

CHAPTER 5.

AIR QUALITY

5.1 AFFECTED ENVIRONMENT

5.1.1 Definition of Resource

Air quality is defined by ambient air concentrations of specific pollutants of concern with respect to the health and welfare of the general public. Air quality can be affected by air pollutants produced by mobile sources, such as vehicular traffic, aircraft, or non-road equipment used for construction activities; and by fixed or immobile facilities, referred to as “stationary sources.” Stationary sources can include combustion and industrial stacks and exhaust vents. Potential air quality effects on Tinian would occur from both construction and operational activities associated with implementation of the proposed actions and associated alternatives.

Under the requirements of the 1970 Clean Air Act (CAA) as amended in 1977 and 1990 (CAA Amendments), the United States (U.S.) Environmental Protection Agency (USEPA) has established National Ambient Air Quality Standards (NAAQS) for six contaminants, referred to as criteria pollutants (40 Code of Federal Regulations [CFR] 50): carbon monoxide (CO), nitrogen dioxides, ozone (with nitrogen oxides [NO_x] and volatile organic compounds [VOCs] as precursors), particulate matter (PM₁₀—less than 10 microns in particle diameter; PM_{2.5}—less than 2.5 microns in particle diameter), lead, and sulfur dioxide (SO₂).

The NAAQS include primary and secondary standards, as listed in Table 5.1-1. The primary standards were established to protect human public health, including the health of “sensitive” populations such as asthmatics, children, and the elderly. Typical sensitive land uses protected by the primary standards are public accessible areas used by these populations, such as residences, hospitals, libraries, churches, parks, playgrounds, schools, etc. The secondary standards were established to protect the environment, including plants and animals, from the adverse effects associated with pollutants in the ambient air.

Table 5.1-1. U.S. National and CNMI Ambient Air Quality Standards

| <i>Pollutant and Averaging Time</i> | <i>Primary Standard¹</i> | <i>Secondary Standard¹</i> |
|----------------------------------------|-------------------------------------|---------------------------------------|
| Carbon Monoxide | | |
| 1-Hour Maximum ² | 35 ppm | None |
| 8-Hour Maximum ² | 9 ppm | |
| Nitrogen Dioxide | | |
| Annual Arithmetic Mean ³ | 100 | 100 |
| Ozone | | |
| 8-Hour Average ⁴ | 0.075 ppm | 0.075 ppm |
| Particulate Matter⁵ | | |
| PM₁₀ | | |
| 24-Hour Average ⁶ | 150 | 150 |
| PM_{2.5} | | |
| Annual Arithmetic Mean ³ | 15 | 15 |
| 24-Hour Average ⁷ | 35 | 35 |
| Lead | | |
| Quarterly Arithmetic Mean ⁸ | 1.5 | 1.5 |
| Rolling 3-Month Average ⁹ | 0.15 | 0.15 |

Table 5.1-1. U.S. National and CNMI Ambient Air Quality Standards

| <i>Pollutant and Averaging Time</i> | <i>Primary Standard¹</i> | <i>Secondary Standard¹</i> |
|-------------------------------------|--------------------------------------|---------------------------------------|
| Sulfur Dioxide | | |
| Annual Arithmetic Mean ³ | 0.03 ppm (80 µg/m ³) | — |
| 3-Hour Maximum ² | — | 0.5 ppm (1300 µg/m ³) |
| 24-Hour Maximum ² | 0.14 ppm (365 µg/m ³) | — |

Legend: — = not available; ppm = parts per million.

