



Site Health and Safety Plan (HASP)

For:

Removal of Hazardous Materials in Connection with Explo Systems, Inc.
Camp Minden
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Minden, Louisiana 71055-7924

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HASP Preparation Date:

03/18/2015

Revision 1

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Site Health and Safety Plan

1.0 Introduction

This Health and Safety Plan is developed using the format and guidance specified in USEPA Publication 9285.1-03, PB92 – 963414, Standard Operating Safety Guides, June 1992. ESI will conduct hazardous materials removal and disposal service operations at Camp Minden, LA for the Louisiana LMD (LMD) in compliance with Occupational Safety and Health Agency (OSHA), Environmental Protection Agency (USEPA), Department of Defense (DOD), Bureau of Alcohol, Tobacco, Firearms and Explosives (BATFE), Louisiana State Police-LSP, Louisiana Department of Environmental Quality-LDEQ and Camp Minden rules and regulations. This Health and Safety Plan establishes the framework and elements for conducting ESI health and safety policy compliance on the hazardous materials removal and disposal service project.

2.0 ESI Health and Safety Policy

ESI was established in 1987 and now has 27 years of successful experience in explosives demolition, disposal, structural removal, and marine salvage. As such, Health and Safety is a top priority for ESI to protect workers, the public, and our mission. The ESI health and safety goal is to provide the safe and efficient explosives work. Our goal and tolerance is for **“zero”** accidents on every ESI project we manage and every project we conduct.

ESI will conduct hazardous materials removal and disposal service operations at Camp Minden, LA for the LMD in compliance with Occupational Safety and Health Agency (OSHA), Environmental Protection Agency (USEPA), Department of Defense (DOD), Bureau of Alcohol, Tobacco, Firearms and Explosives (BATFE), LSP, LDEQ and Camp Minden rules and regulations. The general overall policy for ESI ammunition and explosives (A&E) operations is to employ the “cardinal rule of explosives safety”- limit exposure to a minimum number of personnel, for a minimum amount of time, to a minimum amount of A&E consistent with safe and efficient operations IAW DOD 4145.26-M, C.3.2.1.

3.0 ESI Health and Safety Management

The following work chart shows the hierarchy of management to be used on this project. The ESI Health & Safety Manager reports directly to the ESI Project Manager

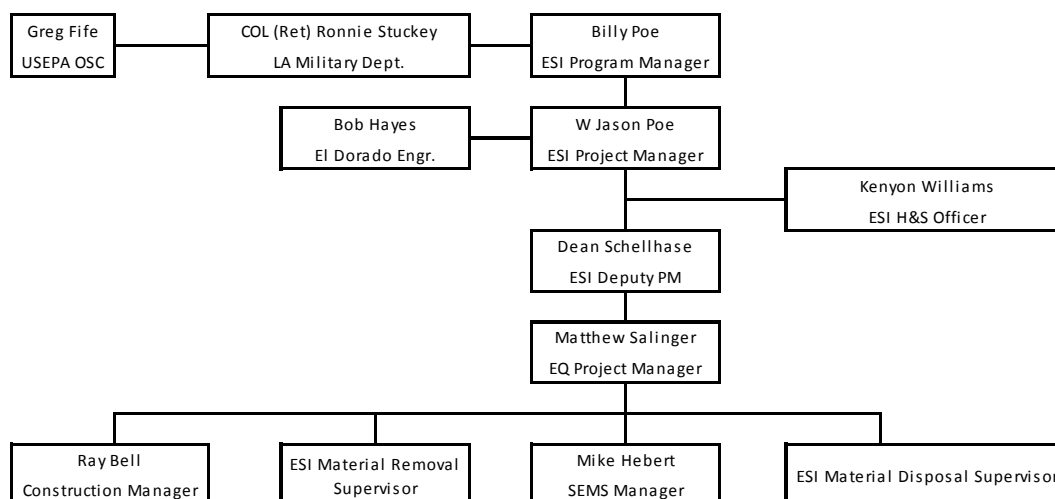


Figure 1 Explo Site Organization and Lines of Authority

The ESI Health & Safety Manager will advise the ESI Project Manager on all aspects of safety and health for this material removal and disposal project. The ESI Health & Safety Manager for this project is Mr. Kenyon Williams, who has 42 years of U.S. Army safety career program experience. Mr. Williams has over 30 years of direct experience working in explosives safety with specific direct experience in explosives material removal and disposal operations through various propellant burn technologies such as the Contained Burn Chamber and Kiln Disposal Unit as proposed by ESI. Mr. Williams resume is included in Appendix A. The ESI Health & Safety Manager will have project authority and responsibility for monitoring and implementing the ESI Site Health & Safety Plan throughout the performance of this material removal and disposal project.

4.0 Site Specific Health and Safety Plan (HASP).

The ESI HASP will be carried out in three phases:

- Phase 1 - Mobilization and Site Preparation;
- Phase 2 – Removal and Disposal Operations; and,
- Phase 3 – Site Restoration and Demobilization.

The critical health and safety elements which will be conducted during the three project phases are as shown in Appendix B and further described below.

4.1. Phase 1 (Mobilization and Site Preparation):

The initial phase will cover mobilization and site preparation for all activities to be completed at the site. Plans and procedures pertaining to health & safety will be developed, submitted and finalized during this phase as follows:

- ESI submission of ESI Health and Safety Plan to LMD and USEPA for review. Incorporation of review comments will finalize the HASP document for ESI implementation.

- Develop and submit ESI Explosives Site Plan IAW DOD 4145.26-M, C1.8 to LMD for review and approval.
- Develop Standard Operating Procedures (SOPs) for material removal and transportation IAW DOD 4145.26-M, C3.3.
- Develop SOPs for material disposal/burning IAW DOD 4145.26-M, C3.3 and C15.9.
- Develop SOPs for public notification to the surrounding community and state and local governments in accordance with LAC 33:V.717.
- Develop SOPs for severe weather/lightning warning, evacuation, and shutdown for ESI operations IAW DOD 4145.26-M, C6.3.
- Develop SOPs for site remediation/restoration IAW DOD 4145.26-M, C3.3, USEPA, LDEQ and LMD requirements.
- Develop hazard analysis for material removal and transportation IAW DOD 4145.26-M, C11.
- Develop hazard analysis for material disposal/burning IAW DOD 4145.26-M, C11.
- Coordinate with Camp Minden Fire Department and Security and develop ESI emergency response plan IAW DOD 4145.26-M, C3.3.1 and C3.3.4.
- Provide initial safety training on site specific safety and health hazards to ESI personnel IAW DOD 4145.26-M, C3.3.3.
- Procure Personal Protective Equipment (PPE) for ESI operators and site visitors IAW DOD 4145.26-M, C3.11.
- Procure appropriate safety tools for ESI operators IAW DOD 4145.26-M, C3.9.
- Monitor site construction of the Contained Burn Chamber or Kiln Disposal Unit with Pollution Abatement System, Material Staging Area, Control Room, Propane Tank, Type II & III Magazines, and Diesel Tank for proper quantity distance application IAW DOD 4145.26-M, C5.0, as well as general construction safety.
- Submit periodic health and safety program status reports on progress to the LMD.

4.2. Phase 2 (Removal and Disposal Operations)

Phase 2 moves from mobilization and preparation into removal and disposal of all material to be addressed under this project. This phase will be longest phase and will include all aspects of material handling and material disposal. Specific action items pertaining to site health safety covered under this phase are as follows:

- Conduct operational start-up safety briefing/training to all ESI employees IAW DOD 4145.26-M, C3.3.3.
- Monitor ESI operations for health and safety issues IAW DOD 4145.26-M, C1.7.3.
- Monitor burn trays for no more than 3" depth of material to be burned IAW DOD 4145.26-M, C15.9.3.1. or use of valid test data such as critical diameter tests which will be conducted on M6 and CBI to demonstrate critical depth requirements along with small scale operational build-up to demonstrate safe burning capability for either the Contained Burn Chamber burn trays and conveyor feed depth/rate in the Kiln Disposal Unit.

- Monitor burn pan temperature (< 228 F) for re-loading pans IAW DOD 4145.26-M, C15.9.8.
- Perform safety certification of inert material for packing and disposal IAW DOD 4160.28-M, V3, C6.0. The current plan is to conduct a 200% visual inspection of M6 and CBI packaging and certify the packaging inert by a 3rd independent quality control sample plan. This certified inert packaging would then be taken off-site by a qualified recycler.

Note: If approved by regulatory agencies, use of either the Contained Burn Chamber or Kiln Disposal Unit with Pollution Abatement System to thermally treat potentially contaminated packaging reduces the risk of material handling and human error in certifying packaging as inert.

- Monitor ESI operations for compliance with SOPs.
- Address public health and safety issues concerning ESI operations as required and continue public notification to the surrounding community and state and local governments in accordance with LAC 33:V.717.
- Monitor severe weather/lightning warnings for potential temporary evacuation and shutdown of ESI operations IAW DOD 4145.26-M, C6.3.
- Monitor for proper use of PPE by ESI operators IAW DOD 4145.26-M, C3.11.
- Monitor for proper use of appropriate safety tools by ESI operators IAW DOD 4145.26-M, C3.9.
- Conduct periodic health and safety training to all ESI employees IAW DOD 4145.26-M, C3.3.3.
- Perform safety certification of inert magazines as emptied and cleaned up IAW DOD 4160.28-M, V3, C6.0.
- Provide safety briefings, PPE, and escort to visitors at ESI operations IAW DOD 4145.26-M, C3.3.3.
- Submit periodic health and safety program status reports on progress to LMD.
- Conduct emergency drills, in conjunction with Camp Minden Fire Department, at ESI operations as required.
- Report and investigate any ESI incidents IAW DOD 4145.26-M, C2.0.
- Support any external organization (OSHA, USEPA, DOD, BATFE, LSP, LDEQ, LMD) health and safety inspections of ESI operations and take immediate action, as needed, to address identified deficiencies.

4.3. Phase 3 (Site Restoration and Demobilization)

Phase 3 is initiated immediately upon final confirmation and approval by LMD of the removal and destruction of the propellant and igniter material. At this point the Contained Burn Chamber or Kiln Disposal Unit and burn area are no longer required and are scheduled to be dismantled and removed. Specific action items pertaining to site health safety covered under this phase are as follows:

- Conduct restoration health and safety briefing/training to all ESI employees per IAW DOD 4145.26-M, C3.3.3.

- Monitor ESI restoration operations for health and safety issues IAW DOD 4145.26-M, C.1.7.3.
- Perform safety inert certification of all Contained Burn Chamber or Kiln Disposal Unit equipment and material for packing, removal, and/or disposal IAW DOD 4160.28-M, V3, C6.0.
- Monitor ESI restoration operations for compliance with SOPs.
- Address public health and safety issues concerning ESI restoration operations as required and continue public notification to the surrounding community and state and local governments in accordance with LAC 33:V.717.
- Monitor severe weather/lightning warnings for potential temporary evacuation and shutdown of ESI operations IAW DOD 4145.26-M, C6.3.
- Monitor for proper use of PPE by ESI operators IAW DOD 4145.26-M, C3.11.
- Monitor for proper use of appropriate safety tools by ESI operators IAW DOD 4145.26-M, C3.9.
- Conduct periodic health and safety training to all ESI employees IAW DOD 4145.26-M, C3.3.3.
- Perform safety certification of magazines as emptied, inert, and cleaned up IAW DOD 4160.28-M, V3, C6.0.
- Perform safety inert certification of all Contained Burn Chamber or Kiln Disposal Unit equipment, materials, and surrounding soil in Area I as adequately cleaned up IAW DOD 4160.28-M, V3, C6.0.
- Provide safety briefings, PPE, and escort to visitors at ESI operations IAW DOD 4145.26-M, C3.3.3.
- Report and investigate any ESI mishap IAW DOD 4145.26-M, C2.0.
- Support any external organization (OSHA, USEPA, LSP, LDEQ, DOD, BATFE, LMD) health and safety inspections of ESI operations and take immediate action, as needed, to address identified deficiencies.
- Submit periodic health and safety program status reports on progress to LMD.

5.0 Personnel Training.

ESI provides a comprehensive training program to all employees whose work entails potential exposure to toxic chemicals or hazardous environments. The program is designed to promote safe work practices under hazardous environmental conditions, as well as under general construction conditions. ESI utilizes in-house experts, and each training program is supervised by ESI's technical experts. These experts have extensive experience in the field of hazardous waste management and college degrees in environmental and science fields and/or technical certification.

All ESI on-site personnel will receive initial and refresher (at least monthly) health and safety training which covers specific health and safety hazards (A&E, heat stress, fatigue, driving, material handling, PPE, SOPs, confined space entry, lockout/tag out, local insects and animals, severe weather, emergency procedures, etc.) associated with the material removal, transportation, disposal, and restoration operations.

ESI personnel who will be participating in on-site operations will have the following training and certifications:

- OSHA 40-Hour HAZWOPER certification in accordance with 29 CFR 1910.120(p).
- Personnel handling explosives will be licensed by Louisiana State Police as Explosives Handlers (8 hour course).
- Personnel responsible for initiating burns will have Louisiana State Police Explosive Blaster's license (16 hour course).
- DOD 4145.26-M - DOD Contractor's Safety Manual For Ammunition and Explosives*
- DOD 5100.76 - Safeguarding Sensitive Conventional Arms, Ammunition, and Explosives (AA&E)*
- LAC Title 55 Chapter 15 – Public Safety – Explosives Code*
- 49 CFR 172 Subpart A Through Subpart G – USDOT HAZMAT for purposes of transportation *
- 27 CFR Part 555 - Bureau of Alcohol, Tobacco, Firearms, and Explosives - Commerce in Explosives*
- LAC Title 33 Part V – Hazardous Waste - **
- 29 CFR 1910 – OSHA Occupational Safety and Health Standards**
 - 29 CFR 1910. 146 Confined Space Entry training for entry into either the Contained Burn Chamber or Kiln Disposal Unit and Pollution Abatement System**
 - 29 CFR 1910.147 Lock-Out/Tag-Out training for work on either the Contained Burn Chamber or Kiln Disposal Unit and Pollution Abatement System**
- Personnel operating forklifts and heavy equipment will have the appropriate licenses and certifications to operate the specified equipment (29CFR part 1926).

*This training will be done by ESI Health & Safety Officer as part of a 16-hour course.

**This training will be done by ESI Health & Safety Officer as part of an 8-hour course.

Additional on-site training, such as confined space entry, lock-out/tag-out, severe weather hazards, first aid, heat stress, cold exposure, emergency response, hot work permit process, smoking policy, company dress and demeanor policy, safe vehicle operations, fire extinguisher use, and site biological hazards, will be covered in daily safety tool box meetings.

All ESI on-site management personnel currently have extensive training and experience conducting material removal and disposal operations that EXCEEDS the RFP as detailed below:

- ESI Project Manager has 10 years or more experience successfully managing a clean-up action issued by the USEPA under CERCLA or RCRA and documented experience managing projects that involved the on-site disposal of explosives materials utilizing open burning in a large scale, continuous process environment and using technology such as a Contained Burn Chamber or Kiln Disposal Unit with Pollution Abatement System.
- ESI Safety Manager has 8 years or more experience managing the safety of personnel and equipment in either the production of or disposal of explosives materials in a large scale,

continuous process environment, as well as knowledge and experience dealing with military propellants, and using technology such as a Contained Burn Chamber or Kiln Disposal Unit with Pollution Abatement System.

- ESI Compliance Manager has 5 years or more experience preparing and submitting all documentation required by the USEPA, DOT, ATF and other regulatory agencies for the management and disposal of hazardous materials and hazardous waste and using technology such as a Contained Burn Chamber or Kiln Disposal Unit with Pollution Abatement System.
- ESI Environmental Manager has 5 years or more experience in ambient air monitoring per USEPA methods, and preparation of air monitoring documentation and using technology such as a Contained Burn Chamber or Kiln Disposal Unit with Pollution Abatement System.
- ESI Material Removal and Transportation Supervisor has 10 years or more experience supervising the storage and transport of explosives materials – including materials that are stored and configured in less than ideal condition, as well as experience with other types of hazardous materials and experience necessary to identify, hire and supervise employees who have the level of experience necessary to perform in difficult and challenging conditions and circumstances.
- ESI Material Disposal Supervisor has 10 years or more experience supervising and working in the disposal of explosives materials, as well as experience utilizing open burning, experience with military propellants, and experience necessary to identify, hire and supervise employees who have the level of experience necessary to perform in difficult and challenging conditions and circumstances and using technology such as a Contained Burn Chamber or Kiln Disposal Unit with Pollution Abatement System.

The ESI Health and Safety Manager will maintain a file of every ESI employee's training records.

6.0 Site Control

The general overall policy for ESI ammunition and explosives (A&E) operations will be employing the “cardinal rule of explosives safety”, which is to limit exposure to a minimum number of personnel, for a minimum amount of time, to a minimum amount of A&E consistent with safe and efficient operations IAW DOD 4145.26-M, C3.2.1.

ESI will develop and submit an Explosives Site Plan IAW DOD 4145.26-M, C1.8 to the LMD for review and approval. A portion of the Explosives Site Plan will address the hazard areas and safety zones which will be established and enforced during ESI A&E operations and material burning to protect both workers and the public. Internal and external safety distances will be used in Area I as shown on Maps in Appendix C and described below.

- Material burns will either be conducted in a metal burn tray in the Contained Burn Chamber or fed by conveyor into the Kiln Disposal Unit. Each burn tray for the Contained Burn Chamber or within the conveyor on the Kiln Disposal Unit will have material leveled to a maximum 3” depth IAW DOD 4145.26-M, C15.9.3.1. or use test data from critical diameter tests conducted on M6 and CBI to demonstrate critical depth requirements with small scale operational build-up to demonstrate safe burning capability for either the Contained Burn Chamber burn trays and conveyor feed depth/rate in the Kiln Disposal Unit. Based on a 3” depth, each burn tray in the Contained Burn Chamber will contain 880 pounds of material or the Kiln Disposal Unit will burn 7 pounds of material continuously. Prior to conducting burns in either the Contained Burn Chamber or the Kiln Disposal Unit, a 1250’ safety zone will be established IAW DOD 4145.26-M, C5.18.5.2. Either the Contained Burn Chamber or Kiln Disposal Unit will be operated on a 24 hours a day basis to meet throughput requirements, so the 1250’ safety zone will be in place on a continuous basis.
- The Material Staging Area will be sited based on 45,000# HD 1.1 and an Inhabited Building Distance safety zone of 1,423’ will be used for protection of unrelated personnel and the public as required by DOD 4145.26-M, Table AP2.T1.
- Internal safety distances for protection of ESI unrelated personnel are 1,423’ for the Range Control Facility based on Inhabited Building Distance from the Material Staging Area with explosives limits of 45,000# HD 1.1 IAW DOD 4145.26-M, Table AP2.T1. During burns in either the Contained Burn Chamber or Kiln Disposal Unit, the Control Room and other related ESI personnel will be at least 231’ for burns of up to 880# HD 1.1 in the Controlled Burn Chamber or 7# HD 1.1 in the Kiln Disposal Unit IAW DOD 4145.26-M, C5.18.5.1. The Material Staging Area will be at least 640’ from either the Contained Burn Chamber or Kiln Disposal Unit based on Unbarricaded Intraline Distance for 45,000# HD 1.1 at the Material Staging Area as required by DOD 4145.26-M, AP2.T5.
- Explosives magazines will be used to store the thermal initiators (hazard class 1.4) and thermal boosters (hazard class 1.3). **NO** Hazardous Class 1.1 explosives will be stored by ESI. These explosives magazines will be limited to 500# HD 1.3 materials and a 50’ intraline distance is applied to the Material Staging Area IAW DOD 4145.26-M, Table AP2.T14.

- An 18,000 gallon propane tank will be required to support either the Contained Burn Chamber or the Kiln Disposal Unit. The propane tank will be located at least 100' (fire protection distance) from the Material Staging Area and at least 231' from the Contained Burn Chamber or Kiln Disposal Unit as required by DOD 4145.26-M, C3.12.1 and C5.18.5.1. A LP or diesel fuel tank/truck will be required to support material handling equipment and will be located 100' based on fire protection distance from the Material Staging Area and at least 231' from the Contained Burn Chamber or Kiln Disposal Unit IAW DOD 4145.26-M, C3.12.1. and C5.18.5.1.

Additionally, the following precautions will be taken and maintained throughout project activities.

- ESI has established a road closure policy on installation roadways to prevent access into the hazard areas during burns and from an accidental explosion to protect the public and any unrelated personnel during material staging and burning operations. Use of Area I for disposal operations will not impact any established installation roadways or contractors working on Camp Minden. The ESI Range Control Facility will be located off the road accessing Area I and outside the 1,423' hazard area where all incoming traffic and visitors to Area I will report and be accessed controlled.
- ESI will establish a 1250' safety zone and evacuate all non-essential personnel from the hazard area prior to conducting disposal operations for either the Contained Burn Chamber or Kiln Disposal Unit. The Contained Burn Chamber or Kiln Disposal Unit will be operated on a 24 hours a day basis to meet throughput requirements, so the 1250' safety zone will be in place on a continuous basis.
- ESI operations for material removal, transportation, disposal, and restoration will be strictly conducted using Standard Operating Procedures (SOPs) IAW DOD 4145.26-M, C3.3 and C15.9.
- All visitors to ESI operations will be provided safety briefings, PPE, and escort to ESI operations IAW DOD 4145.26-M, C3.3.3.
- ESI will support any external organization (OSHA, USEPA, DOD, LSP, LDEQ, BATFE, LMD) health and safety inspections of ESI operations and take immediate action, as needed, to address identified deficiencies.
- ESI will demilitarize material and certify material inert IAW DOD 4160.28-M. Our plan is to conduct a 200% visual inspection of M6 and CBI packaging, and certify the packaging inert by a 3rd independent quality control sample plan. This certified inert packaging would then be taken off-site by a qualified recycler. If permitted, use of the Contained Burn Chamber with Pollution Abatement System to thermally treat potentially contaminated packaging reduces the risk of material handling and human error in certifying packaging as inert.

7.0 Personal Protective Equipment (PPE).

ESI will utilize Job Safety Analysis, as shown in Appendix D, for material removal, transportation, disposal, and restoration operations to identify PPE requirements as risk mitigation measures to reduce exposure to health and safety hazards IAW DOD 4145.26-M, C11. Job Safety Analysis's have been added for either the Contained Burn Chamber or Kiln Disposal Unit operations. PPE requirements for ESI operators will be identified in SOPs for material removal, transportation, disposal, and restoration

operations IAW DOD 4145.26-M, C3.3 and C15.9. ESI will procure and provide any PPE required protecting ESI operators from identified health and safety hazards during the material removal, transportation, disposal, and restoration operations IAW OSHA 1910 Subpart I.

ESI will use all 100% long sleeve cotton coveralls, cotton undergarments, hard hats (magazines only), safety glasses/face shields (specific tasks), steel toed shoes, leather gloves (specific tasks), dust masks (optional), and appropriate respirators for confined space entry in either the Contained Burn Chamber or Kiln Disposal Unit for ESI personnel handling containers and materials and conducting material disposal operations. ESI will provide wash stations and soap for all personnel to use. Proper personal hygiene such as washing hands and face prior to breaks, lunch, and end of day will required by ESI for all personnel working at this site.

