6.5 AIR QUALITY

6.5.1 Affected Environment

There are no air quality monitoring stations close to DMR. The closest air quality monitoring stations are on the south side of O'ahu. Vehicle traffic and aircraft flight operations represent the major Army emission sources that are present intermittently at DMR. Live-fire training exercises are not conducted at DMR, but blank ammunition and ground-based smoke devices are used in other types of training exercises. Army use of the airfield at DMR is rather limited, accounting for about three percent of total annual flight operations. DMR sometimes is used as a refueling and re-arming location for Army OH-58D helicopters during training operations at other installations (Fanscher 2003). Private aircraft are the dominant users of Dillingham Airfield.

There are no meteorological stations at DMR, but the Army has a remote weather station on the ridge between DMR and MMR. The Mākua Ridge monitoring station is probably more representative of conditions at DMR than is the Army's monitoring station at KTA. Wind speeds recorded on the northeast shore of O'ahu tend to be stronger than those that would occur at DMR. Maximum wind speeds exceed the 15 mph (24 kph) threshold commonly associated with wind erosion processes about nine percent of the time.

6.5.2 Environmental Consequences

Summary of Impacts

One significant air quality impact has been identified at DMR under the Proposed Action or the RLA Alternative. Fugitive dust PM_{10} emissions from military vehicle use on unpaved roadways and off-road areas would increase by 211 tons (191 metric tons) per year compared to No Action conditions. Visible dust is a clear indication of airborne PM_{10} concentrations that are typically in the range of several thousand micrograms per cubic meter. It takes only a few hours of such concentrations to produce a 24-hour average that exceeds the state and federal 24-hour average PM_{10} standard of 150 micrograms per cubic meter. Dispersion modeling analyses indicate that fugitive dust emissions from vehicle travel on the DMR military vehicle trail have the potential for violating the federal 24-hour PM_{10} standard at moderate distances beyond the trail right-of-way. PM_{10} represents the size fractions of suspended particulate matter that are likely to penetrate into the lower respiratory tract, creating potential adverse health effects. The substantial increase in fugitive PM_{10} emissions from military vehicle use at DMR, the potential for exceeding the federal 24-hour PM_{10} standard, and the potential impacts on quality of life to surrounding communities result in a significant air quality impact at DMR under the Proposed Action. The impact from fugitive dust emissions would be reduced to a less than significant level through mitigation programs that include using washed gravel on military vehicle trails, periodically applying dust control chemicals, and developing an adaptive management program to manage training area lands and to modify training procedures as necessary to ensure compliance with federal air quality standards.

Construction activities associated with DMR under the Proposed Action or Reduced Land Acquisition would include three FTI antennas and Dillingham Trail. Maximum annual emissions from construction activities would be 56 tons (51 metric tons) of nitrogen oxide emissions in 2006. Nitrogen oxide emissions are of concern primarily as an ozone precursor. Emissions of ozone precursors from construction activities associated with the Proposed Action or the RLA Alternative would be too small to have a measurable effect on ozone levels, and would not change the attainment status of the area. Compared to No Action, ordnance use

quantities at DMR would decrease by about 25 percent under the Proposed Action or the RLA Alternative. Because emission quantities from ordnance use are very small and include only trace quantities of hazardous components, no significant air quality impacts would occur and there would be no change in the attainment status of the area.

SBCT Transformation would add the Stryker armored vehicle to the tactical and support vehicle inventory used at DMR. As a result, vehicle use and resulting vehicle engine emissions would increase at DMR under the Proposed Action or the RLA Alternative. The net increase in military vehicle engine emissions would be 0.45 tons (0.4 metric tons) per year for reactive organic compounds, 4.3 tons (3.9 metric tons) per year for nitrogen oxides, 1.3 tons (1.2 metric tons) per year for carbon monoxide, 0.05 ton (0.05 metric ton) per year for sulfur oxides, and 0.39 ton (0.35 metric tons) per year for PM_{10}. The net increase in military vehicle engine emissions would be too small to have meaningful effects on ambient air quality conditions or to affect the attainment status of the project area. Consequently, the increase in military vehicle engine emissions would have a less than significant impact on air quality.

