4.6.7 Cumulative Impacts

Cumulative impacts to cultural and paleoentology within the ROI are not anticipated to be significant due to proposed mitigation. Over the past hundred years through present day many sites within the ROI have been and continue to be disturbed by illegal collection and vandalism. As the land within the chosen alternative will be under Army control, access to sites currently open to the public and largely unprotected from collection and vandalism will no longer be accessible to the general public. In the ROI as a whole, several sites are under restricted access for collectors, however the vast number of undocumented and un-surveyed areas remains accessible and largely uncontrolled, un-patrolled, or unregulated. In the selected alternative are cultural and paleoentogical identified sites that will be mitigated, either by placing the area off-limits to training or by identification and removal of artifacts before training could occur. The use of the predictive model should increase the number of sites located and thus mitigate the impact to less than significant. Due to the above, it is believed that the proposed project would have a positive cumulative effect on these resources as sites that would be subject to illegal collection and destruction would no longer be accessible to the public.

4.7 Air Quality

Significant air quality impacts are defined as those that cause, or contribute to, an exceedance of a federal or state ambient air quality standard (AAQS). The MDAQMD established daily and annual threshold levels to attain or prevent exceedance of federal and state AAQS (described in Section 3.7, Air Quality, and presented in Table 4.7-1). Federal conformity issues are addressed in the Fort Irwin General Conformity Requirements Land Acquisition Project (see Appendix E, Air Conformity Study).

Table 4.7-1: Criteria Thresholds

THRESHOLD	UNITS	VOC	CO	NOX	SO_2	PM-10
MDAQMD Annual	Tons	25	100	25	25	15
MDAQMD Daily	Pounds	137	548	137	137	82

4.7.1 Construction

Roads and camera towers will be constructed to monitor training exercises. Emissions produced from the construction will be minimal compared to the operational impacts from the training exercises; thus, construction emissions will not be discussed further in this document.

4.7.2 Fugitive Dust Emissions

Particulate emissions from fugitive dust were evaluated as PM-10 through an extensive analysis of vehicle patterns used in the training exercises. The analysis, developed in cooperation with the MDAQMD, was used to determine federal conformity and is included in a "General Conformity Requirements, Land Acquisition Project, Fort Irwin National Training Center" study.

Fugitive dust emission estimates were concentrated on operations that would differ between alternatives. Sources of fugitive dust at Fort Irwin include vehicle miles traveled by equipment,

aviation operations, land moving operations, and wind erosion. Emissions generated from vehicle miles traveled by equipment include all vehicles used during the training exercises, such as trucks, support vehicles, tanks, etc.

Aviation and Land Moving Operations

Aviation operations include planes and helicopters. Land moving equipment is used to dig trenches for equipment and troops during maneuvers. Aviation and land moving operations would remain essentially unchanged.

Wind Erosion

Wind erosion is the process of particulates being separated from the soil and emitted by gusts of wind passing over disturbed desert areas. A quantitative estimate of differences in particulate emissions from wind erosion among alternatives is difficult to estimate. Difficulties arise from estimating disturbed surface area, frequency of disturbance, silt content, evapo-transportation, surface roughness, threshold velocity, and erosion potential.

At Fort Irwin, non-homogeneous surfaces impregnated with non-erodible elements (stones, vegetation) are characterized by a limited reservoir of erodible material. Such surfaces have high threshold wind speeds for wind erosion. The particulate emissions rates tend to settle rapidly when blown. The Fort Irwin region is subject to wind speeds that often exceed 30 mph. Although the desert surface in the confines of Fort Irwin is characterized as non-homogeneous, it is substantially disturbed. Disturbance caused by military maneuvering has generated increased wind erosion and, subsequently, high PM-10 levels within the confines of Fort Irwin.

The study area, previous to the withdrawal of land for the Fort Irwin Expansion, has been generally open to public recreational use to include off road vehicle use. As a result, much of this area has been previously disturbed. The disruption to the soils will, however, increase from training.

Appendix E is the conformity study. The conformity study used a very conservative figure for total disturbed area based on re-vegtation of some current use areas. Some areas currently used for staging areas may be re-vegetated but the majority of currently disturbed land will remain so. As a result, use of the study area for training will result in additional land being disturbed or disturbed to a greater degree increasing the amount of disturbed land subject to wind erosion and thereby increasing the amount of PM-10 generated by wind activity.

