8.5 AIR QUALITY

8.5.1 Affected Environment

There are no air quality monitoring stations close to PTA. The closest air quality monitoring stations are in Hilo and Kona. The monitoring station in Hilo collects data on sulfur dioxide and PM_{10} levels. The Kona monitoring station in Kealakekua currently collects data on sulfur dioxide levels; PM_{10} monitoring at this station was discontinued in June 2000. Military vehicles, aircraft flight operations (mostly helicopters), and ordnance use represent the major Army emission sources that are present at PTA. A package rock crushing facility from SBMR is moved to PTA when needed.

A rain gage at Bradshaw Army Airfield records precipitation data. Annual precipitation averages 16.9 inches per year, ranging from 1.6 inches in June to 4.4 inches in March (WeatherDisc Associates 1990). The Army operates four automated weather stations at PTA, one each in the eastern, southern, north-central, and western portions of PTA. Data from these stations are used in a real-time context for fire management purposes. Consequently, comprehensive data summaries from these stations are not available. Wind speed data from these stations have been evaluated to assist in evaluation of potential wind erosion conditions. Data from the eastern and western stations are most representative of conditions in areas where troop and vehicle maneuver activity occurs. Three years of data from the eastern station show an average hourly wind speed of 13 mph (21 kph) and a maximum hourly average wind speed of 33 mph (53 kph). Hourly average wind speeds at the eastern station exceeded 8.2 mph (13 kph) 75 percent of the time and exceeded the 15 mph (24 kph) threshold commonly associated with wind erosion processes about 35 percent of the time. Three years of data from the western station show an average hourly wind speed of 8.4 mph (13.5 kph) and a maximum hourly average wind speed of 44 mph (71 kph). Hourly average wind speeds at the western station exceeded 4.7 mph (7.6 kph) 75 percent of the time. The low-density silty soils common in the WPAA are subject to wind erosion at lower wind speeds than most soils. Wind speeds on the western side of PTA exceed the likely wind erosion threshold of 12 mph (19 kph) about 15 percent of the time.

Although Hawai'i is in a PM_{10} attainment area under the Clean Air Act, the island of Hawai'i and the surrounding land at PTA have experienced discrete events in which dust impacts have had adverse effects. PM_{10} emissions are important because they are easily airborne and are small enough to be inhaled deep into the lungs creating potential adverse health effects. Because of the extremely small particle size of the soils found on WPAA, the particles easily become airborne during high wind events and other disturbances once vegetation has been removed. In July 1999, a severe dust storm resulted from wind blowing over areas denuded of vegetation by a recent fire. The result was fugitive dust emissions at high enough levels to require temporary evacuation of residences at Waiki'i Ranch.

8.5.2 Environmental Consequences

Summary of Impacts

The Army identified in the Draft EIS a potential significant impact from fugitive dust under the Proposed Action and the RLA Alternative. The Draft EIS separated the fugitive dust impacts into two components: dust generated directly by vehicle travel on unpaved roads or

off-road maneuver areas, and dust generated by wind erosion from areas disturbed by off-road vehicle activity. In response to agency and public comments the Army conducted additional modeling which provided a better understanding of the on-site conditions and potential adverse impacts from fugitive dust. The Army proposes additional mitigation programs that are known to be effective for controlling fugitive dust, reducing the severity of the potential impacts. Implementing these measures will avoid exceeding the PM_{10} standards and will avoid unacceptable impacts on human health and visual resources. The Army acknowledges and has considered the public's concern that annoying dust will be intermittently produced by training and convoy activities at PTA. The Army also recognizes that the potential magnitude of fugitive dust impacts from wind erosion at WPAA are sensitive to the amount of vegetation cover that can be maintained on the area. There is significant uncertainty about the extent to which vegetation cover will be reduced by vehicle maneuver activity at WPAA. Consequently, the Army has retained the significant impact designation for this impact in this Final EIS, even though the Army believes that wind erosion will not violate state or federal air quality standards at off-post locations.

Based on the additional modeling and mitigation measures, the impact of fugitive dust from vehicle activity on unpaved areas has been changed from a significant impact to significant but mitigable to less than significant. Fugitive dust PM_{10} emissions from military vehicle use on unpaved roadways and off-road areas would increase by about 429 tons per year (390 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. PM_{10} emissions represent 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 PTA, 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 PTA under the Proposed Action and the RLA. The impact from fugitive dust emissions would be reduced to a less than significant level through mitigation programs that include the use of washed gravel on military vehicle trails; periodic application of dust control chemicals; monitoring of ambient PM_{10} concentrations; and/or development of an adaptive management program to manage training area lands and to modify training procedures as necessary to ensure compliance with federal air quality standards. Wind erosion from areas disturbed by vehicle maneuver activity would increase by about 1,602 tons per year (1,453 metric tons per year) compared to No Action. The potential magnitude of wind erosion is strongly dependent on the extent of vegetation cover that can be maintained on areas subject to vehicle maneuver activity. As long as high levels of vegetation cover are maintained on the WPAA, only extreme periods of very strong winds would have the potential to generate off-post PM_{10} levels above the value of the state and federal 24-hour PM_{10} standards. The low probability of such extreme high wind conditions indicates that wind erosion at WPAA would be unlikely to generate off-post PM_{10} levels above the value of the state and federal 24-hour PM_{10} standards under the Proposed Action and the RLA Alternative. That conclusion, however, depends in part on maintaining a high level of vegetation cover at WPAA. The Army's DuSMMoP and ITAM program would substantially mitigate potential wind erosion

problems by providing management tools that would help limit damage to vegetation from off-road vehicle maneuver activity. Although violation of air quality standards is not likely, the overall level of PM_{10} generated by wind erosion would increase as a result of the Proposed Action. Given the resulting increase in overall PM_{10} levels, the uncertainties associated with any estimate of potential wind erosion conditions, and public perceptions of the potential magnitude of this impact, the Army considers wind erosion from the WPAA to be a significant air quality impact under the Proposed Action.

Construction activities under either the Proposed Action or the RLA Alternative would result in nitrogen oxide emissions from construction equipment that would be 192 to 213 tons (174 to 193 metric ton) in 2005 and 184 to 186 tons (167 to 169 metric tons) in 2006. Nitrogen oxide emissions are of concern primarily as an ozone precursor. Even though the construction emissions increase substantially in 2005 and 2006, annual 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. Consequently, construction-related emissions would have a less than significant air quality impact under the Proposed Action or the RLA Alternative and would not change the attainment status of the area.

Ordnance use at PTA would increase by about 70 percent under the Proposed Action and by about 110 percent under 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. SBCT transformation would add the Stryker armored vehicle to the tactical and support vehicle types currently used at PTA. Overall military vehicle use would double under the Proposed Action or the RLA Alternative. The net increase in military vehicle engine emissions would be 3.9 tons (3.5 metric tons) per year for reactive organic compounds, 37 tons (34 metric tons) per year for nitrogen oxides, 11.5 tons (10.5 metric tons) per year for carbon monoxide, 0.4 ton (0.4 metric ton) per year for sulfur oxides, and 3.3 tons (3 metric tons) per year for PM_{10}. This minimal increase in emissions from vehicles would result in a less than significant impact. The addition of fixed wing cargo aircraft and UAV flight operations at PTA under the Proposed Action or the RLA Alternative would result in a less than significant increase in overall aircraft emissions. There would be a slight increase in the risk of wildfires at PTA under the Proposed Action or the RLA Alternative, but emissions associated with wildfires at PTA would remain a less than significant impact.

