APPENDIX A

INTERAGENCY AND INTERGOVERNMENTAL COORDINATION FOR ENVIRONMENTAL PLANNING CORRESPONDENCE

December 14, 2001

«Name»
«Title»
«Company»
«Address1»
«Address2»
«CityStateZip»

Dear «Name»

The Air Force Reserve Command is preparing an Environmental Assessment (EA) for Conversion of the 939th Rescue Wing at Portland International Airport, Oregon. The Description of Proposed Action and Alternatives (DOPAA) is included with this correspondence as Attachment 1.

The environmental impact analysis process for this proposal is being conducted by the Air Force Reserve Command in accordance with the Council on Environmental Quality guidelines pursuant to the requirements of the National Environmental Policy Act of 1969. In accordance with Executive Order 12372, *Intergovernmental Review of Federal Programs*, we request your participation by reviewing the attached DOPAA and solicit your comments concerning the proposal and any potential environmental consequences. Please provide written comments or information regarding the action at your earliest convenience but no later than February 15, 2002. Also enclosed is a listing of those Federal, state, and local agencies that have been contacted (see Attachment 2). If there are any additional agencies that you feel should review and comment on the proposal, please include them in your distribution of this letter and the attached materials.

Please address questions concerning the proposal to our consultant, engineering-environmental Management, Inc. (e^2M). The point-of-contact at e^2M is Mr. Martin Heigh. He can be reached at (703) 383-1000 ext. 108. Please forward your written comments to Mr. Heigh, in care of e^2M, Inc., 10331 Democracy Lane, Fairfax, Virginia 22030. Comments will also be accepted via email at <mheigh@e2m.net>. Thank you for your assistance.

Sincerely,
engineering-environmental Management, Inc.

Martin E. Heigh, P.E.
Project Manager

Attachments:
1. Description of Proposed Action and Alternatives
2. Distribution List

Conversion of the 939th Rescue Wing
Portland International Airport, Oregon
Environmental Assessment
Interagency and Intergovernmental Coordination for Environmental Planning List

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Horst Greczmiel
Council on Environmental Quality (CEQ)
360 Old Executive Office Building, NW
Washington, DC 20501

Dr. Willie Taylor
U.S. Department of the Interior
Office of Environmental Policy and Compliance
Main Interior Building, MS 2340
1849 C Street, NW
Washington, DC 20240

Ms. Andree DuVarney
National Environmental Coordinator
Natural Resource Conservation Service (NRCS)
U.S. Department of Agriculture
14th and Independence Ave., SW
PO Box 2890
Washington, DC 20013

Mr. Rhey Solomon
Director, NEPA Staff
Forest Service
U.S. Department of Agriculture
PO Box 96090
Washington, DC 20090-6090

Mr. Richard Sanderson
Director, Office of Federal Activities
U.S. Environmental Protection Agency (USEPA)
Federal Agency Liaison Division, 2251-A
401 M Street, SW
Washington, DC 20460

Ms. Ann M. Hooker
Environmental Specialist, NEPA Liaison
Federal Aviation Administration (FAA)
Office of Environment and Energy (AEE300)
800 Independence Avenue, SW
Washington, DC 20591

Mr. Ralph Thompson
FAA – Airport Program (APP600)
800 Independence Avenue, SW
Washington, DC 20591

Mr. A. Forester Einarsen
U.S. Army Corps of Engineers (USACE)
Office of Environmental Policy (CECW-AR-E)
7701 Telegraph Road
Alexandria, VA 22315-3861

Mr. Don Klima
Director, Office of Planning and Review
Advisory Council on Historic Preservation
1100 Pennsylvania Ave., NW #809
The Old Post Office Building
Washington, DC 20004

Mr. Preston A. Sleeger
U.S. Department of the Interior
Regional Office of Environmental Policy and Compliance
500 NE Multnomah St, Suite 356
Portland, OR 97232

USFWS Regional Office
Federal Projects Coordinator
Eastside Federal Complex
911NE 11th Ave
Portland, OR 97232-4181

Mr. Harry Craig
U.S. EPA Region 9
811 SW 6th Ave
Portland, OR 97204

Mr. Larry Andriesen
Region Administrator
FAA - Northwest Mountain Region
1601 Lind Avenue, SW
Renton, Washington 98055-4056

AFREP/ANM-900, FAA NW Mountain Region
1601 Lind Avenue, SW
Renton, Washington 98055-4056

Rep. Earl Blumenauer
516 S.E. Morrison St., Suite 250
Portland, OR 97232

Sen. Ron Wyden (D-OR)
500 N.E. Multnomah St., Suite 320
Portland, OR 97204

Sen. Gordon Smith (R-OR)
1220 S.W. 3rd Ave., Suite 618
Portland, OR 97204

Oregon State Senator Avel Gordly
2009-B NE 16th St.
Portland, OR 97212

Oregon State Representative Jackie Dingfelder
2124 NE 54th Ave
Portland, OR 97213

Governor John H. Kitzhaber
State Capitol Building
900 Court Street NE
Salem, OR 97301-4047

Mr. Phil Mattson
USDA Forest Service
Pacific Northwest Region (R6)
333 SW First St.
P.O. Box 3623
Portland, Oregon 97208

USFWS
Oregon Ecological Services Field Office
2600 southeast 98th Ave., Suite 100
Portland, OR 97266-1398

Ms Stephanie Hallock
Oregon DEQ Director
2020 S.W. 4th Ave.
Portland, OR 97201

Ms. Chrissy Curran
State Historic Preservation Office
1115 Commercial St. NE, Suite 2
Salem, OR 97301-1012

Ms. Diane Linn
Multnomah County Commissioner
Courthouse, 501 SE Hawthorne Blvd (Rm 600)
Portland, OR 97214

Mr. Bill Foster
Oregon Dept of Admin. Services (Facilities)
1225 Ferry St., SE
U-100
Salem, OR 97301-4281

Mr. Erik Sten
Portland City Commissioner
1220 S.W. 5th Ave.
Portland, OR 97204

Metro, Land Use Division
600 NE Grand
Portland, OR 97232-2799

City of Portland, Bureau of Planning
1120 S.W. 5th
Portland, OR 97204

Mr. Bill Allen
Port of Portland
P.O. Box 3529
Portland, OR 97208

Mr. Chuck Shenk
Port of Portland
P.O. Box 3529
Portland, OR 97208

Ms. Patty McCoy
Columbia Corridor Association
P.O. Box 55651
Portland, OR 97238

Mr. Jay Mower
Columbia Slough Watershed Council
7040 N.E. 47th Ave.
Portland, OR 97218-1212

U.S. Department
of Transportation

**Federal Aviation
Administration**

Northwest Mountain Region
Colorado, Idaho, Montana
Oregon, Utah, Washington,
Wyoming

1601 Lind Avenue, S. W.
Renton, Washington 98055-4056

JAN 29 2002

Mr. Martin E. Heigh
Project Manager
Engineering-Environmental Management, Inc.
10331 Democracy Lane
Fairfax, VA 22030

Dear Mr. Heigh:

This is in response to your letter of December 14, 2001, in which you request our review of Attachment 1, "Description of Proposed Action and Alternatives," part of the forthcoming Environmental Assessment for the conversion of the 939th Rescue Wing at Portland International Airport, Portland, Oregon.

We have completed our review of the attachment, and offer the following comments:

a. Section 2.2.4 Related Operations: We note there will be a substantial increase (from 1.0 to 9.6 million gallons per year) in the amount of jet fuel delivered to the airport. Can the existing storage capacity accommodate this increase in fuel on-hand? If not, where will the new storage facility be constructed and what will be the environmental impacts associated with that construction and operation?

b. Section 2.3 Alternatives to the Proposed Action: Are there other airports available that could accommodate the proposed action/mission? If yes, what would be the environmental impacts associated with the operation at those locations?

The Port of Portland is nearing completion of their Airport Layout Plan (ALP). We ask that you coordinate with their airport planning staff to ensure that your development plans are consistent with the ALP.

Thank you for the opportunity to comment on this proposal.

Sincerely,

for Lawrence B. Andriesen
Regional Administrator
Northwest Mountain Region

Response to FAA – Northwest Mountain Region Comments (dated January 29, 2002)
Conversion of the 939th Rescue Wing at Portland International Airport, Oregon

Comment	Response
a	No new storage facility would be required under the Proposed Action (see Section 4.11.2). Approximately 3.2 additional daily trips would be made by fuel trucks to respond to this demand. Please see Section 4.3.2, Subsection *Fuel Storage and Handling Emissions* and Subsection *Fuel Truck Emissions* for a discussion on potential impacts.
b	Other alternatives, including moving the mission to other airports were considered during the ORANG's screening process. They were eliminated because other locations could not offer the majority of facilities and personnel already in-place. Alternate training locations have been identified at Klamath Falls IAP OR, Beale AFB, CA and Grant County IAP, WA. Construction to support the proposed action would take place entirely on ORANG-leased property and is consistent with the Portland ANGB Master Plan.

RECEIVED

DEC 24 2001

STATE PARKS &
RECREATION DEPT

December 14, 2001

Ms. Chrissy Curran
State Historic Preservation Office
1115 Commercial St. NE, Suite 2
Salem, OR 97301-1012

Dear Ms. Curran

The Air Force Reserve Command is preparing an Environmental Assessment (EA) for Conversion of the 939th Rescue Wing at Portland International Airport, Oregon. The Description of Proposed Action and Alternatives (DOPAA) is included with this correspondence as Attachment 1.

The environmental impact analysis process for this proposal is being conducted by the Air Force Reserve Command in accordance with the Council on Environmental Quality guidelines pursuant to the requirements of the National Environmental Policy Act of 1969. In accordance with Executive Order 12372, *Intergovernmental Review of Federal Programs*, we request your participation by reviewing the attached DOPAA and solicit your comments concerning the proposal and any potential environmental consequences. Please provide written comments or information regarding the action at your earliest convenience but no later than February 15, 2002. Also enclosed is a listing of those Federal, state, and local agencies that have been contacted (see Attachment 2). If there are any additional agencies that you feel should review and comment on the proposal, please include them in your distribution of this letter and the attached materials.

Please address questions concerning the proposal to our consultant, engineering-environmental Management, Inc. (e^2M). The point-of-contact at e^2M is Mr. Martin Heigh. He can be reached at (703) 383-1000 ext. 108. Please forward your written comments to Mr. Heigh, in care of e^2M, Inc., 10331 Democracy Lane, Fairfax, Virginia 22030. Comments will also be accepted via email at <mheigh@e2m.net>. Thank you for your assistance.

Sincerely,
engineering-environmental Management, Inc.

Martin E. Heigh

Martin E. Heigh, P.E.
Project Manager

Attachments:
1. Description of Proposed Action and Alternatives
2. Distribution List

NO HISTORIC PROPERTIES AFFECTED

C. Curran 1-22-02
SHPO

10331 Democracy Lane, Fairfax, VA 22030 / telephone: 703-383-1000 / facsimile: 703-383-1093

1510 West Canal Court, Suite 2000
Littleton, CO 80120

2720 Hemlock Ct., #D
Broken Arrow, OK 74012

Two Bala Plaza, Suite 300
Bala Cynwyd, PA 19004

3000 Hartley, Stes. 2 & 3
Jacksonville, FL 32257

PORT OF PORTLAND

February 13, 2002

Via Overnight Express

Martin Heigh, P.E.
Engineering-Environmental Management, Inc.
10331 Democracy Lane
Fairfax, Virginia 22030

Re: Description of Proposed Action/Alternatives, Conversion of the 939th Rescue Wing to the 939th Air Refueling Wing, Portland International Airport, Oregon

Dear Mr. Heigh:

The Port of Portland (Port) is pleased to provide the following comments on the "Description and Proposed Action and Alternatives, Conversion of the 939th Rescue Wing at Portland International Airport" (December 2001). These comments are being provided in connection with the Interagency and Intergovernmental Coordination for Environmental Planning (IICEP) process to identify the scope of issues to be addressed in the Environmental Assessment (EA) for the proposed action.

The "Description and Proposed Action and Alternatives" states that the Oregon Air National Guard's (ORANG's) "property consists of two parcels. Parcel 1 (19.9 acres) is leased from the Port of Portland. Parcel 2 (225.5 acres) is used by license from the USAF." This description is incorrect and should be revised to clarify that the Port is the property owner for both parcels; the Port leases both parcels to the United States of America with ORANG acting as the agent or host. This ground lease expires in 2029. The Port does not have a ground lease with the United States Air Force (USAF) and has not reviewed or approved the existing sublease between the ORANG and the Air Force Reserve Command (AFRC). It is also important to note that, to date, the Port has not agreed to extend the lease beyond 2029, but if an extension were to be considered, the existing lease would need to be significantly renegotiated, particularly to address environmental concerns and the ability to terminate in the event the land is needed for airport expansion. For your information, a map that shows the current ORANG leasehold is attached to this letter. [1] [2] [3]

The following are additional concerns, for your consideration:

General Comments

- **Analysis of Reasonable Range of Alternatives (Section 2.3)**: The "Description of Proposed Action and Alternatives" does not present and analyze a reasonable range of alternatives as required by the National Environmental Policy Act (NEPA). There are only three alternatives presented in the document: (1) conversion to KC-135E aircraft; (2) conversion to C-130E aircraft; and, (3) the no-action alternative. Additional analysis for conversion to KC-135E or C-130E aircraft is not proposed for the EA; only the no-action alternative is proposed for further analysis. Other [4]

reasonable alternatives, such as relocating the 939th Air Refueling Wing (939 ARW) to another airfield or converting the 939th Rescue Wing (939 RQW) to a mission other than the 939th ARW, must also be identified, described, and analyzed in the EA in order to comply with NEPA. [4]

- **Proposed Construction Projects (Section 2.2.5)**: The description of the proposed alternative includes installation of a fuel hydrant system in two phases. However, it is not clear if the proposed alternative includes installation and operation of additional above ground storage tanks (ASTs). If additional ASTs are a component of the proposed alternative, then the project description should be revised. In addition, the ORANG must enter into an AST agreement with the Port prior to installation and operation of the AST(s). If additional ASTs are not proposed, then an explanation should be provided in the EA of how the 10-fold increase in annual fuel throughput will be managed given the existing storage tank capacity at the ORANG base. [5]

- **Related Operations (Section 2.2.4)**: The "Description of Proposed Action and Alternatives" states that "[a]ircraft painting may occur at facilities owned by the Port of Portland. The Port of Portland painting facility is located on the civilian side of the Portland International Airport." This statement is incorrect because the Port does not own a painting facility at PDX. Presumably, the painting facility referred to in the document are the AMC Hangars, which are currently under sublease to other tenants. Additionally, it should be noted that this facility is actively being marketed for other uses and may not be available for such use by the ORANG. [6]

- **Port Construction Permit**: A Port construction permit is required for all work performed on Port property. Construction includes, but is not limited to, demolition, renovation, and new construction. In addition, all conditions and requirements of the Port construction permit must be met by the permittee. ORANG is not exempt from these obligations. ORANG must also comply with City of Portland building and construction requirements, unless otherwise exempt. [7]

Safety

- **Port Fire Department**: Potential impacts to Fire Department training and equipment should be evaluated. For example, changes in aircraft type or operation of fuel-laden aircraft could necessitate changes in both personnel training, material (extinguishing foam), and equipment in order to maintain the capability for mutual aid and support. Any costs incurred by the Port in support of the proposed alternative would be the sole responsibility of the ORANG or AFRC. [8]

- **Federal Aviation Administration (FAA) Approval and FAA Form 7460-1**: One or more FAA Form 7460-1 (Notice of Proposed Construction or Alteration) may be required for the proposed project to ensure that construction and operation of the project will not adversely impact the safety of airport operations. Identification of the need for and completion of the Form 7460-1 is the responsibility of the project proponent. The Form 7460-1 must be submitted to the FAA for review and approval a minimum of 90 days in advance of the proposed activity triggering the requirement. Examples of activities or operations that require Form 7460-1 approval include, but [9]

are not limited to, mobilization of equipment in areas with height restrictions and construction of new infrastructure, such as ASTs, that could cause reflectivity issues with navigational aids. Costs associated with correctional action or navigational aid replacement/upgrade are the responsibility of the ORANG should it be determined, through the Form 7460-1 process, that proposed activities, operations, or completed facilities adversely affect existing airfield navigational aids. Port staff can assist in the submission of these forms to the FAA.

- **Jet Blast**: The EA should assess the potential impacts of jet blast from aircraft parking along the west edge of the ORANG ramp. Such impacts include, but are not limited to, blowing of Foreign Objects and Debris (FOD) across the unpaved surface between the ORANG ramp and Taxiway J and adverse blast impacts on taxiing aircraft. [10]

Air Quality

- **Air Contaminant Discharge Permit (ACDP)**: A new or revised ACDP from the Oregon Department of Environmental Quality (DEQ) may be needed. New fuel storage tanks may be of sufficient volume to trigger Best Available Control Technology and/or federal New Source Performance Standards. Other activities such as heating, standby electric power and maintenance may require permitting as well. [11]

- **Conformity with the State Implementation Plan (SIP)**: The air shed in which the proposed project is located is under maintenance plans for carbon monoxide and ozone. As such, a conformity analysis and demonstration may be necessary. This analysis must address emissions of carbon monoxide and ozone precursors (volatile organic compounds and oxides of nitrogen). The analysis must consider all air pollutant emitting aspects of the proposed project during and after the construction. Emissions from aircraft, ground service equipment, site access and delivery vehicles, stationary sources and construction equipment must be included in the analysis. The analysis needs to determine the emissions for the highest emitting year (generally associated with the construction phase), the last year of the applicable maintenance plan (2006), and any year where the SIP has an emission budget for the site or activity. [12]

Noise

- **PDX Noise Program and State Noise Regulations**: The ORANG and AFRC must remain active participants in the PDX Noise Program and must comply with Stage 3 noise standards. Only Stage 3 aircraft, such as the KC-135R, are acceptable at PDX. Modified (hush-kitted) aircraft, such as the KC-135E, are not acceptable. Additionally, the proposed operations must meet local DEQ and City of Portland zoning noise limitations. [13] [14]

- **Operational Changes**: An analysis of specific operational changes and noise impacts should be presented in the EA. Examples of activities that could create noise concerns include: (1) 24-hour alert status for aircraft; (2) increased nighttime [15]

operations; (3) changes in angles of approach and departure; (4) training work that includes closed pattern operations and touch-and-goes; and, (5) increased number of fixed-wing aircraft operations. Please note that closed pattern operations are not currently allowed at PDX. In addition, changes in aircraft departure and approach patterns must be modeled in the upcoming Federal Aviation Regulation (FAR) Part 150 Noise Compatibility Study. [16]

- **Ground Run-up Enclosure (GRE)**: The "Description of Proposed Action and Alternatives" states that "some engine testing would have to be performed at off-base facilities. A state-of-the-art Hush-house, used for engine testing, is located at Portland International Airport and very close to the Portland ANGB." All engine run-ups at PDX must, therefore, be performed in accordance with the ORANG's GRE Use Agreement with the Port. [17]

Infrastructure

- **PDX Infrastructure**: Potential impacts to PDX infrastructure, including capacity and maintenance impacts, should be analyzed in the EA. The "Description of the Proposed Action and Alternatives" states that "[t]he current parking ramp is inadequate to withstand the weight of the KC-135R" and the proposed alternative includes construction of a 6-inch structural concrete overlay on ORANG aircraft ramp parking areas. The Port is concerned that more frequent replacement and repair of other PDX pavements, such as runways, would also be required as a result of heavier aircraft and increased operations. Any infrastructure costs associated with the proposed action are the responsibility of the ORANG. Another potential cost that should be identified and analyzed is whether the proposed operations will require an upgrade to or addition of airport navigational aids. [18]

- **Transportation Network**: A traffic analysis should be performed to assess this proposal's impacts on the transportation system in the project area. The traffic study shall use Metro's Travel Forecasting Model as the basis for transportation assumptions. The traffic analysis should address the following items at a minimum: [19]

  Describe the difference between the proposed RQW (with a continued "pararescue team presence") and the current ARW for
  - fuel trucks (volume, weight, routes, time of operation)
  - employee traffic
  - other traffic

  Review for the following time periods
  - average weekday activity (adt, am peak hour, pm peak hour)
  - average weekend day activity (adt, am peak hour, pm peak hour)
  - year 2003 and 2020

  Review the following intersections for level-of-service adequacy for the proposed alternatives
  - Columbia/47th
  - Columbia/Alderwood
  - Alderwood/Cornfoot
  - Alderwood/82nd

Review the structural adequacy of the Columbia Slough bridges on Alderwood Road.
Assess the impact of slow, loaded fuel trucks on "just in time" air cargo operations and scheduling.

Comments from the City of Portland Bureau of Transportation and the Oregon Department of Transportation should also be solicited.

- **Consistency with Airport Layout Plan (ALP)**: The proposed action is inconsistent with the ALP being prepared by the Port for approval by the Federal Aviation Administration (FAA), which includes the eventual construction of a decentralized terminal and a 3rd parallel runway located at the project site. This inconsistency must be addressed in the EA and is also a current barrier to any lease extension. [20]

Water Resources

- **1200-COLS National Pollutant Discharge Elimination System (NPDES) Permit**: A pollutant-by-pollutant quantification of the increased pollutant concentration and load as a result of construction and operation of proposed project should be included in the EA. The quantification of pollutant concentrations and loads is critical to assess project impacts to water resources. In addition, storm water from the ORANG site discharges to the PDX basin detention pond prior to discharge to the Columbia Slough. Although the ORANG is responsible for compliance with all pollutant benchmarks contained in their 1200-COLS permit at the point of discharge into the PDX basin 6 detention pond, the Port is responsible for meeting permit benchmarks at the basin 6 outfall to the Columbia Sough under the terms of the PDX 1200-COLS permit. Thus, the Port has the potential to be adversely impacted by elevated pollutant loads originating from the proposed project. Two potential sources of elevated pollutant loads are fueling and washing activities associated with implementation of the proposed project. The proposed 10-fold increase in annual fuel usage will substantially increase the risk of spills both on-site during fueling operations and during transport of fuel via public roads to the site. Mitigation measures in the EA should include redundant levels of secondary containment and should identify best management practices that will be implemented to minimize potential impacts to the Columbia Slough from fueling operations, spills, truck accidents, and other catastrophic events. In addition, industrial activities, such as aircraft washing, could increase significantly. Mitigation measures in the EA should include measures to prevent the discharge of wash water to the Port's storm system. [21]

- **NPDES Permit Number 101647**: The ORANG is a co-permittee on the PDX NPDES Permit Number 101647, which regulates the discharge of deicing and anti-icing materials to the Columbia Slough. The ORANG and AFRC must comply with all permit requirements for deicing and anti-icing activities. In addition, the ORANG must sign the PDX Deicing Allocation Agreement in order to discharge storm water containing deicing or anti-icing materials into the PDX basin 6 detention pond. Deicing and anti-icing material usage may increase as a result of the proposed [22]

alternative. The ORANG must have monitoring protocols and equipment in place to demonstrate continuous compliance with the waste load allocation for biochemical oxygen demand (BOD_5) set forth in the Total Maximum Daily Load (TMDL) for the Columbia Slough. Thus far, the ORANG has declined to sign the PDX Deicing Allocation Agreement.

- **NPDES Permit Number 101588**: Discharges of excavation wastewater from the ORANG site are regulated under PDX NPDES Permit Number 101588. Construction de-watering is of particular concern due to the presence of groundwater contamination at the ORANG site. All dewatering permit requirements and limitations must be met prior to discharge from the ORANG base into the PDX basin 6 detention pond. In addition, the ORANG and AFRC must enter into a Construction De-watering Agreement with the Port, and must prepare a dewatering plan for review and approval by the Port, prior to any discharge of construction excavation waste water into the Port's storm system, the basin 6 detention pond, or the Columbia Slough. The dewatering plan must address the following concerns: (1) location of known existing groundwater contamination; (2) treatment of contaminated groundwater prior to discharge into the storm system; and, (3) the potential for groundwater contamination to be drawn towards dewatering points. [23]

- **NPDES Permit Number 1200-CA**: If construction activities will disturb one or more acres of land, a 1200-CA permit must be obtained from the DEQ prior to the initiation of any construction activities. The 1200-CA permit requires preparation of an erosion and sediment control plan. The erosion and sediment control plan must be submitted to the Port for review and approval at least two weeks prior to the start of any construction activities. [24]

- **City of Portland Requirements**: An assessment of City of Portland requirements relative to storm water treatment and control should be performed in the EA. Appropriate mitigation measures should be developed to address any applicable requirements. [25]

- **Contaminated Soil and Groundwater**: If soil or groundwater contamination is encountered during construction activities, DEQ and the Port must be notified immediately. The ORANG will also be required to assess the contamination as part of the ongoing Installation Restoration Program (IRP) work. In addition, any contaminated soil or ground water encountered during construction activities must be handled, tested, and disposed of in accordance with all applicable regulations. [26]

Biological Resources

- **Section 7 Consultation**: As we are sure you are aware, under the Endangered Species Act the proposed alternative must undergo Section 7 consultation with both the National Marine Fisheries Service and U.S. Fish and Wildlife because the proposed project is being funded, authorized, and implemented by a Federal agency. In addition, FAA review of a Form 7460-1 may also independently trigger the requirement for Section 7 consultation. We assume that the Section 7 consultation [27]

should include preparation of a biological assessment to evaluate potential impacts on endangered and threatened species.

Socioeconomics and Environmental Justice

- **Mission**: Potential social impacts associated with changing the 939 RQW to the 939 ARW should be addressed in the EA. These impacts should be mitigated if the pararescue functions performed by the 939 RQW cannot be consistently met through consolidation with other bases or cannot be provided by other organizations, such as the U.S Coast Guard. [28]

In summary, the Port has strategic, operational, and environmental concerns associated with all development and redevelopment that occurs at PDX and the ORANG base. In addition, as the landowner of the ORANG/AFRC base the Port is a primary stakeholder for any proposed construction and operational activities and changes occurring at the site. Therefore, we request the opportunity to review and comment on the draft EA, to ensure that the Port's concerns have been adequately addressed, before the final draft EA is issued for public and Agency review and comment.