Notes:

- ¹ All concentrations in micrograms per cubic meter of air (µg/m³), except where noted.
- ² Not to be exceeded more than once a year.
- ³ Not to be exceeded during any calendar year.
- ⁴ Standard attained when 3-year average of annual 4th-highest daily maximum 8-hour concentration is below 0.075 ppm.
- ⁵ PM₁₀: particulate matter diameter of 10 microns or less; PM_{2.5}: particulate matter diameter of 2.5 microns or less.
- ⁶ Not to be exceeded more than once per year on average over 3 years.
- ⁷ Standard attained when the annual highest 98th percentile of 24-hour concentration over 3 years is below 35 µg/m³.
- ⁸ The quarterly lead standard is not to be exceeded during any calendar quarter.
- ⁹ Any three-month average exceeding 0.15 µg/m³ within a three-year period would be considered a violation of the NAAQS. Final rule signed October 15, 2008.

Sources: 40 CFR 50 and Guam Environmental Protection Agency (GEPA) (2004).

Areas where concentration levels are below the NAAQS for criteria pollutants are designated as being in “attainment.” Areas where criteria pollutant levels equal or exceed the NAAQS are designated as being in “nonattainment.” Based on the severity of the pollution problem, nonattainment areas are categorized as marginal, moderate, serious, severe, or extreme. Where insufficient data exist to determine an area’s attainment status, it is designated as either unclassifiable or in attainment.

The CNMI Air Pollution Control Regulations require compliance with NAAQS and permitting for stationary sources of air emissions. The CNMI Division of Environmental Quality reviews air permit applications and issues air permits for stationary sources.

5.1.2 Tinian

Except for power generating facilities, there are no significant sources of air emissions on Tinian. However, military training vessels, on-road vehicles, and open burnings are sources of emissions that contribute to the existing ambient air quality background conditions at Tinian. While there are no air monitoring stations on Tinian, it can be assumed that ambient air quality is good and in compliance with air quality standards given the small number of emission sources on the island and that the island is currently designated as an attainment area for all criteria pollutants.

5.2 ENVIRONMENTAL CONSEQUENCES

Since the proposed training activity on Tinian would not affect the operation and capacity of existing utility systems, no adverse stationary source air quality impacts (i.e., from fixed or immobile facilities) would occur. The air quality consequences analysis performed and presented in this section includes:

- An incremental emissions analysis of criteria pollutants and greenhouse gas in terms of carbon dioxide (CO₂) emissions with the potential to emit from additional training activity operations including the following sources:
- Firing training, inclusive of associated vehicle usage
- Barge operations for transporting military training personnel
- An incremental emissions analysis of criteria pollutants and CO₂ with the potential to emit from construction equipment and hauling truck emissions during the construction period.

5.2.1 Approach to Analysis

5.2.1.1 Methodology

This section describes the analytical approach used to address potential impacts from the proposed Marine Corps training operations on Tinian. The training operations proposed on Tinian would involve the development of live-fire weapons ranges for the sustainment training necessary for individuals, crews, and small units of Marine Corps forces.

Among the three action alternatives (Alternatives 1, 2, and 3), the principal differences are the location and orientation of the firing ranges and the associated surface danger zones (SDZs). The majority of project components that would affect potential air quality conditions would remain the same for each action alternative including the scale of construction and the scale of ground training.

Therefore, it is anticipated that the potential air quality impact from the three alternatives would be same with respect to the overall pollutant emissions resulting from the proposed action. The air emission sources associated with the proposed operations can be characterized as mobile sources for which the criteria pollutant and CO₂ emissions are quantified.

Construction

Construction activities such as the operation of construction equipment and trucks may have short-term air quality impacts. Although the emissions from construction workers' commuting vehicles are considered part of the overall construction emissions, it is anticipated they are negligible given the scale of construction activities and the relatively low level of emissions as compared to trucks. As such, the emission component from workers' commuting vehicles was not considered here, as it is relatively small and cannot be reasonably forecasted.

In estimating construction-related criteria pollutants and CO₂ emissions, the usage of equipment, the likely duration of each activity, and manpower estimates for the construction were based on the information described in Chapter 2 for the future project-associated construction activities.