No additional staff personnel would be based at PTA under the Proposed Action or RLA. Consequently, there would be no air quality impact at PTA from changes in personnel numbers under the Proposed Action or RLA.

Table 8-12 summarizes the significance of air quality impacts at PTA under the Proposed Action, RLA, and No Action.

Table 8-12
Summary of Potential Air Quality Impacts at Pōhakuloa Training Area

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.

LEGEND:

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

Proposed Action

Significant Impacts

Impact 1: Wind Erosion from Areas Disturbed by Military Vehicle Use. Off-road vehicle activity will reduce or eliminate vegetation cover in affected areas, resulting in increased susceptibility to wind erosion. The amount of off-road vehicle activity at PTA would increase by 89 percent under the Proposed Action. In addition, the area available for off-road vehicle maneuvers would increase from 8,843 acres (3,579 hectares) to 31,518 acres (12,755 hectares). Most of the additional land that would become available for off-road vehicle maneuvers has a very high potential for wind erosion if vegetation cover is reduced. The introduction of off-road vehicle maneuver activity into areas currently used for cattle grazing would be expected to reduce vegetation cover and increase the extent of ground disturbance. An estimated 2,447 tons per year (2,220 metric tons per year) of PM_{10} would be generated by wind erosion from the affected areas. This represents a net increase of about 1,602 tons (1,453 metric tons) per year compared to No Action. PM_{10} emissions are important because they are easily airborne and are small enough to be inhaled deep into the lungs, creating potential adverse health effects.

The dispersion modeling results obtained for evaluating a brigade level vehicle maneuver exercise on a 10,000-acre (4,047 hectare) portion of WPAA were used to extrapolate potential PM_{10} concentrations from wind erosion conditions. The extrapolation procedure

adjusted the maneuver exercise modeling results to account for wind erosion emission rates at different wind speeds and the effect of variable wind speeds on dispersion and dilution of the resulting emissions. The extrapolated modeling results were evaluated in the context of wind speed frequency data from the Army's West PTA automated weather station.

Vehicle maneuver activity at WPAA is expected to be widely dispersed over large portions of the area and thus would minimize the extent of vegetation damage resulting from the maneuver exercises. The specific PM_{10} increments generated by wind erosion would vary with distance from the WPAA and with the number of hours per day when average hourly wind speeds exceed 12 mph (5.4 meters per second). Wind erosion emission rates increase rapidly when the average hourly wind speed reaches or exceeds 20 mph (8.9 meters per second). Based on three years of meteorological data from the Army's West PTA automated weather station, wind speeds at WPAA would be expected to reach or exceed 20 mph (32 kph) for 216 hours in a typical year. Wind speeds above 30 mph (48 kph) occur at WPAA about 24 hours per year. Wind speed frequency distributions for the west side of PTA indicate that days with persistent wind speeds above 20 mph (32 kph) are uncommon.

As long as high levels of vegetation cover are maintained on the WPAA, only extreme periods of very strong winds would have the potential to generate off-post PM_{10} levels above the value of the state and federal 24-hour PM_{10} standards. If hourly average wind speeds stayed above 25 mph (40 kph) and blew in the same direction for an entire calendar day, then the federal 24-hour PM_{10} standard could be exceeded at distances of up to 3,200 feet (975 meters) from the WPAA. However, it is very unlikely that a day with such an extreme high wind speed would occur. Historically, a more realistic but still unlikely high wind speed scenario would be a day with 12 hours of wind speeds above 25 mph (40 kph) and 12 hours with wind speeds of 20 to 25 mph (32 to 40 kph). This would limit the occurrence of dust levels above the value of the state and federal 24-hour PM_{10} standards to locations within about 500 feet of the wind erosion source area. The low probability of such extreme high wind conditions indicates that wind erosion at WPAA would be unlikely to generate PM_{10} levels above the value of the state and federal 24-hour PM_{10} standards at Waiki'i Ranch or the Kilohana Girl Scout Camp.

The Army's DuSMMoP and ITAM program would substantially mitigate potential wind erosion problems by providing management tools that would help limit damage to vegetation from off-road vehicle maneuver activity. Although violation of air quality standards is not likely, the overall level of PM_{10} generated by wind erosion would increase as a result of the Proposed Action. Given the resulting increase in overall PM_{10} levels, the uncertainties associated with any estimate of potential wind erosion conditions, and public perceptions of the potential magnitude of this impact, the Army considers wind erosion from the WPAA to be a significant air quality impact under the Proposed Action.

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 plan will 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 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 which 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, implementation of the ITAM program to identify and inventory land condition using a GIS database; coordination between training planners and natural resource managers; implementation of land rehabilitation measures identified in the INRMP; monitoring of the effectiveness of the land rehabilitation measures; evaluation of erosion modeling data to identify areas in need of improved management; and implementation of education and outreach programs to increase user awareness of the value of good land stewardship.

Rotation of maneuver activities among available areas is potentially effective when the available area substantially exceeds the area needed for individual exercise events. While WPAA appears to provide sufficient area to allow for rotation of training activity among different geographic areas, dispersing maneuver activity over large portions of WPAA may actually prove more effective than attempts to combine activity rotation with vegetation reseeding programs. Vegetation reseeding programs normally would require the rotation of maneuver activities among available areas. The effectiveness of reseeding programs depends on having adequate germination and vegetation establishment periods between repeated disturbances. The large acreage available at WPAA may not provide adequate opportunity for reseeding programs to be effective given the relatively low annual rainfall. Although activity rotation and vegetation reseeding programs remain an option that the Army will consider, the proposed DuSMMoP represents a more practical approach to mitigating potential wind erosion problems.

Significant Impacts Mitigable to Less Than Significant

Impact 2: Fugitive Dust from Military Vehicle Use. Approximately 800 vehicles could participate in a single brigade level training exercise. Resulting PM_{10} emissions would be approximately 1,228 tons per year (1,114 metric tons per year). This represents an increase of about 429 tons (390 metric tons) per year compared to No Action conditions.

Sources of fugitive dust associated with military vehicle traffic include vehicle convoys on military vehicle trails, vehicle maneuver training on gravel or dirt roads inside military installations, and off-road military vehicle maneuvers inside military installations. Approximately 88 percent of the net increase in fugitive PM_{10} emissions would be associated with vehicle travel on unpaved roads, while the remaining 12 percent represents potential emissions from off-road vehicle maneuver activity.

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 429 tons (390 metric tons) per year increase in fugitive PM_{10} emissions generated by military vehicles at

PTA, the potential for exceeding the federal 24-hour PM_{10} standard, and the potential impacts on quality of life to Waiki'i Ranch residents and users of Kilohana Girl Scout Camp result in a significant air quality impact at PTA under the Proposed Action. The impact from fugitive dust emissions would be reduced to a less than significant level through mitigation programs that include the use of washed gravel on military vehicle trails, periodic application of dust control chemicals, monitoring of ambient PM_{10} concentrations, and development of an adaptive management program to manage training area lands and modify training procedures as necessary to ensure compliance with federal air quality standards.

Dispersion modeling analyses discussed below indicate that fugitive dust emissions from vehicle travel on unpaved roads and from vehicle operations in off-road maneuver areas have the potential for violating the federal 24-hour PM_{10} standard at off-post locations. The substantial increase in fugitive PM_{10} emissions from military vehicle use at PTA, 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 PTA under the Proposed Action. The impact from fugitive dust emissions would be reduced to a less than significant level through mitigation programs that include the use of washed gravel on military vehicle trails, periodic application of dust control chemicals, monitoring of ambient PM_{10} concentrations, and/or development of an adaptive management program to manage training area lands and modify training procedures as necessary to ensure compliance with federal air quality standards.