8.0 Monitoring.

ESI will conduct air monitoring of the material disposal/burning operations as described in the ESI Quality Assurance Project Plan (QAPP). ESI will address public health and safety issues concerning ESI operations as required and continue public notification to the surrounding community and state and local governments in accordance with LAC 33:V.717.

The ESI Health and Safety Manager will use an Oxygen/Carbon Monoxide meter to perform initial entry in each new Magazine and in the Contained Burn Chamber or Kiln Disposal Unit prior to personnel entry for inspection or maintenance. ESI will use LP forklifts in magazines which are cleaner burning and produce less carbon monoxide than diesel. Forklift operators will be trained to only run engines as needed and minimize use inside magazines. The ESI Health and Safety Manager will periodically monitor for Oxygen and Carbon Monoxide during material removal operations and during confined space entry of either the Contained Burn Chamber or Kiln Disposal Unit and will document and file results. If hazardous levels are approached, then immediate personnel evacuation and risk mitigation measures will be implemented.

9.0 Medical Surveillance Program.

Every ESI employee whose work entails potential exposure to hazardous materials or environments must take part in a comprehensive Medical Monitoring Program (MMP). Before assignment to a hazardous materials site, each ESI employee must complete a medical screening and surveillance examination. This information is used to establish the present medical status of the individual and can be used to assess possible future exposures in the work environment.

ESI will develop documented a Job Safety Analysis (Appendix D) to identify potential health and safety hazards during material removal, transportation, disposal, and restoration operations IAW DOD 4145.26-M, C11. Job Safety Analysis's have been added for either the Contained Burn Chamber or Kiln Disposal Unit operations. Either the Contained Burn Chamber or Kiln Disposal Unit present the additional potential risk of confined space entry and appropriate respirator use as PPE. ESI personnel assigned confined space entry duty will require respirator fit testing, training on respirator maintenance, cleaning, and use, and medical surveillance on the ability to safely wear a respirator.

ESI will use PPE to minimize operator exposure to materials during material removal, transportation, disposal, and restoration operations IAW DOD 4145.26-M, C3.3 and C15.9. ESI will provide wash stations and will train operators on the importance of good personal hygiene practices prior to drinking, eating, and at the end of work shifts.

ESI will periodically monitor operators for any unusual health or safety issues. ESI will consider additional medical surveillance for employees if any causal factor for health and safety concerns is identified.

10.0 Heat Stress and Cold Exposure.

ESI will develop documented Job Safety Analysis (Appendix D) to identify potential health and safety hazards during material removal, transportation, disposal, and restoration operations IAW DOD 4145.26-M, C11. PPE will be used to minimize operator heat stress and cold exposure during material removal, transportation, disposal, and restoration operations IAW DOD 4145.26-M, C3.3 and C15.9. Periodic health and safety training will be conducted as environmental conditions dictate heat stress and cold exposure will be training topics IAW DOD 4145.26-M, C3.3.3. ESI will utilize OSHA guides and literature on preventing heat stress and cold exposure in training ESI employees.

11.0 Decontamination.

ESI will develop documented Job Safety Analysis (Appendix D) to identify potential health and safety hazards during material removal, transportation, disposal, and restoration operations, which may require personnel decontamination IAW DOD 4145.26-M, C11. ESI will use PPE to minimize operator exposure to materials and the requirement for decontamination during material removal, transportation, disposal, and restoration operations IAW DOD 4145.26-M, C3.3 and C15.9. Job Safety Analysis have been added for either the Contained Burn Chamber or Kiln Disposal Unit operations. Either the Contained Burn Chamber or Kiln Disposal Unit present the additional potential risk of confined space entry and appropriate respirator use as PPE. ESI personnel assigned confined space entry duty will require respirator fit testing, training on respirator maintenance, cleaning, and use, and medical surveillance on ability to safely wear a respirator. ESI will provide wash stations and will train operators on the importance of good personal hygiene practices prior to drinking, eating, and at the end of work shifts.

Appendix E provides site-specific chemical hazard information in the form of Material Safety Data Sheets (MSDSs) for all materials present on-site.

Emergency decontamination procedures shall include the following:

- Another team member will render initial first aid and remove the individual from the immediate area of contamination.
- Precautions should be taken to avoid exposure of other individuals to the chemical.
- Eyes: In case of contact, immediately flush with plenty of low pressure water for at least 15 minutes. Remove any contact lenses to assure thorough flushing. Call a Physician.
- Skin: Wash with soap and running water.
- Ingestion: Contact Physician immediately.

- Inhalation: Remove to fresh air. Treat any irritation symptomatically. Call a Physician.

ESI will periodically monitor operators for any unusual health or safety issues.

12.0 Material Handling.

ESI will develop documented Job Safety Analysis (Appendix D) to identify potential health and safety hazards during material removal, transportation, disposal, and restoration operations, which may require personnel decontamination IAW DOD 4145.26-M, C11. Job Safety Analysis have been added for either the Contained Burn Chamber or Kiln Disposal Unit operations.

ESI will require use of proper material handling equipment during material removal, transportation, disposal, and restoration operations. ESI personnel operating material handling equipment will be trained and qualified for proper use of material handling equipment IAW OSHA 1910.176 and OSHA 1910.178.

ESI will use LP forklifts in magazines which are cleaner burning and produce less carbon monoxide than diesel. Forklift operators will be trained to only run engines as needed and minimize use inside magazines. The ESI Health and Safety Manager will periodically monitor for Oxygen and Carbon Monoxide during material removal operations and during confined space entry of either the Contained Burn Chamber or Kiln Disposal Unit will document and file results. If hazardous levels are approached, then immediate personnel evacuation and risk mitigation measures will be implemented. All LP and diesel vehicles operating in the vicinity of explosives will be equipped with exhaust spark arrestors and have approved air cleaners IAW DOD 4145.26-M, C3.12.3.

13.0 Weather Monitoring.

ESI will establish a system for monitoring the approach of electrical storms IAW DOD 4145.26-M, C3.7.1. The ESI Health and Safety Manager will be responsible for monitoring severe weather and advising the Project Manager when to initiate safe shutdown and evacuation procedures. ESI will use local weather forecasts, lightning strike software, hand-held lightning warning meters, and visual observation for data on monitoring the approach of electrical storms and making decisions on operational shutdown and personnel evacuation. ESI will monitor for wind speed and direction to collect and assess environmental conditions related to daily disposal operations. Use of either a Contained Burn Chamber or Kiln Disposal Unit with pollution abatement system for disposing of will eliminate the open burning requirement that no burning will take place when wind velocity exceeds 15 mph IAW DOD 4145.26-M, C15.9.3.3.

14.0 Confined Space Entry.

Job Safety Analysis have been added for either the Contained Burn Chamber or Kiln Disposal Unit operations. Either the Contained Burn Chamber or Kiln Disposal Unit present the additional potential risk of confined space entry and ESI will incorporate the requirements of 29 CFR 1910.146 into SOPs ensuring proper personnel training, use of a confined space entry permit, monitoring, medical surveillance, PPE, and recordkeeping for any personnel entry into either the Contained Burn Chamber or Kiln Disposal Unit.

ESI does not consider the Magazine as a confined space based on the open door and the top ventilator. The ESI Critical Inspection Team will inspect the top ventilator to make sure it is open before entry is

permitted. Also the ESI Health and Safety Manager will use an oxygen meter and measure the oxygen level for initial entry.

ESI will use LP forklifts in magazines which are cleaner burning and produce less carbon monoxide than diesel. Forklift operators will be trained to only run engines as needed and minimize use inside magazines. The ESI Health and Safety Manager will periodically monitor for Oxygen and Carbon Monoxide during material removal operations and during confined space entry of either the Contained Burn Chamber or Kiln Disposal Unit and will document and file results. If hazardous levels are approached, then immediate personnel evacuation and risk mitigation measures will be implemented.

15.0 Emergency Response.

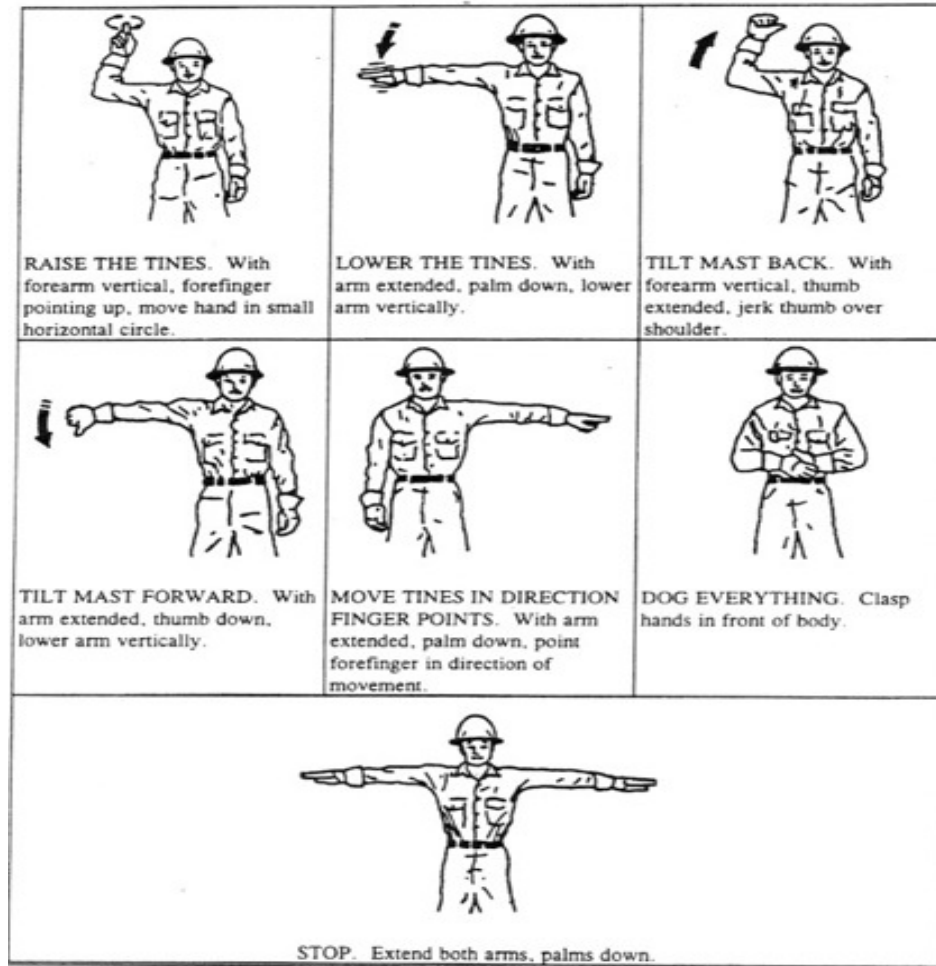
ESI will train ESI personnel on first aid and initial fire extinguisher use to handle initial response.

If a misfire occurs on or during a disposal the site will be evacuated for at least 30 minutes IAW DOD 4145.26-M, C15.9.3.6. ESI operators will implement misfire procedures before approaching any explosives burn in the Contained Burn Chamber or Kiln Disposal Unit. Only two trained and qualified technicians shall approach the position of the explosives. One shall examine the misfire and the other shall act as backup. The backup shall watch the examination from a safe distance, behind natural or artificial barriers or other obstructions for protection.

16.0 Other Requirements and Safety Considerations.

- The buddy system will be utilized at all times.
- All workers will attend the daily safety meeting before commencing work.
- Eating and drinking are strictly prohibited within Area I and at each storage magazine. Smoking is strictly prohibited in all magazine areas at the Camp Minden Site.
- Entry into and exit from Area I and magazines being worked will be restricted. Entry/exit of these zones must be made via the established and monitored access control points.
- Prescribed PPE must be worn as directed by the ESI Project Manager and ESI Health and Safety Manager. If the PPE is compromised in any way, it will be replaced immediately.
- Should any unusual situations occur operations will cease (all personnel will have “Stop Work Authority” in these situations) and the ESI Project Manager and ESI Health and Safety Manager will be contacted for further direction.
- The ESI Project Manager and ESI Health and Safety Manager will be informed when:
 - Adverse reactions or fires occur;
 - Lightning or thunder is detected;
 - Less than full crews are on site;
 - Visitors arrive;
 - Medical emergencies occur; and
 - Accidents or injuries occur on-site.

- Improperly grounded/guarded tools shall be tagged out-of-service and the ESI Supervisor shall be notified immediately. If a piece of equipment fails or is found to be in need of repair, it will be immediately tagged out-of-service and the ESI Supervisor shall be notified. This equipment will not be returned to service until repairs have been completed and the equipment tested by a competent individual.
- Unsafe conditions shall be reported immediately.
- Workers will minimize contact with hazardous materials by:
 - Avoiding areas of obvious contamination;
 - Using polyethylene sheeting to help contain contaminants; and
 - Avoiding contact with nitrocellulose or objects which contain nitrocellulose.
- Only essential personnel holding a Louisiana State Police, ESI explosive “Blaster” or “Handler” photo ID will be permitted in the work zones.
- Cellular phones will not be permitted while working in the magazines, material staging area or Area I burn site. Cell phones will be utilized by the ESI Project Manager, ESI Health and Safety Manager and other designated ESI employees (only when working outside the aforementioned areas).
- Radios will be utilized as primary means of communication between ESI managers, truck drivers, and key personnel. Radios will not be transmitted within 25 feet of unshielded or unshunted electric thermal initiators as required by DOD 4145.26-M, C15.8.2.2.5.
- **Air Horns – means of notification**
 - One blast – attention all personnel
 - Two blasts – attention all personnel, leave the area
 - Three blasts – attention all personnel, “EMERGENCY SITUATION” leave the area immediately
- Hand signals will be utilized to instruct equipment operators in high noise environments. The following hand signals will be used:



- Indigenous hazardous insects, animals, and plants which may be encountered at the project site are shown in Appendix F. ESI personnel will be trained on recognition and first aid. A laminated sheet with pictures of indigenous hazardous insects, animals, and plants and first aid procedures will be prepared and placed in the ESI Team's toolkit for reference.

17.0 References

- a. DOD 4145.26-M, DOD Contractor's Safety Manual for Ammunition and Explosives, 13 March 2008.
- b. 29 CFR 1910, Occupational Safety and Health Administration (OSHA) General Industry Standards.
- c. USEPA Publication 9285.1-03, PB92 – 963414, Standard Operating Safety Guides, June 1992.
- d. DOD 4160.28-M, Volume 3, Defense Demilitarization: Procedural Guidance, 7 June 2011.
- e. DOD 5100.76-M, Physical Security of Sensitive Conventional Arms, Ammunition, and Explosives (AA&E), 17 April 2012.

Appendix A

ESI Health & Safety Manager Resume

Kenyon Lee Williams

HC 62 Box 48A
Eufaula, Oklahoma 74432
United States

Work Experience

08/2013 to Present

- Primary Explosives Safety Consultant to Explosive Service International, Inc, Baton Rouge, LA
- Independent Safety Consultant working for Bastion Technologies, Houston, TX supporting contract with Aviation and Missile Command (AMCOM), Huntsville, AL
- Established limited liability company in August 2013 in Oklahoma as sole proprietor to perform safety consulting work
- Providing explosives safety technical assistance and support to the AMCOM Safety Office
- Developed Redstone Arsenal Explosives Safety Management Program in June 2014
- Completed hazard analysis in September 2014 for SpaceX to install ordnance in Dragon capsule

11/2006 to 08/2013 (Retired from Army Civil Service with 41 years)

- Associate Director of the U.S. Army Technical Center for Explosives Safety, McAlester, OK
- Supervisory Safety Manager, GS-0018-15
- Supervisor - Dr. Upton Shimp, (918) 420-8901
- Supervise three Divisions with approximately 45 employees engaged in professional and technical work of explosives, chemical agent, and unexploded ordnance cleanup safety in support of HQ Department of the Army
- Performs 16 critical explosives safety functions on behalf of the Department of the Army Safety Office
 - Army approve explosives, chemical agent, and clean-up safety site plans
 - Army's Hazard Classifier and maintain Joint Hazard Classification System
 - Maintain Army's explosives safety deviation database
 - Provide explosives safety technical assistance to Army personnel worldwide
 - Participate on Army explosives accident investigations and maintain Army's Explosives Mishap Analysis Module
 - Facilitate the Army Explosives Safety Council
- Alternate Army Board Member to the Department of Defense Explosives Safety Board
- Appointed as the Army Hazard Classifier to the Department of Transportation
- Participated in ISO 9001:2008 and 14001 organizational certification
- Participated in OSHA VPP Star Status organizational certification
- Deployed to Afghanistan and served in USFOR-A HQ Safety Office as explosives safety point of contact
- Served on DoD explosives accident investigation team in Tanzania, Africa

08/1998 to 11/2006

- Chief of the Risk Management Division, U.S. Army Technical Center for Explosives Safety
- Supervisory Safety Engineer, GS-0803-14
- Supervisor - Johnnie Cook (ret), (918) 420-8919

- Supervised 15 technical personnel (Safety Engineers Safety Specialists, QASAS, and Ammunition Managers)
- Conducted 11 major functions of the explosives safety program for the Department of the Army Safety Office
 - Army approval of explosives site plans
 - Army's Hazard Classifier
 - Provide explosives safety technical assistance to Army personnel worldwide
 - Establish and conducted the Army's explosives safety assistance visits program with approximately 15 installation visits/year
 - Participate on Army explosives accident investigations
- Significant accomplishments and improvements:
 - Development and implementation of an Army explosives safety assistance visit program
 - Publication of a five year trend study of Army explosives accidents
 - Development and implementation of a new quantitative risk assessment tool – SAFER
 - Obtained \$500K of annual funding for an Army explosives safety test management program
 - Development and implementation of a new Army course Explosives Safety Management for Safety Professionals
- Alternate Army Board Member to the Department of Defense Explosives Safety Board
- Appointed as the Army Hazard Classifier to the Department of Transportation

10/1996 to 08/1998

- Instrumentation and Engineering Division, U.S. Army Kwajalein Atoll/Kwajalein Missile Range, Kwajalein, Marshall Islands
- General Engineer, GS-0801-13
- Supervisor - Terry Brown (ret), DSN 254-4388
- Contract monitor for ammunition logistics operations, the meteorological support contract, and range facilities maintenance and construction projects for range operations
- Oversaw maintenance and project scheduling for multi-million dollar facilities and equipment
- Significant accomplishments:
 - Functioned as Wake Island Engineering and Instrumentation POC for the TCMP rocket launch from Wake Island
 - Provided daily status briefings to the TCMP Program Manager on readiness to support
 - Performed as lead engineer for closing the Gellinam Island instrumentation site
 - Performed as lead engineer for upgrading the KMR Conference

10/15/1994 to 10/15/1996

- Safety Office, , U.S. Army Kwajalein Atoll/Kwajalein Missile Range, Kwajalein, Marshall Islands
- Safety Engineer, GS-0803-13
- Supervisor - Stephen LaPoint (ret), DSN 254-1516
- Performed as a ground/pad safety engineer for missile build-up and launch programs
- Monitored contractor's explosives operations at USAKA/KMR
 - Responsible for review of hazard analysis and SOPs
 - Conducted risk assessments of ammunition logistics and operations
 - Prepared explosives safety site plans for the missile storage and launch programs
 - Prepared explosives safety waivers/exemptions for Command approval
- Conducted monthly safety inspections of explosives facilities and operations

- Performed as Ground and Pad Safety Officer for missile launches from USAKA and surrounding islands
- Communicated with Flight Safety Officers to ensure all safety launch criteria were met for missile launches
- Operated the ignition enable/inhibit key as the final decision authority in allowing the launch of multi-million dollar missile launches
- Conducted daily meetings with the contractor to discuss safety readiness for upcoming operations
- Planned and conducted USACE explosives blasting operations, annual fireworks celebration, and monitoring of EOD operations at USAKA/KMR

06/15/1993 to 10/15/94

- Program Manager for Underground Testing, U.S. Army Technical Center for Explosives Safety, Savanna, IL
- Safety Engineer, GS-0803-14
- Supervisor - Gary Abrisz (ret), DSN 585-8919
- Served as senior Safety Engineer on Joint US and Republic of Korea Underground Ammunition Storage Technologies program
- Responsible to analyze, develop, and monitor the critical Command safety and health program of a significant National research and development program to establish unique underground storage concepts to enhance safety
- Performed as the explosives safety advisor to the PM on test program development and procedures for conducting the underground explosives tests
- Coordinated with the test engineers of USACE, Waterways Experiment Station to develop the test plans and SOPs for safely conducting the Phase 3, Intermediate Scale Tests
- Worked with the Mine Enforcement and Safety Agency to obtain the required training and certification for Army personnel conducting underground work
 - Identified the required safety equipment for personnel
 - Monitored oxygen levels and noxious gases in underground mines
 - Coordinated to obtain qualified mine inspectors to perform safe re-entry inspections
 - Conducted full time on-site monitoring of the Intermediate Scale Tests which involved approximately 6,000 pounds of high explosives
 - Coordinated with the U.S. Forest Service, Magdalena Fire Department, Magdalena city officials, and citizens of Magdalena, NM
- Tests were successfully completed without any accident or adverse publicity

09/15/1991 to 06/15/1993

- Chief of the Development and Production Explosives Safety Division, U.S. Army Technical Center for Explosives Safety, Savanna, IL
- Program Manager, GS-0340-14
- Supervisor - Gary Abrisz (ret), DSN 585-8919
- Supervised and directed the work activities of eleven professional employees
- Responsible for conducting nine functions of the explosives safety program for the Department of the Army Safety Office
 - Army approvals of explosives site plans
 - Army's hazard classifier
 - Participated on Army explosives accident investigations
 - Maintained Army explosives safety standards
 - Conducted the Army's explosives safety test management program
 - Provided safety technical assistance to Army personnel worldwide
- Significant accomplishments:
 - Established annual division goals for the organization
 - Established Specific Operation Assistance Review (SOAR) program

09/15/1984 to 09/15/1991

- Safety Office, , U.S. Army Kwajalein Atoll/Kwajalein Missile Range, Kwajalein, Marshall Islands
- Safety Engineer, GS-0803-13
- Supervisor - Stephen LaPoint (ret), DSN 254-1516
- Performed as a ground/pad safety engineer for missile build-up and launch programs
- Monitored contractor's safety and fire department operations at USAKA/KMR
 - Responsible for review of hazard analysis and SOPs
 - Conducted risk assessments of logistics and operations
 - Prepared explosives safety site plans for the missile storage and launch programs
 - Prepared explosives safety waivers/exemptions for Command approval
 - Monitored fire department fire prevention and protection program
 - Conducted exercises of the fire department for aviation and residential responses
- Conducted monthly safety inspections of explosives facilities and operations
- Performed as Ground and Pad Safety Officer for missile launches from USAKA and surrounding islands
- Communicated with Flight Safety Officers to ensure all safety launch criteria were met for missile launches
- Operated the ignition enable/inhibit key as the final decision authority in allowing the launch of multi-million dollar missile launches
- Conducted daily meetings with the contractor to discuss safety readiness for upcoming operations
- Planned and conducted USACE explosives blasting operations, annual fireworks celebration, and monitoring of EOD operations at USAKA/KMR