If you have any questions, please contact Susan Aha, PDX Environmental Manager, at 503-460-4326.

Sincerely,

Steven H. Schreiber
Director of Aviation

Attachment

Cc: Lt. Col. John McAllister, ORANG Base Commander
Chuck Shenk, Manager, Aviation Environmental & Safety
Mary Maxwell, General Manager, Business & Properties
Steve Twohey, Manager, Planning & Development
Chris Corich, General Manager, Operations & Maintenance
Barbara Jacobson, Senior Assistant General Counsel
Chris Madsen, Leasing Manager – PDX Airside

CURVE DATA

NO.	Δ	R	L
1	9-19-03	1228.30	199.75
2	53-17-53	545.00	506.99
3	35-37-	355.00	223.07
4	14-38-32	545.00	164.08
5	19-28-30	1845.00	613.09
6	22-14-46	1582.30	596.80
7	12-16-28	1046.48	224.33
8	6-52-12	924.50	111.03

NOTE:
HELD RADIUS & LENGTH FOR CURVE INFORMATION PER 1974 LEASE DESCRIPTION, BOOK 1974, PAGE 772.

PARCEL 1

A tract of land in the Portland Airport, Section 8, Township 1 North, Range 2 East of the Willamette Meridian, Multnomah County, Oregon, described as follows:

Beginning at a point which is South 1,516.46 feet and East 6,550.36 feet from the Northeast corner of the William Hall D.L.C.; thence South 89° 23' 00" West 1,178.35 feet to the northwest corner of the Colwood Golf Course; thence East along the north line of Colwood Golf Course 781.98 feet to a point; thence North 29° 00' 00" East 954.24 feet to a point on a line which is 750 feet southwesterly from and parallel to the centerline of 10R, 28L Runway, Portland Airport; thence following said parallel line North 61° 00' 00" West 1,250.00 feet to the POINT OF BEGINNING, containing ?9.99 acres, more or less. All bearings are true.

Parcel 2

A tract of land in the Portland Airport, Sections 7, 8, 17 and 18, Township 1 North, Range 2 East of the Willamette Meridian, Multnomah County, Oregon, described as follows:

Beginning at a point which is South 1,516.46 feet and East 6,550.36 feet from the Northeast corner of the William Hall D.L.C., said point being on a line which is 750 feet southwesterly from and parallel to the centerline of 10R, 28L Runway, Portland Airport; thence following said parallel line North 61° 00' 00" West 3,842.47 feet to a point; thence South 29° 00' 00" West 1,347.20 feet; thence South 61° 00' 00" East 426.32 feet; thence South 28° 19' 45" West 1,884.11 feet to a point which is 45 feet north from the centerline of Northeast Cornfoot Road (No. 1447); thence easterly along a line parallel to and 45 feet northerly from the centerline of said Cornfoot Road, as follows: thence South 68° 18' 00" East 206.48 feet to a point; thence South 76° 08' 00" East 289.58 feet to a point; thence South 82° 05' 00" East 361.29 feet to a point; thence around the arc of a curve to the right with a radius of 1,845.00 feet a distance of 613.09 feet to a point; thence North 26° 19' 00" East 485.82 feet along the westerly side of Mason Street to a point; thence South 63° 41' 00" East a distance of 359.00 feet along the northerly side of Johnson Avenue to a point; thence South 26° 19' 00" West a distance of 457.31 feet along the easterly side of Meyer Street to a point, said point being 45 feet northeasterly from the centerline of Northeast Cornfoot Road; thence easterly around the arc of a nontangent curve to the left with a radius of 1,582.30 feet 596.80 feet to a point; thence North 87° 46' 00" East 337.98 feet to a point; thence around the arc of a curve to the right with a radius of 1,046.48 feet 224.33 feet; thence South 80° 00' 00" East 445.07 feet to a point; thence on a curve to the right having a radius of 924.5 feet a distance of 111.03 feet to a point on the west line of Colwood Golf Course; thence following said west line and said west line extended North 00° 23' 00" East 2,159.03 feet to the POINT OF BEGINNING, containing 235.47 acres, more or less. All bearings are true.

PARCEL 3

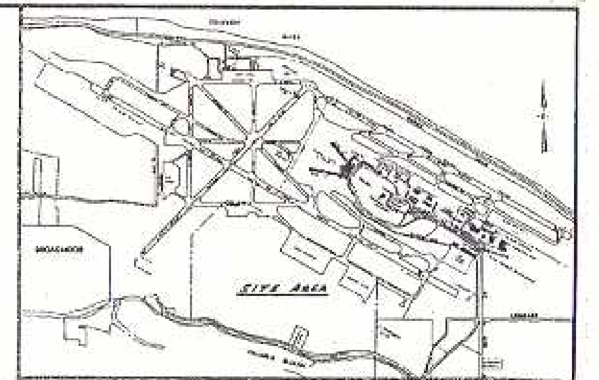
A tract of land in the Portland Airport, Sections 7 and 18, Township 1 North, Range 2 East of the Willamette Meridian, Multnomah County, Oregon, described as follows:

Beginning at a point which is South 272.97 feet and East 1052.55 feet from the Northeast Corner of the William Hall D.L.C.; running thence South 2903.35 feet to a point which is 45 feet north from the centerline of Northeast Cornfoot Road (No. 1447); thence easterly along a line parallel to and 45 feet northerly from the centerline of said Cornfoot Road, as follows: Along the arc of a curve to the left with a radius of 1228.30 feet (having an initial tangent which bears South 80° 53' 00" East) a distance of 199.75 feet to a point; thence North 89° 38' 00" East 248.20 feet to a point; thence around the arc of a curve to the right with a radius of 545.00 feet 506.99 feet to a point; thence South 45° 12' 00" East 95.36 feet to a point; thence around the arc of a curve to the left with a radius of 355.00 feet a distance of 223.07 feet to a point; thence South 80° 49' 00" East 316.00 feet to a point; thence around the arc of a curve to the right with a radius of 545.00 feet a distance of 164.08 feet to a point; thence South 66° 10' 00" East 43.08 feet to a point; thence North 28° 19' 45" East 1884.11 feet; thence North 61° 00' 00" West 426.32 feet; thence North 29° 00' 00" East 1347.20 feet to a point on a line which is 750 feet southwesterly from and parallel to the centerline of 10R, 28L Runway, Portland Airport; thence following said parallel line North 61° 00' 00" West 1311.66 feet to a point on the north edge of the south taxiway Portland Airport; thence following said north edge of taxiway West 550.34 feet to a point on a line which is parallel to and 650 feet southwesterly from the centerline of the Runway 2-20, Portland Airport; thence following said parallel line South 45° 00' 00" West 1563.79 feet to the POINT OF BEGINNING, excepting the following described parcel, beginning at the Northeast Corner of the William Hall Donation Land Claim in Section 7, Township 1 North, Range 2 East, Willamette Meridian, Multnomah County, Oregon; thence South 72° 12' 00" East 2687.80 feet to the TRUE POINT OF BEGINNING; thence South 89° 43' 00" East 149.77 feet; thence South 59° 23' 28" East 25.75 feet; thence South 0° 17' 00" West 73.30 feet; thence South 89° 43' 00" East 106.00 feet; thence South 0° 17' 00" West 120.00 feet; thence North 89° 43' 00" West 72.84 feet; thence South 00° 17' 00" West 74.00 feet; thence North 89° 43' 00" West 122.00 feet; thence North 00° 17' 00" East 114.00 feet; thence North 89° 43' 00" West 317.61 feet; thence North 0° 17' 00" East 40.00 feet; thence South 89° 43' 00" East 234.45 feet; thence North 0° 17' 00" East 106.00 feet to the TRUE POINT OF BEGINNING, consisting of 159.93 acres more or less. All bearings are true.

PARCEL 4

A tract of land in the Portland Airport, Section 7, Township 1 North, Range 2 East of the Willamette Meridian, Multnomah County, Oregon, described as follows:

Beginning at the Northeast corner of the William Hall Donation Land Claim in Section 7, Township 1 North, Range 2 East, Willamette Meridian, Multnomah County, Oregon; thence South 72° 12' 00" East 2,687.80 feet to the TRUE POINT OF BEGINNING; thence South 89° 43' 00" East 149.77 feet; thence South 59° 23' 28" East 25.75 feet; thence South 00° 17' 00" West 73.30 feet; thence South 89° 43' 00" East 106.00 feet; thence South 00° 17' 00" West 120.00 feet; thence North 89° 43' 00" West 72.84 feet; thence South 00° 17' 00" West 74.00 feet; thence North 89° 43' 00" West 122.00 feet; thence North 00° 17' 00" East 114.00 feet; thence North 89° 43' 00" West 317.61 feet; thence North 00° 17' 00" East 40.00 feet; thence South 89° 43' 00" East 234.45 feet; thence North 00° 17' 00" East 106.00 feet to the TRUE POINT OF BEGINNING, consisting of 1.57 acres more or less. All bearings are true.



VICINITY MAP
NO SCALE

NO	DATE	BY	REVISIONS	CK'D	APP'V'D	NO	DATE	BY	REVISIONS	CK'D	APP'V'D

THE PORT OF PORTLAND
PORTLAND, OREGON

PROJECT MANAGER

DESIGNED BY D. COWELL
DRAWN BY K. MC DONALD
CHECKED BY D. COWELL
DATE MAR. 1981
SCALE 1" = 630'

PORTLAND INTERNATIONAL AIRPORT
EXHIBIT PLAT
OREGON AIR NATIONAL GUARD
LEASE AREA

SUBMITTED BY
DRAWING NO. PIA 81-15

Response to Port of Portland Comments (dated February 13, 2002)
Conversion of the 939th Rescue Wing at Portland International Airport, Oregon

Comment	Response
1	This description has been corrected. Please see Section 1.3.
2	The Lease between the Port of Portland and the United States of America (DACA67-8-82-350) states on page 2, paragraph 3, that the parties covenant and agree "to have and to hold…for use of the Department of the Air Force, Air Force Reserves, Air National Guard, National Guard Forces and other military purposes…". The lease was signed by the Deputy Assistant Secretary of the Air Force (Installations), who also signed supplemental agreements 1 and 2. The Air National Guard is the "host" organization and therefore is the legal proponent for all activities on the base. Rights and responsibilities between the Air National Guard and Air Force Reserve are dictated via a host-tenant support agreement. There is no other lease or sublease instrument between the two parties. Therefore, Air Force Reserve Command (939th RWG) is subject to the same considerations spelled out in the lease as the Air National Guard.
3	The ORANG contacted Ms. Susan Aha, Port of Portland, on March 21, 2002 to determine what environmental concerns are associated with the lease extension. Ms. Aha indicated that there were no specific environmental concerns that were required to be addressed at this time. She explained that a standard environmental agreement would be made part of any lease extension agreement.
4	As part of the Air Force screening process, other alternatives were examined, but eliminated. Relocating the 939th to another airfield was eliminated from further consideration because the other airfields could not offer the majority of facilities and personnel already in-place (and thus would have to be constructed at additional cost). Alternatives, such as changing the mission to air mobility were screened out because these mission shortfalls did not exist. Therefore, since these alternatives were not considered reasonable, they were not carried forward in the EA.
5	Additional ASTs are not required as part of the proposed action. The fuel hydrant system (part of Project Nos. 1 and 2 and described in Section 2 and in Section 4.11.2) would be constructed and utilized. Approximately 4 additional fuel trucks per day would carry the required extra fuel.
6	Aircraft would not be painted at PDX; therefore, this statement has been deleted. Aircraft would be painted at regional depots managed by the Department of Defense.

Comment	Response
7	The lease between the Port of Portland and the United States of America (DACA67-8-82-350), identifies several very specific requirements on behalf of the US Government [ie: "The Government will pay the Lessor for sewage treatment based on actual usage…" (clause 6) and "The Lessor shall enter into such contracts with the Multnomah Drainage District…and the Government hereby agrees to pay the cost for such service (clause 8)]. However, there is no such requirement for the Government to obtain construction permits or approvals. In addition, the National Guard, as a Federal Agency "shall not be required to pay for reviews, permits, inspections, and recommendations that are initiated by state and local government" (National Guard Bureau message 052110Z Feb 90, Subject: Compliance with local building codes). In March 11, 1991 memo, the Director of the Bureau of Buildings acknowledged this directive when he stated, "We have no desire to review your plans since we are not allowed to approve them or to charge the required fees."
8	Currently there is a mutual aid agreement between the ORANG and the Port Fire Departments. During the initial Site Activation Task Force (SATAF) visit, fire response issues were discussed with the two departments. The KC-135R uses JP-8 fuel that is the same as currently used. The ORANG will address modifying the mutual aid agreement if the need arises.
9	As done in the past, the ORANG will submit FAA Form 7460's for several flight line associated construction projects to ensure that they will not adversely impact the safety of airport operations.
10	Given aircraft parking orientation and taxi patterns, the only potential for jet blast in a Westerly direction is during a turn while taxiing at the South East corner of the apron. The impact from this location is minimal and would not require mitigation.
11	No additional fuel storage tanks will be required as part of the proposed action. Emissions resulting from construction activities would produce a slightly elevated short-term PM_{10} ambient air concentrations (see Table 4-4). Upon implementation of the Proposed Action, routine off-aircraft engine jet testing would be eliminated at the base. All required repair work is projected to occur off-site at an appropriate maintenance depot. As such, only trim checks and engine run-up tests would occur (see Table 4-5). The information presented in Table 4-5 shows that all regulated pollutant emissions would increase slightly upon implementation of the Proposed Action, but that these increases would be well below *de minimis* thresholds In addition, the proposed action would not exceed "synthetic minor" conditions in our existing permit and, therefore, would not require a permit modification.
12	Please see response # 11. No conformity analysis is required.
13	The KC-135R meets the FAA standards for a stage 3 aircraft. The base will remain an active member of the airport noise committee.

Comment	Response
14	Noise generated by the proposed number of KC-135R operations would result in slightly higher SEL values then current operations. However, this slight increase would not result in a significant noise impact in the vicinity of Portland IAP because the numbers of military operations are minimal when compared to the number of commercial operations currently conducted at Portland IAP annually. Also when compared to the Boeing 757 (the most common commercial aircraft operating from IAP), the KC-135R SEL values are approximately the same. Therefore, there would be no significant, adverse impacts as a result of the noise generated from the KC-135R under the Proposed Action. See Section 4.4.2 for further discussion.
15	In order to quickly respond to potential threats, particularly in the wake of 9/11, 24-hour alert status is a fact of life. In regard to changes in noise resulting from in angles of approach, and touch and goes, please see Table 4-7. As noted in comment 14, there would be no significant, adverse impacts as a result of the noise generated under the Proposed Action.
16	The base is committed to working closely with the Port to address all concerns during their Part 150 study.
17	All engine run-ups will be performed in accordance with the ORANG's GRE Use Agreement with the Port (see Section 2.2.4).
18	The lease between the Port of Portland and the United States of America (DACA67-8-82-350), Supplemental Agreement No. 2, states that "the Government has the right to use all those facilities usable for landing and takeoff…in common with other users… at all times without charge unless the Government use … is substantial. If use is substantial, a charge may be made for a reasonable share, proportional to such use, of the cost of operating and maintaining such flying facilities…shall be the subject of separate negotiations and written agreements between the parties." (paragraph 5).
19	At LTC Rein's request, Ms. Kyung Hwa Kim, Metro, was contacted. The Proposed Action was discussed, particularly the increase of fuel truck trips of 3-4 per day. Ms. Kim said that the Metro's Travel Forecasting Model was really for new residential/commercial developments. She went on further to say that the additional fuel trucks was insignificant and would not show an increase in traffic in the model. (Phonecon between Ms. Kim and Ms. Lang, e^2M). In addition, comments from the City of Portland and Metro were solicited during the NEPA review process.
20	The Port of Portland Master Plan does not identify a target year for implementation of either of the two alternatives identified in the Plan. It is recognized that either alternative, as currently outlined, would eventually require the relocation of all facilities and operations at Portland ANG. However, the needs identified in the Proposed Action are now and necessary in order for the ORANG to meet national mission requirements. Therefore, in absence of other restrictions, the Proposed Action must go forward.

Comment	Response
21	All wash water will discharge to the sanitary sewer under Permit No. 400.024 with the City of Portland. Stormwater in contact with fueling operations will be pre-treated at the existing oil/water separator (North Retention Pond).
22	As a best management practice, the 939 RQW would postpone training operations when possible to limit the use of de-icing fluid. The Proposed Action will not lead to exceedances of the TMDL limits for de-icing fluids. It is estimated that each KC-135R aircraft would require between 80-120 gallons of de-icing fluid during a single de-icing event (4 aircraft). The BOD loading to the Columbia Slough after treatment would be 37.8 kilograms per day. This is significantly less than the daily limit of 244 kilograms per day as cited in the NPDES Stormwater Deicing Permit No. 107220. Please see Sections 4.7.2 and 4.11.2 for further discussion. In addition, Oregon DEQ Permit Manager, Mr. E. Zais, indicated that an allocation agreement is not needed to allow the base to discharge to the Port under the current permit.
23	The ORANG representative has stated, "Dewatering will be accomplished in strict accordance with your comments." (142FW/EM LTC Rein)
24	The ORANG representative has stated, "This comment will be complied with." (142FW/EM LTC Rein)
25	This comment is outside the scope of this EA. However, the ORANG representative has stated, "The City of Portland Stormwater Management Manual will be reviewed for guidance related to the proposed action." (142FW/EM LTC Rein)
26	The ORANG representative has stated, "This comment will be complied with." (142FW/EM LTC Rein)
27	Section 4.8.2, *Threatened and Endangered Species*, states there are no threatened, endangered or rare species known to occur within the area of the proposed construction and demolition projects. The Columbia Slough generally does not provide preferable or suitable habitat for steelhead and other salmonids. As the Proposed Action will lead to no exceedances of the TMDL limits, no effects to steelhead or other endangered species presently in the Columbia Slough are expected. Therefore, a Section 7 consultation is not required.

Comment	Response
28	Socioeconomics and Environmental Justice are discussed in Section 4.10.2. The number of low-income and minority residents in Multnomah County is lower than the state and national averages (see Table 3-17) and the Proposed Action would only result in a slight decrease in personnel. Therefore, the percentage of the population potentially impacted is considered low. Short-term beneficial impacts will result from increased jobs associated with construction activities. Though Oregon will lose the 939th Rescue Wing, it will continue to maintain extremely robust assets. The Air Force plans to leave the Pararescue team in Portland. This team will continue to augment other rescue agencies in and around Portland when state, civilian, and Coast Guard assets are not available. It should be noted that the Departments of Defense and Transportation will still operate some 101 helicopter assets within 180 miles of Portland that are primarily search and rescue, medical evacuation, or secondary SAR capable, and many of which maintain an alert posture to support these missions. The West Coast will still benefit from the long-range SAR capabilities of an Air National Guard Rescue Wing in Sunnyvale, California. Also, the Civil Air Patrol maintains a very large presence in the Pacific Northwest region.

PORT OF PORTLAND

June 12, 2002

Lt. Col Roger Rein
142nd Fighter Wing/EM
6801 Cornfoot Road
Portland, Oregon 97218-2797

Subject: Environmental Assessment, Conversion of the 939th Rescue Wing at Portland International Airport, Oregon, April 2002

Dear Lt. Col. Rein,

The Port of Portland (Port) is pleased to provide the following comments on the above referenced Environmental Assessment (EA) dated April 2002. Additional comments are also provided on the "Response to Port of Portland Comments (dated February 13, 2002)" in Appendix A of the April 2002 EA.

General Comments

- **Response to Port of Portland Comment Number 2**: Response to Comment 2 states that "rights and responsibilities between the Air National Guard and Air Force Reserve are dictated via a host-tenant support agreement. There is no other lease or sublease instrument between the two parties." There are several agreements between the two parties including but not limited to the lease between the United States of America and the Port. The Port has not had an opportunity to review or approve the host-tenant support agreement and, therefore, requests that a copy of this agreement be provided to the Port. In addition, with respect to environmental concerns associated with a lease extension, please be aware that if an extension to the existing lease between the Port and the ORANG is requested, the Port's standard environmental language would be a component of the new agreement. Nothing contained in this letter, however, shall be construed as any commitment by the Port to extend the term of the Lease.

- **Response to Port of Portland Comment Number 5**: Response to Comment 5 states that "approximately 4 additional fuel trucks per day would carry the required extra fuel." Who will own and who will operate the fuel trucks? The Port requires mobile storage tank use agreements, with the Port's standard environmental language, in order to operate mobile storage tanks on Port property. In addition, a spill prevention and control plan that addresses all fueling operations at the site should be prepared and submitted to the Port.

- **Response to Port of Portland Comment Number 7**: Comment 7 in the Port's February 13, 2002 letter states that a "Port construction permit is required for all work performed on Port property." However the Response to Comment 7 refers to

- **Response to Port of Portland Comment Number 7**: Comment 7 in the Port's February 13, 2002 letter states that a "Port construction permit is required for all work performed on Port property." However the Response to Comment 7 refers to Multnomah County Drainage District (MCDD) and City of Portland requirements. Note that Comment 7 actually refers to a Port issued construction permit. A Port issued construction permit is now required for all tenant construction including, but not limited to, new construction, demolition, and renovation. The Port construction permit is a requirement independent from any applicable City of Portland or MCDD requirements.

  In addition, Response to Comment 7 states that Federal Agencies "shall not be required to pay for reviews, permits, inspections, and recommendations that are initiated by state and local government". However, AFPD 32-70 (page 1-4, section 1.4.2) requires the United States Air Force to comply with applicable Federal, state and local environmental laws and regulations. The exemption cited in Response to Comment 7 only applies to local and state permit fees it does not apply to the process itself.

- **Interagency and Intergovernmental Coordination for Environmental Planning List (Appendix A)**: The National Marine Fisheries Service (NMFS) is not identified as one of the agencies notified of the Proposed Action during the Interagency and Intergovernmental Coordination for Environmental Planning phase of the EA. Due to the hydrologic connection between the Columbia Slough and the Willamette River, the NMFS is the primary regulatory agency for compliance with the Endangered Species Act (ESA) relative to potential impacts to federally listed fish species and their habitats. As the primary regulatory agency for these ESA issues they should be notified of the Proposed Action.

  Description of Proposed Action and Alternatives (Section 2): The EA addresses the following alternatives: (1) conversion to KC-135E aircraft, (2) conversion to C-130E aircraft, and (3) the No Action Alternative. The No Action Alternative is carried forward for additional analysis in the EA because, as stated in Section 2.3.4, "inclusion of the No Action Alternative is prescribed by the CEQ [Council on Environmental Quality] regulations". However, the No Action Alternative, as described in the EA, is inconsistent with the Description of Proposed Action and Alternatives (DOPAA). The DOPAA should clarify that there are 10 major construction projects included in the Proposed Action with a cumulative footprint of at least 16 acres, involving the demolition of existing infrastructure and re-construction and development of new impervious surface.

  In addition, the current title of the EA ("Conversion of the 939th Rescue Wing at Portland International Airport") is inconsistent with the analysis presented in the document. A document title that more accurately describes the Proposed Action would be "The Use of the KC-135R Aircraft as the Primary Air Tanker for the New 939 ARW Mission, and the Construction of Projects to Support Infrastructure Specific to this Airframe and Mission".

  Although the purpose of the EA is to address the "Conversion of the 939th Rescue Wing", the EA does not actually evaluate the conversion from pararescue mission

aircraft (939th Rescue Wing) to air refueling aircraft (939th Air Refueling Wing). Instead, the EA evaluates alternatives to KC-135R aircraft. Specifically, the EA assesses KC-135E and C-130E aircraft as "viable alternative[s] to conversion to KC-135R aircraft". All reasonable alternatives to the conversion of the 939th Rescue Wing to the 939th Air Refueling Wing (939 ARW), such as changing the mission to air mobility or relocating the 939 ARW to an airfield other than Portland International Airport, are not carried forward for further analysis in the EA. For example, with respect to locating the 939 ARW at another airfield, section 2.3.3 states that an analysis of this alternative is not carried forward because the "cost of relocation, infrastructure construction, movement of personnel and equipment, recruiting and retention, and loss to the local economy would not make this a viable option." A quantification and comparison based on costs between the reasonable range of alternatives should be provided in the EA to document the accuracy of this assertion.

The EA should include an analysis of potential short-term impacts associated with future relocation of the ORANG for construction of a decentralized terminal and 3rd parallel runway at PDX. The Port can provide a 15-year time table for proposed development at PDX, including a timeline for construction of the decentralized terminal, in order to facilitate an assessment of the potential impacts relative to the Proposed Action. The short-term impacts associated with future relocation of the ORANG should be compared to short-term impacts (if any) from other reasonable alternatives.

The cumulative impacts from the 10 major construction projects included under the Proposed Action are not discussed or analyzed with adequate detail in the EA. Additional details and impact analyses consistent with the comments above should be documented and provided in the EA.

Airspace Management

- **Number of Operations**: Section 3.1.2 states that the "Portland IAP totaled approximately 352,000 aircraft operations in CY 2000." The correct number of operations at PDX for CY2000 is actually 314,378. However, the number of military operations identified in Section 3.1.2 is correct.

  Section 4.1.2 states that the "total military aircraft operations at Portland IAP would decrease by approximately two percent under the Proposed Action" and concludes that "overall, the Proposed Action would have a positive impact on airfield operations at Portland IAP." However, because there is no direct correlation between raw numbers of aircraft operations and airport capacity, the EA should include a breakdown of aircraft operations by type in order to provide an assessment of potential impacts and to support the conclusions in the EA. For example, KC-135R aircraft are considered by Air Traffic Control to be a "heavy jet" and require additional time or distance wake turbulence separation for departure compared to C-130 aircraft. Clearly, replacing C-130 aircraft with KC-135R aircraft may result in an adverse impact to airport capacity.