In response to USEPA and public comments, the Army conducted a more detailed modeling and analysis of fugitive dust issues. The intent of the modeling was to better determine the potential degree of impact and the geographic extent of the impact. The model the Army used is a widely used standard dispersion model (see Appendix G for further detail). Emission rate, vehicle activity, and weather condition factors considered in the modeling included the following:

- Soil type;
- Particle settling and deposition based on particle size and density;
- Soil moisture;
- Climatic conditions, including wind speed, wind direction, rainfall, and atmospheric stability;
- Vegetation cover;
- Vehicle traffic conditions, including the types of vehicles, their weight, number of wheels, and hourly traffic volumes; and,
- Geographic size of the disturbed area.

Vehicle convoys on the PTA Trail would vary considerably in size, ranging from just a few vehicles to several hundred for a major exercise at PTA. Most convoy traffic would be in one direction on a given day, since troops participating in exercises at PTA normally spend several days to a few weeks at the installation before departing. For modeling purposes, it was assumed that total traffic volumes on the PTA Trail might be as high as 500 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, and higher daily traffic volumes could cause PM_{10} problems over larger distances. Without any dust control measures, daily traffic volumes of 300 vehicles per day could cause PM_{10} problems at locations within one mile (1.6 kilometers) of the roadway.

Potential PM_{10} problems from vehicle traffic on the PTA Trail can be reduced substantially 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 road paving or periodic application of chemical dust suppressants. Alternative dust control compounds include hygroscopic salts (such as calcium chloride or magnesium chloride solutions) and synthetic polymer compounds (such as polyvinyl acetate or 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 PTA Trail are illustrated in Figure 8-10, assuming a maximum day traffic volume and implementation of the proposed dust control program. The assumed daily traffic volume (500 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 8-10. Successful implementation of the proposed dust control program would result in high PM_{10} levels being restricted to locations within 400 feet (122 meters) of the trail, assuming persistent wind directions for the entire period during which there is significant vehicle traffic. Due to traffic control procedures at public road crossings, hourly traffic volumes on the PTA Trail generally would be less than 100 vehicles per hour. Since most days would have much lower traffic volumes than the maximum assumed for this analysis, actual areas affected by high concentrations of PM_{10} would typically be within 100 feet (30.5 meters) of the trail.

In addition to the PTA Trail, there are numerous gravel and dirt roads present within PTA. While dirt roads have a higher per-vehicle emission rate than gravel roads, approximately 75 percent of the on-post unpaved roads have a gravel surface. Dirt roads generally carry much smaller traffic volumes than do the gravel roads. Mitigation measures applied to the PTA Trail generally would be applicable to on-post unpaved roads. Consequently, the fugitive dust modeling for PTA Trail is considered representative of conditions for on-post gravel and dirt roads. High concentrations of PM_{10} would be limited to locations close to the unpaved roadways and would not extend beyond installation boundaries.

Given the anticipated effectiveness of feasible mitigation measures, fugitive dust from vehicle travel on unpaved roads at PTA is considered a significant but mitigable to less than significant impact.

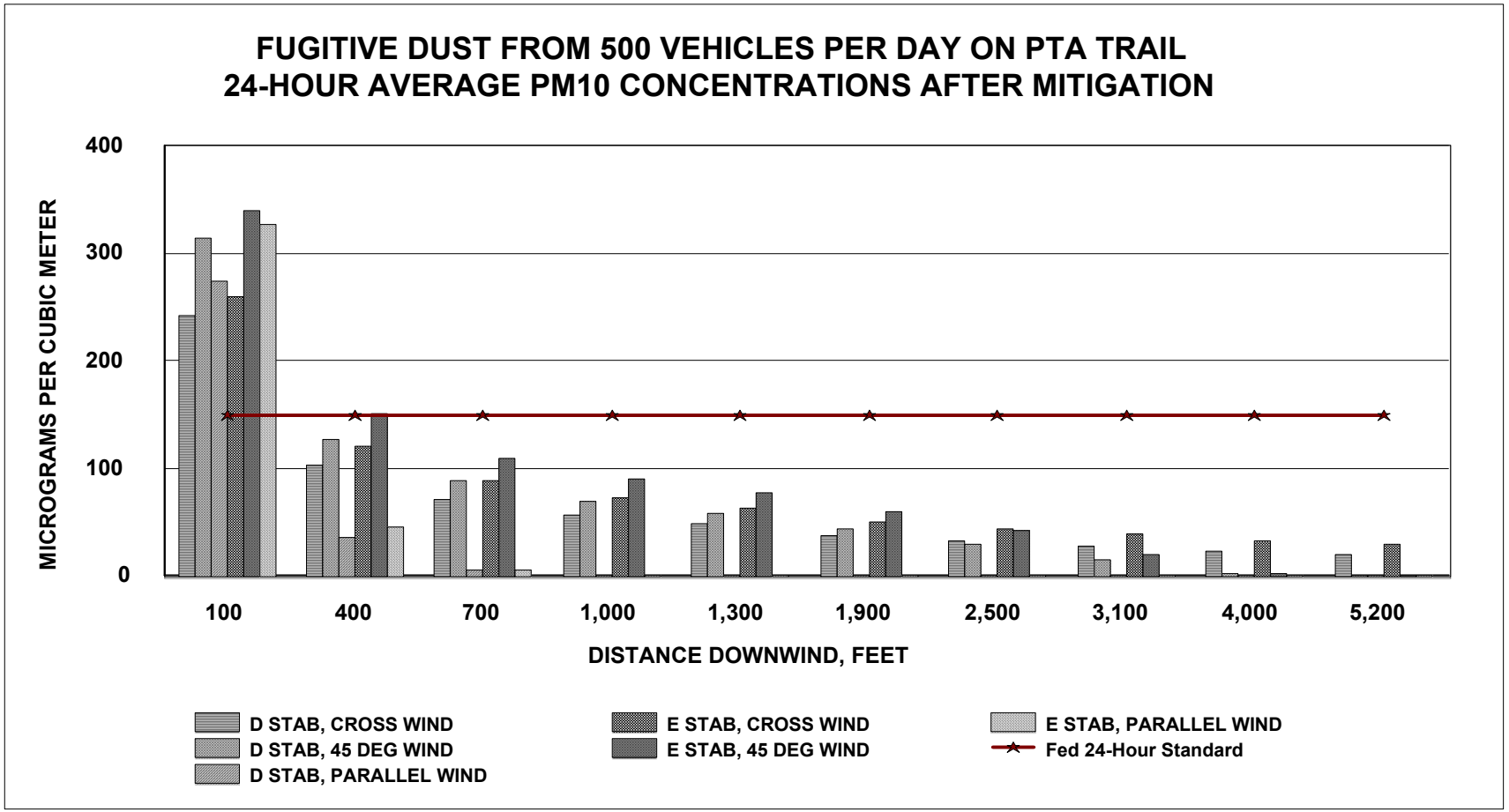

Chart shows potential PM_{10} concentrations under varied weather conditions: three wind directions relative to the local trail alignment, and two atmospheric stability conditions (neutral D stability and mild inversion E stability).