05/15/1980 to 09/15/1984

- Safety Director, Lone Star Army Ammunition Plant, Texarkana, TX
- Safety Specialist, GS-0018-12
- Supervisor - Tommy Eaves (ret)
- Monitored and evaluated contractor performance in safety and health program
- Conducted inspections of ammunition load, assemble, and pack operations
 - M67 Grenade loading and assembly
 - M483 155mm Projectile loading and assembly
 - Flare and incendiary mixing and loading
 - Detonator loading and packaging
 - Propellant and igniter loading and assembly
 - Burning and demolition grounds
- Approved Standing Operating Procedures for the COR
- Approved explosives safety site plans for the COR
- Approved hazard analysis and risk assessments for the COR
- Reviewed and approved explosives licenses for the COR
- Participated on management accident investigations teams

11/15/1978 to 05/15/1980

- Professor of Safety, DARCOM Intern Training Center, Red River Army Depot, TX
- Safety Engineer, GS-0803-12
- Supervisor - Ron Higgins (ret)
- Conducted safety courses for safety engineer interns
- Monitored students progress
- Developed programs of instruction for safety courses

05/15/1976 to 11/15/1978

- Safety Office, Tooele Army Depot, UT
- Safety Engineer, GS-0803-11
- Prepared explosives and chemical agent safety site plans

- Conducted hazard analysis for the Chemical Agent Munitions Disposal System (CAMDS)
- Prepared Standing Operating Procedures for operating CAMDS to dispose of chemical agent munitions
- Conducted daily inspections of the construction operations at CAMDS
- Conducted visitor tours and controls at CAMDS

06/15/1974 to 05/15/1976

- Safety Intern, DARCOM Intern Training Center, Red River Army Depot, TX
- Attended Army safety intern classes
- Obtained Master's Degree in Industrial Engineering (Safety Option) from Texas A&M University

Licenses

- Current Louisiana Explosive Blaster License with Explosive Service International
- Current ATFE Federal Explosive License with Explosive Service International

Education

EDUCATION:

Master's Degree MEIE, 1976, Industrial Engineering (Safety Option), GPA 4.00, Texas A M University, Total Credit hours earned semester: 45

BSIE, 1974, Industrial Engineering, GPA 3.21, Iowa State University, Total Credit hours earned quarter: 170. Courses included Statics (4 hours), Dynamics (4 hours), Strength of Materials (3 hours), Thermodynamics (4 hours), Intro to Electrical Engineering (4 hours), Physics I (5 hours), Physics II (5 hours), Operations Research (3 hours), Engineering Drawing (3 hours), Plant Layout (3 hours), Time and Motion Study (3 hours)

General Engineering, GPA 2.12, U.S. Naval Academy, Total Credit hours earned semester: 32

North Mahaska High School, 1969, New Sharon IA

Additional Information

TRAINING:

(06/01/1974-02/01/1975) DARCOM Safety Engineering Intern Program, DARCOM Intern Training Center, Texarkana, TX

(01/15/1976-05/20/1976) DARCOM Safety Engineering Intern Program, DARCOM Field Safety Activity, Charlestown, IN

(03/15/1977) Chemical Agent Safety Workshop and Downwind Hazard Distance Calculations, DARCOM Field Safety Activity, Charlestown, IN

(06/15/1978) ALMC Instructor Readiness Course. 40 hours, Ft. Lee, VA

(12/01/1979) Hazardous Chemical Safety School and Workshop, 40 hours, J.T. Baker Chemical Co., Dallas, TX

(05/01/1981) Explosives Storage and Safety Course, 40 hours, USADACS, Savanna, IL

TECHNICAL PUBLICATIONS:

Co-Chair of Army Explosives Safety Bulletin Editorial Board (2004-Present)

Transformation of U.S. Army Safety Center, Army Explosives Safety Bulletin - April 2005

Lessons Learned from Army Explosives Accident, Army Explosives Safety Bulletin - April 2005

Accident with Charge Diversionary MK141, Army Explosives Safety Bulletin - December 2004

Captured Enemy Ammunition Challenges, Army Explosives Safety Bulletin - September 2004

OEF/OIF Lessons Learned, Army Explosives Safety Bulletin - September 2004

Go for the Goal, Army Explosives Safety Bulletin - December 2003

WORK RELATED AWARDS, PRESENTATIONS, ETC.:

Alternate Army Member on Department of Defense Explosives Safety Board - (8/2005 to Present)

Army Member on DoD Risk Based Explosives Safety Criteria Team -(8/1998 to Present)

Appointed Army Hazard Classifier - (8/1999 to Present)
Army Member on DoD Test Management Working Group - (8/1999 to Present)
Facilitator for Department of Army Explosives Safety Council - (8/1999 to Present)
Briefer at 25th DAESC meeting - Nov 2005
Briefer at 24th DAESC meeting - May 2005
Briefer at Australian Explosives Safety Conference - Dec 1999
Briefer at IOC Safety Conference - Nov 1999 and received Letter of Appreciation
Briefed ASA (I&E) on Risk-Based Explosives Safety Model - Nov 1999
Briefer at 15th DAESC meeting - Aug 1999
Briefed Director Army Safety - Feb 1999
Briefer at 14th DAESC meeting - Nov 1998
Letter of Appreciation for briefing to new Army Ammunition Plant Commanders - July 1992
Letter of Appreciation for briefing - Mar 1992
Letter of Commendation for participation on Contract Source Selection Board - Nov 1987
Official Commendation for Suggestion Adoption - Apr 1984
Letter of Appreciation for paper and briefing on using accident control charts for DARCOM - May 1980
Letter of Appreciation for safety briefing - Apr 1980
Letter of Commendation for Project Work - June 1978
Letter of Appreciation for participation on pre-op survey team - Nov 1977

REFERENCES:

James Patton-Office of the Director of Army Safety
Phone Number: (703) 697-1306
Email Address: james.t.patton10.civ@mail.mil
Reference Type: Professional

James King-Office of Assistant Secretary of the Army (ESOH) Special Assistant for Munitions
Phone Number: (703) 697-5564
Email Address: james.c.king4.civ@mail.mil
Reference Type: Professional

Mr. Richard Wright-USACE HQ, Chief Safety and Occupational Health
Phone Number: (202) 761-8566
Email Address: Richard.I.wright@usace.army.mil
Reference Type: Professional

Appendix B

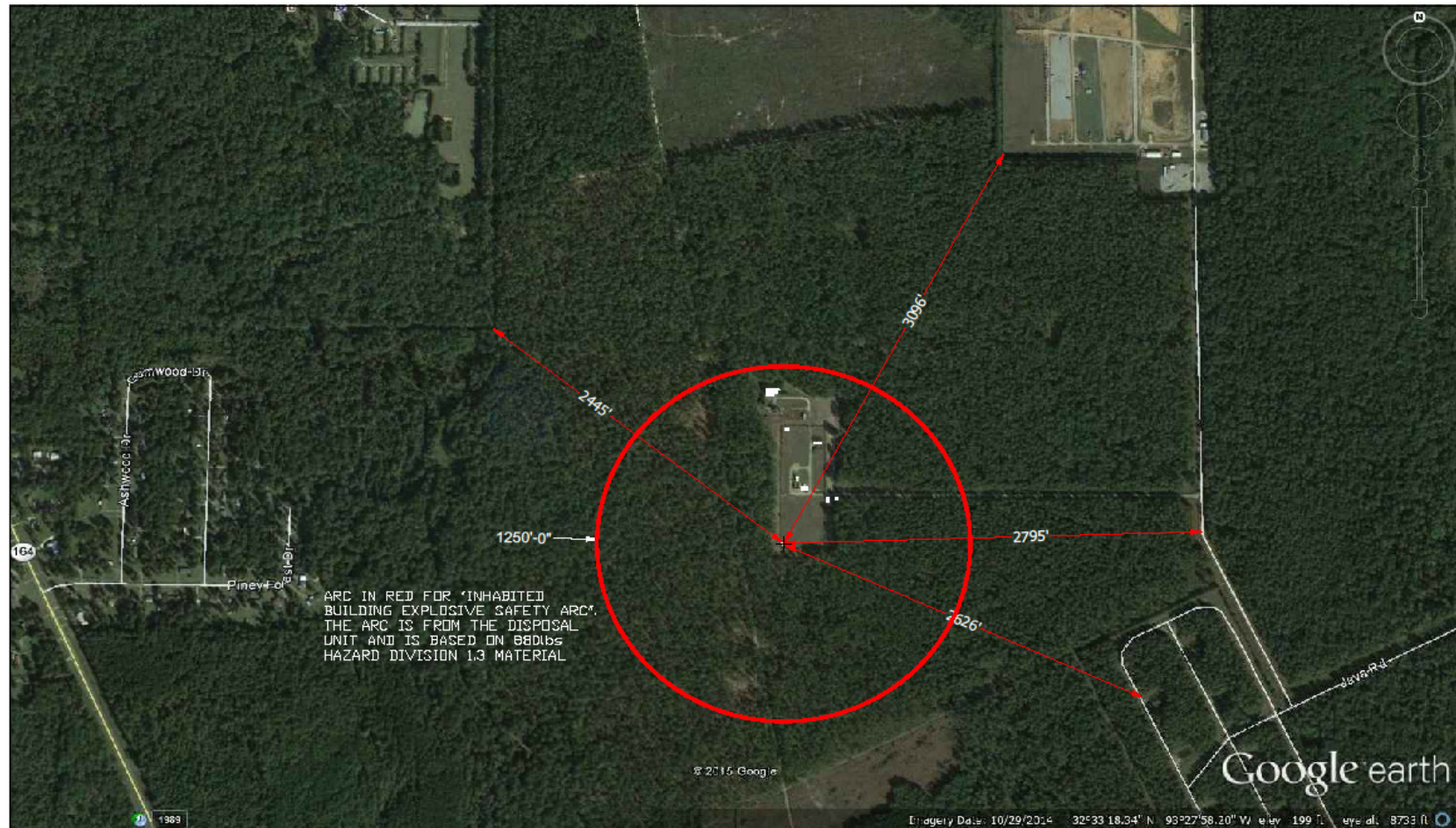
Health and Safety Plan (HASP) - Key Events

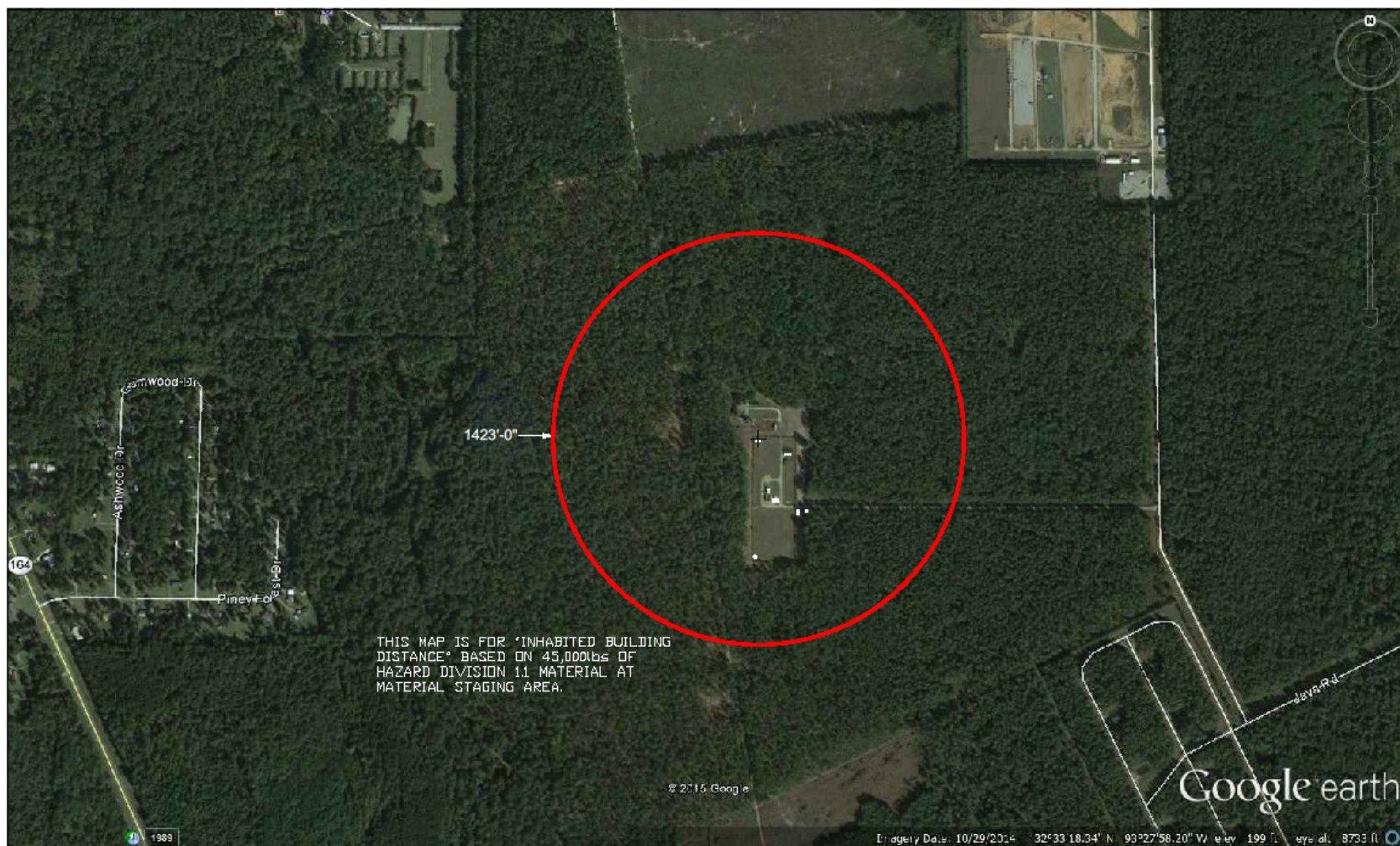
Explo Systems, Inc. Site Health and Safety Plan (HASP) Key Events		
Phase 1 (Mobilization and Site Preparation)	Phase 2 (Removal and Disposal Operations)	Phase 3 (Site Restoration and Demobilization)
<p>Submit Health and Safety Plan for USEPA Review</p> <p>Finalize Job/Process Safety Analysis</p> <p>Monitor mobilization and site preparation operations</p> <p>Document safety inspections</p> <p>Prepare Explosives Site Plan</p> <p>Prepare SOPs for ESI material removal and disposal operations</p> <p>Provide safety training to ESI personnel</p> <p>Prepare ESI emergency response plan</p> <p>Conduct daily safety meeting for mobilization work</p> <p>Order personal protective equipment (PPE)</p> <p>Order required safety equipment (fire extinguishers, first aid kits, fire retardant blanket, thermal gun, CO monitor, gatorade, etc.)</p> <p>Brief ESI Project Manager on safety program status</p> <p>Provide public information on status of safety program readiness to support burn operations</p> <p>Coordinate with Camp Minden Fire Department and Security on emergency response plan</p>	<p>Conduct daily safety brief to ESI personnel</p> <p>Monitor removal and disposal operations</p> <p>Perform safety certification of inert magazines</p> <p>Monitor safety certification of inert material for packing and disposal</p> <p>Document safety inspections</p> <p>Provide safety reports and status to ESI Site Manager</p> <p>Investigate and report ESI mishaps</p> <p>Address public information on safety as needed</p> <p>Monitor ESI supervisor and employee awareness</p> <p>Conduct periodic ESI safety training on pertinent safety topics</p> <p>Provide visitor safety briefings and escort services</p> <p>Conduct ESI emergency drill if needed</p> <p>Monitor adverse weather and advise ESI Site Manager</p> <p>Monitor burn pan temperature for re-loading Function as ESI POC for external safety visits</p>	<p>Prepare site restoration SOP</p> <p>Monitor site restoration operations</p> <p>Perform safety certification of clean-up operations</p> <p>Provide safety technical support on safety issues</p> <p>Address public information on safety as needed</p> <p>Provide safety reports and status to ESI Site Manager</p> <p>Provide visitor safety briefings and escort services</p>

Appendix C

Maps of Safety Zones and Safe Distances







Appendix D

Job Safety Analysis Sheets

Explosive Service International

Job Safety Analysis

Location: Various Magazines – Camp Minden, LA

Operation: Remove Material from Magazines

Revision/Date: Revision 2 (klw) 13 March 2015

Failure Severity	Failure Probability					
	1-Very Low	2-Low	3-Moderate	4-High	5-Very High	
	1-Very Low	1	2	3	4	5
	2-Low	2	4	6	8	10
	3-Moderate	3	6	9	12	15
	4-High	4	8	12	16	20
	5-Very High	5	10	15	20	25

Special Hazards: Accidental Detonation, Forklift Impact, Material Fall/Drop, Personnel Fall, Personnel Strain, Animal/Insect, Heat/Cold

Required and/or Recommended PPE: 100% Cotton Coveralls, Hard Hat, Safety Glasses, Gloves, Steel-Toed Boots, & 100% Cotton Undergarments

Sequence of Job Steps:	Potential Hazards:	Recommendation to Eliminate/Reduce Potential Hazards:	RAC
Open magazine door	Muscle Strain/ Caught Between Moving Parts	2 man rule, operator training on overexertion, competent operators, coverage in SOP for proper door opening, use of personal protective equipment (PPE), and use of tools or mechanical aids if required.	4
Inspect propellant packaging and pallet for damage	Spilled Propellant/Explosion	Competent operators, coverage in SOPs for propellant packaging inspection, coverage in SOPs for re-packaging process for deteriorated propellant packaging, operator training on propellant hazards, use of PPE, strict control of heat producing devices around propellant, and coverage in SOPs for propellant spills.	5

Sequence of Job Steps:	Potential Hazards:	Recommendation to Eliminate/Reduce Potential Hazards:	RAC
Position forklift for propellant pallet movement	Dropped Pallet/ Spilled Propellant/Explosion	2 man rule, licensed forklift operator, competent operators, coverage in SOP for propellant packaging inspection, operator training on propellant hazards, properly maintained forklift, and good housekeeping around forklift movement area.	10
Process or re-palletize spilled propellant, leaking containers, or broken pallets if required	Spilled Propellant/Explosion	2 man rule, competent operators, coverage in SOPs for re-packaging process for deteriorated propellant packaging, operator training on propellant hazards, use of PPE, strict control of heat producing devices around propellant, good housekeeping maintained around re-pack area, clear operator access and egress maintained around re-pack area, use of non-static/non-spark producing tools, and coverage in SOPs for propellant spills.	15
Move propellant on pallet out of magazine	Dropped Pallet/Spilled Propellant/Explosion	2 man rule, licensed forklift operator, competent operators, coverage in SOPs for propellant movement, coverage in SOPs for propellant packaging inspection, coverage in SOPs for processing deteriorated propellant packaging, operator training on propellant hazards, strict control of heat producing devices around propellant, good housekeeping maintained around forklift movement area, clear operator access and egress maintained around forklift movement area, and coverage in SOPs for propellant spills.	10
Load propellant pallet on trailer	Dropped Pallet/ Spilled Propellant/Explosion	2 man rule, licensed forklift operator, properly maintained forklift, good roadway and trailer access, coverage in SOPs for trailer loading, operator training on propellant hazards, strict control of heat producing devices around propellant, and coverage in SOPs for propellant spills.	5

Sequence of Job Steps:	Potential Hazards:	Recommendation to Eliminate/Reduce Potential Hazards:	RAC
Close and lock magazine door	Muscle Strain/ Caught Between Moving Parts	2 man rule, operator training on overexertion, competent operators, packaging, coverage in SOP for proper door opening, use of personal protective equipment (PPE), and use of non-static/non-spark tools or mechanical aids.	4

Equipment	Training	Inspection
Locks and keys for magazines	Supervisor and operator training on key control process	Supervisor/safety check at end of day
LP Forklift	Licensed operator	Daily operator inspection and periodic safety inspection
Tractor/trailer	Licensed operator	Daily operator 626 inspection and periodic safety inspection
“Hot Work” permit process	Supervisor and operator training on process	Supervisor/safety check during daily monitoring
PPE (100% cotton coveralls, 100% cotton undergarments, hard hat, safety shoes, gloves, and safety glasses/face shields)	Operator training on proper requirements and use of PPE for A&E operations	Supervisor/safety checks during daily monitoring
Portable fire extinguishers for tractor, forklift, and magazine	Operator training on proper use of fire extinguishers	Supervisor/safety checks during daily monitoring
Standard Operating Procedures (SOPs) for material removal operations	Operator training on SOPs	Bi-annual review of A&E SOPs
Lightning Warning process	Supervisor training on lightning warning process	Check during facility safety inspection
A&E Emergency Response Plan	Supervisor and operator training on emergency response plan for A&E accident	Conduct periodic drills in conjunction with Local Fire Department
Packaging/pallets for re-packaging when required	Operator training on re-packaging procedures	Supervisor/safety check during daily monitoring
Non-static/non-spark tools for re-packaging propellant	Operator training on use of proper tools	Supervisor/safety check during daily monitoring
Orange Cones	Operator training on use to restrict traffic	Supervisor/safety check during daily monitoring

Equipment	Training	Inspection
O2 and CO meter	Health and Safety Manager training on use	Initial entry and periodic monitoring inside magazine
Tape and plastic for container repair	Operator training on container repair	Supervisor/safety check during daily monitoring

Notes: During all phases, follow the guidance & direction of the explosive technician. Everyone has stop-work-authority during all phases & is encouraged to use it if the situation changes and/or something becomes unclear.

Other Site Specific Hazards that Should Be Noted: Heat and Cold Stress, Lightning and Severe Weather, Walking and Working Surfaces, Improper Lifting, Moving Forklifts and Vehicles, Operating Vehicles, Insects and Vegetation, Falling Stacks or Loads, Slips, Trips, and Falls, Strains and Sprains, and Health/Hygiene.

References/Policy: DOD 4145.26-M, OSHA 1910.109, DOD 5100.76-M, Attached Supplemental Hazard Analysis Worksheet

Summary: The greatest risk (15) is during processing of spilled or leaking material as the material will be in direct contact with operators and their tools. Repair or re-packaging of material will only be performed when packaging is already leaking or there is a high likelihood that the packaging will not contain the material during handling and transportation to the burning grounds. Heat/fire and human error are the greatest concerns for increasing the probability of an accidental initiation of the material. Risk mitigation measures will be used to reduce the risk of accidental initiation of the material, such as: SOPs, PPE, operator training, strict control of potential initiation sources, good housekeeping, maintenance of operator access and egress, non-static/non-spark producing tools, portable fire extinguishers, and use of a 2 man rule to reduce probability of human error occurring.

