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Subject: Yellow Alert- Bulging Drum

Title: Yellow Alert-Hazardous Spill Clean-up Results in Bulging Drum Incident

Identifier LL7402Y Date April 7, 2000

LESSONS LEARNED- Employees must expect the unexpected and consider cause and effect situations during hazardous spill clean-up actions. Placing a composition of rock, limestone base and high pH soil contaminated with sulfuric acid into a sealed drum may allow sufficient chemical reaction to cause excessive internal drum pressure. This pressure may then cause the drum to bulge and to become an even more dangerous hazard to abate. Employees must also be aware that the rate of venting from the bulging drum may not be sufficient enough to overcome the increasing internal drum pressure being generated by the continuing chemical reaction.

ANALYSIS- On April 4, 2000, a hazardous chemical spill at the Waste Water Treatment Facility was reported to the Pantex Operations Center who in turn notified the Pantex Fire Department Hazardous Materials Response Team (HMRT). Two trained persons including the HMRT Captain responded to the spill location. Upon arrival they determined approximately three gallons of sulfuric acid had leaked onto the ground, probably from one of two drums adjacent to the spill area. They evaluated the situation and placed Zip Zorb (a clay based absorbing material) on the spill area. Noting the tarp covering the two adjacent sulfuric acid drums had also become partially saturated, they removed the restraining rope and tarp and placed them into a new 55 gallon drum used for hazardous spill response and remediation. They removed a substantial amount of composition rock, limestone base, soil and placed it into the 55 gallon drum, on top of the tarp and rope, filling the drum almost to the top. Additional soil was placed into a 5 gallon container to complete the clean-up. The HMRT team placed a lid on the 5 gallon container and installed a solid lid and retaining ring on the 55 gallon drum. This HMRT left the scene at approximately 1000 a.m., leaving the drums for a later pick up and disposition by Waste Operations personnel. The HMRT notified the Operations Center the spill had been cleaned up and containerized. At approximately 130 p.m. the same day, a waste water treatment supervisor arrived at the location to perform routine water sampling. Upon arrival, he noticed the 55 gallon drum had begun to bulge. He contacted the Fire Department who in turn dispatched a second two person HMRT, one of which was the HMRT Lieutenant. Upon arrival at the scene, the second HMRT noted the 55 gallon drum was bulging both from the bottom and the top of the drum. The Lieutenant contacted and discussed a plan of action with the HMRT Captain who had responded earlier that morning to clean up the spill. It was decided to vent the pressure from the bulging drum. The Lieutenant approached the bulging drum and loosened the drum's lid retaining ring which allowed the pressure to start venting, confirmed by an audible hissing sound. The Lieutenant left the immediate area of the drum and allowed the venting to continue for approximately 20 minutes. He then approached the drum again to loosen the retaining ring bolt a little more for additional venting. When he loosened the bolt, the retaining ring did not expand. He stopped and tightened the bolt back to the same position as he had first left it and the drum was still venting at the same rate. Upon completing this action, the Lieutenant noticed another Fire Department HMRT vehicle approaching the waste water treatment area. He turned

and backed away approximately five feet from the drum. At the same time, the internal drum pressure became sufficient to cause the lid and retaining ring to blow off and up approximately 20 feet into the air. The retaining ring came to rest about 10' and the lid about 17' from the drum location. Some of the soil in the drum was expelled and came in contact with the Lieutenants' body. With assistance, the Lieutenant used the facility eyewash while awaiting ambulance arrival. The Lieutenant was taken to the Occupational Medicine Department (OMD) at Pantex, where he was diagnosed as having no injuries. A while later, his team member mentioned eye irritation and was directed by recently arrived safety personnel to go to OMD for evaluation. He also was diagnosed as having no injuries related to the incident. The HMRT Captain and team member, who had arrived a second time, took actions to clean up the materials scattered during the expulsion from the drum. Due to compression of the tarp and loss of some of the drum soil, there was sufficient room to consolidate the 5 gallon container contents into the same 55 gallon drum. As they were completing this task, personnel from Waste Operations arrived and had brought a lid fitted with a pressure relief valve system in one of the lid bungs (two holes which are used to allow liquids into a drum and which are usually plugged). This lid was placed on the incident drum, and the scene secured for further investigation purposes.

ACTIONS TAKEN- The following actions have been taken Fire Department HMRT personnel immediately implemented the following:

1. HMRT procedures now require all 55 gallon drums used to containerize spill residue to be sealed with a lid having a pressure/vacuum relief mechanism installed.
2. An additional drum liner will be placed inside the containers to hold contaminated residue. It has not been determined that this would have in any way mitigated the hazard, but is a normal practice by Waste Operations personnel which has now been adopted by the HMRT.

Environment, Safety, Health and Quality Directorate requested plant personnel to evaluate chemical storage to determine the possibility of similar circumstances and to identify unnecessary hazardous chemicals which should be disposed. Waste Water Treatment Facility managers initiated a review to evaluate the need for the two sulfuric acid drums and contents located at the waste water treatment facility. Preliminary discussion indicates the drums could be disposed without negative impact on waste water treatment operations.

RECOMMENDED ACTIONS- All personnel should evaluate their work areas, operations, and equipment conditions on a continuous basis and eliminate or minimize chemical related hazards. Personnel should also review and update procedures as changes occur in the workplace.

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Priority Descriptor Yellow/Caution

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References 29 CFR 1910.120