APPENDIX A

TASK ORDER SCOPE OF WORK

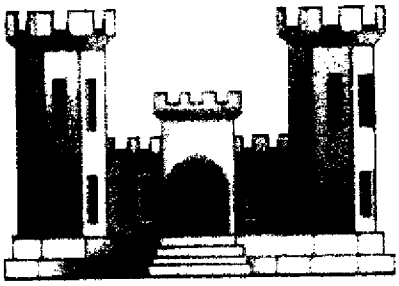
FOR THE

ORDNANCE AND EXPLOSIVES REMOVAL ACTIONS

SECTORS 2, 4 AND 5
FORMER BENICIA ARSENAL, BENICIA, CA

Prepared For:

Contracting Agency:
U.S. Army Engineering & Support Center, Huntsville, Alabama



Geographical Corps District:
US Army Corps of Engineers, Sacramento District

Contract Number: DACA87-97-D-0005
Task Order: 0019
Project Number: W31RYO-0152-68912

Prepared By:

EODT

2229 Old Highway 95
Lenoir City, Tennessee 37771

July 2000

**STATEMENT OF WORK
FOR NON-TIME CRITICAL
ORDNANCE & EXPLOSIVE
REMOVAL ACTIONS
Former Benicia Arsenal
Benicia, CA
22 Feb 00, R12: ~~11 Apr 00~~31 Oct 00**

1.0 OBJECTIVE.
The objective of this Task Order is for the Contractor to safely and efficiently locate and remove conventional unexploded ordnance (UXO) from a total of 135 acres at the former Benicia Arsenal in Benicia, California.

2.0 GENERAL STATEMENT OF WORK.

2.1 The work required under this Statement Work (SOW) falls under the Defense Environmental Restoration Program (DERP) for Formerly Used Defense Sites (FUDS). Ordnance and Explosives (OE) exists on this property formerly owned or controlled by the Department of Defense and currently owned by Benicia Industries, Exxon, Pacific Bay Homes, and various individuals. The work described in the SOW will be performed in a manner that is consistent with the National Contingency Plan (NCP) and the Comprehensive Environment Response, Compensation, and Liability Act (CERCLA). The applicable provisions of 29 CFR 1910.120 shall apply to all actions taken at this site.

2.2 Due to the inherent risk in this type of operation, the Contractor shall be limited to a 40-hour work week (either five 8-hour days or four 10-hour days). Unexploded Ordnance (UXO) personnel shall not perform OE-related tasks for more than 10 hours per day.

2.3 Chemical Warfare Materials. This site is not a suspected Chemical Warfare Material (CWM) site. However, if the Contractor or subcontractors encounter suspected CWM during any phase of work, they shall immediately withdraw upwind from the work area and notify the Project Manager and the Huntsville Center OE Safety Group. The Huntsville Center OE Safety Group will notify the Technical Escort Unit (TEU). This notification sequence shall be specified in the Work Plan.

3.0 SITE DESCRIPTION.

3.1 Site Location: The former Benicia Arsenal is located approximately 25 miles East- northeast of San Francisco. The project area is composed of steep rolling hills and runoff collection areas, which discharge to Suisun Bay.

3.2 Site Owners: Property within the former Benicia Arsenal is currently owned by Benicia Industries, Exxon, Pacific Bay Homes, and various individuals.

3.3 Site History: The site was established in 1849 to be used primarily as a shipping and receiving facility for military equipment and materiel manufactured within CONUS and destined

for military campaigns supported by the Port of San Francisco. Testing of 155-mm howitzers was performed on the Arsenal using two large concrete test tunnels. Additional details regarding site history are located in the "Benicia Arsenal Archive Search Report, March, 1994" and the "Supplement to the Benicia Arsenal Archive Search Report, May 1997". Substantial site revision has eliminated most remnants of the arsenal facilities. Construction of Interstate highway and refinery facilities led to the demolition of many underground storage bunkers used during trans-shipping operations conducted at the Arsenal.

3.4 Clearance Areas and Objectives: The Contractor shall perform project activities within the following areas:

3.4.1 Sector 2, Artillery Test Area, designated as "Limited Industrial/Open Space" land use. West Channel Road to the southeast, the fence alongside the McAllister Land Bridge to the west, the Sector 3A boundary to the north, and the top of the valley to the south define the sector boundaries. The majority of the sector is undeveloped and is characterized by steep terrain and scattered trees. Evaluations of this 15-acre area were limited, and did not expose UXO or related scrap. However, potential exists for the area to contain UXO. Apparently, sector 2 was only used to test firing mechanisms, but concern exists that up to 75-mm Projectiles may be encountered on the site. Due to the severe slopes, subsurface clearance of valley walls may produce erosion. Therefore, the Contractor shall locate and remove all OE and OE-scrap, along the valley floor (approximately six acres), and perform surface clearance of the remaining, sloping terrain in accordance with (IAW) the project performance standards in paragraph 3.5. Anomalies located but not excavated shall be marked on site maps and flagged in the field. The contractor shall perform an erosion assessment in accordance with National Forestry Standards (Ref 7.36) including photographic illustration of hillsides following surface removal activities to establish baseline conditions for future erosion assessments.

3.4.2 Sector 4, Exxon Property Demolition Site, designated as "Limited Industrial" land use. Sector boundaries are irregularly shaped based on topography of land owned by Exxon, and border East 2nd Street to the east, residential homes to the west and north, and Rose Drive to the northeast. Previous evaluations identify that only OE scrap was encountered in this 80-acre area, but it is suspected to possibly contain the following types of OE: 155-mm ballistic proof round (inert filled), 75-mm Projectiles, 37-mm Projectiles, and Grenades. The Contractor shall locate and remove geophysical anomalies at the surface that could be UXO, OE and/or OE-scrap, IAW the project performance standards in paragraph 3.5. It is anticipated that OE clearance actions will be concentrated in the southern portions of Sector 4 . The contractor shall evaluate anomaly locations and provide recommendations for extending clearance operations based on professional judgment of observed conditions. Additionally, at the direction of the Contracting Officer, the contractor shall expand ordnance removal efforts in unitized increments in areas deemed to exhibit potential for UXO in accordance with Tasks 13 (Option 2) and 14 (Option 3). The contractor shall assume that actions will be performed in a single mobilization effort. Costs for removal expansion shall be provided on a unit basis in the contractor's proposal.

3.4.3 Sector 5, Camel Barn Area, designated as "Limited Industrial" land use. This areais suspected to have OE as a result of a 1922 fire and subsequent clean-up activities. Sector

boundaries are defined by Interstates I-680 and I-780, on the north by a fence and open storage area (formerly known as OS 25 and OS 25A). This 40-acre area is suspected to contain the following types of OE: 75-mm Projectiles, 37-mm Projectiles, Grenades, and/or Stokes Mortars. The Contractor shall locate and remove all UXO, as well as all OE and OE-scrap, IAW the performance standards in paragraph 3.5. Ordnance removal will not be performed within 5 feet of original Benicia Arsenal building foundations. Ordnance removal will also not be performed for areas covered by original Benicia Arsenal infrastructure (IE: roads). - Clearance over earth-covered igloos will be limited to surface only. Within the same mobilization effort and as directed by the Contracting Officer, the contractor shall perform geophysical mapping of paved areas in OS 25 (approximately 8 acres) to assess the likelihood of pits, trenches, or other evidence of OE or UXO under the pavement. Recommendations for removal shall be provided electronically to the Contracting Officer within 48 hours of completion of geophysical evaluations. Geophysical evaluation data (to include data QC actions required by DID OT-005-11, Quality Control Plan, to ensure achievement of standards defined in DID OT-005-05, Geophysical Investigation Plan) shall be provided to support recommendations within 96 hours of geophysical evaluations.
At the direction of the Contracting Officer, the contractor shall continue subsurface removal efforts in accordance with Task 14 (option 3).. Additionally, at the direction of the Contracting Officer, the contractor shall expand surface and subsurface ordnance location in unitized increments in accordance with Tasks 13 (option 2) and 14 (Option 3). The contractor shall assume that actions will be performed in a single mobilization effort.

3.5 Project Performance Standards.

3.5.1.1 Performance requirements for surface clearance. The contractor shall find and recover all UXO and OE, and all OE scrap of dimensions 1 inch by 4 inches or larger. Geophysical equipment will be used to assist in the detection of surface ordnance.

3.5.1.12 ~~Detection~~Performance requirements for ~~recovery of OE~~subsurface clearance. The contractor shall find and recover all surface and subsurface ~~[ferrous]/[metallic]~~ UXO, OE and OE-Scrap (on the basis of mass/depth equivalent) to the standards identified in Table 7.32 of EM 1110-1-4009, **Engineering and Design - Ordnance and Explosives Response, 23 June 2000.**
~~*having a diameter larger than 37 millimeters and lying above the following performance line:*~~
~~*log(d) = 1.354 log(dia)-2.655 (for magnetometry)*~~
~~*or*~~
3.5.1.23 Detection requirements for Geophysical Mapping. The contractor shall ensure, through the Geophysical Investigation Prove Out (Section 4.5, Task 5), that electromagnetic equipment used for investigations meets the following performance standard: log(d) = 1.002 log(dia)-1.961 ~~(for electromagnetics)~~where "d" is the actual depth to the top of the buried item, in meters and "dia" is the diameter of the minor axis of the munition, in millimeters.

3.5.21.2.1 Location. Horizontally, 90% of all excavated items must lie within 30 cm of their reacquired and marked surface location, and 95% of all excavated items must lie within a 2 meter radius circle.

3.5.32 Corrective Actions. If the Government, through its Quality Assurance (QA) process, encounters any UXO, OE, or OE Scrap in any grid, which does not meet the project performance detection standard, then that grid will not be accepted by the Government. The Contractor shall dig additional anomalies as required to support the on-site OE safety specialist in conducting QA actions. The Contractor shall perform corrective actions, as the Government deems necessary, to achieve the detection performance standard. If more than 5% of
the project grids fail initial Government QA checks, the Contractor will not be paid "fee" (profit) for corrective action activities on grids that subsequently fail.

4.0 DESCRIPTION OF SERVICES

4.1 (Task 1) Site Visit. A site visit not to exceed four days and using three contractor personnel will be performed. The Contractor will coordinate with the Project Manager at least ten (10) calendar days in advance of the site visit. The site visit team shall include the Contractor's Project Manager, Project Geophysicist registered in the state of California, and a Senior UXO Supervisor. The objective of the site visit is for the Contractor's team to gain familiarization with the site in general and to gather information required to assemble an acceptable and executable Work Plan. No UXO-related activities will be performed during the site visit. The Contractor shall prepare an Abbreviated Site Safety and Health Plan (ASSHP) and submit the plan to the Contracting Officer for review and approval prior to the visit. The ASSHP has a brief, fill-in-the-blank format, and may be obtained from the CEHNC OE Safety Group. The Contractor shall ensure that the visit is fully coordinated and that all members of the site visit team maintain compliance with the ASSHP. The Contractor shall also coordinate with the local points of contact prior to the site visit.

4.2 (Task 2) Prepare Work Plans. The Contractor shall prepare a Work Plan and related sub-plans that describe the Contractor's proposed methodology of accomplishing the objective. The Work Plan shall describe site management actions to be performed, including access control, scrap stockpiling, and erosion data collection. The Work Plan and related sub-plans shall be prepared in accordance with the guidance provided in their respective Data Item Descriptions. All OE related procedures shall comply with *CEHNC Safety Concepts and Basic Considerations for UXO,* 7 March 2000. The Contractor shall prepare the following documents describing the work necessary to respond to the requirements described in this SOW and Data Item Descriptions (DID), as follows:

4.2.1 Work Plan (DID OT-005-01)

4.2.2 Site Safety and Health Plan (DID OT-005-06)

4.2.3 Conventional Explosives Safety Submission (DID OT-060)

4.2.4 Work, Data and Cost Management Plan (DID OT-005-08)

4.2.5 Quality Control Plan (DID OT-005-11)

4.2.6 Site-Specific Environmental Protection Plan (DID OT-005-12)

4.2.7 Property Equipment Plan (DID OT-005-09)

4.2.8 Scrap Monitoring and Disposal Plan (DID OT-040)

4.2.9 Chemical Data, Laboratory and Field Work Sampling Plan (DID OT-005-10)

4.2.10 Investigative Waste Plan (DID OT-005-13)

4.2.11 Explosives Management Plan (DID OT-005-03)

4.2.12 Community Relations Plan (DID OT-045)

4.2.13 Geophysical Investigation Plan (DID OT-005-05)

4.2.14 Technical Management Plan (DID OT-005-02)

4.2.15 Explosives Siting Plan (DID OT-005-04)

4.2.16 Location Surveys and Mapping Plan (DID OT-005-07)

4.2.17 Personnel/ Work Standards (DID OT-025)

4.3 (Task 3) Location Surveying and Mapping. The Contractor shall perform all location surveys and mapping required to establish boundaries of all areas specified in section 3.4 of this SOW and as required to support the project. During all field and intrusive activities, the survey crew shall be accompanied by a UXO specialist who will perform a UXO survey in each area prior to the surveyors starting work. Detection equipment shall be used to survey the location for the establishment of any monuments or markers. Based on site conditions it is possible that a UXO escort will not be required in all areas at all times after the initial site visit. However, such a decision will be made jointly by the Contractor's Site Safety and Health Officer (SSHO) and the USACE OE Safety Specialist who may rescind or modify it at any time. Grid corners shall be established using precision surveying methods. Each corner of each grid area shall be located by establishing the appropriate state plane grid system to the closest one (1) foot and shall be both tabulated and shown on maps of the site. Other coordinate systems and accuracy specifications are not acceptable and shall not be used. Staking shall be accomplished by driving a wooden or steel marker into the ground. Stakes shall be of sufficient size and emplaced to sufficient depth to ensure successful relocation of grid boundaries. The Contractor shall mark and survey the corners of the designated grids with stakes or other visible temporary markers. Individual locations of recovered UXO only shall be tape measured or the "x" & and "y" distance estimated to obtain a horizontal accuracy of plus or minus one foot from the established grid corners. If subsurface UXO are encountered, their depth below ground surface shall also be measured. The location of ordnance scrap, ordnance fragments, shrapnel, small arms ammunition and metallic debris shall be recorded on a "per-grid" basis and not

located by coordinates. The use of Total Station, GPS or other precision survey methods to locate individual UXO, UXO scrap, or geophysical anomalies within a grid is not necessary.

4.3.1 Items and data to be submitted as part of this task are as follows:

4.3.1.1 Control Points List. A tabulated list of all control points showing the adjusted coordinates established and/or used for this survey.

4.3.1.2 Grid Corners List. A tabulated list of all grid corners shall be provided.

4.3.1.2 Description Cards. A "Report of Establishment of Survey Mark" (Description Card) on each control point established and/or used for surveying. The Description Cards shall be 5" X 8" (12.7mm X 20.3mm) with one description per card. In addition to the name or ID number of the control points, the cards should show the adjusted coordinates, a written description for locating the control points, and a sketch showing how to locate the control points. Installation of concrete monuments will not be required; existing monuments will be described and referenced on the survey drawing.

4.3.1.3 Drawings. All maps shall be drawn at a scale no smaller than 1 inch = 400 feet (1:2400), referenced to the North American Datum of 1983 (NAD83), and provided on both reproducible (mylar) drawings and in a digital format. One original and two blue line prints of each final drawing shall be delivered to the Government. English units will be used.

4.3.2 Schedule. All work and services under this task shall be completed and submitted no later than the submission of the Geophysical Investigation Prove-out (task 5).

4.4 (Task 4) Vegetation Removal and Restoration.

4.4.1 Removal. The contractor shall furnish all personnel and equipment necessary to remove vegetation to the extent necessary to effectively locate, investigate and remove surface and subsurface anomalies.

4.4.2 Restoration. Upon conclusion of work at this site, the Contractor shall restore locations disturbed by operations, except those areas where brush/trees were removed. Excavated and trafficked areas shall be returned to natural grade and indigenous vegetation re-established by seeding or planting sprigs.

4.5 (Task 5) Geophysical Investigation Prove-out. The Contractor shall establish a site specific standardization test plot at an approved location on the project site. The test plot shall have dimensions of 50 feet by 50 feet and shall include approximately 12 inert OE items of the type and at the depth anticipated within the clearance area. The Contractor shall use this test plot to demonstrate the performance of the geophysical instruments and techniques used on the project. The Contractor shall geophysically map the test plot, analyze the data, and report the results with exactly the same detail and procedures as planned for the project area. Geophysical Investigations shall not begin in the project area until project objectives are demonstrated to be achieved within the test plot.

4.6 (Task 6) Geophysical Investigations.

4.6.1 General. The Contractor shall perform all geophysical investigations, mapping and evaluation of the project site. This work shall be accomplished in accordance with the approved work plan. The Contractor shall perform the geophysical investigation utilizing digital geophysical methods that integrates a navigation system that provides x-y positional accuracy to 0.25 meters, or better. The approved geophysical mapping technology shall digitally capture the instrument readings into a file coincident with state grid coordinates. All geophysical data, and coincident mapping data (in Intergraph .dgn format) shall be furnished to the Government no later than 30 calendar days after it is collected.

4.6.2 Dig-Sheets. The Contractor shall, using a qualified geophysicist, analyze the geophysical data, identify anomalies that may represent buried UXO, and provide "dig-sheets" containing the following information:
Unique Anomaly Identification Number
Northing, in State Grid Plane Coordinates;
Easting, in State Grid Plane Coordinates;
Instrument Reading at Target Location.
The dig sheets shall be prioritized and anomalies deemed more likely to be UXO ranked higher than anomalies less likely to be UXO.

4.6.3. Paragraph deleted.

~~4.6.3 Inaccessible Areas. Sub-areas within the area required to be geophysically mapped may be inaccessible to digital geophysical investigation equipment. If this occurs the Contractor may, with concurrence of the Project Manager, utilize analog geophysical approaches (e.g., "mag & flag") to clear these sub-areas. Geophysical mapping will not be performed within 20 feet of original Benicia Arsenal building foundations. Geophysical mapping will not be required for areas covered by original Benicia Arsenal infrastructure (IE: roads).~~

4.7 (Task 7) Anomaly Reacquisition. The Contractor shall use precision surveying methods to reacquire the geophysical anomalies identified on the dig-sheets. Anomaly reacquisition is a two-step process. The first step is to locate the ground position as specified on the dig-sheet. The second step is to use appropriate hand-held geophysical instruments to identify the precise location on the ground where excavation for the anomaly should occur. The Contractor shall flag the actual field location of each anomaly shown on the dig-sheets and paint the ground at the flag location with high-visibility paint. The Contractor shall record and report all discrepancies between the dig-sheet locations and the actual reacquired location. The Contractor shall also report any anomalies that could not be reacquired.

4.8 (Task 8) Perform Clearance Action. This task shall be in accordance with the requirements of the Basic Contract and the approved Work Plan, SSHP, and Explosives Safety Submission for this site.

4.8.1. General. The following requirements will apply to all clearance activities covered under this SOW.

4.8.1.1 The Contractor shall provide all necessary personnel and equipment to perform a clearance of all anomalies identified for excavation.

4.8.1.2. Only USAESCH approved UXO personnel shall perform OE-related tasks.

4.8.1.3. Geophysical instruments may be used during excavations to assist the dig teams. Geophysical instruments used for QC shall be field tested daily to ensure they are operating properly. This shall be accomplished by using the established test plot located at the site or an approved alternate method. If the standard indication can not be attained, the instrument shall be re-calibrated, repaired or replaced.

4.8.1.4 If an excavation is required in an area of an endangered or protected plant or animal, excavation shall proceed only after coordination through the Project Manager or the on-site OE safety specialist.
~~OE removal will not be performed within 20 feet of original Benicia Arsenal building foundations.~~

4.8.1.5 All access/excavation/detonation holes shall be back-filled and revegetated in accordance with the requirements of Task 4.

4.8.1.6 The UXO Specialists that excavate the anomalies shall annotate their results. The results of the excavations will include all pertinent features of the anomaly to include items such as type, condition, actual location, depth, UXO depth at the nose and at the tail, size, mass and any other information that would significantly assist in classifying the geophysical anomaly.

4.9 (TASK 9) Final Disposition of AEDA / Range Residue. The Contractor shall furnish all necessary personnel and equipment to make final disposition on all recovered AEDA/Range Residue. The methodology to accomplish this task shall be proposed in the Work Plan.

4.9.1 The Contractor shall follow the provisions of DOD 4160.21-M when making final disposition of AEDA/Range Residue. The Contractor shall complete a DD Form 1348-1A. In the event that DRMO does not accept scrap or is not locally available, the Contractor shall arrange in advance for local scrap contractor to remove the scrap. The DRMO or local scrap dealer shall be identified in the Work Plan. The contractor will also include in the Work Plan the written direction from DRMO if directed to a local scrap dealer and a written statement from the dealer that the scrap will be processed through a smelter or furnace prior to resale or release. In the event that DRMO is not available, an approved local scrap dealer may be used. These documents are required even if The AEDA/Range Residue is conveyed to a local scrap dealer rather than DRMO.

4.9.2 Inspection/Certification of AEDA.

4.9.2.1 The UXO contractor shall ensure that this property is 100% properly inspected IAW the inspection procedures specified in the Work Plan. Qualified UXO personnel shall perform the inspection. UXO contractor personnel responsible for certifying AEDA/Range residue must meet the qualification requirements specified in DID 0T-025. *AEDA/Range residue certification will be entered on the DD 1348-1A as follows:*

"This certifies that the AEDA residue, Range Residue, and/or Explosive Contaminated Property listed has been 100 percent properly inspected and to the best of our knowledge and belief, are inert and/or free of explosives or related material."

The certification requires dual signatures. The SUXOS will sign as the certifier, and the USACE OE Safety Specialist will sign as the verifier.

4.9.2.2 All certificates must clearly show the typed/printed name, organization, signature, and phone number of the person certifying the inspection4.9.2.3 Material which cannot be certified as above shall be returned to the range and
detonated and then re-inspected.

4.9.2.3 These procedures shall apply to AEDA/Range Residue turned into DRMO or a local scrap dealer. Once the inspection is completed, the contractor shall ensure the inspected AEDA/Range Residue is not mixed with other types of material. The contractor shall implement adequate controls to ensure that mixing does not occur.

4.9.2.4 Disposal documentation receipts shall be submitted as a component of the Removal Report.

4.10 (Task 10) Prepare and Submit Removal Report. At the conclusion of all field activities, the Contractor shall submit the Removal Report IAW DID OT-030. The report shall consist of the following:

4.10.1 Detailed accounting of all UXO and OE-related materials located and destroyed. This information will be provided from the Government maintained database.

4.10.2 A system of daily journals of all activities associated with this SOW. A daily journal for the site shall be opened upon first arrival for field operations and closed after contractor demobilization at the project site.

4.10.3 A recapitulation of exposure data. This shall include total number of man-hours worked on-site in OE related activities, total motor vehicle mileage, number of aircraft flights and total of man-hours flown to support the project.

4.10.4 QC documentation.

4.10.5 DRMO turn-in documentation.

4.10.6 The Contractor shall provide color digital pictures of sufficient quality to allow the Government to easily identify the item being photographed. The Contractor shall provide pictures of selected unexploded ordnance located during the clearance action, selected demolition shots (before and after explosion) and any significant events during the course of the field work. The digital pictures shall include the anomaly number in the file name for each picture. The pictures shall be imported into the text of the Removal Report. Further, a minimum of 45 minutes of narrated videotape depicting all major activities shall be provided in two copies.

4.10.7 A financial breakdown by area of all costs and labor hours used to perform this SOW.

4.11 (Task 11) Public Meetings and Technical Support. The Contractor shall provide technical support to CESPK to assure appropriate and accurate data regarding the project is provided for CESPK disposition in other site related documents. The Contractor shall attend three Public Meetings during the administration of the project.

4.12 Task 12 Additional Geophysical Investigation. At the direction of the Contracting Officer, the Contractor shall perform geophysical evaluations of additional areas as identified in Sections 3.4.2 in accordance with the requirements of Section 4.8 (Task 8). For contracting purposes, costs for this effort shall be provided on a unit basis in one-acre increments. It is anticipated that additional geophysical investigation will encompass 20 acres.

4.13 Task 13 Additional Surface Clearance Action. At the direction of the Contracting Officer, the Contractor shall perform surface clearance actions of additional areas as identified in Section 3.4.2 and in accordance with the requirements of Section 4.8 (Task 8). For contracting purposes, costs for this effort shall be provided on a unit basis in one-acre increments. It is anticipated that additional clearance will encompass 20 acres.

4.14 Task 14 Additional Subsurface Clearance Action. At the direction of the Contracting Officer, the Contractor shall perform subsurface clearance actions of additional areas as identified in Section 3.4.3 and in accordance with the requirements of Section 4.8 (Task 8). For contracting purposes, costs for this effort shall be provided on a unit basis in one-acre increments. It is anticipated that additional clearance will encompass 20 acres.

5.0 SUBMITTALS. The Contractor shall furnish copies of the plans and reports to each addressee listed below in the quantities indicated. One copy of the final work plan and the final report shall be sent to the Project Manager on 3.5 inch computer disk or CD ROM in an acceptable format in addition to the number of hard copies identified below. The Contractor shall use express mail services for delivering these plans and reports. Following each submission, comments generated as a result of their review shall be incorporated.

5.1 Addressees:

Addressee	Copies
Commander US Army Engineering and Support Center, Huntsville ATTN: CEHNC-OE-DC (Robert Nore) 4820 University Square Huntsville, AL, ~~35807-4301~~ 35816-1822	3
Commander US Army Corps of Engineers, Sacramento District ATTN: CESPK-ED-E (Bruce Handel) 1325 J Street Sacramento, CA 95816-1822	3
Commander 52nd EOD Group, Fort Gillem Building 736 Forest Park, Ga., 30050-50001	1

5.2 Submittals and Due Dates

DATA ITEM SUBMITTAL	DUE DATES
Draft Work Plan	30 Jun 00
Final Work Plan	~~11 Aug 00~~1 Nov 00
Conventional Explosives Safety Submittal	~~11Aug 00~~1 Nov 00
Accident/Incident Report	Following Accidents
Cost/Schedule Status Reports	Monthly
Report/Minutes Record of Meeting	Following meetings
Telephone Conversation Correspondence	Monthly
Exposure Data Report	Monthly
Draft Removal Report	~~5 Jan 01~~1 May 01
Final Removal Report	~~15 Feb 01~~16 Jun 01
OT-085 Weekly Status Report	1st Working Day of following week

5.3 Computer Hardware and Software.

5.3.1 All final text files generated by the Contractor shall be Word 97, IBM PC compatible format. The drawing and plot data shall be provided as coincident files in State Grid Plane Coordinates in MicroStation 95 CADD to run on typical properly configured Windows 95 and NT 4.0 PCs. The individual CADD files shall be referenced to a master file that allows simultaneous viewing of all historical layers and figures. Discussions shall be held on all non-CADD data to insure that its use and viewing is compatible with the Government's GIS workstations. HNC GIS workstations are Intergraph TDZ-425 dual 266 Pentium II with 128 megabytes of memory. The workstations run under the Windows NT. 4.0 operating system with

MicroStation 95 utilizing the MGE 6.0 complement of software and an Oracle 7.3 relational data base. Current other GIS project related software includes: IRAS B, IRAS C 5.04 and IRAS Engineer, DB Access, MGE Basic Nucleus, MGE Analysts, MGE Map Finisher, MGE Projection Manager, MGE Grid Analyst, MGE Modeler, Inroads, Base and Advanced Imager. All data for formal submittals shall be on either PC 3.5" floppies or PC CD-ROM. CD-ROM is the preferred format is required for data submission sizes from 5 to 600 MB. Three copies of each electronic submittal are required and are to be submitted in separate packages completely document and ready to run.