Personnel Attending JSA Training:

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

SUPPLEMENTAL JOB SAFETY ANALYSIS WORKSHEET

Location: ESI, Camp Minden, LA, Magazines (Various)

Activity: Material Removal from Magazines

- a. The following additional A&E storage risk control measures required by OSHA 1910.109 and DOD 4145.26-M will be incorporated into SOPs:
 - (1) Reference OSHA 1910.109(c) (5) (ii): Packages of explosives shall not be unpacked or repacked in a magazine nor within 50 feet of a magazine or in close proximity to other explosives. Tools used for opening packages of explosives shall be constructed of non-sparking materials, except that metal slitters may be used for opening fiberboard boxes. A wood wedge and a fiber, rubber, or wood mallet shall be used for opening or closing wood packages of explosives. Opened packages of explosives shall be securely closed before being returned to a magazine.
 - (2) Reference OSHA 1910.109(c) (5) (iii): Magazines shall not be used for the storage of any metal tools nor any commodity except explosives.
 - (3) Reference OSHA 1910.109(c)(5)(iv): Magazine floors shall be regularly swept, kept clean, dry, free of grit, paper, empty used packages, and rubbish. Brooms and other cleaning utensils shall not have any spark-producing metal parts. Sweepings from floors of magazines shall be properly disposed of.
 - (4) Reference OSHA 1910.109(c) (5) (vii): Smoking, matches, open flames, spark-producing devices, and firearms (except firearms carried by guards) shall not be permitted inside of or within 50 feet of magazines. The land surrounding a magazine shall be kept clear of all combustible materials for a distance of at least 50 feet. Combustible materials shall not be stored within 50 feet of magazines.
 - (5) Reference OSHA 1910.109(c) (5) (viii): Magazines shall be in the charge of a competent person at all times and who shall be held responsible for the enforcement of all safety precautions.
 - (6) Reference OSHA 1910.109 (c) (1) (ii): Blasting caps, electric blasting caps, detonating primers, and primed cartridges shall not be stored in the same magazine with other explosives.
 - (7) Reference OSHA 1910.109(e)(1)(i): While explosives are being handled or used, smoking shall not be permitted and no one near the explosives shall possess matches, open light or other fire or flame. No person shall be allowed to handle explosives while under the influence of intoxicating liquors, narcotics, or other dangerous drugs.
 - (8) Reference DOD 4145.26-M, C3.3: SOPs. Clearly written procedures are essential to avoid operator errors and ensure process control. Therefore, before starting operations involving AE, qualified personnel shall develop, review, and approve written procedures.
 - (9) Reference DOD 4145.26M, C3.3.3: Training. Personnel shall receive appropriate training before performing work that involves exposure to AE. The training shall include specific safety and health hazards, emergency procedures including shutdown, and safe work practices applicable to the employee's job tasks. The contractor shall ensure that each

employee involved in an AE process has received and understood the training and receives appropriate refresher training. The contractor shall prepare a record that contains the identity of the employee, the date of training, and the means used to verify that the employee understood the training.

- (10) Reference DOD 4145.26-M, C3.3.4: Emergency Procedures. The contractor shall instruct employees on procedures to follow in the event of electrical storms, utility or mechanical failures, equipment failures, process abnormalities, and other emergencies occurring during AE operations.
- (11) Reference DOD 4145.26-M, C3.7.1: A system for monitoring the approach of electrical storms shall be established that provides for the timely shut down of operations and evacuation of personnel from PESs where lightning could initiate explosives. When an electrical storm approaches, all personnel shall evacuate to at least PTRD, or a shelter providing equivalent protection, from: C3.7.1.3. Magazines, open storage sites, or loading docks not equipped with lightning protection systems.
- (12) Reference DOD 4145.26-M, C3.9.1.: Unless a hazard analysis indicates otherwise, only hand tools constructed of wood or non-sparking metals such as bronze, lead, and “K” Monel shall be used for work in locations and on equipment that contain exposed explosives or hazardous concentrations of flammable dusts, gases, or vapors that are susceptible to mechanical spark.
- (13) Reference DOD 4145.26-M, C3.11.1. All AE operations require a hazard assessment to determine the need for protective clothing and personal protective equipment. The assessment shall include an evaluation of all hazards and factors contained in paragraph C3.11.2.
- (14) Reference DOD 4145.26-M, C3.12.1: The contractor shall not refuel gasoline, diesel, or liquefied petroleum gas (LPG) powered equipment inside buildings containing AE. Personnel shall locate refueling vehicles and refueling operations at least 100 ft. [30.48m] (50 ft. [15.24] from non-combustible structures) from structures or sites containing AE.
- (15) Reference DOD 4145.26-M, C3.12.3: Gasoline-, diesel-, and LPG-powered equipment shall have spark arrestors. The contractor shall perform and document inspections of the exhaust and electrical systems of the equipment, as necessary, to ensure that the systems are functioning within the manufacturer's specifications. The contractor shall maintain documentation of the two most recent inspections.
- (16) Reference DOD 4145.26-M, C9.2.3: While crews are working inside magazines, doors shall remain open to permit rapid egress.
- (17) Reference DOD 4145.26-M, C9.4.2: Damaged containers of AE should not be stored in a magazine with serviceable containers of AE. Such containers should be repaired or the contents transferred to new or serviceable containers. All containers of AE in magazines shall be closed with covers securely fastened. Containers that have been opened shall be properly closed before restoring them. Stored containers should be free from loose dust and grit.
- (18) Reference DOD 4145.26-M, C9.4.3: Do not permit loose powder, grains, powder dust, or particles of explosive substances from broken AE or explosive substance containers in magazines. In addition, clean up any spilled explosive substance as soon as possible

following proper procedures established per section C8.4. and suspend all other work in the magazine until accomplished.

- (19) Reference DOD 4145.26-M, C10.2.1: A written fire plan shall be prepared that itemizes the emergency functions of each department or outside agency and indicates responsible individuals and alternates.
- (20) Reference DOD 4145.26-M, C10.3: SMOKING. Smoking may take place only in specifically designated and posted “smoking locations.” Cigarettes, tobacco, and matches shall be discarded in ash receptacles only; they shall not be dropped into trashcans.
- (21) Reference DOD 4145.26-M, C10.4: HOT WORK PERMITS. A written permit shall be required for the temporary use of heat-producing equipment or devices when explosives or highly flammable materials are involved or located in the near vicinity of the hot work.
- (22) Reference DOD 4145.26-M, C10.5: PORTABLE FIRE EXTINGUISHERS. Hand extinguishers within buildings can extinguish fires before major damage is done. Portable equipment may prove similarly valuable outside AGMs and other buildings with AE. Portable fire extinguishers shall be maintained in accordance with NFPA Standard No. 10.
- (23) Reference OSHA 1910.132(d)(1): The employer shall assess the workplace to determine if hazards are present, or are likely to be present, which necessitate the use of personal protective equipment (PPE). If such hazards are present, or likely to be present, the employer shall: OSHA 1910.132(d) (1) (i) Select, and have each affected employee use, the types of PPE that will protect the affected employee from the hazards identified in the hazard assessment; OSHA 1910.132(d) (1) (ii) Communicate selection decisions to each affected employee; and, OSHA 1910.132(d) (1) (iii) Select PPE that properly fits each affected employee. Note: Non-mandatory Appendix B contains an example of procedures that would comply with the requirement for a hazard assessment.
- (24) Reference OSHA 1910.178(c)(2)(xii): If general industrial or commercial properties are hazardous, only approved power-operated industrial trucks specified for such locations in this paragraph (c) (2) shall be used. If not classified as hazardous, any approved power-operated industrial truck designated as Type D, E, G, or LP may be used, or trucks which conform to the requirements of these types may be used.
- (25) Reference OSHA 1910/178(l) (1) (i): The employer shall ensure that each powered industrial truck operator is competent to operate a powered industrial truck safely, as demonstrated by the successful completion of the training and evaluation specified in this paragraph (l).

Explosive Service International

Job Safety Analysis

Location: Various Magazines – Camp Minden, LA

Operation: Transport Material from Magazines to Area I Material Staging Area

Revision/Date: Revision 3 (klw) 14 Mar 2015

Failure Severity	Failure Probability					
		1-Very Low	2-Low	3-Moderate	4-High	5-Very High
	1-Very Low	1	2	3	4	5
	2-Low	2	4	6	8	10
	3-Moderate	3	6	9	12	15
	4-High	4	8	12	16	20
	5-Very High	5	10	15	20	25

Special Hazards: Material Spill/Fire, Tractor/Trailer Accident, Forklift Impact, Material Fall/Drop, Personnel Fall, Personnel Strain, Animal/Insect, Heat/Cold

Required and/or Recommended PPE: 100% Cotton Coveralls, Safety Glasses, Gloves, Steel-Toed Boots, & 100% Cotton Undergarments

Sequence of Job Steps:	Potential Hazards:	Recommendation to Eliminate/Reduce Potential Hazards:	RAC
Park tractor/trailer at Magazine	Tractor/trailer accident/fire	Licensed tractor operator, daily 626 vehicle inspection, wheel chocks, fire extinguishers on tractor, orange cones to block roadway, use of personal protective equipment (PPE), and use of tools or mechanical aids if required.	4
Tie-down/strap material containers on trailer	Muscle Strain/ Fall from Trailer	2 man rule, licensed tractor operator, operator training on overexertion, SOP on proper trailer loading, use of personal protective equipment (PPE), and use of non-static/non-spark tools or mechanical aids if required.	6

Sequence of Job Steps:	Potential Hazards:	Recommendation to Eliminate/Reduce Potential Hazards:	RAC
Drive tractor with material load to Area I Material Staging Area	Vehicle Accident/Vehicle Fire/Spilled Propellant/Explosion	2 man rule, licensed tractor operator, remove wheel chocks, speed limit coverage in SOP, operator training on propellant hazards, fire extinguisher in tractor, properly maintained tractor, placarded tractor/trailer, and radio communication.	10
Drop material loaded trailer at Area I Material Staging Area and pick-up empty trailer	Vehicle Accident/Vehicle Fire/Spilled Propellant/Vegetation Fire/Explosion	2 man rule, licensed tractor operator, good housekeeping and vegetation control around Material Staging Area, place wheel chocks on trailer, Material Staging Area procedures in SOP, operator training on propellant hazards, fire extinguisher in tractor, properly maintained tractor, placarded trailer, remove placards on tractor and empty trailer, speed limit coverage in SOP, and radio communication.	10
Drive tractor with empty trailer back to magazine for loading with propellant	Vehicle Accident/Vehicle Fire	Licensed tractor operator, remove wheel chocks on empty trailer, remove placards on tractor and empty trailer, operator training on driving hazards, fire extinguisher in tractor, properly maintained tractor, speed limit coverage in SOP, and radio communication.	3

Equipment	Training	Inspection
Tractor/trailer	Licensed operator	Daily operator 626 inspection and periodic safety inspection
“Hot Work” permit process	Supervisor and operator training on process	Supervisor/safety check during daily monitoring
PPE (100% cotton coveralls, 100% cotton undergarments, safety shoes, gloves, and safety glasses/face shields)	Operator training on proper requirements and use of PPE for A&E operations	Supervisor/safety checks during daily monitoring
Portable fire extinguishers for tractor	Operator training on proper use of fire extinguishers	Supervisor/safety checks during daily monitoring
Standard Operating Procedures (SOPs) for material transportation	Operator training on SOPs	Bi-annual review of A&E SOPs

Equipment	Training	Inspection
Lightning Warning process	Supervisor training on lightning warning process	Check during facility safety inspection
A&E Emergency Response Plan	Supervisor and operator training on emergency response plan for A&E accident	Conduct periodic drills in conjunction with Local Fire Department
Non-static/non-spark tools for trailer operations	Operator training on use of proper tools	Supervisor/safety check during daily monitoring
Orange Cones	Operator training on use to restrict traffic	Supervisor/safety check during daily monitoring
Wheel chocks	Operator training on proper use	Supervisor/safety check during daily monitoring
Placards for tractor and trailer	Operator training on proper use	Supervisor/safety check during daily monitoring
Radio for communication	Operator training on proper use	Supervisor/safety check during daily monitoring
Tie-down straps	Operator training on proper use	Supervisor/safety check during daily monitoring

Notes: During all phases, follow the guidance & direction of the explosive technician. Everyone has stop-work-authority during all phases & is encouraged to use it if the situation changes and/or something becomes unclear.

Other Site Specific Hazards that Should Be Noted: Heat and Cold Stress, Lightning and Severe Weather, Walking and Working Surfaces, Improper Lifting, Moving Forklifts and Vehicles, Operating Vehicles, Insects and Vegetation, Falling Stacks or Loads, Slips, Trips, and Falls, Strains and Sprains, and Health/Hygiene.

References/Policy: DOD 4145.26-M, OSHA 1910.109, DOD 5100.76-M, Attached Supplemental Hazard Analysis Worksheet

Summary: The greatest risk (10) is during transportation and drop-off of the material loaded trailer at the Area I Material Staging Area. Heat/fire and human error are the greatest concerns for increasing the probability of an accidental initiation of the propellant. Risk mitigation measures will be used to reduce the risk of accidental initiation of the material, such as: SOPs, PPE, operator training, strict control of potential initiation sources, good housekeeping, speed limits, placards, wheel chocks, tie-down straps, radio communication, non-static/non-spark tools, portable fire extinguishers, and use of a 2 man rule to reduce probability of human error and heat/fire occurring.

Personnel Attending JSA Training:

SUPPLEMENTAL JOB SAFETY ANALYSIS WORKSHEET

Location: ESI, Camp Minden, LA, Magazines (Various)

Activity: Transport Propellant from Magazines to Area I Material Staging Area

The following additional A&E storage risk control measures required by OSHA 1910.109 and DOD 4145.26-M will be incorporated into SOPs:

1. Reference OSHA 1910.109(d)(1)(i): No employee shall be allowed to smoke, carry matches or any other flame-producing device, or carry any firearms or loaded cartridges while in or near a motor vehicle transporting explosives; or drive, load, or unload such vehicle in a careless or reckless manner.
2. Reference OSHA 1910.109(d) (1) (iii): Explosives shall not be transferred from one vehicle to another within the confines of any jurisdiction (city, county, State, or other area) without informing the fire and police departments thereof. In the event of breakdown or collision the local fire and police departments shall be promptly notified to help safeguard such emergencies. Explosives shall be transferred from the disabled vehicle to another only, when proper and qualified supervision is provided.
3. Reference OSHA 1910.109(d)(1)(iv): Blasting caps or electric blasting caps shall not be transported over the highways on the same vehicles with other explosives, unless packaged, segregated, and transported in accordance with the Department of Transportation's Hazardous Materials Regulations (49 CFR parts 177-180).
4. Reference 1910.109(d) (2) (i): Vehicles used for transporting explosives shall be strong enough to carry the load without difficulty and be in good mechanical condition. If vehicles do not have a closed body, the body shall be covered with a flameproof and moisture-proof tarpaulin or other effective protection against moisture and sparks. All vehicles used for the transportation of explosives shall have tight floors and any exposed spark-producing metal on the inside of the body shall be covered with wood or other nonsparking materials to prevent contact with packages of explosives. Packages of explosives shall not be loaded above the sides of an open-body vehicle.
5. Reference OSHA 1910.109(d) (2) (ii) (a): Exterior markings or placards required on applicable vehicles shall be as follows for the various classes of commodities: Explosives A (Red letters on white background).
6. Reference OSHA 1910.109(d)(2)(ii)(c): Such markings or placards shall be displayed at the front, rear, and on each side of the motor vehicle or trailer, or other cargo carrying body while it contains explosives or other dangerous articles of such type and in such quantity as specified in paragraph (d)(1)(ii)(a) of this subdivision. The front marking or placard may be displayed on the front of either the truck, truck body, truck tractor or the trailer.
7. Reference OSHA 1910.109(d)(2)(iii): Each motor vehicle used for transporting explosives shall be equipped with a minimum of two extinguishers, each having a rating of at least 10-BC.
8. Reference OSHA 1910.109(d) (2) (iii) (b): Extinguishers shall be filled and ready for immediate use and located near the driver's seat. Extinguishers shall be examined periodically by a competent person.

9. Reference 1910.109(d) (2) (iv): A motor vehicle used for transporting explosives shall be given the following inspection to determine that it is in proper condition for safe transportation of explosives:
10. Reference OSHA 1910.109(d) (2) (iv) (a): Fire extinguishers shall be filled and in working order.
11. Reference OSHA 1910.109(d) (2) (iv) (b): All electrical wiring shall be completely protected and securely fastened to prevent short-circuiting.
12. Reference OSHA 1910.109(d) (2) (iv) (c): Chassis, motor, pan, and underside of body shall be reasonably clean and free of excess oil and grease.
13. Reference OSHA 1910.109(d) (2) (iv) (d): Fuel tank and feedline shall be secure and have no leaks.
14. Reference OSHA 1910.109(d) (2) (iv) (e): Brakes, lights, horn, windshield wipers, and steering apparatus shall function properly.
15. Reference OSHA 1910.109(d) (2) (iv) (f): Tires shall be checked for proper inflation and defects.
16. Reference OSHA 1910.109(d) (2) (iv) (g): The vehicle shall be in proper condition in every other respect and acceptable for handling explosives.
17. Reference OSHA 1910.109(d) (3) (i): Vehicles transporting explosives shall only be driven by and be in the charge of a driver who is familiar with the traffic regulations, State laws, and the provisions of this section.
18. Reference OSHA 1910.109(d)(3)(iii): Every motor vehicle transporting any quantity of Class A or Class B explosives shall, at all times, be attended by a driver or other attendant of the motor carrier. This attendant shall have been made aware of the class of the explosive material in the vehicle and of its inherent dangers, and shall have been instructed in the measures and procedures to be followed in order to protect the public from those dangers. He shall have been made familiar with the vehicle he is assigned, and shall be trained, supplied with the necessary means, and authorized to move the vehicle when required.
19. Reference OSHA 1910.109(d)(3)(iii)(a): For the purpose of this subdivision, a motor vehicle shall be deemed "attended" only when the driver or other attendant is physically on or in the vehicle, or has the vehicle within his field of vision and can reach it quickly and without any kind of interference "attended" also means that the driver or attendant is awake, alert, and not engaged in other duties or activities which may divert his attention from the vehicle, except for necessary communication with public officers, or representatives of the carrier shipper, or consignee, or except for necessary absence from the vehicle to obtain food or to provide for his physical comfort.
20. Reference OSHA 1910.109(d)(3)(iii)(b): However, an explosive-laden vehicle may be left unattended if parked within a securely fenced or walled area with all gates or entrances locked where parking of such vehicle is otherwise permissible, or at a magazine site established solely for the purpose of storing explosives.
21. Reference OSHA 1910.109(d)(3)(iv): No spark-producing metal, spark-producing metal tools, oils, matches, firearms, electric storage batteries, flammable substances, acids, oxidizing materials, or

corrosive compounds shall be carried in the body of any motor truck and/or vehicle transporting explosives, unless the loading of such dangerous articles and the explosives comply with U.S. Department of Transportation regulations.

22. Reference OSHA 1910.109(d) (3) (v): Vehicles transporting explosives shall avoid congested areas and heavy traffic. Where routes through congested areas have been designated by local authorities such routes shall be followed.

23. Reference OSHA 1910.109(d) (3) (vi): Delivery shall only be made to authorized persons and into authorized magazines or authorized temporary storage or handling areas.

24. Reference DOD 4145.26-M, C3.16.1. Written Procedures. The contractor shall develop written procedures to ensure safe and efficient transportation of AE in motor vehicles.

25. Reference DOD 4145.26-M, C3.16.1.1. Brakes shall be set and the wheels chocked when the possibility exists that the vehicle could move during loading or unloading.

25. Reference DOD 4145.26-M, C3.16.1.2. AE shall not be loaded or unloaded when a motor vehicle's engine is running, unless the engine is providing power to accessories used in the loading and unloading, such as mechanical handling equipment. If the engine is diesel powered, it may continue to run during loading or unloading of explosives except when exposed explosives are involved.

27. Reference DOD, C3.16.1.3. Vehicles, including partly or completely loaded flatbeds, shall have the load blocked and braced to prevent shifting during transit.

28. Reference DOD 4145.26-M, C3.16.1.4. The operator shall not transport AE material in the passenger compartment of the vehicle.

29. Reference DOD 4145.26-M, C3.16.1.5. Motor vehicles transporting AE within the establishment but outside the explosives area shall bear at least two appropriate placards identifying the hazard division of the AE. These placards should be removed or covered whenever the vehicle is not loaded. Reflectorized placards are preferred.

30. Reference DOD 4145.26-M, C3.16.1.6. The vehicle operator shall be trained in emergency procedures to be followed in the event of a vehicle fire, breakdown, accident, damaged or leaking containers, and spilled AE material.

31. Reference DOD 4145.26-M, C3.16.2. Pre-loading Motor Vehicle Inspections. All motor vehicles used to transport AE shall be inspected daily before loading to verify:

- a. C3.16.2.1. Vehicles are in a safe operating condition.
- b. C3.16.2.2. Batteries and wiring are not in contact with containers of AE.
- c. C3.16.2.3. Exposed ferrous metal in the interior of the vehicle body is covered with nonsparking material when scrap and bulk explosives are being transported in containers that could be damaged or when explosives could otherwise become exposed.
- d. C3.16.2.4. A serviceable portable fire extinguisher of the appropriate class is carried on the motor vehicle.
- e. C3.16.2.5. Motor vehicles or equipment with internal combustion engines that are used near explosives scrap, waste, or items contaminated with explosives are equipped with exhaust system spark

arresters and carburetor flame arresters (authorized air cleaners). These vehicles and equipment should be inspected and cleaned to prevent accumulation of carbon.