Increased off-road vehicle use under the Proposed Action or RLA Alternative would increase the extent of land disturbance by vehicle use, leading to an increase in wind erosion at DMR. The net increase of 30 tons (27 metric tons) per year of emissions would be too small to have a meaningful effect on ambient air quality conditions. Consequently, increased wind erosion would have a less than significant air quality impact at DMR. The addition of UAV flight operations at DMR under the Proposed Action or the RLA Alternative would result in a less than significant increase in overall aircraft emissions associated with DMR.

There would be no change in the risk of wildfires at DMR under the Proposed Action or RLA. Emissions associated with wildfires at DMR would remain a less than significant impact. No personnel are based at DMR, so there would be no air quality impact at DMR from changes in personnel numbers under the Proposed Action or RLA.

Table 6-11 summarizes the significance of air quality impacts at DMR under the Proposed Action, RLA, and No Action.

Proposed Action (Preferred Alternative)

Significant Impacts Mitigable to Less Than Significant

Impact 1: Fugitive dust from military vehicle use. PM_{10} emissions would be approximately 537 tons (487metric tons) per year, an increase of about 211 tons (191 metric tons) per year compared to No Action conditions. Approximately 32 percent of the net increase in fugitive PM_{10} emissions would be associated with vehicle travel on unpaved roads, while the remaining 68 percent represents potential emissions from off-road vehicle maneuver activity.

Fugitive dust generated by off road military vehicle maneuver traffic inside DMR poses a limited potential for creating either nuisance conditions at nearby off-post locations or localized violations of the state or federal 24-hour average PM_{10} standards. PM_{10} represents the size fractions of suspended particulate matter that are likely to penetrate into the lower respiratory tract, creating potential adverse health effects. DMR is used primarily for logistics training activities, much of which occurs in the portion of DMR near the airfield. Tactical vehicle maneuver training would be limited at DMR. Soils in the level areas near the airfield

Table 6-11
Summary of Potential Air Quality Impacts at Dillingham Military Reservation

Impact Issues	Proposed Action	Reduced Land Acquisition	No Action
Emissions from construction activities	⊙	⊙	○
Emissions from ordnance use	⊙	⊙	⊙
Engine emissions from military vehicle use	⊙	⊙	⊙
Fugitive dust from military vehicle use	⊘	⊘	⊙
Wind erosion from areas disturbed by military vehicle use	⊙	⊙	⊙
Emissions from increased aircraft operations	⊙	⊙	⊙
Emissions from wildfires	⊙	⊙	⊙
Other emissions from personnel increases	○	○	○

In cases when there would be both beneficial and adverse impacts, both are shown on this table. Mitigation measures would only apply to adverse impacts.

LEGEND:

⊗ = Significant
⊘ = Significant but mitigable to less than significant
⊙ = Less than significant
○ = No impact
\+ = Beneficial impact
N/A = Not applicable

have a high sand content, resulting in rapid settling of dust generated by off-road vehicle activity. The nature of the training activities and the rapid settling of dust particles minimize the potential for significant PM_{10} impacts beyond the installation boundaries.

As discussed in Section 4.5, dispersion modeling analyses have been performed to better evaluate the potential for violations of the federal PM_{10} standard due to fugitive dust emissions from military vehicle trails. Vehicle convoys on the DMR Trail would vary in size, ranging from just a few vehicles to as many as 120 for a major exercise at DMR. However, most convoys would not travel to DMR or return to SBMR on the same day. Thus, total traffic volumes on the DMR Trail might be as high as 112 vehicles per day. If road surfaces are dry and winds are light, even relatively modest numbers of vehicles can create sufficient dust to cause downwind PM_{10} concentrations of more than 150 micrograms per cubic meter. In the absence of any dust control measures, daily traffic volumes of about 100 vehicles per day have the potential for causing PM_{10} problems at locations within 2,000 feet (610 meters) of the roadway. Lower daily traffic volumes could cause PM_{10} problems over shorter distances.