Figure 8-10. Potential PM_{10} Concentrations Along PTA Trail With Proposed Dust Control Mitigation Program

The existing boundaries of PTA provide a modest area suitable for off-road vehicle maneuver training. The WPAA would greatly expand the area available for vehicle maneuver training. As indicated in Figure 2-6, most of the available maneuver area would occur as a relatively contiguous parcel that wraps around three sides of the Waikiʻi Ranch residential development. The Kilohana Girl Scout Camp also would be bordered by the WPAA. The primary purpose of the WPAA is to support company, battalion, and brigade level maneuver exercises. Small unit maneuvers would not involve sufficient vehicle activity to create off-post PM_{10} problems. Regardless of scale, most maneuver exercises tend to have their major activity concentrated into one or more periods of activity lasting two to three hours.

Company level vehicle maneuver exercises would typically be spread over 2,000 to 5,000 acres (809 to 2,023 hectares). A 2,500-acre (1,112-hectare) activity area was assumed for modeling company level exercises. Daily activity durations of two hours, three hours, and four hours were evaluated for the company level exercise scenario. Battalion level exercises would involve three companies operating in a coordinated but semi-autonomous manner. Such exercises could be spread over a large portion of the WPAA. To provide a conservative analysis, the modeling evaluation assumed that a battalion level exercise would be concentrated on a 6,000-acre (2,428-hectare) area. Daily activity durations of two hours, four hours, and six hours were evaluated for the battalion level exercise scenarios. Brigade level exercises would typically utilize the entire 23,000 acres (9,308 hectares) of WPAA. To provide a conservative analysis, the modeling evaluation assumed that a brigade level exercise would be concentrated on a 10,000-acre (4,047-hectare) area. Daily activity durations of four hours, six hours, and eight hours were evaluated for the brigade level exercise scenario. As was the case for the military vehicle trail modeling, all analyses of off-road maneuver exercises assumed that ground surface conditions would be dry.

Modeling results for a company level exercise are presented in Figure 8-11. Because vehicle activity and resulting fugitive dust emissions would be widely dispersed, individual downwind locations would experience only low concentrations of PM_{10}. PM_{10} impacts from company level vehicle maneuver exercises would be less than significant.

Modeling results for a battalion level exercise are presented in Figure 8-12. Modeling results for a brigade level exercise are presented in Figure 8-13. For a concentrated activity scenario such as the one analyzed, vehicle activity and resulting fugitive dust emissions would produce relatively high PM_{10} concentrations at downwind distances that would be likely to reach off-post locations. The geographic extent of high PM_{10} concentrations would depend partly on weather conditions and partly on the duration of periods with significant vehicle activity. Events with only four hours of significant vehicle activity in a day could create high PM_{10} concentrations as far as 3,000 feet (914 meters) from the edge of the activity area. Events with six hours of significant vehicle activity in a day could create high PM_{10} concentrations as far as 1.5 miles (2.4 kilometers) from the edge of the activity area. Events with eight hours of significant vehicle activity in a day could create high PM_{10} concentrations at distances of more than 2 miles (3.2 kilometers) from the edge of the activity area. PM_{10} impacts from brigade level vehicle maneuver exercises would be significant but mitigated to a less than significant impact through the proposed mitigation measures.

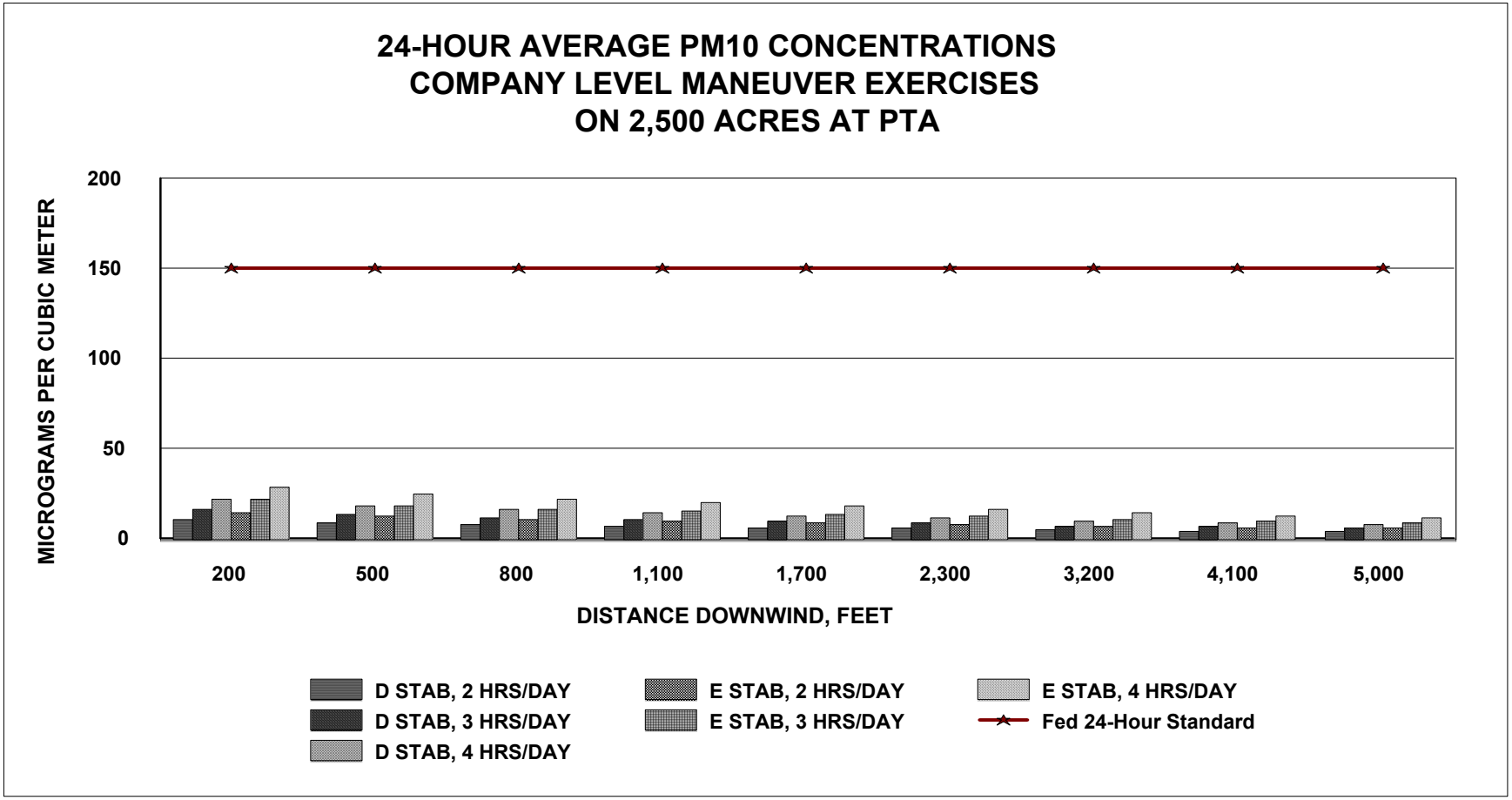

Chart shows potential PM_{10} concentrations under two atmospheric stability conditions (neutral D stability and mild inversion E stability) and varied durations of vehicle maneuver activity during one or two company level exercise events in a single calendar day.