Safety

- **Port Fire Department**: A new Mutual Aid Agreement is currently under negotiation between the Port and the ORANG. The Port would like to reiterate that any additional expense incurred by the Port in support of the proposed alternative, such as additional personnel training, materials or equipment would be the sole responsibility of the ORANG or AFRC. Increased costs incurred by the Port could trigger a renegotiation of the Mutual Aid Agreement following conversion to the 939 ARW.

- **Federal Aviation Administration (FAA) Approval and FAA Form 7460-1**: Response to Comment 9 states that the ORANG will submit FAA Form 7460's for "several flight line associated construction projects to ensure that they will not adversely impact the safety of airport operations." As a point of clarification, an FAA Form 7460 is required for any above surface construction.

- **Jet Blast**: Response to Comment 10 states that "given aircraft parking orientation and taxi patterns, the only potential for jet blast in the Westerly direction is during a turn while taxiing at the South East corner of the apron. The impact from this location is minimal and would not require mitigation." Please provide additional details and analysis regarding potential impacts of jet blast from aircraft parking along the western edge of the ORANG ramp to verify the validity of this assertion. For example, an explanation of aircraft arrival and departure patterns from the ramp would be critical to clarify potential impacts and determine whether these impacts are significant.

Air Quality

The Air Quality Conformity Analysis is thorough, well supported, and largely consistent with the State Implementation Plan (SIP). However, clarification is needed in the following areas.

- The type of engine for the KC-135R needs to be specified. In Section 2.2.2 CFM-56 engines were specified based on noise and fuel economy attributes, whereas emissions were calculated using F108-CF-100 engines. Comparison of emission data suggests that emissions of oxides of nitrogen (NO_x) may be understated in the analysis. As stated in Air Force Institute for Environment, Safety and Occupational Health Risk Analysis (AFIERA) guidance, the emission factors used for the F108-CF-100 engines were developed from tests conducted with JP-5 fuel. It is our understanding that the fuel to be used is JP-8. We are concerned that the emission factors used may not accurately reflect emissions from CFM-56 engines burning JP-8. If the intended engine choice is the CFM-56, the emissions should be recalculated using Emissions Dispersion and Modeling System (EDMS) emission factors. EDMS contains emission factors for the CFM-56 because this engine is commonly used on civilian aircraft. Using EDMS is consistent with the approach used in the SIP.

- The emissions from taxi-in and taxi-out were calculated using combined times ranging from 15 to over 18 minutes. Data presented by the FAA on the Aviation System Performance Metrics (ASPM) website indicates that annual average combined taxi times for PDX were less than 14 minutes during 2001. As a result,

emissions from taxiing may be overstated. The SIP and subsequent inventory work completed by the Oregon Department of Environmental Quality (ODEQ) used the annual average taxi times.

- Clarification is needed regarding the number of vehicle miles traveled (VMT) and the number of round trips by the tanker trucks for fuel deliveries. As stated in EA Section 2.2.4 and in Appendix B Section 6.2.3, an additional 8.6 million gallons of JP-8 would be used. The Appendix states that commercial fuel trucks of 10,000 gallon capacity would be used and result in an increase of 178 trips and 2,844 VMT based on a round trip distance of 16 miles. There appears to be a mathematical error. The data presented suggest that 860 additional trips would be required resulting in a VMT increase of 13,760 miles.

- The General Conformity Rules specify that combined direct and indirect emissions should be compared to applicability thresholds. However, the EA lacks a summary table that presents the combined data required by the General Conformity Rules. The EA presents construction emissions separately from operating emissions. Although, the sum of direct and indirect emissions may be below the de minimis thresholds, a revised summary table would assist the reader in making this determination.

Noise

- **Operational Changes**: Response to Comment 15 states that "noise generated by the proposed number of KC-135R operations would result in slightly higher SEL values than current operations." Although the EA analysis determines this impact to be insignificant, it should still be noted in the EA that an impact will be created because the SEL values for the KC-135R are higher than those of the aircraft they are replacing.

- **Ground Run-up Enclosure (GRE)**: Response to Comment 17 states that "all engine run-ups will be performed in accordance with the ORANG's GRE Use Agreement with the Port". The Port requires that all maintenance engine run-up operations, except those that can be done in the ORANG's run-up facility, be performed in the GRE. Use of the GRE for military operations will require a signed waiver of liability. The 939th Rescue Wing has already signed a waiver; however, this would have to be updated to reflect the unit's name and mission change.

Infrastructure

- **PDX Infrastructure**: Response to Comment 18 refers to the lease between the Port and the United States of America as the pertinent document for describing infrastructure costs associated with military operations. However, the Joint Use Agreement between the Port and the United States of America is the relevant document for determining infrastructure cost reimbursement to the Port associated with military operations on jointly used flying facilities such as runways, taxiways, navigational aids and lighting. This agreement, which has a term of five years, is due to expire and, therefore, is currently under negotiation. If significant impacts from

conversion to the 939 ARW result in cost increases these expenses will be renegotiated in the subsequent five year agreement.

- **Transportation Network**: Response to Comment 19 indicates a misinterpretation of the issue and needed analysis. Metro's Travel Forecasting Model is not an appropriate tool to use for development impact review as it is designed to be used to predict future metropolitan travel patterns, not to conduct local level intersection analysis. Local level analysis should be based on Highway Capacity Manual recommended processes. After reading the EA response, Port staff contacted Ms. Kyung Hwa Kim at Metro, who verified that her comments to Ms. Lang indicated that the regional model was an inappropriate tool to use in this case. Our reference to the Metro model was limited to its ability to provide future year major street traffic volumes as a basis for the needed local level analysis.

  The Port's analysis in prior years indicates that there may be capacity issues within approximately the next 5 years at the following intersections: Columbia/47th, Columbia/Alderwood, Alderwood/Cornfoot, and Alderwood/82nd. These intersections are also identified in our comments dated February 13, 2002. Large, slow, and heavy fuel tanker trucks use much more roadway capacity than normal automobiles, especially for turning movements at signalized intersections. In addition, if the fuel trucks are double trailers, the intersection of Alderwood/Cornfoot may require widening to accommodate the turning movements.

  Cornfoot Road is the only access road for the military and for the "just in time" air cargo industry in the Portland metropolitan area. Companies such as UPS, FedEx, and Airborne Express also rely exclusively on Cornfoot and associated intersections as their only access to the regional system. With the capacity concerns at the noted intersections, we need to understand what, if any, impacts will occur to that vital industry.

  The Port requests a traffic analysis, as proposed in our original comments, to define the traffic impacts associated with the proposed conversion. An additional component of the analysis will be development and implementation of appropriate measures to mitigate any identified impacts.

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If you have any questions, please contact me at (503) 460-4326.

Sincerely,

Susan Aha
Environmental Resource Manager
Portland International Airport

Cc: Lt. Col. John McAllister, ORANG Base Commander
Steve Schreiber, Director of Aviation
Chuck Shenk, Manager, Aviation Environmental & Safety
Mary Maxwell, General Manager, Business & Properties
Steve Twohey, Manager, Planning & Development
Chris Corich, General Manager, Operations & Maintenance
Barbara Jacobson, Senior Assistant General Counsel
Chris Madsen, Airside Properties Manager
Rick Finn, Federal Government Relations Manager

PORT OF PORTLAND

June 12, 2002

Lt. Col Roger Rein
142nd Fighter Wing/EM
6801 Cornfoot Road
Portland, Oregon 97218-2797

Subject: Environmental Assessment, Conversion of the 939th Rescue Wing at Portland International Airport, Oregon, April 2002

Dear Lt. Col. Rein,

The Port of Portland (Port) is pleased to provide the following comments on the above referenced Environmental Assessment (EA) dated April 2002. Additional comments are also provided on the "Response to Port of Portland Comments (dated February 13, 2002)" in Appendix A of the April 2002 EA.

General Comments

- **Response to Port of Portland Comment Number 2**: Response to Comment 2 states that "rights and responsibilities between the Air National Guard and Air Force Reserve are dictated via a host-tenant support agreement. There is no other lease or sublease instrument between the two parties." There are several agreements between the two parties including but not limited to the lease between the United States of America and the Port. The Port has not had an opportunity to review or approve the host-tenant support agreement and, therefore, requests that a copy of this agreement be provided to the Port. In addition, with respect to environmental concerns associated with a lease extension, please be aware that if an extension to the existing lease between the Port and the ORANG is requested, the Port's standard environmental language would be a component of the new agreement. Nothing contained in this letter, however, shall be construed as any commitment by the Port to extend the term of the Lease.

- **Response to Port of Portland Comment Number 5**: Response to Comment 5 states that "approximately 4 additional fuel trucks per day would carry the required extra fuel." Who will own and who will operate the fuel trucks? The Port requires mobile storage tank use agreements, with the Port's standard environmental language, in order to operate mobile storage tanks on Port property. In addition, a spill prevention and control plan that addresses all fueling operations at the site should be prepared and submitted to the Port.

- **Response to Port of Portland Comment Number 7**: Comment 7 in the Port's February 13, 2002 letter states that a "Port construction permit is required for all work performed on Port property." However the Response to Comment 7 refers to

- **Response to Port of Portland Comment Number 7**: Comment 7 in the Port's February 13, 2002 letter states that a "Port construction permit is required for all work performed on Port property." However the Response to Comment 7 refers to Multnomah County Drainage District (MCDD) and City of Portland requirements. Note that Comment 7 actually refers to a Port issued construction permit. A Port issued construction permit is now required for all tenant construction including, but not limited to, new construction, demolition, and renovation. The Port construction permit is a requirement independent from any applicable City of Portland or MCDD requirements.

  In addition, Response to Comment 7 states that Federal Agencies "shall not be required to pay for reviews, permits, inspections, and recommendations that are initiated by state and local government". However, AFPD 32-70 (page 1-4, section 1.4.2) requires the United States Air Force to comply with applicable Federal, state and local environmental laws and regulations. The exemption cited in Response to Comment 7 only applies to local and state permit fees it does not apply to the process itself.

- **Interagency and Intergovernmental Coordination for Environmental Planning List (Appendix A)**: The National Marine Fisheries Service (NMFS) is not identified as one of the agencies notified of the Proposed Action during the Interagency and Intergovernmental Coordination for Environmental Planning phase of the EA. Due to the hydrologic connection between the Columbia Slough and the Willamette River, the NMFS is the primary regulatory agency for compliance with the Endangered Species Act (ESA) relative to potential impacts to federally listed fish species and their habitats. As the primary regulatory agency for these ESA issues they should be notified of the Proposed Action.

  Description of Proposed Action and Alternatives (Section 2): The EA addresses the following alternatives: (1) conversion to KC-135E aircraft, (2) conversion to C-130E aircraft, and (3) the No Action Alternative. The No Action Alternative is carried forward for additional analysis in the EA because, as stated in Section 2.3.4, "inclusion of the No Action Alternative is prescribed by the CEQ [Council on Environmental Quality] regulations". However, the No Action Alternative, as described in the EA, is inconsistent with the Description of Proposed Action and Alternatives (DOPAA). The DOPAA should clarify that there are 10 major construction projects included in the Proposed Action with a cumulative footprint of at least 16 acres, involving the demolition of existing infrastructure and re-construction and development of new impervious surface.

  In addition, the current title of the EA ("Conversion of the 939th Rescue Wing at Portland International Airport") is inconsistent with the analysis presented in the document. A document title that more accurately describes the Proposed Action would be "The Use of the KC-135R Aircraft as the Primary Air Tanker for the New 939 ARW Mission, and the Construction of Projects to Support Infrastructure Specific to this Airframe and Mission".

  Although the purpose of the EA is to address the "Conversion of the 939th Rescue Wing", the EA does not actually evaluate the conversion from pararescue mission

aircraft (939th Rescue Wing) to air refueling aircraft (939th Air Refueling Wing). Instead, the EA evaluates alternatives to KC-135R aircraft. Specifically, the EA assesses KC-135E and C-130E aircraft as "viable alternative[s] to conversion to KC-135R aircraft". All reasonable alternatives to the conversion of the 939th Rescue Wing to the 939th Air Refueling Wing (939 ARW), such as changing the mission to air mobility or relocating the 939 ARW to an airfield other than Portland International Airport, are not carried forward for further analysis in the EA. For example, with respect to locating the 939 ARW at another airfield, section 2.3.3 states that an analysis of this alternative is not carried forward because the "cost of relocation, infrastructure construction, movement of personnel and equipment, recruiting and retention, and loss to the local economy would not make this a viable option." A quantification and comparison based on costs between the reasonable range of alternatives should be provided in the EA to document the accuracy of this assertion.

The EA should include an analysis of potential short-term impacts associated with future relocation of the ORANG for construction of a decentralized terminal and 3rd parallel runway at PDX. The Port can provide a 15-year time table for proposed development at PDX, including a timeline for construction of the decentralized terminal, in order to facilitate an assessment of the potential impacts relative to the Proposed Action. The short-term impacts associated with future relocation of the ORANG should be compared to short-term impacts (if any) from other reasonable alternatives.

The cumulative impacts from the 10 major construction projects included under the Proposed Action are not discussed or analyzed with adequate detail in the EA. Additional details and impact analyses consistent with the comments above should be documented and provided in the EA.

Airspace Management

- **Number of Operations**: Section 3.1.2 states that the "Portland IAP totaled approximately 352,000 aircraft operations in CY 2000." The correct number of operations at PDX for CY2000 is actually 314,378. However, the number of military operations identified in Section 3.1.2 is correct.

  Section 4.1.2 states that the "total military aircraft operations at Portland IAP would decrease by approximately two percent under the Proposed Action" and concludes that "overall, the Proposed Action would have a positive impact on airfield operations at Portland IAP." However, because there is no direct correlation between raw numbers of aircraft operations and airport capacity, the EA should include a breakdown of aircraft operations by type in order to provide an assessment of potential impacts and to support the conclusions in the EA. For example, KC-135R aircraft are considered by Air Traffic Control to be a "heavy jet" and require additional time or distance wake turbulence separation for departure compared to C-130 aircraft. Clearly, replacing C-130 aircraft with KC-135R aircraft may result in an adverse impact to airport capacity.

Safety

- **Port Fire Department**: A new Mutual Aid Agreement is currently under negotiation between the Port and the ORANG. The Port would like to reiterate that any additional expense incurred by the Port in support of the proposed alternative, such as additional personnel training, materials or equipment would be the sole responsibility of the ORANG or AFRC. Increased costs incurred by the Port could trigger a renegotiation of the Mutual Aid Agreement following conversion to the 939 ARW.

- **Federal Aviation Administration (FAA) Approval and FAA Form 7460-1**: Response to Comment 9 states that the ORANG will submit FAA Form 7460's for "several flight line associated construction projects to ensure that they will not adversely impact the safety of airport operations." As a point of clarification, an FAA Form 7460 is required for any above surface construction.

- **Jet Blast**: Response to Comment 10 states that "given aircraft parking orientation and taxi patterns, the only potential for jet blast in the Westerly direction is during a turn while taxiing at the South East corner of the apron. The impact from this location is minimal and would not require mitigation." Please provide additional details and analysis regarding potential impacts of jet blast from aircraft parking along the western edge of the ORANG ramp to verify the validity of this assertion. For example, an explanation of aircraft arrival and departure patterns from the ramp would be critical to clarify potential impacts and determine whether these impacts are significant.

Air Quality

The Air Quality Conformity Analysis is thorough, well supported, and largely consistent with the State Implementation Plan (SIP). However, clarification is needed in the following areas.

- The type of engine for the KC-135R needs to be specified. In Section 2.2.2 CFM-56 engines were specified based on noise and fuel economy attributes, whereas emissions were calculated using F108-CF-100 engines. Comparison of emission data suggests that emissions of oxides of nitrogen (NO_x) may be understated in the analysis. As stated in Air Force Institute for Environment, Safety and Occupational Health Risk Analysis (AFIERA) guidance, the emission factors used for the F108-CF-100 engines were developed from tests conducted with JP-5 fuel. It is our understanding that the fuel to be used is JP-8. We are concerned that the emission factors used may not accurately reflect emissions from CFM-56 engines burning JP-8. If the intended engine choice is the CFM-56, the emissions should be recalculated using Emissions Dispersion and Modeling System (EDMS) emission factors. EDMS contains emission factors for the CFM-56 because this engine is commonly used on civilian aircraft. Using EDMS is consistent with the approach used in the SIP.

- The emissions from taxi-in and taxi-out were calculated using combined times ranging from 15 to over 18 minutes. Data presented by the FAA on the Aviation System Performance Metrics (ASPM) website indicates that annual average combined taxi times for PDX were less than 14 minutes during 2001. As a result,

emissions from taxiing may be overstated. The SIP and subsequent inventory work completed by the Oregon Department of Environmental Quality (ODEQ) used the annual average taxi times.

- Clarification is needed regarding the number of vehicle miles traveled (VMT) and the number of round trips by the tanker trucks for fuel deliveries. As stated in EA Section 2.2.4 and in Appendix B Section 6.2.3, an additional 8.6 million gallons of JP-8 would be used. The Appendix states that commercial fuel trucks of 10,000 gallon capacity would be used and result in an increase of 178 trips and 2,844 VMT based on a round trip distance of 16 miles. There appears to be a mathematical error. The data presented suggest that 860 additional trips would be required resulting in a VMT increase of 13,760 miles.

- The General Conformity Rules specify that combined direct and indirect emissions should be compared to applicability thresholds. However, the EA lacks a summary table that presents the combined data required by the General Conformity Rules. The EA presents construction emissions separately from operating emissions. Although, the sum of direct and indirect emissions may be below the de minimis thresholds, a revised summary table would assist the reader in making this determination.

Noise

- **Operational Changes**: Response to Comment 15 states that "noise generated by the proposed number of KC-135R operations would result in slightly higher SEL values than current operations." Although the EA analysis determines this impact to be insignificant, it should still be noted in the EA that an impact will be created because the SEL values for the KC-135R are higher than those of the aircraft they are replacing.

- **Ground Run-up Enclosure (GRE)**: Response to Comment 17 states that "all engine run-ups will be performed in accordance with the ORANG's GRE Use Agreement with the Port". The Port requires that all maintenance engine run-up operations, except those that can be done in the ORANG's run-up facility, be performed in the GRE. Use of the GRE for military operations will require a signed waiver of liability. The 939th Rescue Wing has already signed a waiver; however, this would have to be updated to reflect the unit's name and mission change.

Infrastructure

- **PDX Infrastructure**: Response to Comment 18 refers to the lease between the Port and the United States of America as the pertinent document for describing infrastructure costs associated with military operations. However, the Joint Use Agreement between the Port and the United States of America is the relevant document for determining infrastructure cost reimbursement to the Port associated with military operations on jointly used flying facilities such as runways, taxiways, navigational aids and lighting. This agreement, which has a term of five years, is due to expire and, therefore, is currently under negotiation. If significant impacts from

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- **Transportation Network**: Response to Comment 19 indicates a misinterpretation of the issue and needed analysis. Metro's Travel Forecasting Model is not an appropriate tool to use for development impact review as it is designed to be used to predict future metropolitan travel patterns, not to conduct local level intersection analysis. Local level analysis should be based on Highway Capacity Manual recommended processes. After reading the EA response, Port staff contacted Ms. Kyung Hwa Kim at Metro, who verified that her comments to Ms. Lang indicated that the regional model was an inappropriate tool to use in this case. Our reference to the Metro model was limited to its ability to provide future year major street traffic volumes as a basis for the needed local level analysis.

  The Port's analysis in prior years indicates that there may be capacity issues within approximately the next 5 years at the following intersections: Columbia/47th, Columbia/Alderwood, Alderwood/Cornfoot, and Alderwood/82nd. These intersections are also identified in our comments dated February 13, 2002. Large, slow, and heavy fuel tanker trucks use much more roadway capacity than normal automobiles, especially for turning movements at signalized intersections. In addition, if the fuel trucks are double trailers, the intersection of Alderwood/Cornfoot may require widening to accommodate the turning movements.

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If you have any questions, please contact me at (503) 460-4326.

Sincerely,

Susan Aha
Environmental Resource Manager
Portland International Airport

Cc: Lt. Col. John McAllister, ORANG Base Commander
Steve Schreiber, Director of Aviation
Chuck Shenk, Manager, Aviation Environmental & Safety
Mary Maxwell, General Manager, Business & Properties
Steve Twohey, Manager, Planning & Development
Chris Corich, General Manager, Operations & Maintenance
Barbara Jacobson, Senior Assistant General Counsel
Chris Madsen, Airside Properties Manager
Rick Finn, Federal Government Relations Manager

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 142D FIGHTER WING (ACC)
PORTLAND AIR NATIONAL GUARD BASE OREGON

2 AUG 02

John A. McAllister, Lt Col, ORANG
Base Commander/Chairman, Environmental Protection Committee
6801 NE Cornfoot Rd
Portland, OR 97218-2797

Susan Aha
Environmental Resource Manager
Portland International Airport
P.O. Box 3529
Portland, OR 97208

RE: Response to Port of Portland Comments, dated 12 JUN 2002

Dear Ms. Aha,

We are providing the following responses to your comments regarding the environmental assessment for the conversion of the 939th Rescue Wing at Portland International Airport, Oregon:

a. Reference Port Comment, "Response to Port of Portland Comment Number 2:" The host, Air National Guard, provides support to base tenants (such as the 939th RQW) through host-tenant support agreements. In order to serve the best interests of our respective military missions, these agreements are not available for review or approval outside of our military chain of command. However, these documents are not classified for security in any way and can be made available for information only.

b. Reference Port Comment, "Response to Port of Portland Comment Number 2:" It is understood that the Port will require that their standard environmental language would be a component of the new lease agreement.

c. Reference Port Comment, "Response to Port of Portland Comment Number 5:" The fuel trucks delivering fuel to Portland Air National Guard Base (ANGB) are owned and operated by a private entity. Information will be added to the EA to address this comment.

d. Reference Port Comment, "Response to Port of Portland Comment Number 5:" It is understood that the Port requires mobile storage tank use agreements, with the Port's

standard environmental language, in order to operate mobile storage tanks on Port property.

e. Reference Port comment, "Response to Port of Portland Comment Number 5:" The base spill, prevention, control and countermeasures plan will be updated and submitted to the Port to reflect changes in fueling operations.

f. Reference Port Comment, "Response to Port of Portland Comment Number 7:"

Speaking only from a facility point of view, not involving any environmental requirements, the 142d Base Civil Engineer (BCE) original response to the Port's insistence that the ORANG must obtain a Port issued construction permit does specifically address the original comment. The lease document between the Port and the Government addresses the Government's right during the lease to alter, attach, and build new structures. There is no language in this document that requires or even hints at the need to obtain a construction permit from the Port. Furthermore, the base and the Port have no other separate agreement that stipulates the requirement to obtain a Port construction permit for projects on the leasehold area.

With that said, over the past couple of years, the dialogue between base and Port personnel has steadily improved. Base major construction and alteration projects are briefed to Port personnel from the airside leasing, environmental, and aviation planning offices. Base personnel listen to their concerns and when mission requirements allow, accommodate the concerns to the best of our ability. The base is specifically cognizant of the restrictions around the runway and taxiways surfaces for navigational aids. The base will continue this open dialogue with Port personnel to accommodate their issues to the best of the base's ability but will not obtain a Port construction permit.

Air Force Policy Directive 32-70, "Environmental Quality" date 20 July 1994 is strictly an environmental directive. The base could not find the referenced page and section from the AFPD 32-70 the Port's 12 June 2002 memo referred to. The Port may have an older version of the AFPD since in the current AFPD 32-70, page 1, paragraph 3.2 does contain the referenced verbiage "The United States Air Force will comply with applicable Federal, state, and local environmental laws and standards". The 142d Base Civil Engineer is not responsible for environmental policy and compliance. Base Civil Engineering relies upon the 142d Environmental Manager to provide review and consultation during project design. However, BCE reiterates their earlier response from March 2002 stating that since the City of Portland has no interest in reviewing project plans, the base is are not going to start applying local or state codes through a "permit review" process. The base

conforms to nationally recognized building codes applicable to the region. From a design and construction perspective, the AFPD 32-70 has nothing to do with building codes (electrical, plumbing, building, seismic, mechanical, life/safety). It is focused on environmental permit processes or fees. If there are environmental issues required during a project design, these processes and fees are an issue the Environmental Manager addresses to BCE during the project design phase for incorporation into the project.