Explosive Service International

Job Safety Analysis

Location: Area I Material Staging Area – Camp Minden, LA

Operation: Place Material in Contained Burn Chamber or Kiln Disposal Unit

Revision/Date: Revision 3 (klw) 14 Mar 2015

Failure Severity	Failure Probability					
		1-Very Low	2-Low	3-Moderate	4-High	5-Very High
	1-Very Low	1	2	3	4	5
	2-Low	2	4	6	8	10
	3-Moderate	3	6	9	12	15
	4-High	4	8	12	16	20
	5-Very High	5	10	15	20	25

Special Hazards: Accidental Fire/Detonation, Forklift Accident, Dropped Container, Spilled Propellant, Heat Stress/Cold Exposure

Required and/or Recommended PPE: 100% Cotton Coveralls, Safety Glasses/Face Shield, Gloves, Steel-Toed Boots, and 100% Cotton Undergarments

Sequence of Job Steps:	Potential Hazards:	Recommendation to Eliminate/Reduce Potential Hazards:	RAC
Inspect propellant packaging and pallet for damage	Spilled Material/Fire	Explosives limits of 45,000# HD 1.1, safety zone of 1,423' IBD, safety distances between other Area I operations, competent operators, coverage in SOPs for propellant packaging inspection, coverage in SOPs for re-packaging process for deteriorated propellant packaging, operator training on propellant hazards, use of PPE, strict control of heat producing devices around propellant, and coverage in SOPs for material spills.	5
Remove material from trailer	Dropped Pallet/Spilled Propellant/Fire/Explosion	2 man rule, licensed forklift operator, competent operators, operator training on propellant hazards, properly	5

Sequence of Job Steps:	Potential Hazards:	Recommendation to Eliminate/Reduce Potential Hazards:	RAC
		maintained forklift, fire extinguisher on forklift, good housekeeping and vegetation control around forklift movement area, and spill clean-up SOP.	
Pour material from container (Super Sacks, Drums, or Boxes) into hopper for Contained Burn Chamber or Kiln Disposal Unit	Dropped Container Spilled Material Fire/Explosion	2 man rule, grounded burn tray/hopper, use of temperature gun to measure burn tray temperature, licensed forklift operator, properly maintained forklift, operator training on propellant hazards, use of PPE, strict control of heat producing devices around propellant, and coverage in SOPs for propellant spills.	10
Level propellant in burn tray for Contained Burn Chamber to maximum 3" depth	Spilled Material Fire/Explosion	2 man rule, operator training on propellant hazards, SOP for propellant depth, use of PPE, use of non-static/non-spark tools, strict control of heat producing devices, and good housekeeping and vegetation control.	15
Transport loaded burn tray to Contained Burn Chamber or loaded transport hopper to Kiln Disposal Unit	Muscle Strain/ Caught Between Moving Parts Dropped Tray/Hopper Spilled Material Fire/Explosion	Licensed forklift operator, SOP for propellant container /pallet inspection and handling, use of PPE, use of non-static/non-spark tools, strict control of heat producing devices, and good housekeeping and vegetation control around container/pallet storage area.	5
Dispose of empty material containers and plastic liners	Muscle Strain Spilled Material/Fire	Coverage in SOPs for disposal of empty material containers and plastic liners, operator training on material hazards, use of PPE, strict control of heat producing devices around material, good housekeeping maintained around disposal areas, clear operator access and egress maintained around disposal areas, and use of 200% inspection to insure containers and plastic liners are empty.	4

Equipment	Training	Inspection
Forklift	Licensed operator	Daily operator inspection and periodic safety inspection

Equipment	Training	Inspection
Temperature Gun	Supervisor and operator training on use	Supervisor/safety check during daily monitoring
“Hot Work” permit process	Supervisor and operator training on process	Supervisor/safety check during daily monitoring
PPE (100% cotton coveralls, 100% cotton undergarments, safety shoes, gloves, and safety glasses/face shields)	Operator training on proper requirements and use of PPE for A&E operations	Supervisor/safety checks during daily monitoring
Portable fire extinguishers for forklift and Material Staging Area	Operator training on proper use of fire extinguishers	Supervisor/safety checks during daily monitoring
Standard Operating Procedures (SOPs) for material placement in transport hoppers	Operator training on SOPs	Bi-annual review of A&E SOPs
Lightning Warning process	Supervisor training on lightning warning process	Check during facility safety inspection
A&E Emergency Response Plan	Supervisor and operator training on emergency response plan for A&E accident	Conduct periodic drills in conjunction with Local Fire Department
Propellant transport hoppers	Operator training on container/pallet inspection and disposal procedures	Supervisor/safety check during daily monitoring
Non-static/non-spark tools for material leveling	Operator training on use of proper tools	Supervisor/safety check during daily monitoring
Flameproof Blanket	Operator training on proper use	Supervisor/safety check during daily monitoring
Burn Tray or Transport Hopper Covers	Operator training on proper use	Supervisor/safety check during daily monitoring

Notes: During all phases, follow the guidance & direction of the explosive technician. Everyone has stop-work-authority during all phases & is encouraged to use it if the situation changes and/or something becomes unclear.

Other Site Specific Hazards that Should Be Noted: Heat and Cold Stress, Lightning and Severe Weather, Walking and Working Surfaces, Improper Lifting, Moving Forklifts and Vehicles, Operating Vehicles, Insects and Vegetation, Falling Stacks or Loads, Slips, Trips, and Falls, Strains and Sprains, and Health/Hygiene.

References/Policy: DOD 4145.26-M, OSHA 1910.109, DOD 5100.76-M, Attached Supplemental Hazard Analysis Worksheet

Summary: The greatest risk (15) is during leveling material in the burn tray for Contained Burn Chamber as the material will be in direct contact with operators and their tools. Human error and fire/heat are the greatest concerns for increasing the probability of an accidental initiation of the material. Risk mitigation measures will be used to reduce the risk of accidental initiation of the material, such as: SOPs, PPE, operator training, temperature gun, strict control of potential initiation sources, good housekeeping, maintenance of operator access and egress, non-static/non-spark producing tools, portable fire extinguishers, and use of a 2 man rule to reduce probability of human error and/or heat/fire occurring in or around the material.

Personnel Attending JSA Training:

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SUPPLEMENTAL JOB SAFETY ANALYSIS WORKSHEET

Location: ESI, Camp Minden, LA, Area I Material Staging Area

Activity: Material Placement in Contained Burn Chamber or Kiln Disposal Unit

The following additional A&E storage risk control measures required by OSHA 1910.109 and DOD 4145.26-M will be incorporated into SOPs:

- (1) Reference OSHA 1910.109(e)(1)(i): While explosives are being handled or used, smoking shall not be permitted and no one near the explosives shall possess matches, open light or other fire or flame. No person shall be allowed to handle explosives while under the influence of intoxicating liquors, narcotics, or other dangerous drugs.
- (2) Reference DOD 4145.26-M, C3.3.: SOPs. Clearly written procedures are essential to avoid operator errors and ensure process control. Therefore, before starting operations involving AE, qualified personnel shall develop, review, and approve written procedures.
- (3) Reference DOD 4145.26M, C3.3.3.: Training. Personnel shall receive appropriate training before performing work that involves exposure to AE. The training shall include specific safety and health hazards, emergency procedures including shutdown, and safe work practices applicable to the employee's job tasks. The contractor shall ensure that each employee involved in an AE process has received and understood the training and receives appropriate refresher training. The contractor shall prepare a record that contains the identity of the employee, the date of training, and the means used to verify that the employee understood the training.
- (4) Reference DOD 4145.26-M, C3.3.4.: Emergency Procedures. The contractor shall instruct employees on procedures to follow in the event of electrical storms, utility or mechanical failures, equipment failures, process abnormalities, and other emergencies occurring during AE operations.
- (5) Reference DOD 4145.26-M, C3.7.1: A system for monitoring the approach of electrical storms shall be established that provides for the timely shut down of operations and evacuation of personnel from PESs where lightning could initiate explosives. When an electrical storm approaches, all personnel shall evacuate to at least PTRD, or a shelter providing equivalent protection, from: C3.7.1.3. Magazines, open storage sites, or loading docks not equipped with lightning protection systems.
- (6) Reference DOD 4145.26-M, C3.9.1.: Unless a hazard analysis indicates otherwise, only hand tools constructed of wood or non-sparking metals such as bronze, lead, and "K" Monel shall be used for work in locations and on equipment that contain exposed explosives or hazardous concentrations of flammable dusts, gases, or vapors that are susceptible to mechanical spark.
- (7) Reference DOD 4145.26-M, C3.11.1. All AE operations require a hazard assessment to determine the need for protective clothing and personal protective equipment. The assessment shall include an evaluation of all hazards and factors contained in paragraph C3.11.2.

- (8) Reference DOD 4145.26-M, C3.12.1: The contractor shall not refuel gasoline, diesel, or liquefied petroleum gas (LPG) powered equipment inside buildings containing AE. Personnel shall locate refueling vehicles and refueling operations at least 100 ft. [30.48m] (50 ft. [15.24] from non-combustible structures) from structures or sites containing AE.
- (9) Reference DOD 4145.26-M, C3.12.3. Gasoline-, diesel-, and LPG-powered equipment shall have spark arrestors. The contractor shall perform and document inspections of the exhaust and electrical systems of the equipment, as necessary, to ensure that the systems are functioning within the manufacturer's specifications. The contractor shall maintain documentation of the two most recent inspections.
- (10) Reference DOD 4145.26-M, C10.2.1. A written fire plan shall be prepared that itemizes the emergency functions of each department or outside agency and indicates responsible individuals and alternates.
- (11) Reference DOD 4145.26-M, C10.3: SMOKING. Smoking may take place only in specifically designated and posted "smoking locations." Cigarettes, tobacco, and matches shall be discarded in ash receptacles only; they shall not be dropped into trashcans.
- (12) Reference DOD 4145.26-M, C10.4: HOT WORK PERMITS. A written permit shall be required for the temporary use of heat-producing equipment or devices when explosives or highly flammable materials are involved or located in the near vicinity of the hot work.
- (13) Reference DOD 4145.26-M, C10.5: PORTABLE FIRE EXTINGUISHERS. Hand extinguishers within buildings can extinguish fires before major damage is done. Portable equipment may prove similarly valuable outside AGMs and other buildings with AE. Portable fire extinguishers shall be maintained in accordance with NFPA Standard No. 10.
- (14) Reference OSHA 1910.132(d)(1): The employer shall assess the workplace to determine if hazards are present, or are likely to be present, which necessitate the use of personal protective equipment (PPE). If such hazards are present, or likely to be present, the employer shall: OSHA 1910.132(d) (1) (i) Select, and have each affected employee use, the types of PPE that will protect the affected employee from the hazards identified in the hazard assessment; OSHA 1910.132(d) (1) (ii) Communicate selection decisions to each affected employee; and, OSHA 1910.132(d) (1) (iii) Select PPE that properly fits each affected employee. Note: Non-mandatory Appendix B contains an example of procedures that would comply with the requirement for a hazard assessment.
- (15) Reference OSHA 1910.178(c)(2)(xii): If general industrial or commercial properties are hazardous, only approved power-operated industrial trucks specified for such locations in this paragraph (c) (2) shall be used. If not classified as hazardous, any approved power-operated industrial truck designated as Type D, E, G, or LP may be used, or trucks which conform to the requirements of these types may be used.
- (16) Reference OSHA 1910/178(l) (1) (i): The employer shall ensure that each powered industrial truck operator is competent to operate a powered industrial truck safely, as demonstrated by the successful completion of the training and evaluation specified in this paragraph (l).
- (17) Reference DOD 4145.26-M, C5.18.5.: Areas for Burning AE

C5.18.5.1. Use QD formula $D = K24W^{1/3}$ [9.52Q^{1/3}] to determine the minimum safe distance for either personnel burning AE or those conducting unrelated AE operations.
C5.18.5.2. Use QD formula $D = K40W^{1/3}$ [15.87Q^{1/3}] to determine the safe distance for persons not performing AE operations. However, if the NEWQD of burn material is more than 450 lbs. [204 kg], the minimum safe distance shall be at least 1,250 ft. [381 m]. If the NEWQD of burn material is < 450 lbs. [204 kg], use the minimum HFD given in Table AP2.T2.
C5.18.5.3. Locate burning grounds at ILD from other PESs.

- (18) Reference DOD 4145.26-M, C8.8.2: Blankets should be provided in easily opened containers within 25 ft. [8 m] of operations where they could be used to smother burning clothing. Alternate means of achieving the same effect should be provided when blankets are not available.
- (19) Reference DOD 4145.26-M, C15.2.2: Personnel shall never work alone during disposal and destruction operations. Warning signs or lights, roadblocks, or other effective means shall restrict the area. One person, available in an emergency, should observe from a safe distance while another performs the operations.
- (20) Reference DOD 4145.26-M, C15.6: AE AWAITING DESTRUCTION When stored in the open, AE awaiting destruction shall be separated by IBD from the AE disposal site. When adequately protected from frontal and overhead hazards, AE awaiting destruction shall be separated by at least ILD from the AE disposal site. All AE awaiting destruction shall be protected from accidental ignition or explosion caused by ambient storage conditions or by fragments, grass fires, burning embers, or blast overpressure originating at the disposal site.
- (21) Reference DOD 4145.26-M, C15.7: CONTAINERS FOR WASTE EXPLOSIVES Containers for AE awaiting destruction shall be the original closed packages or equivalent. Closures shall prevent spillage or leakage of contents when handled or overturned and shall not pinch or rub explosives during closing and opening. Containers shall be marked clearly to identify contents. Containers constructed with spark-producing or easily ignited material shall not be used.
- (22) Reference DOD 4145.26-M, C15.8.3.3.: Containers of explosives or ammunition items to be destroyed at the destruction site shall be spotted and opened at least 10 ft. [3.05 m] from each other and from explosive material set out earlier, to prevent rapid transmission of fire if premature ignition should occur.
- (23) Reference DOD 4145.26-M, C15.8.3.4: Empty containers shall be closed and removed to prevent charring or damage during burning of explosives. Delivery vehicles shall pick up and remove empty containers on the next trip.
- (24) Reference DOD 4145.26-M, C15.9.1: No mixing of an explosive with extraneous material, other explosives, metal powders, detonators, or similar items shall occur without authorization.
- (25) Reference DOD 4145.26-M, C15.9.3.1: The explosive bed shall be no more than 3 inches [76 mm] deep.
- (26) Reference DOD 4145.26-M, C15.9.3.3: No burning shall take place when wind velocity exceeds 15 mph [24 km/h].

- (27) Reference DOD 4145.26-M, C15.9.3.6: The sites of misfires shall be evacuated for at least 30 minutes. Operators shall implement misfire procedures and shall notify safety and emergency response personnel to ensure all appropriate safety precautions are taken before approaching the explosives burn bed. Only two trained and qualified operators shall approach the position of the explosives. One shall examine the misfire and the other shall act as backup. The backup shall watch the examination from a safe distance, behind natural or artificial barriers or other obstructions for protection. The backup shall follow contractor procedures should an accident occur.
- (28) Reference DOD 4145.26-M C15.9.8: Parallel beds of explosives prepared for burning shall be separated by not less than 150 ft. [46 m]. Care shall be taken to prevent material igniting from smoldering residue or from heat retained in the ground from previous burning operations. Unless a burned-over plot has been saturated with water and passed a safety inspection, 24 hours shall elapse before the next burning.

Explosive Service International

Job Safety Analysis

Location: Area I Contained Burn Chamber – Camp Minden, LA

Operation: Dispose of Material in Contained Burn Chamber

Revision/Date: Revision 3 (klw) 14 Mar 2015

Failure Severity	Failure Probability					
		1-Very Low	2-Low	3-Moderate	4-High	5-Very High
	1-Very Low	1	2	3	4	5
	2-Low	2	4	6	8	10
	3-Moderate	3	6	9	12	15
	4-High	4	8	12	16	20
	5-Very High	5	10	15	20	25

Special Hazards: Accidental Burn/Detonation, Misfire, Safety Zone Deviation, Heat Stress/Cold Exposure

Required and/or Recommended PPE: 100% Cotton Coveralls, Safety Glasses/Face Shield, Gloves, Steel-Toed Boots, and 100% Cotton Undergarments

Sequence of Job Steps:	Potential Hazards:	Recommendation to Eliminate/Reduce Potential Hazards:	RAC
Remove expended and replace loaded burn tray on Contained Burn Chamber	Caught Between Moving Parts Dropped Tray/Hopper Spilled Propellant Fire/Explosion	Explosives limits of 880# HD 1.1, safety zone of 1,250', safety distances between other Area I operations, 2 man rule, licensed forklift operator, properly maintained forklift, good roadway and access, coverage in SOPs for loading, operator training on material hazards, strict control of heat producing devices around material, use of grounding and bonding, and coverage in SOPs for material spills.	5

Sequence of Job Steps:	Potential Hazards:	Recommendation to Eliminate/Reduce Potential Hazards:	RAC
Carry thermal initiators and thermal boosters in metal storage container to Contained Burn Chamber and Kiln Disposal Unit	Thermal Initiator/Booster Pre-Mature Initiation/Burn	Thermal initiators and thermal boosters stored in magazine with 500# HD 13. limits and 50' fire protection distance, 2 man rule, PPE, SOPs, operator training on initiator hazards, firing circuit disconnected from firing source and shunted, initiators stored in separate metal container, initiators shunted, RF controls, exclusion zone, fire extinguisher in Contained Burn Chamber area, good housekeeping/vegetation control around Contained Burn Chamber.	5
Connect thermal initiator/booster to firing wires and place thermal initiator/booster in Contained Burn Chamber	Thermal Initiator/Booster Pre-Mature Burn/Explosion	2 man rule, PPE, SOPs, operator training on initiator and propellant hazards, firing circuit disconnected from firing source and shunted, firing circuit tested prior to connection, radio frequency controls, exclusion zone established, fire extinguisher in Contained Burn Chamber area, good housekeeping and vegetation control around Contained Burn Chamber.	15
Return to Control Room	Pre-Mature Burn/Explosion	231' operator protection in case of 880# event at Contained Burn Chamber, 2 man rule, PPE, SOPs, radio frequency controls, safe distance, protective structure, and exclusion zone or 1,250'	5
Connect firing circuit to firing source and initiate disposal sequence in Contained Burn Chamber	Pre-Mature Burn/Explosion	231' operator protection in case of 880# event at Contained Burn Chamber, 2 man rule, PPE, SOPs, radio frequency controls, safe distance, protective structure, exclusion zone, remove shunt from firing circuit and test continuity, connect firing source and initiate firing sequence, monitor burn temperature and pressure for safe approach.	5
Inspection/Maintenance inside Contained Burn Chamber and Pollution Abatement System	Asphyxiation/Skin Burn/Chemical Exposure	Confined space entry permit, monitoring of oxygen and chemical levels, SOPs, PPE, training of operators on confined space entry, compliance with 29 CFR 1910.146 requirements.	10

Equipment	Training	Inspection
Thermal Initiators and Thermal Boosters	Supervisor and operator training on use	Supervisor/safety check during daily monitoring
Metal Container	Supervisor and operator training on use	Supervisor/safety check during daily monitoring
Continuity Tester	Supervisor and operator training on continuity test procedure	Supervisor/safety check during daily monitoring
“Hot Work” permit process	Supervisor and operator training on process	Supervisor/safety check during daily monitoring
PPE (100% cotton coveralls, 100% cotton undergarments, safety shoes, gloves, and safety glasses/face shields)	Operator training on proper requirements and use of PPE for A&E operations	Supervisor/safety checks during daily monitoring
Portable fire extinguishers for Contained Burn Chamber area	Operator training on proper use of fire extinguishers	Supervisor/safety checks during daily monitoring
Standard Operating Procedures (SOPs) for Contained Burn Chamber operation	Operator training on SOPs	Bi-annual review of A&E SOPs
Lightning Warning process	Supervisor training on lightning warning process	Check during facility safety inspection
A&E Emergency Response Plan	Supervisor and operator training on emergency response plan for A&E accident	Conduct periodic drills in conjunction with Local Fire Department
Non-static/non-spark tools	Operator training on use of proper tools	Supervisor/safety check during daily monitoring
Flameproof Blanket	Operator training on proper use	Supervisor/safety check during daily monitoring
Burn Tray Covers	Operator training on proper use	Supervisor/safety check during daily monitoring
Oxygen and Carbon Monoxide Meter	Safety and supervisor training on proper use	Supervisor/safety check prior to use

Notes: During all phases, follow the guidance & direction of the explosive technician. Everyone has stop-work-authority during all phases & is encouraged to use it if the situation changes and/or something becomes unclear.

Other Site Specific Hazards that Should Be Noted: Heat and Cold Stress, Lightning and Severe Weather, Walking and Working Surfaces, Improper Lifting, Moving Forklifts and Vehicles, Operating Vehicles,

Insects and Vegetation, Falling Stacks or Loads, Slips, Trips, and Falls, Strains and Sprains, and Health/Hygiene.

References/Policy: DOD 4145.26-M, OSHA 1910.109, DOD 5100.76-M, Attached Supplemental Hazard Analysis Worksheet

Summary: The greatest risk (15) is during connecting the thermal initiator and thermal booster to firing wires and placing thermal initiator/booster in the Contained Burn Chamber as the material will be in vicinity with operators and the thermal initiator/booster. Human error and fire/heat are the greatest concerns for increasing the probability of an accidental initiation of the material. Risk mitigation measures will be used to reduce the risk of accidental initiation of the material, such as: SOPs, PPE, operator training, disconnected firing source and shunted firing circuit, metal container and shunted thermal initiators, use of non-static/non-spark tools, grounded burn trays, strict control of potential initiation sources, good housekeeping, maintenance of operator access and egress, portable fire extinguishers, safe distance, protective firing bunker, exclusion zone, and use of a 2 man rule to reduce probability of human error and/or heat/fire occurring in or around the material.

Personnel Attending JSA Training:

[illegible]

SUPPLEMENTAL JOB SAFETY ANALYSIS WORKSHEET

Location: ESI, Camp Minden, LA, Area I Contained Burn Chamber

Activity: Dispose of material in Contained Burn Chamber

The following additional A&E storage risk control measures required by OSHA 1910.109 and DOD 4145.26-M will be incorporated into SOPs:

- (1) Reference OSHA 1910.109(e)(1)(i): While explosives are being handled or used, smoking shall not be permitted and no one near the explosives shall possess matches, open light or other fire or flame. No person shall be allowed to handle explosives while under the influence of intoxicating liquors, narcotics, or other dangerous drugs.
- (2) Reference DOD 4145.26-M, C3.3: SOPs. Clearly written procedures are essential to avoid operator errors and ensure process control. Therefore, before starting operations involving AE, qualified personnel shall develop, review, and approve written procedures.
- (3) Reference DOD 4145.26M, C3.3.3: Training. Personnel shall receive appropriate training before performing work that involves exposure to AE. The training shall include specific safety and health hazards, emergency procedures including shutdown, and safe work practices applicable to the employee's job tasks. The contractor shall ensure that each employee involved in an AE process has received and understood the training and receives appropriate refresher training. The contractor shall prepare a record that contains the identity of the employee, the date of training, and the means used to verify that the employee understood the training.
- (4) Reference DOD 4145.26-M, C3.3.4: Emergency Procedures. The contractor shall instruct employees on procedures to follow in the event of electrical storms, utility or mechanical failures, equipment failures, process abnormalities, and other emergencies occurring during AE operations.
- (5) Reference DOD 4145.26-M, C3.7.1: A system for monitoring the approach of electrical storms shall be established that provides for the timely shut down of operations and evacuation of personnel from PESs where lightning could initiate explosives. When an electrical storm approaches, all personnel shall evacuate to at least PTRD, or a shelter providing equivalent protection, from: C3.7.1.3. Magazines, open storage sites, or loading docks not equipped with lightning protection systems.
- (6) Reference DOD 4145.26-M, C3.9.1.: Unless a hazard analysis indicates otherwise, only hand tools constructed of wood or non-sparking metals such as bronze, lead, and "K" Monel shall be used for work in locations and on equipment that contain exposed explosives or hazardous concentrations of flammable dusts, gases, or vapors that are susceptible to mechanical spark.
- (7) Reference DOD 4145.26-M, C3.11.1. All AE operations require a hazard assessment to determine the need for protective clothing and personal protective equipment. The assessment shall include an evaluation of all hazards and factors contained in paragraph C3.11.2.