Figure 8-11. Potential PM_{10} Concentrations Downwind of Company Level Vehicle Maneuver Exercise Activity at PTA

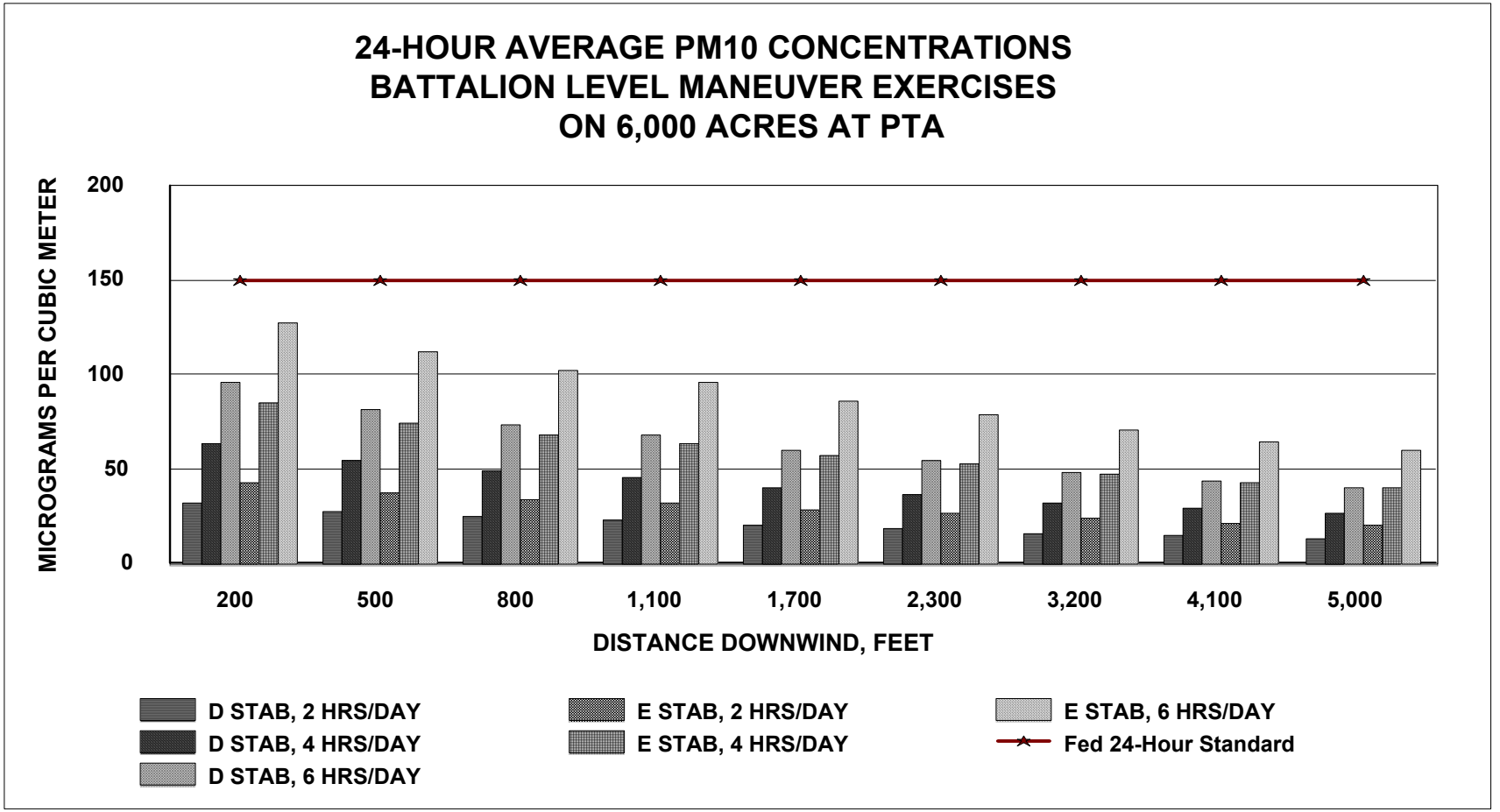

Chart shows potential PM_{10} concentrations under two atmospheric stability conditions (neutral D stability and mild inversion E stability) and varied durations of vehicle maneuver activity during one or two battalion level exercise events in a single calendar day.

Figure 8-12. Potential PM_{10} Concentrations Downwind of Battalion Level Vehicle Maneuver Exercise Activity at PTA

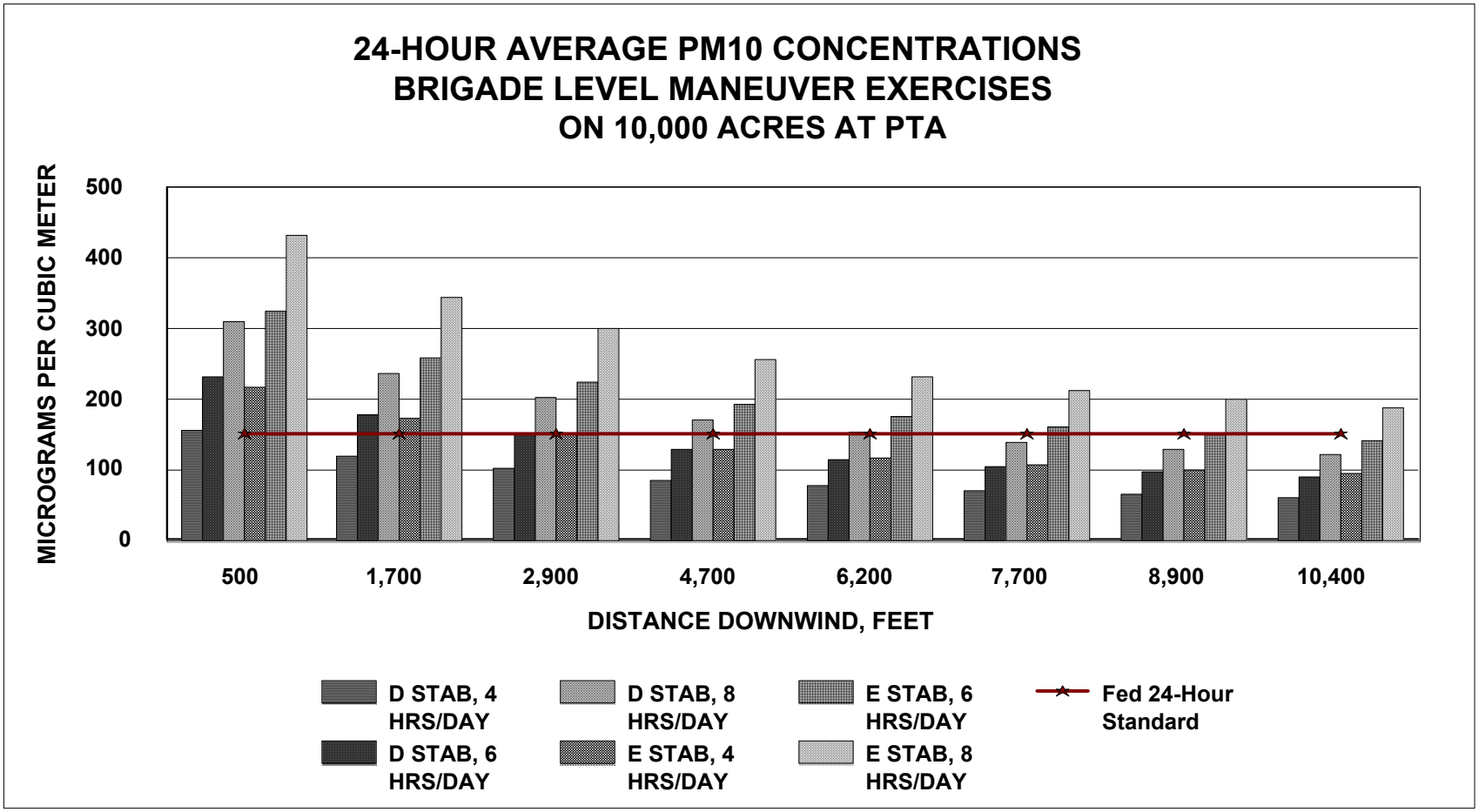

Chart shows potential PM_{10} concentrations under two atmospheric stability conditions (neutral D stability and mild inversion E stability) and varied durations of vehicle maneuver activity during one or two brigade level exercise events in a single calendar day.

