ATTACHMENT E

(2 OF 5)

ATTACHMENT E

(2 OF 5)

Figure 1.1

Site Location
Victorville PBR No.1

FUDS Project No. J09CA067501

San Bernardino County, California

Legend

Project Boundary

Image Source: USGS 7.5' Topo Quadrangles, 1988
Projection: UTM Zone 11 NAD83, Map Units in Meters

5,000 2,500 0 5,000 Feet

N

PARSONS	U.S. ARMY SOUTH PACIFIC DIVISION RANGE SUPPORT CENTER

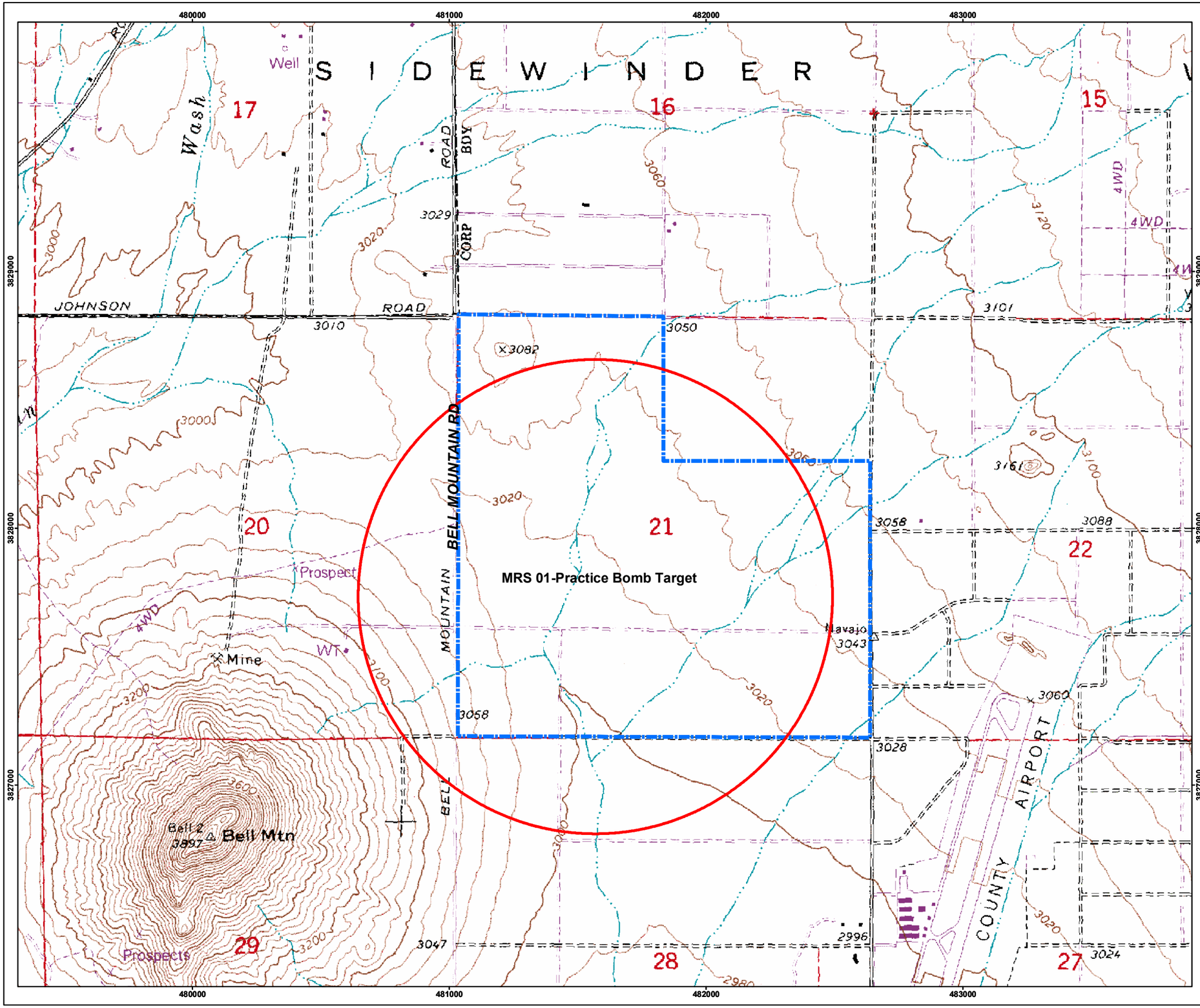
DESIGNED BY: BT	**Site Location**		
DRAWN BY: BT		SCALE: As Shown	PROJECT NUMBER: 744653.74000
CHECKED BY: BB		DATE: March 2008	PAGE NUMBER: 1-4
SUBMITTED BY: DS		FILE: X:\GIS\Site_inspections_sw\Maps\victorville_ca\Fig1_1pbr1.mxd	

Figure 1.2

Site Setting and MRS Designation
Victorville PBR No.1

FUDS Project No. J09CA067501

San Bernardino County, California



Legend

- Range Boundary
- Project Boundary

Site Location in California

N

Image Source: USGS 7.5' Topo Quadrangles, 1988
Projection: UTM Zone 11 NAD83, Map Units in Meters

1,000 500 0 1,000 Feet

PARSONS	U.S. ARMY SOUTH PACIFIC DIVISION RANGE SUPPORT CENTER

DESIGNED BY: BT	Site Setting and MRS Designation		
DRAWN BY: BT		SCALE: As Shown	PROJECT NUMBER: 744653.74000
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SUBMITTED BY: DS		FILE: X:\GIS\Site_inspections_sw\Maps\victorville_ca\Fig1 _2_pbr1.mxd	

CHAPTER 2

PROPERTY DESCRIPTION AND HISTORY

2.1 SITE DESCRIPTION

The Victorville PBR No. 1 site consists of 649 acres located in the county of San Bernardino, approximately 8 miles northeast of Victorville, California. The site consists of vacant desert land used occasionally for recreation (off-road vehicles) and a Wal-Mart Distribution Center is the only building on the site (Figures 1.1 and 1.2, and Appendix E).