A comparison of data from four air monitoring stations at Fort Irwin measuring PM-10 during windy nontraining days was conducted to determine the approximate amount of increased PM-10 production to be expected from disturbed land versus nondisturbed land caused by wind erosion. One monitoring station is on the eastern boundary of Fort Irwin in a disturbed training area (Eastgate station). It was compared to a new monitoring station on the eastern boundary of the Eastgate expansion area that is currently a non-disturbed area. The third monitoring station was in Goldstone on the western boundary of the current training area and compared to a new monitoring station on the western edge of the Superior Valley expansion area in a non-disturbed area. The data indicates a small increase in production of PM-10 in disturbed areas versus non-disturbed areas as predicted. It also indicated the amount of PM10 that could be transported off the installation as a result of wind erosion should be considerable lower than the Federal standard of 150 ppm and would probably only exceed the MDAQMD 24 hour standard of 50 ppm a few days per year with most days generating PM-10 at a significantly lower figure than 50 ppm.

Vehicle Miles Traveled

Vehicle miles traveled over paved and unpaved surfaces contribute a substantial amount of PM-10 emissions at Fort Irwin. The Strategic Planning Office (SPO) at Fort Irwin provided information to estimate quantitatively the vehicle miles traveled per rotation by training type, training day, unit type, and equipment type. The SPO provided two training types: heavy rotation and light rotation. Large volumes of vehicles and large ratios of heavy vehicles to lighter vehicles characterize heavy rotations. Fewer vehicles, higher proportion of light vehicles to heavy vehicles, and larger numbers of foot soldiers characterize light rotations. The SPO defined vehicle types by four weight classes: heavy tracked, heavy wheeled, light tracked, and light wheeled.

- Heavy tracked—tracked vehicles weighing at least 16 tons
- Heavy wheeled—wheeled vehicles weighing more than 4 tons
- Light tracked—tracked vehicles weighing less than 16 tons
- Light wheeled—wheeled vehicles weighing less than 4 tons

Since the weight classes contained multiple vehicle types, specific vehicle weights for each vehicle type needed to be determined. Vehicle descriptions provided by SPO were compared with vehicle descriptions and vehicle weights used in the 1996 Conformity Report. As a result, an average vehicle weight for each weight class was developed. Table 4.7-2 presents the 1996 Conformity Report vehicle list, with corresponding vehicle weights and the new vehicle descriptions. Table 4.7-3 presents the average vehicle weights estimated for each vehicle type.

Road types were developed from information provided by Fort Irwin. Where data was unclear or unavailable, default road types were used. Paved roads were the default road type for support groups; desert was set as default road type for maneuver groups and OPSGRP. Sieve analysis of native soil was used to determine PM-10 content.

To calculate the fugitive emissions associated with travel during deployment activity, Parsons used the tables and equations in EPA, AP-42, Section 13.2.2 for unpaved roads.

Based on 14 days per rotation and eight heavy rotations and two light rotations per year, the current overall fugitive PM-10 emissions were estimated to be 16,035 tons per year. More complete data provided a larger Vehicle Miles Traveled (VMT) estimate in this report than reported in the 1996 DEIS. Table 4.7-4 presents a summary of the fugitive PM-10 emission estimated by alternative.

Table 4.7-2: Weight Classification Assignment

1996 CONFORMITY REPORT DESCRIPTION	NEW DESCRIPTION	1996 CONFORMITY REPORT VEHICLE WEIGHT (TONS)
Tracked (M113 Forward Observation Vehicle)	Light Tracked (LT) < 15 tons	13
Tracked (Eng. Equip.)	Light Tracked (LT) < 15 tons	13
Tracked (M109)	Heavy Tracked (HT) > 16 tons	32
Tracked (M2AO)	Heavy Tracked (HT) > 16 tons	33
Tracked (M578/M88)	Heavy Tracked (HT) > 16 tons	37
Tracked (M1A1)	Heavy Tracked (HT) > 16 tons	67
Wheeled (M998)	Light Wheeled (LW) < 4 tons	2
Wheeled (2.5 ton)	Heavy Wheeled (HW) > HMMV	7
Tractor (10 ton)	Heavy Wheeled > HMMV	10
Wheeled (5 ton)	Heavy Wheeled > HMMV	11
Wheeled (HEMTT)	Heavy Wheeled > HMMV	19

Sources: AVES, General Conformity Requirements Land Acquisition Project, Fort Irwin National Training Center, Fort Irwin California, 1996
SPO, Glossary, HR Alternative 1.ppt, 2002

Table 4.7-3: Average Vehicle Weight by Vehicle Type

NEW DESCRIPTION	AVERAGE WEIGHT BASED ON 1996 CONFORMITY REPORT WEIGHTS (TONS)
Light Tracked (LT) < 15 tons	13
Heavy Tracked (HT) > 16 tons	42
Light Wheeled (LW) < 4 tons	2
Heavy Wheeled > HMMV	12