Potential PM_{10} problems from vehicle traffic on the DMR Trail can be reduced to a less than significant level by a combination of feasible mitigation measures, including the use of washed gravel for surfacing military vehicle trails and/or implementing a dust management program that may include periodic application of chemical dust suppressants. Alternative dust control compounds include environmentally friendly hygroscopic salts (such as calcium chloride or

magnesium chloride solutions) or synthetic polymer compounds (such as polyvinyl acetate and vinyl acrylic). If properly applied, dust control measures for unpaved roads would be expected to achieve at least 90 percent control of fugitive dust under the weather conditions and roadway use levels prevalent at USARHAW installations.

Expected PM_{10} concentrations downwind of the DMR Trail on a maximum use day are illustrated in Figure 6-7, where the modeling results assume implementation of the proposed dust management program. The assumed daily traffic volume of 112 vehicles per day would occur infrequently. Most days would have significantly less vehicle traffic and thus would have lower fugitive dust impacts than indicated in Figure 6-7.

The Dillingham Trail already is planned as a gravel road, with paved sections where necessary to control erosion problems. The gravel surface has been taken into account in the fugitive dust emission estimates. Dust generation could be further reduced by washing gravel after it is produced by rock crushing operations. Asphalt or concrete paving of the entire trail would further reduce dust generation from vehicle travel but might involve unacceptable costs. Water evaporates too rapidly to provide effective dust control for any extended period of time. The necessity for frequent repeat treatments often makes water application for on-going dust control an impractical option in warm climates. Thus, simple water sprays are not recommended for dust control on unpaved roads at USARHAW installations.

The substantial increase in fugitive PM_{10} emissions from military vehicle use at DMR, the potential for exceeding the federal 24-hour PM_{10} standard, and the potential impacts on quality of life to surrounding areas result in a significant air quality impact at DMR under the Proposed Action. The impact from fugitive dust emissions would be reduced to a less than significant level through mitigation programs that include using washed gravel on military vehicle trails, periodically applying dust control chemicals, and developing an adaptive management program to manage training area lands and modify training procedures as necessary to ensure compliance with federal air quality standards. Given the anticipated effectiveness of feasible mitigation measures, fugitive dust from vehicle travel on unpaved areas at DMR is considered a significant but mitigable to less than significant impact.

Regulatory and Administrative Mitigation 1. The Army will develop and implement a DuSMMoP for the training area. The plan will address measures such as, but not limited to, restrictions on the timing or type of training during high risk conditions, vegetation monitoring, dust monitoring, soil monitoring, and buffer zones to minimize dust emissions in populated areas. The Army will use the plan to determine how training will occur in order to keep fugitive dust emissions below CAA standards for PM_{10} and soil erosion and compaction to a minimum. The Army will monitor the impacts of training activities to ensure that emissions stay within the acceptable ranges as predicted and that environmental problems do not result from excessive soil erosion or compaction. The plan will also define contingency measures to mitigate the impacts of training activities that exceed the acceptable ranges for dust emissions or soil compaction.