Therefore, the base will not submit Port Construction Permits for projects on the leasehold; the base uses nationally recognized building codes in accordance with federal guidance, and existing environmental permits issues to the base (stormwater, air and sanitary sewer) are sufficient to support the proposed action with some modifications.

g. Reference Port comment, "Interagency and Intergovernmental Coordination for Environmental Planning List (Appendix A):" Since there are no direct or indirect impacts to the Columbia Slough, there are no impacts to the species that utilize the Slough. The National Marine Fisheries Service (NMFS) was contacted via telephone as part of the development of the EA to obtain information concerning federally listed fish species and their habitats. Follow-on contact will be initiated to provide concurrence with the analysis contained within the EA. This action will occur as part of the modifications made to the EA.

h. Reference Port comment, "Description of Proposed Action and Alternatives (Section 2):" The No-Action Alternative, as presented in the EA, is consistent with the DOPAA although additional detail has been provided in Section 4. As part of the modification of the EA, portions of this additional description will be moved forward to Section 2.3.4. The current text fully describes the planned construction and demolition program. However, Section 2.2 will be slightly modified to provide the summary requested via this comment.

i. Reference Port comment, "Description of Proposed Action and Alternatives (Section 2):" The title of the EA will remain unchanged.

j. Reference Port comment, "Description of Proposed Action and Alternatives (Section 2):" The EA does evaluate the conversion of the 939th RQW by determining the environmental consequences of the beddown of KC-135R aircraft when compared to the existing conditions (i.e., pararescue mission conducted by the 939th RQW). The comment appears to focus solely on the information provided in section 2.3. Furthermore, quantification and comparison based on costs between the reasonable range of alternatives (with respect to Section 2.3.3) would require analysis beyond the scope of an EA. Other alternative missions, such as "air mobility," were not assessed

because the Department of Defense did not have these mission shortfalls to be considered for the 939th.

k. Reference Port comment, "Description of Proposed Action and Alternatives (Section 2):" The Port of Portland Master Plan is discussed in Section 5, Cumulative and Adverse Impacts. Due to the vast temporal difference between the Proposed Action assessed in the EA and the activities proposed in the Port of Portland Master Plan, no viable, comparative analysis is possible.

l. Reference Port comment, "Description of Proposed Action and Alternatives (Section 2):" Section 4 presents discrete (i.e. project specific) and cumulative (i.e., the Proposed Action in its entirety) impact analysis. Section 5 serves to assess the cumulative impacts of the Proposed Action and other known actions within proximity to Portland ANGB. No other actions were identified other than those detailed in the Port of Portland Master Plan (see above discussion concerning Port of Portland Master Plan).

m. Reference Port comment, "Airspace Management, Number of Operations:" The number of operations for PDX will be changed to 314,378 as part of the modifications to the EA. Please note that the number of operations identified within the EA is based on data provided by Port of Portland staff during the data collection site visit.

n. Reference Port comment, "Airspace Management, Number of Operations:" The "raw" numbers are presented in Sections 2.2.3 and 3.1.2. However, this information will be added to Section 4.1.2 as part of the modifications to the EA. The addition of proposed KC-135R aircraft operations was discussed with Port of Portland staff during the data collections site visit. No potential impacts to airport capacity were disclosed at that time by Port of Portland staff. However, a comparison will be made in the EA between the proposed six to eight daily KC-135R aircraft operations and the current C-130 aircraft operations with respect to the additional time and/or distance separation for departure to assess the potential impact to airport capacity.

o. Reference Port comment, "Safety, Port Fire Department:" The base concurs with this comment.

p. Reference Port comment, "Safety, FAA Approval and FAA Form 7460-1:" The base concurs with this comment (FAA Form 7460-1 will be prepared for each construction project).

q. Reference Port comment, "Safety, Jet Blast:" This issue will be studied further to determine engine thrust velocities at the Westerly base property line during KC-135R taxi operations. If significant, various options to minimize thrust effect may be

considered, including adjustments in aircraft arrival and departure patterns and/or blast fence.

r. Reference Port comment, "Air Quality:" Additional clarification will be presented in the EA to address the Port of Portland's concerns. Please note that the requested modifications to the analysis will slightly modify the results, but not the conclusions.

s. Reference Port comment, "Noise, Operational Changes:" Section 4.4.2 will be slightly modified to state that there will be an impact, but the conclusion that the impact will not be significant will remain unchanged based on the analysis.

t. Reference Port comment, "Noise, Ground Run-up Enclosure GRE:" The EA will be modified to account for the need to update the current waiver. The base concurs with this comment.

u. Reference Port comment, "Infrastructure, PDX Infrastructure:" The base concurs with this comment.

v. Reference Port comment, "Infrastructure, Transportation Network:" The response to the original comment adequately addresses the current concerns presented by the Port of Portland. Furthermore, the reduction in the number of vehicles accessing Portland ANGB on a daily basis as a result in the reduction in the number of Reserve personnel under the Proposed Action will more than offset the potential impacts associated with the addition of three to four fuel trucks a day to the local roadways. A traffic analysis is not warranted as a result of the Proposed Action.

w. Reference Port comment, "Infrastructure, Consistency with Airport Layout Plan (ALP):" As previously stated, due to the vast temporal difference between the Proposed Action assessed in the EA and the activities proposed in the Port of Portland Master Plan, no viable, comparative analysis is possible. Resolution to these differences is being addressed through the base lease extension process.

x. Reference Port comment, "Water Resources, 1st bullet:" Although the information presented in Section 3.7.2 is in agreement with reference material obtained during and subsequent to the data collection site visit, upon further investigation, the reference material does not adequately form the basis for the assertion. Therefore, the EA will be modified to indicate that the slough receives precipitation runoff from the airport without indicating a percentage. This will not result in any further changes to the presentation or analysis.

y. Reference Port comment, "Water Resources, 2nd bullet:" The EA will be modified to further emphasize that the Spill Prevention, Control, and Countermeasures Plan and

Storm Water Pollution Prevention Plan will both be updated to adequately address the concerns presented in this comment.

z. Reference Port comment, "Water Resources, 3rd bullet:" The 1200-COLS permit issued to the base requires monthly and semi-annual monitoring at all stormwater points of discharge from the base (note: stormwater from the base flowing into the PDX detention pond has always passed through a backflow prevention device engineered to prevent Port stormwater from entering the base).

aa. Reference Port comment, "Water Resources, 4th bullet:" The EA will be modified to include a statement to address the potential City of Portland "balance cut and fill" requirements for floodplains.

bb. Reference Port comment, "Water Resources, 5th bullet:" The base will terminate the permit in question in the event that the proposed action is implemented.

cc. Reference Port comment, "Water Resource, 6th bullet:" The original Port comment states, "In addition, the ORANG must sign the PDX Deicing Allocation Agreement in order to discharge storm water containing deicing or anti-icing materials into the PDX basin 6 detention pond." The base maintains that our current de-icing permit is the only document needed for the base to discharge de-icing materials to the Port of Portland. The base will address the allocation agreement through the lease extension process. The base has continuous monitoring equipment in place and can make daily BOD_5 data comparisons to the base Waste Load Allocation available via computer website.

dd. Reference Port comment, "Water Resource, 7th Bullet:" The base would appreciate an advance copy of the Port Construction Dewatering Agreement.

ee. Reference Port comment, "Water Resource, 8th Bullet:" The base concurs with this comment.

ff. Reference Port comment, "Biological Resources, 1st Bullet:" A statement will be added to the EA to address the potential that threatened and endangered plant species may occur in the project area. However, please note that numerous USFWS offices were contacted as part of the IICEP process, and that none of these offices responded. Under the Endangered Species Act of 1973, as amended (ESA) (16 United States Cone [U.S.C.] 1531 *et. seq*.), specifically under the Interagency Cooperation regulations (40 CFR 402), the USFWS surpassed any timeline provided by the ESA and its regulations. The timeline for responses to Federal agency requests for a species list under 40 CFR 402.12 (d) is 30 days. No response concludes the Section 7 process.

gg. Reference Port comment, "Biological Resources, 2nd Bullet:" As previously stated, numerous USFWS offices were contacted as part of the IICEP process for this EA. Again, under the ESA (16 United States Code [U.S.C] 1531 *et. seq.*), specifically under the Interagency Cooperation regulations (40 CFR 402), the USFWS surpassed any timeline provided by the EAS and its regulations. The timeline for responses to Federal agency requests for a species list under 40 CFR 402.12(d) is 30 days. No response concludes the Section 7 process. The regional Oregon Department of Fish and Wildlife (ODFW) list used to generate the information presented in Table 3-16 was the best available information, and will remain as written.

hh. Reference Port comment, 'Biological Resources, 3rd Bullet:" Unless new information is provided by NMFS as part of follow-on coordination efforts, the analysis contained within the EA will suffice as written. Again, there are no known threatened or endangered species on Portland ANGB. Furthermore, the analysis clearly shows that there will be no direct or indirect impacts to federally listed species on or off the base.

I can be contacted at (503) 335-5000 should you wish to discuss any of these responses.

JOHN A. McALLISTER

cc:

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
525 NE Oregon Street
PORTLAND, OREGON 97232-2737

Refer to:
2002/01067

September 18, 2002

Mr. Brian Hoppy
Engineering-Environmental Management Inc.
355 West Lancaster Avenue
Building E, 2nd Floor East
Haverford, PA 19041

Re: Endangered Species Act Section 7 Consultation and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation for the Portland Air National Guard Base in Portland, Oregon.

Dear Mr. Hoppy:

This correspondence is in response to your request for consultation under the Endangered Species Act (ESA). Additionally, this letter serves to meet the requirements for consultation under the Magnuson-Stevens Fishery Conservation and Management Act (MSA).

ENDANGERED SPECIES ACT

The Air Force Reserve Command proposes to replace the current existing pararescue aircraft at the Portland Air National Guard Base with air-refueling aircraft. The change in aircraft would require demolition and construction of buildings on the base to provide support for the new aircraft. The proposed action is located near the Columbia River at Portland, Oregon.

On August 30, 2002, the National Marine Fisheries Service (NOAA Fisheries) received project information from Engineering-Environmental Management Inc. (acting as the designated representative for the Air Force Reserve Command) and a request for concurrence with a finding that the proposed action will have "no effect" on Columbia River chum salmon (*Oncorhynchus keta*), Lower Columbia River steelhead (*O. mykiss*), Middle Columbia River steelhead (*O. mykiss*), Upper Columbia River steelhead (*O. mykiss*), Snake River steelhead (*O. mykiss*), Snake River sockeye salmon (*O. nerka*), Lower Columbia River chinook salmon (*O. tshawytscha*), Upper Columbia River spring-run chinook salmon (*O. tshawytscha*), Snake River spring/summer-run chinook salmon (*O. tshawytscha*), Snake River fall chinook salmon (*O. tshawytscha*), or their designated critical habitats in the project area. This consultation is undertaken pursuant to section 7(a)(2) of the Endangered Species Act (ESA) and its implementing regulations, 50 CFR Part 402.

Based on the information provided by Engineering-Environmental Management Inc., NOAA Fisheries concurs with the determination that the proposed project will have no effect on the listed species because: (1) The project involves no in-water or shoreline work; (2) the project is located a substantial distance away from the Columbia River; and, (3) any stormwater runoff from the facility would not enter waters inhabited by ESA listed species.

The Air Force Reserve Command must reinitiate this consultation if: 1) New information reveals that effects of the action may affect listed species in a way not previously considered; 2) the action is modified in a way that causes an effect on listed species that was not previously considered; or 3) a new species is listed or critical habitat is designated that may be affected by the action (50 CFR 402.16).

MAGNUSON-STEVENS ACT

Federal agencies are required under §305(b)(2) of the MSA and its implementing regulations (50 CFR 600 Subpart K), to consult with NMFS regarding actions that are authorized, funded, or undertaken by that agency that may adversely affect Essential Fish Habitat (EFH). The MSA (§3) defines EFH as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." If an action would adversely affect EFH, NMFS is required to provide the Federal action agency with EFH conservation recommendations (MSA §305(b)(4)(A)). This consultation is based, in part, on information provided by the Federal action agency and descriptions of EFH for Pacific salmon contained in Appendix A to Amendment 14 to the Pacific Coast Salmon Plan (August 1999) developed by the Pacific Fishery Management Council and approved by the Secretary of Commerce (September 27, 2000).

The proposed action and action area are described in the information provided by the applicant. The project area does not include habitat which has been designated as EFH. Therefore, conservation recommendations pursuant to MSA (§305(b)(4)(A)) are not necessary.

This concludes consultation under the MSA. If the proposed action is modified in a manner that may adversely affect EFH, or if new information becomes available that affects the basis for NMFS' EFH conservation recommendations, the Air Force Reserve will need to reinitiate EFH consultation with NMFS in accordance with NMFS implementing regulations for EFH at 50 CFR 600.920(k).

Please direct questions regarding this letter to Ben Meyer of my staff in the Oregon Habitat Branch at 503.230.5425.

Sincerely,

for D. Robert Lohn
Regional Administrator

APPENDIX B

CONFORMITY ANALYSIS REPORT

CONFORMITY ANALYSIS REPORT

FOR THE
ENVIRONMENTAL ASSESSMENT
OF THE CONVERSION OF THE 939TH RESCUE WING

PORTLAND AIR NATIONAL GUARD BASE
PORTLAND INTERNATIONAL AIRPORT, OREGON

Prepared for:

Headquarters, Air Force Reserve Command
Environmental Division
255 Richard Ray Boulevard
Robins Air Force Base, Georgia 31098-1637

Prepared by:

engineering-environmental Management, Inc.
10331 Democracy Lane
Fairfax, VA 22030

September 2002

ABBREVIATIONS AND ACRONYMS

939 ARW	939 Air Refueling Wing
939RQW	939 Rescue Wing
AFB	Air Force Base
AFRC	Air Force Reserve Command
AGE	Aerospace Ground Equipment
AGL	Above Ground Level
ANGB	Air National Guard Base
AQCR	Air Quality Control Region
CAA	Clean Air Act
CFR	Code of Federal Regulations
CO	Carbon Monoxide
CY	Calendar Year
FIP	Federal Implementation Plan
ft^2	square feet
FY	Fiscal Year
GOV	Government owned vehicle
IAP	International Airport
JP-8	Jet Petroleum – 8
LTO	Landing and Take-off
N/A	Not Applicable
NAAQS	National Ambient Air Quality Standards
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
O_3	Ozone
PAA	Primary Assigned Aircraft
Pb	Lead
PM_{10}	Particulate Matter less than 10 microns in diameter
POV	Privately owned vehicle
SIP	State Implementation Plan
SO_2	Sulfur Dioxide
SO_x	Sulfur Oxides
TGO	touch-and-go
tpy	tons per year
U.S.	United States
USAF	United States Air Force
USEPA	United States Environmental Protection Agency
VMT	vehicle miles traveled
VOC	Volatile Organic Compound

CONFORMITY ANALYSIS REPORT FOR THE ENVIRONMENTAL ASSESSMENT OF THE CONVERSION OF THE 939TH RESCUE WING PORTLAND AIR NATIONAL GUARD BASE PORTLAND INTERNATIONAL AIRPORT, OREGON

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1.0 Introduction

The Air Force Reserve Command (AFRC) is planning to convert the 939th Rescue Wing (939 RQW) to the 939th Air Refueling Wing (939 ARW). The 939 ARW would conduct training operations and active missions using KC-135R within established airspace and training areas in the western United States. The 939 ARW would be located at Portland Air National Guard Base (Portland ANGB). The base is located on the grounds of Portland International Airport (Portland IAP), Oregon.

2.0 Background on the Decision to Convert to the 939 ARW

The United States Air Force (USAF) pararescue functions worldwide (including the 939 RQW) are considered to be low-density, high-demand meaning that there are very few assets to perform a large and consistent number of missions. Many of the missions are to overseas locations that are very demanding on equipment and personnel. USAF senior leadership has decided that pararescue functions should be more centrally controlled and managed to create efficiencies in the use of equipment and personnel deployment. The purpose of the Proposed Action (see Section 3.0) is to maintain a mission at Portland ANGB while complying with the decision to consolidate pararescue assets.

National security objectives determine the military's force structure and the accompanying mission for AFRC units. There is an increased reliance on AFRC units to fulfill primary missions traditionally assigned to active duty units. Since the number of active duty units permanently stationed overseas has been reduced, United States (U.S.) based forces, including AFRC units, now have a relatively greater responsibility to respond to overseas threats and humanitarian efforts. The increased need for homeland defense has also added more requirements on U.S. based forces to be ready for any contingency. Aerial refueling is one of the many missions AFRC units accomplish to increase overall force readiness.

3.0 Proposed Action

The Proposed Action includes the replacement of MH-60G and C-130 aircraft with KC-135R refueling aircraft and the modification of various facilities and buildings at Portland ANGB. Ten construction projects would be needed to provide adequate facilities for the KC-135R airframe and the air-refueling mission. The 939 ARW would be assigned eight KC-135R primary assigned aircraft (PAA) as part of the conversion of the 939 RQW. The KC-135R is a four engine jet aircraft. It is capable of conducting aerial refueling operations for many aircraft in the

USAF inventory. The KC-135R aircraft would conduct refueling operations in airspace already established for the intended mission.

In addition to the proposed changes at Portland ANGB the Proposed Action includes flight operations at three alternative training locations. These locations are: Klamath Falls International Airport, OR; Grant County International Airport, WA; and Beale Air Force Base (AFB), CA. There are expected to be eight to sixteen flight operations per day, split evenly among these alternative training locations. These operations would increase pollutants at each of the training locations. As such, the USAF must show that any increases in aircraft-related emissions at these locations also conform to Clean Air Act (CAA) requirements.

4.0 Conformity Analysis Requirements

As a Federal agency and proponent of a "Federal Action," AFRC must complete a conformity analysis to determine if the basing of eight KC-135R aircraft and associated regulated pollutant emissions from the Proposed Action would conform to the requirements of the CAA.

In November 1993, the U. S. Environmental Protection Agency (USEPA) promulgated regulations and requirements that clarify the applicability, procedures, and analyses necessary to ensure that Federal facilities comply with the CAA. By establishing the Final General Conformity Rule, USEPA requires Federal agencies to evaluate proposed Federal actions in non-attainment areas and ensure conformance with an approved State Implementation Plan (SIP) or a Federal Implementation Plan (FIP) – key elements of the CAA. More specifically, conformity with the CAA is assured when a Federal action does not:

- Cause a new violation of a National Ambient Air Quality Standard (NAAQS)
- Contribute to an increase in the frequency or severity of violations of NAAQS
- Delay the timely attainment of any NAAQS, interim progress milestones, or other milestones toward achieving compliance with the NAAQS

The General Conformity Rule and applicable procedures apply only to proposed Federal actions that are in USEPA-designated non-attainment or maintenance areas for NAAQS.

In developing the CAA, it was determined that certain pollutants have the potential to cause adverse affects on public health and the environment when certain concentrations are exceeded in ambient air. In order to control and regulate these "criteria pollutants" and better maintain

healthful air, NAAQS were established for six criteria pollutants. These pollutants include: carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), particulate matter less than 10 microns in diameter (PM_{10}), sulfur dioxide (SO_2) and lead (Pb). Ozone is not typically emitted directly from emission sources but rather, is formed in the atmosphere by photochemical reactions involving sunlight and other emitted pollutants or "ozone precursors". Ozone precursors consist primarily of oxides of nitrogen (NO_x) and volatile organic compounds (VOCs), which are common pollutants emitted directly from a wide range of stationary and mobile sources. Therefore, ozone is controlled through the control of NO_x and VOC pollutants.

The General Conformity Rule requires that Federal agencies consider total direct and indirect emissions of criteria pollutants in non-attainment areas and maintenance areas (i.e., where an area has been re-designated from non-attainment to attainment and must "maintain" this status). The Conformity Rule is satisfied for actions where the direct and indirect emissions do not exceed *de minimis* threshold levels promulgated in 40 Code of Federal Regulations (CFR), 93.153(b). Therefore, the comparison of a proposed action to the *de minimis* threshold levels is the first and often only analysis required to show that an action conforms to applicable CAA requirements.

Additionally, the General Conformity rule exempts ongoing activities that are currently being conducted at a facility, as long as the Federal action does not increase non-attainment pollutants above *de minimis* levels. Table 4-1 presents the applicable *de minimis* thresholds under the General Conformity Rule.

If the net increases in direct and indirect non-attainment pollutant emissions do not exceed these *de minimis* thresholds levels, the General Conformity Rule also requires an analysis of "regional significance". This includes a comparison of the net emissions changes to the total baseline inventory of non-attainment pollutants for an affected Air Quality Control Region (AQCR) or non-attainment area. If the action would not increase regional emissions by 10 percent, the action is not considered regionally significant and is exempt from further conformity rule requirements.

When applicable, another required analysis is a comparison of the Federal action's emissions to any existing SIP/FIP emission budgets that have been established for the Federal facility or affected region. If the action would cause an increase in emissions so that the established SIP budgets or rate of progress are exceeded, a conformity determination and other applicable rule requirements would apply.

Table 4-1. General Conformity Rule *de minimis* Emission Thresholds

Criteria Pollutant	Status	Degree or Classification	*de minimis* Threshold (tons per year)
Ozone (NO_x or VOCs)	Non-attainment	Extreme	10
		Severe	25
		Serious	50
		Moderate/marginal (inside ozone transport region)	50 (VOCs)/100 (NO_x)
		All others	100
	Maintenance	Inside ozone transport region	50 (VOCs)/100 (NO_x)
		Outside ozone transport region	100
Carbon Monoxide (CO)	Non-attainment/ maintenance	All	100
Particulate Matter (PM_{10})	Non-attainment/ maintenance	Serious	70
		Moderate	100
		Not Applicable	100
Sulfur Dioxide (SO_2)	Non-attainment/ maintenance	Not Applicable	100
Nitrogen Dioxide (NO_2)	Non-attainment/ maintenance	Not Applicable	100

Source: 40 CFR 93.153 (b)(2)

5.0 Attainment Status

Portland ANGB is located in Multnomah County, Oregon, which is located in Portland Interstate AQCR No. 193. This area has been categorized by the USEPA as a maintenance area for ozone and CO pollutants. AQCR No. 193 is in attainment for all other criteria pollutants.

The Proposed Action would also require the use of three alternative training locations for touch and go's (TGO) and closed pattern flights. The alternative locations include; Klamath Falls International Airport, Oregon; Grant County International Airport, Washington; and Beale AFB, California. The affected AQCRs and the NAAQS attainment status for each of these locations is summarized below:

- Klamath County International Airport lies within the Central Oregon Intrastate AQCR No. 190. This region has been classified as a "moderate" non-attainment area

for PM_{10} and CO pollutants. AQCR No. 190 is in attainment for all other criteria pollutants.

- Grant County International Airport is within the Eastern Washington Northern Idaho Interstate AQCR No. 62. Portions of the AQCR are classified as non-attainment; however, Grant County is classified as within attainment for all criteria pollutants. Therefore, a conformity analysis is not required for proposed Federal actions affecting this airport facility.

- Beale AFB is located in Yuba County, California and is in the Sacramento Intrastate AQCR No. 28. Yuba County has been classified by USEPA as a maintenance area for ozone and PM_{10} pollutants, and is in attainment for all other criteria pollutants.

6.0 Conformity Analysis

This analysis compares the net change and *de minimis* thresholds for maintenance and non-attainment pollutant emissions that would result from implementation of the Proposed Action at Portland ANGB and the alternative training locations. Based on the characteristics of the Proposed Action, potential non-stationary pollutant impacts would result during two stages of this action: construction activities and operational activities. The analysis below presents the net changes in applicable pollutant emissions during each of these stages of the Proposed Action.

6.1 Construction Activities

The Proposed Action consists of eleven construction projects at various locations throughout Portland ANGB. These projects address the requirements for the KC-135R airframe and support facilities. They include demolition or modification of existing buildings and the construction of new facilities as well as smaller modifications and additions to existing structures. Table 6-1 below lists the start date, project duration, and areas affected by implementation of the proposed construction projects or facility modifications at Portland ANGB.

Anticipated pollutant emissions from these construction activities were calculated using USEPA-approved methodologies as well as generally accepted engineering approaches and assumptions. Emissions of fugitive dust (i.e., PM_{10}) and other pollutants are based on the project characteristics, duration, and fuel-fired equipment typically used in each phase of construction. Table 6-2 presents the estimated annual emissions of the CO, NO_x and VOC emissions generated during construction activities for the Portland ANGB. As shown, the greatest annual pollutant emission rates are projected to occur during Fiscal Year (FY) 2004.

Table 6-1. Proposed Construction Projects at Portland ANGB

Proposed Construction Projects	Start Date (FY)	Duration (Months)	Project Area (ft^2)	Asphalt Area (ft^2)
New Facilities				
Phase 1 Construction of Aircraft Parking Overlay –(Fuel Hydrant System)	2003	9	-	291,110
Phase 1 – Construction of Consolidated Training Facility	2003	12	3,380	-
Phase 2 Construction of Aircraft Parking Overlay –(Fuel Hydrant System)	2004	9	-	291,110
Phase 2 – Construction of Consolidated Training Facility	2004	12	16,157	-
Fire/Crash Rescue Station	2003	12	24,754	4300
Construction of Aircraft Maintenance Hangar	2005	15	25,834	97,030
Existing Facilities				
Modification of Maintenance Shops, Buildings 360, 365 and 380	2003	12	39,008	-
Alteration of Maintenance Hanger, Buildings 375	2004	9	8,930	-
Modification to Squadron Operations, Buildings 304	2004	7	13,431	-
Alter Maintenance Hangar, Bldg. 310	2003	4	-	-
Add/Alter Pararescue Squadron Facility, Bldg. 315	2004	6	6,980	-

Note: FY - Fiscal year
ft^2 – square feet

Table 6-2. Construction Activity Emissions from the Proposed Action at Portland ANGB [1]

Fiscal Year	NO_x (tpy) [2]	VOC (tpy)	CO (tpy)	SO_x (tpy)	PM_{10} (tpy)
2003	9.92	3.75	8.25	0.50	10.01
2004	15.63	5.37	13.50	0.78	11.13
2005	4.24	2.14	3.89	0.21	0.92
2006	0.41	0.34	0.38	0.02	0.17

Notes:
[1] Estimates are based on construction project and scheduling information provided by 939 ARW and accepted engineering assumptions.
[2] tpy – tons per year

A comparison of these construction emissions to the *de minimis* threshold of 100 tons per year (tpy) for NO_x, VOCs, and CO pollutants (see Table 4-1) show that this Federal action is well below the applicable threshold requirements of the General Conformity Rule.

6.2 Operational Activities

Operational activities analyzed for this Federal action include two main categories: aircraft flight operations and non-permitted aircraft/facility maintenance support activities. All six regulated criteria pollutants are emitted from these activities as by-products of fuel combustion, paint use, fuel evaporation, aircraft repairs, and various other Portland ANGB operations. Jet fuel combustion during aircraft operations represents the most significant proportion of operating emissions.

Based on the characteristics of the Proposed Action and information received from Portland ANGB personnel, the number and use of aerospace ground equipment (AGE) and space heating devices would increase slightly, but no emission changes are expected. Similarly, the proposed conversion would not increase the number of personnel at Portland ANGB, so privately owned vehicle (POV) and government owned vehicle (GOV) use and associated emissions would not change. The non-permitted source types that are subject to changes under the Proposed Action are described below and the net emissions calculations are presented in Table 6-3.