- (8) Reference DOD 4145.26-M, C3.12.1: The contractor shall not refuel gasoline, diesel, or liquefied petroleum gas (LPG) powered equipment inside buildings containing AE. Personnel shall locate refueling vehicles and refueling operations at least 100 ft. [30.48m] (50 ft. [15.24] from non-combustible structures) from structures or sites containing AE.
- (9) Reference DOD 4145.26-M, C3.12.3: Gasoline-, diesel-, and LPG-powered equipment shall have spark arrestors. The contractor shall perform and document inspections of the exhaust and electrical systems of the equipment, as necessary, to ensure that the systems are functioning within the manufacturer's specifications. The contractor shall maintain documentation of the two most recent inspections.
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- (15) Reference OSHA 1910.178(c)(2)(xii): If general industrial or commercial properties are hazardous, only approved power-operated industrial trucks specified for such locations in this paragraph (c) (2) shall be used. If not classified as hazardous, any approved power-operated industrial truck designated as Type D, E, G, or LP may be used, or trucks which conform to the requirements of these types may be used.
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- (17) Reference DOD 4145.26-M, C5.18.5.: Areas for Burning AE

C5.18.5.1. Use QD formula $D = K24W^{1/3}$ [$9.52Q^{1/3}$] to determine the minimum safe distance for either personnel burning AE or those conducting unrelated AE operations.
C5.18.5.2. Use QD formula $D = K40W^{1/3}$ [$15.87Q^{1/3}$] to determine the safe distance for persons not performing AE operations. However, if the NEWQD of burn material is more than 450 lbs. [204 kg], the minimum safe distance shall be at least 1,250 ft. [381 m]. If the NEWQD of burn material is < 450 lbs. [204 kg], use the minimum HFD given in Table AP2.T2.
C5.18.5.3. Locate burning grounds at ILD from other PESs.

- (18) Reference DOD 4145.26-M, C8.8.2: Blankets should be provided in easily opened containers within 25 ft. [8 m] of operations where they could be used to smother burning clothing. Alternate means of achieving the same effect should be provided when blankets are not available.
- (19) Reference DOD 4145.26-M, C15.2.2: Personnel shall never work alone during disposal and destruction operations. Warning signs or lights, roadblocks, or other effective means shall restrict the area. One person, available in an emergency, should observe from a safe distance while another performs the operations.
- (20) Reference DOD 4145.26-M, C15.6: AE AWAITING DESTRUCTION When stored in the open, AE awaiting destruction shall be separated by IBD from the AE disposal site. When adequately protected from frontal and overhead hazards, AE awaiting destruction shall be separated by at least ILD from the AE disposal site. All AE awaiting destruction shall be protected from accidental ignition or explosion caused by ambient storage conditions or by fragments, grass fires, burning embers, or blast overpressure originating at the disposal site
- (21) Reference DOD 4145.26-M, C15.8.3.3.: Containers of explosives or ammunition items to be destroyed at the destruction site shall be spotted and opened at least 10 ft. [3.05 m] from each other and from explosive material set out earlier, to prevent rapid transmission of fire if premature ignition should occur.
- (22) Reference DOD 4145.26-M, C15.8.3.4: Empty containers shall be closed and removed to prevent charring or damage during burning of explosives. Delivery vehicles shall pick up and remove empty containers on the next trip.
- (23) Reference DOD 4145.26-M, C15.9.1: No mixing of an explosive with extraneous material, other explosives, metal powders, detonators, or similar items shall occur without authorization.
- (24) Reference DOD 4145.26-M, C15.9.3.1: The explosive bed shall be no more than 3 inches [76 mm] deep.
- (25) Reference DOD 4145.26-M, C15.9.3.3: No burning shall take place when wind velocity exceeds 15 mph [24 km/h].
- (26) Reference DOD 4145.26-M, C15.9.3.6: The sites of misfires shall be evacuated for at least 30 minutes. Operators shall implement misfire procedures and shall notify safety and emergency response personnel to ensure all appropriate safety precautions are taken before approaching the explosives burn bed. Only two trained and qualified operators shall approach the position of the explosives. One shall examine the misfire and the other shall act as backup. The backup shall watch the examination from a safe distance, behind natural or artificial barriers or other obstructions for protection. The backup shall follow contractor procedures should an accident occur.

- (27) Reference DOD 4145.26-M C15.9.8: Parallel beds of explosives prepared for burning shall be separated by not less than 150 ft. [46 m]. Care shall be taken to prevent material igniting from smoldering residue or from heat retained in the ground from previous burning operations. Unless a burned-over plot has been saturated with water and passed a safety inspection, 24 hours shall elapse before the next burning.
- (28) Reference DOD 4145.26-M, C15.8.2.2.2.: Except during electrical continuity testing of the blasting cap and lead wires, the shunt shall not be removed from the lead wires of the blasting cap until the moment of connection to the blasting circuit,. If the shunt is removed to test the blasting cap, short circuit the lead wires again following the test by twisting the bare ends of the wires together. The wires shall remain short-circuited in this manner until the moment of connection to the blasting circuit.
- (29) Reference DOD 4145.26-M, C15.8.2.2.4: Blasting circuit wires shall be twisted pairs. Operators shall keep blasting circuit wires twisted together and connected to ground at the power source and twisted at the opposite end at all times except when actually firing the charge or testing circuit for continuity and current or voltage. Never connect the blasting cap to the blasting circuit wires unless the blasting circuit wires are shorted and grounded at the ends near the power source.
- (30) Reference DOD 4145.26-M, C15.8.2.2.5: Electric blasting or demolition operations and unshielded electric blasting caps shall be separated from radio frequency (RF) energy transmitters by safe distances.
- (31) Reference DOD 4145.26-M, C15.8.2.2.6: When transported by vehicles with two-way radios, and when in areas presumed to have extraneous electromagnetic pulse, blasting caps shall be in closed metal boxes.
- (32) Reference DOD 4145.26-M, C15.8.2.2.7: Operators should follow these procedures when connecting electric blasting cap lead wires to the blasting circuit wires.
- (33) Reference DOD 4145.26-M, C15.8.2.2.7.1: The blasting circuit wires shall be tested for electrical continuity.
- (34) Reference DOD 4145.26-M, C15.8.2.2.7.2: The blasting circuit shall be tested for extraneous current and voltage. To test, arrange a dummy test circuit similar to the actual blasting circuit, except substitute a radio pilot lamp of suitable voltage for the blasting cap. If the pilot lamp glows, indicating potentially dangerous amounts of RF energy, blasting operations using electric blasting caps shall stop. Blasting operations may proceed using non-electric blasting caps and a safety fuse. The contractor may substitute other test instruments such as the DuPont "Detect-A-Meter" or "Votometer" for the radio pilot lamp. If the potential source of extraneous electromagnetic pulse is from a radar, a television, or a microwave transmitter, the actual blasting circuit -- including the blasting cap (without other explosives) -- shall be tested for extraneous effects. Personnel performing such tests shall be protected from the effects of an exploding blasting cap.
- (35) Reference DOD 4145.26-M, C15.8.2.2.7.3.: The blasting cap and its lead wires shall be tested for electrical continuity. Personnel performing such tests shall be protected from the effects of an exploding blasting cap. The individual who removes the shunt should ground himself or herself by grasping the blasting circuit wire prior to performing the operation in order to prevent accumulated static electricity from firing the blasting cap.

- (36) Reference DOD 4145.26-M, C15.8.2.2.7.4.: Personnel shall first assure the blasting circuit wires are shorted and grounded at the power source and then connect the blasting cap lead wires to the blasting circuit wires.
- (37) Reference DOD 4145.26-M, C15.8.2.2.7.5.: All but two persons shall evacuate from the area. One person shall partially retreat and act as safety observer. The other person shall maintain physical possession of a safety device that locks out the blasting circuit (e.g., plug, key, pigtail) and shall place the blasting cap onto the charge. Both persons will then retreat to the personnel shelter.
- (38) Reference DOD 4145.26-M, C15.8.2.2.7.6: The operator shall disconnect the blasting circuit wires from ground at the power source, untwist the wires, and use a galvanometer to test the firing circuit for electric continuity before connection to the blasting machine or firing panel.
- (39) Reference DOD 4145.26-M, C15.8.2.2.7.7: The individual assigned to make the connections shall confirm that everyone in the vicinity is in a safe place before connecting the blasting circuit wires to the power source and signaling for detonation. This individual shall not leave the blasting machine or its actuating device for any reason and, when using a panel, shall lock the switch in the open position until ready to fire, retaining the only key. After accounting for all personnel, the blasting circuit wires shall be connected to the power source and the charge fired.
- (40) Reference DOD 4145.26-M, C15.8.2.2.7.8: After firing, the blasting circuit wires shall be disconnected from power source, the wires twisted together, and connected to ground.
- (41) Reference DOD 4145.26-M, C15.8.2.2.7.9: Blasting and destruction operations shall be suspended when electrical storms are in the vicinity. At the first sign of an electrical storm, short-circuit the blasting cap lead wires, short-circuit and ground the blasting circuit wires, and evacuate all personnel from the demolition area to a safe location.
- (42) Reference DOD 4160.28M, Enclosure 3, Paragraph 6.: CERTIFICATION OF DEMIL
 - a. Certification. A certificate as shown in the sample format in Figure 1 shall be signed and dated by a DOD contracted person or a Government employee who actually performed or witnessed the DEMIL. The certificate shall be executed for all line items demilitarized. If the item is classified, it must first be declassified and certified as shown in the sample format in Figure 2.
 - b. Verification. The DEMIL certificate must be verified by a technically qualified DOD contracted person or a Government employee who witnessed the DEMIL of the material or inspected the residue. The individual who verifies the DEMIL should generally be at least in the next higher management or technical level to the initial certifying individual and must be a U.S. citizen.
 - (1) The certification and verification shall include the printed or typed name, grade, rank, or title, and activity of each signatory.
 - (2) Signing false DEMIL certificates constitutes a felony and may subject the individual to prosecution.
 - c. Contractor Sites. These sites are required to have a Government employee acting as a verifier during all DEMIL activities. To certify that DEMIL is complete, a certifier works with the Government verifier to validate DEMIL.

- d. Records Retention Policy for DEMIL Certificates. DOD is responsible for managing their records and documents in accordance with DODD 5015.2 (Reference (I)).

Explosive Service International

Job Safety Analysis

Location: Area I Kiln Disposal Unit – Camp Minden, LA

Operation: Dispose of material in Kiln Disposal Unit

Revision/Date: Revision 3 (klw) 14 Mar 2015

Failure Severity	Failure Probability					
		1-Very Low	2-Low	3-Moderate	4-High	5-Very High
	1-Very Low	1	2	3	4	5
	2-Low	2	4	6	8	10
	3-Moderate	3	6	9	12	15
	4-High	4	8	12	16	20
	5-Very High	5	10	15	20	25

Special Hazards: Accidental Burn/Detonation, Misfire, Safety Zone Deviation, Heat Stress/Cold Exposure

Required and/or Recommended PPE: 100% Cotton Coveralls, Safety Glasses/Face Shield, Gloves, Steel-Toed Boots, and 100% Cotton Undergarments

Sequence of Job Steps:	Potential Hazards:	Recommendation to Eliminate/Reduce Potential Hazards:	RAC
Heat Kiln Disposal Unit to burn temperature using propane	Skin burn/fire	100' fire protection distance of the propane tank and remote operator control center.	3

Sequence of Job Steps:	Potential Hazards:	Recommendation to Eliminate/Reduce Potential Hazards:	RAC
Refill expended supply hopper from loaded transport hopper	Dropped Hopper Spilled Propellant Fire/Explosion	Explosives limits of 2,400# HD 1.1, in supply hopper and safety zone of 1,250', barricade wall for 7 lbs. NEW between Kiln and supply hopper to protect forklift operator, safety distances between other Area I operations, 2 man rule, licensed forklift operator, limit time forklift operator is inside 231' distance from Kiln, properly maintained forklift, good roadway and access, coverage in SOPs for loading supply hopper, operator training on material hazards, strict control of heat producing devices around material, use of grounding and bonding, and coverage in SOPs for material spills.	10
Monitor conveyor feed system speed and rate supplying material from supply hopper into Kiln Disposal Unit	Fire/Explosion Propagation from Kiln back to conveyor and supply hopper	Explosives limits of 7# burning in Kiln Disposal Unit with 231' to Operator Control Center, 2 man rule, PPE, SOPs, operator training on Kiln Disposal Unit operations, exclusion zone of 1,250', water traps in conveyor to prevent propagation through conveyor, positive operator control over conveyor speed and material feed rate, and good housekeeping/vegetation control around Kiln Disposal Unit.	5
Monitor and control Kiln Disposal Unit temperature	Fire/Explosion	Explosives limits of 7# burning in Kiln Disposal Unit with 231' to Operator Control Center, 2 man rule, PPE, SOPs, operator training on Kiln Disposal Unit operations, exclusion zone of 1,250' established, good housekeeping and vegetation control around Kiln Disposal Unit.	5
Inspection/Maintenance inside Kiln Disposal Unit and Pollution Abatement System	Asphyxiation/Skin Burn/Chemical Exposure	Confined space entry permit, monitoring of oxygen and chemical levels, SOPs, PPE, training of operators on confined space entry, compliance with 29 CFR 1910.146 requirements.	10

Equipment	Training	Inspection
Transport Hopper	Supervisor and operator training on use	Supervisor/safety check during daily monitoring
Forklift	Supervisor and operator training on continuity test procedure	Supervisor/safety check during daily monitoring
“Hot Work” permit process	Supervisor and operator training on process	Supervisor/safety check during daily monitoring
PPE (100% cotton coveralls, 100% cotton undergarments, safety shoes, gloves, and safety glasses/face shields)	Operator training on proper requirements and use of PPE for A&E operations	Supervisor/safety checks during daily monitoring
Portable fire extinguishers for Kiln Disposal Unit area	Operator training on proper use of fire extinguishers	Supervisor/safety checks during daily monitoring
Standard Operating Procedures (SOPs) for Kiln Disposal Unit operation	Operator training on SOPs	Bi-annual review of A&E SOPs
Lightning Warning process	Supervisor training on lightning warning process	Check during facility safety inspection
A&E Emergency Response Plan	Supervisor and operator training on emergency response plan for A&E accident	Conduct periodic drills in conjunction with Local Fire Department
Non-static/non-spark tools for material leveling	Operator training on use of proper tools	Supervisor/safety check during daily monitoring
Flameproof Blanket	Operator training on proper use	Supervisor/safety check during daily monitoring
Supply and Transport Hopper Covers	Operator training on proper use	Supervisor/safety check during daily monitoring
Oxygen and Carbon Monoxide Meter	Safety and supervisor training on proper use	Supervisor/safety check prior to use

Notes: During all phases, follow the guidance & direction of the explosive technician. Everyone has stop-work-authority during all phases & is encouraged to use it if the situation changes and/or something becomes unclear.

Other Site Specific Hazards that Should Be Noted: Heat and Cold Stress, Lightning and Severe Weather, Walking and Working Surfaces, Improper Lifting, Moving Forklifts and Vehicles, Operating Vehicles, Insects and Vegetation, Falling Stacks or Loads, Slips, Trips, and Falls, Strains and Sprains, and Health/Hygiene.

References/Policy: DOD 4145.26-M, OSHA 1910.109, DOD 5100.76-M, Attached Supplemental Hazard Analysis Worksheet

Summary: The greatest risk (10) is during forklift operator refilling the supply hopper from the transport hopper at the Kiln Disposal Unit. Human error and fire/heat are the greatest concerns for increasing the probability of an accidental initiation of the material. Risk mitigation measures will be used to reduce the risk of accidental initiation of the material, such as: SOPs, PPE, operator training, use of non-static/non-spark tools, grounded and bonded hoppers, strict control of potential initiation sources, good housekeeping, maintenance of forklift operator access and egress, minimizing forklift operator exposure time, barricade between Kiln and supply hopper to protect forklift operator, portable fire extinguishers, safe distances, protective operator control room, exclusion zone, and use of a 2 man rule to reduce probability of human error and/or heat/fire occurring in or around the material.

Personnel Attending JSA Training:

[illegible]

SUPPLEMENTAL JOB SAFETY ANALYSIS WORKSHEET

Location: ESI, Camp Minden, LA, Area I Kiln Disposal Unit

Activity: Dispose of material in Kiln Disposal Unit

The following additional A&E storage risk control measures required by OSHA 1910.109 and DOD 4145.26-M will be incorporated into SOPs:

- (1) Reference OSHA 1910.109(e)(1)(i): While explosives are being handled or used, smoking shall not be permitted and no one near the explosives shall possess matches, open light or other fire or flame. No person shall be allowed to handle explosives while under the influence of intoxicating liquors, narcotics, or other dangerous drugs.
- (2) Reference DOD 4145.26-M, C3.3: SOPs. Clearly written procedures are essential to avoid operator errors and ensure process control. Therefore, before starting operations involving AE, qualified personnel shall develop, review, and approve written procedures.
- (3) Reference DOD 4145.26M, C3.3.3: Training. Personnel shall receive appropriate training before performing work that involves exposure to AE. The training shall include specific safety and health hazards, emergency procedures including shutdown, and safe work practices applicable to the employee's job tasks. The contractor shall ensure that each employee involved in an AE process has received and understood the training and receives appropriate refresher training. The contractor shall prepare a record that contains the identity of the employee, the date of training, and the means used to verify that the employee understood the training.
- (4) Reference DOD 4145.26-M, C3.3.4: Emergency Procedures. The contractor shall instruct employees on procedures to follow in the event of electrical storms, utility or mechanical failures, equipment failures, process abnormalities, and other emergencies occurring during AE operations.
- (5) Reference DOD 4145.26-M, C3.7.1: A system for monitoring the approach of electrical storms shall be established that provides for the timely shut down of operations and evacuation of personnel from PESs where lightning could initiate explosives. When an electrical storm approaches, all personnel shall evacuate to at least PTRD, or a shelter providing equivalent protection, from: C3.7.1.3. Magazines, open storage sites, or loading docks not equipped with lightning protection systems.
- (6) Reference DOD 4145.26-M, C3.9.1.: Unless a hazard analysis indicates otherwise, only hand tools constructed of wood or non-sparking metals such as bronze, lead, and "K" Monel shall be used for work in locations and on equipment that contain exposed explosives or hazardous concentrations of flammable dusts, gases, or vapors that are susceptible to mechanical spark.
- (7) Reference DOD 4145.26-M, C3.11.1. All AE operations require a hazard assessment to determine the need for protective clothing and personal protective equipment. The assessment shall include an evaluation of all hazards and factors contained in paragraph C3.11.2.

- (8) Reference DOD 4145.26-M, C3.12.1: The contractor shall not refuel gasoline, diesel, or liquefied petroleum gas (LPG) powered equipment inside buildings containing AE. Personnel shall locate refueling vehicles and refueling operations at least 100 ft. [30.48m] (50 ft. [15.24] from non-combustible structures) from structures or sites containing AE.
- (9) Reference DOD 4145.26-M, C3.12.3: Gasoline-, diesel-, and LPG-powered equipment shall have spark arrestors. The contractor shall perform and document inspections of the exhaust and electrical systems of the equipment, as necessary, to ensure that the systems are functioning within the manufacturer's specifications. The contractor shall maintain documentation of the two most recent inspections.
- (10) Reference DOD 4145.26-M, C10.2.1: A written fire plan shall be prepared that itemizes the emergency functions of each department or outside agency and indicates responsible individuals and alternates.
- (11) Reference DOD 4145.26-M, C10.3: SMOKING. Smoking may take place only in specifically designated and posted "smoking locations." Cigarettes, tobacco, and matches shall be discarded in ash receptacles only; they shall not be dropped into trashcans.
- (12) Reference DOD 4145.26-M, C10.4: HOT WORK PERMITS. A written permit shall be required for the temporary use of heat-producing equipment or devices when explosives or highly flammable materials are involved or located in the near vicinity of the hot work.
- (13) Reference DOD 4145.26-M, C10.5: PORTABLE FIRE EXTINGUISHERS. Hand extinguishers within buildings can extinguish fires before major damage is done. Portable equipment may prove similarly valuable outside AGMs and other buildings with AE. Portable fire extinguishers shall be maintained in accordance with NFPA Standard No. 10.
- (14) Reference OSHA 1910.132(d)(1): The employer shall assess the workplace to determine if hazards are present, or are likely to be present, which necessitate the use of personal protective equipment (PPE). If such hazards are present, or likely to be present, the employer shall: OSHA 1910.132(d) (1) (i) Select, and have each affected employee use, the types of PPE that will protect the affected employee from the hazards identified in the hazard assessment; OSHA 1910.132(d) (1) (ii) Communicate selection decisions to each affected employee; and, OSHA 1910.132(d) (1) (iii) Select PPE that properly fits each affected employee. Note: Non-mandatory Appendix B contains an example of procedures that would comply with the requirement for a hazard assessment.
- (15) Reference OSHA 1910.178(c)(2)(xii): If general industrial or commercial properties are hazardous, only approved power-operated industrial trucks specified for such locations in this paragraph (c) (2) shall be used. If not classified as hazardous, any approved power-operated industrial truck designated as Type D, E, G, or LP may be used, or trucks which conform to the requirements of these types may be used.
- (16) Reference OSHA 1910/178(l) (1) (i): The employer shall ensure that each powered industrial truck operator is competent to operate a powered industrial truck safely, as demonstrated by the successful completion of the training and evaluation specified in this paragraph (l).
- (17) Reference DOD 4145.26-M, C5.18.5.: Areas for Burning AE

C5.18.5.1. Use QD formula $D = K24W^{1/3}$ [$9.52Q^{1/3}$] to determine the minimum safe distance for either personnel burning AE or those conducting unrelated AE operations.
C5.18.5.2. Use QD formula $D = K40W^{1/3}$ [$15.87Q^{1/3}$] to determine the safe distance for persons not performing AE operations. However, if the NEWQD of burn material is more than 450 lbs. [204 kg], the minimum safe distance shall be at least 1,250 ft. [381 m]. If the NEWQD of burn material is < 450 lbs. [204 kg], use the minimum HFD given in Table AP2.T2.
C5.18.5.3. Locate burning grounds at ILD from other PESs.

- (18) Reference DOD 4145.26-M, C8.8.2: Blankets should be provided in easily opened containers within 25 ft. [8 m] of operations where they could be used to smother burning clothing. Alternate means of achieving the same effect should be provided when blankets are not available.
- (19) Reference DOD 4145.26-M, C15.2.2: Personnel shall never work alone during disposal and destruction operations. Warning signs or lights, roadblocks, or other effective means shall restrict the area. One person, available in an emergency, should observe from a safe distance while another performs the operations.
- (20) Reference DOD 4145.26-M, C15.6: AE AWAITING DESTRUCTION When stored in the open, AE awaiting destruction shall be separated by IBD from the AE disposal site. When adequately protected from frontal and overhead hazards, AE awaiting destruction shall be separated by at least ILD from the AE disposal site. All AE awaiting destruction shall be protected from accidental ignition or explosion caused by ambient storage conditions or by fragments, grass fires, burning embers, or blast overpressure originating at the disposal site
- (21) Reference DOD 4145.26-M, C15.8.3.3.: Containers of explosives or ammunition items to be destroyed at the destruction site shall be spotted and opened at least 10 ft. [3.05 m] from each other and from explosive material set out earlier, to prevent rapid transmission of fire if premature ignition should occur.
- (22) Reference DOD 4145.26-M, C15.8.3.4: Empty containers shall be closed and removed to prevent charring or damage during burning of explosives. Delivery vehicles shall pick up and remove empty containers on the next trip.
- (23) Reference DOD 4145.26-M, C15.9.1: No mixing of an explosive with extraneous material, other explosives, metal powders, detonators, or similar items shall occur without authorization.
- (24) Reference DOD 4145.26-M, C15.9.3.1: The explosive bed shall be no more than 3 inches [76 mm] deep.
- (25) Reference DOD 4145.26-M, C15.9.3.3: No burning shall take place when wind velocity exceeds 15 mph [24 km/h].
- (26) Reference DOD 4145.26-M, C15.9.3.6: The sites of misfires shall be evacuated for at least 30 minutes. Operators shall implement misfire procedures and shall notify safety and emergency response personnel to ensure all appropriate safety precautions are taken before approaching the explosives burn bed. Only two trained and qualified operators shall approach the position of the explosives. One shall examine the misfire and the other shall act as backup. The backup shall watch the examination from a safe distance, behind natural or artificial barriers or other obstructions for protection. The backup shall follow contractor procedures should an accident occur.

