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Explosive Ordnance Disposal Range

RCRA Part B Permit Renewal Application

Edwards Air Force Base

Prepared for:

412th Civil Engineer Group
Environmental Management Division
120 North Rosamond Blvd., Building 3735
Edwards AFB, CA 93524-8600

May 2015

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LIST OF ACRONYMS

AFB	Air Force Base
AFTC	Air Force Flight Test Center
AFI	Air Force Instruction
AFMAN	Air Force Manual
AFOSH	Air Force Occupational Safety and Health
AFRL	Air Force Research Laboratory
bgs	below ground surface
CA	California
CCR	California Code of Regulations
CE	Civil Engineering
CEV	412th Civil Engineer Group Environmental Management Division
CFETP	Career Field Education and Training Plan
CFR	Code of Federal Regulations
DoD	Department of Defense
DOT	Department of Transportation
dBP	peak sound levels
DTSC	Department of Toxic Substances Control
EKAPCD	Eastern Kern Air Pollution Control District
EMP	Environmental Monitoring Plan
EOD	Explosive Ordnance Disposal
EPA	U.S. Environmental Protection Agency
GMRP	Groundwater Monitoring and Response Plan
HAZWOPER	Hazardous Waste Operations and Emergency Response
HRA	Health Risk Assessment
HW	Hazardous Waste
HWSF	Hazardous Waste Support Facility
lbs	Pounds
LDR	Land Disposal Restriction
mph	miles per hour
MSA	Munitions Storage Area
msl	mean sea level
NCOIC	Non-Commissioned Officer in Charge

NEW	Net Explosive Weight
OB	Open Burn
OB/OD	Open Burn/Open Detonation
OD	Open Detonation
OI	Operating Instruction
OO-ALC	Ogden Air Logistics Center
PEP	Propellants, Explosives, and Pyrotechnics
PIRA	Precision Impact Range Area
PPE	Personal Protective Equipment
RCRA	Resource Conservation and Recovery Act
RDT&E	Research, Development, Test and Evaluation
RDX	1,3,5-Trinitroperhydro-1,3,5-Triazine
RSO	Range Safety Officer
SOP	Standard Operating Procedure
SWMU	Solid Waste Management Unit
TCLP	Toxicity Characteristic Leaching Procedure
TO	Technical Order
TTU	Thermal Treatment Unit
UHC	Underlying Hazardous Constituent
USAF	United States Air Force
USGS	United States Geological Survey
UXO	Unexploded Ordnance
WAP	Waste Analysis Plan
WTID	Waste Turn-In Document

AAA. GENERAL INFORMATION REQUIREMENTS

AAA.1 DESCRIPTION OF ACTIVITIES THAT REQUIRE A RCRA PERMIT

Edwards Air Force Base (AFB) is located in the Mojave Desert of California (CA), approximately 60 miles north-northeast of Los Angeles. Edwards AFB is home of the Air Force Test Center (AFTC), and is responsible for United States Air Force (USAF) Research, Development, Test and Evaluation (RDT&E) of new and modified aircraft weapon systems and sub-systems. The RDT&E operations include testing various types of munitions dropped from aircraft and firing small and large caliber weapons. The Air Force Research Laboratory (AFRL) is also located at Edwards AFB and is responsible for RDT&E of liquid and solid rocket motor propellant systems. Under this mission, Edwards AFB is also host to many tenant organizations from within the Department of Defense (DoD) and other governmental agencies, as well as a number of private contractors working on aircraft and system development. The many operations that support the Edwards AFB mission results in the generation of hazardous wastes (HW) subject to Resource Conservation and Recovery Act (RCRA) regulation. Facilities on Edwards AFB are used to manage HW and require a RCRA HW Facility Permit.

Edwards AFB generates waste munitions, energetic rocket propellant and propellant contaminated waste laboratory materials. Since it is unsafe to treat these items by conventional methods, Edwards AFB uses open burn (OB) and open detonation (OD) to thermally treat these wastes (collectively referred to as OB/OD). OB/OD techniques are uniquely suited to eliminate the reactive hazard characteristic of energetic materials in a safe, economically feasible, and technically practicable manner. OB/OD is defined as a miscellaneous unit in Title 22 of the California Code of Regulations (CCR) 66264.600 since OB/OD does not meet any of the definitions for other types of HW management units, and as such requires a RCRA permit to operate.

Presently, a RCRA HW Facility Permit (United States Environmental Protection Agency [EPA] Identification Number CA1570024504, Permit Number 05-SAC-07) is in place for the Explosive Ordnance Disposal (EOD) Range OB/OD Thermal Treatment Units (TTUs). The OB/OD TTUs are used to thermally treat waste munitions and propellants generated by Edwards AFB operations. The current HW Facility Permit was issued by the California Environmental Protection Agency's Department of Toxic Substances Control (DTSC) on 7 November 2005, and will expire on 7 November 2015. Edwards AFB seeks to obtain a renewal of its HW Facility Permit for its EOD Range operations by submission of a RCRA Part B Permit Renewal Application.

Current Permit Modification History

The record of modifications to the EOD Range part of the current permit is as follows:

- 19 December 2014 – Class 3 modification to add the EOD Range OB/OD TTUs.

This 2015 Edwards AFB RCRA Part B Permit Renewal Application (hereafter referred to as "Application") incorporates all of the above modifications.

Application Organization

Organization of the Application is addressed in Section A of the Base-Wide Information Application document.

In addition to this Application, five other documents have been prepared that directly support this action and have been previously reviewed and approved by DTSC, and are incorporated by reference:

- *Edwards Air Force Base Precision Impact Range Area Open Burn/Open Detonation Environmental Monitoring Plan (2015)*
- *Edwards AFB Precision Impact Range Area Open Burn/Open Detonation Health Risk Assessment (2012, Amended 2015)*;
- *Edwards AFB Ecological Risk Assessment, Precision Impact Range Area Open Burn/Open Detonation Unit (1996);*
- *Edwards AFB Ecological Risk Assessment Soil And Plant Material Analytical Results And Plant Growth Study Results, Precision Impact Range Area Open Burn/Open Detonation Units (2002);*
- *Edwards AFB Groundwater Monitoring Well Installation Technical Work Plan, Open Burn/Open Detonation Facility (2003); and*
- *Edwards AFB Groundwater Monitoring and Response Plan, Open Burn/Open Detonation Facility (2003).*

This Application was prepared using the most current information available. Supporting documents referenced throughout the Application are the most recently available versions. All supporting information/documents are subject to revision. To the extent that changes to facility operations and any supporting information/documents results in a change to any of the environmental and health protective measures explicitly contained in this Application, a request for permit modification will be submitted using the procedures given in 22 CCR 66270.42. Changes to facility operations and supporting information/documents that do not affect the environmental and health protective measures contained in this Application will not constitute a permit modification.

AAA.2 NAME, MAILING ADDRESS, AND LOCATION OF FACILITY, INCLUDING A TOPOGRAPHIC MAP

The 412th Test Wing Civil Engineer Group, Environmental Management Division (hereafter referred to as “CEV”), performs Edwards AFB environmental management functions. The official mailing address and general location information are addressed in Section A of the Base-Wide Information Application document.

The EOD Range OB/OD TTUs (hereafter referred to as “OB/OD Units”) are located within the Precision Impact Range Area (PIRA) at Edwards AFB. The EOD Range is located approximately 7 miles east of the Edwards AFB South-Gate, 11 miles southeast of the West-Gate, 13 miles south of the North-Gate, and just north of Photo Resolution Road. Appendix 16a provides a topographic map of the EOD Range located on the PIRA, and surrounding area out to at least 1-mile beyond the center of EOD Range in all directions. A more detailed topographic map is included in Section BBB.

AAA.3 STANDARD INDUSTRIAL CLASSIFICATION CODE

This item is addressed in Section A of the Base-Wide Information Application document.

AAA.4 OWNER/OPERATOR

This item is addressed in Section A of the Base-Wide Information Application document.

In addition, the EOD Division is responsible for physical operation of the EOD Range and is located at:

412th Civil Engineer Group
Explosive Ordnance Disposal Division
Building 4965
Edwards AFB, CA 93254-8401

AAA.5 INDIAN LANDS

This item is addressed in Section A of the Base-Wide Information Application document.

AAA.6 DESCRIPTION OF PROCESSES USED FOR TREATING HAZARDOUS WASTE

Hazardous wastes that have the characteristic of ignitability and reactivity (i.e., a limited subset of EPA hazardous waste codes D001 and D003), and cannot be safely treated or disposed of through other modes of treatment are candidates for routine OB/OD treatment. This includes wastes that are capable of detonation or explosive reaction if subjected to a strong initiating source or if heated under confinement; readily capable of detonation or explosive decomposition or reaction at standard temperature and pressure; and/or a forbidden explosive as defined in Title 49 of the Code of Federal Regulations (CFR) 173.50 for Class 1 Explosive Divisions 1.1 through 1.6, and 173.54 for forbidden explosives.

OB is the treatment of energetic wastes by self-sustained combustion ignited by an external source (e.g., flame, heat, or detonation wave that does not result in an explosion) and is used primarily to treat rocket propellant. OD is the treatment and consumption of waste energetics by detonation (a supersonic chemical reaction) initiated by an external force (typically a donor charge). The chemical reaction exerts extremely high pressure on the surrounding medium, forming a propagating shock wave that originally is of supersonic velocity. Detonation of waste energetics on ground creates a crater with a depth consistent with the energetic weight of the treated items.

The quantities of waste to be treated by OB/OD are measured in terms of Net Explosive Weight (NEW), the total weight of energetics in the munitions and propellants. NEW is used to determine explosive limits and has been set, for purposes of this Application, at 2,000 pounds (lbs) per treatment event, except for OD of mercury-containing munitions which is 700 lbs for each treatment event. The annual treatment limit, regardless of the munitions or propellants treated is set at 150,000 lbs. Information regarding EOD Range processes and procedures are provided in Sections CCC, DDD and FFF of this Application document.

AAA.7 SPECIFICATION OF HAZARDOUS WASTES LISTED OR DESIGNATED UNDER CCR CHAPTER 11

This item is addressed in Section A of the Base-Wide Information Application document.

AAA.8 LISTING OF ALL PERMITS OR CONSTRUCTION APPROVALS

This item is addressed in Section A of the Base-Wide Information Application document.

BBB. FACILITY DESCRIPTION

BBB.1 GENERAL DESCRIPTION OF THE EOD RANGE

The EOD Range is a rectangular area 700 foot by 1,400 foot located within the PIRA. A chain-link fence encloses the EOD Range. A schematic diagram of the EOD Range is provided in Figure BBB-1. Two hazardous waste management units are located within the EOD Range and are defined as follows:

- The OB Unit – includes a 300-foot radius cleared area that is designated for burn operations; and
- The OD Unit – includes a 300-foot radius cleared area that is designated for detonation operations.

Both units are used to treat waste propellants, energetic-contaminated waste materials, waste munitions, and waste rocket propellants.

Also present within the EOD Range is a cement pad at the south end of the OB Unit. This pad is used as satellite (or initial) accumulation point for storage of drums used to containerize any ash residue generated by OB/OD events. This accumulation point is not part of the RCRA HW Facility Permit and is managed in accordance with established CFR, CCR, USAF and Edwards AFB procedures for similar non-permitted accumulation points throughout Edwards AFB.

BBB.2 TOPOGRAPHIC MAP

BBB.2.a General Requirements

A topographic map of the EOD Range (showing distances of 1,988 feet. from the NE corner, 2,050 feet. from the SE corner, 2,100 feet. from the SW corner, and 1,900 feet. from the NW corner, each to the nearest map edge) is provided in Appendix 16b of this application. All the information required under 22 CCR 66270.14(b)(18) is not on a single map; a discussion and/or the location of items not shown on the topographic map in Appendix 16b is provided in the following subsections.

Included on the map are the OB/OD Unit boundaries, EOD Range boundaries, access roads, monitoring wells, and surface contours. A satellite accumulation point is located immediately inside the chain-link fence used to delineate the EOD Range. There are no other storage, treatment or disposal facilities within the EOD Range. The satellite accumulation point is not part of this Application.

BBB.2.a.1 Scale and Date

The scale and date when the map was generated are shown on the map.

BBB.2.a.2 The 100-year Floodplain Area

Information on the 100-year floodplain area is addressed in Section B of the Base-Wide Information Application document.

The EOD Range is not located within a 100-year floodplain.

BBB.2.a.3 Surface Water Features

Information on surface water features is addressed in Section B of the Base-Wide Information Application document.

No surface water bodies are present at the EOD Range.

BBB.2.a.4 Surrounding Land Use

Information on surrounding land use is addressed in Section B of the Base-Wide Information Application document.

The EOD Range is located in the southwest corner of the PIRA. The PIRA covers a large portion of the eastern part of the base and is used for aircraft flight and munitions testing, and EOD. This area is used to test aircraft targeting equipment and for precision bombing practice. Other activities in the PIRA are severely restricted, occur only occasionally and are scheduled around the range use. A large portion of the PIRA has been designated as Desert Tortoise critical habitat and requires personnel to follow different levels of protection measures based upon the zone and activities to be conducted. The EOD Range is fully within the boundaries of Edwards AFB.

BBB.2.a.5 Wind Rose

A wind rose displaying pertinent meteorological information for Edwards AFB is included on the topographic map provided in Appendix 16b. The wind rose summarizes the average wind velocity and direction monitored at Edwards AFB during a 27-year period from 1973 to 1999. The prevailing wind direction is from the southwest.

BBB.2.a.6 Map Orientation

The north arrow is shown on the topographic maps in Appendix 16.

BBB.2.a.7 Legal Boundaries

The EOD Range is located within the legal boundaries of Edwards AFB approximately 1/3 mile north of the Los Angeles and Kern County border. The legal boundaries of the EOD Range are shown on the topographic map in Appendix 16b. Longitude and latitude coordinates are given in Section BBB.2.a.12.

BBB.2.a.8 Access Control

The EOD Range is surrounded by a chain-link fence, which has a gate that remains locked when the range is not in use. Additional discussion of access control is provided in Section FFF.1.

BBB.2.a.9 Injection and Withdrawal Wells

There are no injection wells on Edwards AFB or within the vicinity of the EOD Range. The water supply wells nearest the EOD Range are Wells AFRL-A, -B, -C, and -D, located in the AFRL well-field approximately 2.3 mi to the north. These wells provide potable water to the AFRL facilities only. Five groundwater monitoring wells were installed around the boundaries of the facility. These wells are shown on Figure BBB-2 and discussed in Section EEE.

BBB.2.a.10 Buildings and Other Structures

The EOD Range has been classified as a remote site. There are no utility lines (e.g., electrical, telephone, sewer, or water) on or near the EOD Range. A steel storage building used to store miscellaneous equipment is located at the south end of the EOD Range. A concrete pad (identified as the satellite accumulation point) used to store 55-gal drums is also located at the south end of the EOD Range. No equipment cleanup areas exist within the EOD Range. Internal roads are discussed in Section BBB.4. Fire control equipment is discussed in Section FFF.

BBB.2.a.11 Drainage and Flood Control Barriers

The EOD Range is not located within a 100-year floodplain; therefore, no structures for drainage or flood control exist within 1,000 feet of the range. Surface drainage follows the slope of the terrain, flowing generally to the west across the range, except where it is intercepted by both unpaved and paved roads. The majority of surface runoff in the area is diverted away from the EOD Range by sloping topography and incised ephemeral channels.

BBB.2.a.12 Location of the Treatment Unit(s) and Decontamination Areas

The OB/OD Units at the EOD Range are located on a relatively level area of the PIRA between 2,380 and 2,405 feet above mean sea level (msl). The terrain in the area immediately adjacent to the EOD Range slopes gently toward the west from a high elevation of 2,600 feet above msl, located near Avenue B southwest of EOD Range, to a low elevation of 2,300 feet above msl, located northwest of the range and running parallel approximately 1,000–2,000 feet east of Mercury Boulevard.

The specific location of the EOD Range and the OB/OD Units are as follows:

<u>General Location</u>

Township:	9 N
Range:	9 W
Section:	S 1/3 of Section 35
Quadrangle:	Rogers Lake South, United States Geological Survey (USGS) 7.5 Minute Series, 2013
Principal Median:	San Bernardino

The assessor's parcel number is not applicable, as the EOD Range is situated totally within Edwards AFB boundaries.

<u>EOD Range Boundaries and Center</u>

NE Corner:	Latitude 34° 49.853' N, Longitude 117° 48.022' W
SE Corner:	Latitude 34° 49.627' N, Longitude 117° 47.968' W
SW Corner:	Latitude 34° 49.605' N, Longitude 117° 48.105' W
NW Corner:	Latitude 34° 49.832' N, Longitude 117° 48.158' W
EOD Center:	Latitude 34° 49.728' N, Longitude 117° 48.063' W

<u>OB/OD Units</u>

The location of each unit is a circle of 300 foot radius wholly within the EOD Range with center points at:

OB Unit Center: Latitude 34° 49.687' N, Longitude 117° 48.053' W
OD Unit Center: Latitude 34° 49.786' N, Longitude 117° 48.077' W

Note that the radius and center points are approximate as these values for both units can vary due to variations in grading.

Nearby areas to the west, north, and east of the EOD Range are entirely within the boundaries of Edwards AFB. Nearby areas to the east-southeast, south, and west-southwest of the EOD Range are in unincorporated Los Angeles County. Table BBB-1 lists the locations of specific nearby points of interest from the EOD Range. Except for a jet target used for visual and video calibration (not used for dropping ordnance on the ground) approximately 1,500 feet due east of the EOD Range, the area surrounding the EOD Range is open desert land. There are no railroad easements within 1 mile of the EOD Range.

A "buffer zone" is defined in 22 CCR 66260.10 as "an area of land which surrounds a hazardous waste facility and on which certain land uses and activities are restricted to protect the public health and safety and environment from existing or potential hazards caused by the migration of hazardous waste." A minimum distance from the EOD Range has been established as a "buffer zone" to protect base personnel from potential hazards, primarily air blasts associated with OD treatment operations. In this situation, an air blast can produce an over-pressure wave that can have adverse health effects at close range. EOD has set this minimum distance at 2,500 feet for a typical treatment of 500 lbs of NEW and 5,000 feet for a maximum treatment of 2,000 lbs of NEW. These distances exceed the requirements of 22 CCR 66265.382 for minimum safe distances from an OB or OD Unit to the property of others (1,730 feet). Also, since the EOD Range is located well within the PIRA, the distances to the property boundaries and nearest public areas are not exceeded, as shown in Table BBB-1. Additional details on buffer zone distances are presented in Section DDD. EOD personnel may change these buffer distances depending on the blast characteristics of the munitions to be treated in a specific event. While OB operations do not generally produce blast effects, the same minimum distances as in OD operations can also be applied to OB operations, at the discretion of EOD personnel.

BBB.2.a.13 Location of Solid Waste Management Units

There are no solid waste management units (SWMUs) within 1,000 feet of the EOD Range.

BBB.2.b Additional Information on the Topographic Map for Land Disposal Facilities

22 CCR 66270.14(c) requires that specific information be provided by owners or operators of HW facilities containing a "regulated unit". A regulated unit is defined in 22 CCR 66264.90 as a surface impoundment, waste pile, or land treatment unit or landfill that receives HW. This subsection is not applicable to Edwards AFB as the EOD Range is not a surface impoundment, waste pile, land treatment unit or landfill

BBB.3 FACILITY LOCATION INFORMATION

This section presents information about the physical location of the EOD Range and its proximity to seismically active faults and the 100-year floodplain. Additional information on the general geologic and hydrogeologic features of Edwards AFB used to support compliance with 22 CCR 66270.14(b)(11) requirements is provided in Section B of the Base-Wide Information Application document.

BBB.3.a Seismic Requirements

The seismic location standard prohibits the placement of hazardous waste management facilities within 200 feet of a fault displaying Holocene (less than 10,000 years before present) displacement.

As shown on the local fault and seismicity map provided in Appendix 4 of the Base-Wide Information Application document, the nearest fault to the EOD Range are postulated extensions of the Blake Ranch or Mirage Valley Faults. The EOD Range is located several hundred feet south of the trends of the Postulated Mirage Valley Fault Extension and approximately 12,000 feet south of the Postulated Blake Ranch Fault Extension. Neither these nor any other faults on Edwards AFB display evidence of Holocene displacement. Therefore, the EOD Range is in compliance with the seismic standard as specified under 22 CCR 66270.14(b)(11).

BBB.3.b Floodplain Requirements

Because of its federal facility status, no Federal Insurance Administration flood maps have been generated for Edwards AFB. The *Edwards AFB Comprehensive Plan (latest version)* does not indicate any flood-prone areas near the EOD Range. In general, flood-prone areas at Edwards AFB are the Rogers, Rosamond, and Buckhorn dry lakebeds, and a major ephemeral stream channel that conducts seasonal runoff into Rogers Dry Lake. The EOD Range is not located within these flood-prone areas.