Table 6-3. Net Changes in Operational Emissions for the Proposed Action at Portland ANGB (CY 2005)

Air Pollutant Emissions Source	NO_x (tpy) [1]	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)
Aircraft & Run-Up Emissions [2]	24.84	-1.15	13.40	1.56	6.34
Fuel Storage & Handling Emissions [3]	-	0.34	-	-	-
Fuel Truck Emissions [4]	0.10	0.03	0.17	0.01	0.12
Total Worst Case Net Change	24.94	-0.78	13.54	1.57	6.46
AQCR No. 193 Emission Inventory	160,546	218,893	1,168,089	120,694	272,701
Applicable *de minimis* Thresholds	**100**	**100**	**100**	**N/A [5]**	**N/A**
Percent of *de minimis* Threshold	24.94%	-0.78%	13.54%	-	-

Notes:
[1] tpy – tons per year
[2] Aircraft operations for CY 2005 include the eight proposed KC-135R aircraft.
[3] Fuel handling emissions were estimated using USEPA and AFIERA guidance as published in *Final 1999 Air Emissions Inventory* prepared for the 142nd Fighter Wing (dated May 2001).
[4] Diesel fuel truck emission factors are from USEPA MOBIL5 emissions model, as compiled and published in the "Air Emissions Inventory Guidance Document for Mobile Sources and Air Force Installations: U.S. Air Force Institute for Environmental Safety and Occupational Health Risk Analysis (AFIERA), July 2001.
[5] N/A – Not Applicable

6.2.1 Aircraft Flight Operations – Portland ANGB/Portland ANGB

The conversion from HH-60 helicopters and C-130 aircraft to KC135R refueling aircraft would change the amounts and characteristics of regulated air pollutant emissions generated by Portland ANGB. Estimates of the net changes in aircraft operational emissions associated with the Proposed Action have been based on existing and proposed annual airfield operations and available documentation on aircraft emissions profiles, flight patterns, and typical operation characteristics. Based on the proposed aircraft drawdown and conversion schedule, the full conversion and use of eight KC-135R aircraft in calendar year (CY) 2005 would be the "worst case" year for emission estimates for the aircraft operations at Portland ANGB.

For the airfield operations in the vicinity of Portland ANGB, it was assumed that the landing and take-off (LTO) cycle includes an approach from 3,000 feet above ground level (AGL) to Portland IAP, landing, taxi-in to a parking position, taxi-out to a runway, takeoff, and climb out to 3,000 feet AGL. Based on information received regarding planned airfield operations, no TGO operations were assumed for the KC-135R operations at Portland IAP. Aircraft engine emission factors were used for estimating pollutant emissions (EDMS 2002) and were applied to the aircraft flight profiles, published fuel flow rates, and times-in-mode.

Table 6-3 presents the results of the emission calculations for NOx, VOC and CO emissions during the "worst case" operating year (2005). As shown, aircraft pollutant emissions are projected to increase under the proposed action.

6.2.2 Fuel Storage and Handling Emissions

The Proposed Action would include an estimated increase of 8.6 million gallons of Jet Petroleum-8 (JP-8) fuel distribution and use at Portland ANGB. This would increase the number of commercial fuel tank truck deliveries to the facility as well as a 10 to 20 percent increase in the use of storage tanks, loading facilities, and ANGB fuel trucks. As a result, increased evaporative fuel emissions (i.e., VOCs) would be generated by this increase in fuel throughput. The net increase in VOC emissions were calculated based on the USEPA approved emission factors, as presented in the CY 1999 emissions inventory for this installation.

6.2.3 Fuel Truck Traffic Emissions

Commercial fuel trucks (10,000-gallon capacity - each) are used to transport JP-8 jet fuel from a local distributor to Portland ANGB. Given a fuel throughput increase of 8.6 million gallons per year and a round trip distance of approximately 16 miles, the proposed action would result in an

increase in approximately 860 trips or 13,760 vehicle miles traveled (VMT). Based on USEPA-approved emission factors for diesel trucks, this increase in local truck VMT would generate a relatively small net increase in all criteria pollutants (see Table 6-3 below).

The projected total net changes in $NO_{x,}$, VOC and CO emissions due to the Proposed Action at Portland ANGB are summarized in Table 6-3. This summary compares the total net estimated emissions changes to the current General Conformity *de minimis* thresholds for these pollutants. As shown in Table 6-3, the operational emissions from the Proposed Action would not exceed the applicable *de minimis* thresholds. Since these emission rates are so far below the *de minimis* thresholds, it is not necessary to complete a comparative review of significance to the regional inventory. Given that the Portland area inventory exceeds thousands of tons per year, regional significance is a far less restrictive criterion than the *de minimis* thresholds discussed herein.

6.2.4 Aircraft Flight Operations – Alternative Training Locations

The proposed aircraft conversion would require the use of three alternative training locations. These operations would change the amounts and characteristics of regulated air pollutant emissions generated at each location. Estimates of the net increases in aircraft operational emissions associated with the Proposed Action are based on proposed annual airfield operations and available documentation on aircraft emissions profiles, flight patterns, and typical operation characteristics.

For the airfield operations in the vicinity of the alternative training locations, it was assumed that only TGO operations would occur. Assuming an even distribution of 2,700 total operations per year, 900 operations per year were assumed for each location. Emission estimates are therefore the same for all three locations. The TGO cycle includes an approach from 3,000 feet AGL to the alternative training sites, landing, takeoff, and climb out to 3,000 feet AGL. As described above, aircraft engine emission factors were used for estimating pollutant emissions and were applied to the aircraft flight profiles, published fuel flow rates, and times-in-mode for the KC-135R (AFIERA 2001).

Table 6-4 presents the results of the emission calculations for NO_x, VOC, PM_{10}, SO_2, and CO emissions during the "worst case" operating year (CY 2005) for two of the alternative training locations: Klamath Falls International Airport and Beale AFB. Grant County International Airport is in an attainment area, so no conformity analysis is required for that location. As shown, aircraft

pollutant emissions increases that would occur under the Proposed Action would be far below the established *de minimis* thresholds for all pollutants.

Table 6-4. Proposed Action Aircraft Operations Net Emissions Increases at Alternative Training Locations [1]

	Net Changes in Criteria Pollutant Emissions				
	NO_x (tpy)	**VOC (tpy)**	**PM_{10} (tpy)**	**SO_2 (tpy)**	**CO (tpy)**
Net Emissions Increase at Klamath Falls IAP, Oregon [1]	5.07	0.02	0.47	0.36	0.82
de minimis Threshold [2]	N/A	N/A	100	N/A	100
Net Increase as a percentage of the *de minimis* Threshold	**-**	**-**	**0.004%**	**-**	**0.008%**
Net Emissions Increase at Beale AFB, California [3]	5.07	0.02	0.47	0.36	0.82
de minimis Threshold	100	100	100	N/A	N/A
Net Increase as a percentage of the *de minimis* Threshold	**0.051%**	**0.0001%**	**0.004%**	**-**	**-**
Net Emissions Increase at Grant County IAP, Washington	5.07	0.02	0.47	0.36	0.82

Source: Calculations are based on proposed operations at each location and AFIERA Guidance for Mobile Sources (AFIERA 2001).
Notes:
[1] Klamath Falls IAP is located in Klamath County, Oregon in AQCR No. 190, which is designated as a moderate non-attaiment area for PM_{10} and CO.
[2] Ref. Table 4-2 above for *de minimis* thresholds for applicable pollutants.
[3] Beale AFB is located in Yuba County, California in AQCR No. 28, which is designated as maintenance area for ozone and PM_{10}.
tpy – tons per year
N/A – not applicable

7.0 Conclusion

Based on the emission calculations and analyses completed for the Proposed Action, it is clear that the net change in NO_x, VOC, PM_{10}, SO_2, and CO emissions would be well below the *de minimis* threshold requirements and the regional significance requirements of the General Conformity Rule. As such, this Federal action is exempt from a Conformity Determination and all other requirements that are specified under the General Conformity Rule and applicable regulations (40 CFR 93).

8.0 References

AFIERA 2001. Air Emissions Inventory Guidance Document for Mobile Sources and Air Force Installations. U.S. Air Force Institute for Environmental Safety and Occupational Risk Analysis (AFIERA), July 2001.

EDMS 2002. Emissions and Dispersion Modeling System (EDMS). Version 4.04. Federal Aviation Administration, Office of Environment and Energy. July 31, 2002.

ORANG 2001. Oregon Air National Guard (ANG), 2001. Final 1999 Air Emissions Inventory, May 2001.

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ATTACHMENT 1

AIRCRAFT AND FUEL EMISSION CALCULATIONS

Attachment 1 to Appendix B

Emissions Estimates for Portland AFRC KC-135 EA

This Workbook Contains:

Portland Airfield Ops	Estimates of emissons from existing and proposed action aircraft operations including landings and takeoffs (LTO) and maintenance run-ups.
Alternate Airfield Ops	Estimates of emissons from proposed action aircraft operations at remote airfields, consisting primariliy of touch-and-go (TGO) training exercises.
Fuel Trucks	Estimates of emissions from the additional fuel delivery truck traffic that will be required because of the increase in jet fuel consumption under the proposed action.
Fuel Handling	Estimates of emissions from the additional fuel storage and handling that will be required because of the increase in jet fuel consumption under the proposed action.

Comparison of KC-135 Emission Factors from the Literature

Overview (data collected from Air Force and Boeing Websites)
Note: Engine Designations in [square parentheses] are military designations for these engines.

KC-135A There were a total of 732 KC-135s manufactured, of which approximately 550 KC-135s are still flying. The original engine in the KC-135A was the PW-J57 [J57-P-59W]

KC-1135R 410 of the Air Force's KC-135As were retrofit with CFM-56 [F108-CF-100] engines. These refurbished aircraft were designated as KC-135Rs (a few special-mission configuration aircraft were designated KC-135Ts and KC-135Qs)

KC-135E 161 of the AFR and ANG's KC-135As were retrofit with refurbished JT3D [TF-33-PW-102] engines from commercial 707s. These refurbished aircraft were designated as KC-135Es. There are 157 of these still flying.

The EDMS database does not list the AFR/ANG KC-135E aircraft, nor does it offer the [TF-33-PW-102] as an engine option, however, it is our understanding that Portland will fly Air Force KC-135Rs.

EDMS offers the following engine options for the KC-135R:

- CFM56-2A SERIES (this is the default engine chosen by EDMS)
- CFM56-2B
- CFM56-2B-1
- F108-CF-100
- J57-P-22

The AF-IERA Mobil Source Guidance document presents emission factors for the [F108-CF-100] for the KC-135R, and factors for the [TF33-P-102] for the KC-135E.

International Civil Aviation Organization (ICAO) Committee on Aviation Environmental Protection (CAEF
The current (July 2002) ICAO database lists 43 different emissions data sets for the CFM56 engine, corresponding to engine models up to the 7B series. All these data are certification data from newly manufactured engines (no in-service or before-overhaul data)
A visual review of the ICAO data indicate that the 5 series has the higheset NOx emissions, with emissions about 25% higher than the average of all CFM56 models tested.
The 2A series engine emission factors are generally a little lower than the average of all models.

AF IERA Factors for F108-CF-100 Ref: Roy F Weston, 1998 JP-5

	Fuel (Mlb/min)	NO_x (lb/Mlb)	HC (lb/Mlb)	CO (lb/Mlb)	SO_2 (lb/Mlb)	PM (lb/Mlb)
Taxi Out	0.01893	3.94	0.92	27.19	0.96	9.08
Takeoff	0.10763	15.28	0.03	0.63	0.96	1.59
Climbout	0.09417	13.53	0.03	1.61	0.96	0.65
Approach	0.04245	6.96	0.04	6.39	0.96	1.55
Taxi In	0.01893	3.94	0.92	27.19	0.96	9.08

(editorial note: These numbers from the AFIERA 2001 document do not exactly match the April 1999 Roy F. Weston Report. The AF IERA factors were used in the Draft EA for Portland)

EDMS 4.04 Factors for CFM56-2A SERIES Ref: ICAO 1995 - C008

	Fuel (Mlb/min)	NO_x (lb/Mlb)	HC (lb/Mlb)	CO (lb/Mlb)	SO_2 (lb/Mlb)	PM (lb/Mlb)
Taxi Out	0.017196	4.30000	1.13000	23.50000	1.00000	
Takeoff	0.147354	20.40000	0.04000	0.90000	1.00000	
Climbout	0.120503	17.30000	0.04000	0.90000	1.00000	
Approach	0.042063	8.70000	0.08000	3.40000	1.00000	
Taxi In	0.017196	4.30000	1.13000	23.50000	1.00000	

EDMS 4.04 Factors for CFM56-2B Ref: EPA-450/4-81-026d

	Fuel (Mlb/min)	NO_x (lb/Mlb)	HC (lb/Mlb)	CO (lb/Mlb)	SO_2 (lb/Mlb)	PM (lb/Mlb)
Taxi Out	0.01631	3.66000	1.67000	29.50000	1.00000	
Takeoff	0.132804	19.06000	0.05000	0.90000	1.00000	
Climbout	0.110952	16.30000	0.08000	0.90000	1.00000	
Approach	0.042685	8.14000	0.10000	3.70000	1.00000	
Taxi In	0.01631	3.66000	1.67000	29.50000	1.00000	

EDMS 4.04 Factors for CFM56-2B-1 Ref: ICAO 1995 - C009

	Fuel (Mlb/min)	NO_x (lb/Mlb)	HC (lb/Mlb)	CO (lb/Mlb)	SO_2 (lb/Mlb)	PM (lb/Mlb)
Taxi Out	0.016931	4.00000	1.82999	30.70000	1.00000	
Takeoff	0.130291	18.50000	0.04000	0.90000	1.00000	
Climbout	0.108333	16.00000	0.05000	0.90000	1.00000	
Approach	0.041138	8.20000	0.07999	4.20000	1.00000	
Taxi In	0.016931	4.00000	1.82999	30.70000	1.00000	

EDMS 4.04 Factors for F108-CF-100 Ref: Air Force

	Fuel (Mlb/min)	NO_x (lb/Mlb)	HC (lb/Mlb)	CO (lb/Mlb)	SO_2 (lb/Mlb)	PM (lb/Mlb)
Taxi Out	0.018929	3.94097	0.92022	27.19666	0.54012	
Takeoff	0.107632	15.28005	0.03000	0.63000	0.54000	
Climbout	0.094167	13.52991	0.03000	1.60999	0.53999	
Approach	0.042447	6.96043	0.04000	6.39040	0.54003	
Taxi In	0.018929	3.94097	0.92022	27.19666	0.54012	

EDMS 4.04 Factors for J57-P-22 Ref: Pratt & Whitney

	Fuel (Mlb/min)	NO_x (lb/Mlb)	HC (lb/Mlb)	CO (lb/Mlb)	SO_2 (lb/Mlb)	PM (lb/Mlb)
Taxi Out	0.018122	2.48001	51.33001	59.30000	0.53998	
Takeoff	0.139299	11.16000	0.65000	1.80000	0.54000	
Climbout	0.139299	11.16000	0.65000	1.80000	0.54000	
Approach	0.028214	2.95001	12.40000	23.50000	0.53999	
Taxi In	0.018122	2.48001	51.33001	59.30000	0.53998	

Armstrong Labs (Brooks AFB) 1994 Emission factors for F108-CF-100 (JP-4 presumed)

	Fuel (Mlb/min)	NO_x (lb/Mlb)	HC (lb/Mlb)	CO (lb/Mlb)	SO_2 (lb/Mlb)	PM (lb/Mlb)
Taxi Out	0.02483	2.845638	0.812081	17.07383	1	
Takeoff	0.14817	21.04949	0.040495	0.899888	1	
Climbout	0.12300	17.18022	0.04065	0.899729	1	
Approach	0.04500	8.618519	0.1	3.4	1	
Taxi In	0.02483	2.845638	0.812081	17.07383	1	

ACAM Version 3.08 Factors for F108-CF-100 Ref: AF IERA 2001

	Fuel (Mlb/min)	NO_x (lb/Mlb)	HC (lb/Mlb)	CO (lb/Mlb)	SO_2 (lb/Mlb)	PM (lb/Mlb)
Taxi Out	0.01893	3.94	0.92	27.19	1	
Takeoff	0.10763	15.28	0.03	0.63	1	
Climbout	0.09417	13.53	0.03	1.61	1	
Approach	0.04245	6.96	0.04	6.39	1	
Taxi In	0.01893	3.94	0.92	27.19	1	

Comparison of KC-135 Emission Factor Sets - Emissions per LTO

Emission Factor Data Set	NO_x (lb/LTO)	HC (lb/LTO)	CO (lb/LTO)	SO_2 (lb/LTO)	PM (lb/LTO)
AF IERA Factors for F108-CF-100	19.5	1.2	39.1	2.6	12.8
EDMS 4.04 Factors for CFM56-2A SERIES	27.0	1.3	29.4	2.8	0.0
EDMS 4.04 Factors for CFM56-2B	23.6	1.9	34.5	2.7	0.0
EDMS 4.04 Factors for CFM56-2B-1	23.4	2.1	37.2	2.6	0.0
EDMS 4.04 Factors for F108-CF-100	19.5	1.2	39.1	1.5	0.0
EDMS 4.04 Factors for J57-P-22	14.5	66.9	83.5	1.4	0.0
Armstrong Labs (Brooks AFB) 1994 Emission	27.5	1.4	30.8	3.3	0.0
ACAM Version 3.08 Factors for F108-CF-100	19.5	1.2	39.1	2.7	0.0

CONCLUSION

For this analysis, the default KC-135 emission factors from the Emissions and Dispersion Modeling System (EDMS) Version 4.04 (7/31/02) from the Office of Environment and Energy, Federal Aviation Administration, will be used. Particulate emission factors from the AF IERA reference "Air Emissions Inventory Guidance Document for Mobile Sources at Air Force Installations" will be used because that is the only reference that lists PM emission factors for this engine.

Portland AFRC Airfield Operation Emissions (LTOs, TGOs, and Runups)

Aircraft Descriptions and Airfield Activity Data

KC-135R

			2000	2003	2005
8	assigned aircraft	LTO Ops	0	900	1,800
4	engines each	TGO Ops			
F108-CF-100 (CFM56)	engine model	Runups		48	96

C-130-P

			2000	2003	2005
5	assigned aircraft	LTO Ops	636	636	0
4	engines each	TGO Ops			
T56-A-15	engine model	Runups	60	60	

MH-60G

			2000	2003	2005
8	assigned aircraft	LTO Ops	1356	1356	0
2	engines each	TGO Ops			
T700-GE-701C	engine model	Runups	32	32	

Emissions are estimated for current activities (CY2000), full implementation of the Proposed Action (CY2005) and for the year where the incoming and outgoing aircraft fleets overlap (CY2003).

Emission Factors, Time-In-Mode, and Fuel Consumption Rates (per engine)

KC-135R	Fuel (Mlb/min)	LTO TIM (minutes)	TGO (minutes)	Runup (minutes)	NO_x (lb/Mlb)	HC (lb/Mlb)	CO (lb/Mlb)	SO_2 (lb/Mlb)	PM (lb/Mlb)
Taxi Out	0.01720	9.18		7.5	4.3	1.13	23.5	0.96	9.08
Takeoff	0.14735	0.42	0.42	30	20.4	0.040	0.9	0.96	1.59
Climbout	0.12050	1.2	1.2		17.3	0.040	0.9	0.96	0.65
Approach	0.04206	5.1	5.1		8.7	0.080	3.4	0.96	1.55
Taxi In	0.01720	9.18			4.3	1.13	23.5	0.96	9.08

C-130-P	Fuel (Mlb/min)	LTO TIM (minutes)	TGO (minutes)	Runup (minutes)	NO_x (lb/Mlb)	HC (lb/Mlb)	CO (lb/Mlb)	SO_2 (lb/Mlb)	PM (lb/Mlb)
Taxi Out	0.01500	9.2		8	7.49	1.97	3.84	0.96	3.64
Takeoff	0.04093	0.4	0.4	40	11.42	0.28	1.77	0.96	1.22
Climbout	0.03633	1.2	1.2		9.69	0.42	1.65	0.96	1.46
Approach	0.02067	5.1	5.1		8.31	0.58	2.82	0.96	3.85
Taxi In	0.01500	6.7			7.49	1.97	3.84	0.96	3.64

MH 60 G	Fuel (Mlb/min)	LTO TIM (minutes)	TGO (minutes)	Runup (minutes)	NO_x (lb/Mlb)	HC (lb/Mlb)	CO (lb/Mlb)	SO_2 (lb/Mlb)	PM (lb/Mlb)
Taxi Out	0.00222	8		38	2.78	56.67	53.18	0.96	1.48
Takeoff	0.01177				8.61	0.39	3.09	0.96	2.6
Climbout	0.00982	6.8	6.8		8.18	0.49	3.75	0.96	2.22
Approach	0.00833	6.8	6.8		7.56	0.37	5.25	0.96	1.26
Taxi In	0.00222	7			2.78	56.67	53.18	0.96	1.48

References:

-NOx, HC, and CO emission factors for KC-135s are taken from the Emissions & Dispersion Modeling System (EDMS) Version 4.04 (7/31/02) from the Office of Environment and Energy, Federal Aviation Administration.

-TIMs for KC 135Rs were taken from Data provided by Gus Hare of e^2M on 2/15/2002

-All other Emission factors & TIMs taken from Table 3-3, AFIERA, "AEI Guidance for Mobile Sources at Air Force Installations", Brooks AFB, July 2001.

-SOx emission factors assume a fuel sulfur content of 0.085 wt%, from Table 3-6, AFIERA

-TIMs for the C-130 and the H-60G were taken from Table 3-7 from the same reference

-Run-up times were provided by Sam Ream of 939 RQW in an email dated 19 Feb 2002:

For (8) KC-135s: 60 hours per year total run-up time for the fleet

For (5) C-130s: 48 hours per year total run-up time for the fleet

For (8) H-60s: 20 hours per year total run-up time for the fleet

-According to the 2/20/02 email from Sam Ream of 939 RQW, the thrust settings are:

KC-135: Assume similar to C-130 runups.

C-130: 90% four engines at full power, 10% 1-2 engines at full power

H-60s: All ground idle

-We will assume monthly run-ups for each aircraft. Therefore, to match the time data:

-KC-135: (8 aircraft)(12 power runs each per year)(37.5 minutes per test) = 60 hours

-C-130 : (5 aircraft)(12 power runs each per year)(48 minutes per test) = 48 hours

-H-60G : (8 aircraft) (4 power runs each per year)(38 minutes per test) = 20 hours

-This simplified (conservative) estimate does not adjust for the 10% of the tests that test only 1-2 engines.

Notes:

Each set of LTO TIMs and TGO TIMs listed in the tables above corresponds to two ops: a complete landing and takeoff or a complete touch-and-go.

Calculations

lbs = (# engines)*(EF lb/Mlb fuel)*(fuel Mlb/min)*(TIM minutes)(total Ops/2) summed over all power settings

2000 Airfield Operation Emissions Estimates

KC-135R **2000 Emissions Estimates**

	NO_x (lbs)	HC (lbs)	CO (lbs)	SO_2 (lbs)	PM (lbs)
LTOs	0	0	0	0	0
TGOs	0	0	0	0	0
Runups	0	0	0	0	0
Totals	0	0	0	0	0

C-130-P **2000 Emissions Estimates**

	NO_x (lbs)	HC (lbs)	CO (lbs)	SO_2 (lbs)	PM (lbs)
LTOs	4,162	705	1,671	493	1,727
TGOs	0	0	0	0	0
Runups	4,703	167	806	405	584
Totals	8,865	871	2,478	898	2,311

MH-60G **2000 Emissions Estimates**

	NO_x (lbs)	HC (lbs)	CO (lbs)	SO_2 (lbs)	PM (lbs)
LTOs	1,447	2,628	3,141	204	364
TGOs	0	0	0	0	0
Runups	15	306	287	5	8
Totals	1,462	2,933	3,427	209	372

Grand Total **2000 Emissions Estimates**

	NO_x (lbs)	HC (lbs)	CO (lbs)	SO_2 (lbs)	PM (lbs)
LTOs	5,608	3,332	4,812	697	2,091
TGOs	0	0	0	0	0
Runups	4,718	472	1,093	410	592
Totals	10,327	3,805	5,905	1,107	2,684
Total Tons per Year	**5.2**	**1.9**	**3.0**	**0.6**	**1.3**
LTO/TGO	2.8	1.7	2.4	0.3	1.0
Runups	2.4	0.2	0.5	0.2	0.3

2003 Airfield Operation Emissions Estimates

KC-135R **2003 Emissions Estimates**

	NO_x (lbs)	HC (lbs)	CO (lbs)	SO_2 (lbs)	PM (lbs)
LTOs	12,579	688	15,002	1,273	6,105
TGOs	0	0	0	0	0
Runups	17,421	62	1,346	839	1,574
Totals	30,000	750	16,348	2,112	7,679

C-130-P **2003 Emissions Estimates**

	NO_x (lbs)	HC (lbs)	CO (lbs)	SO_2 (lbs)	PM (lbs)
LTOs	4,162	705	1,671	493	1,727
TGOs	0	0	0	0	0
Runups	4,703	167	806	405	584
Totals	8,865	871	2,478	898	2,311

MH-60G **2003 Emissions Estimates**

	NO_x (lbs)	HC (lbs)	CO (lbs)	SO_2 (lbs)	PM (lbs)
LTOs	1,447	2,628	3,141	204	364
TGOs	0	0	0	0	0
Runups	15	306	287	5	8
Totals	1,462	2,933	3,427	209	372

Grand Total **2003 Emissions Estimates**

	NO_x (lbs)	HC (lbs)	CO (lbs)	SO_2 (lbs)	PM (lbs)
LTOs	18,187	4,020	19,814	1,970	8,196
TGOs	0	0	0	0	0
Runups	22,140	534	2,439	1,249	2,167
Totals	40,326	4,555	22,253	3,219	10,363
Total Tons per Year	**20.2**	**2.3**	**11.1**	**1.6**	**5.2**
LTO/TGO	9.1	2.0	9.9	1.0	4.1
Runups	11.1	0.3	1.2	0.6	1.1
Net Change: 2003 - 2000 tpy	15.0	0.4	8.2	1.1	3.8

2005 Airfield Operation Emissions Estimates

KC-135R **2005 Emissions Estimates**

	NO_x (lbs)	HC (lbs)	CO (lbs)	SO_2 (lbs)	PM (lbs)
LTOs	25,157	1,376	30,004	2,546	12,210
TGOs	0	0	0	0	0
Runups	34,842	124	2,692	1,677	3,149
Totals	60,000	1,500	32,696	4,223	15,358

C-130-P **2005 Emissions Estimates**

	NO_x (lbs)	HC (lbs)	CO (lbs)	SO_2 (lbs)	PM (lbs)
LTOs	0	0	0	0	0
TGOs	0	0	0	0	0
Runups	0	0	0	0	0
Totals	0	0	0	0	0

MH-60G **2005 Emissions Estimates**

	NO_x (lbs)	HC (lbs)	CO (lbs)	SO_2 (lbs)	PM (lbs)
LTOs	0	0	0	0	0
TGOs	0	0	0	0	0
Runups	0	0	0	0	0
Totals	0	0	0	0	0

Grand Total **2005 Emissions Estimates**

	NO_x (lbs)	HC (lbs)	CO (lbs)	SO_2 (lbs)	PM (lbs)
LTOs	25,157	1,376	30,004	2,546	12,210
TGOs	0	0	0	0	0
Runups	34,842	124	2,692	1,677	3,149
Totals	60,000	1,500	32,696	4,223	15,358
Total Tons per Year	**30.0**	**0.7**	**16.3**	**2.1**	**7.7**
LTO/TGO	12.6	0.7	15.0	1.3	6.1
Runups	17.4	0.1	1.3	0.8	1.6
Net Change: 2005 - 2000 tpy	24.84	-1.15	13.40	1.56	6.34

Summary

	NO_x (ton)	HC (ton)	CO (ton)	SO_2 (ton)	PM (ton)
2000	5.2	1.9	3.0	0.6	1.3
2003	20.2	2.3	11.1	1.6	5.2
2004	26.2	0.7	14.3	1.8	6.7
2005	30.0	0.7	16.3	2.1	7.7

Where 2004 emissions are simply 7/8 of 2005 emissions, because all HH-60s and C-130s are due to be gone, and an average of 7 KC-135s are due to be on site during CY2004.