Figure 8-13. Potential PM_{10} Concentrations Downwind of Brigade Level Vehicle Maneuver Exercise Activity at PTA

The Army will mitigate potential fugitive dust problems from brigade level vehicle maneuver exercises with development and implementation of the DuSMMoP. Through the development of DuSMMoP, brigade level maneuver exercises may be dispersed over most of the available maneuver area to avoid concentrating sources of fugitive dust emissions. Spreading a brigade level exercise over 20,000 acres (8,094 hectares) would reduce the expected downwind concentrations by 50 percent, compared to the scenario with activity concentrated on 10,000 acres (4,047 hectares). The Army prefers to train over large areas, so this requirement would have minimal effect on the planning for most brigade level exercise events. Implementing such a management program would reduce fugitive dust impacts from vehicle maneuver training exercises to a less than significant level.

Each type of maneuver exercise would use aviation support with varying amounts of low altitude helicopter and aircraft flight activity. The Army received comments expressing concerns over dust from helicopter flight activity. The Army reviewed this issue and determined that typical helicopter flight activity would not result in noticeable dust generation because the aircraft would be too high above the ground. Helicopter landings will generate dust, but landings will be brief and limited in number and the dust effects will be very localized (limited to 200 feet or less).

Regulatory and Administrative Mitigation 2. 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 plan will 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 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 which exceed the acceptable ranges for dust emissions or soil compaction.

To reduce fugitive dust associated with the use of military vehicle trails, the Army will implement dust control measures such as dust control chemical applications, the use of 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. Selection of 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, than application of 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.

PTA 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. Asphalt or concrete paving of the entire trail would further reduce dust generation from vehicle travel, but would involve unacceptable costs.

Synthetic dust control chemicals are widely used for ongoing dust control on unpaved roads. When properly matched to road surface, traffic, and weather conditions, synthetic dust control products can achieve high levels of dust control. Section 4.5 includes a summary of major categories of dust control chemicals and the general nature of their environmental risks.

Less than Significant Impacts

Emissions From Construction Activities. The Proposed Action would include nine construction projects at PTA, with construction activities occurring from 2004 into 2007. Construction projects would include two training range facilities (a BAX and AALFTR), a tactical vehicle wash facility, an ammunition storage facility, a range maintenance facility, an upgrade and realignment of Bradshaw Army Airfield, a military vehicle trail between Kawaihae Harbor and PTA, a communications cable system, and 11 FTI towers. UXO clearance would be required prior to construction of the BAX and AALFTR ranges. Figure 8-14 summarizes estimated emissions from these construction projects according to current construction schedules. Maximum annual nitrogen oxide emissions from construction equipment would be 192 tons (174 metric tons) in 2005 and 184 tons (167 metric tons) in 2006. Nitrogen oxide emissions are of concern primarily as an ozone precursor. Even though construction emissions would increase substantially in 2005 and 2006, annual emissions of ozone precursors from construction activities associated with the Proposed Action would be too to have a measurable effect on ozone levels. 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. Consequently, construction-related emissions under the Proposed Action would have a less than significant air quality impact and would not change the attainment status of the area.

Emissions from Ordnance Use. Overall ordnance use by the 25th ID(L) at PTA would increase by about 70 percent from about 3.4 million items per year to about 5.7 million items per year under the Proposed Action. About 96 percent of the ordnance use would be small arms ammunition; heavy weapons ordnance, demolition charges, smoke devices, and pyrotechnic devices would account for about 4 percent of the annual ordnance use. Emissions from ordnance use have not been quantified. However, as discussed for SBMR in Section 5.5.2, pollutant emission quantities from ordnance use are small (Mitchell and Suggs 1998). 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 PTA 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.

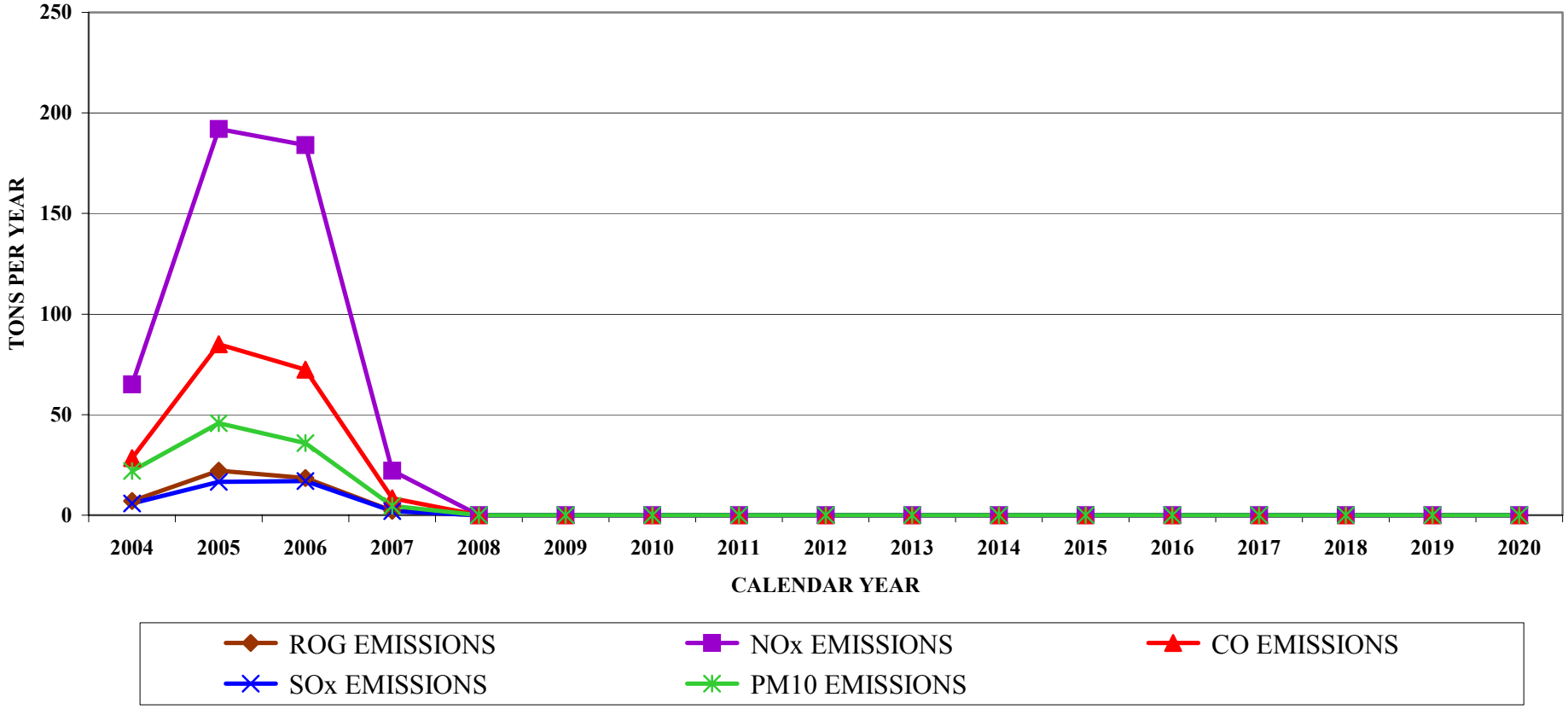

Figure 8-14 Annual Construction Emissions, Pōhakuloa Training Area, Proposed Action