2.2 SITE LOCATION AND SETTING

2.2.1 Topography and Vegetation

2.2.1.1 The Victorville PBR No. 1 site is located within the eastern Mojave Desert Section of the Basin and Range physiographic province. The eastern portion of the Mojave Desert is characterized by basins and open valleys between mountainous masses. In the southern portion, the mountains and valleys have a northwest alignment. In the northern portion, this alignment is nonexistent (CEMVR, 1998a). The Mojave Desert comprises the southwestern quadrant of the Basin and Range physiographic province, a vast region dominated by alluvium-filled basins and rugged mountain ranges that extend from northern Nevada to Mexico and from the California's Sierra Nevada and southern coastal region eastward to central Arizona and Utah. The Mojave Desert is transitional between the lower, hotter Sonoran Desert to the south, and the colder high desert of the Great Basin to the north (Mojave Preserve, 2007).

2.2.1.2 The vegetation cover type of the project area consists of Mojave creosote brush scrub as the dominate cover type with small parcels of desert saltbush scrub, Mojave mixed woody scrub, and Mojave mixed steppe. Mixed desert shrub communities exist along the mountain range fronts and in the middle elevation regions, while the creosote bush and other drought-tolerant species survive in the lower elevation regions where rainfall averages less than 2 inches per year (Mojave Preserve, 2007).

2.2.1.3 The mountain ranges of the area delineate the landscape serving as barriers to the migration of sediments (carried by both wind and water). Next to each range are corresponding valleys that are filled with sediments. The Mojave Desert region

is situated within an inland isolated drainage basin. Great dry lakebeds are exposed to wind erosion. Interspersed between the mountain ranges and the lakebeds are regions covered by coalescing alluvial fans called bajadas, or extensive regions of flat, barren, weathered bedrock (Mojave Preserve, 2007). Each of the large desert basins has an area where the land slopes toward a central depression, and each has a main drainageway that is dry much of the time. The playas are situated in the lowest depressions of the valleys and were left by evaporation of intermittent lakes (U.S. Geological Survey [USGS], 2006).

2.2.1.4 The site is situated in Mojave Valley and is relatively flat, with an average elevation of 1850 feet (Parsons, 2007b). Land use in general supports the recreational and industrial uses. Figures 1.1 and 1.2 depict the site terrain. Appendix E includes photographs of the vegetation and the general desert terrain of the site.

2.2.2 Soil

2.2.2.1 The surface material is undifferentiated Holocene alluvium. The predominant soil on the site is Cajon sand (CEMVR, 1996).

2.2.2.2 The Cajon soil is on wide margins alluvial fans, on slide slopes of coalescing fans, and in interfan drainageways (CEMVR, 1998b).

2.2.2.3 The Cajon soil is very deep and somewhat excessively drained. It formed in alluvium derived dominantly from granitic material. Typically, the surface layer is very pale brown gravely sand about 6 inches thick. The underlying material to a depth of 60 inches or more is very pale brown gravely sand that has strata of sand (CEMVR, 1998b).

2.2.2.4 Permeability of the Cajon soil is rapid. Available water capacity is low. The hazard of water erosion is slight to moderate, and runoff is slow. Effective rooting depth is 60 inches or more. The soil is subject to rare periods of flooding (CEMVR, 1998b).

2.2.3 Climate

2.2.3.1 The overall climate in this portion of San Bernardino County is warm and semi-arid to arid. There is one wet season during the year, as 90 percent of all precipitation falls from October through April. Summers are cloudless, hot, and dry. Winters are mild and semi-arid to arid (CEMVR, 1996). Information on annual precipitation was not provided in the ASR or the ASR Supplement for Victorville PBR No. 1. A reasonable approximation can be attained using information from nearby sites Victorville PBR No's 3 and 4 (CEMVR, 1998a and CEMVR 1998b). Annual precipitation is noted as being 4 and 5 inches respectively. For Victorville PBR No. 1 annual precipitation can be expected to be the same. Snowfall for Victorville PBR No's 3 and 4 is noted as being 1 and 2 inches respectively. Again, for Victorville PBR No. 1 annual snowfall can be expected to be the same.

2.2.3.2 Almost all precipitation arrives in winter, but the region does experience rare, intense summer thunderstorms (Mojave Preserve, 2007). According to the USGS, most of the Mojave Desert basin floor receives less than 6 inches per year of precipitation; however, precipitation can be greater than 40 inches annually in the southern and eastern San Bernardino and San Gabriel Mountains (USGS, 2002).

2.2.3.3 The climate is normally desert type and mild during the winter months. Summers are long and very hot. Winters are quite warm despite the occasional series of days when the nightly temperature drops below freezing. The average winter temperature in the area of the Victorville PBR No. 1 site is 77°F. The average daily minimum temperature during the winter months is 30°F. However, a temperature equal to 17°F was recorded in 1949. In summer, the temperature averages 77°F. The daily maximum temperature averages 97°F. The highest recorded temperature in San Bernardino County was 116°F on 14 July 1972 (CEMVS, 1995 and CEMVR, 1998a)

2.2.3.4 The relative humidity in mid-afternoon averages approximately 20 percent. Humidity is higher at night, and at dawn the average is about 50 percent. Percentage of possible sunshine is 90 percent of the time in summer and 60 percent in winter. The mean annual air temperature for nearby Adelanto is 62°F (CEMVS, 1995).

2.2.3.5 The prevailing wind is from the west at an average speed of eight mile per hour in summer. The highest recorded windspeed is 87.4 miles per hour. Strong dry winds come from varying directions throughout the year. A windspeed of more than 12 miles per hour occurs on an average of 22 percent of the year. Most of the erosive winds come from the south and west (CEMVR, 1998a).

2.2.4 Significant Structures

The site is located directly east of Bell Mountain (elevation 1188 feet) and is accessed by Bell Mountain Road northeast of Victorville. The area is served by two primary highways; Interstate 15 and State Highway 18. There was one occupied structure observed during the SI field effort, the Wal-Mart Distribution Center, and the remainder of the site remains undeveloped. Apple Valley is southeast of the site approximately 5 miles. The MRS is removed from the general population (Appendix E).

2.2.5 Demographics

The Victorville PBR No. 1 site is located approximately 8 miles northeast of Victorville, California. Based on census data for the year 2000, there are no residents living on site (U.S. Census, 2006). The total population residing within a 4-mile radius of the site is estimated at 11,252. The population density for San Bernardino County is 85.25 persons per square mile (U.S. Census, 2006). There was one inhabited structure observed during the SI. Table 5.2 and Figure 5.2 provide additional population proximity information for the site.

