



FINAL

Operational Range Assessment Program Phase I Qualitative Assessment Report White Sands Missile Range, New Mexico

U.S. Army Operational Range Assessment Program
Qualitative Operational Range Assessments

Prepared for:

U.S. Army Environmental Command and
U.S. Army Corps of Engineers Baltimore District



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ABBREVIATIONS/ACRONYMS

AAA	Anti-aircraft artillery
AFB	Air Force Base
ARID-GEO	Army Range Inventory Database-Geodatabase
bgs	Below Ground Surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CSM	Conceptual Site Model
DNT	Dinitrotoluene
DoD	Department of Defense
DODI	Department of Defense Instruction
DTRA	Defense Threat Reduction Agency
DU	Depleted Uranium
E	Ecological receptors identified. (This refers to range grouping; pathway designation always precedes E designation.)
GIS	Geographic Information System
GW	Groundwater pathway identified. (This refers to range grouping; M designation always precedes GW designation.)
H	Human receptors identified. (This refers to range grouping; pathway designation always precedes H designation.)
HMX	Cyclotetramethylenetetranitramine
LS	Limited Source
M	Munitions used. (This refers to range grouping; M designation always precedes applicable pathway.)
MCOC	Munitions Constituents of Concern
mg/L	Milligrams per Liter
NASA	National Aeronautics and Space Administration
NDMA	N-Nitrosodimethylamine
NG	Nitroglycerin
NMOSE	New Mexico Office of the State Engineer
NOAA	National Oceanic and Atmospheric Administration
NRCS	Natural Resources Conservation Service
OB/OD	Open Burn / Open Detonation
ODEP	Office of the Director of Environmental Programs
ORAP	Operational Range Assessment Program
PETN	Pentaerythritoltetranitrate
PU	Pathway unlikely or incomplete. (This refers to range grouping; M designation always precedes PU designation.)
RCRA	Resource Conservation and Recovery Act
RDT&E	Research, development, testing, and evaluation
RDX	Cyclotrimethylenetrinitramine
SW	Surface water pathway identified. (This refers to range grouping; M designation always precedes SW designation.)
TCOO	Test Center Operations Office
TNT	Trinitrotoluene
µg/L	Micrograms per Liter
U.S.	United States
USACE	United States Army Corps of Engineers

USACHPPM	United States Army Center for Health Promotion and Preventive Medicine
USAEC	United States Army Environmental Command
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WP	White Phosphorus
WSMR	White Sands Missile Range
WSPG	White Sands Proving Ground
WSTC	White Sands Test Center
°F	Degrees Fahrenheit

EXECUTIVE SUMMARY

The United States (U.S.) Army is conducting qualitative assessments at operational ranges to meet the requirements of Department of Defense policy and to support the U.S. Army Sustainable Range Program. The operational range qualitative assessment (hereinafter referred to as Phase I Assessment) is the first phase of the U.S. Army Operational Range Assessment Program (ORAP). This Phase I Assessment evaluates the operational range area at White Sands Missile Range (WSMR) to assess whether further investigation is needed to determine if potential munitions constituents of concern (MCOC) are or could be migrating off-range at levels that may pose an unacceptable risk to human health or the environment. In conducting the Phase I Assessment, MCOC sources, potential off-range migration pathways, and potential off-range human and ecological receptors are evaluated as appropriate.

WSMR is an approximately 2,189,690-acre facility located in south-central New Mexico. Four extension areas to the north and west of WSMR, maintained through leases and partner agreements with landowners, encompass an additional 1,514,523 acres. WSMR was established in 1945 as White Sands Proving Ground for the development and testing of rocket technology and missile weapons. The facility was renamed WSMR in 1958 and is currently the largest land-based military test range in the western hemisphere. WSMR is currently a major range and test facility base used by the Army, Navy, Air Force, National Aeronautics and Space Administration, other government agencies, universities, private industries, and foreign militaries for the testing, evaluation, research, and assessment of military and commercial products.

A combination of data from Army Range Inventory Database-Geodatabase (2006) and Geographic Information System data provided by WSMR (2008a) was used to identify operational ranges at WSMR. A total of 81 operational ranges encompassing an operational range area of approximately 3,997,587 acres were identified, with ranges consisting of the entirety of the WSMR operational area (primary research, development, testing, and evaluation [RDT&E] area), the four extension areas (RDT&E extension areas), and 76 sub-ranges (295,452 acres) overlapping the primary RDT&E area or extension areas. An additional 2,078 acres of WSMR were identified as non-operational area. Sub-range types include RDT&E ranges (i.e., specialized facilities, launch complexes, and impact areas) and training ranges (firing ranges, maneuver and training areas, and dudded impact areas). Two of the sub-ranges examined, totaling 26,487 acres, are programmatically excluded from the ORAP as they are currently undergoing Resource Conservation and Recovery Act closure activities. Therefore, a total of 79 ranges (the primary RDT&E area, the four RDT&E extension areas, and 74 sub-ranges) encompassing a total of 3,971,100 acres were addressed under the ORAP.