- (27) Reference DOD 4145.26-M C15.9.8: Parallel beds of explosives prepared for burning shall be separated by not less than 150 ft. [46 m]. Care shall be taken to prevent material igniting from smoldering residue or from heat retained in the ground from previous burning operations. Unless a burned-over plot has been saturated with water and passed a safety inspection, 24 hours shall elapse before the next burning.
- (28) Reference DOD 4145.26-M, C15.8.2.2.2.: Except during electrical continuity testing of the blasting cap and lead wires, the shunt shall not be removed from the lead wires of the blasting cap until the moment of connection to the blasting circuit,. If the shunt is removed to test the blasting cap, short circuit the lead wires again following the test by twisting the bare ends of the wires together. The wires shall remain short-circuited in this manner until the moment of connection to the blasting circuit.
- (29) Reference DOD 4145.26-M, C15.8.2.2.4: Blasting circuit wires shall be twisted pairs. Operators shall keep blasting circuit wires twisted together and connected to ground at the power source and twisted at the opposite end at all times except when actually firing the charge or testing circuit for continuity and current or voltage. Never connect the blasting cap to the blasting circuit wires unless the blasting circuit wires are shorted and grounded at the ends near the power source.
- (30) Reference DOD 4145.26-M, C15.8.2.2.5: Electric blasting or demolition operations and unshielded electric blasting caps shall be separated from radio frequency (RF) energy transmitters by safe distances.
- (31) Reference DOD 4145.26-M, C15.8.2.2.6: When transported by vehicles with two-way radios, and when in areas presumed to have extraneous electromagnetic pulse, blasting caps shall be in closed metal boxes.
- (32) Reference DOD 4145.26-M, C15.8.2.2.7: Operators should follow these procedures when connecting electric blasting cap lead wires to the blasting circuit wires.
- (33) Reference DOD 4145.26-M, C15.8.2.2.7.1: The blasting circuit wires shall be tested for electrical continuity.
- (34) Reference DOD 4145.26-M, C15.8.2.2.7.2: The blasting circuit shall be tested for extraneous current and voltage. To test, arrange a dummy test circuit similar to the actual blasting circuit, except substitute a radio pilot lamp of suitable voltage for the blasting cap. If the pilot lamp glows, indicating potentially dangerous amounts of RF energy, blasting operations using electric blasting caps shall stop. Blasting operations may proceed using non-electric blasting caps and a safety fuse. The contractor may substitute other test instruments such as the DuPont "Detect-A-Meter" or "Votometer" for the radio pilot lamp. If the potential source of extraneous electromagnetic pulse is from a radar, a television, or a microwave transmitter, the actual blasting circuit -- including the blasting cap (without other explosives) -- shall be tested for extraneous effects. Personnel performing such tests shall be protected from the effects of an exploding blasting cap.
- (35) Reference DOD 4145.26-M, C15.8.2.2.7.3: The blasting cap and its lead wires shall be tested for electrical continuity. Personnel performing such tests shall be protected from the effects of an exploding blasting cap. The individual who removes the shunt should ground himself or herself by grasping the blasting circuit wire prior to performing the operation in order to prevent accumulated static electricity from firing the blasting cap.

- (36) Reference DOD 4145.26-M, C15.8.2.2.7.4: Personnel shall first assure the blasting circuit wires are shorted and grounded at the power source and then connect the blasting cap lead wires to the blasting circuit wires.
- (37) Reference DOD 4145.26-M, C15.8.2.2.7.5: All but two persons shall evacuate from the area. One person shall partially retreat and act as safety observer. The other person shall maintain physical possession of a safety device that locks out the blasting circuit (e.g., plug, key, pigtail) and shall place the blasting cap onto the charge. Both persons will then retreat to the personnel shelter.
- (38) Reference DOD 4145.26-M, C15.8.2.2.7.6: The operator shall disconnect the blasting circuit wires from ground at the power source, untwist the wires, and use a galvanometer to test the firing circuit for electric continuity before connection to the blasting machine or firing panel.
- (39) Reference DOD 4145.26-M, C15.8.2.2.7.7: The individual assigned to make the connections shall confirm that everyone in the vicinity is in a safe place before connecting the blasting circuit wires to the power source and signaling for detonation. This individual shall not leave the blasting machine or its actuating device for any reason and, when using a panel, shall lock the switch in the open position until ready to fire, retaining the only key. After accounting for all personnel, the blasting circuit wires shall be connected to the power source and the charge fired.
- (40) Reference DOD 4145.26-M, C15.8.2.2.7.8: After firing, the blasting circuit wires shall be disconnected from power source, the wires twisted together, and connected to ground.
- (41) Reference DOD 4145.26-M, C15.8.2.2.7.9: Blasting and destruction operations shall be suspended when electrical storms are in the vicinity. At the first sign of an electrical storm, short-circuit the blasting cap lead wires, short-circuit and ground the blasting circuit wires, and evacuate all personnel from the demolition area to a safe location.
- (42) Reference DOD 4160.28M, Enclosure 3, Paragraph 6.: CERTIFICATION OF DEMIL
 - a. Certification. A certificate as shown in the sample format in Figure 1 shall be signed and dated by a DOD contracted person or a Government employee who actually performed or witnessed the DEMIL. The certificate shall be executed for all line items demilitarized. If the item is classified, it must first be declassified and certified as shown in the sample format in Figure 2.
 - b. Verification. The DEMIL certificate must be verified by a technically qualified DOD contracted person or a Government employee who witnessed the DEMIL of the material or inspected the residue. The individual who verifies the DEMIL should generally be at least in the next higher management or technical level to the initial certifying individual and must be a U.S. citizen.
 - (1) The certification and verification shall include the printed or typed name, grade, rank, or title, and activity of each signatory.
 - (2) Signing false DEMIL certificates constitutes a felony and may subject the individual to prosecution.
 - c. Contractor Sites. These sites are required to have a Government employee acting as a verifier during all DEMIL activities. To certify that DEMIL is complete, a certifier works with the Government verifier to validate DEMIL.

- d. Records Retention Policy for DEMIL Certificates. DOD is responsible for managing their records and documents in accordance with DODD 5015.2 (Reference (I)).

Explosive Service International

Job Safety Analysis

Location: Area I Contained Burn Chamber – Camp Minden, LA

Operation: Clean-Up Material Residue in Contained Burn Chamber Tray

Revision/Date: Revision 3 (klw) 14 Mar 2015

Failure Severity	Failure Probability					
	1-Very Low	2-Low	3-Moderate	4-High	5-Very High	
	1-Very Low	1	2	3	4	5
	2-Low	2	4	6	8	10
	3-Moderate	3	6	9	12	15
	4-High	4	8	12	16	20
	5-Very High	5	10	15	20	25

Special Hazards: Contact Burns, Accidental Fire, Forklift Accident, Spilled Residue, Mixing Material with Residue, Heat Stress/Cold Exposure

Required and/or Recommended PPE: 100% Cotton Coveralls, Safety Glasses/Face Shield, Gloves, Steel-Toed Boots, and 100% Cotton Undergarments

Sequence of Job Steps:	Potential Hazards:	Recommendation to Eliminate/Reduce Potential Hazards:	RAC
Wait for temperature and pressure in Contained Burn Chamber to be within limits and proceed to expended burn tray with loaded burn tray	Skin Burn/Delayed Fire	2 man rule, PPE, SOPs, disconnect and shunt firing circuit, operator training on propellant residue hazards, use wait period, temperature gun, exclusion zone, fire extinguisher in burning grounds area, and good housekeeping/vegetation control around burn pans.	5
Inspect residue in burn pan and area around burn pan for excess propellant	Skin Burn/Delayed Fire	2 man rule, PPE, SOPs, operator training on propellant residue hazards, measure residue temperature with temperature gun, radio frequency controls, exclusion zone, fire extinguisher in burning grounds area, and good housekeeping and vegetation control around burn pans.	10

Sequence of Job Steps:	Potential Hazards:	Recommendation to Eliminate/Reduce Potential Hazards:	RAC
Remove expended burn tray and place loaded burn tray on feed plate	Skin Burn/Delayed Fire	2 man rule, licensed forklift operator, properly maintained forklift, PPE, good roadway and access, coverage in SOPs for loading, operator training on material hazards, strict control of heat producing devices around material, use of grounding and bonding, and coverage in SOPs for material spills.	5
Transport residue in expended burn tray back to cooling area	Skin Burn/Delayed Fire/Dropped tray/Spilled Residue	2 man rule, licensed forklift operator, properly maintained forklift, PPE, good roadway and access, operator training on material hazards, strict control of heat producing devices around material, and coverage in SOPs for material spills.	5
Remove residue from burn pans and place in disposal containers	Skin Burn/Back Strain/Delayed Fire	2 man rule, PPE, SOPs, non-static/non-spark tools, fire extinguisher in Material Staging Area, use material handling equipment for residue drums, certify residue as inert, and good housekeeping and vegetation control around burn pans.	5
Clean-up and segregate excess propellant for re-burn	Skin Burn/Back Strain/Delayed Fire	2 man rule, PPE, SOPs, non-static/non-spark tools, fire extinguisher in Material Staging Area, use material handling equipment for excess propellant drums, track excess propellant for re-burn, and good housekeeping and vegetation control around burn pans.	10

Equipment	Training	Inspection
Forklift	Licensed operator	Daily operator inspection and periodic safety inspection
Temperature Gun	Supervisor and operator training on use	Supervisor/safety check during daily monitoring
Residue Containers	Supervisor and operator training on use	Supervisor/safety check during daily monitoring
Excess Propellant Containers	Supervisor and operator training on use	Supervisor/safety check during daily monitoring
“Hot Work” permit process	Supervisor and operator training on process	Supervisor/safety check during daily monitoring

Equipment	Training	Inspection
PPE (100% cotton coveralls, 100% cotton undergarments, safety shoes, gloves, and safety glasses/face shields)	Operator training on proper requirements and use of PPE for A&E operations	Supervisor/safety checks during daily monitoring
Portable fire extinguishers for forklift, and burn pad area	Operator training on proper use of fire extinguishers	Supervisor/safety checks during daily monitoring
Standard Operating Procedures (SOPs) for material residue clean-up in burn trays	Operator training on SOPs	Bi-annual review of A&E SOPs
Lightning Warning process	Supervisor training on lightning warning process	Check during facility safety inspection
A&E Emergency Response Plan	Supervisor and operator training on emergency response plan for A&E accident	Conduct periodic drills in conjunction with Local Fire Department
Non-static/non-spark tools for material leveling	Operator training on use of proper tools	Supervisor/safety check during daily monitoring
Flameproof Blanket	Operator training on proper use	Supervisor/safety check during daily monitoring
Burn Tray Covers	Operator training on proper use	Supervisor/safety check during daily monitoring

Notes: During all phases, follow the guidance & direction of the explosive technician. Everyone has stop-work-authority during all phases & is encouraged to use it if the situation changes and/or something becomes unclear.

Other Site Specific Hazards that Should Be Noted: Heat and Cold Stress, Lightning and Severe Weather, Walking and Working Surfaces, Improper Lifting, Moving Forklifts and Vehicles, Operating Vehicles, Insects and Vegetation, Falling Stacks or Loads, Slips, Trips, and Falls, Strains and Sprains, and Health/Hygiene.

References/Policy: DOD 4145.26-M, OSHA 1910.109, DOD 5100.76-M, Attached Supplemental Hazard Analysis Worksheet

Summary: The greatest risk (10) is during residue and excess material inspection and removal as the residue and material will be in direct contact with operators. Human error and fire/heat are the greatest concerns for increasing the probability of an accidental initiation of the residue material. Risk mitigation measures will be used to reduce the risk of accidental initiation of the residue material, such as: SOPs, PPE, operator training, disconnected firing source and shunted firing circuit, strict control of potential initiation sources, good housekeeping, maintenance of operator access and egress, portable

fire extinguishers, exclusion zone, non-static/non-spark tools and use of a 2 man rule to reduce probability of human error and/or heat/fire occurring in or around the residue material.

Personnel Attending JSA Training:

[illegible]

SUPPLEMENTAL JOB SAFETY ANALYSIS WORKSHEET

Location: ESI, Camp Minden, LA, Area I Contained Burn Chamber

Activity: Clean-Up Material Residue in Contained Burn Chamber

The following additional A&E storage risk control measures required by OSHA 1910.109 and DOD 4145.26-M will be incorporated into SOPs:

- (1) Reference OSHA 1910.109(e)(1)(i): While explosives are being handled or used, smoking shall not be permitted and no one near the explosives shall possess matches, open light or other fire or flame. No person shall be allowed to handle explosives while under the influence of intoxicating liquors, narcotics, or other dangerous drugs.
- (2) Reference DOD 4145.26-M, C3.3: SOPs. Clearly written procedures are essential to avoid operator errors and ensure process control. Therefore, before starting operations involving AE, qualified personnel shall develop, review, and approve written procedures.
- (3) Reference DOD 4145.26M, C3.3.3: Training. Personnel shall receive appropriate training before performing work that involves exposure to AE. The training shall include specific safety and health hazards, emergency procedures including shutdown, and safe work practices applicable to the employee's job tasks. The contractor shall ensure that each employee involved in an AE process has received and understood the training and receives appropriate refresher training. The contractor shall prepare a record that contains the identity of the employee, the date of training, and the means used to verify that the employee understood the training.
- (4) Reference DOD 4145.26-M, C3.3.4: Emergency Procedures. The contractor shall instruct employees on procedures to follow in the event of electrical storms, utility or mechanical failures, equipment failures, process abnormalities, and other emergencies occurring during AE operations.
- (5) Reference DOD 4145.26-M, C3.7.1: A system for monitoring the approach of electrical storms shall be established that provides for the timely shut down of operations and evacuation of personnel from PESs where lightning could initiate explosives. When an electrical storm approaches, all personnel shall evacuate to at least PTRD, or a shelter providing equivalent protection, from: C3.7.1.3. Magazines, open storage sites, or loading docks not equipped with lightning protection systems.
- (6) Reference DOD 4145.26-M, C3.9.1.: Unless a hazard analysis indicates otherwise, only hand tools constructed of wood or non-sparking metals such as bronze, lead, and "K" Monel shall be used for work in locations and on equipment that contain exposed explosives or hazardous concentrations of flammable dusts, gases, or vapors that are susceptible to mechanical spark.
- (7) Reference DOD 4145.26-M, C3.11.1. All AE operations require a hazard assessment to determine the need for protective clothing and personal protective equipment. The assessment shall include an evaluation of all hazards and factors contained in paragraph C3.11.2.

- (8) Reference DOD 4145.26-M, C3.12.1: The contractor shall not refuel gasoline, diesel, or liquefied petroleum gas (LPG) powered equipment inside buildings containing AE. Personnel shall locate refueling vehicles and refueling operations at least 100 ft. [30.48m] (50 ft. [15.24] from non-combustible structures) from structures or sites containing AE.
- (9) Reference DOD 4145.26-M, C3.12.3: Gasoline-, diesel-, and LPG-powered equipment shall have spark arrestors. The contractor shall perform and document inspections of the exhaust and electrical systems of the equipment, as necessary, to ensure that the systems are functioning within the manufacturer's specifications. The contractor shall maintain documentation of the two most recent inspections.
- (10) Reference DOD 4145.26-M, C10.2.1: A written fire plan shall be prepared that itemizes the emergency functions of each department or outside agency and indicates responsible individuals and alternates.
- (11) Reference DOD 4145.26-M, C10.3: SMOKING. Smoking may take place only in specifically designated and posted "smoking locations." Cigarettes, tobacco, and matches shall be discarded in ash receptacles only; they shall not be dropped into trashcans.
- (12) Reference DOD 4145.26-M, C10.4: HOT WORK PERMITS. A written permit shall be required for the temporary use of heat-producing equipment or devices when explosives or highly flammable materials are involved or located in the near vicinity of the hot work.
- (13) Reference DOD 4145.26-M, C10.5: PORTABLE FIRE EXTINGUISHERS. Hand extinguishers within buildings can extinguish fires before major damage is done. Portable equipment may prove similarly valuable outside AGMs and other buildings with AE. Portable fire extinguishers shall be maintained in accordance with NFPA Standard No. 10.
- (14) Reference OSHA 1910.132(d)(1): The employer shall assess the workplace to determine if hazards are present, or are likely to be present, which necessitate the use of personal protective equipment (PPE). If such hazards are present, or likely to be present, the employer shall: OSHA 1910.132(d) (1) (i) Select, and have each affected employee use, the types of PPE that will protect the affected employee from the hazards identified in the hazard assessment; OSHA 1910.132(d) (1) (ii) Communicate selection decisions to each affected employee; and, OSHA 1910.132(d) (1) (iii) Select PPE that properly fits each affected employee. Note: Non-mandatory Appendix B contains an example of procedures that would comply with the requirement for a hazard assessment.
- (15) Reference OSHA 1910.178(c)(2)(xii): If general industrial or commercial properties are hazardous, only approved power-operated industrial trucks specified for such locations in this paragraph (c) (2) shall be used. If not classified as hazardous, any approved power-operated industrial truck designated as Type D, E, G, or LP may be used, or trucks which conform to the requirements of these types may be used.
- (16) Reference OSHA 1910/178(l) (1) (i): The employer shall ensure that each powered industrial truck operator is competent to operate a powered industrial truck safely, as demonstrated by the successful completion of the training and evaluation specified in this paragraph (l).

- (17) Reference DOD 4145.26-M, C8.8.2: Blankets should be provided in easily opened containers within 25 ft. [8 m] of operations where they could be used to smother burning clothing. Alternate means of achieving the same effect should be provided when blankets are not available.
- (18) Reference DOD 4145.26-M, C15.2.2: Personnel shall never work alone during disposal and destruction operations. Warning signs or lights, roadblocks, or other effective means shall restrict the area. One person, available in an emergency, should observe from a safe distance while another performs the operations.
- (19) Reference DOD 4145.26-M, C15.6: AE AWAITING DESTRUCTION When stored in the open, AE awaiting destruction shall be separated by IBD from the AE disposal site. When adequately protected from frontal and overhead hazards, AE awaiting destruction shall be separated by at least ILD from the AE disposal site. All AE awaiting destruction shall be protected from accidental ignition or explosion caused by ambient storage conditions or by fragments, grass fires, burning embers, or blast overpressure originating at the disposal site
- (20) Reference DOD 4145.26-M, C15.7: CONTAINERS FOR WASTE EXPLOSIVES Containers for AE awaiting destruction shall be the original closed packages or equivalent. Closures shall prevent spillage or leakage of contents when handled or overturned and shall not pinch or rub explosives during closing and opening. Containers shall be marked clearly to identify contents. Containers constructed with spark-producing or easily ignited material shall not be used.
- (21) Reference DOD 4145.26-M, C15.8.3.4: Empty containers shall be closed and removed to prevent charring or damage during burning of explosives. Delivery vehicles shall pick up and remove empty containers on the next trip.
- (22) Reference DOD 4145.26-M, C15.9.1: No mixing of an explosive with extraneous material, other explosives, metal powders, detonators, or similar items shall occur without authorization.

Appendix E
Material Safety Data Sheets

Material Safety Data Sheet
M6 Propellant

**HERCULES INCORPORATED -- PROPELLANT,EXPLOSIVE,SOLID,M6+2F/76MM --
1376-00N010938**

===== Product Identification =====

Product ID:PROPELLANT,EXPLOSIVE,SOLID,M6+2F/76MM

MSDS Date:01/09/1986

FSC:1376

NIIN:00N010938

MSDS Number: BHVKT

=== Responsible Party ===

Company Name:HERCULES INCORPORATED

Address:RADFORD ARMY AMMUNITION PLANT

City:RADFORD

State:VA

ZIP:24141

Info Phone Num:703-639-7294

Emergency Phone Num:703-639-7294

CAGE:2D295

=== Contractor Identification ===

Company Name:HERCULES INC

Address:RADFORD ARMY AMMUNITION PLANT

Box:City:RADFORD

State:VA

ZIP:24141

Country:US

Phone:703-639-7294

CAGE:2D881

Company Name:HERCULES INCORPORATED

Address:84 5TH AVE

City:NEW YORK

State:NY

ZIP:10011-7603

Country:US

CAGE:2D295

===== Composition/Information on Ingredients =====

Ingred Name:DIBUTYL PHTHALATE (SARA III)

CAS:84-74-2

RTECS #:TI0875000

Fraction by Wt: 3.00%

Other REC Limits:N/K

OSHA PEL:5 MG/M3

ACGIH TLV:5 MG/M3; 9192

EPA Rpt Qty:10 LBS

DOT Rpt Qty:10 LBS

Ingred Name:DIPHENYLAMINE

CAS:122-39-4

RTECS #:JJ7800000

Fraction by Wt: 1.00%

Other REC Limits:N/K

OSHA PEL:10 MG/M3

ACGIH TLV:10 MG/M3; 9192

Ingred Name:POTASSIUM SULFATE

000412



9530601

CAS:7778-80-5
RTECS #:TT5900000
Fraction by Wt: 2.00%
Other REC Limits:N/K
OSHA PEL:N/K
ACGIH TLV:N/K

Ingred Name:NITROCELLULOSE (FLAMMABLE SOLID)
Fraction by Wt: 87.00%
Other REC Limits:N/K
OSHA PEL:N/K
ACGIH TLV:N/K

Ingred Name:DINITROTOLUENE (SARA III)
CAS:25321-14-6
RTECS #:XT1300000
Fraction by Wt: 10.00%
Other REC Limits:N/K
OSHA PEL:S;A2;0.15 MG/M3;9293
ACGIH TLV:S, 1.5 MG/M3
EPA Rpt Qty:10 LBS
DOT Rpt Qty:10 LBS

===== Hazards Identification =====

LD50 LC50 Mixture:N/K
Routes of Entry: Inhalation:YES Skin:YES Ingestion:YES
Reports of Carcinogenicity:NTP:NO IARC:NO OSHA:NO
Health Hazards Acute and Chronic:SEE SIGNS AND SYMPTOMS OF
OVEREXPOSURE.
Explanation of Carcinogenicity:NONE
Effects of Overexposure:EYES:N/K .SKIN:TOXIC,AVOID SKIN
CONTACT.INGESTION:TOXIC,AVOID INGESTION.INHALATION:TOXIC,AVOID
INHALATION.
Medical Cond Aggravated by Exposure:N/K

===== First Aid Measures =====

First Aid:EYES:IN CASE OF CONTACT,IMMEDIATELY FLUSH WITH PLENTY OF LOW
PRESSURE WATER FOR AT LEAST 15 MINUTES.REMOVE ANY CONTACT LENSES TO
ASSURE THOROUGH FLUSHING.CALL A PHYSICIAN.SKIN:WASH WITH SOAP AND
RUNNI NG WATER.INGESTION:CONTACT MD IMMEDIATELY .INHALATION:REMOVE
TO FRESH AIR.TREAT ANY IRRITATION SYMPTOMATICALLY.CALL A PHYSICIAN.

