This includes, but is not limited to, job planning and coordination, record keeping, safety and health of dive team, knowledge and understanding of regulations and procedures related to Commercial Diving Operations and educating less experienced dive team members on clearance walk-downs and boundary issues.
- **Diver/Mechanics (4):** Diver Mechanics are responsible for understanding the overall project or operational plan and to conduct diving and support activities in a safe and efficient manner under the direction of the Diving Supervisor. This includes, but is not limited to, assisting with setting up and maintaining equipment, ensuring the equipment is tested and ready for use, reporting the condition of the job site, informing topside of any potential hazards, maintaining open communication with the Dive Supervisor regarding illness, physical fatigue, pain or problems before and after all dives. Diver/Mechanics will be assigned to perform one of the following specific roles/responsibilities during a given diving activity:
  - **Diver:** The assigned Diver is responsible for understanding the assigned tasks for the planned dive activity and conducting the dive plan in a safe and efficient manner.
  - **Standby Diver:** The assigned Standby Diver will be stationed at the dive location in a state of readiness to be deployed in a timely manner in case of emergency or to assist an injured or fouled Diver. The Standby diver may have limited duties while a diver is in the water.
  - **Tenders:** Assigned Tenders will support the dive team and the diver when performing underwater tasks. This includes, but is not limited to: Assisting the diver with dressing and undressing; Tending the diver during dives and knowing the approximate depth and location of the diver; Assisting with topside support of the diver, being attentive for conditions that may produce a hazard to the diver and/or the dive team; Deploying the Stand-by Diver when required and extracting an incapacitated Diver in the event of an emergency.
- Personnel shall fulfill the above duties as assigned. Personnel may function in more than one (1) position as required by the Diving Supervisor.

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**Safety Considerations:**

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| <ul style="list-style-type: none"> <li>● Dedicated phone line will be utilized at the dive station to contact and communicate with Plant/Local Emergency Services (Control Room/Hospital/Chamber) as necessary.</li> <li>● Diver to maintain situational awareness of surroundings in the water relative to obstructions in the water and the egress route in the event of an emergency.</li> <li>● All diving activities to be performed IAW UCC Safe Practices Manual.</li> </ul> | <ul style="list-style-type: none"> <li>● Diver ingress/egress to be provided via scaffold ladder installed thru 20" diameter man-way at the top of the tank. Optionally, a diver "stage" may be employed to deploy and retrieve the diver.</li> <li>● Plant will be notified upon commencement and completion of each dive.</li> <li>● All equipment to be visually inspected prior to use.</li> <li>● Refer to "Activity Hazards Analysis" section for specific considerations.</li> </ul> |
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**Describe Dive Mode / Equipment Required / Procedures:**

**Diving Mode:**

- Surface-Supplied Air; Contaminated Water Diving Equipment. Contaminated equipment to be inspected prior to use; replace used equipment as deemed necessary.
- Anticipated water depth: Less than 50'.
- All diving activities to be conducted within No-Decompression Limits ("No-D" Limit: 50' / 100 minutes). Actual "No- D" Table to be determined on a per-dive basis based on actual deepest recorded depth for each dive.
- Diving activities are planned utilizing one (1) diver in the water at a time.

**Diving Emergency Plan:**

Incapacitated diver to be removed from the water (CST) by UCC Tenders/Standby Diver as necessary; Plant 1<sup>st</sup> Responders shall coordinate extraction from the CST mezzanine and out of the RCA. In the event of an incapacitated diver emergency:

- Notify Control Room of emergency and request dispatch of Plant Rescue Team
- Retrieve diver to the surface along safe ascent route by pulling on diver umbilical. If the designated Stand-by Diver is needed to affect the rescue, diver shall don equipment and deploy from the dive platform.
- Stand-by diver to attach diver to suspended retrieval device pre-staged on over-head anchor point (attach to D-ring on diver harness to pull diver out of the water).
- Topside personnel to retrieve diver from tank, remove dive helmet and diver-dress, and attend to diver until Plant Rescue Team arrives.
- Stand-by diver can then be removed from tank via the diver stage.