2.2.6 Current and Future Land Use

2.2.6.1 Over the years, the site has been divided into plots (currently 51), ranging from 160 acres (owned by the State of California) and over 40 privately owned parcels ranging in size from 2 to 20 acres. The site is primarily undeveloped; however, Wal-Mart has recently constructed a warehouse distribution center on the northern end of the site with remaining portions of the land used recreationally (off-road vehicles)

2.2.6.2 The land use under present ownership would not have contributed MC or MEC-related contamination. It is anticipated that the land use will continue to be undeveloped desert landscape with limited industrial use.

2.2.6.3 Access to a large portion of the site is unrestricted and accessible by foot as well as by a few secondary and four wheel drive access trails. Access to the general public is denied at the Wal-Mart Distribution Center with a perimeter fence. No warning signs regarding the potential presence of ordnance are posted.

2.3 SITE OWNERSHIP AND HISTORY

2.3.1 The Victorville PBR No. 1 site originally encompassed approximately 560 acres containing a target area previously used for bombing practice. In May 1942, 400 acres were acquired by lease from private landowners, and the remaining 160 acres were transferred in May 1943 from the U.S. Department of the Interior (DOI) by Public Land Order (PLO) 125. The site served as a practice bombing range conducted from VAAF using 100-lb sand-filled M38A2 practice bombs (with spotting charge), presumably from 1943 to 1944. As reported in the 1994 INPR, the lease on the originally private 400 acres was terminated in December 1942, while the remaining 160 acres were returned to the DOI on 1 November 1948, by a Letter of Transfer also declaring the area dedudded and free and clear of all explosives and dangerous material. This transfer was not made official until 29 March 1954, by PLO 948.

2.3.2 The range target was composed of asphalt strips, approximately 5 feet wide, configured as three concentric circles with approximate radii of 100, 200, and 300 feet. Two asphalt strips transected the target at right angles.

2.3.3 For the purpose of this SI, the range identification (included in Table 2.1) lists the eligible range for the FUDS program that has demonstrated former military use. Additional data for the range is shown in the Conceptual Site Model (CSM) located in Appendix J and discussed further in Chapter 3.

Table 2.1
Range and Suspect Past DoD Activities
Former Victorville Precision Bombing Range No. 1, San Bernardino County, CA

Range Name/Suspect Past DoD Activities	Acreage*
MRS 01 – Practice Bomb Target	649
Practice Bombing Range and Buffer Area	
TOTAL	**649**

*Number represents actual acreage for the MRS and may include area outside the project boundaries. Total acreage reported in FUDSMIS and ARC.

2.4 SITE OPERATIONS AND WASTE CHARACTERISTICS

2.4.1 Munitions Response Site-Specific Descriptions/Operations

The Victorville PBR No. 1 site consists of one MRS, totaling 649 acres (CEMVR, 2004), which corresponds to the area depicted on Figure 1.2. The one MRS (listed below) is currently owned by numerous landowners, with a Wal-Mart Distribution Center located on the northern portion of the site. The risk assessment code (RAC) score for this site range was a 3 in the ASR Supplement, indicating a moderate hazard range potential.

- **MRS 01** – Practice Bomb Target – This area originally consisted of approximately 560 acres of undeveloped and sparsely vegetated desert land used by VAAF as a precision bombing range for training pilots stationed at VAAF (refer to Figure A below). There have been no reports of MEC in this MRS. In support of the 1994 INPR, a site visit was conducted on 7 December 1988 where the team observed MD spaced 15 to 20 feet apart within the target circles and 75 to 100 feet apart in the remainder of the site. The site visit conducted from 16 to 19 April 1996 in support of the ASR found a twisted and half-buried rear portion of an M38A2 100-lb sand-filled practice bomb and a spotting charge used in the M38A2 practice bomb. The ASR Supplement reported a RAC score of 3 for this MRS with a Hazard Severity Value of "marginal" based on the potential residual presence of practice bombs (with spotting charges), and a Hazard Probability of "probable" based on the potential for residual hazards on the surface, the presence of inhabited buildings less than 1,250 feet from the potential hazard, and the lack of a barrier system denying access (CEMVR, 2004).

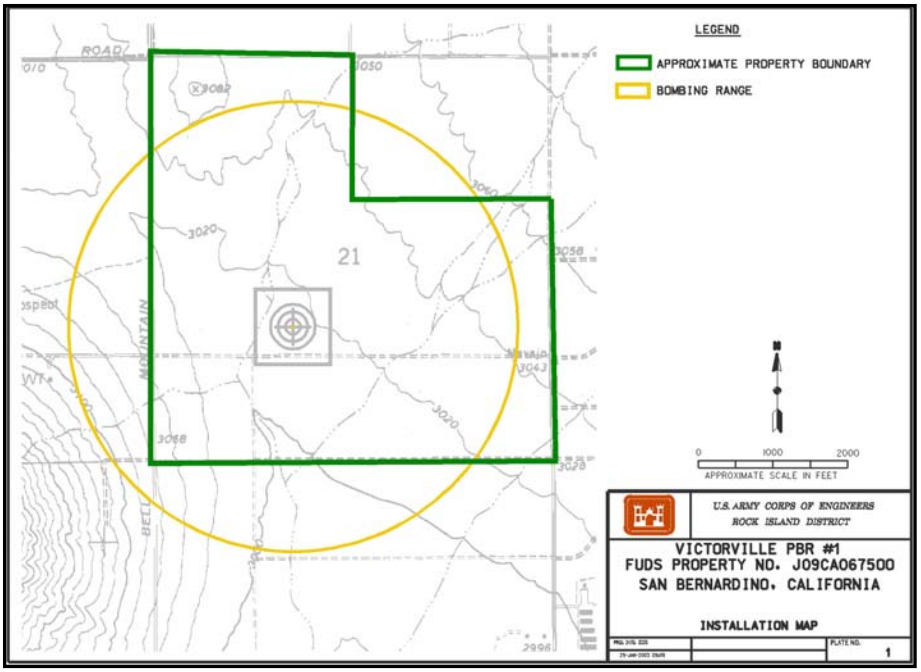

Figure A. Map from 2007 FUDS Management Information System (FUDSMIS) (MRS 01)

2.4.2 REGULATORY COMPLIANCE

The USACE is conducting the SI at the Victorville PBR No. 1 site as part of FUDS response activities pursuant to and in accordance with the guidance, regulations, and legislation listed in Chapter 1.