The EOD Range is located approximately 2,400 feet above msl, about 130 feet higher than the 100-year flood limits. Thus, the EOD Range is not within the 100-year floodplain.

BBB.4 TRAFFIC PATTERNS

General information on traffic patterns is provided in Section B of the Base-Wide Information Application document.

The access roads into the EOD Range are shown on the topographic maps in Appendix 16. Figure BBB-3 provides an aerial image of the PIRA area and highlights the roads and access control points into the PIRA and EOD Range. Referencing the map shown in Figure BBB-3, the nearest publically accessible road to the EOD Range is Avenue B, located just south of the Edwards AFB South Gate. Avenue B curves northward and turns into Mercury Boulevard, terminating at the AFRL-Gate. Mercury Boulevard is also publically accessible from Rocket Road running south from US Route 58, terminating at Mercury Boulevard 2 miles southwest of the AFRL Gate. Avenue B, Mercury Boulevard and Rocket Road are completely within Edwards AFB property lines.

During mission operations, access to any roads within Edwards AFB may be restricted. Non-DoD vehicle traffic is prohibited through all access control points and is blocked by locked gates, or gates guarded by base security forces. Access to the EOD Range from the PIRA West Entry via Photo-Resolution Road is blocked by a locked gate at Mercury Boulevard. The EOD Range may also be accessed through the PIRA East Entry off of Mercury Boulevard 1 mile southwest of the AFRL entry. The PIRA East Entry is blocked during non-business hours by a locked gate. During normal business hours, access is controlled by PIRA personnel at the PIRA Downfall Control Tower complex.

Only authorized personnel and vehicles may enter the EOD Range using Photo Resolution Road. Access is limited almost exclusively to the EOD personnel and other Edwards AFB personnel for the following activities:

- Transporting waste propellant and ordnance materials from the Munitions Storage Area (MSA) or AFRL to the EOD Range for treatment;
- Sampling of post-treatment materials (i.e., ash) for profile analysis;
- Sampling of the EOD Range Groundwater Monitoring Well;
- Transporting ash from satellite accumulation points to the Hazardous Waste Support Facility (HWSF); and
- Site inspections and biological monitoring.

Personnel use pickup trucks (up to 1 ton), flatbed trucks (up to 2.5 tons), and flatbed tractor trailers (up to 15 tons) to transport waste energetics to the EOD Range. A typical load of waste energetics transported at one time is approximately 500 lbs gross weight, including packaging and casing. EOD personnel also have access to specialized military vehicles.

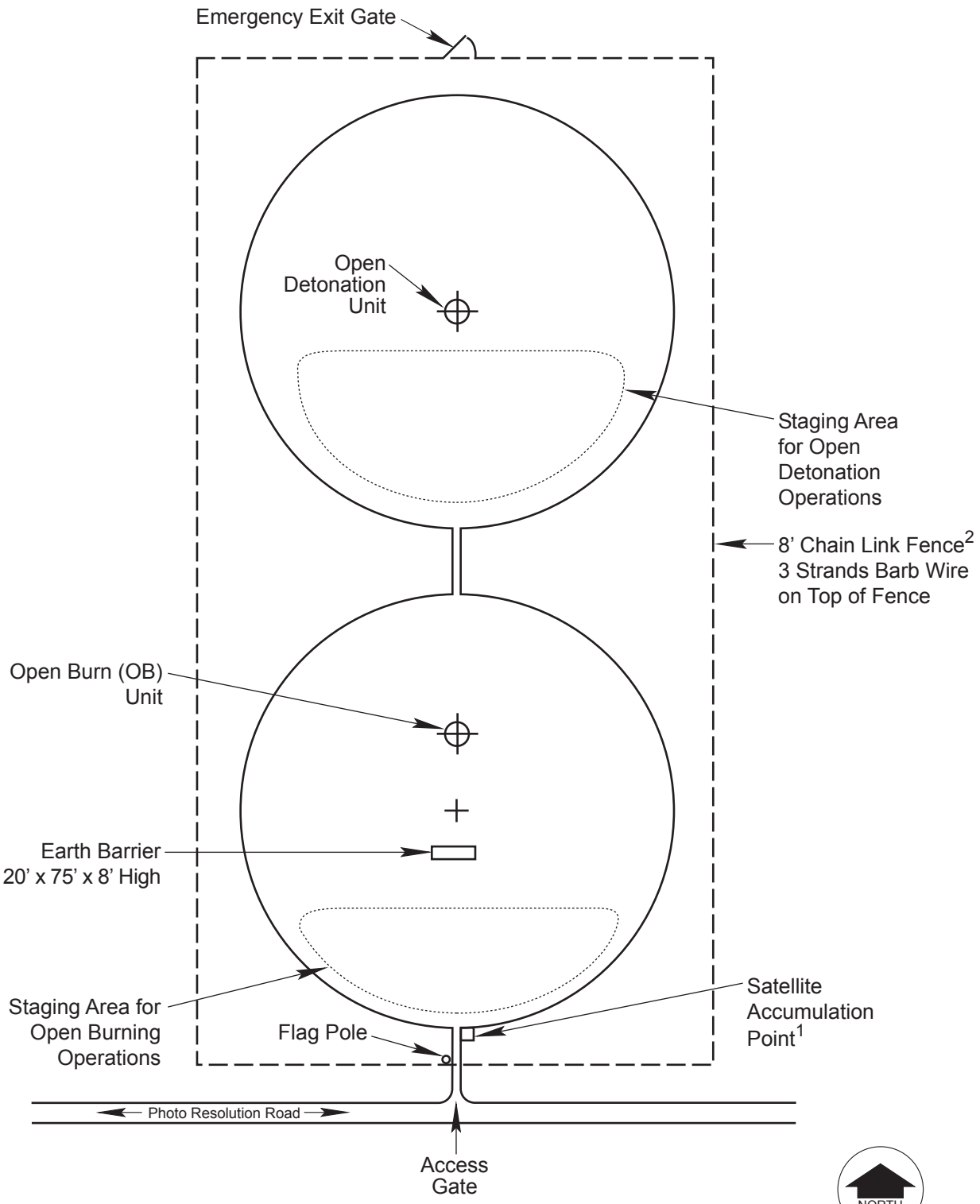
There are no traffic signals in the EOD Range or within the PIRA. However, all vehicle travel on roads within the PIRA requires two-way radio communication with the PIRA control tower at all times.

Avenue B, Mercury Boulevard and Rocket Road are paved roadways. Photo Resolution Road and other roadways in the PIRA are unpaved and range from graded dirt roads to unimproved dirt tracks. The load-bearing capacity of the dirt roads has not been determined. Traffic on the dirt roads is very light, usually less than one truck per hour. The heaviest use of these roads would be during the daylight hours between 0700 and 1700 hours.

Table BBB-1. Locations of Nearby Points of Interest

Description	Compass Direction From the EOD Range	Distance From the EOD Range	
		(kilometers)	(miles)
Nearest Fenceline Point	ESE	2.6	1.6
Nearest Observed Residential Location (in unincorporated Los Angeles County)	S	8.6	5.4
Nearest Occupational Location (South Base Waste Water Treatment Plant)	WNW	9.8	6.1
Nearest Residential Community – Hi Vista	S	9.8	6.1
South Base Area	NW	10.4	6.5
Main Base Area	NW	12.8	8.0
Air Force Research Laboratory	NE	14.4	9.0
Military Family Housing Area	NW	15.4	9.6

Figure BBB-1. Schematic Diagram of EOD Range Showing Major Features



NOTES:
1. Satellite Accumulation Point is not a part of RCRA Facility Permit

2. Chain Link Fence Represents Boundary of EOD Range

SCHEMATIC DIAGRAM OF EOD RANGE SHOWING MAJOR FEATURES

Project No.: 29875499	Date: May 2015	Project:	RCRA PART B PERMIT RENEWAL APPLICATIOIN EDWARDS AIR FORCE BASE	Figure BBB-1

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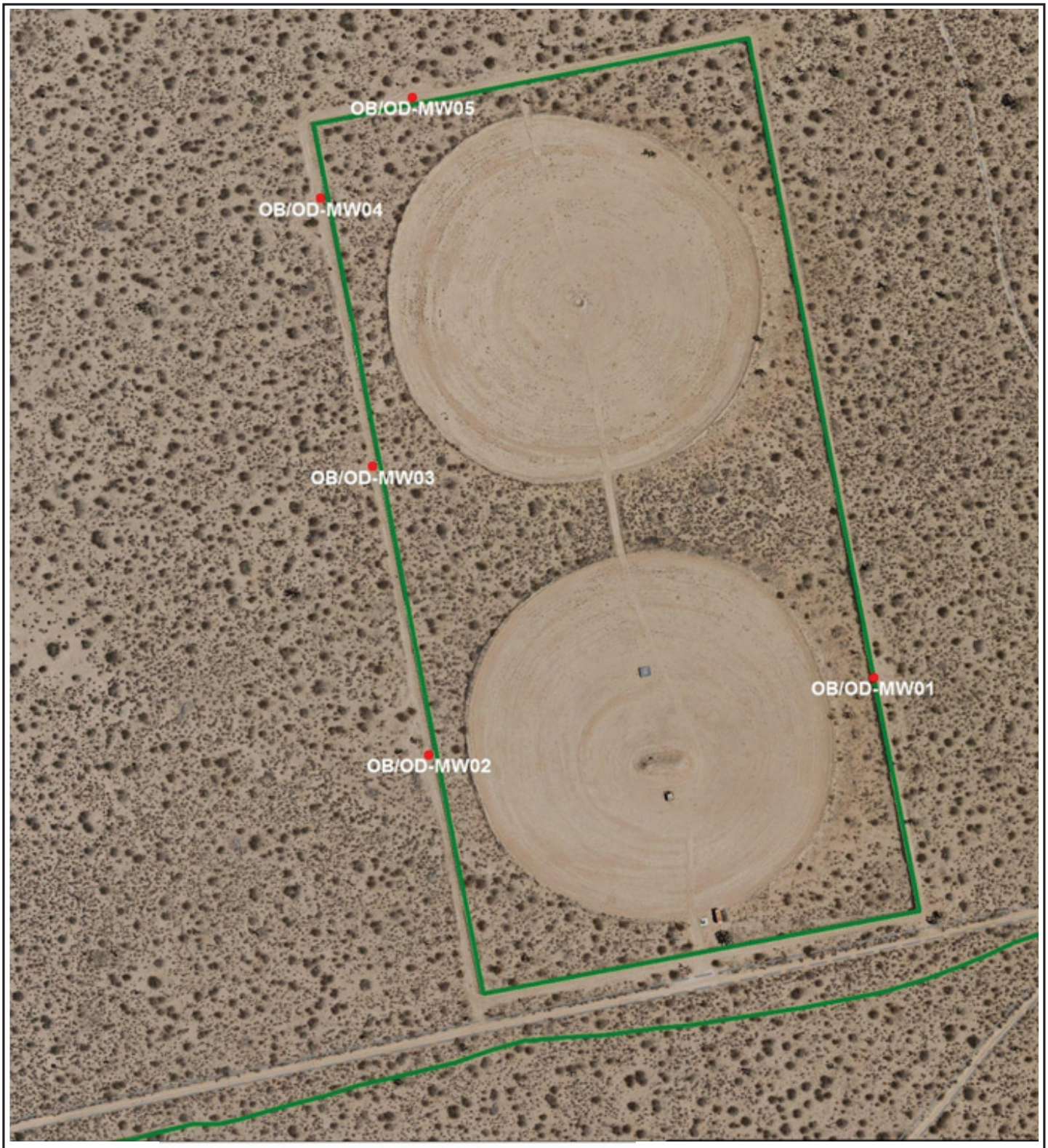
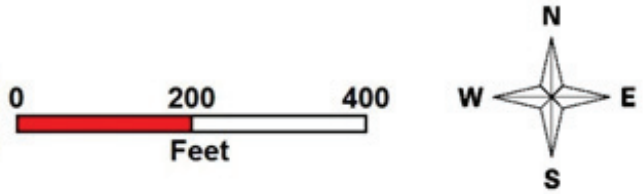
Figure BBB-2. Groundwater Monitoring Wells at the EOD Range





GROUNDWATER MONITORING WELLS AT THE EOD RANGE

Project No.: 29875499	Date: May 2015	Project:	RCRA PART B PERMIT RENEWAL APPLICATION EDWARDS AIR FORCE BASE	Figure BBB-2

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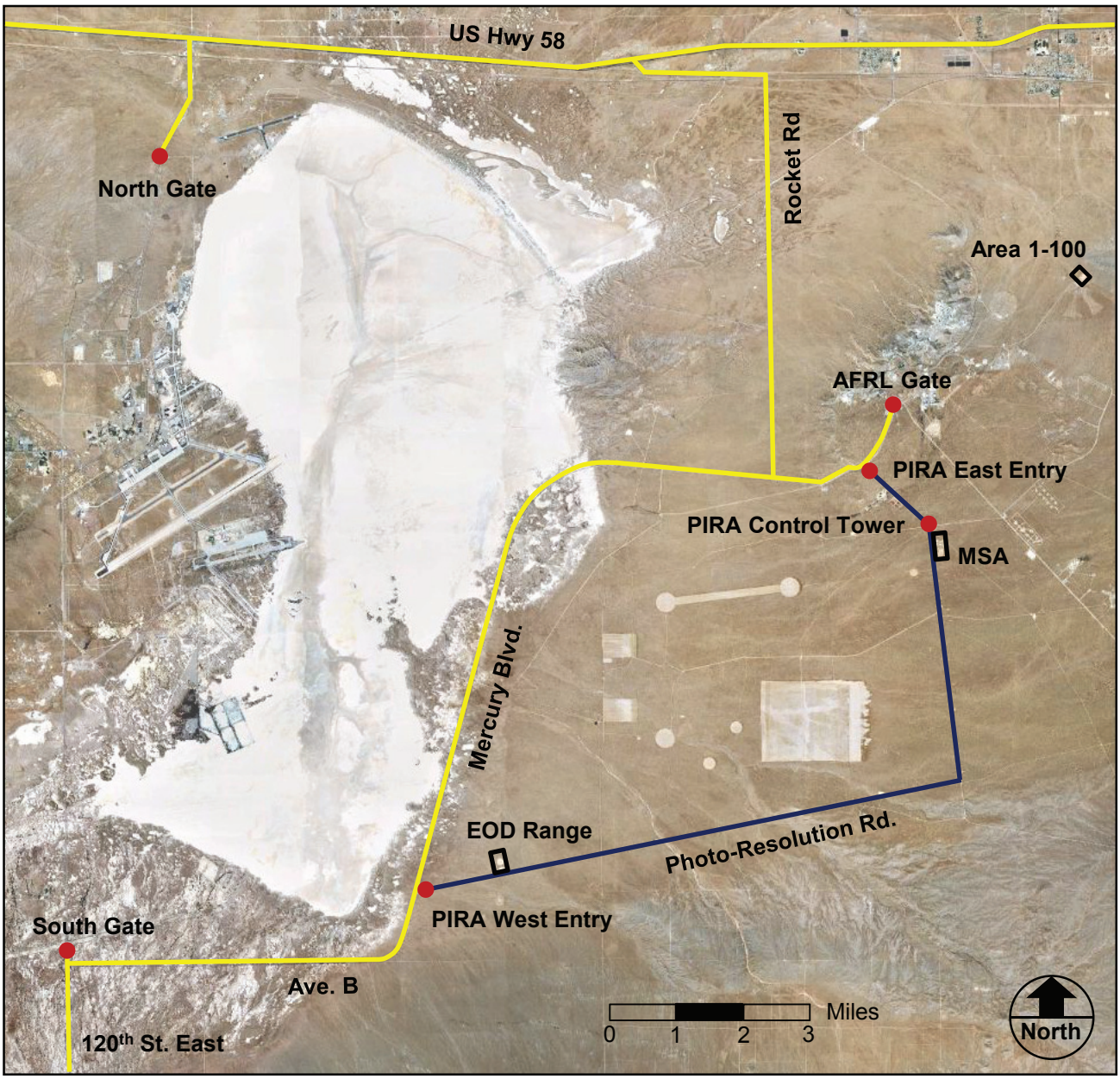
Task 3 - Permit Renewal\2014 Figures\ Figure BBB-3.AI

Figure BBB-3. Map of Edwards AFB with Roads, Access Control Points and Facilities Associated with the EOD Range



Publically Accessible Roads

Access Controlled Roads

Access Controlled Point

Facility

MAP OF EDWARDS AFB WITH ROADS, ACCESS CONTROL POINTS AND FACILITIES ASSOCIATED WITH THE EOD RANGE

Project No.: 29875499	Date: May 2015	Project:	RCRA PART B PERMIT RENEWAL APPLICATION EDWARDS AIR FORCE BASE	Figure BBB-3

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Task 3 - Permit Renewal\2014 Figures\ Figure BBB-3.AI

CCC. WASTE CHARACTERISTICS

CCC.1 CHEMICAL AND PHYSICAL ANALYSES

This section is submitted in accordance with the requirements of 22 CCR 66264.13 and 22 CCR 66270.14(b)(2) and (3). This section describes how the wastes are generated and the chemical and physical nature of HWs treated at the EOD Range.

Additional information concerning the waste characteristic information and data specific to the ash residue generated at the EOD Range is provided in the following subsections, and in the Waste Analysis Plan (WAP), included as Appendix 12 of the HWSF Application document. The WAP provides procedures for sampling, testing, and evaluating the waste to ensure that sufficient information is available for its safe handling and disposal.

CCC.1.a Containerized Waste

Ash residue is produced by OB/OD treatment. The primary source of ash is from OB, with much smaller, if any, ash from OD. Residual ash collected from OB/OD treatment events is placed into 55-gallon drums and stored at the either at the accumulation points near the front gate of the EOD Range, or at AFRL. (Neither of these accumulation points are part of the Edwards AFB HW Facility Permit). However the information in this subsection is being provided so as to demonstrate proper handling of possible HWs generated by EOD Range operations.

The ash is collected after treatment and, by nature, does not contain any free liquid. The drums are stored at the EOD or AFRL accumulation points only until the analytical results from the ash samples are received from the laboratory and a final disposition decision of the ash can be made. Ash residues from OB/OD treatment stored at these sites are handled as a HW until properly characterized by appropriate analytical tests.

22 CCR 66270.15(b) requires a demonstration of compliance with 22 CCR 66264.176 (location of buffer zone and containers holding ignitable or reactive waste) and 22 CCR 66264.177(c) (location of incompatible wastes). The accumulation points located within the EOD Range and within the AFRL complex are more than 15 meters (50 feet) from the Edwards AFB property line. Other than OB/OD ash residue, no other waste is stored at the EOD accumulation point, so there are no incompatible waste issues. Ash residues stored at AFRL are managed according to standard operating procedures to ensure there are no incompatible waste issues. The drums are stored on elevated concrete pads that are sloped to prevent rain accumulation. Residual ash is stored in Department of Transportation (DOT) approved containers that are compatible with ash. If there is any indication that the ash and container may not be compatible with each other, a polyethylene liner may be used in the waste drum to ensure no adverse reactions occur. If the ash residue is characterized as being a HW, the drums are transferred to the HWSF for ultimate disposal.

CCC.1.b Waste in Tank Systems

No tank systems are used at the EOD Range to store or treat HW. This subsection is not applicable.

CCC.1.c Waste in Piles

No waste piles are used at the EOD Range to store or treat HW. This subsection is not applicable.

CCC.1.d Landfilled Wastes

No landfills are used at the EOD Range to dispose of HW. This subsection is not applicable.

Nonhazardous ash, generated as a result of OB/OD treatment, is disposed of in an off-site Class III landfill.

CCC.1.e Wastes Incinerated and Wastes Used in Performance Tests

No incinerators are used at the EOD Range to burn HW. This subsection is not applicable.

CCC.1.f Wastes to be Land Treated

No land treatment units are used at the EOD Range to treat or dispose of HW. This subsection is not applicable.

CCC.1.g Wastes in Miscellaneous Units

The EOD Range OB/OD Units are defined as miscellaneous units per 22 CCR 66264.600 and are the only treatment units in the EOD Range. Waste characteristics information and data specific to the OB/OD Units are provided in the following subsections and in Section DDD.

CCC.1.g.1 DOT Hazard Definitions

The explosive characteristics of the waste propellants and munitions expected to be treated in the OB/OD Units on the EOD Range can be considered in terms of DOT Hazard definitions. The definitions included in 49 CFR 173.50 for Class 1 Explosives Divisions 1.1 through 1.6, and 173.54 for forbidden explosives, are applicable. Table CCC-1 provides the DOT Hazard definitions for Class 1 Explosives Divisions. Forbidden explosives are a special subset that can include wastes for OB/OD treatment, such as leaking or damaged packages containing explosives, and propellants that are unstable or deteriorating. It should be noted that these DOT Hazard definitions do not imply that wastes to be treated at the EOD Range are transportable outside of Edwards AFB, but serve only to aide in characterizing such wastes for treatment.