5.3.2 No digital data will be accepted until proven compatible with the Government's Graphics System. All revisions required to obtain compatibility with the Government's Graphics System shall be performed at Contractor's expense.

5.4 Mapping. All final mapping shall be created by Computer Aided Design and Drafting (CADD) and provided to the Government in MicroStation 95 two-dimensional digital design files on PC CD-ROM. All characteristics such as file naming and relationships, level structures, colors, line styles, weights, etc. shall be in accordance with the surveying and mapping requirements of the Tri-Service Spatial Data Standards (TSSDS) of the current release and shall be compiled in the design files. Site maps plotted from these design files shall be provided on reproducible (Mylar) standard metric A-1 size drawings which are 841 millimeters (mm) by 594mm in size (33.1 inches by 23.4 inches). The location, identification, and coordinates of all the control points, and boundary corners shall be plotted on the reproducible maps. Each control point shall be identified on the map by its name or number and the final adjusted coordinates and elevations to the closest 0.01 ft. Each sheet shall include a standard border, revision block, title block, complete index sheet layout, bar scale, grid north, a true north, and magnetic north arrow with the differences between them shown in minutes and sections. Grid lines or tick marks in feet and at systematic intervals shall be shown with their grid values on the edges of the map. Also, a legend showing the standard National Geodetic Standard (NGS) symbols used for the mapping, a map index showing the site in relationship to all other sites within the boundary lines of the project area shall be included on each sheet.

6.0 PUBLIC AFFAIRS. The Contractor shall not make available or publicly disclose any data generated or reviewed under this contract or any subcontract unless specifically authorized by the Contracting Officer, the U.S. Army Engineer District, Sacramento, PAO and/or the OE Design Center PAO. When approached by any person or entity requesting information about the subject of this contract, the Contractor shall defer to the PAO for response. Reports and data generated under this contract shall become the property of the Government and distribution to any other source by the Contractor is prohibited unless authorized by the Contracting Officer.

7.0 **REFERENCES:**

7.1 DOD Manual 4160.21.M, Defense Utilization and Disposal Manual.

7.2 AR 200-1, Environmental Protection and Enhancement.

7.3 AR 385-40 with USACE Supplement.

7.4 AR 386-63, Policies and Procedures for Firing Ammunition for Training, Target Practice,

and Combat.

7.5 EM 385-1-1, CE Safety and Health Requirements Manual.

7.6 DA PAM 385-64, Ammunition and Explosive Safety Standards.

7.7 CEHND Safety Concepts and Basic Considerations for UXO.

7.8 DoD 6055.9 Std. DoD Ammunition and Explosive Safety Standards

7.9 TM 60A 1-1-31, Explosive Ordnance Disposal Procedures

7.10 National Contingency Plan, 40 CFR 300.

7.11 Federal Acquisition Regulation, F.A.R. Clause 52.236-13: Accident Prevention.

7.12 Army Corps of Engineers, ER-385-1-92, Appendix B, Safety and Occupational Health Document Requirements for Hazardous Toxic and Radioactive Waste (HTRW) and Ordnance and Explosive Waste (OE) Activities, 18 March 1994.

7.13 Occupational Safety and Health Administration (OSHA) General Industry Standards, 29 CFR 1910 and Construction Industry Standards, 29 CFR 1926; especially 196.120/29CFR1926.65-Hazardous Waste Site Operations and Emergency Response.

7.14 NIOSH/OSHA/USCG/EPA, Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities, October 1985. (DHHS/NIOSH) Publication No. 85-115).

7.15 CEHNC 1115-3-86, Ordnance and Explosives Cost-Estimating Risk Tool (OECert) Standing Operating Procedure (SOP), November 1996.

7.16 DID OT-005-01 Removal Action Work Plan (Required for sampling operations)

7.17 DID OT-005-02 Technical Management Plan

7.18 DID OT-005-03 Explosives Management Plan

7.19 DID OT-005-04 Explosives Siting Plan

7.20 DID OT-005-05 Geophysical Investigation Plan

7.21 DID OT-005-06 Site Safety and Health Plan

7.22 DID OT-005-07 Location Surveys and Mapping Plan

7.23 DID OT-005-08 Work, Data, and Cost Management Plan

7.24 DID OT-005-09 Property Management Plan (Government furnished equipment)

7.25 DID OT-005-10 Sampling and Analysis Plan (NOT REQUIRED FOR THIS SOW)

7.26 DID OT-005-11 Quality Control Plan

7.27 DID OT-005-12 Environmental Protection Plan

7.28 DID OT-15 Accident reports

7.29 DID OT-025 Personnel and Work Standards

7.30 DID OT-030 Site Specific Removal Report (Needed for sampling operations)

7.31 DID OT-040 Disposal Feasibility Letter Report (NOT REQUIRED FOR THIS SOW)

7.32 DID OT-045 Reports

7.33 DID OT-055 Telephone Conversations

7.34 DID OT-060 Conventional Safety Submissions

7.35 DID OT-085 Weekly Status Report

7.36 Hall, David E.; Long, Michael T.; Remboldt, Michael D., eds. 1994. Slope Stability Reference Guide for National Forests in the United States. Report EM-7170-13. Washington, DC: U.S. Department of Agriculture, Forest Service, Washington Office Department of Engineering.

7.37 EM 1110-1-4009, Engineering and Design - Ordnance and Explosives Response, CEMP-RA, 23 June 2000

8.0 GOVERNMENT FURNISHED.

8.1 Access Agreements.

8.2 Engineering Evaluation/Cost Analysis, dated March 2000.

8.3 Action Memorandum, dated March 2000.

8.4 Pertinent UXO Technical publications/information as required.

8.6 Maps showing sectors.

8.7 Results of Geophysical Mapping.

8.8 Records Research Report for the Benicia Arsenal VOL 1-4, US Army Corps of Engineers, Sacramento District, April, 1999.

9.0 SPECIAL INSTRUCTIONS.

9.1 29 CFR 1926.100(a) requires personnel to wear protective helmets in areas where there is a possible danger of head injury from impact, from falling/flying objects, or from electrical shock and/or burns. During field activities on ordnance projects, hard hats need not be worn unless a head injury threat is present.

9.2 If the UXO personnel are on the CEHNC database, there is no requirement for the contractor to submit their resumes in the work plans. However, their name and UXO number must be listed and identified in the Work Plans.

APPENDIX B
SITE MAPS

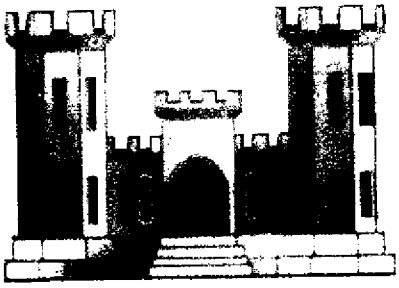
FOR THE

ORDNANCE AND EXPLOSIVES REMOVAL ACTIONS

SECTORS 2, 4 AND 5
FORMER BENICIA ARSENAL, BENICIA, CA

Prepared For:

Contracting Agency:
U.S. Army Engineering & Support Center, Huntsville, Alabama



Geographical Corps District:
US Army Corps of Engineers, Sacramento District

Contract Number: DACA87-97-D-0005
Task Order: 0019
Project Number: W31RYO-0152-68912

Prepared By:

EODT
EOD TECHNOLOGY, INC.

2229 Old Highway 95
Lenoir City, Tennessee 37771

July 2000

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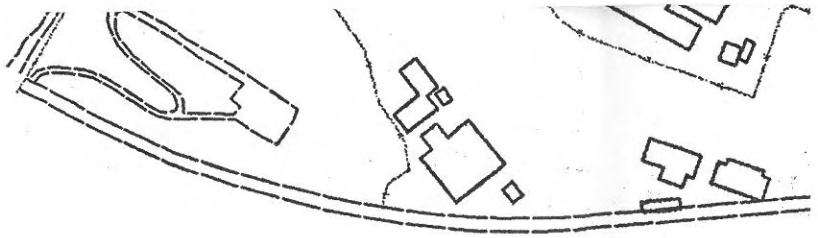
AVAILABLE FOR VIEWING
IN THE CITY ATTORNEY'S OFFICE.



ECT TITLE:

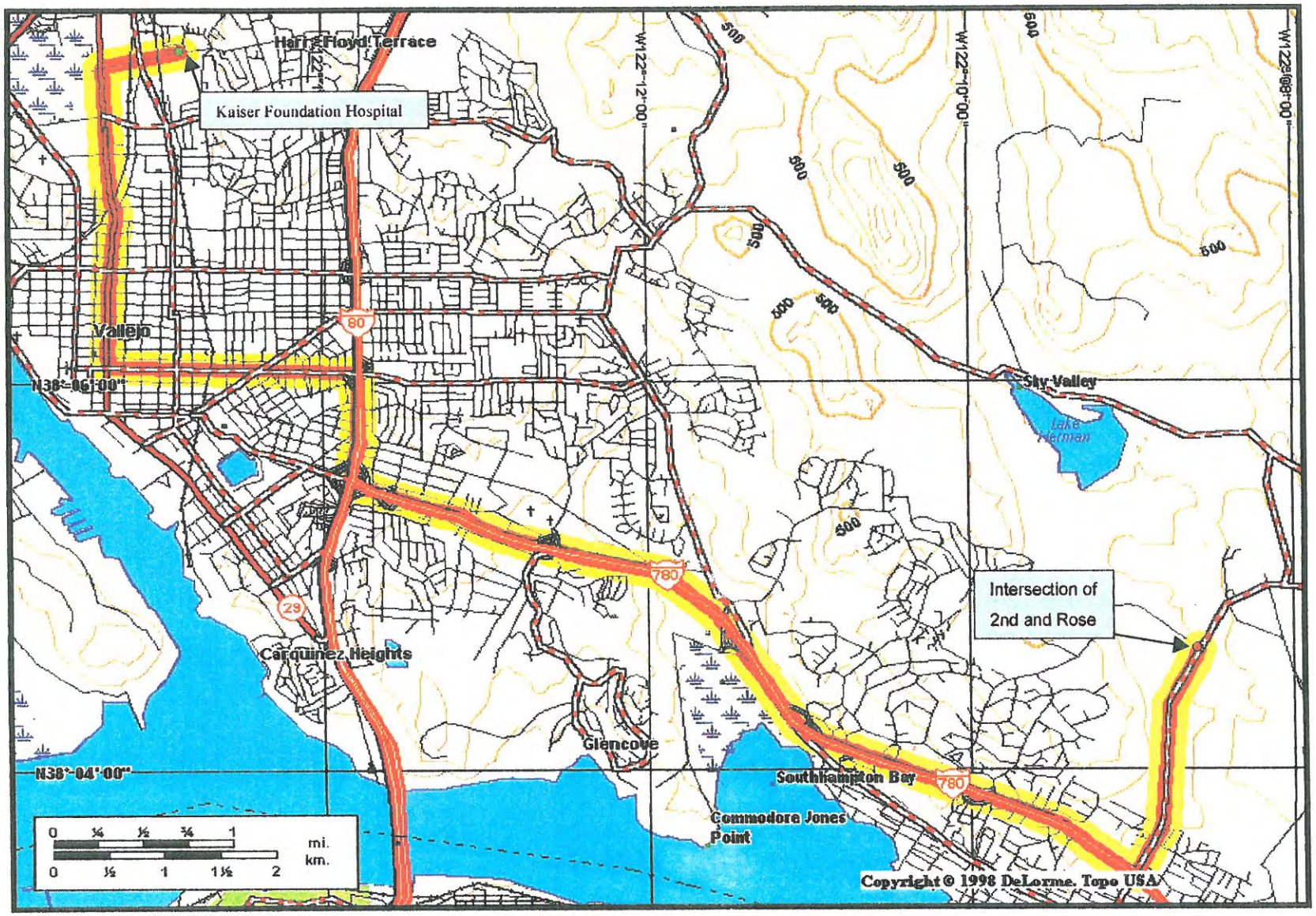
ORDNANCE REMOVAL ACTION

ECT LOCATION:

FORMER BENICIA ARSENAL, BENICIA, CA

T NAME:

U.S. ARMY ENGINEERING SUPPORT CENTER. HUNTSVILL



Route Map to the Kaiser Foundation Hospital

POINTS OF CONTACT

Service / Contact	Agency / Position	Telephone Number
Ambulance	Solano County Emergency Service	911 / 707-421-6330
Emergency Medical Treatment	Kaiser Foundation Hospital	707-651-1000
Local Police	Benicia Police Department	707-745-3412
Local Sheriff	Solano County Sheriff	707-553-5385
Local Fire Department	Benicia Fire Department	707-746-4275
Military EOD Unit	52nd Ordnance Group (EOD) Ft. Gillem, GA	404-362-5953/5978 24-hr Contact - 404-367-5222
CEHNC Safety Office	NA	(256) 895-1582 or 1589 After Hours: (256) 895-1180
Bob Nore	CEHNC Project Manager	(256) 895-1512
TBD	CEHNC On-site Safety Specialist	
Phil Curry	EODT Project Manager	(865) 988-6063
Andrew Bryson, CIH	EODT OSHM/CIH	(865) 988-6063
Steve Voland	EODT QCM	(865) 988-6063
Poison Control Center	24-hour Emergency Number	800-876-4766 (CA only)
Centers for Disease Control		800-311-3435 404-639-3534
National Response Center		800-424-8802
CHEMTREC		800-424-9300

APPENDIX D
CONTRACTOR FORMS

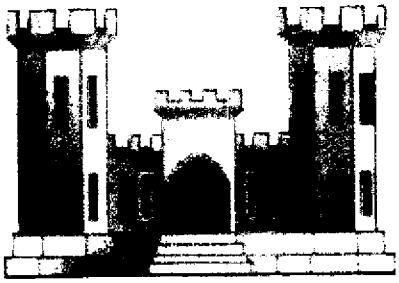
FOR THE

ORDNANCE AND EXPLOSIVES REMOVAL ACTIONS

SECTORS 2, 4 AND 5
FORMER BENICIA ARSENAL, BENICIA, CA

Prepared For:

Contracting Agency:
U.S. Army Engineering & Support Center, Huntsville, Alabama



Geographical Corps District:
US Army Corps of Engineers, Sacramento District

Contract Number: DACA87-97-D-0005
Task Order: 0019
Project Number: W31RYO-0152-68912

Prepared By:

EODT
EOD TECHNOLOGY INC

2229 Old Highway 95
Lenoir City, Tennessee 37771

July 2000

TABLE OF SAMPLE FORMS

GRID QA/QC TRACKING LOG

Project Name and Location: _____ **SUXOS:** _____

Grid Number	Date Completed	Team Number	Date Released For QC	Date QC'd	Results P / F	Date Released For QA	Date QA'd	Results P / F	QA'd By	Remarks

EODT SAFETY TRAINING ATTENDANCE LOG

OE OPERATIONS

Date:	Instructor(s):	Time:	No.:
Contract Number:		Delivery Order Number:	
Location:			

Training Provided: ☐ Initial Site Hazard Training ☐ Weekly Safety Training ☐ Other: _____
☐ Tailgate Safety Briefing ☐ Task/Hazard Specific Training _____

I. TRAINING TOPICS COVERED

Work Plan and /SSHP: _____

UXO/OE Hazards: _____

Chemical Hazards: _____

Physical Hazards: _____

Emergency Procedures: _____

Other: _____

II. TRAINING COURSE ATTENDEES

Name (printed)	Signature	Organization

III. VERIFICATION

I certify that the personnel listed on this roster received the safety training described above. Site personnel not attending this training session will be briefed before beginning their assigned duties or entering the site.

_____ _____

Site Safety and Health Officer Sr. UXO Supervisor / Project Manager

EODT SITE VISITORS LOG
FOR OE OPERATIONS

LOCATION:	CONTRACT NO.:	DELIVERY ORDER NO.:

Date	Name	Company	Reason for Visit	Safety Briefing Given By	Time		Escort Req'd (Y / N)
					In	Out	

EODT DAILY/WEEKLY SAFETY INSPECTION AND AUDIT LOG

FOR OE OPERATIONS

DATE:	TIME:	LOG NO.:
CONTRACT NO.:	TASK ORDER NO.:	
LOCATION:		
WEATHER CONDITIONS: _____		

I. AREAS INSPECTED: (List by grid number, Team or task) _____

II. INSPECTION RESULTS

Item Description	Pass	Item Description	Pass
1. Personal Protection (PPE) per SSHP	Y / N	9. UXO/OE Detection Equipment	Y / N
2. Work Practices Follow SSHP	Y / N	10. UXO/OE Detection Equipment Calibration	Y / N
3. Site Control/Decon per SSHP	Y / N	11. MSDSs and Container Labeling per SSHP	Y / N
4. First Aid Kit(s)/Eyewash Station(s)	Y / N	12. On- and Off-Site Communications	Y / N
5. Fire Extinguisher(s)	Y / N	13. Site House Keeping	Y / N
6. Flammable Storage Areas	Y / N	14. Explosives / Ordnance Storage Areas	Y / N
7. Safety and Health Monitoring Equipment Use	Y / N	15. Other: (list)	Y / N
8. Monitoring Equipment Calibration	Y / N	16. Other: (list)	Y / N

III. CORRECTIVE ACTIONS RECOMMENDED: (If required) _____

IV. REINSPECTION RESULTS: (If required) _____

V. SIGNATURES:

I acknowledge that I have been briefed on the results of this inspection and will take corrective actions (if necessary).

_____ Site Safety and Health Officer

_____ Sr. UXO Supervisor / Project Manager

Note: Safety Inspections are to be conducted each day and documented on this form. This form will also be used to document the Weekly Safety Audit conducted at the end of each work week. The weekly audit will not only indicate the present status of the site/site operations, but will also be used to note the current status of deficiencies noted during daily inspections. Daily inspection forms where deficiencies have been noted, and the weekly audit will be faxed to the EODT Occupational Safety and Health Manager.

EODT OE OPERATIONS DAILY/WEEKLY REPORT

DATE:	LOCATION:	LOG NO.:
CONTRACT NO.:	DELIVERY ORDER NO.:	

WEATHER CONDITIONS: _____

I. WORK SUMMARY

A. WORK SCHEDULED: _____

B. WORK COMPLETED: _____

C. EXPLANATION OF VARIANCE: _____

D. INSPECTION RESULTS: _____

II. INSTRUCTIONS RECEIVED FROM GOVERNMENT REPRESENTATIVE(S)

EODT OE OPERATIONS DAILY/WEEKLY REPORT

III. SAFETY COMMENTS:

IV. UXO SUMMARY

A. UXO/OE LOCATED

DESCRIPTION	ID NO.	QTY.	DISPOSITION

B. DEMOLITION SUPPLIES USED:

DESCRIPTION	QTY.
DETONATORS, ELECTRIC	
DETONATORS, NON-ELECTRIC	
DETONATION CORD	
PERFORATORS (JETX)	
TIME FUZE	
SMOKELESS POWDER	
GREEN STICK	

C. SCRAP GENERATION / DISPOSITION: _____

EODT OE OPERATIONS DAILY/WEEKLY REPORT

V. PERSONNEL / EQUIPMENT UTILIZATION

A. PERSONNEL ON SITE

LABOR CATEGORY	NUMBER	MAN-HOURS	REMARKS
Civil Engineer			
Geophysicist			
GIS Manager			
Project Manager			
Quality Control Specialist			
Senior UXO Supervisor			
Site Safety and Health Officer			
UXO Supervisor			
UXO Specialist			
UXO Assistant			
Geophysical Instrument/Mag Operator			
Drafter 1 / Mapping Tech			
Heavy Equipment Operator			
Surveyor Aid			
Surveyor			
Field Office Administrator			
Environmental Scientist			
CIH / Program Safety & Training			
Program QC/QA			
GIS / Data Specialist			
Equipment Operator			
Contract Administrator			
Program Administrator			
Word Processor			
Laborer			
Program Manager			
SUBCONTRACTOR PERSONNEL (List by Category)			

EODT OE OPERATIONS DAILY/WEEKLY REPORT

V. PERSONNEL / EQUIPMENT UTILIZATION (continued)

B. EQUIPMENT USED ON SITE

DESCRIPTION	QTY.	HOURS	SOURCE	REMARKS
Backhoe, Wheeled / Tracked				
Bull Dozer				
Bush Hog				
Chain Saw				
Differential Global Positioning System				
Excavator, Tracked				
Magnetometers				
Radio, Base Station				
Radio, Hand Held				
Top Con				
Truck, Heavy (4-wheel drive)				
Truck, Light				
Truck, Pick-up				
Vehicle (All Purpose, 4-Wheel Drive)				
Vehicle-All Purpose Utility (APUV)				
Vehicle (Sedan)				
Vehicle (Van)				
Gas Powered Brush Cutter				
Other Equipment (List)				

VI. COMMENTS / CONCERNS

VII. SIGNATURES / DATE

Sr. UXO Supervisor _____ Date _____ Site Safety and Health Officer _____ Date _____

APPENDIX E
RESUMES

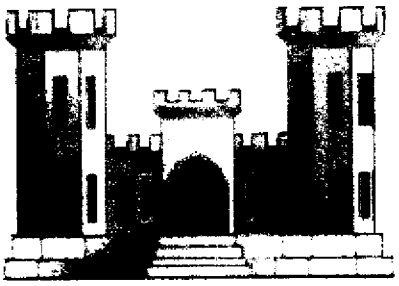
FOR THE

ORDNANCE AND EXPLOSIVES REMOVAL ACTIONS

SECTORS 2, 4 AND 5
FORMER BENICIA ARSENAL, BENICIA, CA

Prepared For:

Contracting Agency:
U.S. Army Engineering & Support Center, Huntsville, Alabama



Geographical Corps District:
US Army Corps of Engineers, Sacramento District

Contract Number: DACA87-97-D-0005
Task Order: 0019
Project Number: W31RYO-0152-68912

Prepared By:

EODT
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2229 Old Highway 95
Lenoir City, Tennessee 37771

July 2000

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1.0 GENERAL

Prior to mobilization, EODT will submit to the CEHNC for approval, the resumes of the UXO-qualified personnel that will be needed for the successful completion of this Task Order. The number of additional UXO personnel that will be required include:

- Two UXO Tech III's; and
- Nine UXO Tech II's.

2.0 RESUMES

This appendix contains the resumes for the management and supervisory personnel listed below, which EODT proposes to use for the execution of the work associated with this Task Order.

- Phil Curry, Project Manager
- SUXOS – The name of the SUXOS will be determined at a date closer to mobilizing field personnel. The resume for the proposed SUXOS will be submitted to CEHNC for approval prior to mobilization.
- Andrew Bryson, OSHM
- Steve Voland, QCM
- UXOQCS – The name of the UXOQCS will be determined at a date closer to mobilizing field personnel. The resume for the proposed UXOQCS will be submitted to CEHNC for approval prior to mobilization.
- UXOSO – The name of the UXOSO will be determined at a date closer to mobilizing field personnel. The resume for the proposed UXOSO will be submitted to CEHNC for approval prior to mobilization.

3.0 OSHA TRAINING

Prior to mobilization, EODT will ensure that all personnel assigned to this project will have received the training required by OSHA in 29 CFR 1910.120. EODT will further ensure that a copy of the 40-hour, and any applicable 8-hour refresher, certificates for all site personnel will be on file in the project field office.

4.0 MEDICAL SURVEILLANCE

Prior to mobilization, EODT will ensure that all EODT site personnel assigned to this project are enrolled in the medical surveillance program as required by the EODT Corporate Safety and Health Program and by OSHA in 29 CFR 1910.120. As proof of participation in the medical surveillance program, a copy of the physician's statement for each person assigned to the project will be on file at the field office.

PHILLIP R. CURRY
PROJECT MANAGER

CITIZENSHIP	**USA**
GRADUATED EOD SCHOOL	**1982**
MILITARY EOD EXPERIENCE	**13.17 YEARS**
COMMERCIAL UXO EXPERIENCE	**4.75 YEARS**

EDUCATION/TRAINING

- OSHA 8 Hour Refresher (10/99)
- OSHA 40 Hour Course (05/95)
- Explosive Ordnance Disposal School (1982)
- OSHA 8 Hour Site Supervisor Course (06/97)

SUMMARY OF EXPERIENCE

Mr. Phillip Curry has been a project manager at EOD Technology, Inc., since July 2000 and is currently managing two ordnance and removal actions at the Seneca Army Depot in Romulus, New York, with a total budget of approximately $5 million. He managed an ordnance and explosives removal action with a budget of over $70,000 at the former Camp Bowie near Brownwood, Texas.

Mr. Curry has more than six years experience managing the EOD/SEAL/Diver Training Program for the U.S. Navy. In this capacity, Mr. Curry was responsible for overseeing the administration, operation, security, training, supply, and budget for the U.S. Navy High Risk Training Environment program, a high visibility program critical to U.S. Navy SEAL and EOD operations. Also, as the Manager for Water Survival/Physical Training, Mr. Curry was responsible for over 30 instructors. Mr. Curry was also responsible for managing the U.S. Navy Classified Material and Physical Security for the Western Pacific, in which he was responsible for the inspection and training in security awareness for over 15 commands. During five years as a Senior UXO Supervisor (SUXOS), Mr. Curry executed a number of project manager tasks, directing all UXO clearance activities, managing schedule and budget for field activities, and directing range operations. In addition, Mr. Curry was responsible for maintaining project documentation and submitting weekly progress reports for the projects. Mr. Curry has also been a UXO Safety Officer and a UXO Quality Control Specialist.

Mr. Curry has a total of five years civilian UXO experience and more than 13 years military EOD experience.

CIVILIAN UXO EXPERIENCE

06/00 – 07/00	SUDHAKAR Company, **UXO QC**, Crab Orchard, Marion, IL
03/00 – 04/00	Parsons Engineering Science, **UXO SO**, Camp Stanley, San Antonio, TX
01/00 – 03/00	Parsons Engineering Science, **UXO SO**, Camp Ellis, Ipava, IL

05/99 – 10/99	HFA, Inc., **QC**, Camp Grant, IL. TO#000032
04/99 – 05/99	HFA, Inc., **UXO Supervisor**, Duck, NC. TO#NC0033.
02/98 – 02/99	HFA, Inc., **SUXOS**, East Elliott, CA. TO#CA0020.
05/98	HFA, Inc., **SUXOS**, Assateague National SeaShore, MD. TO#MD0026.
02/98 – 04/98	HFA, Inc., **SUXOS**, East Elliott, CA. TO#CA0020.
07/97 – 11/97	HFA, Inc., **SUXOS**, Plattsburgh, NY. TO#NY0006.
06/97 – 07/97	HFA, Inc., **SUXOS**, Blossom Point, MD. TO#MD0008.
05/97 – 06/97	HFA, Inc., **QC**, Plattsburgh, NY. TO#NY0006.
04/97	HFA, Inc., **QC**, Camp Green, NC. TO#NC0021.
4/96 – 03/97	HFA, Inc., **QC**, Fort Meade, MD. TO#MD0008.
06/96 – 11/96	HFA, Inc., **UXO Supervisor**, Fort Meade, MD. TO#MD0008.
04/96 – 06/96	HFA, Inc., **UXO Specialist**, Fort Meade, MD. TO#MD0008.
09/95 – 02/96	UXB, **UXO Supervisor**, Kaho'olawe Island Model Cleanup.
05/95 – 08/95	UXB, **UXO Specialist** for Fort Bliss, TX. for OE removal.

MILITARY EOD EXPERIENCE

06/92 – 03/95 **Recruit Training Command, Orlando, FL** Responsible for interviewing and screening Personnel into the various dive programs. Managed a team of over 30 instructors responsible for water survival/physical training in a high risk training environment. Developed curriculum for use in High Risk Training.