Estimates of construction crew and equipment requirements and productivity were based on the data contained in *RSMeans Facilities Construction Cost Data* (RSMeans 2003) and *RSMeans Heavy Construction Cost Data* (RSMeans 2006). It is assumed for emissions estimates purposes that the majority of construction activities would occur from 2011 through 2014 with minimal effort occurring during 2010.

Estimates of construction equipment operational emissions were calculated based on projected hours of equipment use and the emission factors for each type of equipment, as provided by USEPA in the NONROAD emission factor model (USEPA 2008). National default model inputs for non-road engines, equipment, and vehicles of interest were also in the USEPA model (USEPA 2008), as were average equipment horsepower values and equipment power load factors. Since the operational activity data presented in RSMeans' cost data books are generated based on the overall length of equipment presence

duration on site, an equipment actual running time factor (i.e., actual usage factor) was further employed to determine actual equipment usage hours for the purpose of estimating equipment emissions. The usage factor for each equipment type was obtained from Federal Highway Administration's (FHWA) Roadway Construction Noise Model User's Guide (FHWA 2006). Emission factors related to construction-associated delivery trucks were estimated using USEPA Mobile6 emission factor model (USEPA 2003) that provides specific emission factor data base for various truck classifications.

Operation

Operational elements that have potential to impact air quality include:

- Use of barges for transport of equipment from Guam to Tinian for training evolutions
- Ground vehicle operations at various ranges

The emissions from potential barge trips were calculated using emission factors and load factors related to diesel marine vessels obtained from *Current Methodologies and Best Practices in Preparing Port Emission Inventories* (USEPA 2006). Emission factors were multiplied by the estimated running hours for the barge to predict annual total barge emissions.

Ground training vehicle exhaust emissions from trucks, high mobility multipurpose wheeled vehicles, and buses during training exercises were estimated with the same method used to predict construction vehicle emissions. The USEPA Mobile6 emission factor model (USEPA 2003) was used to predict emission factors associated with each type of training vehicles defined based on the average weight and fuel type. The emission factors were then multiplied by the annual vehicle running hours for each type of vehicle during the training periods on Tinian. Moreover, since majority of these training vehicles would maneuver on unpaved roads with potential to generate a great amount of fugitive dust, USEPA AP-42 (USEPA 1995) was used to predict additional unpaved road fugitive dust emissions from training vehicles.

The detailed methodologies used to calculate both construction and operation emissions are presented in Volume 9, Appendix I (Sections 3.3.4 Marine Vessel Training Emissions, 3.3.5 Training Vehicles Emissions and 3.4 Construction Activity Emissions).

5.2.1.2 Determination of Significance

Under the CAA, barges, motor vehicles, and construction equipment are exempt from air permitting requirements. Since the emissions from these sources associated with the proposed project would occur in areas that are in attainment of the NAAQS for all criteria pollutants, the CAA General Conformity Rule (GCR) is not applicable. Nonetheless, the National Environmental Policy Act (NEPA) and its implementing regulations require analysis of the significance of air quality impacts from these sources as well as non-major stationary sources. However, neither NEPA nor its implementing regulations have established criteria for determining the significance of air quality impacts from such sources in CAA attainment areas.

In the GCR applicable to nonattainment areas, USEPA uses the "major stationary source" definition under the New Source Review program as the *de minimis* levels to separate presumably exempt actions from those requiring a positive conformity determination. Since the proposed action and alternatives would occur in areas that have always been in attainment, the "major stationary source" definition (250 tons per year [TPY] or more of any air pollutant subject to regulations under the CAA) from the Prevention of Significant Deterioration (PSD) program was used for the air quality impact assessment. The PSD major source threshold of 250 TPY is used for locations that are in attainment for determining

the potential significance of air quality impacts from these sources. CO₂ is not a criteria pollutant and therefore the 250 TPY threshold is not applicable to it.

The analysis of construction and operational incremental emissions from these sources in attainment areas and the significance threshold selected (250 TPY) are solely for the purpose of informing the public and decision makers about the relative air quality impacts from the proposed action and other alternatives under NEPA requirements.