**Note:** Order of diver/stand-by diver retrieval may be augmented to accommodate conditions.

**Diving Procedures:**

All diving activities to be performed IAW UCC Safe Practices Manual and the following procedures:

- Governing Procedures: Exelon Procedure MA-AA-716-015: Control of Diving; Exelon Procedure RP-AA-461: Radiological Controls for Contaminated water Diving Operations
- Reference Procedure: UCC Procedure IOP.02.05 – Contaminated Water Diving
- Contingency Procedure: UCC Procedure IOP.02.05-1 – Warm Water Diving Procedure

**Diving Equipment:**

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| <ul style="list-style-type: none"> <li>● Two (2) Diver Umbilicals (150' minimum)</li> <li>● Two (2) Diver Radios</li> <li>● One (1) Outland U/W video camera system</li> <li>● One (1) Quincy 325 breathing air compressor</li> <li>● Two (2) Emergency Breathing Air Bottles</li> </ul> | <ul style="list-style-type: none"> <li>● Calibrated Pneumo to read divers depth</li> <li>● Two (2) Diver Helmets (DESCO)</li> <li>● Diver thermal protection as required (woolies/cool suit)</li> <li>● One (1) U/W vacuum system (8-bank filter manifold)</li> <li>● Vacuum-box leak detection equipment</li> <li>● Miscellaneous M&amp;TE</li> </ul> |
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**Safety Equipment:**

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| <ul style="list-style-type: none"> <li>● Ambu-bag type resuscitator</li> <li>● Stokes litter with floatation</li> <li>● Pre-staged extraction equipment</li> </ul> | <ul style="list-style-type: none"> <li>● Dedicated phone line at Dive Control Station</li> <li>● Air monitoring and filtration equipment (HEPA)</li> <li>● Fire Extinguisher</li> <li>● Safety screens for tank outlet penetrations</li> </ul> |
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**Activity Hazards Analysis and Environmental Conditions:**

#	Activity	Description of Hazard/Unsafe Condition	Actions to Mitigate
1.	<b>Topside Activities:</b> <ul style="list-style-type: none"> <li>● Equipment mobilization and set-up;</li> <li>● Equipment demobilization and break-down;</li> <li>● General topside support</li> </ul>	<b>Heat Stress</b> <ul style="list-style-type: none"> <li>● Depending on outside temperature, potential heat stress conditions may exist due to elevated temperatures on top of the tank,</li> </ul>	<ul style="list-style-type: none"> <li>● Drink plenty of fluids.</li> <li>● Avoid over exertion</li> <li>● Employ stay times, if required</li> </ul>
		<b>Open Hole Hazards</b> <ul style="list-style-type: none"> <li>● Open hatchways on top of CST present a falling hazard for topside personnel.</li> </ul>	<ul style="list-style-type: none"> <li>● Fall protection (PFD or Safety Harness) required when working adjacent to unprotected tank openings.</li> </ul>
		<b>Hand Injury Hazards</b> <ul style="list-style-type: none"> <li>● Equipment and material handling present hand injury hazards.</li> </ul>	<ul style="list-style-type: none"> <li>● Use protective gloves appropriate for the task.</li> <li>● Gloves required when climbing ladders.</li> </ul>
		<b>Lifting/Rigging Hazards</b> <ul style="list-style-type: none"> <li>● Equipment and material handling present during bodily injury hazards during equipment set-up and break-down.</li> </ul>	<ul style="list-style-type: none"> <li>● Employ proper lifting techniques when handling heavy and/or awkward items – Lift with your knees, not your back!!</li> <li>● Employ properly rated material handling equipment (hoists, fork lifts) as needed; Plant-certified rigging required for all lifts.</li> <li>● Inspect rigging prior to each use; remove noncompliant items from service.</li> <li>● Verify rigging configuration before making the actual lift;</li> <li>● Stay clear of suspended loads.</li> </ul>
		<b>Tripping / Slipping Hazards</b> <ul style="list-style-type: none"> <li>● Existing and transient equipment on mezzanine / scaffold around CST present potential tripping hazards.</li> <li>● Wet conditions on mezzanine / scaffold around CST during diving activities present potential slipping hazards.</li> </ul>	<ul style="list-style-type: none"> <li>● Minimize tripping hazards by staging transient equipment/hoses away from foot-traffic lanes to the extent possible.</li> <li>● Route intended foot-traffic lanes away from existing fixed-placed equipment / conduits to the extent possible.</li> <li>● Maintain good housekeeping and employ “clean-as-you-go” work practices.</li> <li>● Mop/wipe up standing water on work platform.</li> </ul>
		<b>Noise Hazards</b> <ul style="list-style-type: none"> <li>● Posted high noise areas in various locations of the Plant.</li> <li>● Potential noise hazards in work area around CST’s; may interfere with or complicate communications.</li> </ul>	<ul style="list-style-type: none"> <li>● Hearing protection required in posted areas.</li> <li>● Maintain 3-way repeat-back communications in high noise areas to ensure instructions are understood.</li> <li>● Suspend work activities if high noise adversely affects communications with the diver and/or topside support.</li> </ul>