12/88- 05/92 **COMEODGRU ONE, NAB Coronado, CA.** Senior Enlisted Inspector for Classified Material and Physical Security for the Western Pacific, Explosive Ordnance Disposal Forces. Responsible for the inspection and training in security awareness for over 15 commands. Reviewed and updated the inspection guide and numerous directives used for Command Inspections. Graded readiness exercises, which evaluated unit's ability to perform assigned missions within the EOD Community.

07/87 – 12/88 **EODMU Five, Philippines.** Deployed to the Persian Gulf in support of Operation Earnest Will. Conducted mine clearance operations and disposed of ordnance from a downed helicopter.

12/85- 07/87 **EODGRU One Detachment WESTPAC, Philippines.** Supervised clearances and burn operations.

10/84 – 10/85 **EODTEU ONE, Barbers Point, HI.** Range Safety Supervisor on training unit's demolition ranges.

03/82 – 10/84 **EODMU ONE, Barbers Point, HI.** EOD Team member on deployments to western Pacific, providing EOD services. Conducted range clearance operations on the island of Kaho'olawe.

ANDREW L. BRYSON, JR.
PROGRAM HEALTH AND SAFETY OFFICER

CITIZENSHIP	USA
CERTIFIED INDUSTRIAL HYGIENIST	1993
MASTER OF PUBLIC HEALTH, OCCUPATIONAL & ENVIRONMENTAL HEALTH & SAFETY	1991

EDUCATION/TRAINING

- Certified Industrial Hygienist, American Board of Industrial Hygiene (1993)
- OSHA 40 Hour Hazardous Waste Operations, Emergency Response Course and Annual Refresher (1991/92/93/94/95/96)
- OSHA 8 Hour Hazardous Waste and Emergency Response Supervisor Course (1991)
- First Aid/CPR with Annual CPR Refresher (1993/94/95)
- Master of Public Health, Occupational & Environmental Health and Safety, University of Tennessee (1991)
- NIOSH Sampling and Evaluating Airborne Asbestos Dust (1991)
- Supervision of Asbestos Abatement Projects (1989/90)
- Inspection of Buildings and Asbestos-Containing Materials (1990)
- Bachelor of Arts, Organismal and Systems Biology, University of Tennessee (1983)

EXPERIENCE SUMMARY

A Certified Industrial Hygienist, Mr. Bryson has over eight years of experience in the multi-disciplinary field of Occupational Safety and Health. Mr. Bryson currently serves as the Occupational Safety and Health Manager for EOD Technology, Inc. where he develops and implements EODT's Corporate safety and health policies, procedures and programs. Mr. Bryson maintains, updates and implements the EODT Corporate Safety and Health Program (CSHP); develops and presents OSHA required safety, health, hazardous waste and emergency response training courses and provides occupational safety and health consultation to EODT management and on-site personnel who investigate and remediate sites contaminated with hazardous, toxic, and radiological waste (HTRW), unexploded ordnance (UXO), ordnance and explosive waste (OEW) and Chemical Warfare Material (CWM). Mr. Bryson has considerable experience researching and developing Site Safety and Health Plans (SSHPs) for HTRW, OEW and CWM sites. Conducts on-site occupational safety and health audits to ensure EODT's continued compliance with applicable Federal, state, and local safety and health regulations. His qualifications also include a thorough knowledge of the safety and health requirements mandated by OSHA, ANSI, EPA, DOE, and US Army standards and regulations.

Through his current and previous employment, Mr. Bryson has gained extensive experience providing industrial hygiene and industrial safety consultation and management services. This experience includes:

- Developing and presenting OSHA required training programs;
- Conducting site and facility assessments involving the anticipation, recognition, evaluation, and control of process and work place safety and health hazards; and
- Utilizing direct-reading real-time instruments and integrated sampling to assess personnel exposed to chemical and physical hazards.

PROFESSIONAL EXPERIENCE

Assistant Safety and Health Manager - UXO/OEW/CWM Project - Former American University, Washington D.C.

- Provided health and safety consultation to the Site Safety and Health Officer and project management personnel, and acted as the EODT liaison with the Corps of Engineers, Huntsville Division health and safety staff.
- Integral in developing the project Safety, Health and Emergency Response Plan (SHERP).
- Developed and presented site-specific training related to hazards associated with CWM, HTRW and operational hazards.
- Conducted periodic audits of the site facilities and operations and ensured the safe and healthful conduct of site operations and EODT's continued compliance with OSHA, USACE, and Army regulations.
- Identified and successfully applied cost effective, commercially available, real-time monitoring instruments capable of detecting various chemical warfare agents at levels significantly lower than instruments being used by the military at that time.

Assistant Safety and Health Manager - Area 5 Former Raritan Arsenal, NJ

This site was a confirmed CWM burial and disposal site where EODT characterized and determined the type and extent of CWM contamination. Mr. Bryson:

- Developed the site SHERP, which involved the integration and use of both government-provided and commercially available CWM monitoring to allow for the safe detection of CWM in both the work area and at the site perimeter.
- Provided safety and health consultation and periodic on-site support to the SSHO, and maintained frequent communication with the USACE safety and health staff personnel.

Occupational Safety and Health Manager - Title I and II Services, Southeastern U.S.

This project involved the assessment, investigation and remediation of UXO/OEW contamination at over 17 sites throughout the Southeastern United States and Puerto Rico. While UXO/OEW has been the primary contaminant on these sites, several of the sites have been identified by the USACE as being potential CWM sites as well. Developed the SSHPs for each site. Through site inspections and frequent communication with the SSHOs, Mr. Bryson implemented EODT, OSHA and USACE safety and health requirements during site operations.

Occupational Safety and Health Manager - Drum and Cylinder Sampling, Elmendorf AFB, Anchorage, AK. This project presented significant operational challenges. Drum and cylinder sampling involved collecting samples from 55-gallon steel drums, and five unlabeled high pressure gas cylinders. X-ray and physical examination of the drums revealed concrete-encapsulated storage containers inside the drums. Drums had a piece of plywood imbedded in the concrete labeled "DANGER CYANIDE". Mr. Bryson developed the SSHP and Site Sampling and Monitoring Plan involving the selection of work practice controls and personal protective equipment (PPE) to ensure the health and safety of both on- and off-site personnel.

Demonstration Project for Debris Separation, Open Burn Areas, Savanna Army Depot

EODT, under subcontract to an engineering firm, had a significant role in the performance of this demonstration project for the USACE Nashville District. This project's goal was to gain information to aid in the future remedial designs of other similarly contaminated sites.

- Used advanced sifting technology to remove UXO/OEW debris from over 15,700 cubic yards of soil

contaminated with heavy metals and organic contaminants, with the potential for encountering CWM. EODT site personnel performed extensive site clearing, then constructed support facilities and an environmental enclosure for the sifting operations.

- EODT personnel also conducted the set-up and testing of the sifters, and conducted excavation and sifting operations.
- Developed the project SSHP, which involved the design and assignment of the engineering controls, work practice controls, PPE, real-time monitoring and integrated sampling which resulted in the successful protection of site personnel from the numerous site safety and health hazards.
- Provided consultation and trouble-shooting to the EODT SSO and ensured implementation of all relevant safety and health regulations.

STEPHEN C. VOLAND
PROGRAM QUALITY ASSURANCE/QUALITY CONTROL SPECIALIST
UXO DATABASE # 0061

CITIZENSHIP	**USA**
GRADUATED FROM INDIAN HEAD	**June 15, 1988**
MILITARY EOD EXPERIENCE	**7.83 Years**
COMMERCIAL UXO EXPERIENCE	**6.25 Years**

EDUCATION/TRAINING

- BS Business Administration, Regents College, New York, NY
- Emergency Medical Technician, Belleville Area College, Granite City, IL
- EOD Specialist, Redstone Arsenal (1985) Refreshers (86,87,90,91,93)
- Combat Lifesaver/First Responder (1986)
- Advanced Access and Disablement, Indian Head, Maryland (1989) Refresher (1990)
- Army Advanced EOD Course, Scandia National Lab, Albuquerque, NM (1990)
- Asbestos Awareness (1996)
- 8 Hours Hazardous Materials Transportation (1996)
- 8 Hour Hazardous Waste Refresher (1996)
- 8 Hour OSHA Refresher Training (1999)
- 8 Hour Hazardous Waste Supervisor Training (1995)

CIVILIAN UXO EXPERIENCE

08/99-Present Quality Control Manager, EODT, 2229 Old Highway 95, Lenoir City, TN 37771 Perform site audits on all active sites and administers EODT's Quality Assurance Program.

01/99-08/99 QC Specialist, EODT, Panama Canal, Republic of Panama-range clearance.

02/98-12/98 QC Specialist, EODT, Gaillard Cut Widening Program, Panama Canal, Republic of Panama-range clearance.

01/98-02/98 QC Specialist, EODT, Southwest Proving Ground, Hope, AR. UXO clearance.

02/97-12/97 HFA, Inc. SSO/QCO Morgan Depot, NJ, DO #0016. UXO clearance.

01/97-02/97 HFA, Inc. SSO/QCO Paris, Texas. Range clearance.

10/96-01/97 HFA, Inc., SSO for Morgan Depot, NJ, DO#016. UXO clearance.

08/96-10/96 HFA, Inc. UXO Supervisor, Deleware Water Gap, PA. Minisink Island Flare removal.

05/96-08/96 HFA, Inc. QCO, Ft. Devens, MA. UXO Clearance golf course and housing area.

01/96-03/96	HFA, Inc. UXO Specialist, Dupont Plant, Pompton Plains, NJ. Military blasting cap recovery and disposal. Escort asbestos abatement contractor in disposal area.
05/95-12/95	HFA, Inc. UXO Specialist / Supervisor, Ft. Devens, MA. UXO sampling and EECA.
01/95-04/95	HFA, Inc. UXO Specialist, Dupont Plant, Pompton Plains, NJ. Military blasting cap recovery and disposal.
09/94-11/94	HFA, Inc. UXO Specialist, Ft. Sill, OK. Clearance of Bateman Woods.
08/94	HFA, Inc. UXO Specialist, Pueblo Depot Activity, Driller Escort
07/94	HFA, Inc. UXO Specialist, Ft. Sill, OK. Clearance of Rocket Pond.
04/94-06/94	HFA, Inc. UXO Specialist, Ft. Ord, CA. Clearance of CSU footprint.
02/94-04/94	HFA, Inc. UXO Specialist, Ft. Sill, OK. Clearance of Rocket Pond.
09/93-01/94	HFA, Inc. UXO Specialist, Pueblo Depot Activity, Driller Escort

MILITARY EOD EXPERIENCE

09/92-09/93	EOD Team Leader - Fort Bliss, Texas. In charge of 6 EOD Specialist, responsible for the detection, identification and rendering safe of Explosive Ordnance items in West Texas and the state of New Mexico, with temporary duty in Kuwait.
08/91-08/92	EOD Team Leader - Camp Red Cloud, South Korea. Supervised 6 EOD Specialists and 15 support personnel performing detection, identification and render safe of explosive ordnance items in the entire country.
06/87-08/91	EOD Team Leader - Charles Melvin Price Support Center, Granite City, IL. Supervised 8 EOD Specialists during operations in the entire Mid-West with emphasis on Special improvised Explosive Devices and nuclear Emergency Search Team support.
12/85-06/87	EOD Specialist - Fort Leonard Wood, Missouri. Involved in 4 range clearances in the state of Missouri and the southern portion of Iowa..

APPENDIX F
SSHP APPROVAL

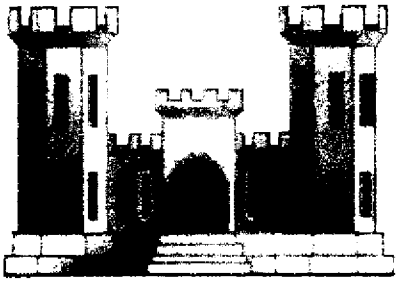
FOR THE

ORDNANCE AND EXPLOSIVES REMOVAL ACTIONS

SECTORS 2, 4 AND 5
FORMER BENICIA ARSENAL, BENICIA, CA

Prepared For:

Contracting Agency:
U.S. Army Engineering & Support Center, Huntsville, Alabama



Geographical Corps District:
US Army Corps of Engineers, Sacramento District

Contract Number: DACA87-97-D-0005
Task Order: 0019
Project Number: W31RYO-0152-68912

Prepared By:

EODT
TECHNOLOGY, INC.

2229 Old Highway 95
Lenoir City, Tennessee 37771

July 2000

SITE SAFETY AND HEALTH PLAN APPROVAL

Project: Ordnance and Explosives Clearance

Site: Sectors 2, 4 and 5 **Site Location:** Former Benicia Arsenal
Benicia, California

Contract Number: DACA87-97-D-0005 **Task Order Number:** 0019

The Site Safety and Health Plan (SSHP) presented as Chapter 6 of this Work Plan was developed for the U.S. Army Engineering and Support Center, Huntsville (CEHNC) in support of the Scope of Work for the above referenced Task Order. The signatures provided below indicate that the SSHP has been reviewed by the referenced EODT personnel and approved for implementation at the above referenced project site once EODT has received Work Plan approval from the CEHNC Contracting Officer. Changes to this SSHP will be provided in writing by EODT to the CEHNC Contracting Officer for approval. On-site implementation of changes may be initiated prior to inclusion of the formal written changes if documented approval is provided to EODT by the CEHNC On-site Safety Specialist.

Reviewed by: Phil Curry Date: 7/27/00
Phil Curry
Project Manager

Prepared and
Approved by: Date: 7/27/00
Drew Bryson, CIH, MPH
Occupational Safety and Health Manager

APPENDIX G
CERTIFICATION OF TASK HAZARD ASSESSMENT FORMS

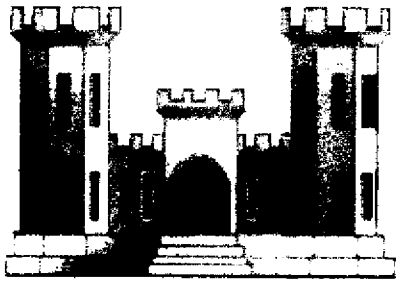
FOR THE

ORDNANCE AND EXPLOSIVES REMOVAL ACTIONS

SECTORS 2, 4 AND 5
FORMER BENICIA ARSENAL, BENICIA, CA

Prepared For:

Contracting Agency:
U.S. Army Engineering & Support Center, Huntsville, Alabama



Geographical Corps District:
US Army Corps of Engineers, Sacramento District

Contract Number: DACA87-97-D-0005
Task Order: 0019
Project Number: W31RYO-0152-68912

Prepared By:

EODT
EOD TECHNOLOGY, INC.

2229 Old Highway 95
Lenoir City, Tennessee 37771

July 2000

TABLE OF CONTENTS

CERTIFICATION OF TASK HAZARD ASSESSMENT

TASK NAME: Field Office / Site Set-up and Close Out **DATE:** 27 July 2000

1.0 Hazard Identification: Items checked are known or anticipated site hazards, or may occur as a result of site operations.

☒ Physical exertion	☒ Lifting hazards	☐ Confined space
☐ Heat Stress (Late Spring - Fall)	☒ Slip, trip or fall	☒ Hazardous plants
☒ Cold Stress (Fall - Early Spring)	☐ High noise (>85 dBA)	☐ Hazardous wildlife (Spring - Fall
☐ Heavy equipment operations	☐ Overhead utilities	☒ Ultraviolet radiation (strong sunlight)
☒ Vehicle traffic in work area(s)	☐ Underground utilities	☒ Hand/Power Tool use
☒ Fire hazards (underline)	☐ Intrusive activity (underline)	☒ Rocky/Steep slopes
• Gasoline/Diesel use	• Soil drilling	☒ Skin contact w/ hazardous materials
• Explosives handling/storage	• Soil excavation	☒ Ordnance and explosives
• Explosive gases/vapors	• Setting stakes/rods/monuments	☒ Cut/Puncture from sharp objects

2.0 Degree of Hazard: Anticipated degree of hazard, based on the hazards associated with this task.

Chemical Hazard:	☒ Low	☐ Serious	**Phys./Bio. Hazard:**	☐ Low	☐ Serious
	☐ Moderate	☐ Unknown		☒ Moderate	☐ Unknown

3.0 Control or Protective Measures: Items checked will be used to control or mitigate the above mentioned hazards.

☒ Tailgate Safety Briefing	☒ Personal protective equipment	☐ Decontamination
☒ Specialized Training	☐ Air Monitoring	☒ Magnetometer Survey
☒ Safe Work Practices	☒ Site Control Zones	

☒ Engineering Controls: Tools with manufacturer-supplied guards will be used with guards in place.

☒ Applicable SOPs/Programs: Cold Stress, and the SSHP.

☐ Other:

4.0 Task PPE: PPE has been assigned based on the potential for exposure as identified by this hazard assessment.

Level of Protection	☐ A ☐ B	☐ C ☒ D	☐ Modified
Respiratory Protection	☐ SCBA ☐ Escape SCBA - Size	☐ Full face respirator ☐ ½ Face respirator	☐ Cartridge - Type ☒ No respirator required
Protective Clothing	☐ Fully encapsulating suit ☐ Standard Tyvek	☐ Saranex ☐ PE Tyvek	☒ Company clothing ☐ Other:
Gloves (specify inner/outer)	☒ Nitrile ★ ☐ Butyl	☐ Neoprene ☐ Latex	☒ Leather ☐ Cotton
Head/Face/Eye/Ear Protection	☒ Safety glasses† ☒ Ear plugs/muffs !!	☐ Safety goggles ☐ Face shield	☒ Hard hat ✦ ☐ Other:
Foot/Leg Protection	☒ Work boots ☐ Steel-toed leather boots	☐ Steel foot covers ☐ Snake leggings ♪	☐ Chemical over boots

5.0 Modifications Required: ★ - Nitrile gloves only required when handling liquids containing hazardous materials/substances. † - Safety glasses required if an eye hazard exists, to include UV hazard; !! - Ear plugs or muffs required for noise levels above 85 dBA, 8-hour TWA; ✦ - Hard hats required if an overhead hazard exists or when working around heavy equipment; ♪ - Snake leggings required in areas where snakes may be present, as prescribed by the UXOSO.

6.0 Certification: The PPE and other control methods and procedures to be used in the conduct of this task have been selected as a result of a hazard assessment conducted by individual identified below.

Printed Name: Drew Bryson, CIH, MPH **Signature:**

CERTIFICATION OF TASK HAZARD ASSESSMENT

TASK NAME: Location Surveying and Mapping **DATE:** 27 July 2000

1.0 Hazard Identification: Items checked are known or anticipated site hazards, or may occur as a result of site operations.

☒ Physical exertion	☒ Lifting hazards	☐ Confined space
☐ Heat Stress (Late Spring - Fall)	☒ Slip, trip or fall	☒ Hazardous plants
☒ Cold Stress (Fall - Early Spring)	☐ High noise (>85 dBA)	☐ Hazardous wildlife (Spring - Fall
☐ Heavy equipment operations	☐ Overhead utilities	☒ Ultraviolet radiation (strong sunlight)
☒ Vehicle traffic in work area(s)	☐ Underground utilities	☒ Hand/Power Tool use
☐ Fire hazards (underline)	☒ Intrusive activity (underline)	☒ Rocky/Steep slopes
• Gasoline/Diesel use	• Soil drilling	☒ Skin contact w/ hazardous materials
• Explosives handling/storage	• Soil excavation	☒ Ordnance and explosives
• Explosive gases/vapors	• Setting stakes/rods/monuments	☒ Cut/Puncture from sharp objects

2.0 Degree of Hazard: Anticipated degree of hazard, based on the hazards associated with this task.

Chemical Hazard: ☒ Low ☐ Serious ☐ Moderate ☐ Unknown **Phys./Bio. Hazard:** ☐ Low ☐ Serious ☒ Moderate ☐ Unknown

3.0 Control or Protective Measures: Items checked will be used to control or mitigate the above mentioned hazards.

☒ Tailgate Safety Briefing	☒ Personal protective equipment	☐ Decontamination
☒ Specialized Training	☐ Air Monitoring	☒ Magnetometer Survey
☒ Safe Work Practices	☒ Site Control Zones	

☒ Engineering Controls: Tools with manufacturer-supplied guards will be used with guards in place.

☒ Applicable SOPs/Programs: Cold Stress, and the SSHP.

☒ Other: Locations where stakes or monuments are to be placed will be checked with a magnetometer to ensure the location is free of anomalies.

4.0 Task PPE: PPE has been assigned based on the potential for exposure as identified by this hazard assessment.

Level of Protection	☐ A ☐ B	☐ C ☒ D	☐ Modified
Respiratory Protection	☐ SCBA ☐ Escape SCBA - Size	☐ Full face respirator ☐ ½ Face respirator	☐ Cartridge - Type ☒ No respirator required
Protective Clothing	☐ Fully encapsulating suit ☐ Standard Tyvek	☐ Saranex ☐ PE Tyvek	☒ Company clothing ☐ Other:
Gloves (specify inner/outer)	☐ Nitrile ☐ Butyl	☐ Neoprene ☐ Latex	☒ Leather ☐ Cotton
Head/Face/Eye/Ear Protection	☒ Safety glasses† ☐ Ear plugs/muffs	☐ Safety goggles ☐ Face shield	☐ Hard hat ☐ Other:
Foot/Leg Protection	☒ Work boots ☐ Steel-toed leather boots	☐ Steel foot covers ☐ Snake leggings	☐ Chemical over boots

5.0 Modifications Required: † - Safety glasses required if an eye hazard exists, to include UV hazard;

6.0 Certification: The PPE and other control methods and procedures to be used in the conduct of this task have been selected as a result of a hazard assessment conducted by individual identified below.

Printed Name: Drew Bryson, CIH, MPH **Signature:**

CERTIFICATION OF TASK HAZARD ASSESSMENT

TASK NAME: Vegetation Removal Using Fuel-powered Brush Cutters or Chainsaws **DATE:** 27 July 2000

1.0 Hazard Identification: Items checked are known or anticipated site hazards, or may occur as a result of site operations.

☒ Physical exertion	☒ Lifting hazards	☐ Confined space
☐ Heat Stress (Late Spring - Fall)	☒ Slip, trip or fall	☒ Hazardous plants
☒ Cold Stress (Fall - Early Spring)	☒ High noise (>85 dBA)	☐ Hazardous wildlife (Spring - Fall
☐ Heavy equipment operations	☐ Overhead utilities	☒ Ultraviolet radiation (strong sunlight)
☒ Vehicle traffic in work area(s)	☐ Underground utilities	☒ Hand/Power Tool use
☒ Fire hazards (underline)	☐ Intrusive activity (underline)	☒ Rocky/Steep slopes
• Gasoline/Diesel use	• Soil drilling	☒ Skin contact w/ hazardous materials
• Explosives handling/storage	• Soil excavation	☒ Ordnance and explosives
• Explosive gases/vapors	• Setting stakes/rods/monuments	☒ Cut/Puncture from sharp objects

2.0 Degree of Hazard: Anticipated degree of hazard, based on the hazards associated with this task.

Chemical Hazard: ☒ Low ☐ Serious ☐ Moderate ☐ Unknown **Phys./Bio. Hazard:** ☐ Low ☐ Serious ☒ Moderate ☐ Unknown

3.0 Control or Protective Measures: Items checked will be used to control or mitigate the above mentioned hazards.

☒ Tailgate Safety Briefing	☒ Personal protective equipment	☐ Decontamination
☒ Specialized Training	☐ Air Monitoring	☐ Magnetometer Survey
☒ Safe Work Practices	☒ Site Control Zones	

☒ Engineering Controls: Tools with manufacturer-supplied guards will be used with guards in place.

☒ Applicable SOPs/Programs: Cold Stress, and the SSHP.

☒ Other: Vegetation will be removed down to within six inches of the surface to allow for the effective use of magnetometers. Either chaps or snake leggings will be worn by personnel operating the bladed brush cutters.

4.0 Task PPE: PPE has been assigned based on the potential for exposure as identified by this hazard assessment.

Level of Protection	☐ A ☐ B	☐ C ☒ D	☐ Modified
Respiratory Protection	☐ SCBA ☐ Escape SCBA - Size	☐ Full face respirator ☐ ½ Face respirator	☐ Cartridge - Type ☒ No respirator required
Protective Clothing	☐ Fully encapsulating suit ☐ Standard Tyvek	☐ Saranex ☐ PE Tyvek	☒ Company clothing ☐ Other:
Gloves (specify inner/outer)	☒ Nitrile ★ ☐ Butyl	☐ Neoprene ☐ Latex	☒ Leather ☐ Cotton
Head/Face/Eye/Ear Protection	☒ Safety glasses ☒ Ear plugs and ear muffs	☐ Safety goggles ☒ Face shield	☒ Hard hat ☐ Other:
Foot/Leg Protection	[†] Work boots [†] Steel-toed leather boots	[†] Steel toe covers ☒ Snake leggings ✦	☐ Chemical over boots ☒ Kevlar™ Chaps ✶

5.0 Modifications Required: ★ - Nitrile gloves only required when handling fuels or other liquids containing hazardous materials/substances. ✶ - Kevlar™ chaps and either steel-toed boots or steel toe covers are required for chainsaw use; ✦ - Snake leggings will be worn by personnel operating bladed brush cutters to protect the lower leg from flying debris.

6.0 Certification: The PPE and other control methods and procedures to be used in the conduct of this task have been selected as a result of a hazard assessment conducted by individual identified below.

Printed Name: Drew Bryson, CIH, MPH **Signature:**

CERTIFICATION OF TASK HAZARD ASSESSMENT

TASK NAME: Vegetation Restoration

DATE: 27 July 2000

1.0 Hazard Identification: Items checked are known or anticipated site hazards, or may occur as a result of site operations.

☒ Physical exertion	☒ Lifting hazards	☐ Confined space
☐ Heat Stress (Late Spring - Fall)	☒ Slip, trip or fall	☒ Hazardous plants
☒ Cold Stress (Fall - Early Spring)	☐ High noise (>85 dBA)	☐ Hazardous wildlife (Spring - Fall
☐ Heavy equipment operations	☐ Overhead utilities	☒ Ultraviolet radiation (strong sunlight)
☒ Vehicle traffic in work area(s)	☐ Underground utilities	☒ Hand/Power Tool use
☐ Fire hazards (underline)	☐ Intrusive activity (underline)	☒ Rocky/Steep slopes
• Gasoline/Diesel use	• Soil drilling	☐ Skin contact w/ hazardous materials
• Explosives handling/storage	• Soil excavation	☐ Ordnance and explosives
• Explosive gases/vapors	• Setting stakes/rods/monuments	☐ Cut/Puncture from sharp objects

2.0 Degree of Hazard: Anticipated degree of hazard, based on the hazards associated with this task.

Chemical Hazard:	☒ Low	☐ Serious	**Phys./Bio. Hazard:**	☒ Low	☐ Serious
	☐ Moderate	☐ Unknown		☐ Moderate	☐ Unknown

3.0 Control or Protective Measures: Items checked will be used to control or mitigate the above mentioned hazards.

☒ Tailgate Safety Briefing	☒ Personal protective equipment	☐ Decontamination
☒ Specialized Training	☐ Air Monitoring	☐ Magnetometer Survey
☒ Safe Work Practices	☒ Site Control Zones	

☐ Engineering Controls:.

☒ Applicable SOPs/Programs: Cold Stress, Heavy Equipment Operations (if EMM is used), and the SSHP.

☒ Other: Investigation holes and demolition holes will be backfilled to grade by hand using shovels and rakes unless the hole is large in which case the hole may be backfilled using EMM. If EMM is used, a safety observer will be stationed near by and all personnel will remain clear of the EMM during operations. EMM operator will be trained in the proper use, inspection and maintenance of the EMM.