Net Change: 2004 - 2000 tpy	21.09	-1.25	11.35	1.29	5.38

Estimation of Airfield Fleets and Operations for Target Years

The only emissions that are expected to change as a result of the Proposed Action are Airfield Operations, and Construction emissions. Airfield ops are expected to scale proportionally to the number of aircraft based in any year.

Aircraft Drawdown/Ramp-Up

Qtr/FY	HH-60	C-130	KC-135	Total	Qtr/CY
1Q/2003	4	5	2	11	1Q/2003
2Q/2003	4	5	4	13	2Q/2003
3Q/2003	4	5	4	13	3Q/2003
4Q/2003	4	5	6	15	4Q/2003
1Q/2004	0	0	6	6	1Q/2004
2Q/2004	0	0	6	6	2Q/2004
3Q/2004	0	0	6	6	3Q/2004
4Q/2004	0	0	8	8	4Q/2004
1Q/2005	0	0	8	8	1Q/2005
2Q/2005	0	0	8	8	2Q/2005
3Q/2005	0	0	8	8	3Q/2005
4Q/2005	0	0	8	8	4Q/2005

Ref: email from Marty Heigh of e^2M, January 2002.

The number of airfield operations will be assumed proportional to the number of aircraft stationed during the year.

Alternate Airfield Operation Emissions (TGOs)

Aircraft Descriptions and Airfield Activity Data

KC-135R

			2005	
8	assigned aircraft	LTO Ops		
4	engines each	TGO Ops	900	(per alternate airfield)
F108-CF-100	engine model	Runups		

Emission Factors, Time-In-Mode, and Fuel Consumption Rates (per engine)

KC-135R	Fuel (Mlb/min)	LTO TIM (minutes)	TGO (minutes)	Runup (minutes)	NOx (lb/Mlb)	HC (lb/Mlb)	CO (lb/Mlb)	SO2 (lb/Mlb)	PM (lb/Mlb)
Taxi Out	0.01720				4.3	1.13	23.5	0.96	9.08
Takeoff	0.14735		0.42		20.4	0.040	0.9	0.96	1.59
Climbout	0.12050		1.2		17.3	0.040	0.9	0.96	0.65
Approach	0.04206		5.1		8.7	0.080	3.4	0.96	1.55
Taxi In	0.01720				4.3	1.13	23.5	0.96	9.08

References:

-NOx, HC, and CO emission factors are taken from the Emissions & Dispersion Modeling System (EDMS) Version 4.04 (7/31/02) from the Office of Environment and Energy, Federal Aviation Administration.

-PM Emission factors taken from Table 3-3, AFIERA AEI Guidance for Mobile Sources at Air Force Installations, Brooks AFB, July 2001.

-TIMs for KC 135Rs were taken from Data provided by Gus Hare of e^2M on 2/15/2002

-SO_x emission factors assume a fuel sulfur content of 0.085 wt%, from Table 3-6, AFIERA

Notes:

-Each set of LTO TIMs and TGO TIMs listed in the tables above corresponds to two ops: a complete landing and takeoff or a complete touch-and-go.

Calculations

lbs = (# engines)*(EF lb/Mlb fuel)*(fuel Mlb/min)*(TIM minutes)(total Ops/2) summed over all power settings

2005 Alternate Airfield Operation Emissions Estimates

KC-135R **2005 Emissions Estimates**

	NO_x (lbs)	HC (lbs)	CO (lbs)	SO_2 (lbs)	PM (lbs)
LTOs	0	0	0	0	0
TGOs	10,135	46	1,647	728	945
Runups	0	0	0	0	0
Totals	10,135	46	1,647	728	945
tpy	5.07	0.02	0.82	0.36	0.47

Estimate of Emissions from Additional Truck Traffic Associated with Proposed Action

(939th Fueling Operations @ 8.6 MM gal/year and 10,000 gallon fuel trucks = 860 trips)

Pollutant Name	#Trips/Day	# Days/yr	R/T Distance (mi./trip)	Emiss. Factor (g/mi)	Emissions (lbs/yr)	Emiss. (tpy)
Nitrogen Oxides(NOx)	3.82	225	16	6.5	197	0.10
Volatile Organic Compounds (VOCs)	"	"	"	2	61	0.03
Sulfur Oxides (SOx)	"	"	"	0.512	16	0.01
Fine Particulate (PM10)	"	"	"	7.73	234	0.12
Carbon Monoxide (CO)	"	"	"	11.1	337	0.17

Emission factors for heavy-duty diesel trucks (average 1999 model year, CY2005 emissions rates) are from U.S. EPA MOBIL5 emissions model, as compiled and published in the " Air Emissions Inventory Guidance Document for Mobile Sources at Air Force Installations". U.S. Air Force Institute for Environmental Safety and Occupational Health Risk Analysis (AFIERA), July 2001.

Note: Based on data collected from fuel shop staff:

1) Current fuel use by the 939th RQW is approximately 8MM gal/yr.
   This is the estimate that that Mr. Wilson gave to Sam Ream.
2) Throughput for AFR and ORANG combined is currently about 8 MM gal/yr
   This is projected to increase by 8.6 MM gal/yr with the proposed Action, according to the DOPAA.
3) Commercial Tanker Trucks with a 10,000 gal capacity bring the fuel in.
4) Round Trip to fuel terminal is approx. 16 miles.
5) The fuel trucks come from Harris Trucking, they average model year 1999 and are
   Freightliner Century Class trucks. Average speed is about 20 miles per hour,

Estimate of Emissions from Additional Fuel Handling Associated with the Proposed Action

(939th Fueling Operations @ 8.6 MM gal/year increase in fuel demand)

Emissions from loading JP-8 (Jet kerosene) onto aircraft can be estimated using the emission factor for submerged filling of tank trucks with jet kerosene, as listed in Table 5.2-5 of AP-42 Section 5.2 "Transportation and Marketing of Petroleum Liquids" dated 1/95.
That emission factor is is 0.04 lbs per 1000 gallons loaded.

However, fuel used at Portland ANGB is also stored, and is handled twice (loading rack to truck and truck to aircraft) before leaving the base.

Once the fuel hydrant system (part of the proposed action) is completed, fuel loaded on to KC-135s will be handled only once, as it will be pumped directly from the tanks through the hydrants and onto the aircraft.

For this estimate, the current practice of handling fuel twice will be used as the basis for a conservative estimate of the net increase in fuel handling emissions.

$$\frac{8{,}600{,}000 \text{ gal}}{\text{year}} \quad \frac{0.04 \text{ lb VOC}}{1000 \text{ gal}} \quad 2 \quad = \quad \frac{688 \text{ lbs VOC}}{\text{year}}$$

There will also be small additional emissions from storage tanks and from fuel trucks used to deliver fuel to the aircraft until the hydrants are in place. The emissions from the additonal 8.6 MM gallons of fuel throughput for the two-315,000 gallon storage tanks is insignificant because the additional throughput is far below the PSEL dictated in the Portland ANGB synthetic minor air operating permit limit (ORANG 2001).

ATTACHMENT 2

CONSTRUCTION EMISSION CALCULATIONS

Attachment 2 to Appendix B

Emissions Estimates for Portland AFRC KC-135 EA - Construction

This workbook contains

Summary	(this worksheet) Summarizes total emissions by calendar year.
Combustion	(one sheet for each calendar year) Estimates emissions from non-road equipment exhaust as well as painting.
Grading	(one sheet for each calendar year) Estimates the number of days of site preparation, to be used for estimating heavy equipment exhaust and earthmoving dust emissions)
Fugitive	(one sheet for each calendar year) Estimates fine particulate emissions from earthmoving, vehicle traffic, and windblown dust.

Summary of Construction Emissions

		NO_x (ton)	HC (ton)	CO (ton)	SO_2 (ton)	PM_{10} (ton)
CY2003						
	Combustion	9.92	3.75	8.25	0.50	0.87
	Fugitive Dust					9.14
	TOTAL CY2003	9.92	3.75	8.25	0.50	10.01
CY2004						
	Combustion	15.63	5.37	13.50	0.78	1.30
	Fugitive Dust					9.83
	TOTAL CY2004	15.63	5.37	13.50	0.78	11.13
CY2005						
	Combustion	4.65	2.27	3.98	0.23	0.39
	Fugitive Dust					3.25
	TOTAL CY2005	4.65	2.27	3.98	0.23	3.64
CY2006						
	Combustion	0.41	0.34	0.38	0.02	0.03
	Fugitive Dust					0.14
	TOTAL CY2006	0.41	0.34	0.38	0.02	0.17

Proposed Construction and Demolition Projects at Portland ANGB

Includes:

100% of Phase 1 - Aircraft Parking Overlay - Fuel Hydrant System. 291,110 ft^2

100% of the demolition for the Maintenance Shop Modifications Bldgs 360, 365 and 380. 1,786 ft^2

100% of the construction for the Maintenance Shop Modifications Bldgs 360, 365 and 380. 37,222 ft^2

100% of the construction for the Phase 1 - Consolidated Training Facility. 3,380 ft^2

Construction Site Air Emissions

Combustive Emissions of ROG, NO_x, SO_2, CO and PM_{10} Due to Construction

31-Jan-02

User Inputs:

Total Building Area:	42,388	ft^2	(Phase 1 of Consolidated Training Facility and Maintenance Modifications)
Total Paved Area:	291,110	ft^2	(Aircraft Parking Overlay)
Total Disturbed Area:	7.7	acres	(Total Building Area and Total Paved Area)
Construction Duration:	1.0	years	(assumed)
Annual Construction Activity:	230	days/yr	(assumed)

Results:[Average per Year Over the Construction Period]

	ROG	NO_x	SO_2	CO	PM_{10}
Emissions, lbs/day	32.60	86.29	4.37	71.77	7.57
Emissions, tons/yr	3.75	9.92	0.50	8.25	0.87

Calculation of Unmitigated Emissions

Summary of Input Parameters

	ROG	NO_x	SO_2	CO	PM_{10}
Total new acres disturbed:	7.65	7.65	7.65	7.65	7.65
Total new acres paved:	0.00	0.00	0.00	0.00	0.00
Total new building space, ft^2:	42,388	42,388	42,388	42,388	42,388
Total years:	1.00	1.00	1.00	1.00	1.00
Area graded, acres in 1 yr:	7.65	7.65	7.65	7.65	7.65
Area paved, acres in 1 yr:	0.00	0.00	0.00	0.00	0.00
Building space, ft^2 in 1 yr:	42,388	42,388	42,388	42,388	42,388

Annual Emissions by Source (lbs/day)

	ROG	NO_x	SO_2	CO	PM_{10}
Grading Equipment	1.9	12.2	0.8	2.6	2.1
Asphalt Paving	0.0	0.0	0.0	0.0	0.0
Stationary Equipment	7.1	5.8	0.4	1.3	0.3
Mobile Equipment	6.8	68.2	3.2	67.9	5.1
Architectural Coatings (Non-Res)	16.8	0.0	0.0	0.0	0.0
Total Emissions (lbs/day):	**32.6**	**86.3**	**4.4**	**71.8**	**7.6**

Emission Factors

Reference: Air Quality Thresholds of Significance, SMAQMD, 1994.

	SMAQMD Emission Factor				
Source	ROG	NO_x	SO_2 *	CO *	PM_{10}
Grading Equipment	2.50E-01 lbs/acre/day	1.60E+00 lbs/acre/day	0.11 lbs/acre/day	0.35 lbs/acre/day	2.80E-01 lbs/acre/day
Asphalt Paving	2.62E-01 lbs/acre/day	NA	NA	NA	NA
Stationary Equipment	1.68E-04 lbs/day/ft^2	1.37E-04 lbs/day/ft^2	9.11E-06 lbs/day/ft^2	######## lbs/day/ft^2	8.00E-06 lbs/day/ft^2
Mobile Equipment	1.60E-04 lbs/day/ft^2	1.61E-03 lbs/day/ft^2	7.48E-05 lbs/day/ft^2	0.0016 lbs/day/ft^2	1.20E-04 lbs/day/ft^2
Architectural Coatings (Non-Res)	8.15E-02 lbs/day/ft	NA	NA	NA	NA

* Factors for grading equipment and stationary equipment are calculated from AP-42 for diesel engines using ratios with the NO_x factors.
Factors for mobile equipment are calculated from ratios with Mobile5a 2001 NO_x emission factors for heavy duty trucks for each site.

Construction Fugitive Dust Emissions

Calculation of PM10 Emissions Due to Site Preparation (Uncontrolled).
Worksheet Revised 16 June 1997.

User Input Parameters / Assumptions

Acres graded per year:	7.7	acres/yr	(From "Combustion" worksheet)
Grading days/yr:	25	days/yr	(From "Grading" worksheet)
Exposed days/yr:	90	assumed days/yr graded area is exposed	
Grading Hours/day:	8	hr/day	
Soil piles area fraction:	0.10	(assumed fraction of site area covered by soil piles)	
Soil percent silt, s:	8.5	%	(mean silt content; expected range: 0.5 to 23, AP-42 Table 13.2.2-1)
Soil percent moisture, M:	50	%	(assumed based upon the moist climate of Oregon)
Annual rainfall days, p:	170	days/yr	rainfall exceeds 0.01 inch/day (AP-42 Fig 13.2.2-1)
Wind speed > 12 mph %, I:	1	%	(www.webmet.com/state_pages/samson/24229_sam.htm)
Fraction of TSP, J:	0.5	(SCAQMD recommendation)	
Mean vehicle speed, S:	5	mi/hr	(On-site)
Dozer path width:	8	ft	
Qty construction vehicles:	1	vehicles	(From "Grading" worksheet)
On-site VMT/vehicle/day:	5	mi/veh/day	(Excluding bulldozer VMT during grading)
PM_{10} Adjustment Factor k	2.6	lb/VMT	(AP-42 Table 13.2.2-2 9/98 for PM_{10})
PM_{10} Adjustment Factor a	0.8	(dimensionless)	(AP-42 Table 13.2.2-2 9/98 for PM_{10})
PM_{10} Adjustment Factor b	0.4	(dimensionless)	(AP-42 Table 13.2.2-2 9/98 for PM_{10})
PM_{10} Adjustment Factor c	0.3	(dimensionless)	(AP-42 Table 13.2.2-2 9/98 for PM_{10})
Mean Vehicle Weight W	40	tons	assumed for aggregate trucks

Emissions Due to Soil Disturbance Activities

Operation Parameters (Calculated from User Inputs)

Grading duration per acre	26.1	hr/acre	
Bulldozer mileage per acre	1	VMT/acre	(Miles traveled by bulldozer during grading)
Construction VMT per day	5	VMT/day	
Construction VMT per acre	15	VMT/acre	(Travel on unpaved surfaces within site)

Equations Used (Corrected for PM_{10})

Operation	Empirical Equation	Units	AP-42 Section (5th Edition)
Bulldozing	$0.75(s^{1.5})/(M^{1.4})$	lbs/hr	Table 11.9-18.24, Overburden
Grading	$(0.60)(0.051)s^{2.0}$	lbs/VMT	Table 11.9-18.24
Vehicle Traffic	$[k(s/12)^{a} (W/3)^{b}/(M/0.2)^{c}] [(365-P)/365]$	lbs/VMT	Section 13.2.2

Source: Compilation of Air Pollutant Emission Factors, Vol. I, USEPA AP-42, Section 11.9 dated 7/98 and Section 13.2 dated 9/98

Calculation of PM_{10} Emission Factors for Each Operation

Operation	Emission Factor (mass/ unit)	Operation Parameter	Emission Factor (lbs/ acre)
Bulldozing	0.08 lbs/hr	26.1 hr/acre	2.1 lbs/acre
Grading	0.77 lbs/VMT	1 VMT/acre	0.8 lbs/acre
Vehicle Traffic	0.57 lbs/VMT	15 VMT/acre	8.5 lbs/acre

Emissions Due to Wind Erosion of Soil Piles and Exposed Graded Surface

Reference: Air Quality Thresholds of Significance, SMAQMD, 1994.

Soil Piles EF = 1.7(s/1.5)[(365 - H)/235](I/15)(J) = (s)(365 - H)(I)(J)/(3110.2941), p. A9-99.

Soil Piles EF = 0.3 lbs/day/acre covered by soil piles

Consider soil piles area fraction so that EF applies to graded area

Soil piles area fraction: 0.10 (Fraction of site area covered by soil piles)
Soil Piles EF = 0.03 lbs/day/acre graded

Graded Surface EF = 26.4 lbs/day/acre (recommended in CEQA Manual, p. A9-93).

Calculation of Annual PM_{10} Emissions

Source	Emission Factor	Graded Acres/yr	Exposed days/yr	Emissions lbs/yr	Emissions tons/yr
Bulldozing	2.1 lbs/acre	7.65	NA	16	0.01
Grading	0.8 lbs/acre	7.65	NA	6	0.00
Vehicle Traffic	8.5 lbs/acre	7.65	NA	65	0.03
Erosion of Soil Piles	0.0 lbs/acre/day	7.65	90	21	0.01
Erosion of Graded Surface	26.4 lbs/acre/day	7.65	90	18,176	9.09
TOTAL				18,284	9.14

Construction (Grading) Schedule

Estimate of time required to grade a specified area.
31-Jan-02

Input Parameters
Construction area 8 acres/yr (from "Combustion" Worksheet)
Qty Equipment: 0.92 (calculated based on acres disturbed)

Assumptions.
Terrain is mostly flat.
Terrain is populated with grass; trees are negligible.
An average of 6" soil is removed during stripping.
An average of 6" soil is excavated from one half of the site and backfilled to the other half of the site; no soil is hauled off-site or borrowed.
200 hp bulldozers are used for site clearing.
300 hp bulldozers are used for stripping, excavation, and backfill.
Vibratory drum rollers are used for compacting.
Stripping, Excavation, Backfill and Compaction require an average of two passes each.
Excavation and Backfill are assumed to involve only half of the site.

Calculation of days required for one piece of equipment to grade the specified area.

Reference: Means Heavy Construction Cost Data, 6th Ed., R. S. Means, 1992.

Means Line No.	Operation	Description	Output	Units	Acres per equip-day)	Equip-days per acre	Acres/yr	Equip-days per year
021 108 0550	Site Clearing	Dozer & rake, medium brush	0.6	acre/day	0.6	1.67	7.65	12.75
021 144 0300	Stripping	Topsoil & stockpiling, adverse soil	1,650	cu. yd/day	2.05	0.49	7.65	3.74
022 242 5220	Excavation	Bulk, open site, common earth, 150' haul	800	cu. yd/day	0.99	1.01	3.83	3.86
022 208 5220	Backfill	Structural, common earth, 150' haul	1,950	cu. yd/day	2.42	0.41	3.83	1.58
022 226 5020	Compaction	Vibrating roller, 6 " lifts, 3 passes	1,950	cu. yd/day	2.42	0.41	7.65	3.16
TOTAL								25.09

Calculation of days required for the indicated pieces of equipment to grade the designated acreage.

(Equip)(day)/yr: 25.09
Qty Equipment: 0.92
Grading days/yr: 25.09

Round to 25 grading days/yr

Proposed Construction and Demolition Projects at Portland ANGB
Includes:
100% of Phase 2 - Aircraft Parking Overlay - Fuel Hydrant System. 291,110 ft^2
100% of the construction for the Phase 2 - Consolidated Training Facility. 16,157 ft^2
100% of Alterations to Bldg 375. 8,930 ft^2
100% of the Modifications to Bldg 304. 6,714 ft^2 - demolition and 6,717 ft^2 - construction
100% of the demolition and construction for the Fire/Crash Rescue Station. 8,608 ft^2 - demolition and 16,146 ft^2 - construction
100% of the paving for the Fire/Crash Rescue Station. 4300 ft^2
100% of the modifications to Bldg 315. 6,980 ft2 - construction

Combustive Emissions of ROG, NO_x, SO_2, CO and PM_{10} Due to Construction

26-Jan-01

User Inputs:

Total Building Area:	70,252	ft^2	(Sum of the sboe mentioned construction and demolition projects)
Total Paved Area:	295,410	ft^2	(Aircraft Parking Overlay - grading only, concrete to be used. Fire/Crash rescue station ashpalt area.)
Total Disturbed Area:	8.2	acres	(Total Building Area and Total Paved Area)
Construction Duration:	1.0	years	(assumed)
Annual Construction Activity:	230	days/yr	(assumed)

Results:[Average per Year Over the Construction Period]

	ROG	NO_x	SO_2	CO	PM_{10}
Emissions, lbs/day	46.73	135.90	6.77	117.41	11.30
Emissions, tons/yr	5.37	15.63	0.78	13.50	1.30

Calculation of Unmitigated Emissions

Summary of Input Parameters

	ROG	NO_x	SO_2	CO	PM_{10}
Total new acres disturbed:	8.23	8.23	8.23	8.23	8.23
Total new acres paved:	0.10	0.10	0.10	0.10	0.10
Total new building space, ft^2:	70,252	70,252	70,252	70,252	70,252
Total years:	1.00	1.00	1.00	1.00	1.00
Area graded, acres in 1 yr:	8.23	8.23	8.23	8.23	8.23
Area paved, acres in 1 yr:	0.10	0.10	0.10	0.10	0.10
Building space, ft^2 in 1 yr:	70,252	70,252	70,252	70,252	70,252

Annual Emissions by Source (lbs/day)

	ROG	NO_x	SO_2	CO	PM_{10}
Grading Equipment	2.1	13.2	0.9	2.8	2.3
Asphalt Paving	0.0	0.0	0.0	0.0	0.0
Stationary Equipment	11.8	9.6	0.6	2.1	0.6
Mobile Equipment	11.2	113.1	5.3	112.5	8.4
Architectural Coatings (Non-Res)	21.6	0.0	0.0	0.0	0.0
Total Emissions (lbs/day):	**46.7**	**135.9**	**6.8**	**117.4**	**11.3**

Emission Factors

Reference: Air Quality Thresholds of Significance, SMAQMD, 1994.

	SMAQMD Emission Factor				
Source	ROG	NO_x	SO_2 *	CO *	PM_{10}
Grading Equipment	2.50E-01 lbs/acre/day	1.60E+00 lbs/acre/day	0.11 lbs/acre/day	0.35 lbs/acre/day	2.80E-01 lbs/acre/day
Asphalt Paving	2.62E-01 lbs/acre/day	NA	NA	NA	NA
Stationary Equipment	1.68E-04 lbs/day/ft²	1.37E-04 lbs/day/ft²	9.11E-06 lbs/day/ft²	######## lbs/day/ft²	8.00E-06 lbs/day/ft²
Mobile Equipment	1.60E-04 lbs/day/ft²	1.61E-03 lbs/day/ft²	7.48E-05 lbs/day/ft²	0.0016 lbs/day/ft²	1.20E-04 lbs/day/ft²
Architectural Coatings (Non-Res)	8.15E-02 lbs/day/ft	NA	NA	NA	NA

* Factors for grading equipment and stationary equipment are calculated from AP-42 for diesel engines using ratios with the NOx factors. Factors for mobile equipment are calculated from ratios with Mobile5a 2001 NOx emission factors for heavy duty trucks for each site.

Construction Fugitive Dust Emissions

Calculation of PM10 Emissions Due to Site Preparation (Uncontrolled).
Worksheet Revised 16 June 1997.