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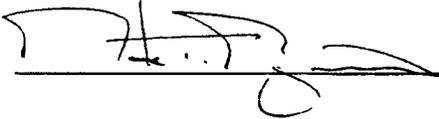
**Activity Hazards Analysis and Environmental Conditions:**

#	Activity	Description of Hazard/Unsafe Condition	Actions to Mitigate
2.	Diving Activities inside the Tank: ● Diving inspection activities inside tank; ● Cleaning activities inside tank;	Hypothermia / Hyperthermia ● Potential hazard for diver depending on actual tank water temperature.	● Tank water temperatures shall be verified with Plant-provided thermocouple prior to each dive. Temperatures to be recorded in 10'-increments inside the tank. ● For temperatures below ≤94°F, employ thermal protection as required (woolies) for diver comfort. ● The provisions of UCC Procedure IOP.02.05-1 – Warm Water Diving Procedure, shall apply for water temperatures greater than 94°F.
		Diver Entrapment / Entanglement Hazards ● Tank to be "in-service" during diving evolutions; penetrations in the tank will not be isolated for personnel protection against potential flow/suction hazards during influent / effluent operations. ● Potential suction/differential hazards in vicinity of CST penetrations / nozzles present risk of diver entrapment. ● U/W vacuum system presents potential entanglement hazard for diver.	● Plant to verify that potential maximum flow rates thru non-isolated penetrations do not present entrapment hazard. ● Diver shall place "Safety Screens" over penetration openings inside the tank as added protection against suction and entrapment hazards. ● Diver to maintain situational awareness of surroundings in the CST relative to obstructions created by suspended vacuum system; minimize items in tank.
		Restricted Access Opening ● The 20" man-way at the top of the tank is too narrow to safely support anything more than diver ingress / egress and lowering or removing tools on an as-needed basis.	● No equipment required for the project shall be staged/suspended thru the 20" man-way (other than access ladder) to maintain the man-way clear for diver egress. ● Any tools/equipment lowered thru the hatch while a diver is in the water shall be immediately removable to affect safe diver egress. ● Vacuum system is required to be suspended underwater; due to the entanglement dangers it would present to diver ingress/egress, an alternate location for suspending the system shall be utilized. ● Power cord for vacuum system shall not be routed thru the access man-way to prevent becoming an entanglement hazard during egress. ● Filters shall be removed from the tank as they are expended; they shall not remain suspended in the tank for later removal due to the entanglement hazard they present to ingress / egress.

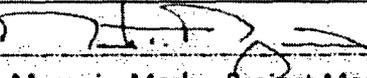
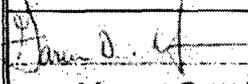
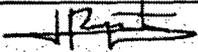
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**Activity Hazards Analysis and Environmental Conditions:**

#	Activity	Description of Hazard/Unsafe Condition	Actions to Mitigate
3.	Diving Activities inside the Tank (continued): <ul style="list-style-type: none"> <li>● Diving inspection activities inside tank;</li> <li>● Cleaning activities inside tank;</li> </ul>	<b>Confined Space Hazards</b> <ul style="list-style-type: none"> <li>● Potential atmospheric hazards inside tank.</li> <li>● Diver ingress/egress hazards – constricted access opening;</li> </ul>	<ul style="list-style-type: none"> <li>● CST considered a “Permit-Required Confined Space”. Air space in CST to be tested/monitored and maintained as “breathable”.</li> <li>● Water level inside tank shall be maintained at highest permissible elevation to minimize free-climb for diver.</li> <li>● Ladder to be installed thru man-way and extend a minimum of 3’ below the water level.</li> <li>● Emergency extraction device to be staged / mounted to lift incapacitated diver out of tank thru the man-way.</li> </ul>
		<b>Radiological Hazards</b> <ul style="list-style-type: none"> <li>● Potential exposure hazards from sludge and spent vacuum filters.</li> <li>● Potential contamination hazards</li> </ul>	<ul style="list-style-type: none"> <li>● Pre-dive survey required in each tank prior to diving.</li> <li>● Spent filters shall be removed from the tank</li> <li>● Employ good rad-worker practices to minimize exposure as well as minimize the spread of contamination.</li> </ul>
4.			●
5.			●

Meeting Conducted By:  \_\_\_\_\_

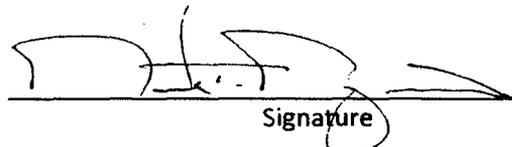
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Employee Signature/Printed Name/ Dive Team Assignment (Title)	Date	Employee Signature/Printed Name/ Dive Team Assignment (Title)	Date
 Fisher, Tim – Diver/Mech	5/6/09		
 Marquis, Mark – Project Manager	5/6/09		
 Moore, Garwin – Diver/Mech	5/6/09		
 Repiton, Heidi – Diver/Mech	05.06.09		
 Swinth, Gordon – Diver/Mech	5/6/09		

By signing the above, I understand and have been briefed on the scope of work and job responsibility that I am to perform, I am physically fit to dive, and have the right to refuse any task which is believed to be unsafe or for which I have not been adequately trained.