Munitions can be considered as Divisions 1.1, 1.2, and 1.4 – 1.6, and are typically treated by OD. Energetic solid rocket propellant and solid propellant-contaminated waste laboratory materials can be considered as Division 1.3, and are typically treated by OB. Other munitions and propellant wastes not otherwise considered as Class 1 explosives can be considered as forbidden explosives, and are treated by either OB or OD depending on the items' conditions.

CCC.1.g.2 Waste Propellant from AFRL

AFRL, a research and development complex where solid propellants are developed for rocket motors, generates solid propellant wastes. The composite-based propellants contain ammonium perchlorate/nitrate oxidizers, aluminum powder fuel, poly-organic binding agents, iron oxide powders, and epoxy curing agents. The chemical makeup of the different formulations within a propellant type does not vary significantly. The variations in different propellant formulations are usually a matter of physical parameters such as particle grain size or small variations in constituent quantities.

The waste stream that must be treated includes propellants, propellant intermediates, explosives, propellant ingredients, and propellant-contaminated materials. Waste propellant is generated during mixing and casting operations and as a result of machining operations. Other solid propellant wastes are generated during quality control sampling, qualification batches, and laboratory research on propellant formulations. More than 97% of the AFRL waste stream consists of large pieces of propellant and silica gel. The remainder of the waste consists of propellants, explosives, and pyrotechnics (PEP)-contaminated material (e.g., rags, gloves, paper towels, Velostat™ bags[1], and polyethylene and polypropylene cups). The waste PEP-contaminated materials are classified as hazardous waste due to the highly energetic and reactive nature of the PEP contaminants.

Propellants present a wide range of hazardous characteristics due to variations in grain size of ingredients and energy content of additives. Knowledge of the properties and types of propellants is critical to the establishment of proper hazard controls. Test data can be used to determine the explosive properties and hazards of the raw materials, intermediate compositions, and solid propellant, both cured and uncured. However, since the propellants are formulated, prepared, and tested at AFRL, their chemical and hazardous characteristics are well known.

Rarely, liquid propellants that have become unstable or in leaking containers may have to be treated as a propellant waste on the EOD Range.

CCC.1.g.3 Waste Munitions from MSA

DoD, USAF and Edwards AFB policies and procedures for management of military munitions are fully detailed in Air Force Instruction (AFI), Air Force Manual (AFMAN), Technical Order (TO) and Operating Instruction (OI) documents. These documents provide standard operating procedures (SOPs) for use by those responsible for waste military munitions management at Edwards AFB and to ensure that the waste munitions are stored, transported, treated, and disposed of properly. DoD, USAF and Edwards AFB munitions policy states that a military munition becomes a waste when "…removed from storage for the purpose of disposal or treatment prior to disposal." This has become known as the Igloo Door Rule. Thus it is important to note that no containers are used to store waste munitions.

The MSA stores, dispenses, and inspects only conventional munitions at Edwards AFB. Edwards AFB does not handle biological, chemical or nuclear munitions. The munitions used at Edwards AFB are in support of the following activities:

- Aircraft RDT&E operations;
- Warehoused munitions identified by the MSA inspection schedule tracking program (which stores information about the life cycle of each munitions lot and identifies munitions items with an expired life cycle); and
- Miscellaneous munition shipments from foreign armed forces used in RDT&E operations at Edwards AFB in support of multinational programs and foreign military sales.

Following the procedures provided in USAF *TO-11A-1-10: Air Force Munitions Surveillance Program and Serviceability Procedures (latest version)*, MSA personnel review munitions in storage, flag the

[1] Velostat™ bags are polyethylene bags with static-dissipative linings that provide electrostatic shielding protection to prevent sparking or buildup of static electricity.

munitions that are unserviceable, unusable, or restricted, and request disposition (e.g., treatment, disposal, shipment, etc.) instructions from EOD personnel and the Ogden Air Logistics Center (OO-ALC) at Hill AFB in Utah. OO-ALC is the logistics management center for all deployed conventional air munitions, solid propellants and explosive devices used throughout the USAF. Munitions that EOD personnel and OO-ALC identifies for treatment are transported to the EOD Range and treated by OB/OD, as specified in the disposition instructions.

Rarely, munitions items may be found during construction work, ground excavations, or from other AFTC operations (e.g., damaged while in bunker storage or when removed from bunker storage, damaged during aircraft loading, miss-fires, etc.) and may be taken directly to the EOD Range for treatment if determined by EOD personnel that the item is safe to move.

CCC.1.g.4 Chemical and Physical Analysis of Propellant and Munitions

Waste from the formulation of new propellants at AFRL and munitions items that have undergone testing or are outdated or obsolete are considered hazardous based on the characteristics of ignitability or reactivity, and assigned the EPA hazardous waste numbers D001 or D003. The information needed to treat and store these wastes cannot be determined by analyzing a representative sample due to their reactivity. Therefore, existing information such as published or historical analytical data, knowledge of the chemical substances used in the manufacturing process and product formulations, and/or data provided by military specifications is used to properly treat and store these wastes.

Energetic waste treated at the OB/OD Units includes cartridges, demolition charges, grenades, pyrotechnics, solid propellants and propellant-contaminated materials. Examples of the various munition and propellant items expected to be treated at the EOD Range are shown in Table CCC-2. The NEW components of these wastes possess the reactivity characteristic because of the presence of energetics. Energetics are chemical compounds or mixtures of chemical compounds that can be divided into the following three classes according to use: (1) propellants, (2) explosives, and (3) pyrotechnics. Explosives and propellants, when initiated, release large quantities of gas in a short time; the difference between explosives and propellants is the rate at which the reaction proceeds. For explosives, a fast reaction produces a very high pressure in the surrounding medium; in propellants, a slower reaction produces lower pressure over a longer period of time. Pyrotechnics release large amounts of heat but much less gas than either propellants or explosives. Appendix 17 provides information on the general chemical composition of typical propellants and energetics present in waste munitions.

Reactivity tests for these items are dangerous to conduct and are not available commercially or at Edwards AFB. In addition, it is dangerous, infeasible, and impractical to disassemble munitions items to sample or test their energetic composition. Therefore, Edwards AFB uses the information provided in USAF *TO-11A-1-42: General Instructions for Disposal of Conventional Munitions (latest version)*, to determine whether a waste munition is appropriate for OB/OD treatment. Within the TO, all munitions are identified by USAF nomenclature/identification number (e.g. General Purpose Bomb/Mk84), the recommended treatment method (e.g., detonation by C4), and includes detailed instructions on setting up firing systems and safety precautions. Any treatment option chosen by EOD personnel must be approved by OO-ALC (Hill AFB). OO-ALC is the logistics management center for all conventional air munitions, solid propellants and explosive devices used throughout the USAF.

The chemical ingredients used in propellants produced by AFRL are known, and provided on a solid propellant processing sheet (also known as a batch sheet). This form, which describes the ingredient list used by AFRL personnel to mix the propellant, provides chemical analysis data that can be used to determine the appropriate treatment method for the waste propellant material. Figure CCC-1 illustrates an example batch sheet. Formulations for future propellants will be reviewed by the appropriate Edwards AFB and AFRL personnel staff to determine what, if any, additional analyses are required to determine the constituents of concern.

Propellant waste items from AFRL are managed by AFRL personnel, who have authority to determine disposition and treatment options. AFRL wastes are almost always treated by OB, though OD can be used if there are other considerations (e.g., item configuration, stability concerns). However, the actual treatment operation is performed by EOD personnel following the guidelines provided in *TO-11A-1-42*.

CCC.1.h Wastes in Boilers and Industrial Furnaces

No boilers or industrial furnaces are used at the EOD Range to burn HW. This subsection is not applicable.

CCC.1.i Wastes on Drip Pads

No drip pads are used at the EOD Range to treat or store any HW. This subsection is not applicable.

CCC.2 WASTE ANALYSIS PLAN

The following information is provided as a supplement to the WAP included as Appendix 12 to the HWSF Application document. The information provided is specific only to ash residue generated by OB/OD operations.

There is no separate WAP for propellants and munitions treated by OB/OD operations at the EOD Range. DoD and the USAF have extensive guidance documents in place that dictate how all waste propellants and munitions are to be characterized and treated by OB/OD. These guidance documents are further discussed in preceding subsections and in Section DDD of this this Application document.

CCC.2.a Parameters and Rationale

The WAP addresses procedures to characterize potential HWs for storage and disposal. The WAP applies to the ash residue generated from OB/OD treatment operations. In the event a new waste stream is identified, the procedures presented in the WAP will be followed for characterization of the waste.

CCC.2.b Test Methods

Discussion of ash residue test methods is presented in the WAP.

CCC.2.c Sampling Methods

Discussion of ash sampling strategies is presented in the WAP.

CCC.2.d Frequency of Analyses

Ash residue is generated during each OB and/or OD event. The ash residue will be sampled in each instance that it is generated.

CCC.2.e Additional Requirements for Wastes Generated Off Site

As a rule, Edwards AFB does not accept any HW, including waste propellants and munitions from off-site generators.

The only exception are military unexploded ordnance (UXO) items discovered off-site (e.g., during land excavations, farming activities, etc.). Edwards AFB EOD personnel may be called by local authorities to provide emergency response to such off-site UXO discoveries. In such a case, EOD may, at its discretion and if safe to do so, transport off-site UXO to the EOD Range for treatment. When treating off-site UXO, EOD will use the same DoD and the USAF guidance documents in place for treating on-site generated waste propellants and munitions.

CCC.2.f Additional Requirements for Ignitable, Reactive, or Incompatible Wastes

Precautions to prevent the accidental ignition or reaction of ignitable, reactive, or incompatible wastes are described in Section FFF of this Application document.

CCC.2.g Additional Requirements Pertaining to Boiler and Industrial Furnace Facilities

No boilers or industrial furnaces are used at the EOD Range to burn HW. This subsection is not applicable.

CCC.3 WASTE ANALYSIS REQUIREMENTS PERTAINING TO LAND DISPOSAL RESTRICTIONS

All ash residue generated as a result of OB/OD treatment will be analyzed. If it is hazardous, it will be accompanied by all data necessary to ascertain whether the waste is restricted from land disposal. These data may be in the form of analytical results or documented knowledge of the hazardous characteristic(s) of the waste based on the materials or processes used. For additional information regarding land disposal restriction (LDR) procedures, see Section CC of the HWSF Application document.

CCC.3.a Waste Analysis

Regarding the ash residue, 22 CCR 66268.7(a) and 40 CFR 268.7(a) require that, for all HWs that may be land disposed, the generator must evaluate whether any of the constituents listed in 22 CCR 66268.48 and 40 CFR 268.48 are expected to be present above treatment standards. Such HWs will be analyzed when constituents are suspected of being present at or above Universal Treatment Standards. The analytical methods selected will be based on the generator's knowledge of the waste (e.g., product data). CEV will ensure the laboratory's target analyte list for each given method includes all analytes of concern (e.g., those analytes required to determine whether the waste is characteristically hazardous as well as those underlying hazardous constituents (UHCs) suspected to be present at or above treatment standards).

Many organic compounds are included in the UHC list presented in 22 CCR 66268.48 and 40 CFR 268.48. Treatment standards are typically based on total analyses; however, some compounds require Toxicity Characteristic Leaching Procedure (TCLP) analyses (e.g., methanol). Totals analysis will be

conducted if the waste is suspected to contain toxic characteristic organics as defined by 22 CCR 66261.24 and 40 CFR 261.24 and organic UHCs. Results from the total analyses will be compared to the TCLP limits. For solids, the results of the total analysis can be divided by 20 (the dilution factor used in TCLP analyses for solids) prior to comparison to toxicity characteristic standards presented in 22 CCR 66261.24 and 40 CFR 261.24. This evaluation assumes a worst-case condition where all constituents are completely leached from the waste during extraction. If results indicate that toxicity characteristic standards may have been exceeded for solids, then a TCLP analysis may be conducted to determine actual leachability, if the EPA-established holding time criteria can be met.

CCC.3.b Notification, Certification, and Recordkeeping Requirements

Analytical results of any ash residue that remains after OB/OD treatment must be evaluated to determine whether tested waste is hazardous according to EPA and state definitions. The evaluation is based on California and EPA regulations on the identification and listing of hazardous waste in 22 CCR 66261 and 40 CFR 261. The generator must also determine whether the waste must be further treated before it is land disposed. This is done by determining whether the HW meets the applicable treatment standards in 22 CCR 66268.40, 22 CCR 66268.45, 22 CCR 66268.48, and/or 22 CCR 66268.49 as well as 40 CFR 268.40, 40 CFR 268.45, and/or 40 CFR 268.49 as appropriate. CEV will maintain a copy of all notices, certifications, waste analysis data, and other documentation on-site for at least 3 years from the date the ash residue waste was sent to an off-site treatment, storage, and disposal facility for ultimate disposal.

CCC.3.c Requirements Pertaining to the Storage of Restricted Wastes

There is no storage of restricted HWs on the EOD Range. This subsection is not applicable.

CCC.3.d Exemptions, Extensions, and Variances to Land Disposal Restrictions

This subsection is not applicable to the EOD Range. No case-by-case extension for RCRA wastes has been requested, nor has a petition been approved by the DTSC. In addition, no variance for non-RCRA wastes has been requested by or granted to the EOD Range. There are no surface impoundments requesting LDR exemptions, and there are no exemptions requested for newly identified or listed wastes.

Table CCC-1. DOT Class 1 Explosive Division Definitions of Energetic Wastes to be Treated at the EOD Range OB/OD Units

Division	Definition
1.1	Explosives that have a mass explosion hazard where the mass explosion is one which affects almost the entire quantity instantaneously.
1.2	Explosives that have a projection hazard but not a mass explosion hazard.
1.3	Explosives that have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard.
1.4	Explosives that present a minor explosion hazard and the explosive effects are largely confined to the container, and no projection of fragments of appreciable size or range is to be expected. An external fire must not cause virtually instantaneous explosion of almost the entire contents.
1.5	Very insensitive explosives comprised of substances which have a mass explosion hazard, but are so insensitive that there is very little probability of initiation or of transition from burning to detonation under normal conditions.
1.6	Extremely insensitive articles which do not have a mass explosive hazard, and are comprised of articles which contain only extremely insensitive detonating substances and which demonstrate a negligible probability of accidental initiation or propagation.

Table CCC-2. Examples of Energetic Wastes to be Treated at the EOD Range OB/OD Units

Waste	Treatment Method[a]	
	OB Unit	OD Unit
Small arms cartridges .50 caliber and smaller		X
Cartridge actuated items and devices[a]		X
Engine starter cartridges[a]		X
Smoke and signal flares[a]		X
Thrusting devices		X
Ignition train components[a]		X
Aircraft external source release and related devices[a]		X
Bombs, practice bombs, bomb units		X
Submunitions		X
Demolition charges		X
Fuses		X
Grenades		X
Land mines		X
Priming and initiating devices		X
Pyrotechnics[a]		X
Explosive components		X
Miscellaneous explosive devices and accessory elements[a]		X
Solid propellants	X	
Energetic contaminated waste materials	X	

[a] Exact treatment method depends on requirements stated in USAF TO 11A-1-42 and the physical condition of the waste, and is always at the discretion of EOD personnel.

Figure CCC-1. Example Solid Propellant Processing Sheet (Batch Sheet)

PT-0053

REQUESTOR	FORMULATION DATE	FORMULATION NO.	BATCH NO.	HAZARD DESIGNATION
Lester Knox	1/10/2012	MURI (1A)	Pint	1.3

PROGRAM	WOR	CAST DATE	STATION	PROCESSING PER.	FORMULATION PER.
MURI (1A)	1.2.2	01/18/2012	202	Vicky Custer	Kelly Lemons

	INGREDIENT	IDENTIFICATION	LOT NO.			EQ. WT	EQ. RATIO	Wt. %	TARGET WEIGHT	WEIGHOUT, g	
1	R-45M	HTPB Polymer - Binder	001217					8.24	28.85	GROSS 46.68 TARE 17.83	NET 28.85
2	DOA	Plasticizer	5G					2.00	7.00	GROSS 21.89 TARE 14.89	NET 7.00
3	ODI	Ammonia Scavenger	5969MKV					0.03	0.11	GROSS 1.53 TARE 1.42	NET 0.11
4	DDI	Curative	1410					1.65	5.78	GROSS 20.74 TARE 14.96	NET 5.78
5	TEPANOL	Bonding Agent	88-024-0945					0.08	0.26	GROSS 2.21 TARE 1.95	NET 0.26
6	TiO2	Additive	8399					2.00	7.00	GROSS 8.29 TARE 1.29	NET 7.00
7	AP (200 μ)	Oxidizer	A2000517					39.05	136.68	GROSS 147.95 TARE 11.27	NET 136.68
8	AP (2μ) used (3μ)	Oxidizer	79077-1					31.95	111.83	GROSS 123.09 ~~GROSS~~ 11.26 TARE	NET 111.83
9	AL (H-95) used MD-1ckss	Fuel	C074160					15.00	52.50	GROSS 63.69 TARE 11.19	NET 52.50
10										GROSS TARE	NET
11										GROSS TARE	NET
19										TARE	
20										GROSS TARE	NET
21										GROSS TARE	NET
					TOTAL			100.0	350.00	GROSS TARE	NET

EXAMPLE SOLID PROPELLANT PROCESSING SHEET (BATCH SHEET)

Project No.: 29875499	Date: May 2015	Project:	RCRA PART B PERMIT RENEWAL APPLICATION EDWARDS AIR FORCE BASE	Figure CCC-1

DDD. PROCESS INFORMATION

DDD.1 CONTAINERS

This section presents specific process information for the storage of HW waste in containers at the EOD Range. The information provided in this section is submitted in accordance with 40 CFR 270.15, 40 CFR 264.170–176, 22 CCR 66270.15, 22 CCR 66264.172, and 22 CCR 66264.175.

The only HW that may be stored in containers at the EOD Range is ash residue from OB/OD operations. Residual ash collected from OB/OD treatment events is placed into 55-gallon drums and stored at the either at the accumulation points near the front gate of the EOD Range, or at AFRL. Neither of these accumulation points are part of the Edwards AFB HW Facility Permit. However the information in this subsection is being provided so as to demonstrate proper handling of possible HWs generated by EOD Range operations.

DDD.1.a Containers with Free Liquids

No containers with free liquid are stored at the EOD Range. This subsection is not applicable.

DDD.1.b Containers without Free Liquids

Containers stored at the EOD Range are DOT-approved containers used to store ash residues generated during OB/OD treatment operations.

DDD.1.b.1 Test for Free Liquids

The ash residue is collected after treatment and, by nature, does not contain any free liquid.

DDD.1.b.2 Description of Containers (Without Free Liquid)

Containers used to store ash at the accumulation points are DOT-approved open-top steel 55-gallon drums. Once ash is placed into the container, the container top is installed and secured with a locking-ring. Drums are labeled in accordance with processes specified in Section DD of the HWSF Application document. No leaking or damaged containers are used to store the ash.

DDD.1.b.3 Container Management Practices (Without Free Liquid)

Containers are stored at the accumulation points located at the south end of the EOD Range, or within the AFRL complex. The drums are stored on cement pads without stacking, and never stacked more than 2 high when necessary. The drums are stored at the accumulation points only until the analytical results from the ash samples are received from the laboratory and a final disposition decision of the ash can be made. The containers are kept closed at all times except when filling or removing waste. When the containers are removed from the accumulation points, care is taken to ensure they do not rupture.

DDD.1.b.4 Container Storage Area Drainage (Without Free Liquid)

The containers are stored on elevated concrete pads that are sloped to prevent rain accumulation.

DDD.2 TANK SYSTEMS

No tank systems are used at the EOD Range to store or treat HW. This subsection is not applicable.

DDD.3 WASTE PILES

No waste piles are used at the EOD Range to store or treat HW. This subsection is not applicable.

DDD.4 SURFACE IMPOUNDMENTS

No surface impoundments are used at the EOD Range to store, treat, or dispose of hazardous waste. This subsection is not applicable.

DDD.5 INCINERATORS

No incinerators are used at the EOD Range to burn HW. This subsection is not applicable.

DDD.6 LANDFILLS

No landfills are used at the EOD Range to dispose of HW. This subsection is not applicable.

DDD.7 LAND TREATMENT

The OB/OD Units are not land treatment units per the definition provided in 22 CCR 66260.10. This subsection is not applicable.

DDD.8 MISCELLANEOUS UNITS

OB/OD treatment is defined as a miscellaneous unit in 22 CCR 66264.600 since OB/OD does not meet any of the definitions for other types of hazardous waste management units. Therefore, by definition, the EOD Range OB/OD Units are miscellaneous units.

DDD.8.a Description of Miscellaneous Units

This section presents specifications for design and operation of the EOD Range that protect the environment from potential releases of hazardous wastes.