4.0 Task PPE: PPE has been assigned based on the potential for exposure as identified by this hazard assessment.

Level of Protection	☐ A ☐ B	☐ C ☒ D	☐ Modified
Respiratory Protection	☐ SCBA ☐ Escape SCBA - Size	☐ Full face respirator ☐ ½ Face respirator	☐ Cartridge - Type ☒ No respirator required
Protective Clothing	☐ Fully encapsulating suit ☐ Standard Tyvek	☐ Saranex ☐ PE Tyvek	☒ Company clothing ☐ Other:
Gloves (specify inner/outer)	☐ Nitrile ☐ Butyl	☐ Neoprene ☐ Latex	☒ Leather ☐ Cotton
Head/Face/Eye/Ear Protection	☒ Safety glasses† [!!] Ear plugs/muffs	☐ Safety goggles ☐ Face shield	[!!] Hard hat ☐ Other:
Foot/Leg Protection	☒ Work boots ☐ Steel-toed leather boots	☐ Steel foot covers ☐ Snake leggings	☐ Chemical over boots

5.0 Modifications Required: † - Safety glasses required if an eye hazard exists, to include UV hazard; !! - Ear plugs/muffs may be required for high noise if EMM is used. Hard hat will be worn by EMM operator and anyone working near the EMM.

6.0 Certification: The PPE and other control methods and procedures to be used in the conduct of this task have been selected as a result of a hazard assessment conducted by individual identified below.

Printed Name: Drew Bryson, CIH, MPH **Signature:**

CERTIFICATION OF TASK HAZARD ASSESSMENT

TASK NAME: Geophysical Investigation Prove-out **DATE:** 27 July 2000

1.0 Hazard Identification: Items checked are known or anticipated site hazards, or may occur as a result of site operations.

☒ Physical exertion	☒ Lifting hazards	☐ Confined space
☐ Heat Stress (Late Spring - Fall)	☒ Slip, trip or fall	☒ Hazardous plants
☒ Cold Stress (Fall - Early Spring)	☐ High noise (>85 dBA)	☐ Hazardous wildlife (Spring - Fall
☐ Heavy equipment operations	☐ Overhead utilities	☒ Ultraviolet radiation (strong sunlight)
☒ Vehicle traffic in work area(s)	☐ Underground utilities	☒ Hand/Power Tool use
☐ Fire hazards (underline)	☒ Intrusive activity (underline)	☐ Rocky/Steep slopes
• Gasoline/Diesel use	• Soil drilling	☒ Skin contact w/ hazardous materials
• Explosives handling/storage	• Soil excavation	☐ Ordnance and explosives
• Explosive gases/vapors	• Setting stakes/rods/monuments	☐ Cut/Puncture from sharp objects

2.0 Degree of Hazard: Anticipated degree of hazard, based on the hazards associated with this task.

Chemical Hazard: ☒ Low ☐ Serious ☐ Moderate ☐ Unknown **Phys./Bio. Hazard:** ☒ Low ☐ Serious ☐ Moderate ☐ Unknown

3.0 Control or Protective Measures: Items checked will be used to control or mitigate the above mentioned hazards.

☒ Tailgate Safety Briefing	☒ Personal protective equipment	☐ Decontamination
☒ Specialized Training	☐ Air Monitoring	☒ Magnetometer Survey
☒ Safe Work Practices	☒ Site Control Zones	

☐ Engineering Controls:

☒ Applicable SOPs/Programs: Cold Stress, and the SSHP.

☐ Other:

4.0 Task PPE: PPE has been assigned based on the potential for exposure as identified by this hazard assessment.

Level of Protection	☐ A ☐ B	☐ C ☒ D	☐ Modified
Respiratory Protection	☐ SCBA ☐ Escape SCBA - Size	☐ Full face respirator ☐ ½ Face respirator	☐ Cartridge - Type ☒ No respirator required
Protective Clothing	☐ Fully encapsulating suit ☐ Standard Tyvek	☐ Saranex ☐ PE Tyvek	☒ Company clothing ☐ Other:
Gloves (specify inner/outer)	☐ Nitrile ☐ Butyl	☐ Neoprene ☐ Latex	☒ Leather ☐ Cotton
Head/Face/Eye/Ear Protection	☒ Safety glasses† ☐ Ear plugs/muffs	☐ Safety goggles ☐ Face shield	☐ Hard hat ☐ Other:
Foot/Leg Protection	☒ Work boots ☐ Steel-toed leather boots	☐ Steel foot covers ☐ Snake leggings	☐ Chemical over boots

5.0 Modifications Required: † - Safety glasses for protection from UV hazards may be required on days of bright sunlight.

6.0 Certification: The PPE and other control methods and procedures to be used in the conduct of this task have been selected as a result of a hazard assessment conducted by individual identified below.

Printed Name: Drew Bryson, CIH, MPH **Signature:**

CERTIFICATION OF TASK HAZARD ASSESSMENT

TASK NAME: Geophysical Surveying and Mapping Investigations **DATE:** 27 July 2000

1.0 Hazard Identification: Items checked are known or anticipated site hazards, or may occur as a result of site operations.

☒ Physical exertion	☒ Lifting hazards	☐ Confined space
☐ Heat Stress (Late Spring - Fall)	☒ Slip, trip or fall	☒ Hazardous plants
☒ Cold Stress (Fall - Early Spring)	☐ High noise (>85 dBA)	☐ Hazardous wildlife (Spring - Fall
☐ Heavy equipment operations	☐ Overhead utilities	☒ Ultraviolet radiation (strong sunlight)
☒ Vehicle traffic in work area(s)	☐ Underground utilities	☒ Hand/Power Tool use
☐ Fire hazards (underline)	☒ Intrusive activity (underline)	☐ Rocky/Steep slopes
• Gasoline/Diesel use	• Soil drilling	☒ Skin contact w/ hazardous materials
• Explosives handling/storage	• Soil excavation	☒ Ordnance and explosives
• Explosive gases/vapors	• Setting stakes/rods/monuments	☒ Cut/Puncture from sharp objects

2.0 Degree of Hazard: Anticipated degree of hazard, based on the hazards associated with this task.

Chemical Hazard:	☒ Low	☐ Serious	**Phys./Bio. Hazard:**	☐ Low	☐ Serious
	☐ Moderate	☐ Unknown		☒ Moderate	☐ Unknown

3.0 Control or Protective Measures: Items checked will be used to control or mitigate the above mentioned hazards.

☒ Tailgate Safety Briefing	☒ Personal protective equipment	☐ Decontamination
☒ Specialized Training	☐ Air Monitoring	☒ Escort by UXO personnel
☒ Safe Work Practices	☒ Site Control Zones	

☐ Engineering Controls:

☒ Applicable SOPs/Programs: Cold Stress, and the SSHP.

☐ Other:

4.0 Task PPE: PPE has been assigned based on the potential for exposure as identified by this hazard assessment.

Level of Protection	☐ A ☐ B	☐ C ☒ D	☐ Modified
Respiratory Protection	☐ SCBA ☐ Escape SCBA - Size	☐ Full face respirator ☐ ½ Face respirator	☐ Cartridge - Type ☒ No respirator required
Protective Clothing	☐ Fully encapsulating suit ☐ Standard Tyvek	☐ Saranex ☐ PE Tyvek	☒ Company clothing ☐ Other:
Gloves (specify inner/outer)	☐ Nitrile ☐ Butyl	☐ Neoprene ☐ Latex	☒ Leather ☐ Cotton
Head/Face/Eye/Ear Protection	☒ Safety glasses† ☐ Ear plugs/muffs	☐ Safety goggles ☐ Face shield	☐ Hard hat ☐ Other:
Foot/Leg Protection	☒ Work boots ☐ Steel-toed leather boots	☐ Steel foot covers ☐ Snake leggings	☐ Chemical over boots

5.0 Modifications Required: † - Safety glasses for protection from UV hazards may be required on days of bright sunlight.

6.0 Certification: The PPE and other control methods and procedures to be used in the conduct of this task have been selected as a result of a hazard assessment conducted by individual identified below.

Printed Name: Drew Bryson, CIH, MPH **Signature:**

CERTIFICATION OF TASK HAZARD ASSESSMENT

TASK NAME: Anomaly Reacquisition **DATE:** 27 July 2000

1.0 Hazard Identification: Items checked are known or anticipated site hazards, or may occur as a result of site operations.

☒ Physical exertion	☒ Lifting hazards	☐ Confined space
☐ Heat Stress (Late Spring - Fall)	☒ Slip, trip or fall	☐ Hazardous plants
☒ Cold Stress (Fall - Early Spring)	☐ High noise (>85 dBA)	☐ Hazardous wildlife (Spring - Fall
☐ Heavy equipment operations	☐ Overhead utilities	☒ Ultraviolet radiation (strong sunlight)
☒ Vehicle traffic in work area(s)	☐ Underground utilities	☒ Hand/Power Tool use
☐ Fire hazards (underline)	☐ Intrusive activity (underline)	☐ Rocky/Steep slopes
• Gasoline/Diesel use	• Soil drilling	☐ Skin contact w/ hazardous materials
• Explosives handling/storage	• Soil excavation	☐ Ordnance and explosives
• Explosive gases/vapors	• Setting stakes/rods/monuments	☐ Cut/Puncture from sharp objects

2.0 Degree of Hazard: Anticipated degree of hazard, based on the hazards associated with this task.

Chemical Hazard:	☒ Low	☐ Serious	**Phys./Bio. Hazard:**	☒ Low	☐ Serious
	☐ Moderate	☐ Unknown		☐ Moderate	☐ Unknown

3.0 Control or Protective Measures: Items checked will be used to control or mitigate the above mentioned hazards.

☒ Tailgate Safety Briefing	☒ Personal protective equipment	☐ Decontamination
☒ Specialized Training	☐ Air Monitoring	☒ Magnetometer Survey
☒ Safe Work Practices	☒ Site Control Zones	

☐ Engineering Controls:

☒ Applicable SOPs/Programs: Cold Stress, and the SSHP.

☐ Other:

4.0 Task PPE: PPE has been assigned based on the potential for exposure as identified by this hazard assessment.

Level of Protection	☐ A ☐ B	☐ C ☒ D	☐ Modified
Respiratory Protection	☐ SCBA ☐ Escape SCBA - Size	☐ Full face respirator ☐ ½ Face respirator	☐ Cartridge - Type ☒ No respirator required
Protective Clothing	☐ Fully encapsulating suit ☐ Standard Tyvek	☐ Saranex ☐ PE Tyvek	☒ Company clothing ☐ Other:
Gloves (specify inner/outer)	☐ Nitrile ☐ Butyl	☐ Neoprene ☐ Latex	☒ Leather ☐ Cotton
Head/Face/Eye/Ear Protection	☒ Safety glasses† ☐ Ear plugs/muffs	☐ Safety goggles ☐ Face shield	☐ Hard hat ☐ Other:
Foot/Leg Protection	☒ Work boots ☐ Steel-toed leather boots	☐ Steel foot covers ☐ Snake leggings	☐ Chemical over boots

5.0 Modifications Required: † - Safety glasses for protection from UV hazards may be required on days of bright sunlight.

6.0 Certification: The PPE and other control methods and procedures to be used in the conduct of this task have been selected as a result of a hazard assessment conducted by individual identified below.

Printed Name: Drew Bryson, CIH, MPH **Signature:**

CERTIFICATION OF TASK HAZARD ASSESSMENT

TASK NAME: Clearance Actions (Surface) **DATE:** 27 July 2000

1.0 Hazard Identification: Items checked are known or anticipated site hazards, or may occur as a result of site operations.

☒ Physical exertion	☒ Lifting hazards	☐ Confined space
☐ Heat Stress (Late Spring - Fall)	☒ Slip, trip or fall	☒ Hazardous plants
☒ Cold Stress (Fall - Early Spring)	☐ High noise (>85 dBA)	☐ Hazardous wildlife (Spring - Fall
☐ Heavy equipment operations	☐ Overhead utilities	☒ Ultraviolet radiation (strong sunlight)
☐ Vehicle traffic in work area(s)	☐ Underground utilities	☒ Hand/Power Tool use
☐ Fire hazards (underline)	☒ Intrusive activity (underline)	☐ Rocky/Steep slopes
• Gasoline/Diesel use	• Soil drilling	☒ Skin contact w/ hazardous materials
• Explosives handling/storage	• Minor near surface excavation	☒ Ordnance and explosives
• Explosive gases/vapors	• Setting stakes/rods/monuments	☒ Cut/Puncture from sharp objects

2.0 Degree of Hazard: Anticipated degree of hazard, based on the hazards associated with this task.

Chemical Hazard:	☒ Low	☐ Serious	**Phys./Bio. Hazard:**	☐ Low	☐ Serious
	☐ Moderate	☐ Unknown		☒ Moderate	☐ Unknown

3.0 Control or Protective Measures: Items checked will be used to control or mitigate the above mentioned hazards.

☒ Tailgate Safety Briefing	☒ Personal protective equipment	☐ Decontamination
☒ Specialized Training	☐ Air Monitoring	☒ Magnetometer Survey
☒ Safe Work Practices	☒ Site Control Zones	

☐ Engineering Controls:

☒ Applicable SOPs/Programs: Cold Stress, and the SSHP.

☐ Other: Surface clearance operations will be magnetometer assisted

4.0 Task PPE: PPE has been assigned based on the potential for exposure as identified by this hazard assessment.

Level of Protection	☐ A ☐ B	☐ C ☒ D	☐ Modified
Respiratory Protection	☐ SCBA ☐ Escape SCBA - Size	☐ Full face respirator ☐ ½ Face respirator	☐ Cartridge - Type ☒ No respirator required
Protective Clothing	☐ Fully encapsulating suit ☐ Standard Tyvek	☐ Saranex ☐ PE Tyvek	☒ Company clothing ☐ Other:
Gloves (specify inner/outer)	☐ Nitrile ☐ Butyl	☐ Neoprene ☐ Latex	☒ Leather ☐ Cotton
Head/Face/Eye/Ear Protection	☒ Safety glasses† ☐ Ear plugs/muffs	☐ Safety goggles ☐ Face shield	☐ Hard hat ☐ Other:
Foot/Leg Protection	☒ Work boots ☐ Steel-toed leather boots	☐ Steel foot covers ☐ Snake leggings	☐ Chemical over boots

5.0 Modifications Required: † - Safety glasses for protection from UV hazards may be required on days of bright sunlight.

6.0 Certification: The PPE and other control methods and procedures to be used in the conduct of this task have been selected as a result of a hazard assessment conducted by individual identified below.

Printed Name: Drew Bryson, CIH, MPH **Signature:**

CERTIFICATION OF TASK HAZARD ASSESSMENT

TASK NAME: Clearance Actions (Subsurface) **DATE:** 27 July 2000

1.0 Hazard Identification: Items checked are known or anticipated site hazards, or may occur as a result of site operations.

☒ Physical exertion	☒ Lifting hazards	☐ Confined space
☐ Heat Stress (Late Spring - Fall)	☒ Slip, trip or fall	☒ Hazardous plants
☒ Cold Stress (Fall - Early Spring)	☐ High noise (>85 dBA)	☐ Hazardous wildlife (Spring - Fall
☒ Heavy equipment operations	☐ Overhead utilities	☒ Ultraviolet radiation (strong sunlight)
☐ Vehicle traffic in work area(s)	☐ Underground utilities	☒ Hand/Power Tool use
☐ Fire hazards (underline)	☒ Intrusive activity (underline)	☐ Rocky/Steep slopes
• Gasoline/Diesel use	• Soil drilling	☒ Skin contact w/ hazardous materials
• Explosives handling/storage	• Soil excavation	☒ Ordnance and explosives
• Explosive gases/vapors	• Setting stakes/rods/monuments	☒ Cut/Puncture from sharp objects

2.0 Degree of Hazard: Anticipated degree of hazard, based on the hazards associated with this task.

Chemical Hazard:	☒ Low	☐ Serious	**Phys./Bio. Hazard:**	☐ Low	☐ Serious
	☐ Moderate	☐ Unknown		☒ Moderate	☐ Unknown

3.0 Control or Protective Measures: Items checked will be used to control or mitigate the above mentioned hazards.

☒ Tailgate Safety Briefing	☒ Personal protective equipment	☐ Decontamination
☒ Specialized Training	☐ Air Monitoring	☒ Magnetometer Survey
☒ Safe Work Practices	☒ Site Control Zones	

☐ Engineering Controls: Maintenance of EMM may require the use of engineering controls for lockout/tagout. The UXOSO will determine the need and application of lockout/tagout procedures.

☒ Applicable SOPs/Programs: Cold Stress, Heavy Equipment Operation, UXO Excavation, and the SSHP.

☒ Other: Most anomaly investigation will be conducted using hand tools. Initial excavation of a subsurface anomaly will start to the side of the anomaly. If EMM is used, a safety observer will be stationed near by and all personnel will remain clear of the EMM during operations. EMM operator will be trained in the proper use, inspection and maintenance of the EMM.

4.0 Task PPE: PPE has been assigned based on the potential for exposure as identified by this hazard assessment.

Level of Protection	☐ A ☐ B	☐ C ☒ D	☐ Modified
Respiratory Protection	☐ SCBA ☐ Escape SCBA - Size	☐ Full face respirator ☐ ½ Face respirator	☐ Cartridge - Type ☒ No respirator required
Protective Clothing	☐ Fully encapsulating suit ☐ Standard Tyvek	☐ Saranex ☐ PE Tyvek	☒ Company clothing ☐ Other:
Gloves (specify inner/outer)	☐ Nitrile ☐ Butyl	☐ Neoprene ☐ Latex	☒ Leather ☐ Cotton
Head/Face/Eye/Ear Protection	☒ Safety glasses† [!!] Ear plugs/muffs	☐ Safety goggles ☐ Face shield	[!!] Hard hat ☐ Other:
Foot/Leg Protection	☒ Work boots ☐ Steel-toed leather boots	☐ Steel foot covers ☐ Snake leggings	☐ Chemical over boots

5.0 Modifications Required: † - Safety glasses for protection from UV hazards may be required on days of bright sunlight. !! - If EMM is used for anomaly excavation, ear plugs/muffs may be needed to protect against high noise, as determined by the UXOSO. A hard hat will be worn by the EMM operator and those personnel working near the EMM.

6.0 Certification: The PPE and other control methods and procedures to be used in the conduct of this task have been selected as a result of a hazard assessment conducted by individual identified below.

Printed Name: Drew Bryson, CIH, MPH **Signature:**

CERTIFICATION OF TASK HAZARD ASSESSMENT

TASK NAME: UXO Disposal Operations **DATE:** 27 July 2000

1.0 Hazard Identification: Items checked are known or anticipated site hazards, or may occur as a result of site operations.

☒ Physical exertion	☒ Lifting hazards (sand bags/OE items)	☐ Confined space
☐ Heat Stress (Late Spring - Fall)	☒ Slip, trip or fall	☒ Hazardous plants
☒ Cold Stress (Fall - Early Spring)	☐ High noise (>85 dBA)	☐ Hazardous wildlife (Spring - Fall
☐ Heavy equipment operations	☐ Overhead utilities	☒ Ultraviolet radiation (strong sunlight)
☒ Vehicle traffic in work area(s)	☐ Underground utilities	☒ Hand/Power Tool use
☒ Fire hazards (underline)	☒ Intrusive activity (underline)	☒ Rocky/Steep slopes
• Gasoline/Diesel use	• Soil drilling	☒ Skin contact w/ hazardous materials
• Explosives handling/storage	• Demo pit	☒ Ordnance and explosives
• Explosive gases/vapors	• Setting stakes/rods/monuments	☒ Cut/Puncture from sharp objects

2.0 Degree of Hazard: Anticipated degree of hazard, based on the hazards associated with this task.

Chemical Hazard:	☒ Low	☐ Serious	**Phys./Bio. Hazard:**	☐ Low	☒ Serious
	☐ Moderate	☐ Unknown		☐ Moderate	☐ Unknown

3.0 Control or Protective Measures: Items checked will be used to control or mitigate the above mentioned hazards.

☒ Tailgate Safety Briefing	☒ Personal protective equipment	☐ Decontamination
☒ Specialized Training	☐ Air Monitoring	☒ Magnetometer Survey – Post demo survey
☒ Safe Work Practices	☒ Site Control Zones	

☒ Engineering Controls: If deemed necessary by the SUXOS, appropriate sandbag enclosure of the demolition shot will be used to reduce fragmentation. Sandbag enclosures will be constructed IAW the requirements of Chapter 2 in the WP.

☒ Applicable SOPs/Programs: Cold Stress, UXO Demolition and Disposal, and the SSHP.

☒ Other: Appropriate control zones will be ensured prior to initiation of demolition operations. If sand bags are used, or heavy OE items are moved, proper lifting techniques will be used.

4.0 Task PPE: PPE has been assigned based on the potential for exposure as identified by this hazard assessment.

Level of Protection	☐ A ☐ B	☐ C ☒ D	☐ Modified
Respiratory Protection	☐ SCBA ☐ Escape SCBA - Size	☐ Full face respirator ☐ ½ Face respirator	☐ Cartridge - Type ☒ No respirator required
Protective Clothing	☐ Fully encapsulating suit ☐ Standard Tyvek	☐ Saranex ☐ PE Tyvek	☒ Company clothing ☐ Other:
Gloves (specify inner/outer)	☐ Nitrile ☐ Butyl	☐ Neoprene ☐ Latex	☐ Leather ☐ Cotton
Head/Face/Eye/Ear Protection	☒ Safety glasses† ☐ Ear plugs/muffs	☐ Safety goggles ☐ Face shield	☐ Hard hat ☐ Other:
Foot/Leg Protection	☒ Work boots ☐ Steel-toed leather boots	☐ Steel foot covers ☐ Snake leggings	☐ Chemical over boots

5.0 Modifications Required: † - Safety glasses for protection from UV hazards may be required on days of bright sunlight. Eyewear retainers (Snugz®, Croakies®, etc.) will be used to secure glasses during demolition shot setup.

6.0 Certification: The PPE and other control methods and procedures to be used in the conduct of this task have been selected as a result of a hazard assessment conducted by individual identified below.

Printed Name: Drew Bryson, CIH, MPH **Signature:** 

CERTIFICATION OF TASK HAZARD ASSESSMENT

TASK NAME: Inspection/handling of AEDA/Range Residue **DATE:** 27 July 2000

1.0 Hazard Identification: Items checked are known or anticipated site hazards, or may occur as a result of site operations.

☒ Physical exertion	☒ Lifting hazards (OE and OE scrap)	☐ Confined space
☐ Heat Stress (Late Spring - Fall)	☐ Slip, trip or fall	☐ Hazardous plants
☒ Cold Stress (Fall - Early Spring)	☐ High noise (>85 dBA)	☐ Hazardous wildlife (Spring - Fall
☐ Heavy equipment operations	☐ Overhead utilities	☒ Ultraviolet radiation (strong sunlight)
☐ Vehicle traffic in work area(s)	☐ Underground utilities	☐ Hand/Power Tool use
☐ Fire hazards (underline)	☐ Intrusive activity (underline)	☐ Rocky/Steep slopes
• Gasoline/Diesel use	• Soil drilling	☐ Skin contact w/ hazardous materials
• Explosives handling/storage	• Soil excavation	☐ Ordnance and explosives
• Explosive gases/vapors	• Setting stakes/rods/monuments	☒ Cut/Puncture from sharp objects

2.0 Degree of Hazard: Anticipated degree of hazard, based on the hazards associated with this task.

Chemical Hazard:	☒ Low	☐ Serious	**Phys./Bio. Hazard:**	☐ Low	☐ Serious
	☐ Moderate	☐ Unknown		☒ Moderate	☐ Unknown

3.0 Control or Protective Measures: Items checked will be used to control or mitigate the above mentioned hazards.

☒ Tailgate Safety Briefing	☒ Personal protective equipment	☐ Decontamination
☒ Specialized Training	☐ Air Monitoring	☐ Magnetometer Survey
☒ Safe Work Practices	☒ Site Control Zones	

☐ Engineering Controls:

☒ Applicable SOPs/Programs: Cold Stress, and the SSHP.

☒ Other: Utilize proper lifting techniques at all times.

4.0 Task PPE: PPE has been assigned based on the potential for exposure as identified by this hazard assessment.

Level of Protection	☐ A ☐ B	☐ C ☒ D	☐ Modified
Respiratory Protection	☐ SCBA ☐ Escape SCBA – Size	☐ Full face respirator ☐ ½ Face respirator	☐ Cartridge - Type ☒ No respirator required
Protective Clothing	☐ Fully encapsulating suit ☐ Standard Tyvek	☐ Saranex ☐ PE Tyvek	☒ Company clothing ☐ Other:
Gloves (specify inner/outer)	☐ Nitrile ☐ Butyl	☐ Neoprene ☐ Latex	☒ Leather ☐ Cotton
Head/Face/Eye/Ear Protection	☒ Safety glasses ☐ Ear plugs/muffs	☐ Safety goggles ☐ Face shield	☐ Hard hat ☐ Other:
Foot/Leg Protection	☒ Work boots ☐ Steel-toed leather boots	☐ Steel foot covers ☐ Snake leggings	☐ Chemical over boots

5.0 Modifications Required:

6.0 Certification: The PPE and other control methods and procedures to be used in the conduct of this task have been selected as a result of a hazard assessment conducted by individual identified below.

Printed Name: Drew Bryson, CIH, MPH **Signature:** 

CERTIFICATION OF TASK HAZARD ASSESSMENT

TASK NAME: Motor Vehicle Operation and Maintenance **DATE:** 27 July 2000

1.0 Hazard Identification: Items checked are known or anticipated site hazards, or may occur as a result of site operations.

☐ Physical exertion	☒ Lifting hazards	☐ Confined space
☐ Heat Stress (Late Spring - Fall)	☐ Slip, trip or fall	☐ Hazardous plants
☐ Cold Stress (Fall - Early Spring)	☐ High noise (>85 dBA)	☐ Hazardous wildlife (Spring - Fall
☐ Heavy equipment operations	☐ Overhead utilities	☒ Ultraviolet radiation (strong sunlight)
☒ Vehicle Traffic	☐ Underground utilities	☒ Hand/Power Tool use
☒ Fire hazards (underline)	☐ Intrusive activity (underline)	☐ Rocky/Steep slopes
• Gasoline/Diesel use	• Soil drilling	☒ Skin contact w/ hazardous materials
• Solvent/Cleaner Use	• Soil excavation	☐ Ordnance and explosives
• Explosive gases/vapors	• Setting stakes/rods/monuments	☐ Cut/Puncture from sharp objects

2.0 Degree of Hazard: Anticipated degree of hazard, based on the hazards associated with this task.

Chemical Hazard:	☒ Low	☐ Serious	**Phys./Bio. Hazard:**	☒ Low	☐ Serious
	☐ Moderate	☐ Unknown		☐ Moderate	☐ Unknown

3.0 Control or Protective Measures: Items checked will be used to control or mitigate the above mentioned hazards.

☒ Tailgate Safety Briefing	☒ Personal protective equipment	☐ Decontamination
☒ Specialized Training	☐ Air Monitoring	☐ Magnetometer Survey
☒ Safe Work Practices	☐ Site Control Zones	

☐ Engineering Controls:

☒ Applicable SOPs/Programs: and the SSHP.

☐ Other:

4.0 Task PPE: PPE has been assigned based on the potential for exposure as identified by this hazard assessment.

Level of Protection	☐ A ☐ B	☐ C ☒ D	☐ Modified
Respiratory Protection	☐ SCBA ☐ Escape SCBA - Size	☐ Full face respirator ☐ ½ Face respirator	☐ Cartridge - Type ☒ No respirator required
Protective Clothing	☐ Fully encapsulating suit ☐ Standard Tyvek	☐ Saranex ☐ PE Tyvek	☒ Company clothing ☐ Other:
Gloves (specify inner/outer)	☐ Nitrile (outer) ✦ ☐ Butyl	☐ Neoprene ☐ Latex	☒ Leather ☐ Cotton
Head/Face/Eye/Ear Protection	☒ Safety glasses † ☐ Ear plugs/muffs	☐ Safety goggles ☐ Face shield	☐ Hard hat ☐ Other:
Foot/Leg Protection	☒ Work boots ☐ Steel-toed leather boots	☐ Steel foot covers ☐ Snake leggings	☐ Chemical over boots

5.0 Modifications Required: † - Safety glasses for protection from UV hazards may be required on days of bright sunlight. ✦- Nitrile gloves will be used if maintenance activities involve the use of solvents or degreasing products that could contact the hands.