Engine Emissions from Military Vehicle Use. Military vehicle use at PTA would increase appreciably under the Proposed Action, with an estimated 69 percent increase in vehicle mileage and an estimated 76 percent increase in vehicle operating hours. Annual emissions from military vehicle use would increase by 128 percent compared to No Action conditions. Figure 8-15 summarizes estimated net increase in annual engine emissions from military vehicle use at PTA under the Proposed Action. The net increase in military vehicle engine emissions would be 3.9 tons (3.5 metric tons) per year for reactive organic compounds, 37 tons (34 metric tons) per year for nitrogen oxides, 11.5 tons (10.5 metric tons) per year for carbon monoxide, 0.4 ton (0.4 metric ton) per year for sulfur oxides, and 3.3 tons (3 metric tons) per year for PM_{10}. Emissions from military vehicle use at PTA would be too small to have a measurable effect on ambient pollutant concentrations. Consequently, emissions from increased military vehicle use at PTA would be a less than significant impact under the Proposed Action.

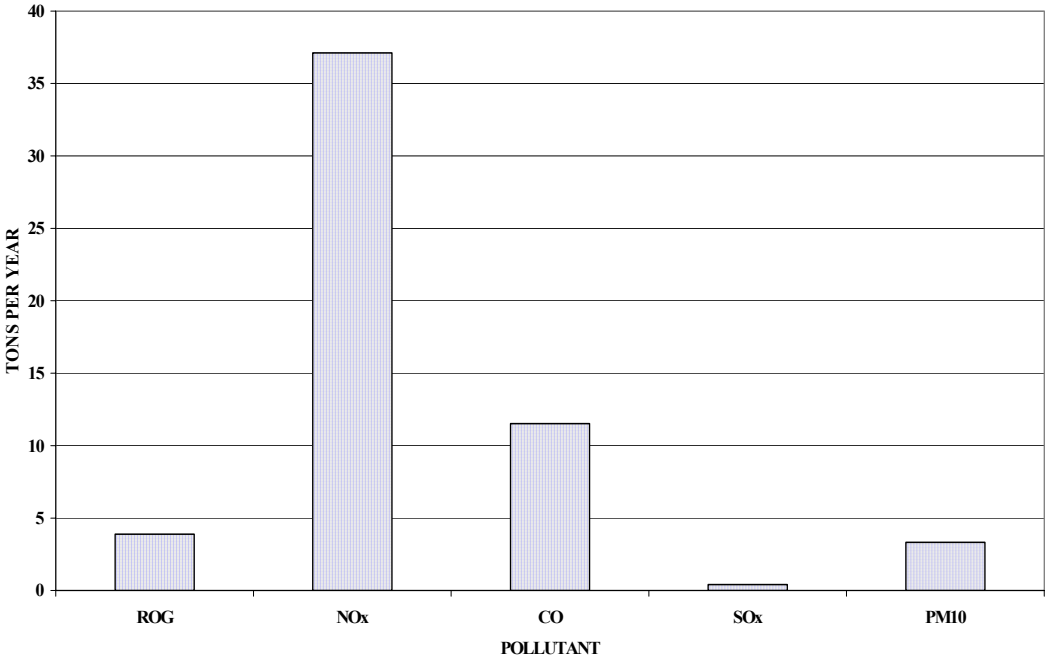

Figure 8-15. Net Change in Military Vehicle Emissions for the Proposed Action: Pōhakuloa Training Area

Emissions from Increased Aircraft Operations. The Proposed Action would not result in any substantial change to existing Army helicopter flight operations in Hawai'i. Airfield improvements at BAAF would accommodate increased use of fixed wing cargo aircraft (C-17 aircraft) for transporting troops and equipment to PTA. The Shadow 200 UAV would be used during many training exercises at PTA under the Proposed Action. However, current patterns of helicopter flight activity would continue to be the dominant flight activity at PTA. Because the net increase in emissions resulting from added cargo aircraft and UAV flight activity would be too small to have much effect on ambient pollutant concentrations,

emissions from increased aircraft operations would be a less than significant impact under the Proposed Action.

Emissions from Wildfires. Tracers, flares, and pyrotechnics have the potential for starting wildfires on training range areas. The use of such munitions would increase somewhat under the Proposed Acton, with a corresponding increase in the potential for wildfires. For purposes of this EIS, wildfire emissions at PTA have been estimated by assuming 80 acres (32.4 hectares) burn each year, with a fuel density of 19 tons (17 metric tons) per acre. Resulting emissions would be as follows:

- 0.23 ton carbon monoxide (0.21 metric ton);
- 0.01 ton nitrogen oxide (0.01 metric ton); and
- 0.03 ton PM_{10} (0.03 metric ton).

These emission quantities would not produce any significant air quality impacts in off-base areas. Consequently, emissions from wildfires on range areas would be a less than significant impact under the Proposed Action.

No Impact

Other Emissions from Personnel Increases. The Proposed Action would not alter the number of staff personnel based at PTA. Consequently, the Proposed Action would not result in any increase in emissions from personal vehicle use or any increase in emissions from fixed facilities at PTA.

Reduced Land Acquisition

Significant Impacts

Impact 1: Wind erosion from areas disturbed by military vehicle use. Wind erosion from vehicle maneuver areas would be the same under Reduced Land Acquisition as discussed for the Proposed Action. The Army considers wind erosion from the WPAA to be a significant air quality impact under the RLA Alternative.

Regulatory and Administrative Mitigation 1. The mitigation measures for wind erosion from areas disturbed by military vehicle use would be the same as those discussed for the Proposed Action.

Significant Impacts Mitigable to Less Than Significant

Impact 2: Fugitive Dust from Military Vehicle Use. Impacts and mitigation from fugitive dust emissions from military vehicle use would be the same as under the Proposed Action.

Regulatory and Administrative Mitigation 2. Mitigation measures for fugitive dust associated with off-road vehicle maneuver exercises use would be the same as those for the Proposed Action.

Less than Significant Impacts

Emissions From Construction Activities. The RLA Alternative would include ten construction projects at PTA, with construction activities occurring from 2004 into 2007. Construction projects would include three training range facilities (a BAX, AALFTR, and QTR2), a tactical vehicle wash facility, an ammunition storage facility, a range maintenance facility, an upgrade and realignment of Bradshaw Army Airfield, a military vehicle trail between Kawaihae Harbor and PTA, a communications cable system, and 11 FTI towers. UXO clearance would be required prior to construction of the BAX, AALFTR, and QTR2 ranges. Figure 8-16 summarizes estimated emissions from these construction projects according to current construction schedules. Maximum annual nitrogen oxide emissions from construction equipment would be 213 tons (193 metric tons) in 2005 and 186 tons (169 metric tons) in 2006. Nitrogen oxide emissions are of concern primarily as an ozone precursor. Even though the construction emissions would drastically increase during those years, annual emissions of ozone precursors from construction activities associated with the RLA Alternative would be too small to have a measurable effect on ozone levels. Consequently, construction-related emissions under the RLA Alternative would have a less than significant air quality impact and would not change the attainment status of the area.

