

APPENDIX K

ENERGY AND NATURAL RESOURCES

This appendix provides information that supplements the assessment of impacts to energy supply, natural resources, and sustainable design.

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ENERGY AND NATURAL RESOURCES

This appendix provides information that supplements the assessment of Existing Conditions (2008) and the evaluation of potential future impacts to energy supply, natural resources, and sustainable design under the Sponsor's Proposed Project and its alternatives for the Gness Field Airport (DVO or Airport). The purpose of the assessment of potential impacts to energy supply and natural resources is to determine whether the Sponsor's Proposed Project or its alternatives would require the use of rare materials or could potentially deplete the supply of natural resources in the area. In addition, the assessment determines whether there would be major changes in the demand for energy at the Airport that would have the potential to exceed the local supply.

K.1 BACKGROUND

There is one runway at DVO, Runway 13/31, which is 3,300 feet long. Marin County proposes to extend the runway and parallel taxiway to a total length of 4,400 feet (a 1,100-foot extension). The runway extension would provide sufficient length for turboprop and turbojet aircraft to depart with enough Jet A fuel to reach the destination airport without stopping enroute to refuel.

K.2 EXISTING CONDITION (2008)

The Airport's historical requirement for electric and natural gas power during 2008 was obtained from Marin County. The County reported the following information for the 2008 calendar year:

- Electrical power: 178 kWh (kilowatt hours) per day (65,148 kWh per year);
- Natural gas power: 10 therms (1,053 cubic feet) per day (157,895 cubic feet per year);¹
- Jet A fuel: 167,918 gallons;
- AvGas (100LL): 75,258 gallons; and
- Unleaded gasoline and diesel fuel, combined: 1,000 gallons for the year.

The total annual use of utility power under Existing Conditions (2008) was converted to millions of British thermal units (MMBtu) for ease in comparing the two types of utility power. The following equalities were used in the analysis:

¹ Note: natural gas was used for heating during the five coldest months of the year during the 2008 baseline period. A standard conversion of 105.3 cubic feet (ft³) per therm was assumed.

- 1 kWh = 3,412 Btu;
- 1 therm = 100,000 Btu;
- 1,000,000 Btu = MMBtu;
- 178 kWh = 222 MMBtu; and
- 10 therms = 150 MMBtu.

K.3 ASSESSMENT METHODOLOGY

The assessment of future energy supply and demand at the Airport focuses on utility power (electric and natural gas) and fuel energy. The following sections provide the methodology used to project the demand under the 2018 Alternative A (No Action), Alternative B (Sponsor's Proposed Project), and Alternative D. A discussion of the supplier's ability to meet the demand projected under the project alternatives is included in Section K.6, *Coordination*.

K.3.1 ELECTRICITY DEMAND UNDER ALTERNATIVE A (NO-ACTION)

The assessment of future electric energy demand at DVO included the assumption that a greater number of annual aircraft operations would occur with each passing year with or without the proposed project alternatives. This could result in an increased demand for electricity to light Airport land-side facilities or cause a need for additional air conditioning. Therefore, the evaluation included an increase in electric power demand under the future no-action alternative in 2018. The projected demand for electric power under Alternative A (No Action) was calculated based on the projected increase in the number annual aircraft operations in 2018.

K.3.2 ELECTRIC POWER DEMAND UNDER PROJECT ALTERNATIVES

Implementation of an extended runway and taxiway under the project alternatives would increase the demand for electric power for edge lighting on the new airfield pavement. While Alternative B (Sponsor's Proposed Project) proposes a 1,100-foot extension of Runway 13, Alternative D proposes an extension of 860 feet to Runway 13 and a 240-foot extension to Runway 31, a total of 1,100 feet, the same total extended length as Alternative B. Thus, both alternatives result in a total extended runway length of 4,400 feet. Under each alternative, the parallel taxiway would be extended to the full length of the extended runway. The increase in the demand for electric power to light the new runway and taxiway pavement would be the same under Alternative B and Alternative D within each future year.

The increase in power demand for the two project alternatives was projected based on typical airfield lighting equipment, the length of pavement edging requiring in-pavement lighting, the number of nighttime hours at DVO including twilight (one hour before sunset until one hour following sunrise), and the average annual hours where low clouds and limited visibility would require use of an illuminated airfield.²

The analysis used the following equations and assumptions:

² Low clouds and obscured visibility in this analysis was assumed to reflect weather conditions defined under instrument flight rules (IFR).

- Runway and taxiway extension length: 1,100 feet;
- Runway and taxiway extension width: 75 feet;
- Annual hours requiring airfield lighting: 5,415;
- Runway edge lighting: five, 120-Watt bulbs per 1,000 linear feet; and
- Taxiway edge lighting: ten, 30-Watt bulbs per 1,000 linear feet.

K.3.3 NATURAL GAS POWER DEMAND UNDER ALTERNATIVE A (NO ACTION)

The assessment of future electric energy demand at DVO included the assumption that a greater number of annual aircraft operations would occur with each passing year with or without the proposed project alternatives. This could result in an increased demand for hot water for the Airport's buildings. As a result and to be conservative, the evaluation included an increase in natural gas power demand under the No Action Alternative in 2018. The projected demand for natural gas power under Alternative A (No Action) was calculated based on the projected increase in the number annual aircraft operations in 2018.