Table 4.7-4: Particulate Matter Of Less Than 10 Microns Emissions By Alternative

DESCRIPTION	ALTERNATIVE I	ALTERNATIVE II	ALTERNATIVE III	ALTERNATIVE IV	ALTERNATIVE V	ALTERNATIVE VI
Heavy Rotation, (ton/rotation)	1,736	1,808	1,736	1,791	1,736	1,736
Light Rotation (ton/rotation)	1,071	1,120	1,053	1,075	1,007	1,075
Annual Emissions* (ton/year)	16,030	16,704	15,994	16,478	15,902	16,038

: Annual emissions are based on 8 heavy and 2 light rotations per year.

4.7.2.1 Alternative I: East/West

Impacts

Alternative I is expected to generate similar VMT and PM-10 emissions as Fort Irwin's current operations and/or Alternative VI. The 9,592,398 VMT generated annually by eight heavy and two light rotations under Alternative I would produce an estimated 16,030 tons of PM-10 per year, which is about eight tons per year less than the current operations. This reduction and/or no-change in PM-10 emissions between Alternative I and Fort Irwin's current operations (Alternative VI) is likely due to the location of staging areas and support groups in the expansion area relative to the attacking groups during training exercises. Any additional PM-10 generated by wind due to a larger area of disturbed land should be minor as much of the area was previously disturbed by off road vehicles and should be off set by the fewer vehicle miles driven. Therefore, the preferred project would not result in a significant air quality impact from dust generated PM-10.

Mitigation

Fort Irwin has instituted a program in which areas not frequently used are re-vegetated with native plants. These areas are watered regularly; consequently, re-vegetated areas grow much faster than under typical desert conditions. The re-vegetated areas reduce wind erosion over disturbed surfaces that receive little operational use.

While overall dust levels are expected to remain almost the same or decline with project implementation, potential impacts (i.e., reduced visibility across State Highway 127) could occur see section 4.13.1.1 for transportation issues. The following mitigation measures will help reduce these impacts to a level that is less than significant.

- Implementation of dust control measures, including the use of snow fencing, vegetation, and safety hazard signs; and
- Dust control measures, such as regular watering, chemical treatment, and an asphalt chip sealer used in primary dust generation areas.

Chemical treatment and soil sealants may have control factors in excess of 90 percent. The above controls, or equally effective measures, can reduce site-generated dust to below current levels for various alternatives. This will reduce any potential impacts to less than significant.

4.7.2.2 Alternative II: East Gate/South

Impacts

Emissions estimated for Alternative II are greater than those estimated for Fort Irwin's current operations (Alternative VI). The 9,988,318 VMT generated annually by eight heavy and two light rotations under Alternative II would produce an estimated 16,704 tons of PM-10 per year, which is about 666 tons per year more PM-10 than Fort Irwin's current operations (Alternative VI).

Alternative II generates more than 100 tons per year of PM-10 greater than Fort Irwin's current operations. Therefore, the estimated increase in PM-10 emissions from Alternative II would likely have a significant impact on air quality.

Mitigation

Mitigation measures to reduce fugitive dust emissions below levels of significance include those outlined in Alternative I and/or reducing the amount of VMT during each rotation.

4.7.2.3 Alternative III: East Gate

Impacts

Emissions estimated for Alternative III are less than and/or equal to those estimated for Fort Irwin's current operations (Alternative VI). Alternative III would generate an estimated 15,994 tons per year from eight heavy and two light rotations with a total 9,586,724 annual VMT. This would be approximately 44 tons less annually than the current operations. This reduction and/or no-change in PM-10 emissions between Alternative III and Fort Irwin's current operations is likely due to the location of staging areas and support groups in the expansion area relative to the attacking groups during training exercises, thereby reducing unneeded administrative travel to the cantonment area. Therefore, Alternative III would not result in a significant air quality impact from dust generated PM-10.

Mitigation

While overall dust levels are expected to remain almost the same or decline with project implementation, potential impacts (i.e., reduced visibility across State Highway 127) could occur. Therefore, the mitigation controls outlined in Alternative I will be implemented for this alternative.

4.7.2.4 Alternative IV: Southwest/East Gate/UTM 90

Impacts

Emissions estimated for Alternative IV are greater than those estimated for Fort Irwin's current operations (Alternative VI). The 9,804,102 VMT generated annually by eight heavy and two light rotations under Alternative IV would produce an estimated 16,478 tons of PM-10 per year, which is about 440 tons per year more PM-10 than Fort Irwin's current operations.