5.2.1.3 Issues Identified During Public Scoping Process

As part of the analyses, concerns relating to air quality effects that were raised by the public, including regulatory stakeholders, during scoping meetings were addressed, if sufficient project data and available impact criteria were available. These include:

- Increases in vehicle and vessel emissions and disclosure of available information of health risks associated with vehicle emissions and other mobile source emissions.
- Increases in construction-related emissions and impacts including emissions estimates of criteria pollutants and diesel PM from construction of alternatives.

5.2.2 Alternative 1 (Preferred Alternative)

5.2.2.1 Tinian

The Range Training Area (RTA) under Alternative 1 would consist of four proposed firing ranges: Rifle Known Distance (KD) Range, Automated Combat Pistol Range, Platoon Battle Course, and Field Firing Range. They would be oriented north, with the exception of the Platoon Battle Course that would be oriented northeast. Total area of disturbance for all ranges combined would be 225 acres (ac) (91 hectares [ha]). SDZs would encompass the Broadway and the Mount Lasso areas but would not extend over ocean waters.

Construction

In Tinian, construction of the ranges would occur within the Military Lease Area (MLA). In order to streamline development of a construction estimate for the live-fire range training facilities and supporting facilities, each individual item was assigned to a “prototype” element with complete construction estimates developed for a representative sample of each of the prototypes.

The total annual air emissions resulting from potential construction equipment, vehicle, and paving activities occurring from 2011 through 2014 for live-fire range training facilities and supporting facilities construction in Tinian are summarized in Table 5.2-1 and detailed in Volume 9, Appendix I, Section 3.4.2 Construction Emissions Marine Corps Relocation – CNMI.

Table 5.2-1. Annual Construction Emissions - Alternative 1

| <i>Pollutant (TPY)</i> | | | | | | |
|------------------------|-----------|------------------------|-------------------------|-----------------------|------------|-----------------------|
| <i>SO₂</i> | <i>CO</i> | <i>PM₁₀</i> | <i>PM_{2.5}</i> | <i>NO_x</i> | <i>VOC</i> | <i>CO₂</i> |
| 0.3 | 1.1 | 0.1 | 0.1 | 0.7 | 0.3 | 108.7 |

Operation

Military training-related aircraft, barge and vehicle emissions during training exercises are summarized in Table 5.2-2 and detailed in Volume 9, Appendix I, Section 3.3.5 Training Vehicles Emissions.

Table 5.2-2. Training Activity Annual Emissions- Alternative 1

| <i>Pollutant (TPY)</i> | | | | | | |
|------------------------|-----------|------------------------|-------------------------|-----------------------|------------|-----------------------|
| <i>SO₂</i> | <i>CO</i> | <i>PM₁₀</i> | <i>PM_{2.5}</i> | <i>NO_x</i> | <i>VOC</i> | <i>CO₂</i> |
| Barge | | | | | | |
| 0.2 | 0.8 | 0.1 | 0.1 | 4.2 | 0.1 | N/A |
| Vehicle | | | | | | |
| 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 2.0 |
| Total | | | | | | |
| 0.2 | 0.8 | 0.2 | 0.1 | 4.2 | 0.1 | 2.0 |

The construction emissions and operational training emissions for Alternative 1 shown in Table 5.2-1 and Table 5.2-2 are all well below the significance threshold of 250 TPY for criteria pollutants, as described in Section 5.2.1.2.

5.2.2.2 Summary of Alternative 1 Impacts

Table 5.2-3 provides a summary of air emissions associated with both construction and operational components of Alternative 1. All air emissions would be well below the significance threshold of 250 TPY for air pollutants subject to regulations under the CAA. Therefore, all project specific air quality impacts are considered less than significant for all areas under Alternative 1.