DDD.8.a.1 EOD Range and OB/OD Unit Configuration

The EOD Range has two treatment units, an OD Unit and an OB Unit. These treatment units are needed to treat explosive wastes that cannot be safely handled by other, conventional means of hazardous waste treatment or disposal. Each unit is used to treat different types of explosive wastes. The OD Unit will treat waste munitions such as bombs, grenades, and assorted pyrotechnics. The OB Unit will treat waste such as solid rocket and missile propellants from AFRL. Depending on specific circumstances, the OD Unit may also be used to treat waste solid rocket and missile propellants from AFRL.

The EOD Range is located on the PIRA well within the boundaries of Edwards AFB. This remote siting provides the separation needed between the EOD Range and public areas to prevent OB/OD operations from impacting potentially inhabited areas. The OB/OD Units are strategically located within the EOD Range. The OD Unit is north of the OB Unit and farthest from Photo Resolution Road. This provides extra separation distance from the road. The OD Unit is accessed through the OB Unit area. Figure DDD-1 shows the layout and dimensions of the OB/OD Units in the EOD Range. Appendix 18 contains photographs of the EOD Range and OB/OD Units. The internal layout and dimensions of the OB/OD Units are set in accordance with guidance in *TO-11A-1-42*.

A minimum distance from the EOD Range has been established as a "buffer zone" to protect base personnel from potential hazards, primarily air blasts associated with OD treatment operations. In this situation, an air blast can produce an over-pressure wave that can have adverse health effects at close range. EOD has set this minimum distance at 2,500 feet for a typical treatment of 500 lbs of explosives and 5,000 feet for a maximum treatment of 2,000 lbs of explosives. These buffer zones are based on guidance provided in the *AFMAN 91-201: Explosive Safety Standards (latest version)*. This guidance provides mathematical formulas that can be used to calculated safe over-pressure distances based on the NEW of munitions. EOD personnel have discretion to change theses buffer distances depending on the blast characteristics of the munitions to be treated in a specific event. While OB operations do not generally produce blast effects, the same minimum distances as in OD operations may be applied to OB operations at the discretion of EOD personnel. Figure DDD-2 shows an aerial image of the EOD Range and the buffer zones (to scale) from the center of the OD Unit. It should be noted that the entire area within both zones are empty, open desert land. The nearest publicly accessible road, Mercury Boulevard to the west, can be closed to all traffic by Edwards AFB Security Forces if necessary, again at the discretion of EOD personnel if any OB/OD operations warrant such a road closure.

DDD.8.a.2 EOD Range and OB/OD Operating Guidance

Edwards AFB EOD is organized as a Division under the 412th Test Wing Civil Engineer Group (CE). EOD operations are managed in accordance with the Edwards AFB *EOD Operating Instruction 91-4: OB/OD Facility Operations (latest version)*. *OI 91-4* establishes general processes to be used by EOD for operating the OB/OD Units. The latest version of *OI 91-4* is presented in Appendix 19.

Within *OI 91-4* are checklists and references to AFI, AFMAN and TO documents that provide general and specific guidance, SOPs and data on EOD Range and OB/OD operations. The documents that are directly relevant to this Application document are listed in Table DDD-1.

The documents cited in Table DDD-1 detail EOD Range and OB/OB Unit design, operating and firing procedures, safety requirements and standards, and munition specific data: over 1,000 pages dedicated to safety and treatment procedures for munitions and propellants.

OB/OD operations are planned events, occurring approximately one to two times a month. All OB/OD operations are coordinated with Edwards AFB PIRA, CE, Medical and Security Forces personnel to ensure controlled access to the EOD Range. OB/OD operations can usually be completed in one day. Each operation is done separately; the OD treatment is done first, followed by OB treatment. This sequence affords the best use of time and ensures the safety of operating personnel. OD will always occur first since it lasts only a few seconds and Edwards AFB personnel can return to the area soon after the detonation is complete. OB will always occur second. Although OB may only last for 1–2 minutes, it requires a 24-hour cool-down period before EOD Range personnel can return to the site.

The use of either burning or detonation as treatment is dictated by the nature of the waste itself. Certain wastes, like propellants, are known to burn rapidly with no chance of detonation. However, because of age or configuration, it is sometimes safer to treat propellants by detonation. Other wastes may burn with some chance to detonate in the process. For this reason, guidance is provided in *OI 91-4* and the documents referenced within as to which treatment method is most appropriate, and how or whether certain explosive items may be combined for treatment.

These DoD, USAF and Edwards AFB guidance documents also allow EOD personnel discretion in implementing OB/OD operations depending on waste and site conditions. It must be specifically noted that the very nature of military munitions and propellants is one of extreme danger. EOD personnel are highly trained to handle military munitions and propellants and will always select the safest disposal method.

DDD.8.a.3 Operating Conditions of the EOD Range

The general operating characteristics of the OB/OD Units that minimize potential human and environmental impacts from airborne emissions are:

- Treatment of energetic wastes is anticipated to occur 1 to 2 times a month,
- OB/OD treatments have short durations, and
- Treatment of energetic wastes takes place only during certain times and meteorological conditions.

DDD.8.a.3.1 Operating Time Frames

The EOD Range is operated during daylight hours only (time of day: typically 0800–1600 hours). OB/OD treatments have short durations: approximately 3–30 minutes for OB and 10 seconds or less for OD. Rapid burning is accomplished because of the reactive characteristics of the explosives.

DDD.8.a.3.2 Acceptable Meteorological Conditions

Treatment of energetic wastes takes place only during certain meteorological conditions for the safety of EOD personnel, to maximize dispersion of combustion products, and to minimize the impacts to potential receptors. For treatment to take place, according to *TO-11A-1-42* there must be no electrical, sand, dust, rain, or snow storms present at the EOD Range and no electrical storms within 5.75 miles of the EOD Range during OB/OD operations. Additionally, for OB operations, the prevailing wind must not exceed 15 miles per hour (mph).

DDD.8.a.4 Open Burn Unit

The OB Unit is used to treat waste solid rocket and missile propellants, and propellant contaminated laboratory wastes from AFRL that are considered hazardous based on their ignitable and reactive properties.

At the points of generation at AFRL, the wastes are placed in Velostat™ bags, which are both compatible with the waste and can be burned along with the propellant, without creating smoke or excessive particulates. The Velostat™ bags are stored inside metal containers for structural support during accumulation, storage and transport. All AFRL waste propellants are managed and stored in a 90-day accumulation point in Building 8955 adjacent to the Area 1-100 site at AFRL. The Area 1-100 facility and accumulation point are not part of this Application for the EOD Range. All AFRL waste propellants are managed according to applicable parts in the propellant waste collection, handling, and storage and disposal sections of the Edwards AFB *AFRL Area 1-30, 1-38, 1-100, 1-21 Chemical Hygiene Plan (latest version)*. All records regarding AFRL management of their propellant wastes are maintained on site by AFRL personnel within the AFRL facility.

Since the propellants that constitute the wastes are formulated, prepared, and tested at AFRL, their burn characteristics are well known. The use of the OB Unit is appropriate since these wastes are not likely to detonate. The most common waste items from AFRL are propellant test articles, propellant scraps from cutting, and propellant contaminated laboratory materials. These items are generated from local AFRL RDT&E activities and generally do not include any packaging materials such as wood, metal, fiberboard and fiberglass. However, RDT&E items that may be in long-term storage and later deemed a waste for OD treatment may be in a packaged form. Under such circumstances, and when safety is not compromised, packaging materials are removed before OB treatment.

A specialized class of waste propellant items can include large cast propellant segments that can weigh up to 2,000 lbs. Such items are stored and handled on wood pallets, and when treated by OB, are burned with the pallets as it is not safe to try and remove the items from the pallets. These large items are not stored in Building 8955 due to safety considerations, but rather in specialized explosive shelters located throughout AFRL. These items are not classified as a HW until AFRL has determined their disposition, at which point they are moved to the EOD Range for treatment. Because of their size and weight, special coordination and equipment is required before such items are declared a waste and then treated.

OB is done on the ground in a large, flat, cleared area designated for OB operations. In accordance with *TO-11A-1-42*, the cleared area should be a minimum 200 foot radius; however, for additional protection against fire, the cleared area has a 300-foot radius and is maintained free of vegetation as long as the OB unit is in operation. Clearing is done at least annually and more often if needed. The OB Unit is separated from the OD Unit to provide an open area in case any propellant is thrown during a burn (e.g., sputtering, kick-out of propellant chunks). An approximately 8-foot tall earth barrier located within the OB unit provides additional protection to the satellite accumulation point and areas immediately south of the OB Unit from any thrown burning propellant. An earth barrier is preferred over a metal barrier since metal fragments might fly from a metal barrier if an accidental detonation occurred in the OB area. The barrier design and spacing requirements are in accordance with specifications provided in *TO-11A-1-42*. Figure DDD-1 illustrates the dimensions of the OB Unit and the location of the earth barrier.

Documentation of the actual treatment action is accomplished via AF Form AM517I, an example of which is provided in Appendix 20. The form is signed by EOD personnel after treatment signifying destruction of the waste propellants. Records are maintained by AFRL personnel on site within the AFRL complex.

AFRL personnel contact EOD personnel and coordinate transfer of waste propellants to be treated to the EOD Range. AFRL personnel transport waste propellants to the EOD Range the day of a scheduled treatment event. At their discretion, EOD personnel may accompany AFRL personnel during transportation. Vehicles used for transportation are USAF government-registered vehicles only – no personal vehicles are allowed. Vehicles used can include pickup trucks (up to 1 ton), flatbed trucks (up to 2.5 tons), and flatbed tractor trailers (up to 15 tons) to transport waste munitions to the EOD Range. A typical load of waste munitions transported at one time is approximately 500 lbs or less gross weight. Vehicles used are commercially available models. Specific vehicles types and on-board equipment are determined based on the size, weight and configuration of the propellant items for treatment. Large and/or heavy propellant items can be transported by specialized USAF vehicles (e.g., flat-bed with crane) that

are not commercially available. Another factor in vehicle selection is road conditions as roads into and out of the EOD Range are graded-dirt roads only. All transportation takes place on paved and graded-dirt roads entirely within Edwards AFB, and can be access controlled by base Security Forces to block any use by non-authorized personnel during propellant transport. Referencing the map shown in Figure BBB-3, the normal route for transportation by AFRL to the EOD Range starts from Area 1-100 to the AFRL Gate on roads accessible only to DoD authorized traffic, then about 1 mile southwest on Mercury Boulevard to the PIRA East Entry, then 1.4 miles southeast to the PIRA Control Tower, then 3.9 miles south to Photo-Resolution Rd, then 7 miles west to the EOD Range. However, depending on load and road conditions, AFRL may use Mercury Boulevard traveling 12.3 miles west-southwest from the AFRL Gate to the normally locked PIRA West Entry to Photo-Resolution Road, then 1.4 miles east to the EOD Range. Additionally, there are other alternative PIRA roads accessible from the PIRA Control Tower that can be used to get to Photo-Resolution Road, again depending on load and road conditions.

All operations within the OB Unit are conducted by EOD personnel in accordance with *TO-11A-1-42*. AFRL personnel may assist at the direction of EOD. OB operations are conducted so that they occur only during acceptable meteorological conditions as previously defined. An OB event is set up by placing the waste items in the approximate center of the OB Unit on the ground. The actual physical arrangement is dictated by the configuration of the items to be treated. Generally heavier items are placed first, and lighter items placed on top. Generally, OBs are initiated by a thermite or powder charge ignited by a dual firing system using either two timed-fuses, or two remote activated electric squibs or blasting caps. It is important to note the OB initiation systems used can vary according to the OB situation at hand, and at the discretion of EOD personnel. There are instances where the energetic characteristics of the waste to be treated by OB may not be sufficient to start and maintain a burn. In such instances, EOD personnel use wood dunnage and diesel fuel to help initiate and maintain a burn. For a 2,000 lb OB event, the waste items are placed on 4 standard 4-foot by 4-foot wood-pallets arrange in a 2 x 2 square, then surrounded on each side by 8 wood-pallets (2 pallets per side placed on edge), then topped with 4 more wood-pallets in a 2 x 2 square. The arrangement resembles a box of 16 wood-pallets surrounding the waste items. Finally, EOD personnel pour up to 8 gallons of standard vehicle diesel fuel onto the waste/pallet stack to aid in starting the burning of the pallets. Ignition of the waste/pallet stack is as previously described. Smaller OB events will use fewer pallets arranged so that the waste items are surrounded, and less diesel fuel. Once initiated, the all burn processes quickly produce large volumes of combustion gases. A very large volume of expanding gases would be generated in a normal burn event.

OB is an efficient treatment method for solid propellants since they are designed for efficient and complete combustion during rocket engine or missile firing. As a result, OB treatment generally results in complete conversion of the waste to gases with little ash created. After a 24-hour cool-down for each burn the entire OB area is inspected. Any residual ash is collected using hand tools (e.g., shovels), and placed in a 55-gal drum(s), the drums labeled, and then sampled. Any unburned propellant (considered an unlikely event) is collected and re-burned. The drum(s) is temporarily placed at the accumulation points on the EOD Range or within the AFRL complex, and then disposed of as either hazardous or nonhazardous waste after results of laboratory analysis are received. These accumulation points are not included in the scope of this permit. Since ash is removed from the OB Unit after the 24-hour cool-down period, no special provisions for run-on or run-off management are needed.

If analytical results indicate the ash is non-hazardous, EOD or AFRL personnel contact personnel in CE, who pick up the drums and arrange for disposal at an authorized off-site Class III landfill. If analytical results indicate the ash is hazardous, EOD or AFRL personnel complete a Waste Turn-In Document (WTID), an example of which is provided in Appendix 20. EOD or AFRL contact the CEV Hazardous Waste Program Manager to coordinate transport by authorized Edwards AFB personnel of the waste drums to the HWSF. Once HWSF personnel characterize the waste material, it is readied for transport and disposal at a properly licensed off-site facility.

DDD.8.a.5 Open Detonation Unit

The OD Unit is used to treat waste munitions generated by AFTC RDT&E activities. General types of waste munitions that require detonation are bombs, grenades, land mines, warheads, priming and initiating cartridges, fuses, and flares. Under certain circumstances such as age or configuration, propellant items are safer to treat by OD, as determined by AFRL personnel.

Except as noted above and in section CCC, waste munitions treated by OD originate from MSA. Munition disposition starts with MSA initiation of AF Form 191 – Ammunition Disposition Request, followed by the procedures described in section CCC. A copy of Air Force (AF) Form 191 is provided in Appendix 20. Before OD treatment, the waste munitions are packaged in an appropriate container for transporting from the MSA to the EOD Range. USAF *TO-11A-1-46: Fire Fighting Guidance, Transportation, and Storage (latest version)* provides guidance on hazard classification, fire-fighting, and transportation/storage data for conventional USAF munitions. The TO specifies packaging to be used for different types of munition items, and can be applied to the same munition items as wastes for OD treatment. Typical containers are wooden boxes or crates, fiberboard boxes, metal cans or boxes, fiberglass containers, and/or pallets. As long as safety is not compromised, these packaging materials are removed and reused. If a container becomes damaged, it is inspected to ensure that no energetic wastes are in the container and then discarded as a non-hazardous waste. In the unlikely event that there is energetic waste in the container, it is treated in the OD Unit as appropriate. AFRL waste propellants to be treated by OD are handled as detailed in Section DDD.8.a.4.

OD is done on the ground in a large, flat, cleared area designated for OD operations. In accordance with *TO-11A-1-42*, the cleared area should be a minimum 200 foot radius; however, for additional protection against fire, the cleared area has a 300-foot radius and is maintained free of vegetation as long as the OD Unit is in operation. Clearing is done at least annually and more often if needed. Because of the nature of OD treatment, there are no other special engineering preparations or materials of construction associated with the unit. Wastes that detonate release high energy and any confinement such as concrete, paving and berms could crack and/or become a projectile and safety hazard. Cased munitions, such as gravity bombs, can produce fragments during an OD operation. Per *AFMAN 91-201*, the maximum calculated fragmentation distance for a 2,000 lbs Mk 84 gravity bomb (with 945 lbs of NEW) is 5,107 feet. The most likely fragmentation scenario for the OD Unit is a 500 lbs Mk 82 (with 192 lbs of NEW), giving a maximum calculated fragmentation distance of 4,478 feet. This distance is within the buffer zone defined in Section DDD.8.a.1. Additionally, EOD personnel may change these buffer distances depending on the blast characteristics of the munitions to be treated in a specific event.

Documentation of the actual treatment action is accomplished via AF Form 191, an example of which is provided in Appendix 20. The form is signed by EOD personnel after treatment signifying destruction of the waste munitions. Records are maintained by MSA personnel on site within the MSA facility.

MSA personnel transport waste munitions to the EOD Range the day of a scheduled treatment event. At their discretion, EOD personnel may accompany MSA personnel during transportation. Vehicles used for transportation are USAF government-registered vehicles only – no personal vehicles are allowed. Vehicles used can include pickup trucks (up to 1 ton), flatbed trucks (up to 2.5 tons), and flatbed tractor trailers (up to 15 tons) to transport waste munitions to the EOD Range. A typical load of waste munitions transported at one time is approximately 500 lbs gross weight, including packaging and casings. Vehicles used are commercially available models. Specific vehicles types and on-board equipment are determined based on the size, weight and configuration of the munition items for treatment. Large and/or heavy munition items can be transported by specialized USAF vehicles (e.g., flat-bed with crane) that are not commercially available. Another factor in vehicle selection is road conditions as roads into and out of the EOD Range are dirt roads only. All transportation takes place on paved and dirt roads entirely within Edwards AFB, and can be access controlled by Security Forces to block any use by non-authorized personnel during munitions transport. Referencing the map shown in Figure BBB-3, the normal route for transportation by MSA to the EOD Range starts from the MSA facility, then 3.6 miles south to Photo-Resolution Road, then 7 miles east to the EOD Range. However, depending on load and road conditions, MSA may use Mercury Boulevard, traveling 1.7 miles northwest to the PIRA East Entry, then 11.3 miles west-southwest on Mercury Boulevard to the normally locked PIRA West Entry to Photo-Resolution Road, then 1.4 miles east to the EOD Range. Additionally, there are other alternative PIRA roads accessible from the PIRA Control Tower that can be used to get to Photo-Resolution Road, again depending on load and road conditions. Other waste munitions from AFTC operations, as described in Section CCC, would be transported by EOD personnel to either the PIRA West or East Entries from South Gate, and then to the EOD Range using the routes already detailed. AFRL waste propellants to be treated by OD are transported as detailed in Section DDD.8.a.4.

All operations within the OD Unit are conducted by EOD personnel in accordance with *TO-11A-1-42*. OD operations are conducted so that they occur only during acceptable meteorological conditions as previously defined. An OD event is set up by placing the waste items in the approximate center of the OD Unit on the ground. The actual physical arrangement is dictated by the munition items and their configuration. ODs are initiated by demolition charges (commonly called a donor charge); usually C4 blocks placed on the munition items then detonated by a dual firing system using either two timed-fuses, or two remote activated electric blasting caps. Details for each USAF munition item on physical arrangements within the OD Unit, placement of demolition charges and firing systems are specified in *TO-11A-1-42*. It is important to note the OD initiation systems used can vary according to the OD situation at hand, and at the discretion of EOD personnel. OD of AFRL propellant wastes is accomplished using the same procedures as for munitions.

Detonation is an efficient treatment method for waste munitions since they are designed to detonate. Therefore, treatment by OD generally results in complete conversion of the waste energetics to gases. The only residues generated from OD operations are dispersed metal fragments and, on occasion, residual ash and pieces of energetic material or UXO that were not completely treated. After every detonation

event, the EOD Range is inspected for ash, energetic materials and metal fragments. Any remaining energetic materials or UXO that is found is detonated in place. Fragments that do not visibly contain energetic material are considered "inert certified", and are collected and sent to a range residue collection area in the MSA as scrap metal for final disposition. Any ash residue that remains after an OD is inspected by EOD personnel, cleaned up immediately and managed the same as OB ash residue for storage and disposition. As a result, no run-on or run-off management is required for OD operations.

DDD.8.a.6 Standard Operating Procedures

Within *OI 91-4* are references to AFI, AFMAN, TO and OI documents that provide general and specific guidance, SOPs and data on EOD Range and OB/OD operations, including operating and firing procedures, safety requirements and standards, and munition specific data. It must be noted that due to the broad range of munition and propellant items and configurations used by the USAF, EOD personnel are highly trained experts and have full discretion to work within the procedures detailed in the aforementioned documents. A very brief overview of a typical OB/OD operation is provided below.

Additionally, other TOs and Plans that are referenced in this Application document provide general and specific guidance, SOPs and data on other supporting non-EOD operations, such as munition and propellant handling, transportation and disposition determinations. All supporting operations will comply with the most recent version of these documents. To the extent that changes to these non-EOD documents result in a change to any of the environmental and health protective measures explicitly contained in this Application, a request for permit modification will be submitted. Changes to these documents that do not affect the environmental and health protective measures contained in this Application will not constitute a permit modification.