6.0 Certification: The PPE and other control methods and procedures to be used in the conduct of this task have been selected as a result of a hazard assessment conducted by individual identified below.

Printed Name: Drew Bryson, CIH, MPH **Signature:**

APPENDIX I
MATERIAL SAFETY DATA SHEETS

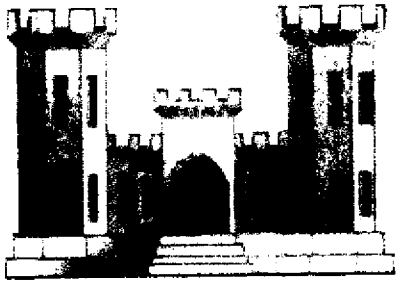
FOR THE

ORDNANCE AND EXPLOSIVES REMOVAL ACTIONS

SECTORS 2, 4 AND 5
FORMER BENICIA ARSENAL, BENICIA, CA

Prepared For:

Contracting Agency:
U.S. Army Engineering & Support Center, Huntsville, Alabama



Geographical Corps District:
US Army Corps of Engineers, Sacramento District

Contract Number: DACA87-97-D-0005
Task Order: 0019
Project Number: W31RYO-0152-68912

Prepared By:

EODT
TECHNOLOGY, INC.

2229 Old Highway 95
Lenoir City, Tennessee 37771

July 2000

FENDALL -- EYESALINE SOLUTION, (SEE SUPPLEM FOR PART NO.) - EYESALINE SOLUTION
MATERIAL SAFETY DATA SHEET
NSN: 6840013870008
Manufacturer's CAGE: 9S617
Part No. Indicator: A
Part Number/Trade Name: EYESALINE SOLUTION, (SEE SUPPLEM FOR PART NO.)

General Information

Item Name: EYESALINE SOLUTION
Company's Name: FENDALL CO
Company's Street: 5 E COLLEGE DR
Company's City: ARLINGTON HEIGHTS
Company's State: IL
Company's Country: US
Company's Zip Code: 60004
Company's Emerg Ph #: 708-577-7400
Company's Info Ph #: 800-543-4842
Record No. For Safety Entry: 001
Tot Safety Entries This Stk#: 002
Status: SE
Date MSDS Prepared: 17MAY94
Safety Data Review Date: 27OCT94
Supply Item Manager: CX
MSDS Serial Number: BVHNQ
Specification Number: UNKNOWN
Hazard Characteristic Code: N1
Unit Of Issue: BX
Unit Of Issue Container Qty: 4 PKG OF6-8OZ
Type Of Container: BOTTLES
Net Unit Weight: UNKNOWN

Ingredients/Identity Information

Proprietary: NO
Ingredient: ALKYL DIMETHYL BENZYL AMMONIUM CHLORIDES
Ingredient Sequence Number: 01
Percent:

AMEREX -- ABC DRY CHEMICAL (MODEL #500T) - DRY CHEMICAL FIRE EXTINGUISHING POWDER
MATERIAL SAFETY DATA SHEET
NSN: 4210001654703
Manufacturer's CAGE: 54905
Part No. Indicator: A
Part Number/Trade Name: ABC DRY CHEMICAL (MODEL #500T)

General Information

Item Name: DRY CHEMICAL FIRE EXTINGUISHING POWDER
Company's Name: AMEREX CORP
Company's Street: 7595 GADSDEN HWY E
Company's P. O. Box: 81
Company's City: TRUSSVILLE
Company's State: AL
Company's Country: US
Company's Zip Code: 35173-0081
Company's Emerg Ph #: 205-655-3271
Company's Info Ph #: 205-655-3271
Record No. For Safety Entry: 006
Tot Safety Entries This Stk#: 011
Status: SE
Date MSDS Prepared: 01AUG91
Safety Data Review Date: 06NOV92
Supply Item Manager: AX
MSDS Serial Number: BPFQR
Hazard Characteristic Code: G3

Ingredients/Identity Information

Proprietary: NO
Ingredient: KAOLIN
Ingredient Sequence Number: 01
NIOSH (RTECS) Number: GF1670500
CAS Number: 1332-58-7
OSHA PEL: 15 MG/M3 TDUST
ACGIH TLV: 2 MG/M3 TDUST; 9293
Other Recommended Limit: 10 MG/M3 TDUST,5 RD

Proprietary: NO
Ingredient: SILICA, MICA, MUSCOVITE
Ingredient Sequence Number: 02
NIOSH (RTECS) Number: VV8760000
CAS Number: 12001-26-2
OSHA PEL: 20 MPPCF
ACGIH TLV: 3 MG/M3 RDUST; 9293
Other Recommended Limit: NONE SPECIFIED BY M.

Proprietary: NO
Ingredient: AMMONIUM DIHYDROGEN PHOSPHATE
Ingredient Sequence Number: 03
NIOSH (RTECS) Number: 1002884AP
CAS Number: 7722-76-1
OSHA PEL: 15 MG/M3 TDUST
ACGIH TLV: NOT ESTABLISHED
Other Recommended Limit: 5 MG/M3 RESP DUST

Proprietary: NO
Ingredient: AMMONIUM SULFATE (SARA III)
Ingredient Sequence Number: 04
NIOSH (RTECS) Number: BS4500000

CAS Number: 7783-20-2
OSHA PEL: 15 MG/M3 TDUST
ACGIH TLV: NOT ESTABLISHED
Other Recommended Limit: 5 MG/M3 RESP DUST

Physical/Chemical Characteristics

Appearance And Odor: FINE YELLOW POWDER, ODORLESS.
Solubility In Water: WATER REPELLENT COAT

Fire and Explosion Hazard Data

Flash Point: NON-FLAMMABLE
Extinguishing Media: PRODUCT IS A FIRE EXTINGUISHER.

Reactivity Data

Stability: YES
Materials To Avoid: ALKALIS, MG, SODIUM NITRITE, PERCHLORATES AND HYPOCHLORITES.
Hazardous Decomp Products: AMMONIA, CARBON DIOXIDE AND OXIDES OF NITROGEN.
Hazardous Poly Occur: NO

Health Hazard Data

Route Of Entry - Inhalation: YES
Route Of Entry - Skin: YES
Route Of Entry - Ingestion: NO
Health Haz Acute And Chronic: DUST MAY CAUSE IRRITATION TO THE EYES AND SKIN. INHALATION OF DUST MAY CAUSE RESPIRATORY TRACT IRRITATIONS. INGESTION:MAY BE HARMFUL.
Carcinogenicity - NTP: NO
Carcinogenicity - IARC: NO
Carcinogenicity - OSHA: NO
Explanation Carcinogenicity: NONE
Signs/Symptoms Of Overexp: INHALATION: IRRITATION OF RESPIRATORY TRACT. SKIN & EYES: IRRITATION. INGESTION:SORE THROAT, ABDOMINAL PAIN, NAUSEA, VOMITING.
Med Cond Aggravated By Exp: SKIN SENSITIVITY; RESPIRATORY DISORDER
Emergency/First Aid Proc: INHALATION:REMOVE TO FRESH AIR, PROVIDE CPR/ OXYGEN IF NEEDED. EYE CONTACT:FLUSH WITH WATER FOR 15 MINUTES. GET MEDICAL HELP. SKIN CONTACT:WASH WITH SOAP AND WATER. GET MED ATTENTION IF SYMPTOMS PERSIST. INGESTION:DO NOT INDUCE VOMITING, RINSE MOUTH. GET MEDICAL HELP IMMEDIATELY.

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: WEAR DUST MASK. RECOVER BY VACUUMING AND SAVE FOR DISPOSAL.
Waste Disposal Method: CONSULT W/FEDERAL, STATE OR LOCAL ENVIRONMENTAL REGULATORY AGENCIES FOR ACCEPTABLE DISPOSAL PROCEDURES.
Precautions-Handling/Storing: STORE IN CLOSED CONTAINERS. KEEP DRY AND AT MODERATE TEMPERATURES.
Other Precautions: AVOID CONTAMINATION W/ALKALINE MATERIALS.

Control Measures

Respiratory Protection: NIOSH APPROVED DUST RESPIRATOR
Ventilation: LOCAL EXHAUST
Protective Gloves: AS REQUIRED
Eye Protection: SAFETY GOGGLES
Other Protective Equipment: WASHING FACILITIES

Work Hygienic Practices: USE GOOD PERSONAL HYGIENE AND GOOD HOUSEKEEPING PRACTICES.
Suppl. Safety & Health Data: FIRE EXTINGUISHER IS CHARGED WITH NITROGEN TO 105 PSI.

Transportation Data

Trans Data Review Date: 92311
DOT PSN Code: GHB
DOT Proper Shipping Name: FIRE EXTINGUISHERS
DOT Class: 2.2
DOT ID Number: UN1044
DOT Label: NONFLAMMABLE GAS
IMO PSN Code: HGH
IMO Proper Shipping Name: FIRE EXTINGUISHERS
IMO Regulations Page Number: 2141-1
IMO UN Number: 1044
IMO UN Class: 2(2.2)
IMO Subsidiary Risk Label: -
IATA PSN Code: LXU
IATA UN ID Number: 1044
IATA Proper Shipping Name: FIRE EXTINGUISHERS
IATA UN Class: 2.2
IATA Label: NON-FLAMMABLE GAS
AFI PSN Code: LXU
AFI Prop. Shipping Name: FIRE EXTINGUISHERS
AFI Class: 2.2
AFI ID Number: UN1044
AFI Basic Pac Ref: 6-6,6-12
N.O.S. Shipping Name: AMMONIUM PHOSPHATE, NITROGEN(USED AS A CHARGE)

Disposal Data

Label Data

Label Required: YES
Technical Review Date: 06NOV92
Label Date: 28MAY92
Label Status: G
Common Name: ABC DRY CHEMICAL (MODEL #500T)
Chronic Hazard: YES
Signal Word: CAUTION!
Acute Health Hazard-Slight: X
Contact Hazard-Slight: X
Fire Hazard-None: X
Reactivity Hazard-None: X
Special Hazard Precautions: DRY CHEMICALS FIRE EXTINGUISHER, CHARGED WITH NOTROGEN. DUST MAY CAUSE IRRITATION TO THE EYES AND SKIN. INHALATION OF DUST MAY CAUSE PULMONARY TRACT PROBLEMS. AVOID BREATHING DUST. FIRST AID-INHALATION OF DUST, REMOVE TO FRESH AIR. EYE CONTACT: FLUSH WITH WATER FOR 15 MINUTES. IF REDNESS OR IRRITATION PERSIST CONTACT A DOCTOR. SKIN:WASH WITH SOAP AND WATER. INGESTION: CONSULT A DOCTOR.
Protect Eye: Y
Protect Respiratory: Y
Label Name: AMEREX CORP
Label Street: 7595 GADSDEN HWY E
Label P.O. Box: 81
Label City: TRUSSVILLE
Label State: AL
Label Zip Code: 35173-0081
Label Country: US

CHEMSICO DIV OF UNITED INDUSTRIES -- SPECTRACIDE WASP & HORNET KILLER II
MATERIAL SAFETY DATA SHEET
NSN: 684000F054580
Manufacturer's CAGE: 0WMK8
Part No. Indicator: A
Part Number/Trade Name: SPECTRACIDE WASP & HORNET KILLER II

General Information

Company's Name: CHEMSICO DIV OF UNITED INDUSTRIES CORP
Company's Street: 8494 CHAPIN INDUSTRIAL DR
Company's P. O. Box: 15842
Company's City: SAINT LOUIS
Company's State: MO
Company's Country: US
Company's Zip Code: 63114-5000
Company's Emerg Ph #: 800-633-2873/800-332-5553
Company's Info Ph #: 800-332-5553/800-633-2873
Distributor/Vendor # 1: SPECTRUM GROUP (DIV OF UNITED INDUSTRIES
Distributor/Vendor # 1 Cage: 0WRF5
Record No. For Safety Entry: 001
Tot Safety Entries This Stk#: 001
Status: SE
Date MSDS Prepared: 20DEC94
Safety Data Review Date: 26NOV97
MSDS Preparer's Name: H L PAULS
Preparer's Company: CHEMSICO DIV OF UNITED INDUSTRIES CORP
Preparer's St Or P. O. Box: 8494 CHAPIN INDUSTRIAL DR
Preparer's City: SAINT LOUIS
Preparer's State: MO
Preparer's Zip Code: 63114-5000
MSDS Serial Number: CGHKK

Ingredients/Identity Information

Proprietary: NO
Ingredient: 2-PROPANOL-1-BUTOXY, PROPYLENE GLYCOL N-BUTYL ETHER *97-3*
Ingredient Sequence Number: 01
Percent: 6
NIOSH (RTECS) Number: UA7700000
CAS Number: 5131-66-8

Proprietary: NO
Ingredient: HEPTANE *97-3*
Ingredient Sequence Number: 02
Percent: 4
NIOSH (RTECS) Number: MI7700000
CAS Number: 142-82-5
OSHA PEL: 2000 MG/CUM
ACGIH TLV: 1640 MG/CUM
Other Recommended Limit: 400 PPM

Proprietary: NO
Ingredient: CHLORPYRIFOS (O,O,-DIETHYL-O-,3,5,6-TRICHLORO-2-PYRIDYL PHOSPHOROTHIOATE)
Ingredient Sequence Number: 03
Percent: 0.25
NIOSH (RTECS) Number: TF6300000
CAS Number: 2921-88-2
OSHA PEL: 0.2 MG/CUM (SKIN)
ACGIH TLV: 0.2 MG/CUM (SKIN)

Proprietary: NO
Ingredient: D-TRANS-ALLETHRIN *97-3*
Ingredient Sequence Number: 04
Percent: 0.05
NIOSH (RTECS) Number: 1008166TA
CAS Number: 28434-00-6

Proprietary: NO
Ingredient: PROPANE (DIMETHYLMETHANE) *97-3*
Ingredient Sequence Number: 05
Percent: 3
NIOSH (RTECS) Number: TX2275000
CAS Number: 74-98-6
OSHA PEL: 1000 PPM
ACGIH TLV: SIMPLE ASPHYXIANT
Other Recommended Limit: 1800 MG/CUM

Proprietary: NO
Ingredient: D-TRANS ALLETHRIN
Ingredient Sequence Number: 06
Percent: 0.05
NIOSH (RTECS) Number: 1015516DA
CAS Number: 61009-26-5
==========

Physical/Chemical Characteristics

==========
Appearance And Odor: JET SPRAY; CLEAR WET FILM W/GLYCOL ETHER ODOR
Vapor Pressure (MM Hg/70 F): 120
Vapor Density (Air=1): >1
Specific Gravity: 0.95
Evaporation Rate And Ref: (BU AC = 1): 90
Percent Volatiles By Volume: 97
==========

Fire and Explosion Hazard Data

==========
Flash Point: 138F
Flash Point Method: TCC
Extinguishing Media: WATER FOG, CO2, DRY CHEMICAL.
Special Fire Fighting Proc: KEEP CONTAINERS COOL. USE EQUIPMENT/ SHIELDING REQUIRED TO PROTECT PERSONNEL AGAINST BURSTING, RUPTURING/VENTING CONTAINERS.
Unusual Fire And Expl Hazrds: AT ELEVATED TEMPS >130F, CONTAINERS MAY VENT, RUPTURE/BURST.
==========

Reactivity Data

==========
Stability: YES
Cond To Avoid (Stability): TEMPS >130F.
Hazardous Decomp Products: CO2, CO.
Hazardous Poly Occur: NO
==========

Health Hazard Data

==========
Route Of Entry - Inhalation: NO
Route Of Entry - Skin: YES
Route Of Entry - Ingestion: YES
Health Haz Acute And Chronic: INGESTION: HARMFUL. SKIN: HARMFUL IF ABSORBED. EYES: IRRITATION.
Carcinogenicity - NTP: NO
Carcinogenicity - IARC: NO

Carcinogenicity - OSHA: NO
Explanation Carcinogenicity: NONE
Signs/Symptoms Of Overexp: IRRITATION.
Emergency/First Aid Proc: SKIN: WASH W/SOAP & WATER. EYES: FLUSH W/ PLENTY OF WATER. INHALATION: REMOVE TO FRESH AIR. OBTAIN MEDICAL ATTENTION IN ALL CASES.

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: AVOID BREATHING VAPORS. REMOVE IGNITION SOURCES. AVOID SKIN CONTACT W/LIQUID.
Waste Disposal Method: GIVE EMPTY, LEAKING/FULL CONTAINERS TO A FACILITY QUALIFIED TO DISPOSE OF PRESSURIZED CONTAINERS, IAW/FEDERAL, STATE & LOCAL REGULATIONS. DON'T PUNCTURE/INCINERATE CONTAINERS.
Precautions-Handling/Storing: DON'T STORE WHERE TEMPS CAN EXCEED 130F.

Control Measures

Work Hygienic Practices: READ & FOLLOW LABEL DIRECTIONS.

Transportation Data

Disposal Data

Label Data

AMOCO OIL -- AMOCO REGULAR LEAD-FREE GASOLINE - GASOLINE,UNLEADED
MATERIAL SAFETY DATA SHEET
NSN: 9130012084172
Manufacturer's CAGE: 15958
Part No. Indicator: B
Part Number/Trade Name: AMOCO REGULAR LEAD-FREE GASOLINE

General Information

Item Name: GASOLINE,UNLEADED
Company's Name: AMOCO OIL COMPANY
Company's Street: 200 EAST RANDOLPH DRIVE
Company's City: CHICAGO
Company's State: IL
Company's Country: US
Company's Zip Code: 60601
Company's Emerg Ph #: 800-447-8735 (HEALTH)
Company's Info Ph #: 312-856-3907
Record No. For Safety Entry: 022
Tot Safety Entries This Stk#: 064
Status: FE
Date MSDS Prepared: 24SEP93
Safety Data Review Date: 20OCT94
Supply Item Manager: KY
MSDS Preparer's Name: DONALD M. BARKER, DIR
Preparer's Company: PRODUCT STEWARDSHIP & TOXICOLOY
Preparer's St Or P. O. Box: (MSDS#:02003992)
MSDS Serial Number: BVHJH
Specification Number: VV-G-1690
Spec Type, Grade, Class: CIVGAS
Hazard Characteristic Code: F2
Unit Of Issue: DR
Unit Of Issue Container Qty: 55 GALLONS
Type Of Container: DRUM, 18 GAGE
Net Unit Weight: 343.5 LBS

Ingredients/Identity Information

Proprietary: NO
Ingredient: GASOLINE
Ingredient Sequence Number: 01
Percent: N/GIVEN
NIOSH (RTECS) Number: LX3300000
CAS Number: 8006-61-9
OSHA PEL: 300 PPM
ACGIH TLV: 300 PPM/500STEL;9394
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: BENZENE (SARA III)
Ingredient Sequence Number: 02
Percent: 4
NIOSH (RTECS) Number: CY1400000
CAS Number: 71-43-2
OSHA PEL: SEE 1910.1028
ACGIH TLV: 10 PPM; A2; 9394
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: ETHYL BENZENE (SARA III)
Ingredient Sequence Number: 03
Percent: 2

NIOSH (RTECS) Number: DA0700000
CAS Number: 100-41-4
OSHA PEL: 100 PPM
ACGIH TLV: 100 PPM/125STEL;9394
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: TOLUENE (SARA III)
Ingredient Sequence Number: 04
Percent: 22
NIOSH (RTECS) Number: XS5250000
CAS Number: 108-88-3
OSHA PEL: 200 PPM; Z-2
ACGIH TLV: S, 50 PPM; 9394
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: CYCLOHEXANE (SARA III)
Ingredient Sequence Number: 05
Percent: 5
NIOSH (RTECS) Number: GU6300000
CAS Number: 110-82-7
OSHA PEL: 300 PPM
ACGIH TLV: 300 PPM, 9394
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: XYLENES (O-,M-,P- ISOMERS) (SARA III)
Ingredient Sequence Number: 06
Percent: 10
NIOSH (RTECS) Number: ZE2100000
CAS Number: 1330-20-7
OSHA PEL: 100 PPM
ACGIH TLV: 100 PPM/150STEL;9394
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: METHYL TERT-BUTYL ETHER (SARA III)
Ingredient Sequence Number: 07
Percent: 15
NIOSH (RTECS) Number: KN5250000
CAS Number: 1634-04-4
OSHA PEL: NOT ESTABLISHED
ACGIH TLV: NOT ESTABLISHED
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: BUTANE
Ingredient Sequence Number: 08
Percent: N/GIVEN
NIOSH (RTECS) Number: EJ4200000
CAS Number: 106-97-8
OSHA PEL: 800 PPM
ACGIH TLV: 800 PPM; 9394
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: N-HEPTANE
Ingredient Sequence Number: 09
Percent: N/GIVEN
NIOSH (RTECS) Number: MI7700000
CAS Number: 142-82-5

OSHA PEL: 500 PPM
ACGIH TLV: 400 PPM/500STEL;9394
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: HEXANE (N-HEXANE)
Ingredient Sequence Number: 10
Percent: N/GIVEN
NIOSH (RTECS) Number: MN9275000
CAS Number: 110-54-3
OSHA PEL: 500 PPM
ACGIH TLV: 50 PPM; 9394
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: PENTANE
Ingredient Sequence Number: 11
Percent: N/GIVEN
NIOSH (RTECS) Number: RZ9450000
CAS Number: 109-66-0
OSHA PEL: 1000 PPM
ACGIH TLV: 600 PPM/750STEL;9394
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: TRIMETHYL BENZENE (SARA III)
Ingredient Sequence Number: 12
Percent: N/GIVEN
NIOSH (RTECS) Number: DC3220000
CAS Number: 25551-13-7
OSHA PEL: 25 PPM
ACGIH TLV: 25 PPM; 9394
Other Recommended Limit: NONE RECOMMENDED
==========

Physical/Chemical Characteristics

==========
Appearance And Odor: CLEAR, BRIGHT LIQUID, CHARACTERISTIC ODOR.
Boiling Point: 80.0F,26.7C
Vapor Pressure (MM Hg/70 F): 7-15LBS
Vapor Density (Air=1): 3-4
Specific Gravity: 0.75
Solubility In Water: NEGLIGIBLE,

MSDS
HYDRAULIC FLUID

*** IDENTIFICATION ***

MSDS RECORD NUMBER : 480541
PRODUCT NAME(S): HYDRAULIC FLUID
DATE OF MSDS : 1991-07-15
EMERGENCY TELEPHONE NO.:
303-623-5716 800-424-9300 (CHEMTREC)

*** MATERIAL SAFETY DATA ***

MATERIAL SAFETY DATA SHEET
307-766 REV. C
Issued: 8-30-91 Supersedes Rev., Dated:
6-18-86

SECTION I - PRODUCT IDENTIFICATION AND USE
PRODUCT IDENTIFIER HYDRAULIC FLUID
PRODUCT IDENTIFICATION NUMBER (PIN) UN
PRODUCT USE Hydraulic fluid used in hydraulic motors and hydraulic power supplies.
CHEMICAL NAME AND SYNONYMS Industrial oils
CHEMICAL FAMILY Petroleum hydrocarbons

SECTION II - HAZARDOUS INGREDIENTS
HAZARDOUS INGREDIENTS & CAS #
% BY WEIGHT EXPOSURE LIMITS

Petroleum hydrocarbon industrial mixture
100 NE
oil (CAS# Unavailable)
LD50 (SPECIES & ROUTE): NE
LC50 (SPECIES): NE
Oil mist, if generated (mineral)
5 mg/m3 (1, 2)
(CAS# 64742-65-0)
10 mg/m3 (3)
LD50 (SPECIES & ROUTE): NE
LC50 (SPECIES): NE
Sara (40 CFR 372), Title III, Section 313
Reportable Chemicals: None
Product does not meet classification criteria of WHMIS and is not a controlled product.
NOTES: (1) ACGIH TLV (TWA); (2) OSHA PEL (TWA); (3) ACGIH STEL; (4) OSHA STEL; (5) MFR/SUPPLIER TLV; c=Ceiling value LD50 Values are via Oral Route unless otherwise indicated.

SECTION III - PHYSICAL DATA
PHYSICAL STATE Liquid
VAPOR PRESSURE (mm Hg) NE
VAPOR DENSITY (Air=1) >1
% VOLATILE AT ROOM TEMP. DEG C Negligible
EVAPORATION RATE (N-BUTYL ACETATE=1) <1
APPEARANCE Clear, yellow
SOLUBILITY IN WATER Negligible
SPECIFIC GRAVITY (WATER=1) 0.88 - 0.89
BOILING POINT DEG C 316
FREEZING POINT DEG C NA
ODOR Characteristic petroleum odor
ODOR THRESHOLD NE
pH NA
COEFFICIENT OF WATER/OIL DISTRIBUTION NE
OTHER NA

SECTION IV - FIRE AND EXPLOSION DATA

FLAMMABLE YES [ ] NO [X]
IF YES, UNDER WHAT CONDITIONS? This material will burn, but will not readily ignite.
FLASH POINT DEG C (METHOD) 210 (COC)
UPPER FLAMMABLE LIMIT (%) NE
LOWER FLAMMABLE LIMIT (%) NE
AUTOIGNITION TEMP. DEG C UN
METHOD OF EXTINCTION Dry chemical, CO2, water spray, foam, sand or earth. Water and foam may cause frothing.
SPECIAL PROCEDURES Water spray may minimize vapors and cool containers exposed to heat and flame. Avoid spreading burning liquid with water used for cooling purposes.
EXPLOSION DATA Heat from fire may cause containers to explode.
HAZARDOUS COMBUSTION PROD. Oxides of carbon, nitrogen, sulfur

SECTION V - REACTIVITY DATA

CHEMICAL STABILITY YES [X] NO [ ]
AVOID Extended exposure to high temperatures
DECOMPOSITION PRODUCTS See Section IV.
INCOMPATIBILITY WITH OTHER SUBSTANCES Strong oxidizing agents
HAZARDOUS POLYMERIZATION Will not occur.

SECTION VI - TOXICOLOGICAL PROPERTIES

ROUTES OF ENTRY
SKIN CONTACT [Yes] SKIN ABSORPTION [NA] · EYE CONTACT [Yes]
INHALATION [Yes] INGESTION [Yes]
EFFECTS OF ACUTE EXPOSURE TO PRODUCT
This material may cause eye and skin irritation. Direct eye contact may result in burning, tearing and redness. Exposure to mists, or prolonged or repeated exposure to fumes or vapors that may be generated if this material is heated, may cause irritation of nose and throat.
EFFECTS OF CHRONIC EXPOSURE TO PRODUCT
Prolonged or repeated skin contact may cause redness, burning anddermatitis.
IRRITANCY OF PRODUCT Eye, skin - slight
SENSITIZATION TO PRODUCT None anticipated
SYNERGISTIC MATERIALS None known
CARCINOGENICITY NA
SOURCE NA
REPRODUCTIVE TOXICITY NA
TERATOGENICITY NA
MUTAGENICITY NA

SECTION VII - PREVENTIVE MEASURES

PERSONAL PROTECTIVE EQUIPMENT (SPECIFY APPROPRIATE SELECTIONS FOR EACH CATEGORY)
GLOVES/CLOTHING Wear gloves impermeable to petroleum hydrocarbons to prevent skin contact and possible irritation.
EYE Chemical safety goggles.
RESPIRATORY If TLV is exceeded or for symptoms of overexposure wear a NIOSH-approved respirator.
OTHER An eyewash and safety shower is recommended to be available in the workplace.
ENGINEERING CONTROLS If current ventilation practices are not adequate in maintaining airborne concentrations below the established exposure limits, additional ventilation or exhaust systems may be required.
LEAK/SPILL PROCEDURES Collect leaking liquid in sealable containers. Absorb spilled liquid in sand or inert absorbant.
WASTE DISPOSAL Dispose of product in accordance with local, county, state, provincial, and federal regulations.
HANDLING PROCEDURES/EQUIPMENT AND STORAGE REQUIREMENTS Store in cool, dry location. Keep away from incompatible materials (Section V). Avoid generating oil mists while handling. Avoid prolonged or repeated skin contact. Wash thoroughly after handling. Do not wear oil-soaked clothing or shoes.
SPECIAL SHIPPING INFORMATION Product is not DOT or TDG regulated. The CHEMTREC emergency telephone number is to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure, or accident involving chemicals.