Table 5.2-3. Summary of Alternative 1 Impacts

| <i>Area</i> | <i>Project Activities</i> | <i>Project Air Quality Impacts</i> |
|-------------|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| Tinian | Construction | Less than significant impacts to air quality. Construction emissions from all components would be well below significance thresholds. |
| | Operation | Less than significant impacts to air quality. Operational emissions from all components would be well below significance thresholds. |

5.2.2.3 Alternative 1 Potential Mitigation Measures

The predicted construction emissions (2011 through 2014) and operational emissions associated with training activities (2015 and after) are combined with the emissions from other components of the proposed action in Volume 7 to determine the total potential air emissions impact significance using the impact thresholds described in Section 5.2.1.2. However, as the actions discussed in this volume are in a separate region of influence (ROI) from other actions, emissions from the activities discussed here are unlikely to influence emissions on Guam ROIs, with the exception of CO₂, which was selected to represent greenhouse gases. CO₂ is discussed for all ROIs in Volume 7, as the entire geographic region is a more appropriate scale for evaluation of potential impacts.

5.2.3 Alternative 2

5.2.3.1 Tinian

The RTA under Alternative 2 would consist of the same four proposed firing ranges as Alternative 1. They would be oriented north, with the exception of the Platoon Battle Course that would be oriented northeast. Total area of disturbance for all ranges combined would be 225 ac (91 ha). SDZs would encompass the Broadway and the Mount Lasso areas, and the Field Firing Range SDZ would extend over ocean waters.

Construction

The construction emissions that would result from the proposed construction live-fire range training facilities and supporting facilities on Tinian for Alternative 2 are assumed to be the same as those for

Alternative 1, based the similar components of each alternative. Air emissions during construction that apply to this alternative are discussed in Section 5.2.2 and are presented in Table 5.2-1.

Operation

The operational emissions associated with military training related emissions including those from aircraft, barge, and training vehicle operations at or around Tinian are also assumed to be the same as those for Alternative 1, and are summarized in Table 5.2-2.

5.2.3.2 Summary of Alternative 2 Impacts

Table 5.2-4 provides a summary of air emissions associated with both construction and operational components of Alternative 2. All air emissions would be well below the significance threshold of 250 TPY for air pollutants subject to regulations under the CAA. Therefore, all project specific air quality impacts are considered less than significant for all areas for this action.

Table 5.2-4. Summary of Alternative 2 Impacts

| <i>Area</i> | <i>Project Activities</i> | <i>Project Air Quality Impacts</i> |
|-------------|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| Tinian | Construction | Less than significant impacts to air quality. Construction emissions from all components would be well below significance thresholds. |
| | Operation | Less than significant impacts to air quality. Operational emissions from all components would be well below significance thresholds. |

5.2.3.3 Alternative 2 Potential Mitigation Measures

The predicted construction emissions (2011 through 2014) and operational emissions (2015 and after) for criteria pollutants within each ROI are all below the 250 TPY threshold or 100 TPY SO₂ threshold applicable for SO₂ nonattainment areas. Therefore, potential air quality impacts under Alternative 2 are considered less than significant and emissions mitigation measures are not warranted.

5.2.4 Alternative 3

5.2.4.1 Tinian

The RTA under Alternative 3 would consist of the same four proposed firing ranges as Alternative 1. Three ranges (Field Firing Range, Combat Pistol/Multipurpose Firearms Qualification Course and the Rifle KD Range) would be located farther to the south than under Alternative 1. They would be oriented north. The Platoon Battle Course that would be in the same location as Alternative 1 and would be oriented northeast. Total area of disturbance for all ranges combined would be 225 ac (91 ha). SDZs would encompass the Broadway and the Mount Lasso areas but would not extend over ocean waters.

Construction

The primary difference between Alternatives 2 and 3 is the orientation of the Platoon Battle Course. Construction emissions that would result from the proposed construction of live-fire range training facilities and supporting facilities in Tinian for Alternative 3 are assumed to be the same as those for Alternative 1 based on the similar components of each alternative. Air emissions that apply to this alternative are discussed in Section 5.2.2 and are presented in Table 5.2-1.