2.5 PREVIOUS INVESTIGATIONS/CLEARANCE ACTIONS

Parsons performed a historical document review for the Victorville PBR No. 1 site. Documents reviewed included the 1994 INPR, the 1996 ASR (CEMVR, 1996), and the 2004 ASR Supplement (CEMVR, 2004). Previous investigations have determined that Victorville PBR No. 1 was used by the military as a practice bombing range.

2.5.1 Historical Dedudding Operations

The INPR reported that the Letter of Transfer dated 1 November 1948 declared the area dedudded and free and clear of all explosives and dangerous material (CESPL, 1994).

2.5.2 1994 Inventory Project Report

The INPR was completed by CESPL in 1994 (CESPL, 1994). The INPR established the Victorville PBR No. 1 site as a FUDS, established the preliminary site boundary, assigned the FUDS Project Number J09CA067501, and recommended an investigation to evaluate the presence of MEC. The site visit performed in support of the INPR on 7 December 1988, noted the discovery of MD spaced 15 to 20 feet apart within the target circles and 75 to 100 feet apart in the remainder of the site.

2.5.3 1996 Archives Search Report

The ASR was completed by CEMVR in September 1996. The ASR presents the findings of an historical records search and site inspection for the presence of ordnance and explosives located at the Victorville PBR No. 1 site. The investigation focused on the 560 acres identified as the former bomb target. Interviews failed to provide eye-witness accounts of munitions on the site; however, the site visit, performed from 16 through 19 April 1996, was unable to locate the asphalt target but did observe two pieces of MD from M38A2 practice bombs.

2.5.4 2004 Archives Search Report Supplement

2.5.4.1 The ASR Supplement was completed by CEMVR as an addition to the 1996 ASR. This document applied standard range configurations to the site, yielding specific range boundaries for the target area (refer to Figure B that follows). The ASR Supplement identified range land and access restrictions, range owners, and other pertinent information as well a list of MEC that may be found within the range area. No site visit was conducted in support of the ASR Supplement. The MRS identified in the ASR Supplement for Victorville PBR No. 1, its suspected acreage, and types of munitions include:

- **MRS 01 – Practice Bomb Target;** 649 acres; M38A2, Practice Bomb, 100-lb; M1A1, Spotting Charge

2.5.4.2 The Defense Environmental Programs (DEP) ARC for fiscal year 2005 includes the Victorville PBR No. 1 in the MMRP Inventory (see Appendix L).

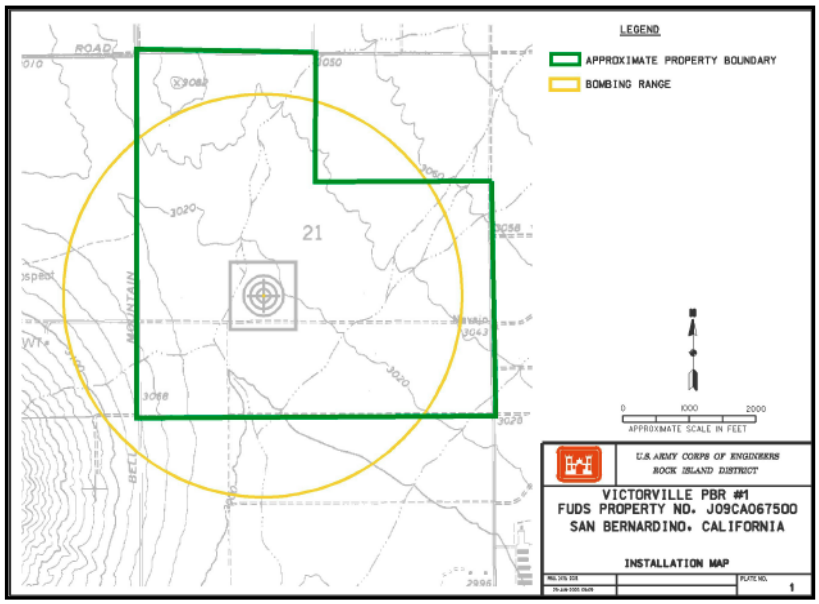

Figure B. Installation Map from ASR Supplement

CHAPTER 3

SITE INSPECTION TASKS

3.1 HISTORICAL RECORD REVIEW

Parsons performed a document review for the Victorville PBR No. 1 site. Documents reviewed included the 1994 INPR, the 1996 ASR, and the 2004 ASR Supplement.

3.2 TECHNICAL PROJECT PLANNING

The Victorville PBR No. 1 FUDS falls under the purview of the CESPL, which facilitated a TPP meeting on 31 January 2007. Participants included representatives of CESPL, Parsons, DTSC, BLM, and San Bernardino County Fire Department. The TPP Team reached unanimous concurrence with the Technical Approach presented in the Final TPP Memorandum (Parsons, 2007a; reprinted in Appendix B). Key TPP findings and decisions are summarized below:

- The Project Team concurred with the Technical Approach (developed to support a Remedial Investigation/Feasibility Study [RI/FS]) as presented/revised at the TPP meeting on 31 January 2007 inclusive of number, type, and location of samples, as well as sampling methodology and laboratory analyses.

- The Project Team agreed that the exact soil sampling locations would be left to the professional judgment of the Site Visit Team (SVT). The sampling locations identified on the figures and CSM would serve as a starting point to assist the SVT in finding conditions indicative of MEC and MC contamination and would represent the fallback sample location in the absence of field observations. The Field Team Leader (FTL) was able move any sample up to 150 feet without prior approval of the Project Team. The sample location selection process was further defined in the SS-WP.

- The sampling depth was 2 to 4 inches below ground surface due to the sandy nature of the soils in this area and the risk of soil erosion.

- Soil samples were screened for explosives and select metals. The TPP team agreed to exclude arsenic, chromium, lead, and mercury from screening due to the absence of these metals from the known munitions used on site. However, lead was included for screening due to recently received MC data associated with the

spotting charges. If any munitions were identified on site containing one or more of these metals, samples would also be screened for the respective metal(s).

- If small arms rounds were located during the Site Visit, the SVT would identify the item and contact Ms. Deborah Walker to determine if additional constituents would need to be included for laboratory analysis.

- The following process was to be used to compare sample results (discussed in detail in Chapter 3, paragraphs 3.3.2.5 and 3.3.2.6 of the SS-WP Addendum). First, the maximum detected concentration of each analyte will be compared to a background concentration (a background concentration for each metal will be determined using the maximum concentration from the ambient samples collected in association with this project). Each analyte will also be evaluated to verify that it is a potential MC for the site (i.e., the munitions known or suspected for the site). Only those analytes that are detected at the site above background concentrations and are potential MC will be retained for consideration in the screening level risk assessment (SLRA). If any analytes remain after this comparison process, then they will be compared in the SLRA to the USEPA Region 9 and CAL-Modified Industrial Soil PRGs.