SECTION VIII - FIRST AID MEASURES

INHALATION If irritation of nose or throat develops, move away from source of exposure and into fresh air. Seek medical attention if irritation persists.
SKIN Wipe material from skin and remove contaminated clothing. Wash affected area(s) thoroughly using mild soap and water and, if necessary, a waterless skin cleanser. Seek medical attention if irritation develops or persists.
EYES If irritation or redness develops, move victim to fresh air. Flush eyes with clean water. Seek medical attention if irritation persists.
INGESTION Contact physician or local poison control center immediately.
GENERAL ADVICE/SPECIAL NOTES TO PHYSICIAN

Acute aspiration of large amounts of oil laden material may produce a serious aspiration pneumonia. Repeated aspiration of small quantities of mineral oil can produce chronic inflammation of the lung.

QUAKER STATE -- 403448, QUAKER STATE HD MOTOR OIL (10W)
MATERIAL SAFETY DATA SHEET
NSN: 915000N031316
Manufacturer's CAGE: 77493
Part No. Indicator: A
Part Number/Trade Name: 403448, QUAKER STATE HD MOTOR OIL (10W)

General Information

Company's Name: QUAKER STATE CORP
Company's P. O. Box: 989
Company's City: OIL CITY
Company's State: PA
Company's Country: US
Company's Zip Code: 16301
Company's Emerg Ph #: 814-676-7676
Company's Info Ph #: 814-676-7676
Record No. For Safety Entry: 001
Tot Safety Entries This Stk#: 002
Status: SMJ
Date MSDS Prepared: 01JUL90
Safety Data Review Date: 19JUL95
MSDS Serial Number: BPLGC
Hazard Characteristic Code: N1

Ingredients/Identity Information

Proprietary: YES
Ingredient: PROPRIETARY
Ingredient Sequence Number: 01

Proprietary: YES
Ingredient: PROPRIETARY
Ingredient Sequence Number: 02

Proprietary: YES
Ingredient: PROPRIETARY
Ingredient Sequence Number: 03

Proprietary: YES
Ingredient: PROPRIETARY
Ingredient Sequence Number: 04

Physical/Chemical Characteristics

Appearance And Odor: DARK LIQUID (THICKNESS DEPENDENT ON VISCOSITY). SLIGHT HYDROCARBON ODOR.
Vapor Pressure (MM Hg/70 F): -N/K
Specific Gravity: 0.87 (H2O=1)
Solubility In Water: NIL (WT)
Percent Volatiles By Volume: NIL

Fire and Explosion Hazard Data

Flash Point: >400F,>204C
Flash Point Method: COC
Lower Explosive Limit: N/A
Upper Explosive Limit: N/A
Extinguishing Media: CO2, DRY CHEMICAL, FOAM, WATER FOG.
Special Fire Fighting Proc: WEAR NIOSH/MSHA APPRVD SCBA & FULL PROT EQUIP (FP N). WATER MAY BE INEFFECTIVE IN FIGHTING AN OIL FIRE UNLESS USED BY EXPERIENCED FIRE FIGHTERS.

Unusual Fire And Expl Hazrds: CONTAINERS MAY BURST WHEN EXPOSED TO FIRE CONDITIONS.

Reactivity Data

Stability: YES
Cond To Avoid (Stability): HIGH TEMPERATURES AND OPEN FLAMES.
Materials To Avoid: STRONG OXIDIZING AGENTS.
Hazardous Decomp Products: CO2, WATER VAPOR. MAY PRODUCE SOX, NOX, & POX. INCOMPLETE COMBUSTION CAN PRODUCE CO.
Hazardous Poly Occur: NO
Conditions To Avoid (Poly): NOT RELEVANT.

Health Hazard Data

LD50-LC50 Mixture: NONE SPECIFIED BY MANUFACTURER.
Route Of Entry - Inhalation: NO
Route Of Entry - Skin: NO
Route Of Entry - Ingestion: NO
NOT EXPECTED TO BE TOXIC. HOWEVER, BREATHING MINERAL OIL MISTS AT LEVELS ABOVE TLV MAY CAUSE RESPIRATORY IRRITATION AND POSSIBLE DISCOMFORT. THE CREATION OF AN OIL MIST IS UNLIKELY WHEN USED AS A MOTOR OIL. SKIN:MATERIAL EXPECTED TO CAUSE NO MORE THAN MINOR (EFTS OF OVEREXP)
Carcinogenicity - NTP: NO
Carcinogenicity - IARC: NO
Carcinogenicity - OSHA: NO
Explanation Carcinogenicity: NOT RELEVANT.
Signs/Symptoms Of Overexp: HLTH HAZ:SKIN IRRITATION FOLLOWING PROLONGED AND/OR REPEATED CONTACT. EYE:MAY CAUSE MINOR IRRITATION. CHRONIC:NONE KNOWN.
Med Cond Aggravated By Exp: NONE SPECIFIED BY MANUFACTURER.
Emergency/First Aid Proc: INGEST:DO NOT INDUCE VOMITING AND CALL MD. SKIN:WASH THOROUGHLY WITH SOAP & WATER. LAUNDER SOILED CLOTHING. INHAL:MOVE TO FRESH AIR. CALL MD IF DISCOMFORT OR IRRITATION CONTINUES. EYE:FLUSH WITH WATER FOR AT LEAST 15 MINUTES. IF IRRITATION CONTINUES, CALL MD. NOTE TO MD:USED MOTOR OILS HAVE BEEN SHOWN TO CAUSE SKIN CANCER IN MICE FOLLOWING RPTD APPLIC & CONTINUOUS EXPOS. BRIEF OR (SUPP DATA)

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: CLEAN UP SPILLS AS SOON AS POSSIBLE. ABSORB LARGE SPILLS WITH COMMERCIALLY AVAILABLE ABSORBENT MATERIALS, SUCH AS ABSORBENT CLAY.
Neutralizing Agent: NONE SPECIFIED BY MANUFACTURER.
Waste Disposal Method: PLACE CONTAMINATED MATERIAL IN DISPOSABLE CONTAINERS AND BURY IN APPROVED LANDFILL SITE PER LOCAL, STATE AND FEDERAL REGULATIONS.
Precautions-Handling/Storing: DO NOT STORE NEAR HIGH HEAT OR OPEN FLAMES.
Other Precautions: AVOID PROLONGED OR FREQUENTLY REPEATED SKIN CONTACT WITH THIS MATERIAL. REGULAR LAUNDERING OF CONTAMINATED CLOTHING IS ESSENTIAL TO REDUCE INDIRECT SKIN CONTACT WITH THIS MATERIAL.

Control Measures

Respiratory Protection: NOT APPLICABLE FOR INTENDED USE. HOWEVER, IF OPERATING CONDITIONS CREATE CONCENTRATIONS IN EXCESS OF TLV, A NIOSH/MSHA APPROVED RESPIRATOR IS RECOMMENDED.
Ventilation: NONE NEEDED FOR INTENDED USE. SPECIAL VENT IS NECESSARY ONLY IF UNUSUAL OPERATING CNDTNS CREATE CONC IN EXCESS OF TLV.
Protective Gloves: IMPERVIOUS GLOVES.
Eye Protection: CHEM WORK GOGG/FULL LENGTH FSHLD (FP N).
Other Protective Equipment: NONE NORMALLY NECESSARY FOR INTENDED USE.

Work Hygienic Practices: GOOD PERSONAL HYGIENE IS ESSENTIAL. HANDS & OTHER EXPOSED AREAS SHOULD BE WASHED THORO W/SOAP & WATER (ING 4)
Suppl. Safety & Health Data: FIRST AID PROC:INTERMITTENT SKIN CNTCT W/ USED MOTOR OIL NOT EXPECTED TO HAVE SERIOUS EFTS IN HUMANS IF OIL IS THORO REMOVED BY WASHING W/SOAP & WATER. IT IS BELIEVED THAT DURING USE IN INTERNAL COMBUSTION ENGINES CONTAM OF OIL W/LOW LEVELS OF CANCER CAUSING COMBUST PRODS (POLY NUCLEAR AROMATICS) OCCURS.

Transportation Data

Trans Data Review Date: 93007
DOT PSN Code: ZZZ
DOT Proper Shipping Name: NOT REGULATED BY THIS MODE OF TRANSPORTATION
IMO PSN Code: ZZZ
IMO Proper Shipping Name: NOT REGULATED FOR THIS MODE OF TRANSPORTATION
IATA PSN Code: ZZZ
IATA Proper Shipping Name: NOT REGULATED BY THIS MODE OF TRANSPORTATION
AFI PSN Code: ZZZ
AFI Prop. Shipping Name: NOT REGULATED BY THIS MODE OF TRANSPORTATION
Additional Trans Data: NOT REGULATED FOR TRANSPORTATION

Disposal Data

Label Data

Label Required: YES
Technical Review Date: 04JUN92
Label Date: 04JUN92
Label Status: G
Common Name: 403448, QUAKER STATE HD MOTOR OIL (10W)
Chronic Hazard: YES
Signal Word: CAUTION!
Acute Health Hazard-Slight: X
Contact Hazard-Slight: X
Fire Hazard-Slight: X
Reactivity Hazard-None: X
INGESTION MAY CAUSE NAUSEA AND DIARRHEA. INHALATION OF OIL MISTS MAY CAUSE RESPIRATORY IRRITATION AND POSSIBLE DISCOMFORT. EYE OR SKIN CONTACT MAY CAUSE MINOR IRRITATION. CHRONIC:USED MOTOR OILS HAVE BEEN SHOWN TO CAUSE SKIN CANCER IN MICE.
Protect Eye: Y
Protect Skin: Y
Protect Respiratory: Y
Label Name: QUAKER STATE CORP
Label P.O. Box: 989
Label City: OIL CITY
Label State: PA
Label Zip Code: 16301
Label Country: US
Label Emergency Number: 814-676-7676

STIHL TWO-CYCLE ENGINE OIL

FSC: 9150
NIIN: 00F008333
NSN: 915000F0083330
MANUFACTURERS CAGE: 0A6L6
PART NO INDICATOR: B
PART NUMBER TRADE NAME: STIHL TWO-CYCLE ENGINE OIL

Standard PMS Identification Data

SPIN FSC: (WES
SPIN NIIN: TLAND) OI
SPIN: L COM

General Information

ITEM NAME: PANY 2740 VALLEYVIEW DR
MANUFACTURERS NAME: 8098 SHREVEPORT LA
MANUFACTURERS STREET: US71148 318-688-1300/318-687-8000
MANUFACTURERS P O BOX:
MANUFACTURERS CITY: 318-687-8000
MANUFACTURERS STATE:
MANUFACTURERS COUNTRY:
MANUFACTURERS ZIP CODE:
MANUFACTURERS EMERG PH:
MANUFACTURERS INFO PH:
DISTRIBUTOR VENDOR 1:
DISTRIBUTOR VENDOR 1 CAGE:
DISTRIBUTOR VENDOR 2:
DISTRIBUTOR VENDOR 2 CAGE:
DISTRIBUTOR VENDOR 3: F 002002FE 04MAY8814SEP94
DISTRIBUTOR VENDOR 3 CAGE:
DISTRIBUTOR VENDOR 4: SPECIALTY (WESTLAND) OIL COMP
DISTRIBUTOR VENDOR 4 CAGE: ANY
SAFETY DATA ACTION CODE:
SAFETY FOCAL POINT:
RECORD NO FOR SAFETY ENTRY:
TOT SAFETY ENTRIES THIS STK: 274
STATUS: 0 V
DATE MSDS PREPARED: ALLEYVI
SAFETY DATA REVIEW DATE: EW DR
SUPPLY ITEM MANAGER:
MSDS PREPARERS NAME: SHREVEPO
PREPARERS COMPANY: RT LA71148
PREPARERS ST OR P O BOX:
PREPARERS CITY: BVRJD
PREPARERS STATE:
PREPARERS ZIP CODE:
OTHER MSDS NUMBER:
MSDS SERIAL NUMBER:
SPECIFICATION NUMBER:
SPEC TYPE GRADE CLASS: DARK EMERALD
HAZARD CHARACTERISTIC CODE: GREE
UNIT OF ISSUE: N
UNIT OF ISSUE CONTAINER QTY: LIQUID W/AMMO
TYPE OF CONTAINER: NIA ODOR
NET UNIT WEIGHT:
NRC STATE LICENSE NUMBER:
NET EXPLOSIVE WEIGHT:
NET PROPELLANT WEIGHT AMMO: N/K
COAST GUARD AMMUNITION CODE:

Physical & Chemical Characteristics

APPEARANCE AND ODOR: (SUPP) 5 0.881 N/K (N-BU AC=1): 0.2
BOILING POINT: <0.1%
MELTING POINT:
VAPOR PRESSURE MM HG 70 F: 8
VAPOR DENSITY AIR 1:
SPECIFIC GRAVITY: 7
DECOMPOSITION TEMPERATURE:
EVAPORATION RATE AND REF: N/K 175F
SOLUBILITY IN WATER: PMCC 0.
PERCENT VOLATILES BY VOLUME: 9
VISCOSITY: 7
PH: FOA
RADIOACTIVITY: M, WATER SPR
FORM RADIOACTIVE MATL: AY,(FOG)
MAGNETISM MILLIGAUSS: , DRY
CORROSION RATE IPY: CHEMICA
AUTOIGNITION TEMPERATURE: L, CO2

Fire and Explosion Hazard Data

FLASH POINT: , VAPORIZING LIQ
FLASH POINT METHOD: UID TY
LOWER EXPLOSIVE LIMIT: PE AGENTS.
UPPER EXPLOSIVE LIMIT:
EXTINGUISHING MEDIA: WATER/FOAM MAY CAUSE FROTHING. USE WATER TO KEEP FIRE-EXPOSED CONTAINERS COOL. WATER SPR
SPECIAL FIRE FIGHTING PROC: AY MAY BE USED TO FLUSH SPILLS AWAY FROM EXPOSURES. (SEE SUPP) EXPOSING CONTAINERS TO IGNITION SOURCES MAY CAUSE AN EXPLOSION.
UNUSUAL FIRE AND EXPL HAZRDS: YESHEAT, FLAME, SPARKS, STATIC ELECTRICITY & OTHER SOURCES OF IGNITION.

Reactivity Data

STABILITY:
COND TO AVOID STABILITY: STONG OXIDANTS, LIQUID CHLORINE, CONCENTRATED OXYGEN, SODIUM HYPOCHLORITE/CALCIUM HYPOCH
MATERIALS TO AVOID: YLORITE. FUMES, SMOKE, CO, SULFUR OXIDES, ALDEHYDES & OTHER PRODUCTS OF INCOMPLETE COMBUSTION.
HAZARDOUS DECOMP PRODUCTS: NO N/K
HAZARDOUS POLY OCCUR:
CONDITIONS TO AVOID POLY: ORAL LD50(RAT): >5G/KG YESNO YESPROLONGED/REPEATED SKIN CONTACT MAY CAU

Health Hazard Data

LD50 LC50 MIXTURE: SE IRRITATION, REMOVE OILS & LEAD TO DER
ROUTE OF ENTRY INHALATION: MAT
ROUTE OF ENTRY SKIN: ITI
ROUTE OF ENTRY INGESTION: S.
HEALTH HAZ ACUTE AND CHRONIC: EYES: MAY CAUSE IRRITATION. MINUTE AMOUNTS ASPIRATED INTO THE LUNGS BY VOMITING/INGESTION MAY CAUSE MILD TO SEVERE PULMONARY INJURY. NO NO NO NONE
CARCINOGENICITY NTP:
CARCINOGENICITY IARC:
CARCINOGENICITY OSHA:
EXPLANATION CARCINOGENICITY: IRRITATION
SIGNS SYMPTOMS OF OVEREXP: EXISTING DERMATITIS
MED COND AGGRAVATED BY EXP: EYES: FLUSH W/CLEAR WATER FOR 15 MINS. SKIN: WASH W/SOAP & WATER. INHALATION: REMOVE FRO
EMERGENCY FIRST AID PROC: M EXPOSURE. IF BREATHING IS IRREGULAR/HAS STOPPED START CPR, ADMINISTER OXYGEN IF AVAILABLE. IF OVEREXPOSURE TO OIL MIST, REMOVE FROM FURTHER EXPOSURE UNTIL EXCESSIVE OIL MIST CONDITIONS SUBSIDES. INGESTION: ASPIRATION HAZARD.

DONT INDUCE VOMITING. OBTAIN MEDICAL ATTENTION IN ALL CASES. RECOVER FREE PRODUCT. ADD SAND, EARTH/OTHER SUITABLE ABSORBNET TO AREA. MINIMIZE SKIN CO

Precautions for Safe Handling and Use

STEPS IF MATL RELEASED SPILL: NTACT. KEEP PRODUCT OUT OF SEWERS & WATERCOURSES BY DIKING/IMPOUNDING. N/K DISPOSE
NEUTRALIZING AGENT: OF IAW/LOCAL, STATE & FEDERAL REGULATIONS. EMPTY CONTAINERS RETAIN RESIDUE & CAN
WASTE DISPOSAL METHOD: BE DANGEROUS. DONT ATTEMPT TO CLEAN. DRUMS SHOULD BE COMPLETELY DRAINED, PROPERLY BUNGED & RETURNED TO A RECONDITIONER. USE PRODUCT W/CAUTION AROUND HEAT, SPARKS, PILOT LIGHTS, STATIC ELECTRICITY & OPEN FLAME
PRECAUTIONS HANDLING STORING: . KEEP CONTAINERS & STORAGE CONTAINERS CLOSED WHEN NOT IN USE. DONT STORE NEAR HEAT, SPAR
OTHER PRECAUTIONS: KS, FLAME/STRONG OXIDANTS. AVOID PROLONGED/ REPEATED CONTACT W/SKIN. USE SUPPLIED-AIR RESPIRATORY PROTECTION IN CONFINED/ENCLOSED SPACES, IF NEEDED.

Control Measures

RESPIRATORY PROTECTION: USE LOCAL EXHAUST TO CAPTURE VAPOR, MISTS/FUMES, IF NECESSARY. USE EXPLOSION-PROOF EQUIP
VENTILATION: MENT. CHEMICAL-RESISTANT SPLASH GOGGLES/FACE SHIELD CHEMICAL
PROTECTIVE GLOVES: RESISTANT APRON/IMPERVIOUS CLOTHING
EYE PROTECTION:
OTHER PROTECTIVE EQUIPMENT: REMOVE/LAUNDER CONTAMINATED CLOTHING BEFORE REUSE. WASH THOROUGHLY AFTER HANDLING.
WORK HYGIENIC PRACTICES: SPECIAL FIRE FIGHTING PROCEDURES CONT'D: MINIMIZE BREATHING GASES, VAPOR, FUMES/DECOMPOS
SUPPL SAFETY HEALTH DATA: ITION PRODUCTS. USE SUPPLIED-AIR BREATHING EQUIPMENT FOR ENCLOSED/CONFINED SPACES. POUR POINT: -20F.

Transportation Data

TRANSPORTATION ACTION CODE:
TRANSPORTATION FOCAL POINT:
TRANS DATA REVIEW DATE:
DOT PSN CODE:
DOT SYMBOL:
DOT PROPER SHIPPING NAME:
DOT CLASS:
DOT ID NUMBER:
DOT PACK GROUP:
DOT LABEL:
DOT DOD EXEMPTION NUMBER:
ADDITIONAL TRANS DATA:

Disposal Data

DISPOSAL DATA ACTION CODE:
DISPOSAL DATA FOCAL POINT:
DISPOSAL DATA REVIEW DATE:
RECNUM FOR THIS DISP ENTR:
TOT DISP ENTRIES PER NSN:
LANDFILL BAN ITEM:
DISPOSAL SUPPLEMENTAL DAT:
EPAACUTEHAZARD 2ND NEW:
EPAHAZWST 3RD CODE NEW:
EPAHAZWST 3RD NAME NEW: YES14SEP9414SEP94N/R F STIHL TWO-CYCLE ENGINE OI
EPAHAZWST 3RD CHAR NEW: L
EPAACUTE 3RD HAZARD NEW:

Label Data

LABEL REQUIRED:
TECHNICAL REVIEW DATE: YES
LABEL DATE: WARNING

MFR NUMBER: ! X X X X
LABEL STATUS: P
COMMON NAME: ROLONGED/REPEATED SKIN CONTACT MAY CAUSE IRRITATION, REMOVE
CHRONIC HAZARD: OIL
SIGNAL WORD: S & LEAD
ACUTE HEALTH HAZARD NONE:
ACUTE HEALTH HAZARD SLIGHT: T
ACUTE HEALTH HAZARD MODERATE: O
ACUTE HEALTH HAZARD SEVERE:
CONTACT HAZARD NONE: D
CONTACT HAZARD SLIGHT: E
CONTACT HAZARD MODERATE: R
CONTACT HAZARD SEVERE: M
FIRE HAZARD NONE: A
FIRE HAZARD SLIGHT: T
FIRE HAZARD MODERATE: I
FIRE HAZARD SEVERE: T
REACTIVITY HAZARD NONE: I
REACTIVITY HAZARD SLIGHT: S
REACTIVITY HAZARD MODERATE: .
REACTIVITY HAZARD SEVERE:
SPECIAL HAZARD PRECAUTIONS: EYES: MAY CAUSE IRRITATION. MINUTE AMOUNTS ASPIRATED INTO THE LUNGS BY VOMITING/INGESTION MAY CAUSE MILD TO SEVERE PULMONARY INJURY. TARGET ORGANS: LUNGS. INOGENS: 2,4-TOLUENE DIISOCYANATE & SILICON DIOXIDE. YYYSPECIALTY (WESTLAND) OIL COMPANY 2740 VALLEYVIEW DR
PROTECT EYE:
PROTECT SKIN:
PROTECT RESPIRATORY:
LABEL NAME: 8098 SHREVEPORT LA
LABEL STREET: 71148 US318-688-1300/318-687-8000
LABEL P O BOX:
LABEL CITY: UNK
LABEL STATE:
LABEL ZIP CODE:
LABEL COUNTRY:
LABEL EMERGENCY NUMBER:
YEAR PROCURED:
FIRE HAZARD SEVERE: T
REACTIVITY HAZARD NONE: I
REACTIVITY HAZARD SLIGHT: S
REACTIVITY HAZARD MODERATE: .
REACTIVITY HAZARD SEVERE:
SPECIAL HAZARD PRECAUTIONS: EYES: MAY CAUSE IRRITATION. MINUTE AMOUNTS ASPIRATED INTO THE LUNGS BY VOMITING/INGESTION MAY CAUSE MILD TO SEVERE PULMONARY INJURY. TARGET ORGANS: LUNGS. INOGENS: 2,4-TOLUENE DIISOCYANATE & SILICON DIOXIDE. YYYSPECIALTY (WESTLAND) OIL COMPANY 2740 VALLEYVIEW DR
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LABEL P O BOX:
LABEL CITY: UNK
LABEL STATE:
LABEL ZIP CODE:
LABEL COUNTRY:
LABEL EMERGENCY NUMBER:
YEAR PROCURED:

SPECIALTY OIL -- STIHL CHAIN & BAR LUBRICANT
MATERIAL SAFETY DATA SHEET
NSN: 915000F017998
Manufacturer's CAGE: 0A6L6
Part No. Indicator: B
Part Number/Trade Name: STIHL CHAIN & BAR LUBRICANT

General Information

Company's Name: SPECIALTY (WESTLAND) OIL COMPANY
Company's Street: 2740 VALLEYVIEW DR
Company's P. O. Box: 8098
Company's City: SHREVEPORT
Company's State: LA
Company's Country: US
Company's Zip Code: 71148
Company's Emerg Ph #: 318-688-1300/318-687-8000
Company's Info Ph #: 318-687-8000
Record No. For Safety Entry: 002
Tot Safety Entries This Stk#: 002
Status: FE
Date MSDS Prepared: 04MAY88
Safety Data Review Date: 13SEP94
Preparer's Company: SPECIALTY (WESTLAND) OIL COMPANY
Preparer's St Or P. O. Box: 2740 VALLEYVIEW DR
Preparer's City: SHREVEPORT
Preparer's State: LA
Preparer's Zip Code: 71148
MSDS Serial Number: BVRKN

Ingredients/Identity Information

Proprietary: NO
Ingredient: PETROLEUM OIL, HYDROTREATED HEAVY NAPHTHENIC DISTILLATE (PETROLEUM), PETROLEUM DISTILLATES, MINERAL OIL (SEVERE)
Ingredient Sequence Number: 01
Percent: 5
Specific Gravity: 0.92
Evaporation Rate And Ref: (N-BU AC=1): 600F

Reactivity Data

Stability: YES
Cond To Avoid (Stability): IGNITION SOURCES
Materials To Avoid: STRONG OXIDANTS, LIQUID CHLORINE, CONCENTRATED OXYGEN, SODIUM HYPOCHLORITE/CALCIUM HYPOCHYLORITE.
Hazardous Decomp Products: FUMES, SMOKE, CO, SULFUR OXIDES, ALDEHYDES & OTHER DECOMPOSITION PRODUCTS.
Hazardous Poly Occur: NO

Health Hazard Data

LD50-LC50 Mixture: ORAL LD50(RAT): > 5 G/KG
Route Of Entry - Inhalation: YES
Route Of Entry - Skin: NO
Route Of Entry - Ingestion: YES
Health Haz Acute And Chronic: PROLONGED/REPEATED SKIN CONTACT MAY CAUSE IRRITATION, REMOVE SKIN OILS & LEAD TO DERMATITIS. EYES: IRRITATION. INGESTION: SMALL AMOUNTS ASPIRATED INTO THE LUNGS DURING INGESTION/VOMITING MAY CAUSE MILD TO SEVERE PULMONARY INJURY/DEATH.
Carcinogenicity - NTP: NO
Carcinogenicity - IARC: NO

Carcinogenicity - OSHA: NO
Explanation Carcinogenicity: NONE
Signs/Symptoms Of Overexp: IRRITATION
WASH THOROUGHLY W/SOAP & WATER. INHALATION: REMOVE FROM EXPOSURE. IF BREATHING IS IRREGULAR/HAS STOPPED APPLY CPR/OXYGEN. INGESTION: ASPIRATION HAZARD. DON'T INDUCE VOMITING. ASPIRATION HAZARD. OBTAIN MEDICAL ATTENTION IN ALL CASES.

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: RECOVER FREE PRODUCT. ADD SAND, EARTH/OTHER SUITABLE ABSORBENT TO AREA. KEEP PRODUCT OUT OF SEWERS & WATERCOURSES BY DIKING/IMPOUNDING.
Waste Disposal Method: DISPOSE OF IAW/LOCAL, STATE & FEDERAL REGULATIONS. EMPTY CONTAINERS RETAIN RESIDUE & CAN BE DANGEROUS. DON'T EXPOSE TO IGNITION SOURCES, THEY MAY EXPLODE. (SEE SUPP)
Precautions-Handling/Storing: KEEP CONTAINERS & STORAGE CONTAINERS CLOSED WHEN NOT IN USE. DON'T STORE NEAR HEAT/SPARKS/FLAME/STRONG OXIDANTS.
Other Precautions: MINIMIZE BREATHING VAPOR/MIST/FUMES. AVOID PROLONGED/ REPEATED CONTACT.