Before any treatment operation can occur, all OB/OD operations are coordinated with Edwards AFB PIRA, CE, Medical and Security Forces personnel to ensure controlled access to the EOD Range. Since the EOD Range is on an active bombing range, advanced coordination with PIRA personnel is essential to ensure no interference with ongoing AFTC RDT&E flight operations.

Equipment and supplies needed for OB/OD are staged, and include: two-way radios, range flags, shovels, fire extinguishers, first aid kit, water jugs, demolition kits, and personal protective equipment (PPE): full-face respirator with combination P100 filters, Tyvek suits, steel-toed boots, over-boots, rubber gloves, leather gloves, and safety glasses. As detailed in Sections DDD.8.a.4 and 5, EOD personnel stage demolition charges and ignition trains required for treatment. These are prepared in advance of an OB/OD operation. After these preparations have been made, a specific date is set for the event.

On the day of the OB/OD operation:

- All Edwards AFB groups are notified to obtain final clearance for the action.
- Eastern Kern Air Pollution Control District (EKAPCD) is contacted on the day of the event and before proceeding to the EOD Range to determine if a "no burn day" is in effect. If a "no burn" day is in effect, the treatment is not scheduled for that day.
- The wastes are transported to the EOD Range.
- Access roads are barricaded as required.

- The range flag is raised and flown throughout the OB/OD operation.
- The Range Safety Officer (RSO) or the Safety Supervisor leads a range safety briefing.

After the waste items arrive at the EOD Range, they are prepared for treatment in accordance with specific guidance, SOPs and data on munition and propellant items. These activities are done in the staging area for the OB Unit and/or the staging area for the OD Unit. As a safety precaution, as required by *TO 11A-1-42*, the staging activities for OB/OD events are done at least 50 feet from the actual treatment location.

The OB/OD event can be initiated by any of the EOD personnel on the range, except the RSO. The RSO is the most senior EOD person on the range, and must devote full attention to the supervision of the treatment event. Once the RSO has determined that all safety precautions are set, and the treatment events are set, the RSO give the OK to proceed with the action. Once the OB/OD action is complete, follow-up actions proceed as previously detailed in sections DDD.8.a.4 and 5.

DDD.8.b Waste Characterization

The quantities of waste to be treated by OB/OD are measured in terms of NEW. NEW is used to determine explosive limits and has been set, for purposes of this Application, at 2,000 lbs per treatment event, except for OD of mercury-containing munitions which is 700 lbs for each treatment event. The annual treatment limit, regardless of the munitions or propellants treated is set at 150,000 lbs.

DDD.8.c Treatment Effectiveness

OB and OD events are the desired treatment methods because they are effective in destroying the waste on-site and eliminate the need for transportation or for further storage, treatment, or disposal.

The primary goal of OB/OD is to deactivate and render safe the energetic component of the waste treated. A measure of the effectiveness of the OB/OD processes is the reactivity characteristic of the post-treatment wastes, which include ash (from OB/OD operations) and munitions components/shrapnel fragments (from OD operations). Based on knowledge of the propellant constituents, as well as an understanding of the propellant combustion process, waste propellant treated via OB would be fully oxidized during combustion, rendering the post-treatment waste neither ignitable nor reactive. The OD of waste munitions is performed using an initiating charge capable of ensuring complete oxidation during combustion of both the munition and the initiating charge.

OB/OD treatments are effective because they completely oxidize the explosive constituents of the wastes. Complete oxidation is ensured by the following factors:

- Characteristics of the waste – The desired properties of PEP materials also ensure complete oxidation because they burn rapidly and completely.
- Excess oxygen is available for combustion – Oxygen is available for combustion of explosive wastes from two sources: (1) ambient air and (2) oxidizers within the waste, such as ammonium perchlorate.
- Turbulent atmospheric condition – OB and especially OD treatments create turbulent atmospheric conditions, thereby enhancing oxidation by afterburning.

AFRL tests the waste ash generated from OB/OD for corrosivity and toxicity characteristics; the analytical results from past ash sampling are provided in the *Edwards AFB Precision Impact Range Area Open Burn/Open Detonation Health Risk Assessment (2012, Amended 2015)*, hereafter referred to as the " HRA".

Volume reduction data resulting from OB/OD treatment events at Edwards AFB are not available; however, the effectiveness of OB/OD treatment has been demonstrated using field data obtained during multiple DoD PEP emissions testing programs. Several of the early measurement studies were conducted initially at facilities at Sandia National Laboratories and subsequently at the U.S. Army's Dugway Proving Ground. These measurement studies included small-scale tests and field studies.

The small-scale studies were conducted within an elasticized, flexible hemisphere. The device emission characterization facility is also known as the "BangBox" and has a volume of approximately 1,000 m^3. The facility was fully instrumented with high-volume samplers, canisters, real-time analyzers and data acquisition equipment. EPA had primary responsibility to ensure that proper quality assurance procedures were followed and has approved the use of the measurement data in risk assessments used to support the development of DoD OB/OD RCRA permit applications. The HRA presents the calculations used to estimate the emission rates of various combustion byproducts generated during OB/OD treatment of PEP and PEP-containing materials at Edwards AFB.

DDD.8.d Environmental Performance Standards for Miscellaneous Units

The regulatory requirements for miscellaneous units do not specify minimum technology or monitoring requirements for miscellaneous units, but specify environmental performance standards that must be met through conformance with appropriate design, operating, detection, and monitoring provisions, as well as requirements for responses to releases of hazardous waste or hazardous constituents from the units. These performance-based standards, as specified in 22 CCR 66264.601, require the prevention of releases that present an unacceptable level of risk to groundwater or subsurface environment, surface soil, surface water, and air.

Additionally, the regulatory requirements call for an environmental assessment and a minimum of a screening-level risk assessment to be performed to demonstrate compliance with the standard. The design, location, construction, operation, maintenance and closure standards for miscellaneous units must prevent releases to groundwater, the subsurface environment, surface water, soil surface, and air and must be protective of human health and the environment.

The permit information requirements specific to environmental performance standards that pertain to miscellaneous units are given in 22 CCR 66270.23(b) and (c).

DDD.8.d.1 Protection of Groundwater and Subsurface Environment

Permit requirements focus on the geological, hydrogeological, and meteorological conditions of the site and how these conditions may potentially affect compliance of the unit with environmental performance standards for protection of groundwater and the subsurface environment. Geological and hydrogeological information specific to Edwards AFB and the EOD Range are presented in Section B of the Base-Wide Information Application document. Additional meteorological information is discussed below.

As stated in Section B of the Base-Wide Information Application document, the average rainfall for Edwards AFB is 5.03 inches, recorded from 1942 through 2013. The average annual evaporation rates from 1995 to 2005 are 82.4 inches/year.[2] Due to the arid, windy, desert climate of Edwards AFB, pan evaporation rates are high, approximately 116 inches/year.[3] Evapotranspiration rates in the vicinity of the EOD Range are 66.4 inches/year.[4]

Pan evaporation and evapotranspiration rates far exceed the average rainfall at the EOD Range. Drainage in the EOD Range generally flows west, following the topographic profile of the ground surface. Sheet flow drainage occurs after minor precipitation, while significant rainfall produces runoff that travels through ephemeral channels. Much of the precipitation falling on the EOD Range is subject to a high rate of evaporation, while runoff resulting from major storm events is conveyed within ephemeral channels relatively quickly. Based upon these factors it is estimated that the net recharge to groundwater under the EOD Range is minimal at most. It can be reasonably assumed that the extremely low soil moisture content would provide little, if any, mechanism for contaminants from OB/OD operations to migrate into the subsurface at depth. During installation of monitoring wells around the perimeter of the EOD Range in 2003, the minimum depth-to-groundwater was found to be 201 feet below ground surface (bgs). This further reinforces the unlikelihood of any mechanism for contaminants to migrate into the subsurface at depth.

However, in order to determine whether future operations under the Permit impact groundwater, Edwards AFB has implemented a groundwater monitoring plan. Details on the aforementioned monitoring wells and groundwater monitoring plan can be found in Sections DDD.8.e and EEE.

DDD.8.d.2 Protection of Surface Water, Wetlands, and Soil Surfaces

Due to the high desert environment where Edwards AFB resides, there are no surface waters and wetlands exposed to EOD operations, therefore requirements for protection of surface waters and wetlands do not apply.

Based on feasible exposure pathways, it is assumed that contaminated soils and plants (through uptake from soils) may have potential impacts on the Desert Tortoise (*Gopherus agassizii*) and Mohave Ground Squirrel (*Spermophilus mohavensis*). As discussed in Section K of the Base-Wide Information Application document, the desert tortoise is listed as a “threatened species” by both the federal government and the state of California, and the Mohave ground squirrel is listed as a “threatened species” by the state of California. In 1996, Edwards AFB prepared a Phase I Predictive Ecological Risk Assessment which identified five potential contaminants-of-concern (COC) that could impact the Desert Tortoise. These COCs can impact the Desert Tortoise through direct soil ingestion, and by ingestion of plants contaminated with COCs. This triggered a 2002 Phase II Ecological Risk Assessment Validation Study that evaluated the COC levels from past OB/OD operations in both soils and plants in the EOD Range downwind area of impact, against an unaffected background area. The results of the Phase II ERA indicated there were no significant statistical differences in either soil or plant COC concentrations between the downwind or background areas. The overall conclusion is that past OB/OD operations have

[2] Edwards AFB Climatology Data, 2006

[3] Dutcher, L.C. and Worts, G.F., Geology, Hydrology, and Water Supply of Edwards Air Force Base, Kern County, California, U.S. Geological Survey Open-File Report, 1963.

[4] California Irrigation Management Information System, Palmdale Station, September 2005 – August 2006.

not had any discernible impact on Desert Tortoise populations. However, in order to determine whether future operations under the Permit impact soils, Edwards AFB will implement a soil monitoring plan as described in section DDD.8.e.1.

DDD.8.d.3 Protection of the Atmosphere

A HRA has been prepared to evaluate the potential health risk impacts associated with emissions from OB/OD treatment events. The HRA was reviewed and approved by DTSC on 5 January 2012. Copies of the approval letters are provided in Appendix 21. Data supporting an amended version of the HRA to address the addition of wood dunnage and diesel fuel use in OB events was submitted to DTSC April 2014, and the amended HRA was submitted to DTSC in 2015. The HRA evaluated direct and indirect sources of emissions released during OB/OD. The direct emissions result from the actual treatment at the OB/OD Units; the indirect emissions result from activities that support the treatment activities such as ash handling, grading, and windblown dust from disturbed ground. To facilitate characterization of emissions, the various types of wastes treated using OB/OD were grouped into several emission categories, including for example: C4 (1,3,5-Trinitroperhydro-1,3,5-Triazine [RDX] dominated explosive); DB (double-based propellant dominated by Nitrocellulose and Nitroglycerin); RPMAX (composite worse-case rocket propellant); and lead (lead-based PEP). The HRA calculated the maximum predicted cancer and non-cancer risks when each emission category is treated at the permit limit of 2,000 lbs NEW[5] for each event and 150,000 lbs NEW for an annual treatment limit. The results of the HRA indicate no unacceptable risk to human receptors at these permit limits. The methodology and results of the risk assessment are discussed in detail in the HRA.

In addition to potential impacts associated with emissions from OB/OD operations, OD events may result in noise impacts from OD blasts. In 2006, Edwards AFB completed a noise evaluation study: *RCRA Part B Noise Assessment for Open Detonation Activities (2006)*. In this study, OD events were modeled for noise impacts by predicting peak sound levels (dBP) for impulse events based on 100, 500, 1,000 and 2,000 lbs NEW OD events, and under various meteorological conditions. The study concluded that detonation of munitions up to 2,000 lbs NEW during optimum weather conditions (sunny day, cumulus clouds, and windy) and less optimal weather conditions (low winds, clouds), would yield dBP levels that have a possibility of producing complaints, but otherwise would not result in any significant health or physical impacts. The greatest dBP levels were predicted for the least common weather condition (low stable clouds, winds < 4.5 mph), and could yield the highest possibility of complaints, and some possibility of health and physical impacts for 1,000 lbs or greater OD events. The most common weather condition at Edwards AFB is sunny with high cumulus clouds and average winds of 8.4 mph.

DDD.8.e Monitoring, Analysis and Response

DDD.8.e.1 Elements of a Monitoring Program

The *Edwards Air Force Base Explosive Ordnance Disposal Range Open Burn/Open Detonation Environmental Monitoring Plan (Draft 2015)* (EMP) presents a comprehensive sampling, analysis, and monitoring plan to evaluate the potential impacts on a long-term basis from OB/OD activities. The EMP assess COCs dispersed onto soils in the EOD Range and surrounding areas, and COCs in groundwater

[5] Emissions from PEP-containing mercury resulted in an exceedance of the acute mercury hazard index for OD treatment above 700 lbs NEW. Therefore, waste items with mercury-based PEP are limited to 700 lbs NEW per OD event.

using the five previously installed monitoring wells. Soil and groundwater COC concentrations will be statistically compared to existing background levels to determine if impacts are occurring.

DDD.8.e.2 Air Monitoring Alternatives

Due to the nature of OB/OD events (very high temperatures and pressures), and variations in plume dispersion properties based on ambient weather conditions, traditional air monitoring approaches such as sampling canisters and real-time analyzers are not viable. Instead, Edwards AFB will monitor the impacts of COCs released from OB/OD activities through the aforementioned EMP.

DDD.9 BOILERS AND INDUSTRIAL FURNACES

Boilers and industrial furnaces are not used at the EOD Range to burn HW. This subsection is not applicable.

DDD.10 CONTAINMENT BUILDINGS

Containment buildings are not used at the EOD Range to store HW. This subsection is not applicable.

DDD.11 DRIP PADS

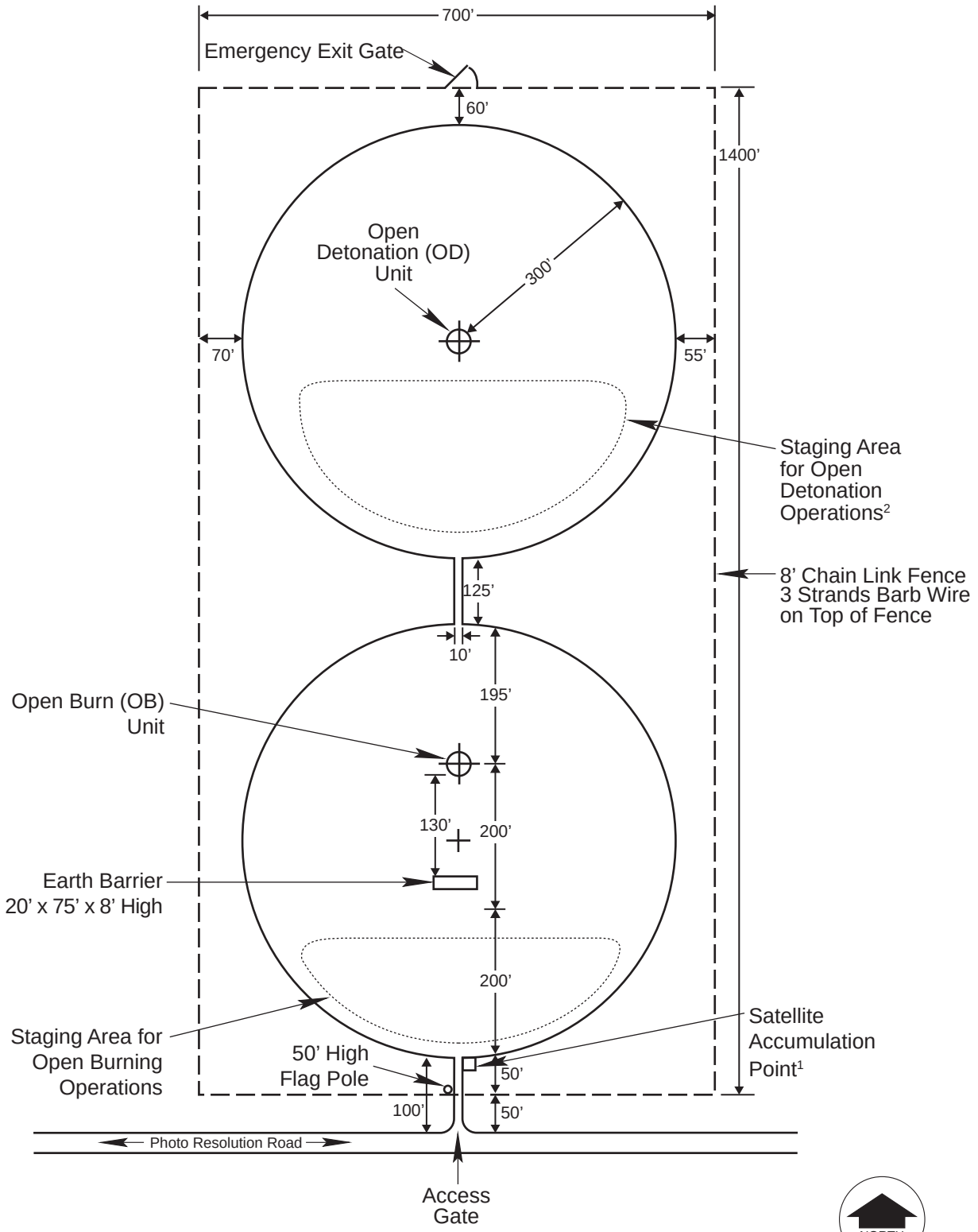
Drip pads are not used at the EOD Range to treat or store HW. This subsection is not applicable.

Table DDD-1. Technical References for Explosive Operations Used by the USAF

Reference Number	Title[a]
AFMAN 91-201	Explosives Safety Standards
TO-11A-1-42	General Instructions for Disposal of Conventional Munitions
TO-11A-1-66	General Instructions, Demolitions
TO-60A-1-1-22	EOD Disposal Procedures, General EOD Safety Precautions
60-Series TOs	Specialized EOD Technical Orders

[a] All EOD Range and OB/OD operations will comply with the most recent version of these documents. The documents cited in Table DDD-1 may be revised. To the extent that changes to these documents result in a change to any of the environmental and health protective measures explicitly contained in this Application, a request for permit modification will be submitted. Changes to these documents that do not affect the environmental and health protective measures contained in this Application will not constitute a permit modification.

Figure DDD-1. Layout and Dimensions of OB/OD Units in the Edwards AFB EOD Range



NOTES:
1. This is a satellite accumulation point and is not part of the Regulated Unit
2. Staging area must be at least 50' from designated OD or OB operation

LAYOUT AND DIMENSIONS OF OB/OD UNITS IN THE EDWARDS AFB EOD RANGE

Project No.: 29875499	Date: May 2015	Project:	RCRA PART B PERMIT RENEWAL APPLICATION EDWARDS AIR FORCE BASE	Figure DDD-1

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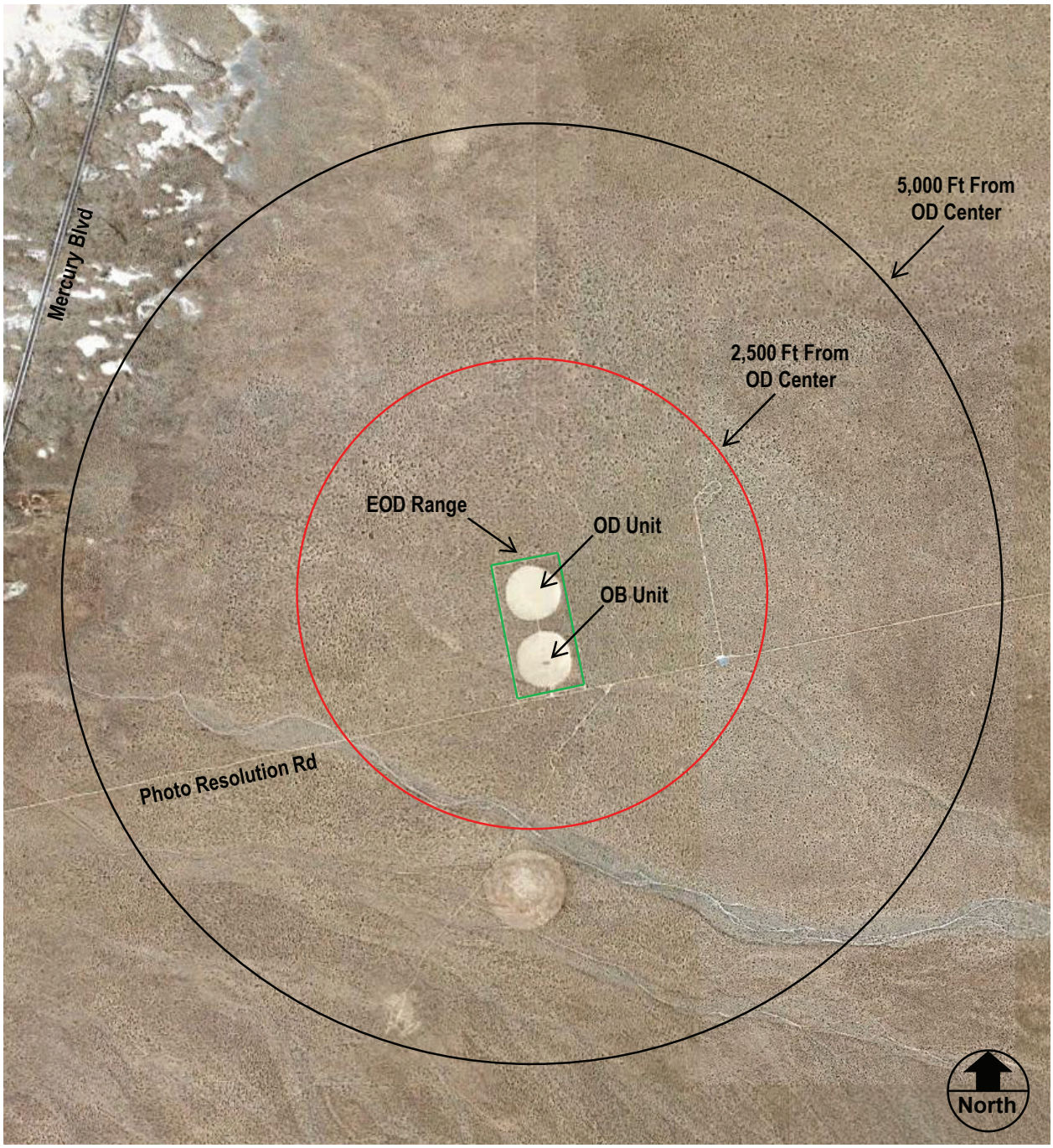
Task 3 - Permit Renewal\2014 Figures\ Figure BBB-3.AI

Figure DDD-2. OD Unit Buffer Zones at Edwards AFB EOD Range



OD UNIT BUFFER ZONES AT EDWARDS AFB EOD RANGE

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EEE. GROUNDWATER MONITORING

EEE.1 EXEMPTION FROM GROUNDWATER PROTECTION REQUIREMENTS

22 CCR 66270.14(c)(5) requires that specific information be provided by owners or operators of HW facilities containing a "regulated unit". A regulated unit is defined in 22 CCR 66264.90(a) as a surface impoundment, waste pile, or land treatment unit or landfill that receives HW. This section is not applicable to Edwards AFB as the EOD Range does not treat HW in surface impoundments, waste piles, land treatment units or landfills. The information contained in this section is provided in support of the environmental performance standards for groundwater protection discussed in Section DDD.8.e.