Alternative IV would generate more than 100 tons per year of PM-10, which is greater than Fort Irwin's current operations. Therefore, the estimated increase in PM-10 emissions from Alternative IV would likely have a significant impact on air quality.

Mitigation

Mitigation measures to reduce fugitive dust emissions below levels of significance include those outlined in Alternative I and/or reducing the amount of VMT during each rotation.

4.7.2.5 Alternative V: East Gate/UTM 90

Impacts

Emissions estimated for Alternative V are similar to those estimated for Fort Irwin's current operations (Alternative VI). Alternative V would generate an estimated 15,902 tons of PM-10 from eight heavy and two light rotations annually, with a total 9,542,514 annual VMT. This would generate an estimated 136 tons less than the current operations. This reduction in PM-10 emissions between Alternative V and Fort Irwin's current operations is due to the location of staging areas and support groups in the expansion area relative to the attacking groups during training exercises, thereby reducing the need for administrative trips to the cantonment area and will off set any additional PM-10 generated by wind due to increased disturbed areas. Therefore, Alternative V would not result in a significant air quality impact from dust generated PM-10.

Mitigation

While overall dust levels are expected to remain almost the same or decline with project implementation, potential impacts (i.e., reduced visibility across State Highway 127) could occur. Therefore, the mitigation controls outlined in Alternative I will be implemented.

4.7.2.6 Alternative VI: No Action

Under this alternative, the Army would not operate in the study area. Military exercises and equipment support under this alternative would be limited to the existing levels at the NTC and within Fort Irwin's boundaries. Therefore, the amount of dust generated PM-10 would not change under this alternative.

Impacts

Emissions estimated for Alternative VI are discussed in detail earlier in this section. In summary, Alternative VI would generate an estimated 16,038 tons per year from eight heavy and two light rotations, with a total 9,596,140 annual VMT.

Mitigation

Mitigation controls currently implemented by the NTC and Fort Irwin include those outlined in Alternative I.

Fugitive Dust Transport

The EIS examines off-site air quality impacts. PM-10 monitoring, discussed in Section 3.7.3, Baseline Air Quality, reveals that the highest PM-10 concentrations do not occur during days when training takes place. From this, particulate emissions from training would not directly generate significant off-site PM-10 impacts.

Observations at Camp Pendleton concur with the PM-10 data discussed above. At Camp Pendleton, dust lofting from tanks and helicopter prop wash within 2,000 feet of the highway may create a driving hazard. Beyond that distance, dilution will thin out the cloud such that visibility is not significantly impaired, but there is still traffic slowing and a moderate hazard until the source-receptor distance reaches 3,000 to 4,000 feet. PM-10 dust emissions are anticipated to travel two to nine miles downwind during activities. Based on the existing area and position of Fort Irwin, prevailing winds are usually parallel to I-15 blowing from the southwest; the dust will not be carried toward offsite population centers or the Death Valley National Park area. In fact, most of this dust would be expected to settle back within the Fort Irwin area.

The quantitative analysis presented in this report is based on the total daily mileage, and while this may not have a distinct representation of all emissions, it does present the differences in emissions associated with each alternative.

4.7.3 Exhaust Emissions

Particulate Criteria Emission Factors

Internal combustion engines produce PM-10 emissions as part of the combustion process. This is especially true of diesel engines. In the case of Fort Irwin, vehicle exhaust PM-10 emissions are much lower in magnitude relative to the VMT fugitive dust emissions. Still, it is important to understand their contribution.

Exhaust emission estimates are calculated using VMT results from the fugitive dust VMT exercise. The increased VMT produces increased exhaust emissions.

Emission estimates for both the existing and proposed travel were based on emission factors developed with PART5 computer models distributed by the EPA. The new vehicle types were matched to the vehicle types in PART5 by vehicle weight. Table 4.7-5 presents PART5 vehicle classifications used for Fort Irwin.

Table 4.7-5: Fort Irwin Mobile5b And Part5 Vehicle Classifications

DESCRIPTION	VEHICLE WEIGHT (POUNDS)	MOBILE5B (VEHICLE CATEGORY)	PART5 (VEHICLE CATEGORY)
HT	84,500	HDDV (8501+ lb GVW)	HDDV (Class 8B; > 33,000 lb GVW)
LT	26,000	HDDV (8501+ lb GVW)	MHDDV (19,501–33,000 lb GVW)
HW	23,260	HDDV (8501+ lb GVW)	MHDDV (19,501–33,000 lb GVW)
LW	4,000	LDDT (0-8500 lb GVW)	LDDV (< 4,000 lb GVW)