K.3.4 NATURAL GAS POWER DEMAND UNDER PROJECT ALTERNATIVES

Implementation of an extended runway and taxiway under the project alternatives would not affect the demand for natural gas above the level calculated for the No Action alternative for 2018. There would be no analysis necessary to project natural gas demand for either of the project alternatives.

K.3.5 FUEL DEMAND UNDER ALTERNATIVE A (NO ACTION)

The assessment of future fuel demand at DVO included the assumption that a greater number of annual aircraft operations would occur with each passing year with or without the proposed project alternatives. The increase in aircraft operations would naturally increase the demand for fuel of all types.

The future demand for unleaded gasoline and diesel fuel for Ground Service Equipment (GSE) increases with the greater number of annual operations that would occur each year with or without the proposed project alternatives. The airside improvements at DVO would have no affect on the use of GSE or the fuel to power this equipment. Thus, the future demand for unleaded gasoline and diesel fuel would remain at the same level as for Alternative A (No Action) for both Alternatives B and D in 2018.

K.3.6 FUEL DEMAND UNDER ALTERNATIVE B (SPONSOR'S PROPOSED PROJECT)

The annual demand for fuel at the Airport depends primarily on the type of aircraft, the fuel load of each aircraft, and the number of annual operations. Under this alternative, turboprop and turbojet aircraft that could not carry sufficient Jet A fuel onboard to reach the destination airport under the Existing Condition (2008) would be able to fuel to capacity. There would be an increase in the demand for fuel at DVO because of the availability of a runway of sufficient length to accommodate the departure of the heavier aircraft. The aircraft representative of greater fueling demand are:

- Raytheon Super King Air 300
- Cessna 525 Citation Jet
- Cessna 560 Citation Excel

The demand for Jet A fuel using a longer runway assumed all operations of the aircraft listed above would depart DVO with enough fuel onboard to equal the aircraft's maximum takeoff weight (MTOW). This would increase the demand for Jet A fuel at the Airport.

The 1,100-foot extension of Runway 13 would require aircraft powered by AvGas to taxi a longer distance when accessing Runway 13 for departure requiring additional AvGas fuel. The estimate of additional AvGas for the longer average taxi time for the smaller aircraft was calculated assuming a taxi speed of 17 miles per hour (MPH) and fuel consumption of 15 miles per gallon of AvGas.

K.3.7 FUEL DEMAND UNDER ALTERNATIVE D

Under Alternative D, Marin County proposes to extend Runway 13 by 860 feet and extend Runway 31 by 240 feet, a total of 1,100 feet, the same length as proposed under Alternative B. Although the total extension would also be 1,100 feet, the shorter extension to both runway ends slightly decreases the average taxi time when compared to Alternative B.

K.4 NATURAL RESOURCES

Due to the urbanization of the area around DVO, natural cover and concentrations of natural resources are relatively non-existent. The typical natural resources used in the construction of airfield improvements such as that proposed for DVO consist of asphalt, concrete, steel, earthen fill, rock, gravel, and water. All of these resources are readily available within the region and none are in short supply. Further, there are no known historic or active mines, nor any known precious metals or mineral deposits, nor any oil or gas fields located within or near the Airport. As such, no further evaluation of natural resources is required for the assessment.

K.5 COORDINATION

Electricity and natural gas are provided to the Airport by Pacific Gas & Electric (PG&E). The power company, PG&E, was contacted to determine the ability of the company to meet the increase in demand. PG&E indicated that they could serve this load for the Airport with no further infrastructure upgrades.³ Therefore, the increase would not constitute a significant impact to the supply of electricity. A copy of the correspondence with PG&E is included in this Appendix.

³ Email correspondence between Consultant and Peter Niewieroski, Account Executive – North Coast (Marin County account representative) Pacific Gas and Electric Company, December 22, 2010.

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Sara Hassert

From: Niewieroski, Pete [PJN2@pge.com]
Sent: Wednesday, December 22, 2010 4:15 PM
To: Sara Hassert
Subject: RE: Projected Future Electricity Demand at Gness Field Airport with proposed runway extension
 Sara:

PG&E will have no problem serving this load for the airport with no further infrastructure upgrades.

Happy Holidays,
 Pete

Peter Niewieroski | Account Executive – North Coast
 Pacific Gas and Electric Company
 Service and Sales
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From: Sara Hassert [<mailto:SHassert@landrum-brown.com>]
Sent: Wednesday, December 22, 2010 2:09 PM
To: Niewieroski, Pete
Subject: Projected Future Electricity Demand at Gness Field Airport with proposed runway extension

Pete,

I am contacting you today regarding the projected future energy needs at Gness Field Airport for the proposed runway extension. My firm, Landrum & Brown, is contracted by Marin County to complete an Environmental Impact Report (EIR) for the proposed runway extension. We are also working with the FAA to develop a concurrent Environmental Impact Statement (EIS).

Each of the two runway development alternatives would extend the existing runway and parallel taxiway by 1,100 feet. Alternative B would extend the runway and taxiway 1,100 feet to the northwest, while Alternative D would extend the runway and taxiway 860 feet to the northwest and 240 feet to the southeast. With each alternative, the new airfield pavement would require edge lighting and would increase the demand for electric power to 74,196 kWh, an increase of 5,568 kWh per year. Please advise if PG&E anticipates any problems in meeting this projected electricity demand.

Thank you for your consideration of this request. I look forward to your reply.

Additional project information is available at: www.gnessfieldeis-eir.com

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