Operation

The operational emissions associated with military training-related emissions including those from aircraft, barge, and training vehicle operations at or around Tinian are also assumed to be the same as those for Alternative 1 and are summarized in Table 5.2-2.

5.2.4.2 Summary of Alternative 3 Impacts

Table 5.2-5 provides a summary of air emissions associated with both construction and operational components of Alternative 3. All air emissions would be well below the significance threshold of 250 TPY for air pollutants subject to regulations under the CAA. Therefore, all project specific air quality impacts are considered less than significant for all areas for this action.

Table 5.2-5. Summary of Alternative 3 Impacts

| <i>Area</i> | <i>Project Activities</i> | <i>Project Air Quality Impacts</i> |
|-------------|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| Tinian | Construction | Less than significant impacts to air quality. Construction emissions from all components would be well below significance thresholds. |
| | Operation | Less than significant impacts to air quality. Operational emissions from all components would be well below significance thresholds. |

5.2.4.3 Alternative 3 Potential Mitigation Measures

The predicted construction emissions (2011 through 2014) and operational emissions (2015 and after) for criteria pollutants within each ROI are all below the 250 TPY threshold or 100 TPY SO₂ threshold applicable for SO₂ nonattainment areas. Therefore, potential air quality impacts under Alternative 3 are considered less than significant and emissions mitigation measures are not warranted.

5.2.5 No-Action Alternative

Under the no-action alternative, Marine Corps units would not move to Guam and there would be no additional training conducted in the CNMI. No construction and training operations associated with the military relocation would occur. Existing operations on Tinian would continue. Therefore, the no-action alternative would not have significant air quality impacts.

5.2.6 Summary of Impacts

Table 5.2-6 summarizes the potential impacts of the three action alternatives and the no-action alternative. As noted in this section, this evaluation assumed that the construction effort for all live-fire weapons ranges would be the same, regardless of location or orientation. Therefore, the estimate of air emissions calculated for all action alternatives (Alternatives 1, 2, and 3) are equal. The operational components of military training related emissions for all three action alternatives are also considered to be the same and therefore predicted emissions for all action alternatives are also the same.

Table 5.2-6. Summary of Impacts

| <i>Alternative 1</i> | <i>Alternative 2</i> | <i>Alternative 3</i> | <i>No-Action Alternative</i> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| Construction Impacts | | | |
| LSI <ul style="list-style-type: none"> Construction emissions from all components would be well below significance thresholds. | LSI <ul style="list-style-type: none"> Construction emissions from all components would be well below significance thresholds. | LSI <ul style="list-style-type: none"> Construction emissions from all components would be well below significance thresholds. | NI |
| Operation Impacts | | | |
| LSI <ul style="list-style-type: none"> Training operation emissions from all components would be well below significance thresholds. | LSI <ul style="list-style-type: none"> Training operation emissions from all components would be well below significance thresholds. | LSI <ul style="list-style-type: none"> Training operation emissions from all components would be well below significance thresholds. | NI |

Legend: LSI = Less than significant impact; NI = No impact.

The potential air emissions for Alternatives 1, 2, and 3 associated with construction and operational activities are well below the significance threshold of 250 TPY. Therefore, Alternatives 1, 2, and 3 would result in less than significant impacts to air quality resources. The no-action alternative would result in no impacts to air quality resources.

5.2.7 Summary of Potential Mitigation Measures

As the predicted air emissions would result in less than significant impacts for all alternatives for both construction and operation components of the proposed action, no mitigation measures are warranted, as summarized in Table 5.2-7.

Table 5.2-7. Summary of Potential Mitigation Measures

| <i>Alternative 1</i> | <i>Alternative 2</i> | <i>Alternative 3</i> |
|----------------------|----------------------|----------------------|
| Construction | | |
| • None | • None | • None |
| Operation | | |
| • None | • None | • None |

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