- Ecological screening criteria were provided in the SS-WP and included USEPA Ecological Soil Screening Levels, supplemented with PSAP Addendum ecological screening values, as needed.

- Airborne contaminants would not be assessed during the SI phase.

- The Project Team considered groundwater and surface water as incomplete exposure pathways.

- Ms. Seehafer confirmed that involvement by the California Department of Fish & Wildlife would only be necessary at the anticipated RI/FS and later phases; as BLM would be handling any species issues during the SI stage. Parsons would coordinate with the BLM archeologist for the necessary permitting. If additional effort would need to be coordinated with California Department of Fish and Game, BLM would notify USACE.

- If MEC was found during the Site Visit, the GPS coordinates would be acquired and recorded, and the land owner would be notified and requested to contact the San Bernardino County Sheriff's Office at (909) 387-8313. Additionally, Jose May, San Bernardino County Fire Department, requested that the SVT also contact San Bernardino County Fire Department, Hazardous Materials Division (800-33-TOXIC) immediately, as well as the State of California, Governor's Office of Emergency Services (800-852-7550). If a situation is an emergency, 911 would be called first.

- The Project Team did not identify any site-specific issues requiring an expedited project schedule or document reviews for this site.

3.3 NON-MEASUREMENT DATA COLLECTION

3.3.1 Regional geological and hydrogeological information including information about the groundwater wells located on and near the site was acquired from Banks Environmental Data (Banks, 2007); California Regional Water Quality Control Board (CRWQCB), (CRWQCB, 1994, 1995, 2004a, and 2004b); California Department of Water Resources (DWR), (DWR, 2007), Mojave Water Agency (MWA), (MWA, 2007), and USGS (USGS, 2001, 2002, 2003, 2004a, 2004b, 2006a, 2006b, and 2006c).

3.3.2 The following printed and electronic information sources were consulted as part of the Victorville PBR N-3 SI:

- Topographic Map – USGS
- Wetlands Online Mapper – National Wetlands Inventory (NWI), USFWS
- Threatened and Endangered Species System (TESS) – Endangered Species Program, USFWS
- California Department of Fish and Game (CDF&G) – BioGeographic Data Branch, California Natural Diversity Database (CNDDB)
- National Wildlife Refuge System (NWRS) – USFWS
- National Park Service (NPS)
- U.S. Department of Agriculture - National Forest Service (NFS)
- California State Parks System
- San Bernardino County Parks
- National Register Information System (NRIS) – San Bernardino County, California
- National Register of Historic Places (NRHP)
- National Register of Historic District (NRHD)
- National Historic Landmarks (NHL) – National Historic Landmarks Program (California)
- National Heritage Areas (NHA) – National Heritage Areas Program
- California Office of Historic Preservation (OHP) Database
- California OHP – San Bernardino Archaeological Information Center, San Bernardino County Museum
- National Oceanic and Atmospheric Administration (NOAA) – Coastal Zone Management Program (CZMP)
- September 1996 ASR Findings for the former Victorville PBR No. 1, Victorville, California

3.4 SITE-SPECIFIC WORK PLAN

3.4.1 The SS-WP Addendum augments the PWP and PSAP, as warranted, to present pertinent site-specific information and procedural adjustments that could not be readily captured in the programmatic documents or that resulted from TPP Team agreements that required modifying the preliminary SI Technical Approach. The DTSC and TPP Team concurred with the Final Technical Approach and field procedures in the Final SS-WP Addendum (Parsons, 2007b).

3.4.2 The PWP and PSAP are intended to be umbrella documents that set overall programmatic objectives and approaches, whereas the SS-WP Addendum provides site-specific details and action plans. The PWP, PSAP, and SS-WP Addendum accompanied the SI field team during SI field activities.

3.4.3 The SS-WP Addendum includes the project description, the field investigation plan, the sampling and analysis plan, the environmental protection plan, and the health and safety plan specific to the Victorville PBR No. 1 site. The field investigation plan presented the technical approach to guide sample collection and analysis for MEC and MC to ensure that the results were sufficient to determine whether additional investigations or implementation of a remedy are necessary for the site. Key elements of the technical approach include the CSM to help determine types of samples and their locations, data quality objectives (DQOs) to ensure that the data acquired is sufficient to characterize MEC and MC at the site, and qualitative reconnaissance (QR) to confirm known target locations and to evaluate the presence or absence of MEC/MC in remote portions of the site. The SS-WP Addendum included a sampling rationale for each proposed sample location and the latitude and longitude of the proposed samples. The sampling rationale is included in Table 3.1 and has been updated to show actual conditions observed by the SVT.

3.4.4 The sampling and analysis plan discusses procedures for soil sample acquisition from locations biased toward the highest potential for MEC contamination; quality control (QC) and quality assurance (QA) for the sampling process; sample shipment to an approved, independent laboratory; and analysis of the samples by the laboratory. The environmental protection plan ensures compliance with the Army Regulation 200-2 by presenting procedures for avoiding, minimizing, and mitigating potential impacts to environmental and cultural resources during site field activities. The health and safety plan supplements the programmatic accident prevention plan with site-specific emergency contact information and directions to the nearest hospital.

3.5 DEPARTURES FROM PLANNING DOCUMENTS

3.5.1 During the SI, and particularly during the soil sampling procedures, a 4-foot diameter plastic template was not used to determine the locations of the seven composite samples per the Cold Regions Research and Engineering Laboratory (CRREL) seven-point wheel sampling technique (discussed in more detail in Subchapter 5.1 of the Final Sampling and Analysis Plan (SAP) Addendum, March 2006 [Parsons, 2006]). A template was not used and the 2-foot distance from the center sampling location to the six

sample locations on the perimeter of the "wheel" was approximated, thus preserving the original intent of the template. This field deviation from the SS-WP is not believed to have had any effect on the overall quality of the sampling process.

3.5.2 During the SI, the SVT modified the QR path and sample locations from that proposed in the SS-WP Addendum due to a lack of executed ROEs for some parcels. A ROE was not obtained for the Wal-Mart parcel, therefore, all QR proposed for that area was not conducted. The SVT did increase QR elsewhere to compensate for the lost QR.