Emissions from Ordnance Use. Ordnance use by the 25th ID(L) at PTA would increase by 110 percent under Reduced Land Acquisition. Placement of the QTR2 range at PTA would result in higher quantities of small arms ammunition being used at PTA under the RLA Alternative than under the Proposed Action. Approximately 97 percent of the 7.1 million ordnance items used per year would be small arms ammunition. Emissions associated with ordnance use at PTA would pose very little risk of creating adverse air quality impacts. Consequently, air quality impacts from munitions use at PTA under the RLA Alternative are considered less than significant.

Engine Emissions from Military Vehicle Use. Military vehicle use at PTA under the RLA Alternative would be the same as discussed for the Proposed Action. As illustrated previously in Figure 8-15, the net increase in military vehicle engine emissions would be 3.9 tons (3.5 metric tons) per year for reactive organic compounds, 37 tons (34 metric tons) per year for nitrogen oxides, 11.5 tons (10.5 metric tons) per year for carbon monoxide, 0.4 ton (0.4 metric ton) per year for sulfur oxides, and 3.3 tons (3 metric tons) per year for PM_{10}. Emissions from military vehicle use at PTA would be too small to have a measurable effect on ambient pollutant concentrations. Consequently, emissions from increased military vehicle use at PTA would be a less than significant impact under the RLA Alternative.

Emissions from Increased Aircraft Operations. The RLA Alternative would have the same small effect on emissions from aircraft operations at PTA as discussed for the Proposed Action. Consequently, the increase in aircraft emissions at PTA under the RLA Alternative would be a less than significant impact.

Emissions from Wildfires. The RLA Alternative would have the same potential for wildfires at PTA as discussed for the Proposed Action. As noted for the Proposed Action, emissions from wildfires would be a less than significant impact under the RLA Alternative.

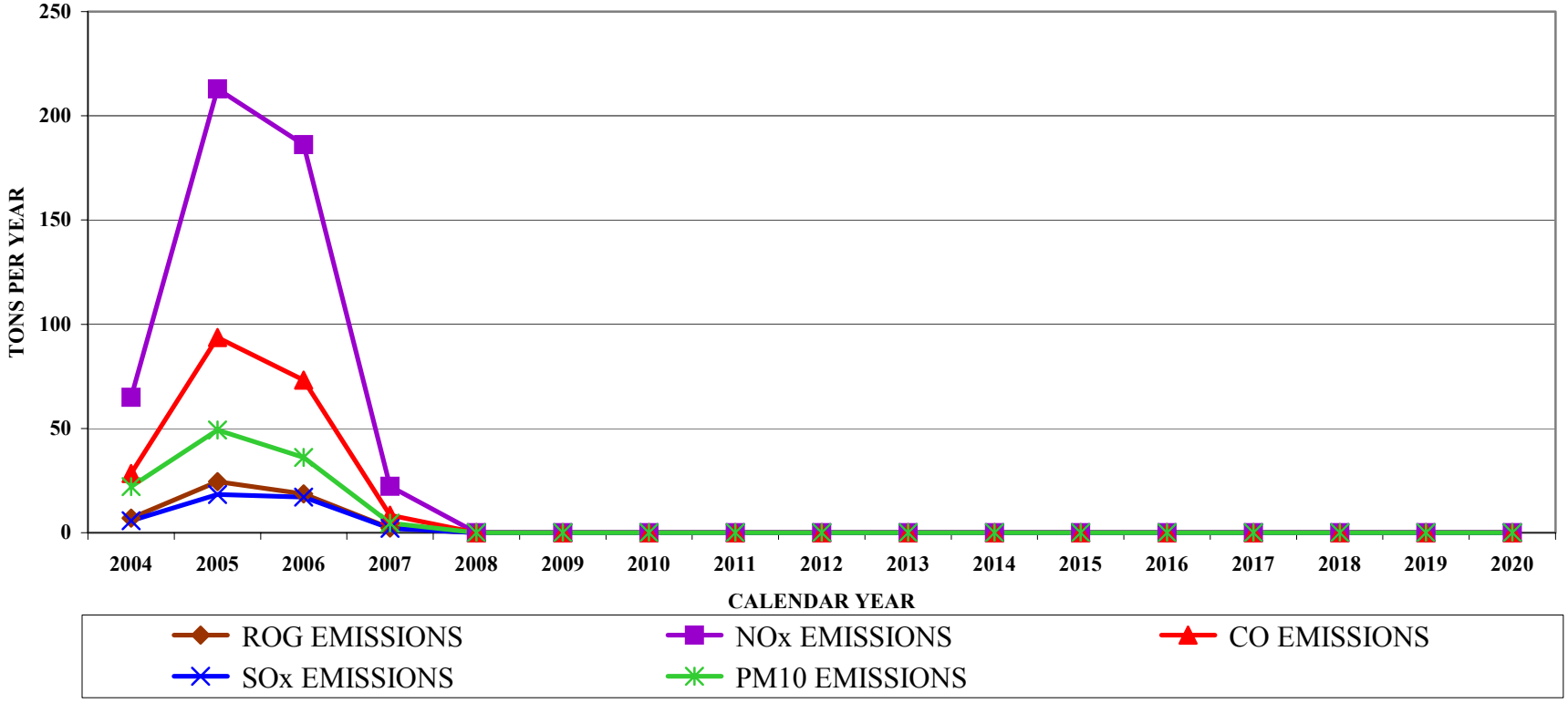

Figure 8-16 Annual Construction Emissions, Pōhakuloa Training Area, Reduced Land Acquisition

No Impact

Other Emissions from Personnel Increases. The RLA Alternative would not alter the number of staff personnel based at PTA. Consequently, RLA would not result in any increase in emissions from personal vehicle use or any increase in emissions from fixed facilities at PTA.

No Action

Less than Significant Impacts

Emissions from Ordnance Use. Overall ordnance use under No Action would be less than under the Proposed Action or RLA. 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 training ordnance use at PTA 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 PTA would remain at present levels under No Action. Estimated annual emissions from vehicle engine operations would be as follows:

- 3.0 tons (2.8 metric tons) per year of reactive organic compounds;
- 29 tons (26 metric tons) per year of nitrogen oxides;
- 9.0 tons (8.2 metric tons) per year of carbon monoxide;
- 0.32 ton (0.29 metric ton) per year of sulfur oxides; and
- 2.6 tons (2.4 metric tons) per year of PM_{10}.

Emissions from military vehicle use at PTA would be too small to have a measurable effect on ambient pollutant concentrations. 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 PTA would remain at the current level of about 798 tons per year (724 metric tons per year). Because existing conditions at PTA have not led to any known violations of state or federal ambient air quality standards, the fugitive dust from military vehicle use at PTA would have a less than significant impact under No Action.

Wind Erosion from Areas Disturbed by Tactical Vehicle Use. Vehicle maneuver activity at PTA would remain the same as current conditions under No Action. An estimated 845 tons per year (766 metric tons per year) of PM_{10} would be generated by wind erosion from the affected areas. Because existing conditions at PTA have not led to any known violations of state or federal ambient air quality standards, wind erosion from disturbed areas 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 PTA 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 PTA would remain the same as for current conditions under No Action. Because the frequency and size of wildfires at PTA would not be expected to change, emissions from wildfires would be a less than significant impact under No Action.

No Impact

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

Other Emissions from Personnel Increases. There would be no change in personnel numbers under No Action. Consequently, No Action would not result in any emissions from added personal vehicle use or any increase in emissions from fixed facilities.