EEE.2 INTERIM STATUS GROUNDWATER MONITORING DATA

Edwards AFB is currently operating under a quarterly groundwater monitoring program. The groundwater monitoring well network and sample collection procedures are discussed in the following sections.

EEE.2.a Description of Wells

Five monitoring wells were installed around the perimeter of the EOD Range in December, 2003. The wells were installed in accordance with the Edwards AFB *Groundwater Monitoring Well Installation Technical Work Plan, Open Burn/Open Detonation Facility (2003)*. The work plan was reviewed and approved by DTSC on 21 July 2003. A copy of the approval letter is provided in Appendix 21.

A surface and down-hole ordnance avoidance survey was conducted to clear the location prior to and during intrusive drilling procedures. UXO-trained personnel used hand augers to excavate the proposed borehole to a depth of 6 feet bgs. A hollow stem auger rig was then used to facilitate the down-hole clearance by pre-drilling each site to a depth of 20 feet bgs. At each 2-foot interval a magnetometer was lowered down the hole to evaluate the presence of ferrous objects. No ordnance or explosives were encountered during the survey. None of the proposed locations needed to be relocated to avoid ordnance. Total drilling depth at the site ranged from 220 to 252 feet bgs. The actual depth-to-groundwater for the wells ranged from 201 feet bgs to 222 feet bgs. Upon completion of the fieldwork, the monitoring wells were referenced to standard horizontal and vertical control by a California-licensed land surveyor. The elevations were surveyed at the top of the inside well casing and at the ground surface adjacent to the well. Figure BBB-2 shows the location of the five groundwater monitoring wells. Details on the well installation work are documented in the Edwards AFB *Well Completion Report, Open Burn/Open Detonation Facility (2004).*

EEE.2.b Description of Sampling and Analysis Procedures

Groundwater samples are currently collected and analyzed using EPA-approved methods. The samples are analyzed for explosives, metals, and other constituents that may be present due to prior OB/OD treatment of waste munitions and propellants (e.g., perchlorate). Sampling and analysis procedures are provided in the *Groundwater Monitoring and Response Plan, Open Burn/Open Detonation Facility (2003)* (GMRP). The GMRP was approved by DTSC on 21 July 2003. A copy of the approval letter is provided in Appendix 21.

EEE.2.c Monitoring Data

Edwards AFB has been collecting samples from the monitoring wells located at the EOD Range since 2004. This data will be incorporated in the EMP for as a baseline background for comparison with future groundwater monitoring data collected during OB/OD operations.

EEE.2.d Statistical Procedures

Refer to the EMP for a statistical analysis of the groundwater data to determine background levels.

EEE.2.e Groundwater Assessment Plan

Edwards AFB has been collecting samples from the monitoring wells located at the EOD Range since 2004, and in accordance with the procedures set forth in the GMRP. The data are used to determine groundwater flow direction and whether contaminants, if detected, are increasing in the aquifer underlying the EOD Range. Refer to the EMP for the procedures used to determine if contaminant levels are increasing above background.

EEE.3 GENERAL HYDROGEOLOGIC INFORMATION

Hydrogeological information on Edwards AFB and EOD Range is presented in section B of the Base-Wide Information Application document.

EEE.4 TOPOGRAPHIC MAP REQUIREMENTS

The boundaries of the EOD Range and the OB/OD units are delineated on the topographic map provided in Appendix 16d. Information on the uppermost aquifer and aquifers hydraulically interconnected beneath the facility property are not included on the topographic map. However, they are described in section B of the Base-Wide Information Application document.

Monitoring wells have been placed at along the perimeter of the EOD Range, also shown on the topographic map in Appendix 16b. No contaminants have been detected in the groundwater monitoring wells; therefore, no plume is shown on the map.

EEE.5 CONTAMINANT PLUME DESCRIPTION

Based on the quarterly groundwater data collected from the EOD Range monitoring wells to date, there is no groundwater plume.

EEE.6 GENERAL MONITORING PROGRAM REQUIREMENTS

Edwards AFB proposes using the existing monitoring wells at the EOD Range to meet the general groundwater monitoring requirements in 22 CCR 66264.601(a). The five groundwater monitoring wells installed around the perimeter of the EOD area are currently used to measure any contamination background levels and any contamination that may have migrated from the OB/OD Units to the underlying aquifer.

The GMRP presents the background, objectives, and methodology for the recurring sampling of groundwater monitoring wells located at the EOD Range. The groundwater data being collected prior to

2015 and in accordance with the GMRP are considered background data, and will be used to evaluate whether future OB/OD operations at the EOD Range are impacting groundwater as part of the EMP described in section DDD.8.e.

EEE.7 DETECTION MONITORING PROGRAM

Edwards AFB is operating under a detection monitoring program. Samples are collected quarterly and analyzed for various energetics, metals and other contaminants of concern. Groundwater quality data such as specific conductivity, dissolved oxygen, pH, and oxidation/reduction potential are also collected. The EMP includes a statistical analysis of the groundwater data collected to determine background levels. The EMP details the procedures to be used to determine if contaminant levels are increasing above background.

EEE.8 COMPLIANCE MONITORING PROGRAM

Hazardous levels of contaminants of concern have not been detected in the monitoring wells; therefore, this section is not applicable.

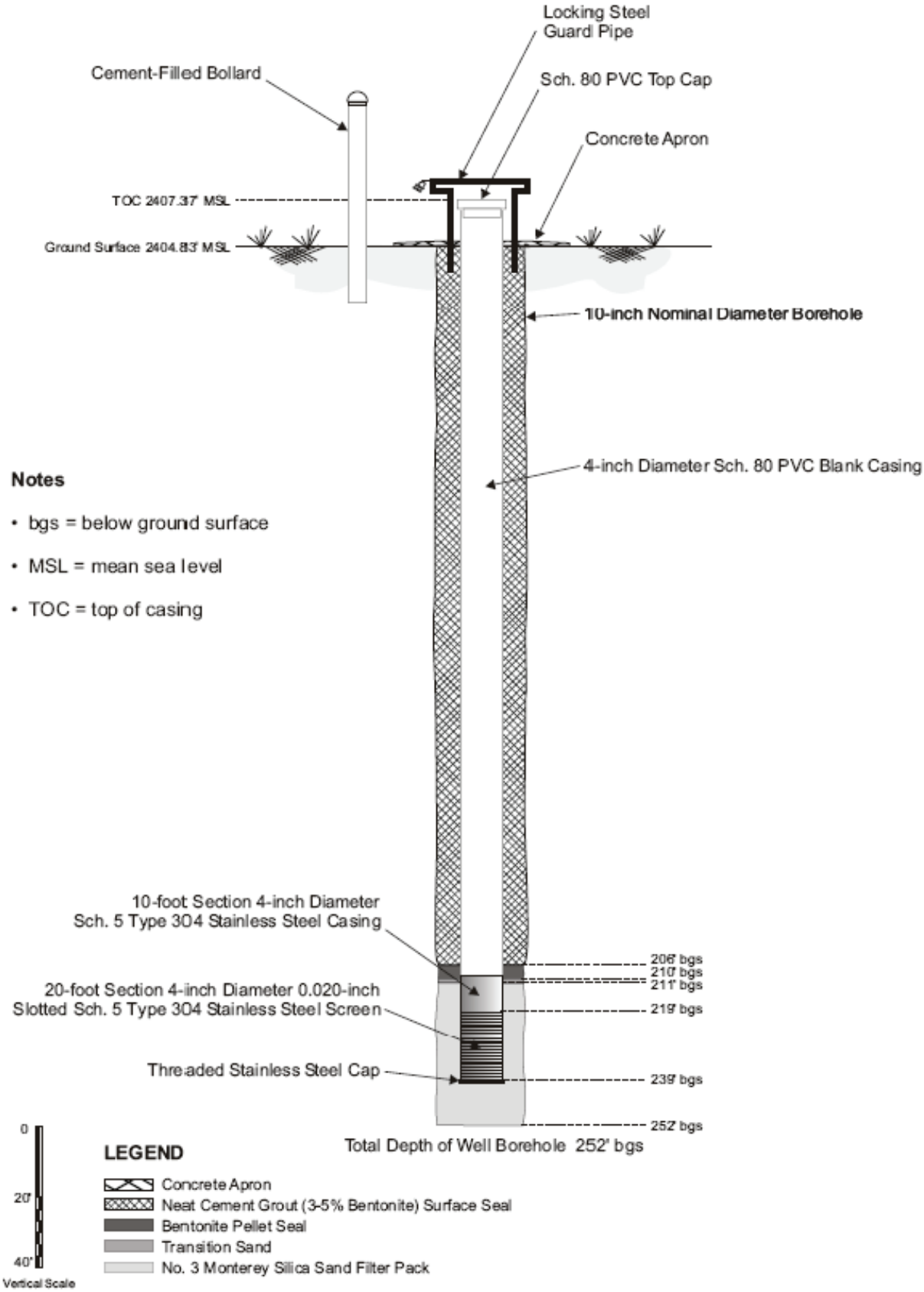
EEE.9 CORRECTIVE ACTION PROGRAM

Hazardous levels of contaminants of concern have not been detected in the monitoring wells; therefore, this section is not applicable.

EEE.10 GROUNDWATER MONITORING WELL DESIGN

Figure EEE-1 shows the monitoring well construction diagram for OB/OD-MW-01. The other four wells OB/OD-MW-02 through 05 are similar in construction.

Figure EEE-1. Monitoring Well Construction Diagram



MONITORING WELL CONSTRUCTION DIAGRAM

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FFF. PROCEDURES TO PREVENT HAZARDS

This section addresses the following requirements as they apply specifically to the EOD Range: security, inspection schedule, preparedness and prevention requirements, preventive procedures, structures and equipment, and prevention of reaction to ignitable, reactive, and incompatible wastes. Also included in this section are recordkeeping procedures.

FFF.1 SECURITY ELEMENTS

FFF.1.a Waiver and Injury to Intruder

The EOD Range does not request a waiver of the security requirements of 22 CCR 66270.14(b)(4) regarding injury to intruder and violation by intruder. A description of the security elements and equipment required by 22 CCR 66264.14 is provided in Section FFF.1.b. This section describes the security measures used to prevent the unauthorized entry of persons, livestock, or wildlife into the EOD Range.

FFF.1.b Security Procedures and Equipment

The EOD Range is entirely within Edwards AFB boundaries with access-controlled entry that does not allow unauthorized access by the public. The EOD Range is located within the PIRA, a further restricted access area within Edwards AFB boundaries, and only a limited number of EOD and Edwards AFB personnel are authorized to enter the range. Section BBB and Figure BBB-3 provides additional details on roads and access control points for the PIRA and EOD Range.

In order to enter or exit the PIRA, all personnel are first required to check in at the PIRA Downfall Control Tower complex. All movement on the PIRA is arranged by contacting the control tower by two-way radio communication. Before leaving the PIRA, all personnel must also check out. Access to and from the EOD Range itself occurs through a single gate located on the south end of the facility, which remains locked unless authorized personnel are present. There is an additional locked gate on the north end that is to be used only as an emergency exit during treatment operations.

The EOD Range is operated during daylight hours only (time of day: typically 0800–1600 hours). There are no electrical power, water or sewer utilities at the facility since it is considered a “remote” site. The EOD Range is surrounded by 8-foot-high chain-link fences that are topped with three strands of barbed wire. The barbed wire and the chain-link fence together have an effective height of 9 feet. The north and south gates in the fence surrounding the EOD Range are secured with keyed locks to prevent unauthorized entry when EOD personnel, or other authorized Edwards AFB personnel, are not present. A limited number of EOD and Edwards AFB personnel have access to the keys for these locks. As a remote site, there is no video surveillance in or around the EOD Range.

FFF.1.c Warning Signs

Bilingual caution signs are posted at the main front entrance gate, and at the rear, and on the fencing surrounding the EOD Range at regular intervals, at the main front entrance gate, and at the rear. Wording is as follows:

Danger **Hazardous Waste Area** **Explosive Disposal Range** **Keep Out** **No Smoking**	**Peligro** **Area De Los Desechos Peligrosos** **Rango Explosivo de La Disposicion** **Mantiene Fuera De** **No Fumar**

These signs are posted at a location for maximum visibility to personnel in the area, and are legible from a distance of 25 ft. The area is not open to the public. Signage is posted per *TO-11A-1-42*. Photographs of the signs are provided in Appendix 18.

FFF.2 INSPECTION SCHEDULE

The following section outlines the EOD Range's procedures for monitoring and inspecting safety emergency equipment, communications and alarm systems, decontamination equipment, security devices, monitoring equipment, and operating and structural equipment, in accordance with 22 CCR 66264.15 requirements.

FFF.2.a General Inspection Requirements

EOD personnel inspect the facility for malfunctions and deterioration, operator errors, and discharges that may be causing, or may lead to, release of hazardous waste constituents to the environment or a threat to human health. These inspections also include review of operating records and items such as equipment malfunction, structural deterioration, fire hazards, and safety and security problems.

EOD personnel conduct these inspections in accordance with the *Inspection Checklist for EOD Range*, as shown in attachment 6 of *OI 91-4*, as provided in Appendix 19. Inspections are intended to identify problems in time to correct them before they harm human health or the environment.

Additional notes on Inspection Checklists in *OI 91-4*:

- OB Burn Pan and Burn Dumpster and drip pan: this equipment has never been used and will be removed from the EOD Unit at a later date. They are not part of this permit application. The OI will be revised during its next update cycle.

- Satellite Accumulation Point: EOD personnel are responsible for management of the accumulation point for ash residue storage. While the accumulation point is included in the checklist, it is not part of this permit application.

FFF.2.a.1 Types of Problems

The inspection checklist identifies the types of problems to be looked for during the inspection.

FFF.2.a.1.1 Monitoring Well Inspections

The *OI 91-4 Inspection Checklist for the EOD Range* does not include the five monitoring wells detailed in Section EEE. EOD personnel are not trained to inspect such wells. If EOD personnel observe obvious signs of damage to the well heads and casings, CEV is alerted. Such observations take place when the

EOD Range is used for OB/OD operations. Qualified inspections of these wells are accomplished when samples are taken. These inspection procedures are described in the EMP discussed in Section DDD.8.e.

FFF.2.a.2 Frequency of Inspections

The inspection checklist specifies the frequency of inspections for the EOD Range.

FFF.2.a.3 Schedule of Remedial Action

Remedial actions are taken as soon as possible to correct deficiencies noted in inspection reports. If an inspection of a HW container in the Satellite Accumulation Point reveals a leaking container, it will be either overpacked or its contents will be transferred to another container. In the event an inspection detects a leak or a situation that may threaten the environment or human health and cannot be immediately controlled, the applicable requirements as described in the Edwards AFB Contingency Plan will be implemented. The Contingency Plan is included as Appendix 6 of the Base-Wide Information Application document.

FFF.2.a.4 Inspection Log

The *OI 91-4 Inspection Checklist for EOD Range* also functions as an inspection log.

FFF.2.b Specific Process Inspection Requirements

FFF.2.b.1 Container Inspection

The EOD Range does not use containers for the treatment of munitions and propellants. The Satellite Accumulation Point within the EOD Range (not part of this Application) may handle HW in containers. Procedures for inspection of such containers are provided in Sections FF of the HWSF Application document.

FFF.2.b.2 Tank Systems Inspection

The EOD Range does not store HW in tanks. This subsection is not applicable.

FFF.2.b.3 Waste Pile Inspection

The EOD Range does not store HW in waste piles. This subsection is not applicable.

FFF.2.b.4 Surface Impoundment Inspection

The EOD Range does not store HW in surface impoundments. This subsection is not applicable.

FFF.2.b.5 Incinerator Inspection

The EOD Range does not incinerate HWs. This subsection is not applicable.

FFF.2.b.6 Landfill Inspection

The EOD Range does not place any HW into landfills. This subsection is not applicable.

FFF.2.b.7 Land Treatment Inspection

The EOD Range does not place any of its HWs into land treatment units. This subsection is not applicable.

FFF.2.b.8 Miscellaneous Unit Inspection

The *OI 91-4 Inspection Checklist for EOD Range* defines the scope, type of problems, corrective actions and frequency of inspections. All inspections are conducted in accordance with the following general guidelines:

- The EOD Range is inspected during each OB/OD event to:
  - Observe waste handling and ensure compliance with proper procedures and documents and correct noncompliance promptly;
  - Check and secure warning signs located at the fence line;
  - Check labels and accumulation start dates of any ash-containing drums stored at the nearby satellite accumulation point to ensure compliance with regulations;
  - Check for leaks, dents, expansion, or corrosion of ash-containing drums; and
  - Check that lids of ash-containing drums are tight and that container is not overfilled.
- Security equipment (i.e., fences, signs, and locks) and emergency equipment are inspected to ensure correct operation, and checked for rusting and wear and tear.
- Mobile equipment is inspected when in use.
- Areas subject to spills, such as loading or unloading areas, are inspected when in use.
- Safety equipment is checked for:
  - Operability;
  - General wear and tear of PPE;
  - Secure and maintained first aid supplies;
  - Operation of phones, two-way radios, and their batteries; and
  - Adequate charge and current service records for portable fire extinguishers.

Unacceptable inspection results are corrected as soon as possible. EOD personnel can delay or terminate any OB/OD operation if an inspection result is deemed to cause any potential environmental or safety hazard. General procedures to ensure that any unacceptable results discovered during an inspection are corrected include:

- Report all problems noted during any inspection to the EOD Superintendent/Chief who will schedule corrective actions accordingly; and
- Include documentation of all corrective actions as part of the inspection records.

Supplies of inspection checklists are maintained at EOD Building 4965. Inspections are accomplished in accordance with the frequencies specified in the checklist, and are signed by EOD personnel as completed.

FFF.2.b.9 Boilers and Industrial Furnaces Inspection

The EOD Range does not treat or store any of its HWs in boilers or industrial furnaces. This subsection is not applicable.

FFF.2.b.10 Containment Building Inspections

The EOD Range does not treat or store any of its HWs in containment buildings. This subsection is not applicable.

FFF.2.b.11 Drip Pad Inspections

The EOD Range does not treat or store any of its HWs on drip pads. This subsection is not applicable.

FFF.3 WAIVER OR DOCUMENTATION OF PREPAREDNESS AND PREVENTION REQUIREMENTS

The EOD Range does not request a waiver for the preparedness and prevention requirements of 22 CCR 66264.32(a) through (d).