The Army will continue to implement land restoration measures identified in the INRMP. Mitigation measures include, but are not limited to, implementing the ITAM program to

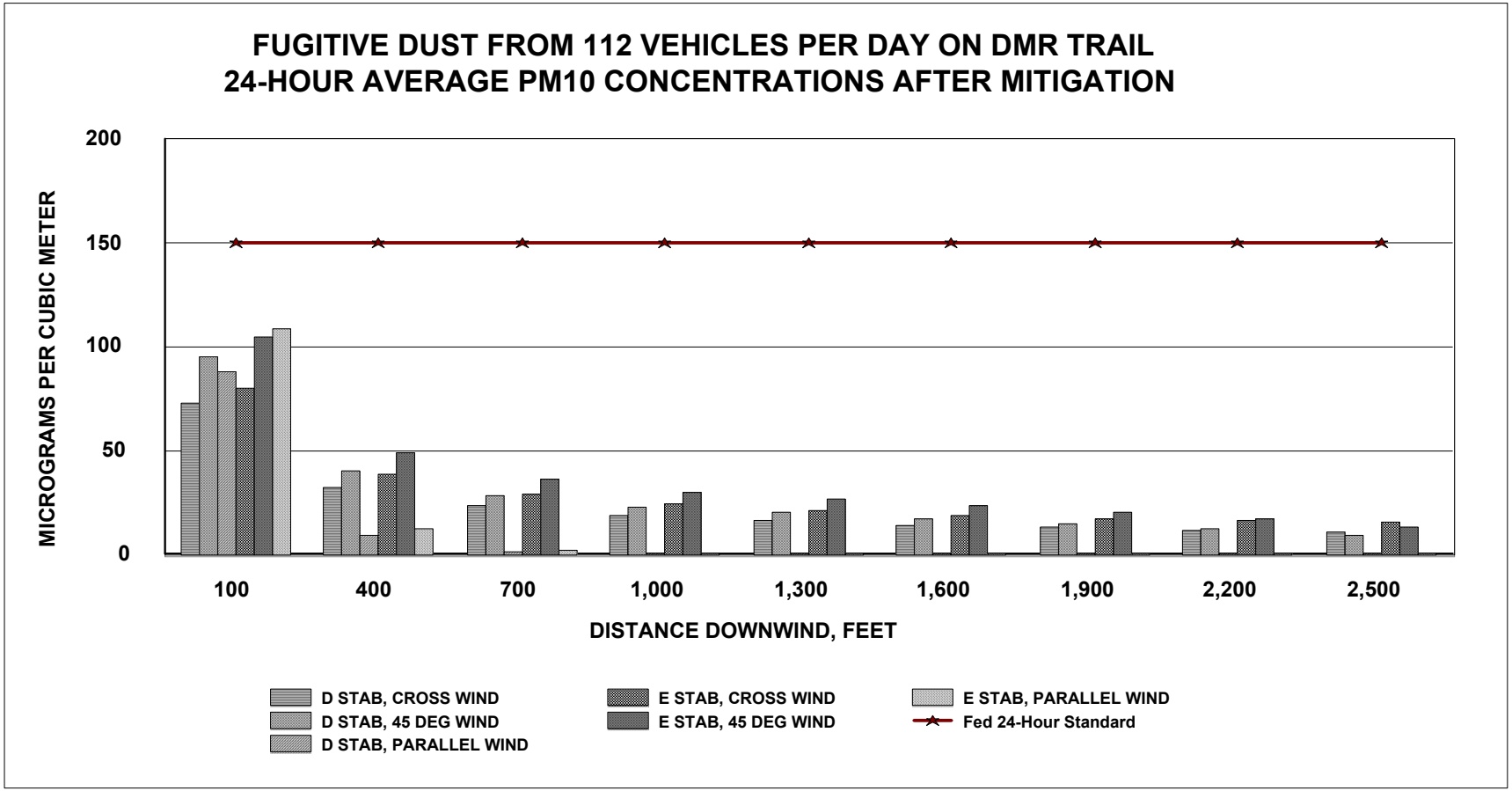

Chart shows potential PM_{10} concentrations under varied weather conditions: three wind directions relative to the local trail alignment and two atmospheric stability conditions (neutral D stability and mild inversion E stability).