User Input Parameters / Assumptions

Acres graded per year:	8.2	acres/yr	(From "Combustion" worksheet)
Grading days/yr:	25	days/yr	(From "Grading" worksheet)
Exposed days/yr:	90	assumed days/yr graded area is exposed	
Grading Hours/day:	8	hr/day	
Soil piles area fraction:	0.10	(assumed fraction of site area covered by soil piles)	
Soil percent silt, s:	8.5	%	(mean silt content; expected range: 0.5 to 23, AP-42 Table 13.2.2-1
Soil percent moisture, M:	50	%	(assumed based upon the moist climate of Oregon)
Annual rainfall days, p:	170	days/yr	rainfall exceeds 0.01 inch/day (AP-42 Fig 13.2.2-1)
Wind speed > 12 mph %, I:	1	%	(www.webmet.com/state_pages/samson/24229_sam.htm)
Fraction of TSP, J:	0.5	(SCAQMD recommendation)	
Mean vehicle speed, S:	5	mi/hr	(On-site)
Dozer path width:	8	ft	
Qty construction vehicles:	1	vehicles	(From "Grading" worksheet)
On-site VMT/vehicle/day:	5	mi/veh/day	(Excluding bulldozer VMT during grading)
PM10 Adjustment Factor k	2.6	lb/VMT	(AP-42 Table 13.2.2-2 9/98 for PM10)
PM10 Adjustment Factor a	0.8	(dimensionless	(AP-42 Table 13.2.2-2 9/98 for PM10)
PM10 Adjustment Factor b	0.4	(dimensionless	(AP-42 Table 13.2.2-2 9/98 for PM10)
PM10 Adjustment Factor c	0.3	(dimensionless	(AP-42 Table 13.2.2-2 9/98 for PM10)
Mean Vehicle Weight W	40	tons	assumed for aggegate trucks

Emissions Due to Soil Disturbance Activities

Operation Parameters (Calculated from User Inputs)

Grading duration per acre	24.3	hr/acre	
Bulldozer mileage per acre	1	VMT/acre	(Miles traveled by bulldozer during grading)
Construction VMT per day	5	VMT/day	
Construction VMT per acre	13.9	VMT/acre	(Travel on unpaved surfaces within site)

Equations Used (Corrected for PM10)

Operation	Empirical Equation	Units	AP-42 Section (5th Edition)
Bulldozing	$0.75(s^{1.5})/(M^{1.4})$	lbs/hr	Table 11.9-18.24, Overburden
Grading	$(0.60)(0.051)s^{2.0}$	lbs/VMT	Table 11.9-18.24
Vehicle Traffic	$[k(s/12)^{a} (W/3)^{b}/(M/0.2)^{c}] [(365-P)/365]$	lbs/VMT	Section 13.2.2

Source: Compilation of Air Pollutant Emission Factors, Vol. I, USEPA AP-42, Section 11.9 dated 7/98 and Section 13.2 dated

Calculation of PM10 Emission Factors for Each Operation

Operation	Emission Factor (mass/ unit)	Operation Parameter	Emission Factor (lbs/ acre)
Bulldozing	0.08 lbs/hr	24.3 hr/acre	1.9 lbs/acre
Grading	0.77 lbs/VMT	1 VMT/acre	0.8 lbs/acre
Vehicle Traffic	0.57 lbs/VMT	13.9 VMT/acre	7.9 lbs/acre

Emissions Due to Wind Erosion of Soil Piles and Exposed Graded Surface

Reference: Air Quality Thresholds of Significance, SMAQMD, 1994.

Soil Piles EF = 1.7(s/1.5)[(365 - H)/235](I/15)(J) = (s)(365 - H)(I)(J)/(3110.2941), p. A9-99.

Soil Piles EF = 0.3 lbs/day/acres covered by soil piles

Consider soil piles area fraction so that EF applies to graded area

Soil piles area fraction: 0.10 (Fraction of site area covered by soil piles)
Soil Piles EF = 0.03 lbs/day/acres graded

Graded Surface EF = 26.4 lbs/day/acre (recommended in CEQA Manual, p. A9-93).

Calculation of Annual PM10 Emissions

Source	Emission Factor	Graded Acres/yr	Exposed days/yr	Emissions lbs/yr	Emissions tons/yr
Bulldozing	1.9 lbs/acre	8.23	NA	16	0.01
Grading	0.8 lbs/acre	8.23	NA	7	0.00
Vehicle Traffic	7.9 lbs/acre	8.23	NA	65	0.03
Erosion of Soil Piles	0.0 lbs/acre/day	8.23	90	22	0.01
Erosion of Graded Surface	26.4 lbs/acre/day	8.23	90	19,554	9.78
TOTAL				19,664	9.83

Construction (Grading) Schedule

Estimate of time required to grade a specified area.
31-Jan-02

Input Parameters
Construction area 8 acres/yr (from "Combustion" Worksheet)
Qty Equipment: 0.99 (calculated based on acres disturbed)

Assumptions.
Terrain is mostly flat.
Terrain is populated with grass; trees are negligible.
An average of 6" soil is removed during stripping.
An average of 6" soil is excavated from one half of the site and backfilled to the other half of the site; no soil is hauled off-site or borrowed.
200 hp bulldozers are used for site clearing.
300 hp bulldozers are used for stripping, excavation, and backfill.
Vibratory drum rollers are used for compacting.
Stripping, Excavation, Backfill and Compaction require an average of two passes each.
Excavation and Backfill are assumed to involve only half of the site.

Calculation of days required for one piece of equipment to grade the specified area.

Reference: Means Heavy Construction Cost Data, 6th Ed., R. S. Means, 1992.

Means Line No.	Operation	Description	Output	Units	Acres per equip-day	equip-days per acre	Acres/yr	Equip-days per year
021 108 0550	Site Clearing	Dozer & rake, medium brush	0.6	acre/day	0.6	1.67	8.23	13.72
021 144 0300	Stripping	Topsoil & stockpiling, adverse soil	1,650	cu. yd/day	2.05	0.49	8.23	4.02
022 242 5220	Excavation	Bulk, open site, common earth, 150' hau	800	cu. yd/day	0.99	1.01	4.12	4.15
022 208 5220	Backfill	Structural, common earth, 150' haul	1,950	cu. yd/day	2.42	0.41	4.12	1.70
022 226 5020	Compaction	Vibrating roller, 6 " lifts, 3 passes	1,950	cu. yd/day	2.42	0.41	8.23	3.40
TOTAL								27.00

Calculation of days required for the indicated pieces of equipment to grade the designated acreage.

(Equip)(day)/yr: 27.00
Qty Equipment: 0.99
Grading days/yr: 27.00

Round to	27	grading days/yr

Proposed Construction and Demolition Projects at Portland ANGB
Includes:
80% of the construction on the Aircraft Maintenance Hangar - 20,667 ft^2
100% of the paved area for the Aircraft Maintenance Hangar, (it is assumed all paving and grading will occur within CY 2005.)

Construction Site Air Emissions
Combustive Emissions of ROG, NO_x, SO_2, CO and PM_{10} Due to Construction

26-Jan-01

User Inputs:

Total Building Area:	20,667	ft^2	(Aircraft Maintenance Hangar)
Total Paved Area:	97,030	ft^2	(paving area for the Aicraft Maintenance Hangar)
Total Disturbed Area:	2.7	acres	(Total Building Area and Total Paved Area)
Construction Duration:	1.0	years	(assumed)
Annual Construction Activity:	230	days/yr	(assumed)

Results:[Average per Year Over the Construction Period]

	ROG	NO_x	SO_2	CO	PM_{10}
Emissions, lbs/day	19.75	40.43	2.02	34.64	3.40
Emissions, tons/yr	2.27	4.65	0.23	3.98	0.39

Calculation of Unmitigated Emissions

Summary of Input Parameters

	ROG	NO_x	SO_2	CO	PM_{10}
Total new acres disturbed:	2.70	2.70	2.70	2.70	2.70
Total new acres paved:	2.23	2.23	2.23	2.23	2.23
Total new building space, ft^2:	20,667	20,667	20,667	20,667	20,667
Total years:	1.00	1.00	1.00	1.00	1.00
Area graded, acres in 1 yr:	2.70	2.70	2.70	2.70	2.70
Area paved, acres in 1 yr:	2.23	2.23	2.23	2.23	2.23
Building space, ft^2 in 1 yr:	20,667	20,667	20,667	20,667	20,667

Annual Emissions by Source (lbs/day)

	ROG	NO_x	SO_2	CO	PM_{10}
Grading Equipment	0.7	4.3	0.3	0.9	0.8
Asphalt Paving	0.6	0.0	0.0	0.0	0.0
Stationary Equipment	3.5	2.8	0.2	0.6	0.2
Mobile Equipment	3.3	33.3	1.5	33.1	2.5
Architectural Coatings (Non-Res)	11.7	0.0	0.0	0.0	0.0
Total Emissions (lbs/day):	**19.8**	**40.4**	**2.0**	**34.6**	**3.4**

Emission Factors

Reference: Air Quality Thresholds of Significance, SMAQMD, 1994.

	SMAQMD Emission Factor				
Source	ROG	NO_x	SO_2 *	CO *	PM_{10}
Grading Equipment	2.50E-01 lbs/acre/day	1.60E+00 lbs/acre/day	0.11 lbs/acre/day	0.35 lbs/acre/day	2.80E-01 lbs/acre/day
Asphalt Paving	2.62E-01 lbs/acre/day	NA	NA	NA	NA
Stationary Equipment	1.68E-04 lbs/day/ft²	1.37E-04 lbs/day/ft²	9.11E-06 lbs/day/ft²	######## lbs/day/ft²	8.00E-06 lbs/day/ft²
Mobile Equipment	1.60E-04 lbs/day/ft²	1.61E-03 lbs/day/ft²	7.48E-05 lbs/day/ft²	0.0016 lbs/day/ft²	1.20E-04 lbs/day/ft²
Architectural Coatings (Non-Res)	8.15E-02 lbs/day/ft	NA	NA	NA	NA

* Factors for grading equipment and stationary equipment are calculated from AP-42 for diesel engines using ratios with the NO_x factors.
Factors for mobile equipment are calculated from ratios with Mobile5a 2001 NO_x emission factors for heavy duty trucks for each site.

Construction Fugitive Dust Emissions

Calculation of PM_{10} Emissions Due to Site Preparation (Uncontrolled).
Worksheet Revised 16 June 1997.

User Input Parameters / Assumptions

Acres graded per year:	2.7	acres/yr	(From "Combustion" worksheet)
Grading days/yr:	25	days/yr	(From "Grading" worksheet)
Exposed days/yr:	90	assumed days/yr graded area is exposed	
Grading Hours/day:	8	hr/day	
Soil piles area fraction:	0.10	(assumed fraction of site area covered by soil piles)	
Soil percent silt, s:	8.5	%	(mean silt content; expected range: 0.5 to 23, AP-42 Table 13.2.2-1
Soil percent moisture, M:	50	%	(assumed based upon the moist climate of Oregon)
Annual rainfall days, p:	170	days/yr	rainfall exceeds 0.01 inch/day (AP-42 Fig 13.2.2-1)
Wind speed > 12 mph %, I:	1	%	(www.webmet.com/state_pages/samson/24229_sam.htm)
Fraction of TSP, J:	0.5	(SCAQMD recommendation)	
Mean vehicle speed, S:	5	mi/hr	(On-site)
Dozer path width:	8	ft	
Qty construction vehicles:	1	vehicles	(From "Grading" worksheet)
On-site VMT/vehicle/day:	5	mi/veh/day	(Excluding bulldozer VMT during grading)
PM_{10} Adjustment Factor k	2.6	lb/VMT	(AP-42 Table 13.2.2-2 9/98 for PM_{10})
PM_{10} Adjustment Factor a	0.8	(dimensionless)	(AP-42 Table 13.2.2-2 9/98 for PM_{10})
PM_{10} Adjustment Factor b	0.4	(dimensionless)	(AP-42 Table 13.2.2-2 9/98 for PM_{10})
PM_{10} Adjustment Factor c	0.3	(dimensionless)	(AP-42 Table 13.2.2-2 9/98 for PM_{10})
Mean Vehicle Weight W	40	tons	assumed for aggregate trucks

Emissions Due to Soil Disturbance Activities

Operation Parameters (Calculated from User Inputs)

Grading duration per acre	74.1	hr/acre	
Bulldozer mileage per acre	1	VMT/acre	(Miles traveled by bulldozer during grading)
Construction VMT per day	5	VMT/day	
Construction VMT per acre	42.5	VMT/acre	(Travel on unpaved surfaces within site)

Equations Used (Corrected for PM_{10})

Operation	Empirical Equation	Units	AP-42 Section (5th Edition)
Bulldozing	$0.75(s^{1.5})/(M^{1.4})$	lbs/hr	Table 11.9-18.24, Overburden
Grading	$(0.60)(0.051)s^{2.0}$	lbs/VMT	Table 11.9-18.24
Vehicle Traffic	$[k(s/12)^{a} (W/3)^{b}/(M/0.2)^{c}] [(365-P)/365]$	lbs/VMT	Section 13.2.2

Source: Compilation of Air Pollutant Emission Factors, Vol. I, USEPA AP-42, Section 11.9 dated 7/98 and Section 13.2 dated 9/9

Calculation of PM_{10} Emission Factors for Each Operation

Operation	Emission Factor (mass/ unit)	Operation Parameter	Emission Factor (lbs/ acre)
Bulldozing	0.08 lbs/hr	74.1 hr/acre	5.9 lbs/acre
Grading	0.77 lbs/VMT	1 VMT/acre	0.8 lbs/acre
Vehicle Traffic	0.57 lbs/VMT	42.5 VMT/acre	24.1 lbs/acre

Emissions Due to Wind Erosion of Soil Piles and Exposed Graded Surface

Reference: Air Quality Thresholds of Significance, SMAQMD, 1994.

Soil Piles EF = 1.7(s/1.5)[(365 - H)/235](I/15)(J) = (s)(365 - H)(I)(J)/(3110.2941), p. A9-99.

Soil Piles EF = 0.3 lbs/day/acre covered by soil piles

Consider soil piles area fraction so that EF applies to graded area

Soil piles area fraction: 0.10 (Fraction of site area covered by soil piles)
Soil Piles EF = 0.03 lbs/day/acre graded

Graded Surface EF = 26.4 lbs/day/acre (recommended in CEQA Manual, p. A9-93).

Calculation of Annual PM_{10} Emissions

Source	Emission Factor	Graded Acres/yr	Exposed days/yr	Emissions lbs/yr	Emissions tons/yr
Bulldozing	5.9 lbs/acre	2.70	NA	16	0.01
Grading	0.8 lbs/acre	2.70	NA	2	0.00
Vehicle Traffic	24.1 lbs/acre	2.70	NA	65	0.03
Erosion of Soil Piles	0.0 lbs/acre/day	2.70	90	7	0.00
Erosion of Graded Surface	26.4 lbs/acre/day	2.70	90	6,415	3.21
TOTAL				6,506	3.25

Construction (Grading) Schedule

Estimate of time required to grade a specified area.
31-Jan-02

Input Parameters
Construction area 2.70 acres/yr (from "Combustion" Worksheet)
Qty Equipment: 0.32 (calculated based on acres disturbed)

Assumptions.
Terrain is mostly flat.
Terrain is populated with grass; trees are negligible.
An average of 6" soil is removed during stripping.
An average of 6" soil is excavated from one half of the site and backfilled to the other half of the site; no soil is hauled off-site or borrowed.
200 hp bulldozers are used for site clearing.
300 hp bulldozers are used for stripping, excavation, and backfill.
Vibratory drum rollers are used for compacting.
Stripping, Excavation, Backfill and Compaction require an average of two passes each.
Excavation and Backfill are assumed to involve only half of the site.

Calculation of days required for one piece of equipment to grade the specified area.

Reference: Means Heavy Construction Cost Data, 6th Ed., R. S. Means, 1992.

Means Line No.	Operation	Description	Output	Units	Acres per equip-day)	Equip-days per acre	Acres/yr	Equip-days per year
021 108 0550	Site Clearing	Dozer & rake, medium brush	0.6	acre/day	0.6	1.67	2.70	4.50
021 144 0300	Stripping	Topsoil & stockpiling, adverse soil	1,650	cu. yd/day	2.05	0.49	2.70	1.32
022 242 5220	Excavation	Bulk, open site, common earth, 150' hau	800	cu. yd/day	0.99	1.01	1.35	1.36
022 208 5220	Backfill	Structural, common earth, 150' haul	1,950	cu. yd/day	2.42	0.41	1.35	0.56
022 226 5020	Compaction	Vibrating roller, 6 " lifts, 3 passes	1,950	cu. yd/day	2.42	0.41	2.70	1.12
TOTAL								8.86

Calculation of days required for the indicated pieces of equipment to grade the designated acreage.

(Equip)(day)/yr: 8.86
Qty Equipment: 0.32
Grading days/yr: 8.86

Round to	9	grading days/yr

Proposed Construction and Demolition Projects at Portland ANGB
Includes:
20% of the construction on the Aircraft Maintenance Hangar - 5167 ft^2

Construction Site Air Emissions
Combustive Emissions of ROG, NO_x, SO_2, CO and PM_{10} Due to Construction

26-Jan-01

User Inputs:

Total Building Area:	5,167	ft^2	(Aircraft Maintenance Hangar)
Total Paved Area:	0	ft^2	
Total Disturbed Area:	0.1	acres	(paved area plus unpaved lease south of new apron)
Construction Duration:	1.0	years	(assumed)
Annual Construction Activity:	90	days/yr	(assumed to correspond to the assumption that 20% of the hangar construction area is assumed for this year)

Results:[Average per Year Over the Construction Period]

	ROG	NO_x	SO_2	CO	PM_{10}
Emissions, lbs/day	7.58	9.22	0.45	8.47	0.69
Emissions, tons/yr	0.34	0.41	0.02	0.38	0.03

Calculation of Unmitigated Emissions

Summary of Input Parameters

	ROG	NO_x	SO_2	CO	PM_{10}
Total new acres disturbed:	0.12	0.12	0.12	0.12	0.12
Total new acres paved:	0.00	0.00	0.00	0.00	0.00
Total new building space, ft^2:	5,167	5,167	5,167	5,167	5,167
Total years:	1.00	1.00	1.00	1.00	1.00
Area graded, acres in 1 yr:	0.12	0.12	0.12	0.12	0.12
Area paved, acres in 1 yr:	0.00	0.00	0.00	0.00	0.00
Building space, ft^2 in 1 yr:	5,167	5,167	5,167	5,167	5,167

Annual Emissions by Source (lbs/day)

	ROG	NO_x	SO_2	CO	PM_{10}
Grading Equipment	0.0	0.2	0.0	0.0	0.0
Asphalt Paving	0.0	0.0	0.0	0.0	0.0
Stationary Equipment	0.9	0.7	0.0	0.2	0.0
Mobile Equipment	0.8	8.3	0.4	8.3	0.6
Architectural Coatings (Non-Res)	5.9	0.0	0.0	0.0	0.0
Total Emissions (lbs/day):	**7.6**	**9.2**	**0.4**	**8.5**	**0.7**

Emission Factors

Reference: Air Quality Thresholds of Significance, SMAQMD, 1994.

	SMAQMD Emission Factor				
Source	ROG	NO_x	SO_2 *	CO *	PM_{10}
Grading Equipment	2.50E-01 lbs/acre/day	1.60E+00 lbs/acre/day	0.11 lbs/acre/day	0.35 lbs/acre/day	2.80E-01 lbs/acre/day
Asphalt Paving	2.62E-01 lbs/acre/day	NA	NA	NA	NA
Stationary Equipment	1.68E-04 lbs/day/ft²	1.37E-04 lbs/day/ft²	9.11E-06 lbs/day/ft²	######## lbs/day/ft²	8.00E-06 lbs/day/ft²
Mobile Equipment	1.60E-04 lbs/day/ft²	1.61E-03 lbs/day/ft²	7.48E-05 lbs/day/ft²	0.0016 lbs/day/ft²	1.20E-04 lbs/day/ft²
Architectural Coatings (Non-Res)	8.15E-02 lbs/day/ft	NA	NA	NA	NA

* Factors for grading equipment and stationary equipment are calculated from AP-42 for diesel engines using ratios with the NO_x factors.
Factors for mobile equipment are calculated from ratios with Mobile5a 2001 NO_x emission factors for heavy duty trucks for each site.

Construction Fugitive Dust Emissions

Calculation of PM10 Emissions Due to Site Preparation (Uncontrolled).
Worksheet Revised 16 June 1997.

User Input Parameters / Assumptions

Acres graded per year:	0.1	acres/yr	(From "Combustion" worksheet)
Grading days/yr:	0.4	days/yr	(From "Grading" worksheet)
Exposed days/yr:	90	assumed days/yr graded area is exposed	
Grading Hours/day:	8	hr/day	
Soil piles area fraction:	0.10	(assumed fraction of site area covered by soil piles)	
Soil percent silt, s:	8.5	%	(mean silt content; expected range: 0.5 to 23, AP-42 Table 13.2.2-1)
Soil percent moisture, M:	50	%	(assumed based upon the moist climate of Oregon)
Annual rainfall days, p:	170	days/yr rainfall exceeds 0.01 inch/day	(AP-42 Fig 13.2.2-1)
Wind speed > 12 mph %, I:	1	%	(www.webmet.com/state_pages/samson/24229_sam.htm)
Fraction of TSP, J:	0.5	(SCAQMD recommendation)	
Mean vehicle speed, S:	5	mi/hr	(On-site)
Dozer path width:	8	ft	
Qty construction vehicles:	1	vehicles	(From "Grading" worksheet)
On-site VMT/vehicle/day:	5	mi/veh/day	(Excluding bulldozer VMT during grading)
PM_{10} Adjustment Factor k	2.6	lb/VMT	(AP-42 Table 13.2.2-2 9/98 for PM_{10})
PM_{10} Adjustment Factor a	0.8	(dimensionless)	(AP-42 Table 13.2.2-2 9/98 for PM_{10})
PM_{10} Adjustment Factor b	0.4	(dimensionless)	(AP-42 Table 13.2.2-2 9/98 for PM_{10})
PM_{10} Adjustment Factor c	0.3	(dimensionless)	(AP-42 Table 13.2.2-2 9/98 for PM_{10})
Mean Vehicle Weight W	40	tons	assumed for aggregate trucks

Emissions Due to Soil Disturbance Activities

Operation Parameters (Calculated from User Inputs)

Grading duration per acre	26.2	hr/acre	
Bulldozer mileage per acre	1	VMT/acre	(Miles traveled by bulldozer during grading)
Construction VMT per day	5	VMT/day	
Construction VMT per acre	15.1	VMT/acre	(Travel on unpaved surfaces within site)

Equations Used (Corrected for PM_{10})

Operation	Empirical Equation	Units	AP-42 Section (5th Edition)
Bulldozing	$0.75(s^{1.5})/(M^{1.4})$	lbs/hr	Table 11.9-18.24, Overburden
Grading	$(0.60)(0.051)s^{2.0}$	lbs/VMT	Table 11.9-18.24
Vehicle Traffic	$[k(s/12)^{a} (W/3)^{b}/(M/0.2)^{c}] [(365-P)/365]$	lbs/VMT	Section 13.2.2

Source: Compilation of Air Pollutant Emission Factors, Vol. I, USEPA AP-42, Section 11.9 dated 7/98 and Section 13.2 dated 9/98

Calculation of PM_{10} Emission Factors for Each Operation

Operation	Emission Factor (mass/ unit)	Operation Parameter	Emission Factor (lbs/ acre)
Bulldozing	0.08 lbs/hr	26.2 hr/acre	2.1 lbs/acre
Grading	0.77 lbs/VMT	1 VMT/acre	0.8 lbs/acre
Vehicle Traffic	0.57 lbs/VMT	15.1 VMT/acre	8.6 lbs/acre

Emissions Due to Wind Erosion of Soil Piles and Exposed Graded Surface

Reference: Air Quality Thresholds of Significance, SMAQMD, 1994.

Soil Piles EF = 1.7(s/1.5)[(365 - H)/235](I/15)(J) = (s)(365 - H)(I)(J)/(3110.2941), p. A9-99.

Soil Piles EF = 0.3 lbs/day/acre covered by soil piles

Consider soil piles area fraction so that EF applies to graded area

Soil piles area fraction: 0.10 (Fraction of site area covered by soil piles)
Soil Piles EF = 0.03 lbs/day/acre graded

Graded Surface EF = 26.4 lbs/day/acre (recommended in CEQA Manual, p. A9-93).

Calculation of Annual PM10 Emissions

Source	Emission Factor	Graded Acres/yr	Exposed days/yr	Emissions lbs/yr	Emissions tons/yr
Bulldozing	2.1 lbs/acre	0.12	NA	0.25	0.00
Grading	0.8 lbs/acre	0.12	NA	0.10	0.00
Vehicle Traffic	8.6 lbs/acre	0.12	NA	1.03	0.00
Erosion of Soil Piles	0.0 lbs/acre/day	0.12	90	0.32	0.00
Erosion of Graded Surface	26.4 lbs/acre/day	0.12	90	285.12	0.14
TOTAL				287	0.14

Construction (Grading) Schedule

Estimate of time required to grade a specified area.
31-Jan-02

Input Parameters
Construction area 0.12 acres/yr (from "Combustion" Worksheet)
Qty Equipment: 0.01 (calculated based on acres disturbed)

Assumptions.
Terrain is mostly flat.
Terrain is populated with grass; trees are negligible.
An average of 6" soil is removed during stripping.
An average of 6" soil is excavated from one half of the site and backfilled to the other half of the site; no soil is hauled off-site or borrowed.
200 hp bulldozers are used for site clearing.
300 hp bulldozers are used for stripping, excavation, and backfill.
Vibratory drum rollers are used for compacting.
Stripping, Excavation, Backfill and Compaction require an average of two passes each.
Excavation and Backfill are assumed to involve only half of the site.

Calculation of days required for one piece of equipment to grade the specified area.

Reference: Means Heavy Construction Cost Data, 6th Ed., R. S. Means, 1992.

Means Line No.	Operation	Description	Output	Units	Acres per equip-day)	Equip-days per acre	Acres/yr	Equip-days per year
021 108 0550	Site Clearing	Dozer & rake, medium brush	0.6	acre/day	0.6	1.67	0.12	0.20
021 144 0300	Stripping	Topsoil & stockpiling, adverse soil	1,650	cu. yd/day	2.05	0.49	0.12	0.06
022 242 5220	Excavation	Bulk, open site, common earth, 150' haul	800	cu. yd/day	0.99	1.01	0.06	0.06
022 208 5220	Backfill	Structural, common earth, 150' haul	1,950	cu. yd/day	2.42	0.41	0.06	0.02
022 226 5020	Compaction	Vibrating roller, 6 " lifts, 3 passes	1,950	cu. yd/day	2.42	0.41	0.12	0.05
TOTAL								0.39

Calculation of days required for the indicated pieces of equipment to grade the designated acreage.