3.5.3 Lead was added to the list of MC metals for screening due to recently received information regarding spotting charges. Table 4.1 has been updated to include those newly received data.

TABLE 3.1
SAMPLING RATIONALE
VICTORVILLE PRECISION BOMBING RANGE NO. 1 (MRS 01), SAN BERNARDINO COUNTY, CALIFORNIA

Sample ID	Sample Coordinates		Media	Analysis	Munitions [1]	Rationale
	Longitude	Latitude				
VV-1MRS01-SS-24-01	-117.20928	34.59688	Soil	Select Metals, Explosives	Bomb, Practice, 100-lb, M38A2; Spotting Charge, M1A1, M3, M5	Outside of the former bombing range to reflect ambient conditions
VV-1MRS01-SS-24-02	-117.20116	34.59289	Soil	Select Metals, Explosives	Bomb, Practice, 100-lb, M38A2; Spotting Charge, M1A1, M3, M5	Within the former bombing range
VV-1MRS01-SS-24-03	-117.20215	34.58962	Soil	Select Metals, Explosives	Bomb, Practice, 100-lb, M38A2; Spotting Charge, M1A1, M3, M5	Within the former bombing range
VV-1MRS01-SS-24-04	-117.20092	34.59239	Soil	Select Metals, Explosives	Bomb, Practice, 100-lb, M38A2; Spotting Charge, M1A1, M3, M5	Within the former bombing range
VV-1MRS01-SS-24-05	-117.20040	34.50622	Soil	Select Metals, Explosives	Bomb, Practice, 100-lb, M38A2; Spotting Charge, M1A1, M3, M5	Within the former bombing range
VV-1MRS01-SS-24-06	-117.19760	34.59204	Soil	Select Metals, Explosives	Bomb, Practice, 100-lb, M38A2; Spotting Charge, M1A1, M3, M5	Within the former bombing range
VV-1MRS01-SS-24-07	-117.20465	34.58848	Soil	Select Metals, Explosives	Bomb, Practice, 100-lb, M38A2; Spotting Charge, M1A1, M3, M5	Within the former bombing range
VV-1MRS01-SS-24-08	-117.19017	34.58712	Soil	Select Metals, Explosives	Bomb, Practice, 100-lb, M38A2; Spotting Charge, M1A1, M3, M5	Outside of the former bombing range to reflect ambient conditions
VV-1MRS01-SS-24-09	-117.19564	34.59110	Soil	Select Metals, Explosives	Bomb, Practice, 100-lb, M38A2; Spotting Charge, M1A1, M3, M5	Discretionary sample selected from an area of concentrated MD, east of the target center.
VV-1MRS01-SS-24-10	-117.19802	34.59273	Soil	Select Metals, Explosives	Bomb, Practice, 100-lb, M38A2; Spotting Charge, M1A1, M3, M5	Discretionary sample selected from an area of concentrated MD, northeast of the target center.

(1) Munitions potentially present on site based on historical documentation (INPR and ASR Supplement)

CHAPTER 4

MUNITIONS AND EXPLOSIVES OF CONCERN FINDINGS

4.1 GENERAL INFORMATION

Based on a review of historical records, previous studies and current conditions, it was determined that there was a potential to find MEC/MD at the Victorville PBR No. 1 site. QR and soil sampling were conducted within the MRS to substantiate the anticipated RI/FS recommendation. This chapter details the overall DQOs, MEC history, and inspection activities for the site.

4.1.1 Qualitative Reconnaissance

4.1.1.1 As stated previously, the primary task of the SI was to assess the presence of MEC and MC. To assess the presence of MEC, the field team conducted a pedestrian QR for approximately 7 miles on 16 and 17 October 2007. The QR was increased from the originally proposed 4.3 miles as site conditions warranted. The QR consisted of visual reconnaissance of the site surface to identify indicators of suspect areas including earthen berms, distressed vegetation, discolored soil, ground scars, craters, target remnants, and visible metallic debris at MRS 01- Practice Bomb Target as agreed to by the TPP Team in January 2007.

4.1.1.2 To complete the QR, three SVT members including a unexploded ordnance (UXO) Technician, a field team leader, and a field team environmental sampler, walked side by side approximating the traverses loosely defined during the TPP Meeting and presented in the SS-WP Addendum. The SVT was authorized by the TPP Team to modify the planned QR paths for such circumstances as rights of entry (ROE) refusals, unsafe adverse terrain or vegetation, recent development, and based on professional judgment to capture field observations indicative of potential MEC/MC contamination. The SVT initiated the QR by driving to pre-determined points and establishing a "base" from which to conduct the QR on foot. The UXO Technician used a Schonstedt GA-92XTi magnetometer for safety purposes (MEC avoidance) and to measure relative changes in the magnetic fields of the sample locations to ensure the absence of potential subsurface MEC. Prior to beginning the QR, the magnetometer underwent a system check to confirm that it was operating correctly. SVT members conducted the QR along the paths shown on Figure 4.1, stopping periodically to note changes in field conditions, to document the presence or absence of MEC/MD, to take photographs of site conditions (Appendix E), and/or to collect soil samples. From each sample location, the SVT also walked one or more QR loops in the vicinity, making observations and recording field notes at the observation points. Soil sampling results and sampling locations are presented in Chapter 5.

4.1.1.3 The route followed by the SVT during the QR is shown in Figure 4.1. As discussed above and in the SS-WP Addendum, the QR route was not limited to the proposed path depicted in the SS-WP Addendum maps (and not ground-truthed), but was determined in the field by the FTL based on the baseline QC procedures described in Chapter 3 of the PWP (Parsons, 2005), visual observations, and areas of pre-determined focus. Table 4.1 presents the potential MEC anticipated to be present at the site and the potential constituents that may be contained in the MEC. The MEC CSM and MC conceptual site exposure model (CSEM) are included in Appendix J.