Figure 6-7. Potential PM_{10} Concentrations Along DMR Trail With Proposed Dust Control Mitigation Program

identify and inventory land condition using a GIS database; coordinating between training planners and natural resource managers; implementing land rehabilitation measures identified in the INRMP; monitoring the effectiveness of the land rehabilitation measures; evaluating erosion modeling data to identify areas in need of improved management; and implementing education and outreach programs to increase user awareness of the value of good land stewardship.

To reduce fugitive dust associated with the use of military vehicle trails, the Army will implement dust control measures, such as applying dust control chemicals, using washed gravel for surfacing, spraying water, or paving sections of trails. The extent of gravel washing would have to balance dust reduction goals with engineering requirements for achieving a stable roadway surface. Selecting the appropriate dust control products would be based on testing alternative products on dirt and gravel road segments. Based on general characteristics and performance elsewhere, environmentally friendly synthetic polymers (such as polyvinyl acetate and vinyl acrylic) and hygroscopic salt solutions (such as calcium chloride or magnesium chloride) appear to be the most promising groups of dust control agents. The Army will monitor road surface conditions and will apply palliatives as necessary. If moisture levels are adequate to suppress dust, then applying dust palliatives would not be necessary. To the extent possible, the Army would plan dust suppressant applications to be scheduled to immediately precede periods of significant convoy traffic.

Less than Significant Impacts

Emissions from construction activities. The Proposed Action would include two construction projects at DMR, with construction activities occurring from 2005 into 2007. Construction projects would include a military vehicle trail between SBMR and DRM and three FTI antennas. Most construction activity would be completed in 2006. Figure 6-8 summarizes estimated emissions from the construction projects according to current construction schedules. Maximum annual emissions from construction equipment would be 56 tons (51 metric tons) per year of nitrogen oxide emissions in 2006. Nitrogen oxide emissions are of concern primarily as an ozone precursor. Emissions of ozone precursors from construction activities associated with the Proposed Action would be too small to have a measurable effect on ozone levels, and would not change the attainment status of the area. Consequently, construction activities at DMR would have a less than significant air quality impact under the Proposed Action.

Construction contractors will comply with the provisions of Hawaii Administrative Rules, Sec. 11-60.1-33 on Fugitive Dust as part of the requirements of construction contracts.

Emissions from ordnance use. Live ordnance is not used at DMR, but blank ammunition and ground-based smoke devices are used for some training exercises. The total estimated ordnance use by the 2nd Brigade at all USARHAW installations would decrease by about 25 percent under the Proposed Action. Smoke, flare, and simulator items would remain the predominant munitions used at DMR. Emissions from ordnance use have not been quantified. However, as discussed in Chapter 5, Section 5.5.2, pollutant emission quantities from ordnance use are small. Based on the general nature of detonation processes and the very low emission rates that have been published in studies of munitions firing and open detonations, emissions associated with ordnance use at DMR pose very little risk of creating adverse air quality impacts. Consequently, air quality impacts from munitions use under the Proposed Action are considered less than significant.