HT: Heavy Tracked LT: Light Track HW: Heavy Wheeled
LW: Light Wheeled GVW: Gross Vehicle Weight
MOBILE5b:
HT and HW = heavy-duty diesel-powered vehicles (HDDV), 8501+ lb GVW)
LW = light-duty diesel-powered trucks (LDDT), 8500 lb GVW
PART5
HT = heavy heavy-duty diesel vehicle (HDDV), Class 8B, > 33,000 lb GVW
LT and HW = medium heavy-duty diesel vehicle (MHDDV), Class 6, 7, 8A, 19,501–33,000 lb GVW
LW = light-duty diesel truck (LDDV); Class 4, < 4,000 lb GVW

PM-10 and SO_2 exhaust emissions for existing operations were calculated using emission factors developed with EPA's PART5 Particulate Emission Factor Model. PART5 is a program designed for particulate air pollution impact of in-use gasoline-fueled and diesel-fueled motor vehicles. Existing PM-10 exhaust emissions are 6.13 tons per year with 8 heavy rotations and 2 light rotations annually. Existing SO_2 emissions are 2.89 tons per year with 8 heavy rotations and 2 light rotations annually. Table 4.7-6 presents particulate emission factors developed with PART5.

Table 4.7-6: Exhaust Emission Factors For Criteria Pollutants

		MOBILE5B EMISSION FACTORS			PART5 EMISSION FACTORS	
DESCRIPTION	VEHICLE WEIGHT (POUNDS)	EXHAUST RUNNING VOC (G/MI)	EXHAUST CO (G/MI)	EXHAUST NOX (G/MI)	EXHAUST SO_2 (G/MI)	EXHAUST PM-10 (G/MI)
HT	84,500	1.98	9.29	12.46	0.519	1.023
LT	26,000	1.98	9.29	12.46	0.427	0.881
HW	23,260	1.98	9.29	12.46	0.427	0.881
LW	4,000	0.89	1.54	1.67	0.111	0.264

HT: Heavy Tracked LT: Light Track HW: Heavy Wheeled
LW: Light Wheeled GVW: Gross Vehicle Weight
MOBILE5b 1997 Emission Factors at 25 mph
HT and HW = heavy-duty diesel-powered vehicles (HDDV), 8501+ lb GVW)
LW = light-duty diesel-powered trucks (LDDT), 8500 lb GVW
PART5 1997 Emission Factors at 25 mph
HT = heavy heavy-duty diesel vehicle (HDDV), Class 8B, > 33,000 lb GVW
LT and HW = medium heavy-duty diesel vehicle (MHDDV), Class 6, 7, 8A, 19,501 - 33,000 lb GVW

Gaseous Exhaust Criteria Emission Factors

Gaseous exhaust criteria emissions include NOx, CO, and VOC. Gaseous exhaust criteria emissions for existing operations were calculated using the diesel emission factors developed with MOBILE5b Mobile Emission Factor Model distributed by the EPA. The new vehicle types were matched to the vehicle types in MOBILE5b by vehicle weight. Table 4.7-5 presents MOBILE5b vehicle classifications used for Fort Irwin. The emission factors generated by MOBILE5b are presented in Table 4.7-6.

Exhaust Criteria Emission Estimates

Exhaust criteria emissions from heavy and light rotation alternatives are presented in Tables 4.7-7 and 4.7-8. Based on 14 days per rotation with a five-day RSOI and eight heavy rotations and two light rotations per year, the current criteria emissions were estimated to be 15.06 tons per year of VOC, 56.58 tons per year of CO, 73.72 tons per year of NOx, 2.94 tons per year of SO_2, and 6.16 tons per year of PM-10. Table 4.7-9 presents estimates of annual average exhaust criteria emissions per alternative. All proposed alternative exhaust criteria emission estimates are below or equivalent to the existing exhaust criteria emission estimates.

Table 4.7-7: Exhaust Criteria Emissions From Heavy Rotation per Alternative

ALTERNATIVE	VOC (TONS /ROTATION)	CO (TONS /ROTATION)	NOX (TONS /ROTATION)	SO_2 (TONS /ROTATION)	PM-10 (TONS /ROTATION)
Alternative I	1.62	6.20	8.10	0.32	0.67
Alternative II	1.69	6.47	8.45	0.33	0.69
Alternative III	1.62	6.20	8.10	0.32	0.67
Alternative IV	1.67	6.39	8.36	0.33	0.69
Alternative V	1.62	6.20	8.10	0.32	0.67
Alternative VI	1.62	6.20	8.10	0.32	0.67

CO: Carbon monoxide NOx: Oxides of Nitrogen VOC: Volatile Organic Compounds SO2: Sulfur Dioxide
PM-10: Particulate Matter (less than 10 microns in diameter)