**NOTE: A NEW JOB HAZARD ANALYSIS/DIVE PLAN SHALL BE PERFORMED WHEN THERE IS A CHANGE TO SCOPE OF WORK, DIVE CONDITIONS OR WHEN DEEMED NECESSARY BY THE PERSON IN CHARGE**

Conducted By: Mark Marquis  
Printed Name

  
Signature

Title: Project Manager

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Item No.	Description	Yes	No	N/A	Comments
1	Personal diving helmet, mask, etc. may not be used for diving operations without prior approval from the President of UCC or his designee.			X	
2	Umbilical is marked in 10 foot increments up to 100 feet, starting at the divers end and in 50 foot increments after 100 feet.	X			
3	Helmets and masks contain working two-way communication at each dive location.	X			
4	When not in use, breathing gas supply hoses have open ends taped, capped or plugged.	X			
5	Breathing gas supply, including reserves is adequate. Record breathing gas supply type in comment section.	X			To be recorded on dive log prior to each dive.
6	Electrical equipment equipped with a plug having a grounding lug, GFI and visually inspected prior to each use.	X			
7	All hand held electrical tools and equipment are de-energized before being placed in or retrieved from the water.	X			
8	A two-way voice communication system and phone numbers, for use in obtaining emergency assistance, is available at each dive location.	X			
9	Is diver's thermal protection required, if yes, record protection equipment used in comment section.	X			Dry suit; woolies or cool suit as required.
10	Gas cylinder caps in place, bottles stored in vertical positions and away from heat.	X			
11	Air lines, electrical leads, etc. tied off overhead or secured and covered at ground level.	X			
12	Flammables in approved, labeled containers.	X			
13	Diving mode has been determined and is adequate for the environment and conditions of the dive.	X			
14	Fire extinguishers at work locations.	X			Supplied by Plant
15	Copy of UCC Safe Practices Dive Manual present.	X			
16	Equipment tagout/lockout considerations have been addressed.	X			
17	If rigging and heavy material handling are required, personnel training has been conducted.	X			Plant craft available for rigging.
18	When divers are working in an enclosed or physically confining space, a standby diver is always positioned at the point of entry.	X			As necessary
19	Adequate warning signals are displayed at each dive location where the area is capable of supporting marine traffic.			X	
20	No penetrations or decompression dives are permitted without prior department approval of the Operations Department.			X	
21	Divers are equipped with a quick release weight belt.	X			

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Item No.	Description	Yes	No	N/A	Comments
22	American Red Cross First Aid kit and a bag type manual resuscitator are at dive location.	X			
23	Life jackets or throw-rings made available to dive team members.	X			As required
24	General area has been assessed for possible hazards due to other operations in the dive area.	X			
25	A safe means has been designated for entering and exiting the water which extends below the surface and is adequate for rescue of dive personnel.	X			
26	Compressor intakes are located into the wind and care taken to keep possible sources of contaminants out of the air supply.	X			
27	Calibrated gauges, indicating the diver's depth, are used by all divers.	X			
28	When welding underwater, a current interrupt switch is tended by a dive team member.			X	
29	The primary breathing air supply at the dive location is sufficient to support all divers for the planned duration of the dive including decompression.	X			
30	All dive equipment has been inspected prior to each dive.	X			Refer to pre-dive check-lists
31	Support personnel have adequate personal protection equipment (i.e.: hardhats, eye protection, safety shoes).	X			
32	Have all dive team members been briefed on dive objective and possible hazards? Determined to be physically fit to dive?	X			To be assessed again prior to each dive.
33	All personnel have been briefed and understand the hazardous materials and chemicals used at the job location. Containers are marked and MSDS information is available.	X			
34	Dives in excess of 100 fsw has a decompression chamber present, staffed with qualified personnel. Decompression and treatment tables have been reviewed. Altitude corrections taken into consideration?			X	

Submitted By:

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Date

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Project Management Review:

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Date

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Compliance Review:

\_\_\_\_\_

Date

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Division Safety Coordinator