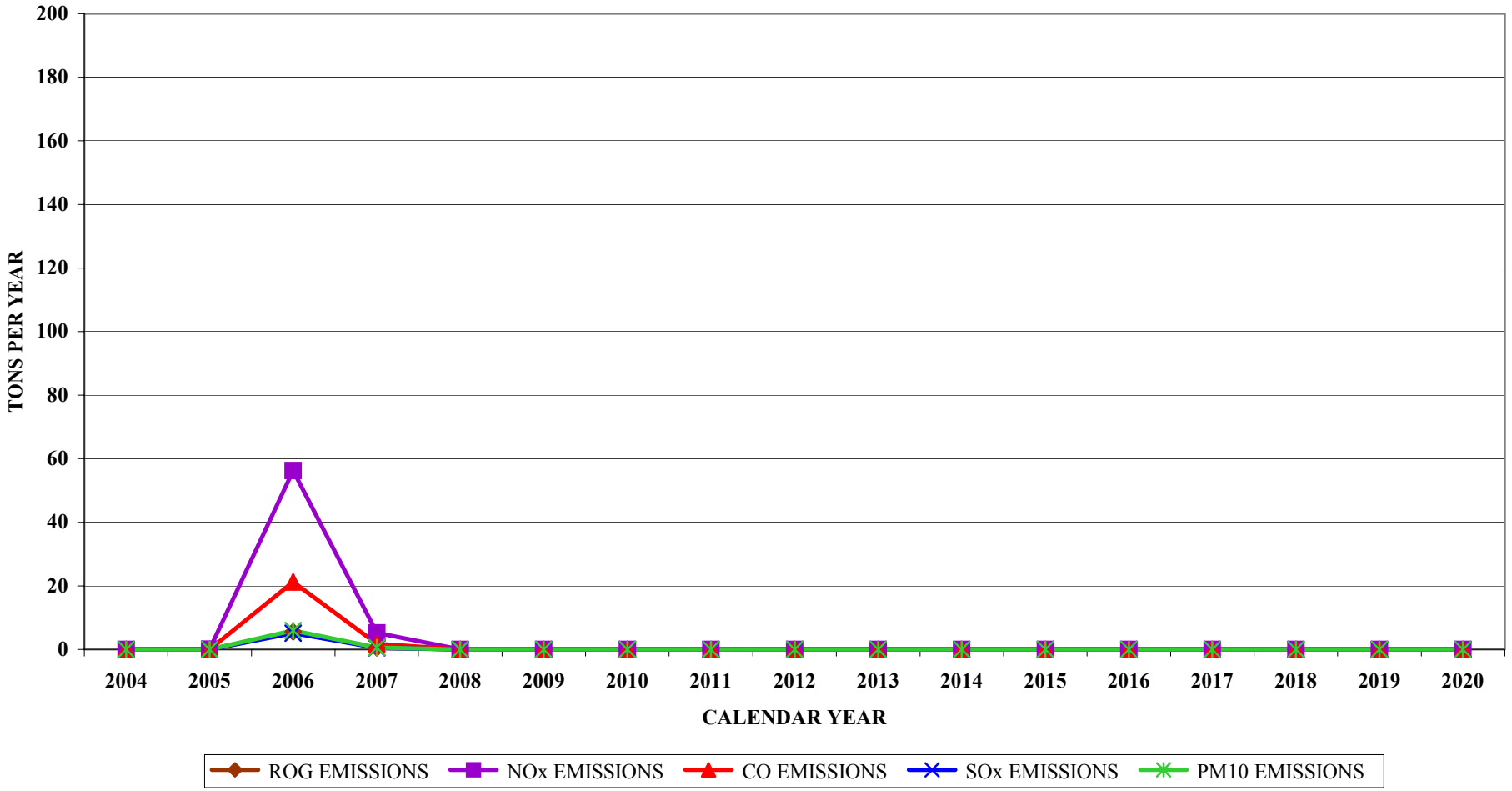

Figure 6-8 Estimated Emissions from Construction Projects at Dillingham Military Reservation

Engine emissions from military vehicle use. Estimated annual use of military vehicles at DMR would result in a 32 percent increase in annual military vehicle emissions, compared to No Action. Figure 6-9 summarizes an estimated net increase in annual engine emissions from military vehicle use at DMR under the Proposed Action. The net increase in military vehicle engine emissions would be 0.45 tons (0.4 metric tons) per year for reactive organic compounds, 4.3 tons (3.9 metric tons) per year for nitrogen oxides, 1.3 tons (1.2 metric tons) per year for carbon monoxide, 0.05 ton (0.05 metric ton) per year for sulfur oxides, and 0.39 ton (0.35 metric tons) per year for PM_{10}. The net increase in military vehicle engine emissions would be too small to have meaningful effects on ambient air quality conditions or to affect the attainment status of the project area. Consequently, emissions from military vehicle use at DMR would be a less than significant impact under the Proposed Action.