Table 4.7-8: Exhaust Criteria Emissions From Light Rotation per Alternative

ALTERNATIVE	VOC (TONS /ROTATION)	CO (TONS /ROTATION)	NOX (TONS /ROTATION)	SO_2 (TONS /ROTATION)	PM-10 (TONS /ROTATION)
Alternative I	1.05	3.52	4.50	0.19	0.40
Alternative II	1.09	3.59	4.59	0.19	0.41
Alternative III	1.03	3.32	4.24	0.18	0.39
Alternative IV	1.05	3.45	4.41	0.19	0.40
Alternative V	1.00	3.28	4.18	0.18	0.38
Alternative VI	1.05	3.49	4.46	0.19	0.40

CO: Carbon monoxide NOx: Oxides of Nitrogen VOC: Volatile Organic Compounds SO2: Sulfur Dioxide PM-10: Particulate Matter (less than 10 microns in diameter)

Table 4.7-9: Annual Average Exhaust Criteria Emissions* per Alternative

ALTERNATIVE	VOC (TONS /ROTATION)	CO (TONS /ROTATION)	NOX (TONS /ROTATION)	SO_2 (TONS /ROTATION)	PM-10 (TONS /ROTATION)
Alternative I	15.06	56.64	73.80	2.94	6.16
Alternative II	15.70	58.94	76.78	3.02	6.34
Alternative III	15.02	56.24	73.28	2.92	6.14
Alternative IV	15.46	58.02	75.70	3.02	6.32
Alternative V	14.96	56.16	73.16	2.92	6.12
Alternative VI	15.06	56.58	73.72	2.94	6.16

****: Annual Average Emissions based on eight heavy rotations and two light rotations per year.***
CO: Carbon monoxide NOx: Oxides of Nitrogen VOC: Volatile Organic Compounds SO2: Sulfur Dioxide PM-10: Particulate Matter (less than 10 microns in diameter)

4.7.3.1 Alternative I: East/West

Impacts

Alternative I is expected to generate similar VMT and exhaust criteria emissions as Fort Irwin's current operations (Alternative VI). Based on 14 days per rotation with a five day RSOI and eight heavy rotations and two light rotations per year, Alterative I criteria emissions were estimated to be 15.06 tons per year of VOC, 56.64 tons per year of CO, 73.80 tons per year of NOx, 2.94 tons per year of SO_2, and 6.16 tons per year of PM-10. Therefore, criteria exhaust emissions from Alternative I would not result in significant impacts to air quality.

Mitigation

Mitigation controls for criteria exhaust emissions under Alternative I are not necessary.

4.7.3.2 Alternative II: East Gate South

Impacts

Estimated emissions for Alternative II are greater than those estimated for Fort Irwin's current operations (Alternative VI). Alternative II would generate approximately 15.7 tons per year of VOC, 58.94 tons per year of CO, 76.78 tons per year of NOx, 3.02 tons per year of SO_2, and 6.34 tons per year of PM-10. This would be an increase of one ton per year of VOC, two tons per year of CO, three tons per year of NOx, and less than one ton per year of SO_2 and PM-10 emissions. These increases would add to the significant impacts estimated previously for dust generated PM-10, however, criteria exhaust emissions from Alternative II would not result in significant impacts to air quality.

Mitigation

Mitigation controls for criteria exhaust emissions under Alternative II are not necessary.

4.7.3.3 Alternative III: East Gate

Impacts

Alternative III would generate a lower level of emissions than those estimated for Fort Irwin's current operation (Alternative VI). Alternative III would generate approximately 15.02 tons per year of VOC, 56.24 tons per year of CO, 73.28 tons per year of NOx, 2.92 tons per year of SO_2, and 6.1 tons per year of PM-10. This would be a decrease of less than one ton per year of VOC, CO, NOx, SO_2, and PM-10. Therefore, criteria exhaust emissions from Alternative III would not result in significant impacts to air quality.

Mitigation

Mitigation controls for criteria exhaust emissions under Alternative III are not necessary.

4.7.3.4 Alternative IV: Southwest/East Gate/UTM 90

Impacts

Estimated emissions for Alternative IV are greater than those estimated for Fort Irwin's current operations (Alternative VI). Alternative IV would generate approximately 15.46 tons per year of

VOC, 58.02 tons per year of CO, 75.7 tons per year of NOx, 3.02 tons per year of SO_2, and 6.12 tons per year of PM-10. This would be an increase of one ton per year of CO, two tons per year of NOx, and less than one ton per year of VOC, SO_2, and PM-10 emissions. These increases would add to the significant impacts estimated previously for dust generated PM-10, however, criteria exhaust emissions from Alternative IV would not result in significant impacts to air quality.