Control Measures

Respiratory Protection: USE SUPPLIED-AIR RESPIRATOR PROTECTON IN CONFINED/ ENCLOSED SPACES, IF NEEDED.
Ventilation: LOCAL EXHAUST TO CAPTURE VAPOR, MISTS/FUMES. USE EXPLOSION PROOF EQUIPMENT.
Protective Gloves: CHEMICAL-RESISTANT
Eye Protection: SPLASH GOGGLES/FACE SHIELD
Other Protective Equipment: CHEMICAL-RESISTANT APRON/IMPERVIOUS CLOTHING
Work Hygienic Practices: REMOVE/LAUNDER CONTAMINATED CLOTHING BEFORE REUSE. DISCARD OIL-SOAKED SHOES. WASH THOROUGHLY AFTER HANDLING.
Suppl. Safety & Health Data: WASTE DISPOSAL CONT'D: DON'T ATTEMPT TO CLEAN, CONTAINERS SHOULD BE COMPLETELY DRAINED/PROPERLY BUNGED/PROMPTLY RETURNED TO A RECONDITIONER. ALL OTHER CONTAINERS SHOULD BE DISPOSED OF PROPERLY. POUR POINT: 0F.

Transportation Data

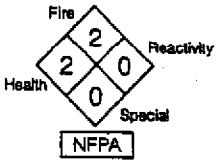
Disposal Data

Label Data

Label Required: YES
Technical Review Date: 13SEP94
Label Date: 13SEP94
Label Status: F
Common Name: STIHL CHAIN AND BAR LUBRICANT
Chronic Hazard: YES
Signal Word: CAUTION!
Acute Health Hazard-Slight: X
Contact Hazard-Slight: X
Fire Hazard-Slight: X
Reactivity Hazard-None: X
Special Hazard Precautions: PROLONGED/REPEATED SKIN CONTACT MAY CAUSE IRRITATION, REMOVE SKIN OILS & LEAD TO DERMATITIS. EYES: IRRITATION. INGESTION: SMALL AMOUNTS ASPIRATED INTO THE LUNGS DURING INGESTION/VOMITING MAY CAUSE MILD TO SEVERE PULMONARY INJURY/DEATH. TARGET ORGANS: LUNGS. INOGENS: 2,4-TOLUENE DIISOCYANATE & SILICON DIOXIDE.
Protect Eye: Y

Protect Skin: Y
Protect Respiratory: Y
Label Name: SPECIALTY (WESTLAND) OIL COMPANY
Label Street: 2740 VALLEYVIEW DR
Label P.O. Box: 8098
Label City: SHREVEPORT
Label State: LA
Label Zip Code: 71148
Label Country: US
Label Emergency Number: 318-688-1300/318-687-8000
Year Procured: UNK

WD-40®



MATERIAL SAFETY DATA SHEET

I. PRODUCT IDENTIFICATION

Manufacturer:	WD-40 Company	Telephone:	
Address:	1061 Cudahy Place (92110) P.O. Box 80607 San Diego, California 92138-0607	Emergency Only:	1 (800) 424-9300 (CHEMTREC)
		Information:	(619) 275-1400
		Chemical Name:	Organic Mixture
		Trade Name:	WD-40 Aerosol
		Item No.	10002, 10005, 10008, 10011, 10013, 10016, 10023

II. HAZARDOUS INGREDIENTS

Chemical Name	CAS Number	%	Exposure Limit ACGIH/OSHA	
Aliphatic Petroleum Distillates	8052-41-3	60-70	100 ppm	PEL
Petroleum Base Oil	64742-65-0	15-25	5 mg/M³	TWA (mist)
Carbon Dioxide	124-38-9	2-3	5000 ppm	PEL
Non-hazardous Ingredients		<10		

III. PHYSICAL DATA

Boiling Point:	NA	Evaporation Rate:	Not determined
Vapor Density (air = 1):	Greater than 1	Vapor Pressure:	110 ±5 PSI @ 70°F
Solubility in Water:	Insoluble	Appearance:	Light amber
Specific Gravity (H_20 = 1):	0.816 @ 70°F	Odor:	Characteristic odor
Percent Volatile (volume):	70%		

IV. FIRE AND EXPLOSION

Flash Point:	Tag Open Cup 110°F (minimum)
Flammable Limits:	(Solvent Portion) [Lel] 1.0% [Uel] 6.0%
Extinguishing Media:	CO_2, Dry Chemical, Foam
Special Fire Fighting Procedures:	Contents Under Pressure
Unusual Fire and Explosion Hazards:	FLAMMABLE – U.F.C. level 3 AEROSOL

V. HEALTH HAZARD / ROUTE(S) OF ENTRY

Threshold Limit Value

Aliphatic Petroleum Distillates (Stoddard solvent) lowest TLV (ACGIH 100 ppm.)

Symptoms of Overexposure

Inhalation (Breathing):	May cause anesthesia, headache, dizziness, nausea and upper respiratory irritation.
Skin Contact:	May cause drying of skin and/or irritation.
Eye Contact:	May cause irritation, tearing and redness.
Ingestion (Swallowed):	May cause irritation, nausea, vomiting and diarrhea.

First Aid Emergency Procedures

Ingestion (Swallowed):	Do not induce vomiting, seek medical attention.
Eye Contact:	Immediately flush eyes with large amounts of water for 15 minutes.
Skin Contact:	Wash with soap and water.
Inhalation (Breathing):	Remove to fresh air. Give artificial respiration if necessary. If breathing is difficult, give oxygen.
	Pre-existing medical conditions such as eye, skin and respiratory disorders may be aggravated by exposure.

DANGER!

Aspiration Hazard:	If swallowed, can enter lungs and may cause chemical pneumonitis. Do not induce vomiting. Call Physician immediately.

Suspected Cancer Agent

Yes _____ No __X__ The components in this mixture have been found to be noncarcinogenic by NTP, IARC and OSHA.

VI. REACTIVITY DATA

Stability:	Stable ___X___	Unstable _____
Conditions to avoid:	NA	
Incompatibility:	Strong oxidizing materials	
Hazardous decomposition products:	Thermal decomposition may yield carbon monoxide and/or carbon dioxide.	
Hazardous polymerization:	May occur _____	Will not occur ___X___

VII. SPILL OR LEAK PROCEDURES

Spill Response Procedures

Spill unlikely from aerosol cans. Leaking cans should be placed in plastic bag or open pail until pressure has dissipated.

Waste Disposal Method

Empty aerosol cans should not be punctured or incinerated; bury in land fill. Liquid should be incinerated or buried in land fill. Dispose of in accordance with local, state and federal regulations.

VIII. SPECIAL HANDLING INFORMATION

Ventilation:	Sufficient to keep solvent vapor less than TLV.
Respiratory Protection:	Advised when concentrations exceed TLV.
Protective Gloves:	Advised to prevent possible skin irritation.
Eye Protection:	Approved eye protection to safeguard against potential eye contact, irritation or injury.
Other Protective Equipment:	None required.

IX. SPECIAL PRECAUTIONS

Keep from sources of ignition. Avoid excessive inhalation of spray particles, do not take internally. Do not puncture, incinerate or store container above 120°F. Exposure to heat may cause bursting. Keep can away from electrical current or battery terminals. Electrical arcing can cause burn-through (puncture) which may result in flash fire, causing serious injury. Keep from children.

X. TRANSPORTATION DATA (49 CFR 172.101)

Domestic Surface

Description:	Consumer Commodity
Hazard Class:	ORM-D
ID No.:	NONE
Label Required:	Consumer Commodity (ORM-D)

Domestic Air

Description:	Consumer Commodity (Non-Flammable Gas – Aerosol)
Hazard Class:	ORM-D
ID No.:	NONE
Label Required:	Consumer Commodity (ORM-D-AIR)

XI. REGULATORY INFORMATION

All ingredients for this product are listed on the TSCA inventory.

SARA Title III chemicals:	None
California Prop 65 chemicals:	None
CERCLA reportable quantity:	None
RCRA hazardous waste no.:	D001 (Ignitable)

SIGNATURE: _____ TITLE: Technical Director

REVISION DATE: March 1998 SUPERSEDES: June 1996

NA = Not applicable NDA = No data available < = Less than > = More than

MATERIAL SAFETY DATA SHEET

CAST BOOSTERS

DATE SEPTEMBER 1998 MSDS NO. P-1 PAGE 1 of 2

Issued by the Safety and Compliance Dept.

SECTION I

AUSTIN POWDER COMPANY
25800 SCIENCE PARK DRIVE
CLEVELAND, OHIO 44122
EMERGENCY PHONE
DAY 216-464-2400
NIGHT 216-464-2407

TRADE NAME AND SYNONYMS
ACP Boosters: Orange Cap, Red Cap, Black Cap, Brown Cap Green Cap, Purple Cap, White Cap, Gray Cap, etc. NDS Boosters, ADP Boosters, Gold Nugget, Silver Nugget, Diamond Nugget, DES SERIES, DES Pentolite Charges, Rock Crushers, 90 Gram, 150 Gram, DES Shaped Charges, Prime Gel*, Renforcatuers, HDP 150, HDP 400, HDP 400LP, HDP 450, Doubledet and Ringprime

SECTION II HAZARDOUS INGREDIENTS

Formulated with TNT and an explosive sensitizer such as PETN, RDX and/or HMX.

TNT, Trinitrotoluene, $C_7H_5N_3O_6$,	CAS No. 118-96-7	30% to 80% TNT
PETN, Pentaerythritol tetranitrate, $C_5H_8N_4O_{12}$,	CAS No. 78-11-5	20% to 70% PETN, RDX, and/or HMX.
HMX, Cyclotetramethylene tetranitramine, Octogen, $C_4H_8N_8O_8$,	CAS No. 261-41-0	
RDX, Cyclotrimethylene trinitramine, Cyclonite, $C_3H_6N_6O_6$,	CAS No. 121-82-4	
Aluminum, AL	CAS No. 7429-90-5	0% to 20% Aluminum
Pentolite is a 50/50 mixture of PETN and TNT.	CAS No. 8066-33-9	

SECTION III PHYSICAL DATA

BOILING POINT	Decomposes	VAPOR PRESSURE (mm Hg)	Negligible at 20°C
SPECIFIC GRAVITY (H_2O = 1)	1.65	VAPOR DENSITY (Air = 1)	N/A
PERCENT VOLATILE BY VOL. (%)	N/A	EVAPORATION RATE:	N/A
SOLUBILITY IN WATER:	0.15%		

APPEARANCE AND ODOR: Solid yellow-buff cast crystalline material. No odor.

SECTION IV FIRE AND EXPLOSION DATA

FLASH POINT:	N/A
FLAMMABLE LIMITS:	N/A
EXTINGUISHING MEDIA:	See below
SPECIAL FIRE FIGHTING PROCEDURES:	Do not fight fires. Withdraw personnel immediately . Allow fire to burn itself out. Avoid toxic fumes from fire.
UNUSUAL FIRE AND EXPLOSION HAZARDS:	May explode when subjected to fire or shock.

SECTION V HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE: ACGIH: TNT-Skin, 0.1 MG/M³ PETN-None RDX-Skin, 1.5 MG/M³ AL-10MG/M³
OSHA : TNT-Skin, 1.5 MG/M³ PETN-None RDX-None AL-15MG/M³

EFFECTS OF OVEREXPOSURE: TNT ingestion may cause headache, weakness, anemia, or liver damage. Excessive skin contact may cause dermatitis and sensitization. PETN is a vasodilator. Ingestion of RDX may cause nervous system disorders or epiliptiform seizures.

EMERGENCY AND FIRST AID PROCEDURES:

FUMES: Remove to fresh air.
IF INGESTED: Obtain medical attention immediately.

MATERIAL SAFETY DATA SHEET

CAST BOOSTERS

SECTION VI REACTIVITY DATA

Issued by the Safety and Compliance Dept.

STABILITY: Stable under normal conditions. May explode when subjected to fire shock or friction.

INCOMPATIBILITY (MATERIALS TO AVOID): Avoid contact with strong acids or alkalies. Do not exceed 150°F (66°C).

HAZARDOUS DECOMPOSITION PRODUCTS: Gaseous Nitrogen Oxides and Carbon Oxides

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Sweep up and dispose of all spilled material immediately. Do not permit smoking or open flames near spill site.

WASTE DISPOSAL METHOD: Dispose of under direct supervision of a qualified person according to local, state and federal regulations. Call Austin Powder for recommendations and assistance. This material may become a hazardous waste under certain conditions and must be collected, labeled and disposed of per state and federal hazardous waste regulations.

TRANSPORTATION EMERGENCIES involving spills, leaks, fires or exposures in the United States: CALL CHEMTREC: 1-800-424-9300. For emergency calls originating outside the U. S. dial the U. S. access number followed by: 1-703-527-3887. All calls are recorded.

SECTION VIII SPECIAL PROTECTION INFORMATION:

RESPIRATORY PROTECTION:	Avoid breathing fumes from detonation.
VENTILATION:	Not required under normal conditions.
PROTECTIVE GLOVES:	Not required for normal handling of boosters.
EYE PROTECTION:	Not required under normal conditions.

SECTION IX SPECIAL PRECAUTIONS

COMPLY WITH "ALWAYS AND NEVER" AS ADOPTED BY THE INSTITUTE OF MAKERS OF EXPLOSIVES. TRANSPORTATION, STORAGE AND USE MUST COMPLY WITH OSHA SAFETY AND HEALTH STANDARDS 29CFR1910.109, APPLICABLE MSHA REGULATIONS, THE DOT AND HAZARDOUS MATERIALS REGULATIONS BATF REQUIREMENTS AND STATE AND LOCAL TRANSPORTATION, STORAGE AND USE REGULATIONS AND ORDINANCES.

DOT or IMDG proper shipping description: Boosters, Without Detonator, 1.1D, UN 0042, PG II

None of the components are listed in the 1987 IARC Monographs, Group 1, 2A, or 2B as a known, probable or possible carcinogen, nor are they listed in the NTP annual report on carcinogens.

Primer Gel contains both a Cast Booster and Hydromite.
Also see the Hydromite MSDS.

MATERIAL SAFETY DATA SHEET

ELECTRIC DETONATORS
NON ELECTRIC DETONATORS

DATE SEPTEMBER 1998 MSDS NO. ED-1 PAGE 1 of 2

SECTION I — **Issued by the Safety and Compliance Dept.**

AUSTIN POWDER COMPANY
25800 SCIENCE PARK DRIVE
CLEVELAND, OHIO 44122
EMERGENCY PHONE
DAY 216-464-2400
NIGHT 216-464-2407

TRADE NAME AND SYNONYMS
Coal* Star, Rock* Star, Time* Star, Coal Mine Delays, Seismic* Star, Twin* Star Detonators, 3-D Star, Seismic Detonators and Shock*Star; In-Hole Delays, Surface Delay Connectors, Quick-Relay Connectors, Dual Delays, Shorty STD (Shock Tube with Detonators) and MS Connector.

Electric Blasting Caps

SECTION II HAZARDOUS INGREDIENTS

Explosive components are PETN (possibly TNT) and lead compounds sealed in a metal shell.

PETN, Pentaerythritol Tetranitrate,	CAS No. 78-11-5
Lead Azide, Pb $(N_3)_2$	CAS No. 13424-46-9
Lead Styphnate, Lead Trinitroresorcinate, $C_6H_3N_3O_8Pb$	CAS No. 15245-44-0
TNT, Trinitrotoluene, $C_7H_5N_3O_6$	CAS No. 118-96-7 (May be included in some detonators)

SECTION III PHYSICAL DATA

LING POINT	N/A	VAPOR PRESSURE (mm Hg)	N/A
SPECIFIC GRAVITY (H_2O = 1)	N/A	VAPOR DENSITY (Air = 1)	N/A
PERCENT VOLATILE BY VOL. (%)	N/A	EVAPORATION RATE:	N/A
SOLUBILITY IN WATER:	Insoluble		

APPEARANCE AND ODOR: Aluminum or copper shells with attached PVC or polyethyene coated copper or iron leg wires. No odor.

SECTION IV FIRE AND EXPLOSION DATA

FLASH POINT:	N/A
FLAMMABLE LIMITS:	N/A
EXTINGUISHING MEDIA:	See below
SPECIAL FIREFIGHTING PROCEDURES:	Do not fight fire. Withdraw personnel immediately . Allow fire to burn itself out.
UNUSUAL FIRE AND EXPLOSION HAZARDS:	May explode when subjected to flame, heat, impact, friction, electric current, electrostatic or radio frequency energy. Do not exceed 150°F (66°C). Avoid toxic fumes from fire.

SECTION V HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE: ACGIH: 0.05 mg/M³ TWA, lead, elemental, and inorganic compounds, as Pb.
OSHA : 50 µg/M³ PEL as Pb. For additional information, see 29 CFR 1910.1025

EFFECTS OF OVEREXPOSURE: None likely when safe blasting practices are employed.

EMERGENCY AND FIRST AID PROCEDURES: Improper handling or misuse may cause detonation resulting in injuries from ypnel. Lead and lead compounds are listed in the 1987 IARC Monographs as possible human carcinogens (Group 2B). Lead is listed in the NTP annual report on carcinogens.

MATERIAL SAFETY DATA SHEET

ELECTRIC DETONATORS
NON ELECTRIC DETONATORS

SECTION VI REACTIVITY DATA
Issued by the Safety and Compliance Dept.

STABILITY: May explode when subjected to flame, heat, impact, friction, electric currents, electrostatic or radio frequency energy. Avoid static charge build up. Keep lead wires shunted until wiring into circuit.

INCOMPATIBILITY (MATERIALS TO AVOID): Avoid contact with acids or alkalies.

HAZARDOUS DECOMPOSITION PRODUCTS: Gaseous Nitrogen Oxides, Carbon Oxides, and lead fumes.

HAZARDOUS POLYMERIZATION WILL NOT OCCUR.

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Pick up containers or units by hand. Avoid conditions affecting stability. DO NOT use damaged detonators.

WASTE DISPOSAL METHOD: Dispose of under direct supervision of a qualified person according to local, state and federal regulations. Call Austin Powder for recommendations and assistance. This material may become a hazardous waste under certain conditions and must be collected, labeled and disposed of per state and federal hazardous waste regulations.

TRANSPORTATION EMERGENCIES involving spills, leaks, fires or exposures in the United States: CHEMTREC: 1-800-424-9300. For emergency calls originating outside the U. S. dial the U. S. access number followed by: 1-703-527-3887. All calls are recorded.

SECTION VIII SPECIAL PROTECTION INFORMATION:

RESPIRATORY PROTECTION:	Avoid breathing fumes from detonation.
VENTILATION:	Not required.
PROTECTIVE GLOVES:	Not required.
EYE PROTECTION:	Not required.

SECTION IX SPECIAL PRECAUTIONS

COMPLY WITH "ALWAYS AND NEVER" AS ADOPTED BY THE INSTITUTE OF MAKERS OF EXPLOSIVES. TRANSPORTATION, STORAGE AND USE MUST COMPLY WITH OSHA SAFETY AND HEALTH STANDARDS 29CFR1910.109, APPLICABLE MSHA REGULATIONS, THE DOT AND HAZARDOUS MATERIALS REGULATIONS BATF REQUIREMENTS AND STATE AND LOCAL TRANSPORTATION, STORAGE AND USE REGULATIONS AND ORDINANCES.

THESE DETONATORS MAY BE SHIPPED UNDER ONE OF THE FOLLOWING DOT CLASSIFICATIONS:

DOT or IMDG proper shipping description:

Detonators, Electric, 1.4B, UN0255, PGII ← this is what will order!
Detonators, Electric, 1.1B, UN0030, PGII
Detonator Assemblies, Non-Electric, 1.1B, UN0360, PGII
Detonator Assemblies, Non-Electric, 1.4B, UN0361, PGII ← this is what will order!
Articles, explosive, n.o.s. 1.4S, UN0349, PGII "

Consult IME Safety Library Publication No. 20, SAFETY GUIDE FOR THE PREVENTION OF RADIO FREQUENCY RADIATION HAZARDS IN THE USE OF ELECTRIC BLASTING CAPS, and Publication No. 22, RECOMMENDATIONS FOR THE SAFE TRANSPORTATION OF DETONATORS IN A VEHICLE WITH CERTAIN OTHER EXPLOSIVE MATERIALS.

HALLIBURTON

HALLIBURTON ENERGY SERVICES

Explosive Products Center / 8432 South I-35 West / Alvarado, Texas 76009-9775 / Tel: 817-783-5111 / Fax: 817-783-5812

MATERIAL SAFETY DATA SHEET

PRODUCT IDENTIFICATION

PRODUCT NAME: SHAPED CHARGE PRODUCTS Revision Date: 05/08/98

TRADE NAMES ANS SYNONYMS

Tubing Cutters, Drill Pipe Cutters, Casing Cutters, Big Hole Charges, Deep Penetrating Charges, Gravel Pack Charges, DYNA-Strip Charges, DYNA-Cap Charges, DYNA-Jet Charges, SSB Charges, Sidewinder Charges, GSC Charges, Junk Shot Charges, Linear Shaped Charges, (LSC) Flexible Linear Shaped Charges (FLSC)

MANUFACTURER: Halliburton Energy Services
Explosive Products Center
8432 South I-35 W
Alvarado, Texas 76009-9775

PRODUCT INFORMATION PHONE: (817) 783-5111
EMERGENCY PHONE: (817) 783-5111

TRANSPORTATION EMERGENCY PHONE: INFOTRAC: (800) 535-5053 U.S. & CANADA

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HAZARDOUS COMPONENTS

CHEMICAL	Exposure Limits TLV	PEL
Cyclotrimethylenetrinitramine (RDX)	1.5mg/M³	1.5 mg/M³
Cyclotetramethylenetetranitramine (HMX)	NE	NE
Hexanitrostilbene (HNS)	NE	NE
2,6-bis (Picrylamino)-3,5-dinitropyridine (PYX)	NE	NE
Nonanitroterphenyl (NONA)	NE	NE
Desensitizing Wax	NE	NE
Iron	5 mg/M³	10 mg/M³
Copper	1 mg/M³	1 mg/M³
Tin	2 mg/M³	2 mg/M³
Aluminum	5 mg/M³	NE
Corrosion Resistant Steel	NE	NE
Lead	0.15 mg/M³	50 g/M³
Antimony	0.5 mg/M³	0.5 g/M³

NE = Not Established

****

PHYSICAL DATA

Packed powder charges (encased in metal casing).

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HAZARDOUS REACTIVITY

INSTABILITY: May detonate with friction, impact, heat, and low level electrical current.
INCOMPATIBILITY: Acids and aklalis.
HAZARD DECOMPOSITION: Detonation may product shrapnel. Gases produced may contain carbon monoxide and nitrogen oxide. Lead fumes may also be produced.
POLYMERIZATION: Polymerization will not occur.

****

FIRE AND EXPLOSION DATA

FLASHPOINT: N/A

EXTINGUISHING MEDIA: None

SPECIAL FIRE FIGHTING PROCEDURES: DO NOT fight fire. Isolate area. Evacuate personnel to a safe area. Guard against intruders. Allow fire to burn itself out.

SPECIAL FIRE FIGHTING PROCEDURES: DO NOT fight fire. Isolate area. Evacuate personnel to a safe area. Guard against intruders. Allow fire to burn itself out.

UNUSUAL FIRE AND EXPLOSION HAZARDS: May detonate with impact or on heating. May explode and throw fragments 1 mile or more if fire reaches cargo. Evacuate all persons, including emergency responders from the area.

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HEALTH HAZARDS

Shaped Charge Products do not present health hazards in normal handling and use. However, the proudcts are Class A or Class C Explosives and detonation may cause severe physical injury, including death. All explosives are dangerous and must be handled carefully and used folooing approved sagety procedures under the direction of competent, experienced perosns in accordance with all applicable Federal, State, and Local Laws, Regulations and Ordinances.

Inhalation of explosive powders may cause nervous system irregularities including headaches and dizziness. May be absorbed through the skin in toxic amounts.

Over exposure to lead may cause adverse effects to the blood forming, nervous, urinary, and reproductive systems incldiuing weatkness, weight loss, insomnia, constipation, anemia, motor weakness, and encephalopathy. Lead may penetrate the placental barrier and has caused congenital abnomalties in animals. Several animal studies have indicated that hight doses of lead may be carcinogenic.

Nitrogen oxides generated during use are skin, eye and respiratory tract irritants.

CARCINOGENICITY

None of the components of these materials are listed as a carcinogen by NTP, IARC, or OSHA.

OTHER SYMPTOMS AFFECTED

A review of available data does not identify any conditions worsened by exposure to this product.

FIRST AID

INHALATION:

Not a likely route of exposure. If inhaled, remove to fresh air. If not breathing, give artificial respiration, preferably by mouth-to-mouth. If breathing is difficult, give oxygen. Seek Prompt Medical Attention.

EYE AND SKIN CONTACT:

Not a likely route of exposure.

INGESTION:

Not a likely route of exposure.

NOTE: Seek prompt medical attention if detonation caused physical injury.

****

SPILL OR LEAK PROCEDURES:

Use appropriate protective equipment. Isolate area and remove sources of friction, impact, heat, low level electrical current, electrostatic or RF energy. Only competent, experienced persons should be involved in clean up procedures. Sweep up with non-sparking tools and remove.

WASTE DISPOSAL

Disposal of in compliance with applicable Federal Regulations under the authority of the Resource Conservation and Recovery Act (40 CFR, parts 260-271).

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SPECIAL PROTECTION INFORMATION

VENTILATION: Use only with adequate ventilation.

RESPIRATORY: NIOSH/MESA approved particle masks for dust and mist.

EYE: Safety glasses or goggles.

GLOVES: Normal work gloves.

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SPECIAL PRECAUTIONS

Keep away from friction, impact and heat. Do Not consume food, drink or tobacco in areas where they may become contaminated with these materials.

STORAGE CONDITIONS

Refer to manufacturer's recommendations and warning for proper storage conditions.

****

THE INFORMATION WHICH IS CONTAINED IN THIS DOCUMENT IS BASED UPON AVAILABLE DATA AND BELIEVED TO BE CORRECT. HOWEVER, AS SUCH HAS BEEN OBTAINED FROM VARIOUS SOURCES, INCLUDING THE MANUFACTURER AND INDEPENDENT LABORATORIES, IT IS GIVEN WITHOUT WARRANTY OR REPRESENTATION THAT IT IS COMPLETE, ACCURATE AND CAN BE RELIED UPON. HALLIBURTON ENERGY SERVICES HAS NOT ATTEMPTED TO CONCEAL IN ANY WAY THE DELETERIOUS ASPECTS OF THE PRODUCT LISTED HEREIN, BUT MAKES NO WARRANTY AS TO SUCH. FURTHER, AS HALLIBURTON ENERGY SERVICES CANNOT ANTICIPATE NOR CONTROL THE MANY SITUATIONS IN WHICH THE LISTED PRODUCT OR THIS INFORMATION MAY BE USED BY OUR CUSTOMER, THERE IS NO GUARANTEE THAT THE HEALTH AND SAFETY PRECAUTIONS SUGGESTED WILL BE PROPER UNDER ALL CONDITIONS. IT IS THE SOLE RESPONSIBILITY OF EACH USER OF THE LISTED PRODUCT TO DETERMINE AND COMPLY WITH THE REQUIREMENTS OF ALL APPLICABLE LAWS AND REGULATIONS REGARDING ITS USE. THIS INFORMATION IS GIVEN SOLELY FOR THE PURPOSES OF SAFETY TO PERSONS AND PROPERTY. ANY OTHER USE OF THIS INFORMATION IS EXPRESSLY PROHIBITED. GOVERNMENT REGULATIONS DEPARTMENT, HALLIBURTON SERVICES.