FFF.3.a Equipment Requirements

As described in Section CCC, munition and propellant wastes are generated at the MSA, AFRL and other occasional sources prior to treatment at the EOD Range. Waste handling equipment allows personnel at the MSA, AFRL, and EOD Range to safely move hazardous and nonhazardous wastes, within their respective areas, during loading operations for transport between the MSA, AFRL or other locations to the EOD Range, and from the EOD Range to the HWSF or an off-site Class III landfill if results indicate the ash residues after treatment are hazardous or nonhazardous, respectively. The following guidelines ensure safe operation of waste handling equipment:

- The number of workers is limited within the vicinity of operation to minimize potential collision and material handling hazards.
- Loading and unloading of waste containers weighing less than 75 lbs may be done manually by EOD personnel.
- Pickup trucks (up to 1 ton), flatbed trucks (up to 2.5 tons), flatbed tractor trailers (up to 15 tons) and/or electrically powered and/or gasoline-powered forklifts equipped with spark arresters are used to load and unload energetic wastes.
- All material handling and personnel transport vehicles operated within the vicinity of the MSA, AFRL, or EOD Range are equipped with safety windshields and horns.
- An emergency response vehicle at the Edwards AFB Fire Department is available to assist MSA, AFRL, and EOD personnel on short notice. If a high probability exists that the EOD Range will catch fire during an OB/OD event, EOD personnel will request a pumper truck from the Edwards AFB Fire Department to be on standby. Emergency response equipment will be maintained in this truck as well as in the respective generator (MSA, AFRL) and treatment (EOD) facilities.

Communication equipment, alarm system, and fire control equipment are used at the EOD Range to manage unplanned releases of HW constituents to the environment. This equipment is described in the Edwards AFB Contingency Plan. Although there is no piped water supply in the vicinity of the EOD Range, fire extinguishers are available for small fires. In the unlikely event that a fire occurs that is beyond EOD Range personnel capabilities, the Edwards AFB Fire Department, which has been notified in advance that EOD operations are taking place, would be summoned.

FFF.3.b Aisle Space Requirement

The layout of the EOD Range provides unobstructed movement of personnel, fire protection equipment, spill control equipment, and decontamination equipment in case of an emergency. There are no aisle spaces. There are no obstructions to impede the movement of forklifts, equipment, or personnel during emergencies.

FFF.4 PREVENTION PROCEDURES, STRUCTURES, AND EQUIPMENT

This section outlines prevention procedures, structures, and equipment used at the EOD Range to prevent hazards, runoff or flooding, contamination, equipment or power failure, releases into the atmosphere, and prevention of undue exposure of personnel to hazardous waste.

FFF.4.a Unloading and Loading Procedures and Equipment

Energetic waste unloading and ash residue loading procedures at the EOD Range are described in Section DDD.8.a.4 for the OB Unit and Section DDD.8.a.5 for the OD Unit.

FFF.4.a.1 Pre-Operational and Operational Procedures

Before any Edwards AFB personnel even step into the EOD Range for an OB/OD event, a great deal of pre-operational planning and actions occurs. Section DDD details much of the planning and actions that occur before any OB/OD event. *OI 91-4* includes the specific pre-operational and operational briefing and worksheet to be used on the day of an OB/OD event:

- Safety Briefing – ensures all safety checks and safety information has been completed before, during and after an OB/OD event, including pre-operational tasks, range safety and emergency procedures. The safety briefing is accomplished in accordance with the *OI 91-4 Safety Briefing*, attachment 2.

- Pre-Operational Plan Worksheet – ensures that operational data needed to execute an OB/OD event are complete before the event. The pre-operational plan worksheet is accomplished in accordance with the *OI 91-4 Pre-Operational Plan Worksheet*, attachment 3.

FFF.4.b Runoff

As described in Section DDD, operational practices prohibit surface or subsurface drainage (water run-on or runoff) when energetic wastes or ash residues are present.

Due to the nature of OB/OD operations, no physical barriers exist to prevent water run-on or runoff, though operational procedures can prevent OB/OD operations from occurring unless specific weather conditions exist. Edwards AFB maintains a weather station and staff meteorologist on hand to assess weather conditions prior to OB/OD events.

FFF.4.c Water Supplies

The nearest water supply wells to the EOD Range are Wells AFRL-A, -B, -C, and -D, located in the AFRL well-field approximately 2.3 miles to the northeast. These wells provide potable water to the AFRL facilities only. As detailed in Section EEE, groundwater monitoring wells are in place to monitor

the condition of groundwater near the EOD Range. There are no injection wells within the vicinity of the EOD Range.

FFF.4.d Equipment and Power Failure

The EOD Range is classified as a remote site, meaning that there are no utilities (i.e., electricity, sewer, or water lines) on or near the EOD Range.

FFF.4.e Personnel Protection Procedures

PPE for the EOD Range complies with CCR Title 8 and CFR Title 29 requirements for Occupational Safety and Health. EOD Range procedures for handling HW call for use of safety equipment by all persons working at the EOD Range, which may include military boots, cotton coveralls, safety glasses/goggles, gloves, and respirators. All EOD personnel who handle or contact propellant or munitions wastes may be required to wear coveralls, safety shoes, and safety glasses/goggles. When necessary, half-face respirators with organic vapor/dust cartridges can be worn. Exact PPE requirements are determined based on the actual OB/OD operation at hand. During OB/OD operations, the senior EOD member (Team Leader or RSO) is ultimately responsible to ensure that proper safety procedures and equipment are used.

A first aid kit is available in the cab of each truck for use if minor injuries are sustained while working at the EOD Range. The kit contains bandages, gauze pads and rolls, adhesive tape, antibacterial ointments, aspirin, and an eyewash bottle with solution.

FFF.4.f Procedures to Minimize Releases to the Atmosphere

EOD Range operations include burning or detonation of munitions and propellant wastes. No air pollution control devices are required for these operations. Wastes to be treated are characterized prior to transport to the EOD Range to ensure compatibility with OB/OD treatment methods. No other hazardous materials, wastes, or toxic materials are treated at the EOD Range. Any solid propellant wastes transported in containers to the EOD Range are kept closed so that operator personnel are not exposed to the contents and so that no materiel can escape during transit.

Additional procedures that are in place to minimize release to the atmosphere are the permitted quantity limitations for OB/OD treatment and the meteorological restrictions that are described in Section DDD.

FFF.5 PREVENTION OF REACTION OF IGNITABLE, REACTIVE, AND INCOMPATIBLE WASTE

This section describes precautions taken to prevent accidental ignition or reaction of ignitable, reactive, or incompatible wastes.

All EOD Range personnel who handle and manage HW are provided training in the handling and storage of ignitable, reactive, and incompatible wastes to prevent possible sources of ignition or reaction. Any HW containers moved to the EOD Range are labeled and sealed and segregated by compatibility categories described in the following Sections.

FFF.5.a Precautions to Prevent Ignition or Reaction of Ignitable or Reactive Wastes

Smoking is strictly prohibited throughout the EOD Range. “No Smoking” signs are conspicuously displayed at the entrances to the EOD Range and along the perimeter fencing.

All energetic wastes are kept separated and protected from heat sources that might cause ignition or reaction such as open flames, smoking, cutting, welding, hot surfaces, frictional heat, sparks, spontaneous ignition, and radiant heat. The Velostat™ bags used to store propellant wastes have static-dissipative linings that provide electrostatic shielding protection to prevent sparking or buildup of static electricity.

All energetic wastes are approved for treatment prior to receipt at the EOD Range based on the characterization processes described in Section CCC. Ignitable and reactive wastes are handled, treated, and stored as follows to minimize the risk of explosions or releases:

- Smoking, welding, or other activities involving an open flame are not allowed within 50 feet of explosives or explosive operations,
- All waste drums are kept sealed during transfer and storage, and
- Only electrically powered and/or gasoline-powered forklifts equipped with spark arresters are used in the open space outside any building or structure.

FFF.5.b General Precautions for Handling Ignitable or Reactive Waste and Mixing of Incompatible Waste

In accordance with the Propellant Waste Collection, Handling, Storage and Disposal Section of the *AFRL Area 1-30, 1-38, 1-100, 1-21 Chemical Hygiene Plan*, all AFRL waste propellants are categorized, stored, and handled as Division 1.1 or 1.3 explosives. All waste propellants stored at AFRL are segregated into three categories, based on their physical and chemical characteristics:

- Waste fuels,
- Waste oxidizers, and
- Waste solid propellants.

This separation of incompatible wastes (i.e., fuels versus oxidizers) is maintained from point of origin to final disposal.

Munition wastes from MSA and other on-base sources are handled in accordance with the procedures detailed in the technical references described in Section DDD. Because of the physical nature of munitions, incompatibility concerns are not an issue.

FFF.5.c Management of Ignitable or Reactive Wastes in Containers

The EOD Range does not use containers for the treatment of munitions and propellants. The Satellite Accumulation Point within the EOD Range (not part of this Application) may handle HW in containers. Any containers holding ignitable or reactive waste are located more than 50 feet from the Edwards AFB property line.

FFF.5.d Management of Incompatible Wastes in Containers

The EOD Range does not use containers for the treatment of munitions and propellants. Containers may be used to store and transfer waste propellants from AFRL to the EOD Range. Such wastes are separated into like composition groups, and separated into like hazard characteristics, with special attention to incompatibility.

FFF.5.e Management of Ignitable or Reactive Wastes in Tank Systems

The EOD Range does not store HW in tanks. This subsection is not applicable.

FFF.5.f Management of Incompatible Wastes in Tank Systems

The EOD Range does not store HW in tanks. This subsection is not applicable.

FFF.5.g Management of Ignitable or Reactive Wastes Placed in Waste Piles

The EOD Range does not store HW in waste piles. This subsection is not applicable.

FFF.5.h Management of Incompatible Wastes Placed in Waste Piles

The EOD Range does not store HW in waste piles. This subsection is not applicable.

FFF.5.i Management of Ignitable or Reactive Wastes in Surface Impoundments

The EOD Range does not store HW in surface impoundments. This subsection is not applicable.

FFF.5.j Management of Incompatible Wastes in Surface Impoundments

The EOD Range does not store HW in surface impoundments. This subsection is not applicable.

FFF.5.k Management of Ignitable or Reactive Wastes Placed in Landfills

The EOD Range does not dispose of ignitable or reactive hazardous waste in landfills. This subsection is not applicable.

FFF.5.l Management of Incompatible Wastes Placed in Landfills

The EOD Range does not dispose of incompatible hazardous waste in landfills. This subsection is not applicable.

FFF.5.m Management of Ignitable or Reactive Wastes Placed in Land Treatment Units

The EOD Range does not place any of its HWs into land treatment units. This subsection is not applicable.

FFF.5.n Management of Incompatible Wastes Placed in Land Treatment Units

The EOD Range does not place any of its HWs into land treatment units. This subsection is not applicable.

FFF.5.o Management of Incompatible Wastes Placed in Containment Buildings

The EOD Range does not store HW in containment buildings. This subsection is not applicable.

FFF.6 RECORDKEEPING

This section provides additional information on documentation and recordkeeping procedures used for the EOD Range OB/OD operations. This information is in addition to the required items for Section FFF specified in the Permit Completeness Checklist provided in Appendix 1.

FFF.6.a Operating Record

A written operating record is maintained at the EOD Building 4965 until closure of the EOD Range. The operating record contains:

- Name, address, and telephone number of the waste producer (MSA, AFRL or other on-site-generated wastes);
- Date of receipt for treatment for each load of waste received;
- Description and quantity of each energetic waste treated at the EOD Range, and the method(s) and date(s) of its treatment with cross-references to specific stock numbers (munitions wastes) or batch numbers (propellant wastes), if applicable;
- Copies of applicable hazardous waste profiles;
- All records and results of ash waste analyses performed in accordance with the WAP;
- All summary reports of incidents when contingency plan measures were implemented; and
- All records and results of inspections conducted at the EOD Range.

OI 91-4 includes forms, checklists and briefings that have been previously described which support the Operating Record requirement. A general record keeping form used by EOD personnel to support the Operating Record requirement is included in *OI 91-4 Record Keeping Form*, attachment 1.

Additionally, the Operating Record will include a log used to track the quantities of energetic wastes treated in the EOD Range OB/OD Units. This log is used to plan treatment events at the EOD Range and to demonstrate compliance with the annual quantity limits in the HRA. The log will show the following:

- Date, quantity and description of energetic wastes treated in each OB/OD event – demonstrates compliance with the HRA 2,000 lbs/event limit (OB or OD) and the 700 lbs/event limit for Mercury-containing energetic waste (OD only).

- Rolling annual average of total OB/OD events based on current date plus previous 12 months – demonstrates compliance with the HRA 150,000 lbs/year limit (OB and OD combined).

FFF.6.b Unmanifested Waste Report

Since the EOD Range only receives wastes from its on-site generators, there is no need to prepare or submit an un-manifested waste report to DTSC. All HW ash that is generated at the EOD Range as a result of treatment operations is transported to the HWSF, and strict manifesting procedures are carried out at the HWSF.

FFF.6.c Annual Report

By 1 March of each year, CEV prepares and submits an Annual Report per 22 CCR 66264.75. From the EOD Range operating records and by other data requests from CEV to EOD, data for the Annual Record will include:

- Description of the type and quantity of each hazardous waste treated at the EOD Range during the previous calendar year, and the tracking log to demonstrate compliance with the HRA treatment limits;
- The method of treatment of each hazardous waste;
- A description of efforts undertaken to reduce volume and toxicity of wastes generated; and
- A description of changes in the volume and toxicity of waste achieved in current year versus prior years.

FFF.6.d Records Available for Agency Inspection

All records and plans are furnished upon request, and made available at all reasonable times for inspection by any officer, employee, or representative of EPA, DTSC, State Water Resources Control Board, the Regional Water Quality Control Board (RQWCB) (22 CCR 66264.74), and EKAPCD. The operating record described in Section FFF.6.a is maintained until closure of the EOD Range. Other records are maintained for a minimum of three years. This retention period is extended automatically during the course of any unresolved enforcement actions or as requested by DTSC or other agencies.

While this Application is only specific to the EOD Range and OB/OD Units, many Edwards AFB organizations maintain records for OB/OD operations. Table FFF-1 summarizes the organizations and the OB/OD records they maintain, and their general locations. Due to the dynamic nature of USAF operations, the organizational names and locations may change over time. However, as the owner/operator of Edwards AFB and the EOD Range, the 412th Test Wing Commander has ultimate responsibility for ensuring that proper records management for the EOD Range is assigned to the appropriate base organizations.

FFF.6.e Other Reports and Records

CEV submits other reports and records to DTSC as described in 22 CCR 66264.77 to meet requirements for reporting releases, fires, explosions, closure, etc.

Accident reports involving the release of explosive wastes, which could result in a hazard to public health and safety, domestic livestock, or wildlife, or result in a discharge of hazardous waste outside the area designated in this permit application, will be reported immediately by Edwards AFB in accordance with the notification procedures outlined in the Contingency Plan for the EOD Range included as Appendix 6 of the HWSF Application document.

Table FFF-1. Distribution of EOD Range and OB/OD Unit Records

Base Organization	Location	Records Maintained[a]
EOD	Building 4965	• Operating Record (Section FFF.6.a) • EOD Personnel Training Records (Section HHH)
EM	Building 2650A	• Ash Residue Analyses and Disposition Records (Section CCC.3 and DDD.8.a.4 and 5) • Annual Reports (Section FFF.6.c)
MSA	MSA Facility	• Munition Disposition Records (Section DDD.8.a.5)
AFRL	AFRL Facility	• Waste Propellant Disposition Records (Section DDD.8.a.3)

[a] The Section references given for each record provides additional detail on record purpose and content.

GGG. CONTINGENCY PLAN

The Contingency Plan for the EOD Range is included as Appendix 6 of the Base-Wide Information Application document.

The contingency plan addresses the actions Edwards AFB personnel take in response to fires, explosions, or any unplanned sudden or non-sudden release of HW or HW constituents to air, soil, or surface water at Edwards AFB.

HHH. PERSONNEL TRAINING

HHH.1 OUTLINE OF INTRODUCTORY AND CONTINUING TRAINING PROGRAMS

This section contains the personnel training program that was designed to ensure the safe management and handling of HWs at the EOD Range and to meet the requirements of 22 CCR 66264.16. This section is specific to management of HW and does not address training related to munitions and propellant management required by the USAF and DoD. The training program is mandatory for all Edwards AFB personnel that operate the EOD Range. Due to the nature of EOD operations, only trained EOD personnel operate the EOD Range. The training program was developed with the following objectives:

- To comply with the regulatory requirements;
- To promote health and safety for EOD personnel and visitors; and
- To promote and maintain environmental protection.

Certain waste handling procedures outside the EOD Range, such as transportation of munitions or propellants to the EOD Range, or transportation of ash residue from the EOD or AFRL to the HWSF, can be done by other authorized Edwards AFB personnel. These personnel also undergo training for their particular job function. The minimum training requirements for personnel performing these transportation activities is 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) training. These personnel also attend annual refresher training as required. Training records for these personnel are kept by their parent organizations at Edwards AFB for a minimum of 3 years, as required.

HHH.1.a Job Title/Job Description

All EOD personnel are active-duty non-commissioned military personnel. Initial training for EOD personnel consists of an introductory training phase covering basic HW management and safety. This initial training is followed by ongoing, on-the-job training and periodic classroom instruction designed to train EOD personnel using current procedural and regulatory instruction. The various levels of on-the-job and continuous training are presented in the *AFSC 3E8X1 EOD Career Field Education and Training Plan (latest version)* (CFETP), a copy of which is provided in Appendix 22. This document provides guidance in the planning and development, as well as life-cycle training requirements for EOD personnel in the EOD career field. Table HHH-1 summarizes the various levels of training covered in the CFETP.

Per *OI 91-4*, the standard EOD team required for operation of the EOD Range is three personnel: Team Lead, RSO and a qualified EOD Technician. Under critical manning situations, a minimum team of two qualified EOD Technicians, one of which must be at least a 7-skill level, can be used for operation of the EOD Range.

HHH.1.b Description of How Training Will Be Designed to Meet Actual Job Tasks

The training program contents are designed to cover EOD operations and applicable regulations. The purpose of training is to ensure compliance with regulatory requirements regarding HW management and to ensure that the EOD Range is operated in a safe manner. Training is conducted by experienced instructors knowledgeable on all aspects of hazardous waste management policy, regulation, and operational requirements. Specifically, classroom instruction is supplemented by on-the-job training so

that EOD personnel can relate HW policy and procedure with practical daily operation of the EOD Range. On a periodic basis, the training program is reviewed by EOD personnel and the EOD Training Coordinator, and appropriate suggestions as to the content and applicability of the training material presented are incorporated into future training programs.

HHH.1.b.1 Introductory Program

At Edwards AFB, all persons involved with the handling, management, and transport of HWs must complete basic 40-hour HAZWOPER training, provided by classroom instruction, as required in 29 CFR 1910.120. In addition to the HAZWOPER training, EOD personnel must attend the Air Force Occupational Safety and Health (AFOSH) training program. This introductory program is comprised of classroom instruction and is supplemented by on-the-job training as described in the CFETP.

The content of the introductory program for EOD personnel covers, but is not limited to, the following:

- Basic 40-hour HAZWOPER training, as required by 29 CFR 1910.120 – including hazardous material identification and characteristics, PPE, respiratory protection, and decontamination procedures;
- Training in HW management procedures – including contingency plan implementation and EOD operating procedures relevant to personnel positions;
- Training in emergency procedures, equipment, and systems – including procedures for using, inspecting, repairing, and replacing emergency and monitoring equipment; emergency shutdown of operations; activating communication and alarm systems; proper response to chemical spills, unexpected fires, or explosions; prevention of accidents; administering first aid and cardiopulmonary resuscitation; on-site sampling and field tests; and confined space entry; and
- Basic AFOSH training, as required by USAF regulations – including mishap prevention programs, hazard identification, EOD health and safety standards, PPE, fire prevention, nuclear safety, and mishap reporting and investigation.

Training programs are instructed and administered either by qualified base personnel or by contracted instructors, or through USAF educational and training organizations.

All EOD personnel complete their HW specific introductory training program within 6 months of from date of assignment to the EOD Range. Personnel who have not completed this training are restricted from working in unsupervised positions until they have completed the introductory program.

HHH.1.b.2 Continuing Program

Following the introductory training program, EOD personnel receive continual on-the-job training for the remainder of their assignment at the EOD Range. A complete training program along with a detailed description of the various skill levels individuals must complete to progress throughout their career in EOD are presented in the CFETP. This consists of formal classroom instruction and practical hands-on experience for USAF and EOD operations. A description and checklist of the specialty training standards for EOD personnel is found in Part II of the CFETP. Generally, the classroom instruction builds upon the basic HAZWOPER foundation, and includes the destruction of explosives and related hazardous materials training as related to transportation, firing systems, disposal of munitions and materials, munitions residue, EPA permits, and environmental impacts. This training is provided to EOD personnel

on a continuous basis as part of their career development program. All EOD personnel must attend an 8-hour annual refresher course to keep their HAZWOPER certification.