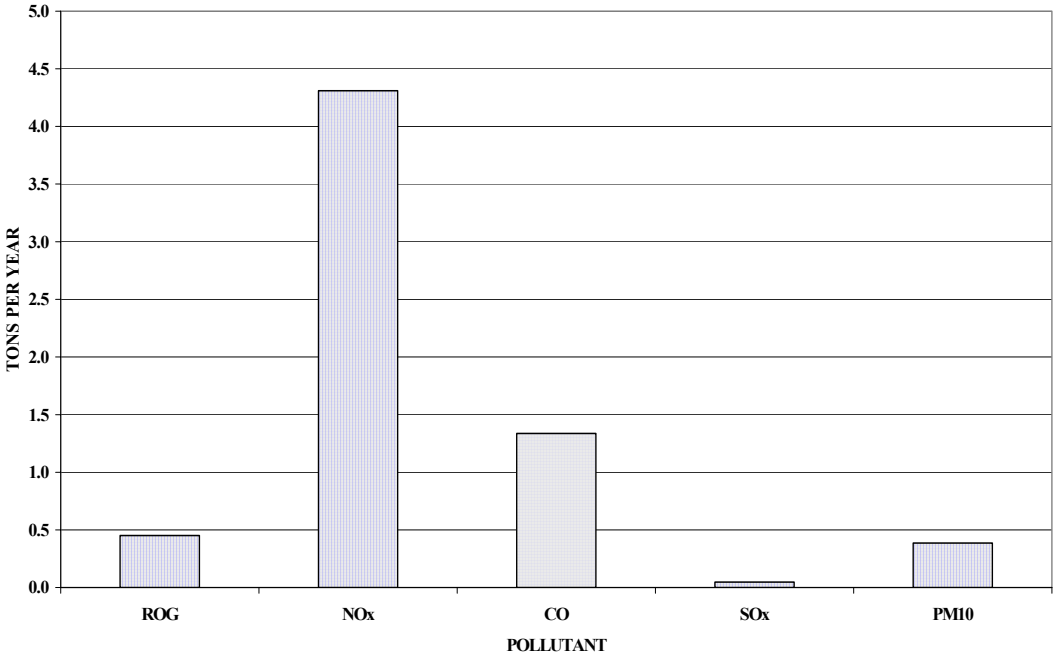

Figure 6-9. Net Change in Military Vehicle Emissions for the Proposed Action: Dillingham Military Reservation

Engine emissions from military vehicle use. Estimated annual use of military vehicles at DMR would result in a 32 percent increase in annual military vehicle emissions, compared to No Action. Figure 6-9 summarizes an estimated net increase in annual engine emissions from military vehicle use at DMR under the Proposed Action. The net increase in military vehicle engine emissions would be 0.45 tons (0.4 metric tons) per year for reactive organic compounds, 4.3 tons (3.9 metric tons) per year for nitrogen oxides, 1.3 tons (1.2 metric tons) per year for carbon monoxide, 0.05 ton (0.05 metric ton) per year for sulfur oxides, and 0.39 ton (0.35 metric tons) per year for PM_{10}. The net increase in military vehicle engine emissions would be too small to have meaningful effects on ambient air quality conditions or to affect the attainment status of the project area. Consequently, emissions from military vehicle use at DMR would be a less than significant impact under the Proposed Action.

Wind erosion from areas disturbed by military vehicle use. Off-road vehicle activity can reduce or eliminate vegetation cover in affected areas, resulting in increased susceptibility to wind erosion. The amount of off-road vehicle activity at DMR would increase by 28 percent under the Proposed Action. This increase in off-road vehicle activity would reduce vegetation cover in the maneuver areas. An estimated 90.5 tons (82 metric tons) per year of PM_{10} would be generated by wind erosion from the affected areas, a net increase of about 30 tons (27 metric tons) per year compared to No Action. The net increase in emissions would be too small to have a meaningful effect on ambient air quality conditions. Consequently, wind erosion from disturbed areas would be a less than significant impact under the Proposed Action.