Mitigation

Mitigation controls for criteria exhaust emissions under Alternative IV are not necessary.

4.7.3.5 Alternative V: East Gate/UTM 90

Impacts

Alternative V would generate a lower level of emissions than those estimated for Fort Irwin's current operations (Alternative VI). Alternative V would generate approximately 14.96 tons per year of VOC, 56.16 tons per year of CO, 73.16 tons per year of NOx, 2.92 tons per year of SO_2, and 6.12 tons per year of PM-10. This would be a decrease of less than one ton per year of VOC, CO, NOx, SO_2, and PM-10. Therefore, criteria exhaust emissions from Alternative V would not result in significant impacts to air quality.

Mitigation

Mitigation controls for criteria exhaust emissions under Alternative V are not necessary.

4.7.3.6 Alternative VI: No Action

Under this alternative, the Army would not operate in the study area. Military exercises and equipment support under this alternative would be limited to the existing levels at the NTC and within Fort Irwin's boundaries. Therefore, the amount of criteria exhaust emissions generated would not change under this alternative.

Impacts

Emissions estimated for Alternative VI are discussed in detail at the beginning of this section (4.7.3). In summary, Alternative VI would generate approximately 15.06 tons per year of VOC, 56.58 tons per year of CO, 73.72 tons per year of NOx, 2.94 tons per year of SO_2, and 6.16 tons per year of PM-10.

Mitigation

Mitigation controls for criteria exhaust emissions under Alternative VI are not necessary.

4.7.4 Summary of Criteria Emission Estimates

A summary of the annual average criteria emissions is presented in Table 4.7-10. Table 4.7-11 presents the difference in annual average criteria emissions generated between each alternative and the existing operations, Alternative VI. A summary of the daily average criteria emissions is presented in Table 4.7-12. The daily average criteria emissions were estimated by averaging the annual emissions over ten 14-day rotations, each with a five day RSOI, per year (8 heavy rotations and 2 light rotations). Table 4.7-13 presents the difference in daily average criteria emissions generated between each alternative and the existing configuration, Alternative VI.

Tables 4.7-11 and 4.7-13 show that emission estimated for Alternatives I, III, and V are below or equivalent to the existing configuration. All emission estimates for Alternatives I, III, and V are also below the federal and MDAQMD significant emission thresholds. Therefore, these alternatives are not expected to impact air quality.

Table 4.7-10: Summary Of Annual Average Criteria Emissions* per Alternative

ALTERNATIVE	VOC (TONS/YEAR)	CO (TONS/YEAR)	NOX (TONS/YEAR)	SO_2 (TONS/YEAR)	PM-10 (TONS/YEAR)
Alternative I	15.06	56.64	73.80	2.94	16,036
Alternative II	15.70	58.94	76.78	3.02	16,710
Alternative III	15.02	56.24	73.28	2.92	16,000
Alternative IV	15.46	58.02	75.70	3.02	16,484
Alternative V	14.96	56.16	73.16	2.92	15,908
Alternative VI	15.06	56.58	73.72	2.94	16,044

**: Annual Average Criteria Emissions based on eight heavy rotations and two light rotations per year.*
CO: Carbon monoxide NOx: Oxides of Nitrogen VOC: Volatile Organic Compounds SO2: Sulfur Dioxide
PM-10: Particulate Matter (less than 10 microns in diameter)—Exhaust PM-10 + Dust PM-10

Table 4.7-11: Difference Between Existing And Alternative Annual Average Criteria Emissions

ALTERNATIVE	VOC (TONS/YEAR)	CO (TONS/YEAR)	NOX (TONS/YEAR)	SO_2 (TONS/YEAR)	PM-10 (TONS/YEAR)
Alternative I	0	0	0	0	-8
Alternative II	1	2	3	1	666
Alternative III	0	0	0	0	-44
Alternative IV	0	1	2	0	440
Alternative V	0	0	-1	0	-136
MDAQMD Threshold	25	100	25	25	15

CO: Carbon monoxide NOx: Oxides of Nitrogen VOC: Volatile Organic Compounds SO2: Sulfur Dioxide
PM-10: Particulate Matter (less than 10 microns in diameter)—Exhaust PM-10 + Dust PM-10

