7.20 GAS FREE MISHAPS
“DEATH IN A PUMP ROOM”

ENABLING OBJECTIVES

EXPLAIN how Gas Free evolutions can go wrong and the Lessons Learned by these incidents

BACKGROUND

- East Coast Carrier, R-Division personnel were clearing tags and removing a blank flange from CHT piping in STBD CHT Pump Room to restore the system following completion of contractor repairs.
- Removal of the flange resulted in release of sewage and Hydrogen Sulfide (H_2S).

BACKGROUND

- On 06 Apr 04, CHT Work Center Supervisor was directed by the Repair Officer to clear tags on CHT System NR3. Due to other ongoing evolutions/maintenance, the work had not occurred by 1600. The acting CHT Shop LCPO relayed the Repair Officer's order that the work be completed prior to granting of liberty. Approximately 1730 the WCS received permission from the EOOW/EDO to clear tags and place the NR3 CHT system into operation.

BACKGROUND

- HT3 and HTFA entered STBD CHT Pump Room and commenced clearing tags on various valves and a blank flange. HTFN joined HTFA and HT3 in the STBD Pump Room when HT3 started to remove the bolts in order to remove the blank flange. After loosening five bolts and removing three bolts from the discharge flange, H_2S and sewage under static head pressure began to escape into the Pump Room.

BACKGROUND

- HT3 tried to divert the flow of sewage by attempting to open NR3 CHT pump discharge valve in order to gravity drain system into NR3 CHT Tank. Due to the odor of the high concentration of H_2S, HT3 decided to evacuate the Pump Room and directed HTFA and HTFN to evacuate. HTFN, overwhelmed by the existing H_2S, attempted to evacuate the space but was overcome.

BACKGROUND

- HTFN fell approximately 20 feet becoming entangled in the ladder safety cage and blocked HTFA's only exit path, trapping the HTFA in the STBD CHT Pump Room.

TIMELINE

0930

Repair Officer orders “Clear Tags”

1129

Major Fuel Oil leak, all other work ordered to stop till casualty cleared.

1630

HT2 initiates clearance of tags

1715

HTFA and HTFN directed by HT2 to clear tags and bring NR3 CHT System into operation.

-Work identified as “Liberty Dependant” not as “IDLH”, CO/CHENG not informed.

-Space not Gas Freed, Briefed or Supervised by CHT Shop Khaki/LPO or Safety Observer.

-Did not follow NSTM 593, NSTM 074 or 5100.19D.

TIMELINE

1730

HTFA and a second HTFN shift spectacle flange in Comminutor space joined by first HTFN and HT3. First HTFN and HT3 head to STBD CHT Pump Room to standby to clear tags.

1740

HTFA proceeds to STBD CHT Pump Room where he finds First HTFN and HT3 loosening bolts to top of pump discharge valve to remove the blank flange. While attempting to remove blank flange HT3 hears gas escaping from loose flange and is then sprayed with sewage. HT3 experienced shortness of breath and departs the space and directs HTFN and HTFA to evacuate space. The H_2S alarms did not activate.

-No Air Breathing, Ventilation or PPE equipment used.

-Space Ventilation system non-operational due to grounds in vent motor, CHT Shop aware system INOP.

TIMELINE

1745

HT3 encountered an HTFN on the 3rd deck and directed him to get help. The HTFN went to the CHT Shop and notified the HT2 of the incident. HT2 contacted DC Central and reported "Man Down" in the space, HTFN (in space) called to HTFA (in space) to exit the space, then proceeded to climb the vertical ladder. He remembers making it to the top of the ladder at the fourth deck, but passed out before gaining the platform. He fell approximately 20 feet down the ladder and became entangled, hanging upside down by one leg in the safety cage. HT3, looking down the ladder from 4th deck witnesses HTFA attempting to climb the ladder, but he was blocked by the HTFN. HTFA climbs back down into the space and appeared to be pacing, dazed and confused. He succumbed and fell to the deck grating.

-Victims failed to don EEBD's (available) to egress the space.

-"Man Down" causes wrong response team to arrive.

TIMELINE

1750

HT3 attempts to descend down ladder without respiratory protection to try and move the HTFN to allow the HTFA to escape. HT3 unable to move HTFN and is forced out by high concentrations of H_2S gas.

1755

“Man Down” called away. Initial Man Down response was by the Medical Team, per command doctrine. Additional response was based on hearing calls on HYDRA and word of mouth.