APPENDIX J
MINIMUM SEPARATION DISTANCES

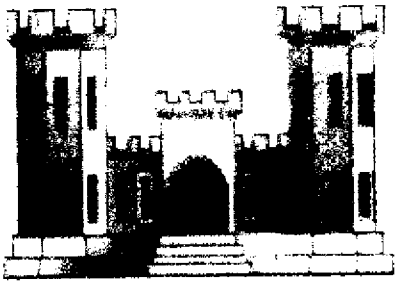
FOR THE

ORDNANCE AND EXPLOSIVES REMOVAL ACTIONS

SECTORS 2, 4 AND 5
FORMER BENICIA ARSENAL, BENICIA, CA

Prepared For:

Contracting Agency:
U.S. Army Engineering & Support Center, Huntsville, Alabama



Geographical Corps District:
US Army Corps of Engineers, Sacramento District

Contract Number: DACA87-97-D-0005
Task Order: 0019
Project Number: W31RYO-0152-68912

Prepared By:

EODT
EOD TECHNOLOGY, INC.

2229 Old Highway 95
Lenoir City, Tennessee 37771

July 2000

CEHNC-OE-DC 28 July 2000

MEMORANDUM FOR CEHNC-OE-S, ATTN: Mr. Wayne Galloway

SUBJECT: Reduction of Minimum Separation Distances (MSD) for USACE Removal Action at Former Benicia Arsenal, Benicia, California

1. Reference letter dated July 18, 2000 from EODT, Inc sub (Enclosure 1).

2. Request you identify the MSD and the Most Probable Munition for each sector per referenced letter. The contractor has recited the suspect munitions from the Scope of Work. However the EE/CA results do not necessarily indicate that these munitions were found for the specific sectors.

3. Also request approval to use the calculated MSDs (Enclosure 2) for 1 hazardous fragment in 600 square feet for three sites scheduled for ordnance removal at the former Benicia Arsenal.

4. Historical Ordnance Storage Area (Sector 5). Use of the 1/600 distance was approved for use during the EE/CA due to the fact that munitions had been stored and not fired. Actual sampling resulted in the finding of 15 OE items (Enclosure 3). No UXO was found. The planned subsurface removal action covering approximately 45 acres will at times be conducted within the right of way for Interstates 680 and 780, next to a historical museum, and next to several businesses. Denial of the 1/600 distance would prohibit clearance due to the added cost of engineering controls or closing down of Interstate highways for any period of time.

5. Artillery Testing Area (Sector 2). This 15-acre sector is adjacent to Sector 3 and was approved for use of the 1/600 distance based on the fact that no fired UXO had previously been found in the area. Only one grid was sampled in Sector 2 due to right of entry problems. No DS or OE scrap was found in the grid, but because OE scrap was found in nearby Sector 3 grids (indicating a potential for kickouts from the Sector 3 demolition area) it was decided to conduct a subsurface clearance of the valley floor and surface clearance of the sideslopes. Several businesses will have to be evacuated if the 1/600 distance cannot be used.

CEHNC-OE-DC 28 July 2000
SUBJECT: Reduction of Minimum Separation Distances (MSD) for USACE Removal Action at Former Benicia Arsenal, Benicia, California

6. Demolition Site on Exxon Property (Sector 4). Sampling from the EE/CA revealed only OE scrap. No OE was found, but OE scrap was found. A surface clearance is planned for 80 acres in the middle of this sector (approximately a 1000-foot radius from the suspect demolition site). The site is an open meadow bordered by State Highway 21 on the East and a residential subdivision on the West and South. It is possible that these areas will be within the normal MSD of the surface clearance, in which case evacuations may be necessary.

ROBERT NORE, P.E.
Project Manager, OE Design Center

3 Encls

CEHNC-OE-S (200-1c) 7 August 2000

MEMORANDUM FOR CEHNC-OE-DC-A (Mr. Robert Nore)

SUBJECT: Contract DACA87-95-D-0085, Task Order 0019, Removal Action, Former Benicia Arsenal, Benicia, California - Minimum Separation Distance (MSD)

1. References:

a. Memorandum, CEHNC OE-CX, 1 June 1998, Determination of Appropriate Safety Distances, OE Center of Expertise Interim Guidance Document 00-01, 2 March 2000.

b. Memorandum, your office, 28 July 2000.

2. Your request for approval to reduce the MSD, based on the stated "most probable munitions" anticipated for the Former Benicia Arsenal Removal Action, of the Artillery Testing Area (Sector 2) and Demolition Site on Exxon Property (Sector 4) with a MSD of 234 feet, which is based on the M48, 75mm is approved. Historical Ordnance Storage Area (Sector 5) with a MSD of 313 feet is which is based on the 4-Inch Stokes Mortar, is also approved.

3. If any UXO is discovered, all work will cease and the MSD will be reevaluated.

4. Questions regarding this matter should be directed to the undersigned, at 256-895-1582, or facsimile 256-895-1819.

KATYE H. GALLOWAY
Chief, Safety Group
for Ordnance and Explosives Team

CF:
OE-DC Read
OE-S Read/Bayuga
OE Read
ED File/Read

Walker/jc/1579/MSDoeslr-Benicia(aug-00)

CALCULATION SHEET 2-2A – 1 of 2

Minimum Separation Distances
Former Denicia Arsenal
75 mm M48
24 July 2000

REQUESTED BY: Bob Nore
PREPARED BY: Michelle Crull, PhD, PE

This form shows calculated distances only. It does not constitute approval. Concurrence of CEHNC-OE-S is required to determine the applicable distance for a specific site.

In accordance with (IAW) OE Center of Expertise Interim Guidance Document 00-01, use of the range to no more than 1 hazardous fragment/600 sq ft as the minimum separation distance for accidental detonations requires written justification, a risk analysis, calculation of this distance by CEHNC-ED-CS-S, and concurrence of CEHNC-OE-S.

CALCULATIONS FOR UNINTENTIONAL DETONATIONS

Maximum Fragment Range = 1701 ft
Range to No More Than 1 Hazardous Fragment/600 sq ft = 234 ft
Range to 0.9 psi Overpressure = 60 ft

IAW OE Center of Expertise Interim Guidance Document 00-01, the minimum separation distance for intentional detonations may not be less than the default distance provided in DoD 6055.9-STD or the maximum fragment range or the K328 overpressure distance.

CALCULATIONS FOR INTENTIONAL DETONATIONS

Maximum Fragment Range = 1701 ft
K328 Overpressure Range = 396 ft

The primary fragmentation characteristics used in the calculation of the values listed above were computed IAW CEHNC-ED-CS-S-98-1. The maximum fragment range was calculated using the maximum weight fragment and the initial velocity from these characteristics in the computer software TRAJ. The range to no more than 1 hazardous fragment/600 sq ft was calculated IAW CEHNC-ED-CS-S-98-2.

SANDBAG ENCLOSURE FOR INTENTIONAL DETONATIONS

Required Sandbag Thickness = 24 in. with 6" standoff between munition and sandbags
Sandbag Throw Distance = 125 ft
Minimum Separation Distance = 200 ft

CALCULATION SHEET 2-2A – 2 of 2

Minimum Separation Distances
Former Benicia Arsenal
75 mm M48
24 July 2000

The required sandbag thickness and the sandbag throw distance were calculated IAW CEHNC-ED-CS-S-98-7. The minimum separation distance is based on the largest of the sandbag throw distance from test data based on the total NEW (munition plus donor charge) or 200 ft. A copy of HNC-ED-CS-S-98-7, "Use of Sandbags for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions" must be available on site. This report may be downloaded from the USAESCH homepage at http://www.hnd.usace.army.mil Select "Product Lines", "Ordnance and Explosives", "Innovative Technology", then "Analytical Tools". The first time you access the site you will have to register. You will be notified by e-mail when your login and password have been activated. You must have a login and password to download the report.

SIGNATURES:

Michelle Crull 7/24/00
Subject Matter Expert

CEHNC-ED-CS-S Branch Chief

CALCULATION SHEET 2-2B – 1 of 2

Minimum Separation Distances
Former Benicia Arsenal
37 mm Mk II
24 July 2000

REQUESTED BY: Bob Nore
PREPARED BY: Michelle Crull, PhD, PE

This form shows calculated distances only. It does not constitute approval. Concurrence of CEHNC-OE-S is required to determine the applicable distance for a specific site.

In accordance with (IAW) OE Center of Expertise Interim Guidance Document 00-01, use of the range to no more than 1 hazardous fragment/600 sq ft as the minimum separation distance for accidental detonations requires written justification, a risk analysis, calculation of this distance by CEHNC-ED-CS-S, and concurrence of CEHNC-OE-S.

CALCULATIONS FOR UNINTENTIONAL DETONATIONS

Maximum Fragment Range = 1181 ft
Range to No More Than 1 Hazardous Fragment/600 sq ft = 200 ft
Range to 0.9 psi Overpressure = 43 ft

IAW OE Center of Expertise Interim Guidance Document 00-01, the minimum separation distance for intentional detonations may not be less than the default distance provided in DoD 6055.9-STD or the maximum fragment range or the K328 overpressure distance.

CALCULATIONS FOR INTENTIONAL DETONATIONS

Maximum Fragment Range = 1181 ft
K328 Overpressure Range = 292 ft

The primary fragmentation characteristics used in the calculation of the values listed above were computed IAW CEHNC-ED-CS-S-98-1. The maximum fragment range was calculated using the maximum weight fragment and the initial velocity from these characteristics in the computer software TRAJ. The range to no more than 1 hazardous fragment/600 sq ft was calculated IAW CEHNC-ED-CS-S-98-2.

SANDBAG ENCLOSURE FOR INTENTIONAL DETONATIONS

Required Sandbag Thickness = 20 in. with 6" standoff between munition and sandbags
Sandbag Throw Distance = 125 ft
Minimum Separation Distance = 200 ft

CALCULATION SHEET 2-2B – 2 of 2

Minimum Separation Distances
Former Benicia Arsenal
37 mm Mk II
24 July 2000

The required sandbag thickness and the sandbag throw distance were calculated IAW CEHNC-ED-CS-S-98-7. The minimum separation distance is based on the largest of the sandbag throw distance from test data based on the total NEW (munition plus donor charge) or 200 ft. A copy of HNC-ED-CS-S-98-7, "Use of Sandbags for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions' must be available on site. This report may be downloaded from the USAESCH homepage at http://www.hnd.usace.army.mil. Select "Product Lines", 'Ordnance and Explosives", "Innovative Technology", then "Analytical Tools'. The first time you access the site you will have to register. You will be notified by e-mail when your login and password have been activated. You must have a login and password to download the report.

SIGNATURES:

Michelle Crull 7/24/00
Subject Matter Expert

William H. Roberts Jr. 7/24/00
CEHNC-ED-CS-S Branch Chief

CALCULATION SHEET 2-2C – 1 of 2

Minimum Separation Distances
Former Benicia Arsenal
VB Rifle Grenade
24 July 2000

REQUESTED BY: Bob Nora
PREPARED BY: Michelle Crull, PhD, PE

This form shows calculated distances only. It does not constitute approval. Concurrence of CEHNC-OE-S is required to determine the applicable distance for a specific site.

In accordance with (IAW) OE Center of Expertise Interim Guidance Document 00-01, use of the range to no more than 1 hazardous fragment/600 sq ft as the minimum separation distance for accidental detonations requires written justification, a risk analysis, calculation of this distance by CEHNC-ED-CS-S, and concurrence of CEHNC-OE-S.

CALCULATIONS FOR UNINTENTIONAL DETONATIONS

Maximum Fragment Range = 716 ft
Range to No More Than 1 Hazardous Fragment/600 sq ft = 200 ft
Range to 0.9 psi Overpressure = 24 ft

IAW OE Center of Expertise Interim Guidance Document 00-01, the minimum separation distance for intentional detonations may not be less than the default distance provided in DoD 6055.9-STD or the maximum fragment range or the K328 overpressure distance.

CALCULATIONS FOR INTENTIONAL DETONATIONS

Maximum Fragment Range = 716 ft
K328 Overpressure Range = 167 ft

The primary fragmentation characteristics used in the calculation of the values listed above were computed IAW CEHNC-ED-CS-S-98-1. The maximum fragment range was calculated using the maximum weight fragment and the initial velocity from these characteristics in the computer software TRAJ. The range to no more than 1 hazardous fragment/600 sq ft was calculated IAW CEHNC-ED CS-S-98-2.

SANDBAG ENCLOSURE FOR INTENTIONAL DETONATIONS.

Required Sandbag Thickness = 12 in. with 6" standoff between munition and sandbags
Sandbag Throw Distance = 25 ft
Minimum Separation Distance = 200 ft

CALCULATION SHEET 2-2C – 2 of 2

Minimum Separation Distances
Former Benicia Arsenal
VB Rifle Grenade
24 July 2000

The required sandbag thickness and the sandbag throw distance were calculated IAW CEHNC-ED-CS-S-98-7. The minimum separation distance is based on the largest of the sandbag throw distance from test data based on the total NEW (munition plus donor charge) or 200 ft. A copy of HNC-ED-CS-S-98-7, "Use of Sandbags for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions" must be available on site. This report may be downloaded from the USAESCH homepage at http://www.hnd.usace.army.mil Select "Product Lines", "Ordnance and Explosives", "Innovative Technology", then "Analytical Tools". The first time you access the site you will have to register. You will be notified by e-mail when your login and password have been activated. You must have a login and password to download the report.

SIGNATURES:

Michelle Cull 7/24/00
Subject Matter Expert

CEHNC-ED-CS-S Branch Chief

CALCULATION SHEET 2-2D – 1 of 2

Minimum Separation Distances
Former Benicia Arsenal
3" Stokes Mortar
24 July 2000

REQUESTED BY: Bob Nore
PREPARED BY: Michelle Crull, PhD, PE

This form shows calculated distances only. It does not constitute approval. Concurrence of CEHNC-OE-S is required to determine the applicable distance for a specific site.

In accordance with (IAW) OE Center of Expertise Interim Guidance Document 00-01, use of the range to no more than 1 hazardous fragment/600 sq ft as the minimum separation distance for accidental detonations requires written justification, a risk analysis, calculation of this distance by CEHNC-ED-CS-S, and concurrence of CEHNC-OE-S.

CALCULATIONS FOR UNINTENTIONAL DETONATIONS

Maximum Fragment Range = 1346 ft
Range to No More Than 1 Hazardous Fragment/600 sq ft = 219 ft
Range to 0.9 psi Overpressure = 88 ft

IAW OE Center of Expertise Interim Guidance Document 00-01, the minimum separation distance for intentional detonations may not be less than the default distance provided in DoD 6055.9-STD or the maximum fragment range or the K328 overpressure distance.

CALCULATIONS FOR INTENTIONAL DETONATIONS

Maximum Fragment Range = 1346 ft
K328 Overpressure Range = 446 ft

The primary fragmentation characteristics used in the calculation of the values listed above were computed IAW CEHNC-ED-CS-S-98-1. The maximum fragment range was calculated using the maximum weight fragment and the initial velocity from these characteristics in the computer software TRAJ. The range to no more than 1 hazardous fragment/600 sq ft was calculated IAW CEHNC-ED-CS-S-98-2.

SANDBAG ENCLOSURE FOR INTENTIONAL DETONATIONS

Required Sandbag Thickness = 24 in. with 6" standoff between munition and sandbags
Sandbag Throw Distance = 125 ft
Minimum Separation Distance = 200 ft

CALCULATION SHEET 2-2D – 2 of 2

Minimum Separation Distances
Former Benicia Arsenal
3" Stokes Mortar
24 July 2000

The required sandbag thickness and the sandbag throw distance were calculated IAW CEHNC-ED-CS-S-98-7. The minimum separation distance is based on the largest of the sandbag throw distance from test data based on the total NEW (munition plus donor charge) or 200 ft. A copy of HNC-ED-CS-S-98-7, "Use of Sandbags for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions" must be available on site. This report may be downloaded from the USAESCH homepage at http://www.hnd.usace.army.mil Select "Product Lines", "Ordnance and Explosives", "Innovative Technology", then "Analytical Tools". The first time you access the site you will have to register. You will be notified by e-mail when your login and password have been activated. You must have a login and password to download the report.

SIGNATURES:

Subject Matter Expert

CEHNC-ED-CS-S Branch Chief

CALCULATION SHEET 2-2E – 1 of 2

Minimum Separation Distances
Former Benicia Arsenal
4" Stokes Mortar
24 July 2000

REQUESTED BY: Bob Nore
PREPARED BY: Michelle Crull, PhD, PE

This form shows calculated distances only. It does not constitute approval. Concurrence of CEHNC-OE-S is required to determine the applicable distance for a specific site.

In accordance with (IAW) OE Center of Expertise Interim Guidance Document 00-01, use of the range to no more than 1 hazardous fragment/600 sq ft as the minimum separation distance for accidental detonations requires written justification, a risk analysis, calculation of this distance by CEHNC-ED-CS-S, and concurrence of CEHNC-OE-S.

CALCULATIONS FOR UNINTENTIONAL DETONATIONS

Maximum Fragment Range = 1611 ft
Range to No More Than 1 Hazardous Fragment/600 sq ft = 313 ft
Range to 0.9 psi Overpressure = 106 ft

IAW OE Center of Expertise Interim Guidance Document 00-01, the minimum separation distance for intentional detonations may not be less than the default distance provided in DoD 6055.9-STD or the maximum fragment range or the K328 overpressure distance.

CALCULATIONS FOR INTENTIONAL DETONATIONS

Maximum Fragment Range = 1611 ft
K328 Overpressure Range = 695 ft

The primary fragmentation characteristics used in the calculation of the values listed above were computed IAW CEHNC-ED-CS-S-98-1. The maximum fragment range was calculated using the maximum weight fragment and the initial velocity from these characteristics in the computer software TRAJ. The range to no more than 1 hazardous fragment/600 sq ft was calculated IAW CEHNC-ED-CS-S-98-2.

SANDBAG ENCLOSURE FOR INTENTIONAL DETONATIONS

Required Sandbag Thickness = 24 in. with 6" standoff between munition and sandbags
Sandbag Throw Distance = 125 ft
Minimum Separation Distance = 280 ft

CALCULATION SHEET 2-2E – 2 of 2

Minimum Separation Distances
Former Benicia Arsenal
4" Stokes Mortar
24 July 2000

The required sandbag thickness and the sandbag throw distance were calculated IAW CEHNC-ED-CS-S-98-7. The minimum separation distance is based on the largest of the sandbag throw distance from test data based on the total NEW (munition plus donor charge) or 200 ft. A copy of HNC-ED-CS-S-98-7, "Use of Sandbags for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions" must be available on site. This report may be downloaded from the USAESCH homepage at http://www.hnd.usace.army.mil Select "Product Lines", "Ordnance and Explosives", "Innovative Technology", then "Analytical Tools". The first time you access the site you will have to register. You will be notified by e-mail when your login and password have been activated. You must have a login and password to download the report.

SIGNATURES:

Subject Matter Expert

CEHNC-ED-CS-S Branch Chief

CALCULATION SHEET 2-2F – 1 of 2

Minimum Separation Distances
Former Benicia Arsenal
3"/50 AP Mk 20
27 July 2000

REQUESTED BY: Bob Nore
PREPARED BY: Michelle Crull, PhD, PE

This form shows calculated distances only. It does not constitute approval. Concurrence of CEHNC-OE-S is required to determine the applicable distance for a specific site.

In accordance with (IAW) OE Center of Expertise Interim Guidance Document 00-01, use of the range to no more than 1 hazardous fragment/600 sq ft as the minimum separation distance for accidental detonations requires written justification, a risk analysis, calculation of this distance by CEHNC-ED-CS-S, and concurrence of CEHNC-OE-S.

CALCULATIONS FOR UNINTENTIONAL DETONATIONS

Maximum Fragment Range = 1595 ft
Range to No More Than 1 Hazardous Fragment/600 sq ft = 200 ft
Range to 0.9 psi Overpressure = 26 ft

IAW OE Center of Expertise Interim Guidance Document 00-01, the minimum separation distance for intentional detonations may not be less than the default distance provided in DoD 6055.9-STD or the maximum fragment range or the K328 overpressure distance.

CALCULATIONS FOR INTENTIONAL DETONATIONS

Maximum Fragment Range = 1595 ft
K328 Overpressure Range = 171 ft

The primary fragmentation characteristics used in the calculation of the values listed above were computed IAW CEHNC-ED-CS-S-98-1. The maximum fragment range was calculated using the maximum weight fragment and the initial velocity from these characteristics in the computer software TRAJ. The range to no more than 1 hazardous fragment/600 sq ft was calculated IAW CEHNC-ED-CS-S-98-2.

SANDBAG ENCLOSURE FOR INTENTIONAL DETONATIONS

Required Sandbag Thickness = 12 in. with 8" standoff between munition and sandbags
Sandbag Throw Distance = 25 ft
Minimum Separation Distance = 200 ft

CALCULATION SHEET 2-2F – 2 of 2

Minimum Separation Distances
Former Benicia Arsenal
3"/50 AP Mk 20
27 July 2000

The required sandbag thickness and the sandbag throw distance were calculated IAW CEHNC-ED-CS-S-98-7. The minimum separation distance is based on the largest of the sandbag throw distance from test data based on the total NEW (munition plus donor charge) or 200 ft. A copy of HNC-ED-CS-S-98-7, "Use of Sandbags for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions" must be available on site. This report may be downloaded from the USAESCH homepage at http://www.hnd.usace.army.mil Select "Product Lines", "Ordnance and Explosives", "Innovative Technology", then "Analytical Tools". The first time you access the site you will have to register. You will be notified by e-mail when your login and password have been activated. You must have a login and password to download the report.

SIGNATURES:

Subject Matter Expert

CEHNC-ED-CS-S Branch Chief

APPENDIX K
EROSION ASSESSMENT

FOR THE

ORDNANCE AND EXPLOSIVES REMOVAL ACTIONS

SECTORS 2, 4 AND 5
FORMER BENICIA ARSENAL, BENICIA, CA

Prepared For:

Contracting Agency:
U.S. Army Engineering & Support Center, Huntsville, Alabama

Geographical Corps District:
US Army Corps of Engineers, Sacramento District

Contract Number: DACA87-97-D-0005
Task Order: 0019
Project Number: W31RYO-0152-68912

Prepared By:

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Appendix K

Erosion Assessment Procedures

EODT will conduct an erosion assessment in accordance with the Slope Stability Reference Guide for National Forest in the United States in Sector 2 of the Former Benicia Arsenal, Benicia, CA.

During erosion assessments, two aspects should be studied - *potential soil erosion risk* (indicating the inherent susceptibility of land to erosion) and *actual soil erosion risk* (taking into account also contemporary land cover/management practices). By collecting and comparing baseline data with future assessment data, the future natural and human erosive effects can be analyzed, documented, and managed.

The use of GIS is recommended for use in this assessment. The basic thematic maps to be used as a first step in soil erosion are maps of rainfall, agro-climatic, soils, land use/land cover, and drainage. Much of this information is currently available and should be entered into a GIS. GIS-based assessment of soil erosion risk comes from principles defined in the Universal Soil Loss Equation (USLE, Wischmeier and Smith 1978) as modified for application at the site level. The following model input parameters should be applied:

- *rainfall erosivity* (calculated and interpolated from climatic data)
- *soil erodibility* (derived from the map of soil texture)
- *potential of relief* (computed from slope angle)
- *protective function of land cover/management* (derived from database created by visual interpretation of Landsat TM or photogrammetic data).

The model input parameters and computed values of potential and actual erosion risk are handled as indices (weight coefficients) rather then absolute values. The final computation can be realized using a raster data model.

This erosion assessment will use conventional surveying methods and contain photographic illustrations of hillsides, following surface removal activities, to establish baseline conditions for future erosion assessments.

In order to monitor the area of potential erosive activity, preliminary surveying will be instigated to establish a control network by which the migration of materials can be measured.

Once control is set, a number of assessment tools can be used including LandSat interpretation, aircraft-mounted laser systems such as the Airborne Topographic Mapper (ATM) Photogrammetry, and/or land photography from control stations can be performed.

By comparing data obtained in follow-up collection activities, erosion effects can be detected and documented. Annual surveys of this type help scientists and environmental managers understand long-term erosion trends and estimate the effects of human activities, erosion control

devices, and slope vulnerability. The data produced by this assessment will conform to national standards and allow landowners to manage erosive activities.

OVERALL SAFETY PRECAUTIONS AND PRACTICES

EODT will provide UXO escort for surveying personnel.

Before control points or monitoring stations are set, UXO personnel will employ standard UXO Avoidance Techniques and check the area with Schonstedt magnetometers for any subsurface contacts. If a subsurface contact is encountered, EODT's UXO personnel will search in the immediate surrounding area for a site that is free of subsurface contacts.

Establishment of Survey Control

Survey control shall be established by utilizing existing 1st Order National Geodetic Survey control monuments (or other local high precision control if necessary) and by using Sokkia Set 4100 Total Station (01" accuracy), accompanied by TDS Ranger Data collector. If appropriate, Trimble 4700/4800 GPS receivers will be used to determine state plane coordinates on monuments, No.4 rebar (24"length), PK nails, or other control stations. Once the adjusted coordinates have been established, either conventional survey methods or GPS can be used to set additional control points, baselines, or grid corners. All control will be marked with stakes and referenced to expedite recovery at a later date.

EODT will establish several primary control stations throughout Sector 2. This will be accomplished by GPS observations, conventional survey traverse methods, or any combination thereof. No. 4 rebar shall be used to identify the control points. Each control station will be tied to the state plane system. The map for Sector 2 is contained in Appendix B.

Monitoring stations will be placed on the severe slopes in question. This will be accomplished using No. 4 rebar and following the procedures outlined above.

A topographic survey of Sector 2 will be conducted.

Once the control network is in place and the topographic survey has been conducted, the area can be resurveyed as often as necessary to reflect changes in contour, vegetation outcroppings, dereliction, accretion, etc.

Additional photographs to illustrate the hillsides will be taken following surface removal activities. The photos will show the following features:

- Existing site contours for distinguishing runoff patterns after disturbance
- Existing vegetation (grassy areas, major groups of trees, and unique species)
- Critical areas within or near project area, such as streams, lakes, and wetlands

Erosion Assessment Report

The data collected from the erosion assessment will be documented in a Surface Erosion Assessment Report and included as an Appendix to the Final Removal Report.

The Surface Erosion Assessment Report will summarize and presents results of the surface erosion assessment. The report will compile key work products, maps, and narratives. The compilation will be interpreted and summarized. While the report should be concise, it should be complete enough so that it provides the input necessary for the synthesis and prescription phases. The following outline/products are recommended to standardize the assessment.

1.0 INTRODUCTION
1.1 Characteristics Influencing Surface Erosion
1.1.1 Topography
1.1.2 Soils
1.1.3 Climate
1.1.4 Land Ownership and Use
1.1.5 Types of Ground Disturbing Activities
1.1.6 Sub-basins Used in Analysis
2.0 HILLSLOPE SURFACE EROSION
2.1 Methods
2.2 Soil Erosion Potential
2.3 Analysis and Results
2.3.1 Agriculture/Mining/Recreational Vehicles/Urbanization/Construction/Other
2.4 Conclusions
2.5 Confidence Discussion
3.0 MONITORING RECOMMENDATIONS
4.0 REFERENCES
APPENDICES
Hill slope Calculation Spreadsheet

The following maps are very useful for the analysis, synthesis, and prescription teams and will be included in the report. All maps should be at a standard scale (1:24,000 is a good working scale) and include streams, roads, township/range/section, and sub-basin boundaries.
Map 1 Soil Erosion Potential
Map 2 Past (and possible proposed future) Slope Disturbance Activities (best to code by year and activity – site prep, traffic and excavation activities)

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