TerranearPMC Safety Share

Week of March 31, 2014 – Equipment Maintenance

On February 5, an event occurred which resulted in the nation's only deep underground nuclear waste repository to be shut down with operations suspended indefinitely. The Waste Isolation Pilot Plant or WIPP, located in Carlsbad, New Mexico was constructed throughout the 1970's, 80's and 90's, costing over one billion dollars. It began accepting transuranic (TRU) waste from various DOE facilities from around the country in March 1999.

The WIPP facility has a depth of over 2000 feet with salt being the primary geological composition. As far back as 1957, the National Academy of Sciences recommended salt for radioactive waste disposal because it would plastically deform; a motion called "salt creep" in the salt-mining industry. It is because of this unique property of salt that it creates a natural sealing of any openings created, including the waste entombments used at WIPP. While "salt creep" may be advantageous for the entombment of radiological or TRU waste, it requires constant maintenance as the underground paths or drifts, are continuously being narrowed or altered. This maintenance involves manual removal and reconfiguration of the underground travelways, including sides (aka ribs), ceiling (aka back) and floor (aka invert). Once removed, the excess salt is loaded onto trucks, where the salt can be transferred to proper storage locations. It was on February 5 that one of these salt-hauling trucks caught fire, causing six workers to be treated for smoke inhalation while creating a release of radiation, exposing at least 17 workers. And on an even larger scale, this incident brought concern and skepticism toward our country's ability to provide safe storage of nuclear waste.

According to DOE this incident was entirely preventable. Findings indicate that the truck that caught fire was 29 years old and was not being properly maintained. In addition, the equipment's automatic fire suppression system was determined not to be active and the truck's fire extinguisher did not work as the driver found out when he tried using it. Another system that failed was the underground emergency notification strobe lights, which had a delayed activation of five minutes, while the subsequent investigation determined that the command-center response was lacking and emergency training drills were inadequate.

The investigation of the truck fire did not reveal exactly what sparked the blaze, but it did note that the old truck that was hauling salt had a buildup of oil and other combustible materials as well as active leaks.

It is believed that the fire started about 30 minutes before the driver saw the orange glow from the engine compartment. If the equipment fire suppression system was functioning properly, it would have detected the heat sooner than the estimated 30-minute initial response and, therefore, could have defeated the fire during the initial incendiary stage. Maybe with a properly working fire extinguisher, again, the fire during its initial stage could have been extinguished. And of course, if the truck was placed on a regular scheduled maintenance program, there is a strong possibility that this entire incident would not have even occurred.

So what happened? How and why did the unit's fire suppression system fail? Why was the truck's fire extinguisher inoperable? And what happened to the lack of maintenance for the truck? Surely these items had a formal inspection and maintenance schedule with specific

personnel responsible to ensure they functioned properly. While no information was provided as to the maintenance schedule for the truck's fire suppression system, OSHA requires (29 CFR 1910.164) that fire detection systems must be maintained in an operable condition (except during repairs and maintenance). In addition, fire extinguishers need to be inspected monthly. This is a simple check, verifying if the gauge shows whether the extinguisher is properly charged as well as performing a visual inspection to see if other basic conditions are acceptable (no damage, deterioration, pull pin properly secured, etc.). Fire extinguishers also need to be formally inspected annually with a hydro test (for container strength and integrity) either every five or twelve years; depending on the fire extinguisher material.

The conditions of the fire extinguisher and fire suppression system were probably the assigned responsibility of someone, with a supervisor having the responsibility to ensure inspections were conducted. At this time one may only speculate as to how these safety inspections slipped through the cracks. Possibly persons were merely "pencil-whipping" their safety check lists without conducting a concerted effort to truly see whether their equipment was functioning properly. If this was indeed the case, then quite possibly this type of documentation could have been going on for years. Such behavior may be termed as "at risk" as inadequate inspections increase the risk of an unwanted event to occur while rendering an important control step to be ineffective once an unwanted event is initiated.

Another important check is the verification of the underground warning system, which seemed to be on a delayed response. Quick response to fires (especially underground fires) is paramount to conduct an immediate assessment of the situation: thereby affording the appropriate response; be it fire fighting methods or to quickly evacuate. While the subsequent investigation has recognized this as a failure in WIPP's emergency response program, so far the reason for this failure; whether a lack of scheduled inspection/maintenance or negligent documentation, has yet to be reported.

Many times when we are out in the field, daily and other regularly scheduled inspections are required. They can range from heavy equipment and passenger vehicle inspections, ensuring that back-up alarms and windshield wipers work while ensuring first aid kits are properly stocked and, of course, fire extinguishers are correctly charged and in good condition. Because our main assignments, in many cases, focus on the actual field activity, these simple checks may be viewed as extraneous and even not as important as the work activities for which our presence has been demanded.

True, the odds are in our favor that an event will not happen which will demand that our steps toward emergency preparedness will be tested. However, when emergency equipment is necessary, the circumstances for which they are warranted can be unforgiving. When such a time as this does come and we did not take the time and effort to ensure our equipment functions properly, it may be too late. Those persons that were underground at the WIPP site were very fortunate for if just one factor was different; such as the operator returning to the truck a few minutes later or the fire occurring at another location where other fuel sources were more abundant, the story that is being told in Carlsbad, NM could be much different.

The violets in the mountains have broken the rocks.
Tennessee Williams