HHH.1.b.3 Supervisory and Advanced Training

Edwards AFB personnel in command positions, who have completed the introductory and continuing training programs, may be selected to receive supervisory and/or Hazardous Material Incident Commander Training. This specialized training is generally restricted to senior members of the Edwards AFB Command and General Staff and the Edwards AFB Fire Department, and is designed to provide guidance and training in management of hazardous waste emergencies on Edwards AFB. These courses are taught by the Edwards AFB Fire Department Training Staff.

HHH.1.b.4 Introductory and Continuing Training Program Implementation and Schedule

All EOD personnel must complete the introductory training program within a set period after the date of their assignment or change of duties. Personnel who have not successfully completed the introductory training program work only under the supervision of an experienced, trained EOD supervisor. A continuing program of on-the-job training occurs throughout the career of EOD personnel.

Refresher HAZWOPER training is provided to all personnel on an annual basis. Since all EOD personnel are active duty military, some personnel may miss their annual refresher training due to off-base overseas deployments. In such situations, these personnel will complete their refresher training as soon as possible upon return.

HHH.1.c Training Director

The Training Director for the 412th Test Wing EOD division is the Training Section Non-Commissioned Officer in Charge (NCOIC). He/she oversees all training that is conducted in-house and training received from outside organizations and/or agencies. The Training Director also maintains all records and ensures that all personnel are up to date and meet all requirements set forth by the EOD Range training doctrine. All training for personnel assigned to duties at the OB/OD Units is conducted under the direct supervision of a person knowledgeable in the specific area of instruction.

HHH.1.d Relevance of Training to Job Position

Table HHH-1 provides a generalized description of the job title and type of initial and continuing training for each job at the EOD Range.

HHH.1.e Training for Emergency Response

All training elements taught to EOD personnel are designed to ensure that EOD personnel are able to respond effectively to emergencies by familiarizing them with emergency procedures, emergency equipment, and emergency systems.

HHH.2 MAINTENANCE OF TRAINING RECORDS/COPY OF PERSONNEL TRAINING DOCUMENTS

EOD personnel training records are kept in employee personnel files at the EOD Building 4965. Training records are tracked for EOD personnel using the recordkeeping templates (or equivalent) specified in Part II if the CFETP.

All training records on current EOD personnel are maintained for the duration of their assignment at Edwards AFB. Additionally, the USAF maintains a complete training record for all USAF military personnel for the duration of their enlistment in the USAF. The training records on former Edwards AFB EOD personnel are retained on-site for at least 3 years from the date their re-assignment.

Table HHH-1. Generalized Job Descriptions and Training Levels for EOD Personnel

Title	Skill Level	Job Description	Training Level
EOD Apprentice	3	Performs basic EOD functions as directed by and only under the supervision of skill level 5, skill level 7, or skill level 9 personnel.	• EOD initial skills and continuation training[a] • 40-hour HAZWOPER[b] • AFOSH training[c]
EOD Journeyman	5	Performs EOD functions, conducts area reconnaissance for detecting and identifying UXO, determines distances to which personnel and material may be evacuated, performs as a specialized member of disaster preparedness teams, performs related munitions and weapons functions.	• EOD initial skills, upgrade, and continuation training[a] • 40-hour HAZWOPER[b] • AFOSH training[c]
EOD Craftsman	7	Advises on EOD disposal problems, organizes and performs EOD disposal, ensures EOD area is cleared before proceeding with disposal, renders UXO safe, prepares reports concerning EOD activities, performs as a specialized member of disaster preparedness teams, and supervises related munitions and weapons functions.	• EOD initial skills, upgrade, continuation and qualification training[a] • 24-hour supervisor training[b] • 40-hour HAZWOPER[b] • AFOSH training[c]
EOD Superintendent/ Chief Enlisted Manager	9	Plans, organizes, directs EOD activities, inspects and evaluates EOD activities to ensure compliance with policies, regulations, and technical publications, performs EOD disposal functions, and coordinates EOD disposal and movement with related organizations.	• EOD initial skills, upgrade, continuation, and advanced training[a] • 24-hour supervisor training[b] • 40-hour HAZWOPER[b] • AFOSH training[c]

[a] Defined in CFETP.

[b] HAZWOPER training requirements are described under 29 CFR 1910.120.

[c] AFOSH training as described in CFETP.

III. CLOSURE/POST-CLOSURE FINANCIAL REQUIREMENTS

III.1 CLOSURE PLAN

This Closure Plan provides a plan of action for future closure of the OB/OD Units and EOD Range, and is submitted in accordance with the requirements of 22 CCR 66264.110-120 and 66264.140-151. The objective of site closure is to minimize or eliminate potential threats to both human health and the environment, and to preclude the potential release of any HW or hazardous constituent into the surrounding soil, groundwater, or the atmosphere following site closure.

This Closure Plan identifies the basic steps necessary to complete the closure of the EOD Range at the end of its operating life. For the purposes of the Closure Plan, the EOD Range is as the shown in Figure BBB-1 and includes the fence-line and everything within. Prior to actual closure of the OB/OD Units and EOD Range, a detailed Site Closure Work Plan that incorporates data from other sources (e.g., the EMP) will be submitted to DTSC for review and approval.

III.1.a Closure Performance Standard

This Closure Plan identifies the key steps necessary to close the EOD Range at the end of its operational life. The Closure Plan assumes that the EOD Range will close prior to closure of Edwards AFB. The objective of the site closure is to use a risk based approach to minimize or eliminate potential threats to both human health and the environment and to preclude the potential escape of any hazardous waste, hazardous waste constituents, leachate-contaminated rainfall, and waste decomposition products to the soil, groundwater, or atmosphere following closure. The EOD Range will be closed in a manner that:

- Minimizes the need for further maintenance;
- Controls, minimizes, or eliminates, to the extent necessary to protect human health and the environment, post-closure escape of HW, hazardous constituents, leachate, contaminated rainfall or runoff, or waste decomposition products to the ground or surface waters or to the atmosphere;
- Complies with the requirements of 22 CCR 66264.111 through 22 CCR 66264.115 and 22 CCR 66264.178; and
- Complies with the miscellaneous unit closure requirements of 22 CCR 66264.601 through 22 CCR 66264.603.

III.1.a.1 Hazardous Constituents Identification and Sampling

Potential hazardous constituents that may be present at the EOD Range from OB/OD activities will be identified from EOD records on previous OB/OD treatment events, and supplemented with soil and groundwater analytical data as appropriate from the EMP. EOD records provide specifics on the waste munitions and propellants treated by OB/OD, from which the hazardous constituents released by OB/OD activities can be determined.

Soil and groundwater samples to document the current condition of the surface and subsurface soils, and groundwater at the EOD Range will be collected to: verify the presence and extent, if any, of contamination; evaluate background concentrations of analytes in soil and groundwater to provide a baseline for comparison with analyte concentrations at the site; identify the relatively high-concentration

areas of contamination if present; and assess the horizontal and vertical (for soils only) extent of the contamination. Soil and groundwater data from the EMP will be used as appropriate to supplement data collected under the Site Closure Work Plan.

The data from the EMP will also be used to direct specific locations for soil sampling, including areas both inside and outside of the EOD Range. If EMP soil data indicates significant and above background levels of soil contamination outside of the EOD Range, the Closure Plan will be modified to assess the extent of contamination in these areas for potential clean-up requirements.

While EMP groundwater data is specific to only the five monitoring well locations as described in Section EEE, data which may indicate significant and above background levels of groundwater contamination would require the Closure Plan be modified to assess the extent of contamination for potential clean-up requirements. However, due to the geology and hydrogeology of the EOD Range and surrounding areas, groundwater contamination is not expected.

In addition to soil and groundwater, any EOD Range structures, buildings and equipment will also be sampled to determine if they need to be decontaminated and removed from the site.

III.1.b Time and Activities Required for Partial Closure and Final Closure Activities

Figure III-1 presents the time and general activities required to complete each step anticipated for final closure of the EOD Range. Section III.1.e describes the activities and procedures used to affect closure of the EOD Range. A detailed Site Closure Work Plan that incorporates data from other sources and further details closure schedule and activities will be submitted to DTSC for review and approval before closure is initiated.

There are no plans for partial closure of the EOD Range. The entire EOD Range, as defined by the Edwards AFB RCRA HW Facility Permit, is the maximum extent of operations that will be active during the lifetime of the facility.

III.1.b.1 Closure Certification Report

In accordance with 22 CCR 66264(a)(2)(b), closure activities will be completed within 180 days once closure of the site is initiated. On completion of closure, a Closure Certification Report, signed by an approved Edwards AFB representative, will be submitted to DTSC. This certification will include:

- Site certified closed by an independent, qualified, California-registered professional engineer;
- Description of the closure activities which were completed to ensure that no further post-closure maintenance or controls will be necessary;
- Description of the final disposal locations for the final inventory and any HWs generated during facility decontamination activities, including waste types, waste quantities, and the names and locations of the final disposal facilities.
- Sampling and analysis data;
- Discussion of analytical results and comparison to site-specific closure performance standards;
- Modifications and amendments to the Plan (if applicable); and

- Site notes, photographs and field logbooks.

III.1.c Maximum Waste Inventory

Up to a maximum of 2,000 lbs of NEW munitions and/or propellants can be placed in the OB/OD units for treatment on the day of the treatment event. No wastes are stored at the EOD Range with the exception of residual ash wastes that are collected following each treatment operation. The residual ash from the OB/OD treatment is stored in drums at the adjacent accumulation point.

III.1.d Schedule for Closure

There are no plans for closure of the EOD Range at this time. The EOD Range will be used as a HW treatment area until either the USAF decides to cease OB/OD operations at Edwards AFB, or Edwards AFB itself is closed. A firm schedule will be established at the time of an official closure decision and will be included in the Site Closure Work Plan. Upon completion of closure activities and as subject to any applicable post-closure requirements, the EOD Range may continue to be used to support other PIRA operations that are not regulated under a RCRA HW Facility Permit.

III.1.d.1 Time Allowed for Closure

Figure III-1 presents the time required to complete each step anticipated for closure of the EOD Range. In accordance with 22 CCR 66264(a)(2)(b), closure activities will be completed within 180 days once closure of the site is initiated. Upon review and approval of the Site Closure Work Plan by DTSC, closure field activities will begin. In the event that significant soil and/or groundwater contamination is identified at the EOD Range, the schedule will be modified, as necessary.

III.1.d.1.1 Extension for Closure Time

If an extension to the proposed closure time frame is warranted, a request or petition for an extension of the closure time will be submitted to DTSC in accordance with the requirements of 22 CCR 66264.113(a) and 22 CCR 66264.113(b). The petition will identify the need for the extension, the status of the facility, and the actions required to prevent threats to the environment or human health during the extension.

III.1.e Closure Procedures

III.1.e.1 Inventory Removal

No wastes awaiting OB/OD treatment are stored at the EOD Range. Removal of inventory at closure will not be required.

III.1.e.2 Disposal or Decontamination of Equipment, Structure, and Soils

As determined by sampling results, any equipment and structures to be decontaminated and removed from the EOD Range site may include the satellite accumulation area building, EOD Range fencing and associated concrete pads. Decontamination will be accomplished by: rinse with a high-pressure/hot water steam cleaner; washing surfaces with high pressure/hot water and Alconox; scrubbing as necessary to remove dirt, grime, grease, and oil; rinse with a high-pressure/hot water steam cleaner; rinse with potable water; and air dry.

III.1.e.2.1 Soil/Groundwater Clean-up and Disposal

As determined by sampling results, if soil contamination is found to be present in localized areas (hot spots), clean closure will be achieved by removal of the soil, characterization of the soil to determine the treatment and disposal requirements (such as RCRA toxicity characteristics), and transportation off-site for appropriate treatment and/or disposal. Confirmation sampling will be performed in the excavated area to verify that no soil remains at the EOD Range in excess of the site-specific cleanup levels. In the event that soil contamination is determined to be widespread and cannot be differentiated from the surrounding PIRA soils, closure in-place will proceed in a method commensurate with the future land use of the area. If additional soil sampling, removal procedures, or other activities are required, the Closure Plan will be modified as necessary.

Groundwater contamination is not anticipated at the EOD Range due to the significant depth to groundwater and the lack of waste materials previously stored at the site after OB/OD operations. Therefore, groundwater treatment is not addressed in this Closure Plan. In the event that contamination is detected in the groundwater above site-specific cleanup levels, the extent of the contamination will be investigated and the migration potential of this contamination determined. If additional groundwater sampling, treatment, or other activities are required, the Closure Plan will be modified as necessary.

III.1.e.3 Closure of Disposal Units/Contingent Closures

The EOD Range is not a disposal unit. This subsection is not applicable.

III.1.e.4 Closure of Containers

No wastes awaiting OB/OD treatment are stored at the EOD Range. Any containers with HW located at the satellite accumulation point within the EOD Range will be transferred to the HWSF. This subsection is not applicable.

III.1.e.5 Closure of Tanks

No tank systems are used at the EOD Range to store or treat HW. This subsection is not applicable.

III.1.e.6 Closure of Waste Piles

No waste piles are used at the EOD Range to store or treat HW. This subsection is not applicable.

III.1.e.7 Closure of Surface Impoundments

No surface impoundments are used at the EOD Range to store, treat, or dispose of hazardous waste. This subsection is not applicable.

III.1.e.8 Closure of Incinerators

No incinerators are used at the EOD Range to burn HW. This subsection is not applicable.

III.1.e.9 Closure of Landfills

No landfills are used at the EOD Range to dispose of HW. This subsection is not applicable.

III.1.e.10 Closure of Land Treatment Facilities

The EOD Range is not a land treatment unit per the definition provided in 22 CCR 66260.10. This subsection is not applicable.

III.1.e.11 Closure of Miscellaneous Units

OB/OD treatment is defined as a miscellaneous unit in 22 CCR 66264.600 since OB/OD does not meet any of the definitions for other types of hazardous waste management units. Therefore, by definition, the EOD Range and OB/OD Units are miscellaneous units. Closure of the EOD Range OB/OD Units is discussed in Section III of this Application document.

III.1.e.12 Closure of Boilers and Industrial Furnaces

Boilers and industrial furnaces are not used at the EOD Range to burn HW. This subsection is not applicable.

III.1.e.13 Closure of Containment Buildings

Containment buildings are not used at the EOD Range to store HW. This subsection is not applicable.

III.2 POST-CLOSURE PLAN

In accordance with 22 CCR 66264.117, Post Closure Care and Use of Property, Edwards AFB must prepare a contingent Post-Closure Plan and comply with post-closure maintenance and monitoring requirements if all HW, waste residues, contaminated materials, or contaminated soils are not removed at final closure. However, Edwards AFB anticipates removal of all contaminated materials and soils at the EOD Range at time of closure. As a result, a Post-Closure Plan is not expected to be required. In the event that not all contaminated materials or soils can be practically removed from the site at closure, a Post-Closure Plan will be developed and submitted to the DTSC.

III.3 NOTICES REQUIRED FOR DISPOSAL FACILITIES

All HWs generated during closure of the EOD Range will be removed to an appropriate off-site TSDF in accordance with approved procedures. All wastes will be adequately characterized and profiled prior to shipment. Appropriate notifications will be provided to each approved off-site TSDF based on their internal waste acceptance requirements. DTSC will be notified of the start of closure activities at the HWSF at least 180 days prior to the anticipated closure date.

III.4 CLOSURE COST ESTIMATE

Edwards AFB is owned by the federal government. 40 CFR 264.140(c) and 22 CCR 66265.140(c) specifically exempt federally owned facilities from having to provide a cost estimate for closure of the EOD Range.

III.5 FINANCIAL ASSURANCE FOR CLOSURE

Edwards AFB is owned by the federal government. 40 CFR 264.140(c) and 22 CCR 66265.140(c) specifically exempt federally owned facilities from having to provide financial assurance for closure of the EOD Range.

III.6 POST-CLOSURE COST ESTIMATE

Edwards AFB is owned by the federal government. 40 CFR 264.140(c) and 22 CCR 66265.140(c) specifically exempt federally owned facilities from having to provide a post-closure cost estimate for the EOD Range.

III.7 FINANCIAL ASSURANCE MECHANISM FOR POST CLOSURE CARE

Edwards AFB is owned by the federal government. 40 CFR 264.140(c) and 22 CCR 66265.140(c) specifically exempt federally owned facilities from having to provide a financial assurance mechanism for post-closure care of the EDO Range.

III.8 LIABILITY REQUIREMENTS

Edwards AFB is owned by the federal government. 40 CFR 264.140(c) and 22 CCR 66265.140(c) specifically exempt federally owned facilities from having to provide liability insurance coverage for closure of the EOD Range.

III.9 USE OF STATE REQUIRED MECHANISMS

Edwards AFB is owned by the federal government. 40 CFR 264.140(c) and 22 CCR 66265.140(c) specifically exempt federally owned facilities from the need to use state financial mechanisms for closure of the EOD Range.

Figure III-1. Estimated Closure Schedule for the EOD Range

ACTIVITY	DAYS OF CLOSURE ACTIVITIES																	
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
Final DTSC Approval of Closure Plan																		
Final Receipt of Hazardous Waste and Notify DTSC to Commense Site Closure																		
Select Field Contractor and Preparation for Field Work																		
Field Kick-Off Meeting and Site Mobilization																		
Removal and Disposal of Hazardous Waste Inventory																		
Soil and Structure Sampling[1]																		
Removal and Disposal of Contaiminated Soil and Structures																		
Groundwater Sampling[1]																		
Review of Site Analytical Data																		
Site Demobilization																		
Preparation of Closure Certification Report																		
Submittal of Closure Certification Report to DTSC																		

NOTES:
1. Schedule will be modified if significant soil and/or groundwater contamination is identified.

ESTIMATED CLOSURE SCHEDULE FOR THE EOD RANGE

Project No.: 29875499	Date: May 2015	Project:	RCRA PART B PERMIT RENEWAL APPLICATION EDWARDS AIR FORCE BASE	Figure III-1

JJJ. SOLID WASTE MANAGEMENT UNITS

There are no SWMUs within 1,000 feet of the EOD Range. This section is not applicable.

KKK. OTHER FEDERAL LAWS

Other Federal laws that are applicable to the EOD Range are discussed in Section K of the Base-Wide Information Application document.

LLL. PART B CERTIFICATION

The signed Part B certification is provided in Section L of the Base-Wide Information Application document.

MMM. ARTICLE 27 (SUBPART AA) – AIR EMISSION STANDARDS FOR PROCESS VENTS

MMM.1 DEFINITION OF PROCESS VENT

22 CCR 66260.10 defines Process Vent to mean "any open-ended pipe or stack that is vented to the atmosphere either directly, through a vacuum-producing system, or through a tank (e.g., distillate receiver, condenser, bottoms receiver, surge control tank, separator tank, or hot well) associated with hazardous waste distillation, fractionation, thin-film evaporation, solvent extraction, or air or steam stripping operations".

MMM.2 APPLICABILITY

Per 22 CCR 66264.1030, Process Vents associated with operations that manage RCRA HWs using distillation, fractionation, thin-film evaporation, solvent extraction, or air or steam stripping be subject to Article 27 requirements of for control of air emissions.

Edwards AFB does not use any of the above processes to manage HW within the EOD Range, and therefore has no process vents subject to Article 27 requirements.

NNN. ARTICLE 28 (SUBPART BB) – AIR EMISSION STANDARDS FOR EQUIPMENT LEAKS

NNN.1 APPLICABILITY

22 CCR 66264.1050 requires that equipment that contains or contacts HWs with organic concentrations of at least 10 percent by weight be subject to Article 28 requirements, and as such be controlled for air emissions due to leaks. Equipment specially regulated under Article 28 includes: liquid pumps; compressors; gas, vapor and liquid pressure relief devices; sampling connection systems; open-ended values or lines; flanges and other connections; and closed-vent systems and control devices.

Edwards AFB does not use any of the above equipment to contain HW within the EOD Range, and therefore has no equipment subject to Article 28 requirements.

OOO. ARTICLE 28.5 (SUBPART CC) – AIR EMISSION STANDARDS FOR CONTAINERS, TANKS, AND SURFACE IMPOUNDMENTS

OOO.1 STANDARDS

22 CCR 66264.1080 requires that facilities that treat, store, or dispose of RCRA HWs in tanks, surface impoundments, or containers be subject to Article 28.5 requirements for control of air emissions.

The EOD Range does not treat, store, or dispose of RCRA HWs in tanks, surface impoundments, or containers and is therefore not subject to Article 28.5 requirements.

PPP. EXPOSURE INFORMATION

PPP.1 POTENTIAL FOR THE PUBLIC TO BE EXPOSED TO RELEASES

The EOD Range does not store HW in surface impoundments or land disposal units. This section is not applicable.