4.1.1.4 As shown in Appendix E (Photo-Documentation Log) the SVT documented 28 discrete field observations throughout the course of the QR, such as topography and vegetation, terrain, the presence of any barriers, changes in magnetic fields (based on audible signals), and MD. Visual MEC and/or MD (as well as craters, berms, distressed vegetation, stained soil, etc) is programmatic rationale for documentation of a field observation. ***For the Victorville PBR No. 1 site, no MEC items were observed and sixteen observations of MD were noted (See Appendix E and Figure 4.1). These MD observations were in the form of M38A2 100-lb practice bomb debris and spotting charge debris. No stressed vegetation or stained soil was observed; however, remnants of the target were still clearly visible.***

4.1.2 Data Quality Objectives

4.1.2.1 DQOs are qualitative and quantitative statements that clarify study objectives and specify the type and quality of the data necessary to support decisions. The development of DQOs for a specific site takes into account factors that determine whether the quality and quantity of data are adequate for project needs, such as data collection, uses, types, and needs. While developing these DQOs in accordance with the process presented in Chapter 3, paragraph 3.1.2 of the PWP (Parsons, 2005), Parsons followed the USACE TPP Process Engineering Manual, EM 200-1-2 (USACE, 1998).

4.1.2.2 The goal of the TPP process is to achieve stakeholder, USACE, and applicable state and federal regulatory concurrence with the DQOs for a given site. The TPP Team approved the Victorville PBR No. 1 DQOs at the TPP meeting on 31 January 2007. Appendix B of this SI Report presents the TPP documentation. Tables 4.2 through 4.5 present the DQO worksheets developed by the TPP Team and they have been updated in accordance with the SI activities completed. *All the DQOs for the MRSs have been met.*

4.1.2.3 As stated in Chapter 1 of this SI Report, data must be sufficient to do the following: 1) determine whether a removal action is necessary; 2) enable HRS scoring by USEPA; 3) characterize the release for effective and rapid initiation of RI/FS; and 4) complete the MRSPP.

4.1.2.4 DQOs cover four project objectives that SI data must satisfy: 1) evaluate potential presence of MEC; 2) evaluate potential presence of MC; 3) collect data needed to complete MRSPP scoring sheets; and 4) collect information for HRS scoring.

Table 4.1
Chemical Composition of MEC and Potential MC
Victorville Precision Bombing Range No. 1

General Munition Type	Type/Model	Case Composition	Filler	Potential Constituent
Bomb, 100-lb, Practice	M38A2	Sheet Metal	Sand, wet sand, water, or concrete Spotting charge contains black powder	Nitrocellulose, Potassium Nitrate
Signal, Spotting Charge	M1A1	Tin	Black Powder, Smokeless Powder, Primer Mix	Antimony Sulfide, Dinitrotoluene Diphenylamine, Lead Styphnate Nitrocellulose, Pentaerythritoltetranitrate, Potassium Nitrate, Tetracene
Signal, Spotting Charge	M3	Tin	Black Powder. Dark Smoke Composition, Primer Mix	Antimony Sulfide, Dinitrotoluene, Diphenylamine, Lead Styphnate, Magnesium, Nitrocellulose, Pentaerythritoltetranitrate, Potassium, Potassium Nitrate, Tetracene
Signal, Spotting Charge	M5	Glass	FM Smoke Mixture	Titanium Tetrachloride

Source – Munitions information for Table 4.1 was supplied by the 1996 ASR, 2004 ASR Supplement, and other government reports.

4.1.2.1 Munitions and Explosives of Concern Data Quality Objective

The MEC DQO *was achieved* by evaluating the potential presence of MEC at MRS 01 at the Victorville PBR No. 1 site. The QR team searched for visual evidence of MEC and MD at MRS 01- Practice Bomb Target. Remnants of the target, including the target center, were observed but there were no other visual indicators (earthen berms, distressed vegetation, stained soil, ground scars or craters) of suspect areas identified during the QR. MD in the form of M38A2 100-lb practice bomb debris and spotting charge debris were observed during the SI field work at MRS 01. These discoveries of MD are noted in the Daily Field Report (Appendix D) and Photo-documentation Log (Appendix E). No MEC was observed at MRS 01. ***Data collected during the SI indicates that a Removal Action (RA) is not needed for MRS 01 at this time.***

4.1.2.2 Munitions Constituents Data Quality Objective

The MC DQO *was achieved* by evaluating potential presence of MC at MRS 01. The TPP Team agreed on the list of analytes for sample analysis based on the munitions potentially used at the site. A summary of the MC known to occur in the MEC documented or suspected at the site is provided in Table 4.1. Table 4.1 has been revised from that which was presented in the Final SS-WP Addendum due to recently received MC data; lead was also added for MC screening. Chapters 5 and 6 present the MC sampling results that indicate ***that lead was the only non-essential nutrient MC metal detected above the background concentrations in the soil at the Victorville PBR No. 1 site; however, lead did not exceed the human health screening value. No explosives were detected in the soil at Victorville PBR No. 1.***

4.1.2.3 Munitions Response Site Prioritization Protocol Data Quality Objective

The MRSPP DQO *was achieved* by obtaining sufficient information to complete the MRSPP scoring sheets. Specific input data were collected, and the three modules for the MRSPP were populated for MRS 01 as part of the SI. The scoring sheets for the MRSPP are included in Appendix K.

4.1.2.4 Hazard Ranking System Data Quality Objective

The HRS DQO *was achieved* by including information in the SI report necessary for the USEPA to populate the HRS score sheets. Source documents for the HRS information include the INPR, ASR, and ASR Supplement documents, as well as the MC sampling results reported in Chapter 5 and information from local and state agencies regarding population, groundwater well users, and drinking water well use.

4.2 MRS 01 – PRACTICE BOMB TARGET

4.2.1 Historical MEC Information

A field visit was conducted on 7 December 1988 in support of the 1994 INPR and found MD scattered throughout the target area. The field visit in support of the 1996 ASR reported the discovery of two pieces of M38A2 practice bomb debris. The ASR reported M38A2 100-lb practice bombs and M1A1 spotting charges would have been

used at the site. The ASR Supplement reported a RAC score of 3 for this range, indicating a "medium" risk.