Emissions from increased aircraft operations. The Proposed Action would not result in any major change to existing Army helicopter flight operations in Hawai'i. Some UAV flight activity could be based at DMR, but the total flight time would be relatively low. The net increase in emissions resulting from UAV flight activity would be too small to have a meaningful effect on ambient air quality conditions. Consequently, the increase in aircraft emissions at DMR under the Proposed Action would be a less than significant impact.

Emissions from wildfires. Because there are no live-fire exercises at DMR and overall munitions use would decrease by 25 percent under the Proposed Action, there is little chance that the Proposed Action would increase the risk of wildfires at DMR. Because the frequency and size of wildfires at DMR is not expected to change, emissions from wildfires would be a less than significant impact under the Proposed Action.

No Impact

Other emissions from personnel increases. No Army personnel are based at DMR, and the installation does not have any stationary emission sources; consequently, the Proposed Action would not result in any emissions from personal vehicle use or any increase in emissions from fixed facilities.

Reduced Land Acquisition

Air quality impacts and mitigations under the RLA Alternative would be the same as under the Proposed Action.

No Action

Less than Significant Impacts

Emissions from ordnance use. Overall ordnance use under No Action would be about 34 percent greater under No Action than under the Proposed Action or the RLA Alternative. Based on the general nature of detonation processes and the very low emission rates that have been published in studies of munitions firing and open detonations, emissions associated with ordnance use at DMR pose very little risk of creating adverse air quality impacts. Consequently, air quality impacts from munitions use under No Action are considered less than significant.

Engine emissions from military vehicle use. Vehicle use associated with DMR would remain at present levels under No Action. Estimated annual emissions from vehicle engine operations would be approximately the following:

- 1.4 tons (1.3 metric tons) of reactive organic compounds;
- 13.4 tons (12 metric tons) of nitrogen oxides;
- 4.1 tons (3.8 metric tons) of carbon monoxide;
- 0.15 ton (0.14 metric ton) of sulfur oxides; and
- 1.2 tons (1.1 metric tons) of PM_{10}.

The amount of military vehicle engine emissions would be too small to have meaningful effects on ambient air quality conditions. Consequently, military vehicle engine emissions would have a less than significant impact under No Action.

Fugitive dust from military vehicle use. Vehicle numbers and estimated annual use levels would remain at current conditions under No Action. Fugitive dust PM_{10} emissions from military vehicle use at DMR would remain at the current level of about 326 tons (296 metric tons) per year. Because existing conditions at DMR have not led to any known violations of state or federal ambient air quality standards, the fugitive dust from military vehicle use at DMR would have a less than significant impact under No Action.

Wind erosion from areas disturbed by tactical vehicle use. Vehicle maneuver activity at DMR would remain the same as current conditions under No Action. An estimated 60.5 tons (55 metric tons) per year of PM_{10} would be generated by wind erosion from the affected areas. Wind erosion from disturbed areas would be too small to have a meaningful effect on ambient air quality conditions, and therefore would be a less than significant impact under No Action.

Emissions from increased aircraft operations. There would be no change in aircraft operations and no increase in aircraft emissions at DMR under No Action. Because there would be no change from current conditions and because current conditions have not created any known violations of state or federal ambient air quality standards, emissions from aircraft operations under No Action would have a less than significant impact on air quality.

Emissions from wildfires. The risk of wildfires at DMR would remain the same as for current conditions under No Action. Because the frequency and size of wildfires at DMR is not expected to change, emissions from wildfires would be a less than significant impact under No Action.

No Impact

Emissions from Construction. No construction projects are associated with No Action, so there would be no air quality impact from construction under No Action.

Other emissions from personnel increases. No Army personnel are based at DMR, and the installation does not have any stationary emission sources; consequently, No Action would not result in any emissions from personal vehicle use or any increase in emissions from fixed facilities.