Current and historical munitions use at WSMR includes small, medium, and large caliber munitions, pyrotechnics/obscurants, and other munitions. Primarily, MCOC sources at WSMR consist of small and medium caliber firing, hand grenade ranges, launch complexes / sites, and impact areas. MCOC sources from historical use of the main area of WSMR have been identified. In general, MCOC from source areas potentially impact soil source media (e.g., impact berms and impact areas surrounding targets).

Surface water at WSMR is primarily limited to ephemeral streams that infiltrate and/or evaporate prior to flowing off the operational range area. Therefore, groundwater is the only potential pathway for off-range migration of MCOC from source areas at WSMR. Ranges containing potential MCOC sources were identified in recharge areas for the basin-fill aquifer of the Tularosa and Jornada del Muerto Basins (which are sources of drinking water for WSMR), communities to the west and east of WSMR (Las Cruces, Alamogordo), and domestic wells in the vicinity of WSMR, and for the bedrock

aquifer which is a source of drinking water for domestic wells and communities to the north and northeast of WSMR. Based on current and historical military munitions usage at WSMR and a review of potential pathways and potential human and/or ecological receptors, no ranges were identified as having the potential for off-range migration of potential MCOC that may affect human and ecological receptors. The depth to groundwater in the source areas, limited annual precipitation, and high evaporation rates in the region minimize the potential for off-range migration of potential MCOC.

The 79 operational ranges addressed under the ORAP at WSMR are categorized as Unlikely.

Unlikely – Five-Year Review

A total of 79 ranges at WSMR are categorized as Unlikely, totaling 3,971,101 acres¹. These ranges consist of the primary RDT&E area, the extension areas, RDT&E sub-ranges (consisting of specialized facilities, launch complexes, and impact areas) and training sub-ranges (consisting of live-fire small caliber firing ranges, live-fire medium caliber firing ranges, non-live-fire ranges, live-fire and non-live-fire maneuver and training areas, and dudded impact areas). Based upon a review of readily available information, ranges where there is sufficient evidence to show that there are no known releases or source-receptor interactions off-range that could present an unacceptable risk to human health or the environment are categorized as Unlikely. Ranges categorized as Unlikely are required to be re-evaluated at least every five years. Re-evaluation may occur sooner if significant changes (e.g., change in range operations or site conditions, regulatory changes) occur that affect determinations made during this Phase I Assessment.

Table ES-1 summarizes the Phase I Assessment findings.

¹ Total acreage of ranges categorized as unlikely (3,971,101 acres) is greater than the total operational area of WSMR (3,702,135 acres) due to overlapping range usage (e.g., training ranges within the primary RDT&E area).

Table ES-1: Summary of Findings and Conclusions for White Sands Missile Range

Category	Total Number of Ranges and Acreage	Source(s)	Pathway(s)	Human Receptors	Ecological Receptors	Conclusions and Rationale	
Unlikely	79 operational ranges, 3,971,101 acres	No source—limited or no military munitions use (RDT&E extension areas)	Not evaluated (no source identified)			Re-evaluate during the five-year review. No source was identified.	
		RDT&E sub-ranges (RDT&E launch complexes, RDT&E impact areas, RDT&E specialized facilities), and training sub-ranges (firing ranges)	No sources located within recharge areas for the basin-fill or bedrock aquifers	Not evaluated (migration pathways unlikely to be complete)			Re-evaluate during the five-year review. Migration pathways are unlikely.
		RDT&E sub-ranges (RDT&E launch complex and RDT&E specialized facilities) and training sub-ranges (maneuver and training areas, dudded impact areas, and firing ranges)	Recharge to basin-fill and/or bedrock aquifers	None	None		Re-evaluate during the five-year review. No receptors were identified.

Category	Total Number of Ranges and Acreage	Source(s)	Pathway(s)	Human Receptors	Ecological Receptors	Conclusions and Rationale
		RDT&E sub-range (RDT&E specialized facility) and the primary RDT&E area of WSMR	Recharge to basin-fill and/or bedrock aquifers	WSMR Main Post wells and groundwater users of the basin-fill aquifer	None	Re-evaluate during the five-year review. The deep groundwater table, limited annual precipitation, and high evaporation rates minimize the potential for off-range migration of potential MCOC.