===== Fire Fighting Measures =====

Extinguishing Media:SELF-OXIDIZING,DELUGE W/ H*2O.MAY NOT BE ABLE TO
EXTING MATL BEFORE IT IS CONSUMED UNLESS LRG QTY USED IN SHORT
TIME.
Fire Fighting Procedures:USE NIOSH/MSHA APPROVED SCBA AND FULL
PROTECTIVE EQUIPMENT .EVACUATE THE AREA.
Unusual Fire/Explosion Hazard:EASILY IGNITED,HIGHLY COMBUSTIBLE;PROTECT
FROM FIRE,SPARKS & EXTREME HEAT.AUTOIGNITION
TEMP:383F,195C.HAZARDOUS DECOMPOSITION PRODUCTS:OXIDES OF CARBON.

===== Accidental Release Measures =====

000413

Spill Release Procedures:CLEAN UP SPILLS IMMEDIATELY USING A SOFT
BRISTLE BRUSH AND A CONDUCTIVE RUBBER OR PLASTIC SHOVEL.USE
CAUTION,MATERIAL SENSITIVE TO IMPACT, FRICTION AND ELECTROSTATIC
DISCHARGE.

Neutralizing Agent:N/K

===== Handling and Storage =====

Handling and Storage Precautions:AVOID PRLNG TEMP ABOVE
50C,125F.REC:21C,75F;50% HUMIDITY.STOR MUST CONFORM TO
LOCAL,STATE,FEDERAL REGS (OSHA 29CFR1910.109;BATF 27CFR55 SUBPART
K) .

Other Precautions:WARNING,FLAMMABLE SOLID.KEEP AWAY FROM HEAT,SPARKS
AND OPEN FLAME.KEEP CONTAINERS CLOSED.USE WITH ADEQUATE
VENTILATION.

===== Exposure Controls/Personal Protection =====

Respiratory Protection:NIOSH/MSHA APPROVED RESPIRATOR APPROPRIATE FOR
EXPOSURE OF CONCERN .

Ventilation:LOCAL AND GENERAL VENTILATION NECESSARY TO KEEP AIR
CONCENTRATION BELOW TLV .

Protective Gloves:COTTON OR LEATHER.

Eye Protection:SAFETY GLASSES

Other Protective Equipment:FLAMEPROOF COVERALLS AND CONDUCTIVE SHOES.

Work Hygienic Practices:N/K

Supplemental Safety and Health

ROUTES OF ENTRY:INGEST/SKIN/INHAL .

===== Physical/Chemical Properties =====

Melt/Freeze Pt:M.P/F.P Text:N/K

Decomp Temp:Decomp Text:N/K

Vapor Pres:NEGLIGIBLE

Spec Gravity:1.4955,WATER=1

Evaporation Rate & Reference:<1 (BUTYL ACETATE=1)

Solubility in Water:NEGLIGIBLE

Appearance and Odor:HARD CYLINDER,PERFORATED,SMOOTH,GREENISH YELLOW
COLOR.ODORLESS.

===== Stability and Reactivity Data =====

Stability Indicator/Materials to Avoid:YES

OXIDES OF NITROGEN AND CARBON.

Stability Condition to Avoid:AVOID OPEN FLAME,SPARKS AND HEAT.

Hazardous Decomposition Products:OXIDES OF CARBON.

===== Disposal Considerations =====

Waste Disposal Methods:DISPOSAL MUST BE IN ACCORDANCE WITH
FEDERAL,STATE AND LOCAL REGULATIONS .BURN IN OPEN BURNING GROUND IN
ACCORDANCE WITH REGULATIONS.MAY ALSO BE BURNED IN AN INCINERATOR
APPROVED FOR EXPLOSIVES.

Disclaimer (provided with this information by the compiling agencies):
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000415

Material Safety Data Sheet

Nitrocellulose

KOPPERS CO INC -- NITROCELLULOSE -- 8010-00-242-6319

===== Product Identification =====

Product ID:NITROCELLULOSE
MSDS Date:01/01/1987
FSC:8010
NIIN:00-242-6319
MSDS Number: BDMVK
=== Responsible Party ===
Company Name:KOPPERS CO INC
Address:3000 KOPPERS BLDG
City:PITTSBURGH
State:PA
ZIP:15219-1818
Country:US
CAGE:80592
=== Contractor Identification ===
Company Name:KOPPERS CO INC
Address:3000 KOPPERS BLDG
Box:City:PITTSBURGH
State:PA
ZIP:15219-1818
Country:US
CAGE:80592

===== Composition/Information on Ingredients =====

Ingred Name:ALKYD/NITROCELLULOSE

Ingred Name:NAPHTHA (PETROLEUM SPIRITS OR BENZIN)
CAS:8030-30-6
RTECS #:SE7555000
Fraction by Wt: 9.0%
OSHA PEL:100 PPM

Ingred Name:AMSCO 6645 SOLVENT
Fraction by Wt: 18.7%
ACGIH TLV:200PPM

Ingred Name:ISOPROPYL ALCOHOL (SARA III)
CAS:67-63-0
RTECS #:NT8050000
OSHA PEL:400 PPM/500 STEL
ACGIH TLV:400 PPM/500STEL;9192

Ingred Name:N-BUTYL ACETATE (SARA III)
CAS:123-86-4
RTECS #:AF7350000
Other REC Limits:NONE RECOMMENDED
OSHA PEL:150 PPM
ACGIH TLV:150 PPM/200STEL;9394
EPA Rpt Qty:5000 LBS
DOT Rpt Qty:5000 LBS

===== Hazards Identification =====

Effects of Overexposure:SYSTEMIC TOXIC EFFECTS MAY ALSO RESULT FR SKIN
ABSORB.IRRIT TO EYES,NOSE & THROAT NR OR ABOV 25PPM.

===== First Aid Measures =====

First Aid:IF INHALED,REMOVE TO FRESH AIR.IF NOT BREATHING,GIVE
ARTIFICIAL RESPIRATION,PREFERABLY MOUTH TO MOUTH.CALL A DR.IN CASE
OF SKIN CONTACT,WASH THOROUGHLY W/SOAP & WATER,FOR EYES,FLUSH
IMMED.W/PLENTY OF WATER FOR 15 MIN. & CONTACT A DR.WASH CONTAM

===== Fire Fighting Measures =====

Flash Point:23 F TCC -5C
Extinguishing Media:FOAM,DRY CHEMICAL,WATER SPRAY FOG OR CO*2.
Fire Fighting Procedures:USE AIR SUPPLIED EQPMT FOR ENCL AREAS.COOL
EXPOS CONTAINERS
Unusual Fire/Explosion Hazard:KEEP AWAY FROM HEAT HEAT,SPARKS AND
FLAME.

===== Accidental Release Measures =====

Spill Release Procedures:REMOVE ALL SOURCES OF
IGNITION(FLAME,ELECTRICAL,STATIC OR FRICTIONAL SPARKS;HOT
SURFACES,ETC.)AVOID BREATHING VAPORS.VENTILATE AREA.CONTAIN & SCOOP
UP SPILL W/NON-SPARKING TOOLS,RAGS,ETC.USE INERT ABS ORBENT
MATERIALS ON SM SPILLS OR ON RESIDUAL OF

===== Handling and Storage =====

Handling and Storage Precautions:KEEP CONTAINERS CLOSED & UPRIGHT TO
PREVENT LEAKAGE.AVOID FLAMES,WELDING,SMOKING,SPARKS,OPEN
LIGHTS,ETC.AND BREATHING OF VAP OR SPRAY MIST.AVD EYE &
Other Precautions:MAINTAIN GOOD PERSONAL HYGIENE.DO NOT USE IN CONFINED
AREAS,TANK OR PIT W/O ADEQUATE VENTILATION.

===== Exposure Controls/Personal Protection =====

Respiratory Protection:ORGANIC VAP CANISTER WHERE OXYGEN CONTENT IS
ADEQUATE & VAP CONCENTR
Ventilation:LOCAL EXHAUST & MECHANICAL
Protective Gloves:RUBBER GLOVES
Eye Protection:GOGGLES
Supplemental Safety and Health
HAZ.INGRED:BUTYL CELLOSOLVE,EP3600000,6.3%,25PPM;METHYL ISOBUTYL
CARBINOL, P05776000,5.0%,25PPM;METHYL ISOBUTYL
KETONE,P06125000,8.0%,50 PPM.METHYL ETHYL
KETONE,PM7780000,5.2%,200PPM

===== Physical/Chemical Properties =====

HCC:F2
Vapor Density:HEAV
Spec Gravity:8.0 LB

Evaporation Rate & Reference:N. BUTYL ACET-FAST
Solubility in Water:NEGLIGIBLE
Appearance and Odor:VISCIOUS BLUE LIQUID W/TYPICAL SOLVENT ODOR
Percent Volatiles by Volume:74

===== Stability and Reactivity Data =====

Stability Indicator/Materials to Avoid:YES

===== Disposal Considerations =====

Waste Disposal Methods:DISPOSE OF IN ACCORDANCE W/LOCAL APPLICABLE
REGS.

Disclaimer (provided with this information by the compiling agencies):
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assume responsibility for the suitability of this information to their
particular situation.

Appendix F

Hazardous Insects, Animals, and Plants

1. Scorpions



All Scorpions are venomous. Only about 25-30 of them have a type of venom that is potent enough to make someone very ill or to kill them. The Scorpion loves to live around rocks, sand, and trees. However, they are very adaptable and have been found living in some very unusual places. They are nocturnal and will usually stay in holes or under rocks during the day.

First Aid (Information taken from WebMD <http://www.webmd.com/allergies/scorpion-stings>)

1. Most people will have only minor problems, like pain, swelling, numbness, and tingling at the site of the bite.
2. Use ice to bring down the swelling.
3. Take an antihistamine or use a hydrocortisone cream to relive swelling and itching.

2. Wasp and other stinging insects



Wasp, bees and hornets all live in hives or combs. Their homes are always in cooler and sheltered areas, often within the shade of trees or under a roof. Bees, wasps, and hornets all proliferate in warm weather, their hives growing in the spring and early summer.

First Aid (Information taken from WebMD <http://www.webmd.com/first-aid/bee-and-wasp-stings-treatment>)

1. The majority of problems that require medical attention come from an allergic reaction to the sting.
2. Remove any stingers immediately. Some experts recommend scraping out the stinger with a credit card.
3. Applying ice to the site may provide some mild relief. Apply ice for 20 minutes once every hour as needed. Wrap the ice in a towel or keep a cloth between the ice and skin to keep from freezing the skin.
4. Taking an antihistamine such as diphenhydramine (Benadryl) or a nonsedating one such as loratadine (Claritin) will help with itching.
5. Take ibuprofen (Motrin) or acetaminophen (Tylenol) for pain relief as needed.
6. Wash the sting site with soap and water and place an antibiotic ointment on the site.
7. If it's been more than 10 years since your last tetanus booster, get a booster within the next few days.
8. Most insect stings require no additional medical care.

3. Fire Ants



A typical fire colony produces large mounds in open areas, and feeds mostly on young plants and seeds. Fire ants often attack small animals and can kill them. Unlike many other ants which bite and then spray acid on the wound, fire ants bite only to get a grip and then sting (from the abdomen) and inject a toxic venom. For humans, this is a painful sting, a sensation similar to what one feels when burned by fire (hence the name) and the after effects of the sting can be deadly to sensitive people. Fire ants are more aggressive than most native species and so have pushed many species away from their local habitat.

First Aid (Information taken from WebMD <http://www.webmd.com/allergies/fire-ant-stings#>)

1. Put ice on the sting off and on (15 minutes on, 15 minutes off). Use a towel. Don't put ice directly on your skin and don't use heat.
2. Elevate the area of the sting to reduce swelling.
3. Take an antihistamine and use a hydrocortisone cream to relieve itching.
4. If the sting is very large and painful your doctor may give you prescription antihistamines and steroids.

4. Spiders

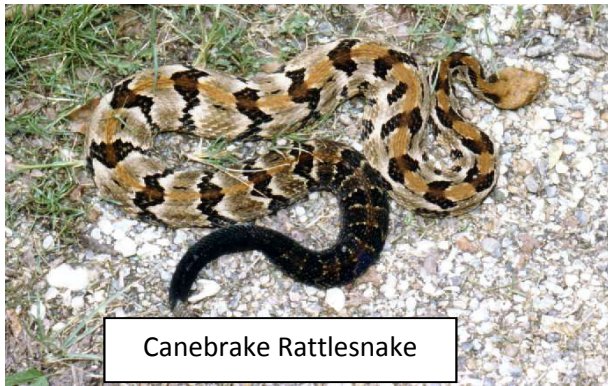


Venomous spiders use venom to kill their prey after they have captured it in their web or by other means. They can pose a danger to workers. Spiders reside in cool dark areas, often inside buildings and open/enclosed structures. If encountered, workers should avoid them.

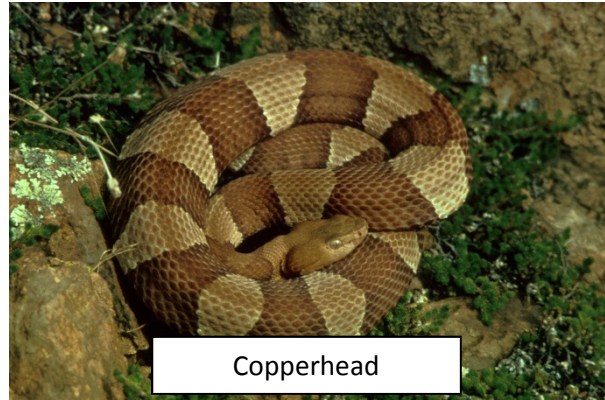
First Aid (Information taken from WebMD <http://www.webmd.com/first-aid/understanding-insect-bites-spider-bites-treatment>)

1. For spider bites that aren't serious, the goal of treatment is simply to relieve discomfort. If the bite or sting causes a severe reaction, seek immediate medical help.
2. If you think you've been bitten by a black widow spider, seek medical help.
3. A spreading wound from a brown recluse spider bite should be surgically cleaned and repaired although surgery isn't always required. Apply cold packs but don't apply ice.

5. Indigenous Louisiana Venomous Snakes



Canebrake Rattlesnake



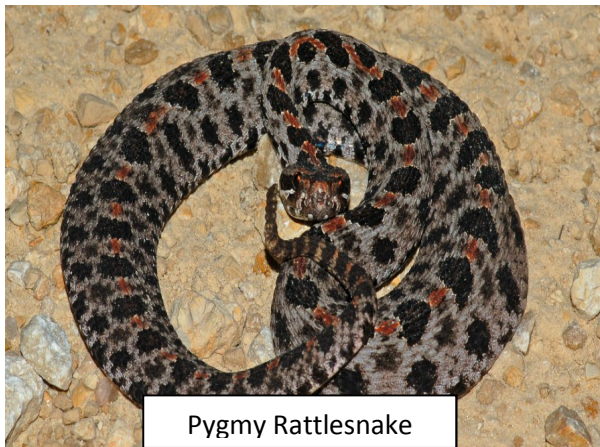
Copperhead



Cottonmouth



Eastern Diamondback Rattlesnake



Pygmy Rattlesnake



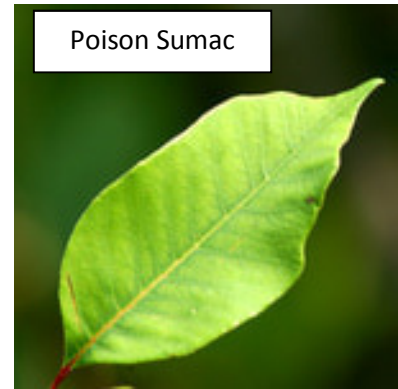
Texas Coral Snake

Snakes are not aggressive except when defending themselves. They do not pursue people, although they may swim or crawl toward someone they don't recognize as a threat. Venomous snakes are unable to strike a distance more than their body length, even less for large rattlesnakes. Thus, a distance of only five or six feet can be considered "safe" for any venomous snake in Louisiana. Snakes usually stay hidden under leaves, logs or heavy vegetation. All snakes should be treated as venomous. In the event you encounter a snake "Stay Away".

First Aid (Information taken from WebMD <http://www.webmd.com/first-aid/snakebite-treatment>)

1. Note the Snake's Appearance
 - Be ready to describe the snake to emergency staff.
2. Protect the Person
3. While waiting for medical help:
 - Move the person beyond striking distance of the snake.
 - Have the person lie down with wound below the heart.
 - Keep the person still to keep venom from spreading.
 - Cover the wound with loose, sterile bandage.
4. Do not:
 - Cut a bite wound
 - Attempt to suck out venom
 - Apply tourniquet, ice, or water
 - Give the person alcohol or caffeinated drinks
5. Follow Up
6. If you treat the bite:
 - Contact a health care provider. The person may need a tetanus shot. Tetanus boosters should be given every 10 years.
7. At the hospital, treatment will depend on the type of snake.
 - If the snake was venomous, the person will be given anti-venom treatment.
 - A tetanus shot may be given, depending on date of last injection.

6. Poisonous Plants



Poison ivy - typically grows as a vine or shrub, and it can be found throughout much of North America. It grows in open fields, wooded areas, on the roadside, and along riverbanks. Poison ivy plants typically have leaf arrangements that are clustered in groups of three leaflets, though this can vary. The color and shape of the leaves may also vary depending upon the exact species, the local environment, and the time of year. The plant may have yellow or green flowers, and white to green-yellow berries, depending on the season.

Poison oak - grows as a vine or shrub, and it is found in the western United States. It also has a leaf arrangement similar to poison ivy, with clusters of three leaflets. The leaves may sometimes resemble true oak leaves

Poison sumac - grows as a shrub or small tree, and it is found in the eastern/southeastern United States. It grows in very wet areas. Each stem contains seven to 13 leaves arranged in pairs. It has the potential to cause a more severe rash than either poison ivy or poison oak.

First Aid (Information taken from WebMD <http://www.webmd.com/first-aid/allergy-poison-ivy-oak-and-sumac-treatment>)

1. Wash Exposed Area
 - Wash with warm soap and water
 - Washing within 10 minutes can significantly reduce the chance of an allergic reaction.
2. Remove Contaminated Clothing
 - Plant oil can continue to spread from clothing and shoes.
3. Ease Itching and Discomfort
 - Apply cool compresses for 15 to 30 minutes at a time.
 - Avoid topical antihistamines, anesthetics like benzocaine, and antibiotic ointments, all of which may make skin more sensitive.
 - Have the person take oatmeal baths.

- Apply calamine lotion.
- If itchiness makes sleep difficult, give an oral antihistamine.

4. When to See a Doctor

- Get medical help if rash covers a large part of the person's body, or if the person has blisters or can't sleep.

5. Follow Up

- Symptoms usually go away within a week or two.
- Wash contaminated clothing to avoid exposure to oil.
- If serious rash persists, call a doctor.

Appendix- G Emergency Contacts

Emergency Contacts

Prior to mobilization and any activity on site, ESI will notify both local and state authorities about the nature of work conducted regarding this disposal activity. Site manager will review the emergency contacts and emergency medical treatment options prior the commencement of work operations.

Agency/Organization	Contact number
La. State Police Hazardous Material Hotline	(225) 925-6595
Col. Ronnie Stuckey-LMD	(318) 542-5624
Karen Price, LDEQ	(225) 936-8832
Greg Fife, EPA OSC Region VI	(214) 665-2724
Camp Minden MP Station	(318) 382-4171
Alcohol Tobacco Firearms and Explosives Hotline	(800) 800-3855
Linda Mahon, Installation Safety Officer	(318) 382-4265 DSN 435
Local Police and Fire Medical Emergency	911
ESI-Ken Williams	(225)275-2152
ESI-Jason Poe	(225)247-1771
El Dorado Engineering Inc.-Bob Hayes	(801) 966-8288

Emergency Medical Treatment

Minden Medical Center – Emergency Care

(318) 377-8933

102 S. Monroe St.

Minden, LA 71055 (Approximately 10 miles away)

Or

Brentwood Hospital (Shreveport)-Emergency Room

(877) 678-7500

1006 Highland Ave. Shreveport, LA 71103. (Approximately 24 miles away)

Driving directions to 102 S Monroe St, Minden, LA 71055-3357 on Yahoo Maps, Drivin... Page 1 of 2

Map & Directions

Map Only

Directions Only

Print

2 Hotels in Minden LA booking.com/minden-hotels Half-Price Hotels. Book your Hotel in Minden LA online.

Ad

YAHOO!
MAPS

A

Java Rd, Minden, LA 71055

B

102 S Monroe St, Minden, LA 71055-3357

Nearest Medical Clinic

233

Total Distance: 10.53 mi— Total Time: 18 mins

Map Layout

A

Java Rd, Minden, LA 71055

Expand All

Head toward 3rd St on Java Rd

Go for 0.1 mi

Hide

Turn right onto 3rd St

Go for 1.3 mi

Hide

Turn right onto Bataan Ave

Go for 0.3 mi

Hide

Turn left onto Macarthur Ave


Go for 0.5 mi

Hide

<https://maps.yahoo.com/obp/directions/?lat=32.58298146583809&lon=-93.354434967041...> 3/15/2015


77

Driving directions to 102 S Monroe St, Minden, LA 71055-3357 on Yahoo Maps, Drivin... Page 2 of 2

 Bear right onto US-79 E, US-80 E


Go for 8.2 mi

Hide

 Turn left onto Pine St

Go for 0.1 mi

Hide


 Turn right onto S Monroe St

Go for 242 ft

Hide

Your destination on S Monroe St is on the right. The trip takes 10.5 mi and 18 mins.

Hide

 102 S Monroe St, Minden, LA 71055-3357







Expand All

When using any driving directions or map, it is a good idea to double check and make sure the road still exists, watch out for construction, and follow all traffic safety precautions. This is only to be used as an aid in planning

<https://maps.yahoo.com/obp/directions/?lat=32.58298146583809&lon=-93.354434967041...> 3/15/2015

<https://maps.yahoo.com/obp/directions/?lat=32.52597362010652&lon=-93.571586608886...> 3/15/2015

Driving directions to 1006 Highland Ave, Shreveport, LA 71101-4103 on Yahoo Maps, ... Page 2 of 2

	Turn right onto Goodwill Rd	Go for 0.9 mi	Hide
	Turn left and take ramp onto I-20 W toward Shreveport	Go for 19.4 mi	Hide
	Take exit #19A/LA-1 S/US-71 N/LA-1 N/Market St/Spring St onto Market St (LA-1 S)	Go for 0.7 mi	Hide
	Bear right onto Market St	Go for 370 ft	Hide
	Turn right onto Highland Ave	Go for 0.2 mi	Hide
Your destination on Highland Ave is on the right. The trip takes 23.1 mi and 27 mins.			Hide
	1006 Highland Ave, Shreveport, LA 71101-4103	Expand All	

When using any driving directions or map, it is a good idea to double check and make sure the road still exists, watch out for construction, and follow all traffic safety precautions. This is only to be used as an aid in planning

<https://maps.yahoo.com/obp/directions/?lat=32.52597362010652&lon=-93.571586608886...> 3/15/2015