(Equip)(day)/yr: 0.39
Qty Equipment: 0.01
Grading days/yr: 0.39

Round to 0.00 grading days/yr

APPENDIX C

NOISE TERMINOLOGY AND ANALYSIS METHODOLOGY

This Appendix presents a detailed discussion of noise and its effects on people and the environment. An assessment of aircraft noise requires a general understanding of how sound is measured and how it affects people in the natural environment. The purpose of this appendix is to address public concerns regarding aircraft noise impacts.

Section C.1 is a general discussion on the properties of noise. Section C.2 summarizes the noise metrics discussed throughout this Environmental Assessment (EA). Section C.3 provides Federal land use compatibility guidelines that are used in applying aircraft noise impacts to land use planning in the airport environment.

C.1 GENERAL

Noise, often defined as unwanted sound, is one of the most common environmental issues associated with aircraft operations. Of course, aircraft are not the only source of noise in an urban or suburban surrounding, where interstate and local roadway traffic, rail, industrial, and neighborhood sources also intrude on the everyday quality of life. Nevertheless, aircraft are readily identifiable to those affected by their noise, and typically are singled out for special attention and criticism. Consequently, aircraft noise problems often dominate analyses of environmental impacts.

Sound is a physical phenomenon, and consists of minute vibrations that travel through a medium, such as air, and are sensed by the human ear. Whether that sound is interpreted as pleasant or unpleasant depends largely on the listener's current activity, past experience, and attitude toward the source of that sound. It is often true that one person's music is another person's noise.

The measurement and human perception of sound involves two basic physical characteristics, intensity and frequency. The intensity is a measure of the strength or amplitude of the sound vibrations and is expressed in terms of sound pressure. The higher the sound pressure, the more energy carried by the sound and the louder is the perception of that sound. The second important physical characteristic is sound frequency which is the number of times per second the air vibrates or oscillates. Low-frequency sounds are characterized as rumbles or roars, while high-frequency sounds are typified by sirens or screeches.

The loudest sounds which can be detected comfortably by the human ear have intensities which are 1,000,000,000,000 times larger than those of sounds which can just be detected. Because of this vast

range, any attempt to represent the intensity of sound using a linear scale becomes very unwieldy. As a result, a logarithmic unit known as the decibel (dB) is used to represent the intensity of a sound. Such a representation is called a sound level.

Because of the logarithmic nature of the decibel unit, sound levels cannot be added or subtracted directly and are somewhat cumbersome to handle mathematically. However, some simple rules of thumb are useful in dealing with sound levels. First, if a sound's intensity is doubled, the sound level increases by 3 dB, regardless of the initial sound level. For example:

60 dB + 60 dB = 63 dB, and

80 dB + 80 dB = 83 dB

The total sound level produced by two sounds of different levels is usually only slightly more than the higher of the two. For example:

60.0 dB + 70.0 dB = 70.4 dB

Because the addition of sound levels behaves differently than that of ordinary numbers, such addition is often referred to as “decibel addition” or “energy addition.” The latter term arises from the fact that what we are really doing when we add decibel values is first converting each decibel value to its corresponding acoustic energy, then adding the energies using the normal rules of addition, and finally converting the total energy back to its decibel equivalent.

An important facet of decibel addition arises later when the concept of time-average sound levels is introduced to explain Day-Night Average Sound Level (DNL). Because of the logarithmic units, the time-average sound level is dominated by the louder levels that occur during the averaging period. As a simple example, consider a sound level which is 100 dB and lasts for 30 seconds, followed by a sound level of 50 dB which also lasts for 30 seconds. The time-average sound level over the total 60-second period is 97 dB, not 75 dB.

A sound level of 0 dB is approximately the threshold of human hearing and is barely audible under extremely quiet listening conditions. Normal speech has a sound level of approximately 60 dB. Sound levels above about 120 dB begin to be felt inside the human ear as discomfort and eventually pain at still higher levels.

The minimum change in the time-average sound level of individual events which an average human ear can detect is about 3 dB. A change in sound level of about 10 dB is usually perceived by the average

person as a doubling (or halving) of the sound's loudness, and this relation holds true for loud sounds and for quieter sounds.

Sound frequency is pitch measured in terms of hertz (Hz). The normal human ear can detect sounds which range in frequency from about 20 Hz to about 15,000 Hz. All sounds in this wide range of frequencies, however, are not heard equally well by the human ear, which is most sensitive to frequencies in the 1,000 to 4,000 Hz range. To account for the varied frequency sensitivity of people, we use the A-weighted scale that approximates the average, healthy human ear. The A-weighting de-emphasizes the low and high frequency portion of the noise signal and emphasizes the mid-frequency portion. Sound levels measured using A-weighting are most properly called A-weighted sound levels while sound levels measured without any frequency weighting are most properly called sound levels. However, since most environmental impact analysis documents deal only with A-weighted sound levels, the adjective "A-weighted" is often omitted, and A-weighted sound levels are referred to simply as sound levels. In some instances, the author will indicate that the levels have been A-weighted by using the abbreviation dBA or dB(A), rather than the abbreviation dB, for decibel. As long as the use of A-weighting is understood to be used, there is no difference implied by the terms "sound level" and "A-weighted sound level" or by the units dB, dBA, and dB(A). The A-weighting function de-emphasizes higher and especially lower frequencies to which humans are less sensitive. Because the A-weighting is closely related to human hearing characteristics, it is appropriate to use A-weighted sound levels when assessing potential noise effects on humans and many terrestrial wildlife species. In this document, all sound levels are A-weighted and are reported in dB.

Sound levels do not represent instantaneous measurements but rather averages over short periods of time. Two measurement time periods are most common – 1 second and 1/8 of a second. A measured sound level averaged over 1 second is called a slow response sound level; one averaged over 1/8 of a second is called a fast response sound level. Most environmental noise studies use slow response measurements, and the adjective "slow response" is usually omitted. It is easy to understand why the proper descriptor "slow response A-weighted sound level" is usually shortened to "sound level" in environmental impact analysis documents.

C.2 NOISE METRICS

A "metric" is defined as something "of, involving, or used in measurement." As used in environmental noise analyses, a metric refers to the unit or quantity that measures or represents the effect of noise on people. Noise measurements typically have involved a confusing proliferation of noise metrics as individual researchers have attempted to understand and

represent the effects of noise. As a result, past literature describing environmental noise or environmental noise abatement has included many different metrics. Recently, however, various Federal agencies involved in environmental noise mitigation have agreed on common metrics for environmental impact analyses documents, and both the Department of Defense (DoD) and the Federal Aviation Administration (FAA) have specified those which should be used for Federal aviation noise assessments. These metrics are as follows.

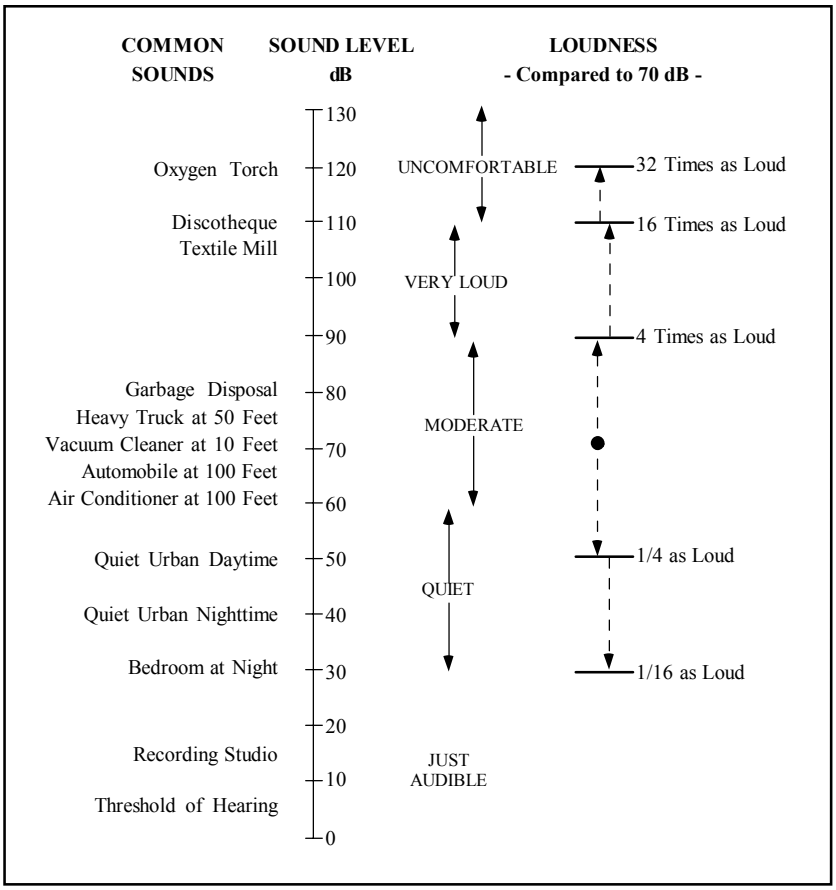
C.2.1 Maximum Sound Level

The highest A-weighted sound level measured during a single event in which the sound level changes value as time goes on (e.g., an aircraft overflight) is called the maximum A-weighted sound level or maximum sound level, for short. It is usually abbreviated by ALM, L_{max}, or LA_{max}. The typical A-weighted levels of common sounds are shown in Figure C-1. The maximum sound level is important in judging the interference caused by a noise event with conversation, TV or radio listening, sleep, or other common activities.

C.2.2 Sound Exposure Level

Individual time-varying noise events have two main characteristics: 1) a sound level which changes throughout the event, and 2) a period of time during which the event is heard. Although the maximum sound level, described above, provides some measure of the intrusiveness of the event, it alone does not completely describe the total event. The period of time during which the sound is heard is also significant. The sound exposure level (abbreviated SEL or LAE) combines both of these characteristics into a single metric.

Sound exposure level is a logarithmic measure of the total acoustic energy transmitted to the listener during the event. Mathematically, it represents the sound level of the constant sound that would, in one second, generate the same acoustic energy as did the actual time-varying noise event. Since aircraft overflights usually last longer than one second, the SEL of an overflight is usually greater than the maximum sound level of the overflight.



Source: Harris 1979

Figure C-1. Typical A-Weighted Sound Levels of Common Sounds

Sound exposure level is a composite metric which represents both the intensity of a sound and its duration. It does not directly represent the sound level heard at any given time, but rather provides a measure of the net impact of the entire acoustic event. It has been well established in the scientific community that SEL measures this impact much more reliably than just the maximum sound level. Because the SEL and the maximum sound level are both A-weighted sound levels expressed in dBs, there is sometimes confusion between the two, so the specific metric used should be clearly stated.

C.2.3 Day-Night Average Sound Level

Time-average sound levels are the measurements of sound levels which are averaged over a specified length of time. These levels provide a measure of the average sound energy during the measurement period.

For the evaluation of community noise effects, and particularly aircraft noise effects, the day-night average sound level (abbreviated DNL or L_{dn}) is used. Day-night average sound level averages aircraft sound levels at a location over a complete 24-hour period, with a 10-dB adjustment added to those noise events which take place between 10:00 p.m. and 7:00 a.m. (local time) the following morning. This 10-dB

"penalty" represents the added intrusiveness of sounds which occur during normal sleeping hours, both because of the increased sensitivity to noise during those hours and because ambient sound levels during nighttime are typically about 10 dB lower than during daytime hours.

Ignoring the 10-dB nighttime adjustment for the moment, DNL may be thought of as the continuous A-weighted sound level which would be present if all of the variations in sound level which occur over a 24-hour period were smoothed out so as to contain the same total sound energy.

Day-night average sound level provides a single measure of overall noise impact, but does not provide specific information on the number of noise events or the individual sound levels which occur during the day. For example, a DNL of 65 dB could result from a very few noisy events, or a large number of quieter events.

As noted earlier for SEL, DNL does not represent the sound level heard at any particular time, but rather represents the total sound exposure. Scientific studies and social surveys which have been conducted to appraise community annoyance to all types of environmental noise have found the DNL to be the best measure of that annoyance. Its use is endorsed by the scientific community (American National Standards Institute [ANSI] 1980, 1988; U.S. Environmental Protection Agency [EPA] 1974; Federal Interagency Committee on Urban Noise [FICUN] 1980; Federal Interagency Committee on Noise [FICON] 1992).

There is, in fact, a remarkable consistency in the results of attitudinal surveys about aircraft noise conducted in different countries to find the percentages of groups of people who express various degrees of annoyance when exposed to different levels of DNL. This is illustrated in Figure C-2, which summarizes the results of a large number of social surveys relating community responses to various types of noises, measured in DNL.

Figure C-2 is taken from Schultz (1978) and shows the original curve fit. A more recent study has reaffirmed this relationship (Fidell et al. 1991). Figure C-3 shows an updated form of the curve fit (Finegold et al. 1992) in comparison with the original. The updated fit, which does not differ substantially from the original, is the current preferred form. In general, correlation coefficients of 0.85 to 0.95 are found between the percentages of groups of people highly annoyed and the level of average noise exposure. The correlation coefficients for the annoyance of individuals are relatively low, however, on the order of 0.5 or less. This is not surprising, considering the varying personal factors which influence the manner in which individuals react to noise. Nevertheless, findings substantiate that community annoyance to aircraft noise is represented quite reliably using DNL.

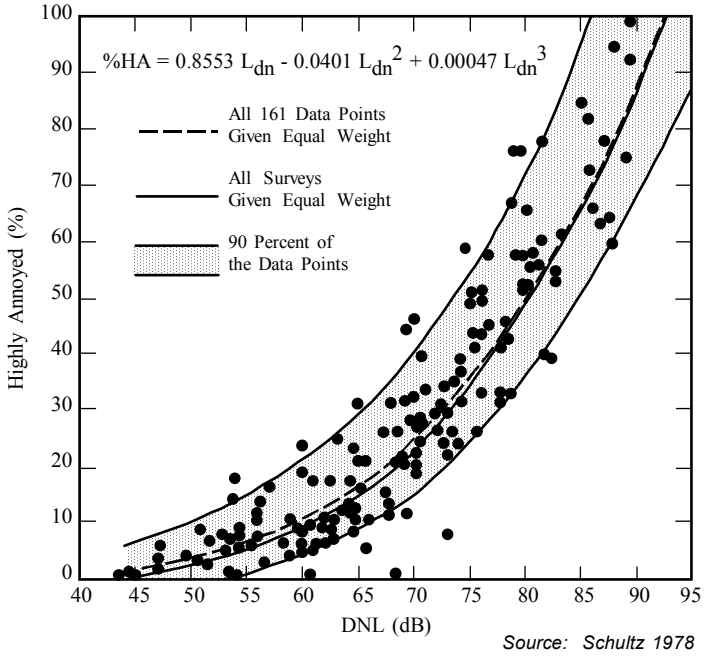
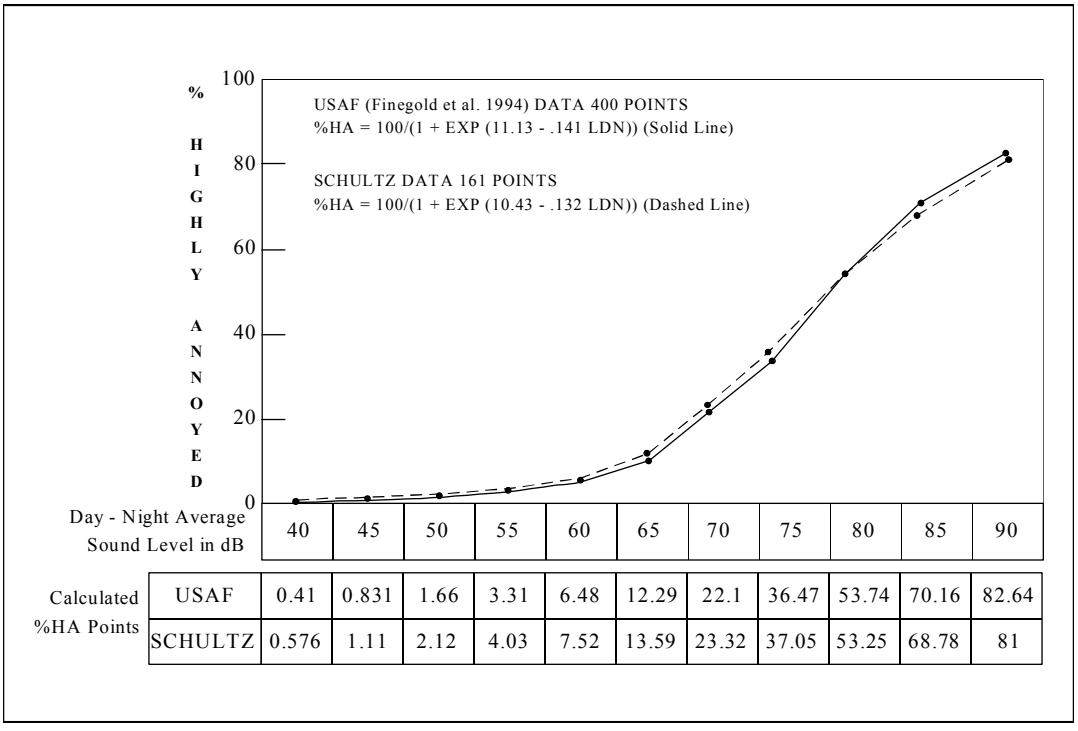


Figure C-2. Community Surveys of Noise Annoyance



Day - Night Average Sound Level in dB		40	45	50	55	60	65	70	75	80	85	90
Calculated %HA Points	USAF	0.41	0.831	1.66	3.31	6.48	12.29	22.1	36.47	53.74	70.16	82.64
	SCHULTZ	0.576	1.11	2.12	4.03	7.52	13.59	23.32	37.05	53.25	68.78	81

Sources: Schultz 1978 and Finegold et al. 1994

Figure C-3. Response of Communities to Noise and Comparison of Original Schultz 1978 and Current AF Curve Fits

This relation between community annoyance and time-average sound level has been confirmed, even for infrequent aircraft noise events. A NASA study (Fields and Powell 1985) reported the reactions of

individuals in a community to daily helicopter overflights, ranging from 1 to 32 per day. The stated reactions to infrequent helicopter overflights correlated quite well with the daily time-average sound levels over this range of numbers of daily noise events.

The use of DNL has been criticized recently as not accurately representing community annoyance and land-use compatibility with aircraft noise. Much of that criticism stems from a lack of understanding of the basis for the measurement or calculation of DNL. One frequent criticism is based on the inherent feeling that people react more to single noise events and not as much to "meaningless" time-average sound levels.

Time-average noise metric, such as DNL, takes into account both the noise levels of all individual events which occur during a 24-hour period and the number of times those events occur. As described briefly above, the logarithmic nature of the decibel unit causes the noise levels of the loudest events to control the 24-hour average.

As a simple example of this characteristic, consider a case in which only one aircraft overflight occurs in daytime during a 24-hour period, creating a sound level of 100 dB for 30 seconds. During the remaining 23 hours, 59 minutes, and 30 seconds of the day, the ambient sound level is 50 dB. The DNL for this 24-hour period is 65.5 dB. Assume, as a second example, that 10 such 30-second overflights occur in daytime hours during the next 24-hour period, with the same ambient sound level of 50 dB during the remaining 23 hours and 55 minutes of the day. The DNL for this 24-hour period is 75.4 dB. Clearly, the averaging of noise over a 24-hour period does not ignore the louder single events and tends to emphasize both the sound levels and number of events. This is the basic concept of a time-average sound metric, and specifically the DNL.

C.3 LAND-USE COMPATIBILITY

As noted above, the inherent variability between individuals makes it impossible to predict accurately how any individual will react to a given noise event. Nevertheless, when a community is considered as a whole, its overall reaction to noise can be represented with a high degree of confidence. As described above, the best noise exposure metric for this correlation is the DNL. In June 1980, an *ad hoc* Federal Interagency Committee on Urban Noise (FICUN) published guidelines for considering noise in land use planning (FICUN 1980). These guidelines related DNL to compatible land uses in urban areas. The committee was composed of representatives from the DoD, Department of Transportation, Department of Housing and Urban Development; the EPA; and the Veterans Administration. Since the issuance of these guidelines, Federal agencies have generally adopted these guidelines to make recommendations to the local communities on land use compatibilities.

The FAA included the committee's guidelines in the Federal Aviation Regulations (Harris 1984). These guidelines are reprinted in Table C-1, along with the explanatory notes included in the regulation. Although these guidelines are not mandatory (see Notes in Table C-1), they provide the best means for evaluating noise impact in airport communities. In general, residential land uses normally are not compatible with outdoor DNL (L_{dn} values) above 65 dB, and the extent of land areas and populations exposed to DNL of 65 dB and higher provides the best means for assessing the noise impacts of alternative aircraft actions.

In 1990, the FICON was formed to review the manner in which aviation noise effects are assessed and presented. This group released its report in 1992 and reaffirmed the use of DNL as the best metric for this purpose (FICON 1992).

Analyses of aircraft noise impacts and compatible land uses around DoD facilities are normally made using NOISEMAP (Moulton 1992). This computer-based program calculates DNL at many points on the ground around an airfield and draws contours of equal levels for overlay onto land-use maps of the same scale. The program mathematically calculates the DNL of all aircraft operations for a 24-hour period, taking into consideration the number and types of aircraft, their flight paths and engine thrust settings, and the time of day (daytime or nighttime) that each operation occurs.

Day-night average sound levels may also be measured directly around an airfield, rather than calculated with NOISEMAP; however, the direct measurement of annualized DNL is difficult and costly since it requires year-round monitoring or careful seasonal sampling. NOISEMAP provides an accurate projection of aircraft noise around airfields.

NOISEMAP also has the flexibility of calculating sound levels at any specified ground location so that noise levels at representative points under flight paths can be ascertained. NOISEMAP is most accurate for comparing "before and after" noise impacts which would result from proposed airfield changes or alternative noise control actions, so long as the various impacts are calculated in a consistent manner.

Table C-1. Land Use Compatibility Guidelines with Yearly Day-Night Average Sound Levels

LAND USE	YEARLY DAY-NIGHT AVERAGE SOUND LEVELS IN DECIBELS					
	BELOW 65	65-70	70-75	75-80	80-85	OVER 85
Residential						
Residential, other than mobile homes and transient lodgings	*Y*	*N(1)*	*N(1)*	*N*	*N*	*N*
Mobile home parks	*Y*	*N*	*N*	*N*	*N*	*N*
Transient lodgings	*Y*	*N(1)*	*N(1)*	*N(1)*	*N*	*N*
Public Use						
Schools	*Y*	*N(1)*	*N(1)*	*N*	*N*	*N*
Hospitals & nursing homes	*Y*	*25*	*30*	*N*	*N*	*N*
Churches, auditoria, & concert halls	*Y*	*25*	*30*	*N*	*N*	*N*
Government services	*Y*	*Y*	*25*	*30*	*N*	*N*
Transportation	*Y*	*Y*	*Y(2)*	*Y(3)*	*Y(4)*	*Y(4)*
Parking	*Y*	*Y*	*Y(2)*	*Y(3)*	*Y(4)*	*N*
Commercial Use						
Offices, business, & professional	*Y*	*Y*	*25*	*30*	*N*	*N*
Wholesale & retail-building materials, hardware, and farm equipment	*Y*	*Y*	*Y(2)*	*Y(3)*	*Y(4)*	*N*
Retail trade-general	*Y*	*Y*	*25*	*30*	*N*	*N*
Utilities	*Y*	*Y*	*Y(2)*	*Y(3)*	*Y(4)*	*N*
Communication	*Y*	*Y*	*25*	*30*	*N*	*N*
Manufacturing and Production						
Manufacturing, general	*Y*	*Y*	*Y(2)*	*Y(3)*	*Y(4)*	*N*
Photographic & optical	*Y*	*Y*	*25*	*30*	*N*	*N*
Agriculture (except livestock) & forestry	*Y*	*Y(6)*	*Y(7)*	*Y(8)*	*Y(8)*	*Y(8)*
Livestock farming & breeding	*Y*	*Y(6)*	*Y(7)*	*N*	*N*	*N*
Mining & fishing, resource production & extraction	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*
Recreational						
Outdoor sports arenas & spectator sports	*Y*	*Y(5)*	*Y(5)*	*N*	*N*	*N*
Outdoor music shells, amphitheaters	*Y*	*N*	*N*	*N*	*N*	*N*
Nature exhibits & zoos	*Y*	*Y*	*N*	*N*	*N*	*N*
Amusements, parks, resorts, & camps	*Y*	*Y*	*Y*	*N*	*N*	*N*
Golf courses, riding stables, & water recreation	*Y*	*Y*	*25*	*30*	*N*	*N*

Key:
Y (Yes) = Land use and related structures compatible without restrictions.
N (No) = Land use and related structures are not compatible and should be prohibited.
NLR = Noise Level Reduction (outdoor to indoor) to be achieved through incorporation of noise attenuation into the design and construction of the structure.
25 or 30 = Land use and related structures generally compatible; measures to achieve NLR of 25, 30, or 35 dB must be incorporated into design and construction of structures.
Notes:
(1) Where the community determines that residential or school uses must be allowed, measures to achieve outdoor-to-indoor NLR of at least 25 and 30 dB should be incorporated into building codes and be considered in individual approvals. Normal residential construction can be expected to provide an NLR of 20 dB; thus, the reduction requirements often are stated as 5, 10, or 15 dB over standard construction and normally assume mechanical ventilation and closed windows year-round. However, the use of NLR criteria will not eliminate outdoor noise problems.
(2) Measures to achieve NLR of 25 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas, or where the normal noise level is low.
(3) Measures to achieve NLR of 30 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas, or where the normal noise level is low.
(4) Measures to achieve NLR of 35 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas, or where the normal level is low.
(5) Land-use compatible, provided special sound reinforcement systems are installed.
(6) Residential buildings require an NLR of 25 dB.
(7) Residential buildings require an NLR of 30 dB.
(8) Residential buildings not permitted.

Source: USDOT 1984 and FAA 1985