Table 4.7-12: Summary of Daily Average Criteria Emissions* per Alternative

ALTERNATIVE	VOC POUNDS/DAY	CO POUNDS/DAY	NOX POUNDS/DAY	SO_2 POUNDS/DAY	PM-10 POUNDS/DAY
Alternative I	158.5	596.2	776.8	30.9	168,802
Alternative II	165.3	620.4	808.2	31.8	175,899
Alternative III	158.1	592.0	771.4	30.7	168,423
Alternative IV	162.7	610.7	796.8	31.8	173,520
Alternative V	157.5	591.2	770.1	30.7	167,453
Alternative VI	158.5	595.6	776.0	30.9	168,886

: Daily Average Criteria Emissions, Pounds/Day = (Total Annual Average Criteria Emission, ton/yr x 2,000 lb/ton)/(10 rotations per year x 14 days per rotation each with a five day RSOI)
CO: Carbon monoxide NOx: Oxides of Nitrogen VOC: Volatile Organic Compounds SO2: Sulfur Dioxide
PM-10: Particulate Matter (less than 10 microns in diameter)—Exhaust PM-10 + Dust PM-10

Table 4.7-13: Difference Between Existing And Alternative Daily Average Criteria Emissions

ALTERNATIVE	VOC POUNDS/DAY	CO POUNDS/DAY	NOX POUNDS/DAY	SO_2 POUNDS/DAY	PM-10 POUNDS/DAY
Alternative I	0	1	1	0	-84
Alternative II	7	25	32	1	7,013
Alternative III	0	-4	-5	0	-463
Alternative IV	4	15	21	1	4,634
Alternative V	-1	-4	-6	0	-1,432
MDAQMD Thresholds	137	548	137	137	82

CO: Carbon monoxide NOx: Oxides of Nitrogen VOC: Volatile Organic Compounds SO2: Sulfur Dioxide
PM-10: Particulate Matter (less than 10 microns in diameter)—Exhaust PM-10 + Dust PM-10

Alternatives II and IV generate emissions greater than the existing configuration. In addition, the PM-10 generated by Alternatives II and IV exceeds the MDAQMD thresholds of 15 tons per year of PM-10. The MDAQMD significance threshold was developed to prevent projects from causing or contributing to exceeding any federal or state AAQS for areas in attainment, and to achieve the AAQS for areas in non-attainment. Because the PM-10 emissions estimated in Tables 10 and 12

exceed the MDAQMD significance threshold, Alternatives II and IV would generate significant PM-10 impacts.

4.7.5 Cumulative Impacts

The proposed project, in combination with other actions particularly in the vicinity of State Highway 127 and the area to the southeast of the study area towards Interstate 15, or within one of the many utility corridors lying to the east and southeast of Fort Irwin, may have a significant cumulative impact. While no additional miles will be traveled per rotation and there will be no increase in the number of rotations, thus no increase in other types of pollutants, there is the potential for fugitive dust to travel beyond the installation boundaries on days of exceptionally high winds. On these days, fugitive dust may be combined with dust created by military movement along Manix Trail, private vehicle movement along dirt roads and highways, and fugitive dust created by projects that are ongoing within the utility corridors or other commercial or private activities.

The situation should improve in the future with the addition of the Fort Irwin rail spur, which would eliminate most vehicle traffic on the Manix Trail, and the implementation of the BLM's route closure program. In addition, the purchase of private land for mitigation for the proposed project should curb private development and route proliferation in the ROI in the future preventing additional soil disturbance.

The creation of the NTC in the early 80s, and prior training activities dating back to WWII, have created a condition wherein vegetation cover has been lost from much of the installation. The addition of training land and additional loss of vegetation cover associated with military maneuvers will add to this impact by increasing the acreage of exposed soil that would then be subject to wind erosion and attendant creation of air borne particulate matter.

4.8 Noise

This section provides a discussion of the noise impacts associated with the project and the project's affect on surrounding noise sensitive areas.

Determining a significant noise impact is based on Army Regulation 200-1, which implements federal laws concerning environmental noise for Department of the Army activities. Based on this regulation, a significant noise impact would occur if any of the following occurred:

- Noise-sensitive land uses such as residences, schools, and medical facilities fall within Noise Zones II or III, as described in Table 3.8-1.

Noise Zone I would be considered an insignificant noise impact. The following sections describe noise-producing activities that occur within Fort Irwin.

4.8.1 Noise Impacts on Wildlife

Studies on the effects of noise on wildlife, caused by aircraft overflights and impulse noise such as sonic booms have been focused on birds and hoofed mammals, including raptors and bighorn sheep. It has been shown that occasional, low-altitude overflights can produce increased heart rates in hoofed mammals, but the effect was not found to be detrimental. Birds, on the other hand, appear to be unaffected by both low-level aircraft overflight noise and sonic booms. In one study, a researcher observed a raptor species hunting on a bombing range in Mississippi. The species