4.2.2 Inspection Activities

To assess the presence of MEC contamination at the Practice Bomb Target, the three-person SVT conducted QR over a 7-mile path within the MRS. The actual QR path was modified from the originally proposed path due the lack of executed ROEs for some of the parcels. Two samples location were also moved due to the lack of an executed ROE. Three additional samples were moved due to the lack of MD in their originally proposed locations. The SVT deviated from the QR path when MD could be seen in other areas (before returning to the originally proposed path). The TPP Team agreed that seven to eight biased soil samples collected within the MRS was sufficient (Table 3.1). Soil samples VV-1MRS01-SS-24-01 (ambient), VV-1MRS01-SS-24-08 (ambient), and VV-1MRS01-SS-24-09 (discretionary) were collected on 16 October 2007. Soil samples VV-1MRS01-SS-24-02, VV-1MRS01-SS-24-03, VV-1MRS01-SS-24-04, VV-1MRS01-SS-24-05, VV-1MRS01-SS-24-06, VV-1MRS01-SS-24-07, and VV-1MRS01-SS-24-10 (discretionary added during field effort) were collected on 17 October 2007 (Refer to Figure 5.4). Chapter 5 provides details of the surface soil samples collected as well as potential exposure pathways. ***MD was observed in the form of 100-lb practice bomb debris and spotting charge debris; however, no MEC was observed during the SI field effort in this MRS.***

TABLE 4.2
MEC DATA QUALITY OBJECTIVE WORKSHEET

SITE: **Victorville Precision Bombing Range No. 1, California**

PROJECT: **MMRP Site Inspection / FUDS Project No. J09CA067501**

DQO Element Number*	DQO Element Description*	Site-Specific DQO Statement	Objective Met? Yes (Y)/No (N)
Intended Data Use(s):			
1	Project Objective(s) Satisfied	Evaluate presence/lack thereof of MEC	Y
Intended Need Requirements:			
2	Data User Perspective(s)	Risk, Remedy	Y
3	Contaminant or Characteristic of Interest	MEC, MD	Y
4	Media of Interest	N/A	N/A
5	Required Locations or Areas	Bombing Range	Y
6	Number of Samples Required	QR path (total length) = 7 linear miles (approximate)	Y
7	Reference Concentration of Interest or Other Performance Criteria	QR within MRS 01 – Practice Bomb Target	Y
Appropriate Sampling and Analysis Methods:			
8	Sampling Method	Qualitative Reconnaissance	Y
9	Analytical Method	N/A	N/A

* Refer to EM 200-1-2, Paragraph 4.2.1
N/A = not applicable

TABLE 4.3
MC DATA QUALITY OBJECTIVE WORKSHEET

SITE: **Victorville Precision Bombing Range No. 1, California**

PROJECT: **MMRP Site Inspection / FUDS Project No. J09CA067501**

DQO Element Number*	DQO Element Description*	Site-Specific DQO Statement	Objective Met? Yes (Y)/No (N)
Intended Data Use(s):			
1	Project Objective(s) Satisfied	Evaluate presence/lack thereof of MC	Y
Intended Need Requirements:			
2	Data User Perspective(s)	Risk, Remedy	Y
3	Contaminant or Characteristic of Interest	Explosives and select metals	Y
4	Media of Interest	Surface Soil	Y
5	Required Sampling Locations or Areas and Depths	Within the MRS as determined by the TPP Team, see Figure 5.4. Depth is 2 to 4 inches.	Y
6	Number of Samples Required	10 surface soil samples plus associated QA/QC samples.	Y
7	Reference Concentration of Interest or Other Performance Criteria	USEPA Region 9 Industrial PRGs or California-Modified USEPA Region 9 Industrial PRGs. Ecological Screening Values (ESVs) include USEPA ecological SSLs supplemented with PSAP Addendum values, as needed.	Y
Appropriate Sampling and Analysis Methods:			
8	Sampling Method	Composite samples in accordance with the PSAP and PSAP Addendum	Y
9	Analytical Method	Explosives – SW8321A; Select Metals SW6010B or SW6020	Y

* Refer to EM 200-1-2, Paragraph 4.2.1

Table 4.4 MRSPP Data Quality Objective Worksheet

Site: Victorville Precision Bombing Range No. 1
Project: MMRP Site Inspection / FUDS No. J09CA067501
DQO Statement Number: 3 of 4

Module	Table #	Table Description	Known Data	Current Data Gap	Data Source
Explosive Hazard Evaluation (EHE)	1	Munitions Type	X		Historical Records/Findings
	2	Source of Hazard	X		Historical Maps
	3	Location of Munitions	X		Historical or Field Findings
	4	Ease of Access	X		Field Findings
	5	Status of Property	X		Tax Records
	6	Population Density	X		U.S. Census Bureau
	7	Population Near Hazard	X		Field Findings
	8	Types of Activities/Structures	X		Field Findings
	9	Ecological and/or Cultural Resources	X		State Historic Preservation Office
	10	Determining the EHE	X		Scores from Tables 1 through 9
Chemical Warfare Materiel (CWM) Hazard Evaluation (CHE)	11	CWM Configuration	X		Historical Records/Findings
	12	Sources of CWM	X		Historical Records/Findings
	13	Location of CWM	X		Historical Findings
	14	Ease of Access	X		Field Findings
	15	Status of Property	X		Historical Records
	16	Population Density	X		U.S. Census Bureau
	17	Population Near Hazard	X		Field Findings
	18	Types of Activities/Structures	X		Field Findings
	19	Ecological and/or Cultural Resources	X		State Historic Preservation Office
	20	Determining the CHE	X		Scores from Tables 11 through 19
Health Hazard Evaluation (HHE)	21	Groundwater Data	X		Banks Environmental
	22	Surface Water - Human Endpoint	X		Sampling Results
	23	Sediment - Human Endpoint	X		Sampling Results
	24	Surface Water - Ecological Endpoint	X		Sampling Results
	25	Sediment - Ecological Endpoint	X		Sampling Results
	26	Surface Soil	X		Sampling Results
	27	Supplemental Contaminant Hazard Factor	X		All MC Sampling Results
	28	Determining the HHE	X		Scores from Tables 21 through 27
	29	MRS Priority	X		Scores from Tables 10, 20, and 28
	A	MRS Background Information	X		DoD Databases

Table 4.5 HRS Data Quality Objective Worksheet

Site: Victorville Precision Bombing Range No. 1
Project: MMRP Site Inspection / FUDS No. J09CA067501
DQO Statement Number: 4 of 4

Data Description	Known Data	Current Data Gap	Data Source
Source Type	X		Historical Records/Findings
Estimated Volume or Area	X		Field Findings
Hazardous Substance	X		Constituents of Suspected Munitions
Groundwater Sample Concentration	X		Sample Results
Groundwater Use	X		Well Records/Municipal Data
Surface Water Sample Concentration	X		Sample Results
Surface Water Pathways	X		Field Findings
Soil Sample Concentration	X		Sample Results
Soil Pathways	X		Municipal Data
Sensitive Environments	X		State Historic Preservation Office, US Fish and Wildlife Service, various government agencies
Attractiveness/Accessibility	X		Field Findings/Land Use Records