1805

Base Fire and Rescue receive a 911 call from ship.

-No one was clearly in charge at scene of casualty.

-CHENG and On-Scene Leader donned SCBA’s in order to rescue HTFN.

TIMELINE

1810

Base Fire and Rescue on scene

1830

Ship's IET and Base Fire Department extract HTFN from space for treatment by Medical Response Team.

1835

Life Flight helicopter requested by Base Fire and Rescue.

-IET not trained in "Deep Vertical Access Rescue".

-Cage around vertical ladder at entrance to STBD Pump Room and deck combing were not conductive to space Ingress/Egress with SCBA's and hampered personnel recovery efforts

TIMELINE

1845

HTFN is medevaced to local hospital

1859

Life Flight helo arrives on ship's flight deck.

1900

HTFA extracted from space by Base Fire Department and is taken to Medical for stabilization.

–IET working with CHENG rescued the injured HTFN, Base Fire and Rescue recovered the HTFA.

–This training *has* been required IAW the 074 V3 for years (1982), yet it is not trained in earnest, if at all.

–Specialized equipment is costly and to use properly requires civilian training until NAVSEA outfits ships and provides advanced training.

TIMELINE

1929

HTFA departs ship's flight deck via Life Flight helicopter en route to local hospital.

2000

Ship is notified HTFA has expired.

09 APR 04

HTFN is released from local hospital.

-A drop test using the 4 gas analyzer at the entrance to the space indicated H2S levels of 250 PPM. IDLH is 100 PPM and PEL is 10 PPM.

Final Analysis

- CHT Shop personnel from Maintenance Man to LCPO were not knowledgeable of instructions pertaining to working in a potentially toxic gas environment as associated with CHT systems
- CHT Shop LCPO and LPO failed to train divisional personnel on the hazards of being exposed to sewage or what PPE and air sampling requirements were required while performing maintenance on CHT piping systems.
- Repair Officer failed to inform and receive authorization from the CHENG and CO that the CHT Division was opening CHT piping.

Final Analysis

- The Repair Officer failed to ensure a FWP was prepared and routed for working on a toxic/sewage system as required by the Joint Fleet Maintenance Manual.
- The Repair Officer violated the CNALINST 5400.32A (EDORM) by ordering the restoration of NR3 CHT system after normal working hours.
- The DCA failed to ensure the crew was indoctrinated in the use of EEBD's which should have included use in a toxic gas environment as directed per CINCPACFLTINST 3541.1B AND CINCLANTFLTINST 3541.1G.

Final Analysis

- Due to lack of knowledge, DCA failed to adequately review a single valve tag out on a toxic gas system and subsequently was not able to make the appropriate recommendations for isolation, safety and notification through the chain of command.
- The CHENG failed to enforce the use of established procedures for tag out and performing repairs and preventative maintenance on CHT systems as outlined in JFMM 4790.3, NSTM's 593 and 074 VOL3, TUM, and PMS MIP 4361/015.

Final Analysis

- The CHENG allowed a breakdown in communication by not requiring his notification of repairs to critical systems. Consequently there was no enforcement of required pre-maintenance briefs, status of repairs, status of ventilation, status of safeties and alarms. This situation subsequently prevented the Commanding Officer's knowledge and concurrence.

Final Analysis

- The DC organization experienced a break down of organization during initial rescue attempts. There was no Command and Control at the scene as the CHENG and On-Scene Leader donned an SCBA in order to rescue the HTFN. Initial word passed was “Man Down” vice “Toxic Gas” that caused the IET not to respond in full. Correct word was never subsequently passed. Duty Fire Marshal positioned himself at the entrance to the scene but failed to establish control of the situation.

Final Analysis

- Disciplinary action (Admirals Mast) was held for 6 crew member which included both enlisted and officers.
- 3 crew members were awarded nonjudicial punishment and 3 received non-punitive actions.
- Non-punitive actions take the form of verbal or written admonishments.

SUMMARY

We discussed how Gas Free evolutions can go wrong and the Lessons Learned by these incidents.

The Job of a DCA is more than a title, you are held Liable for your actions and the actions of your divisional personnel.

As a Damage Control Leader you and your division are 95% trainers and 5% responders. Know your job, Know your references, Train your crew and by doing all this you will keep your Shipmates safe!

REVIEW QUESTION

What must be followed strictly to ensure a safe evolution in Gas Freeing.

SORM, 074V3, Ships Gas Free Instruction