CEHNC-ED 26 May 2005

MEMORANDUM THRU Director, Chemical Demilitarization (CEHNC-CD/ Mr. Pat Haas), 4820 University Square, Huntsville, Alabama 35816

FOR Site Project Manager, Field Office for Umatilla Chemical Agent Disposal Facility (AMSCM-OPUM-U/Mr. Don Barclay), 78072 Ordnance Road, Hermiston, Oregon 97838

SUBJECT: Assessment of Repeated Inadvertent Ignition of Propellant Events on the Explosive Containment Room (ECR) Structure and Heating, Ventilation, and Air Conditioning (HVAC) System Components.

1. Reference is made to the following:

a. CEHNC Report Number HNDED-CS-90-1, Blast Pressure Effects on ECR Ventilation Ducting, Tooele Army Depot, Chemical Stockpile Disposal Program (CSDP), March 1990.

b. CEHNC-ED Memorandum, 4 May 2005, Subject: Preliminary Assessment of Umatilla Chemical Agent Disposal Facility (UMCDF) Explosive Containment Room (ECR) Structural Integrity after Recent Fire Events

c. Telephone discussion with Dave Mears, SAIC, 23 May 2005, Subject: 18 May 2005 fire event.

2. Within the last several weeks, there were three separate events where the propellant ignited during the shearing operation on the M55 rocket. These events occurred on 7 April, 23 April, and 18 May. Operations have been halted while the cause of the events is being investigated. As part of the investigation, Mr. St. Pierre, CMA, requested an assessment of the impact of repeated inadvertent ignition of propellant events on the ECR structure and associated HVAC system components.

3. Concerning the ECR structure, further analysis has confirmed the conclusion presented in the preliminary assessment (Reference 1b) that the ECR structural integrity, including explosion containment capability, is not compromised by repeated inadvertent ignition of propellant events. Computer analysis of the ECR subjected to repeated inadvertent ignition of propellant events predicts no permanent structural deformation, a conclusion supported by a review of the original ECR structural calculations. Also, according to site personnel, no damage to the ECR structure, including the coating over the concrete surfaces, was noted during visual inspections after all three events.

4. With respect to the HVAC system, three components were evaluated: the ductwork, the blast valves and the isolation valves. The analysis and conclusions reached with each of the components are addressed in the following paragraphs.

a. Ductwork: The original design of the duct system was based upon shock pressures and a quasi-static pressure of 44.7 psi in the duct system derived from a rocket detonation in the ECR (Reference 1.a). The predicted maximum gas pressure resulting from one rocket propellant burn is 24 psi (Reference 1.b). Since the pressure is less than the 44.7 psi quasi-static design pressure, we conclude that the performance and integrity of the duct system and filters will not be compromised by repeated inadvertent ignition of propellant events.

b. Blast Valves/Isolation Valves: Two factors are important with respect to the blast and isolation valves, pressure, and temperature. The predicted maximum gas pressure of 24 psi as previously discussed is well within the design parameters of this equipment. Concerning temperature, since a propellant fire is a short duration event, it is not likely that these valves experienced significant temperatures. This is further substantiated by the lack of any noted damage to the room coatings or the combustible component of the rocket shear machine in close proximity to the fire location. Also, the valve manufacturers confirmed that the thermal properties of the valves exceed the design parameters. Therefore, we conclude that these components will not be compromised by repeated inadvertent ignition of propellant events.

5. CEHNC recommends that a visual inspection of these components be performed after any subsequent event. Also, the proper operation of these components should be confirmed by functional tests recommended by the manufacturers. In addition, CEHNC highly recommends that real-time pressure and temperature reading/recording devices be installed in the ECR to monitor the pressure and temperature prior to the restart of operations.

6. Please contact us if you have any questions regarding this evaluation or the conclusions contained herein. The point of contract for this evaluation is Mr. Steve Wright (256)-895-1738.

Boyce L. Ross, P.E.
Director of Engineering

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CF:
U.S. Army Chemical Materials, (AMSCM-RD/Mr. St. Pierre), 5183 Blackhawk Road, Aberdeen Proving Ground, MD 21010
ED (Read/File)
ED-CS (Coulston, Acosta, Wright)
ED-CS (Read/File)
ED-SY-C (Read/File)
ED-SY-C (Waits, Rollins)
ED-ME (Loyd)
ED-ME-M (Haywood, Pace)
ED-SY-O (Campbell)
ED-SY-T (Crull)
CD-AC (Dohrman, Light)
CD

	Initial	Date
ED-CS-S, Coulston	JWC	26MAY05
ED-CS, Suever	RmS	26 May 05
ED, Ross	RmS	26 May 05
ED-ME, Haywood		26 MAY 05
ED-ME, Pace		26 May 05
ED-SY, Rollins	RW	26 MAY 05