1 Purpose.

- This Advisory Circular (AC) discusses oil and gas development on federally obligated airport land, including any drilling that penetrates the property (surface and subsurface). It describes existing FAA policy, guidance, standards, and obligations, as well as other applicable laws and regulations, for airport sponsors to apply to proposed on-airport oil and gas development activities.

- An airport sponsor may propose to develop its oil and gas resources and/or convey its mineral rights pursuant to an oil and gas lease for extraction from its obligated land. Oil and gas leases that only provide for the sale of the airport mineral rights and do not require access or use of airport surface land for well sites or supporting infrastructure, or any other “on-airport” construction or changes to the airport surface for the production of oil and gas may not require any amendments, revisions, or modifications to the FAA-approved Airport Layout Plan (ALP). Therefore, the FAA requirements related to ALP approval or on-airport construction and operation, as described in this AC, may not apply to these “non-surface disturbance / non-surface occupancy” oil and gas leases. However, the FAA compliance and airspace notification requirements may be applicable, as described in Chapter 2. FAA revenue use requirements are applicable.

- This AC does not discuss on-airport extraction of other resources, such as water wells or coal, ore, sand and gravel or other solid minerals. However, certain grant assurances, lease provisions, and planning, environmental, and safety considerations discussed in this AC are applicable, and any on-airport construction or land use must be subordinate to and compatible with airport use of the airport land.

2 Application.

This AC applies to airport sponsors with federally obligated airport land that are considering on-airport oil and gas production, and in particular involving hydraulic
fracturing. See appendix A for a brief overview of hydraulic fracturing as used in shale oil and gas production.

Elliott Black
Director of Airport Planning and Programming
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CHAPTER 1. INTRODUCTION

1.1 Applicability.
This AC applies to airport sponsors with federally obligated airport land that are considering oil and gas lease for sale of mineral extraction rights and allowable access, use, or occupancy of airport surface land. One source for determining if an airport is federally obligated is FAA Order 5190.2, List of Public Airports Affected by Agreements with the Federal Government. The Order contains a listing of publicly and privately owned public use airports affected by agreements with the federal government and handled by the FAA. In addition, line 25 of Form 5010-3, The Airport Master Record (Existing Public Use Airports), indicates whether the airport is obligated. Form 5010-3 is available online at http://www.gcr1.com/5010web/.

1.2 Related FAA Guidance and Requirements.
This AC does not create new requirements, but is a compilation of existing FAA guidance and requirements applicable on airport construction for oil and gas development on airport land, including the following.
- FAA AC 70/7460-1K, Obstruction Marking and Lighting
- FAA AC 150/5070-6 Airport Master Plans
- FAA AC 150/5100-17, Land Acquisition and Relocation Assistance for Airport Improvement Program Assisted Projects
- FAA AC 150/5200-33, Hazardous Wildlife Attractants On or Near Airports
- FAA AC 150/5370-2, Operational Safety on Airports During Construction
- FAA Order 1050.1, Environmental Impacts: Policies and Procedures
- FAA Order 5050.4, National Environmental Policy Act (NEPA) Implementing Instructions for Airport Projects
- FAA Order 5190.6, FAA Airport Compliance Manual
- FAA Order 5200.11, FAA Airports (ARP) Safety Management System (SMS)
- FAA Order JO 7400.2, Procedures for Handling Airspace Matters
- FAA’s Policy and Procedures Concerning the Use of Airport Revenue (Revenue Use Policy) (64 FR 7696 February 16, 1999)
- FAA AC 150/5200-36A, Qualifications for Wildlife Biologist Conducting Wildlife Hazard Assessment and Training Curriculums for Airport Personnel Involved in Controlling Wildlife Hazards on Airports
1.3 **Organization of this Advisory Circular.**

- Chapter 1, Introduction.
- Chapter 2, Sponsor Oil and Gas Development, compiles the airport sponsor and FAA staff with existing FAA requirements and provides recommendations on what factors to consider when evaluating and reviewing on-airport oil and gas development plans and proposals. This chapter identifies the airport sponsor grant assurances that apply to federally obligated airports. This chapter provides a step-by-step process an airport sponsor can follow for when drafting and negotiating an oil and gas lease for oil and gas development. The step-by-step process identifies existing sponsor submittal requirements applicable to each of the phases of oil and gas development on obligated airport land (see Figure 2-1 for a process overview).
- Chapter 3, FAA Review Process, provides an overview of the requirements for the FAA review of sponsor submittals. This chapter identifies existing compliance, safety, construction, planning and environmental review requirements applicable to oil and gas development on federally obligated airport property.
- Appendix A, Unconventional Oil and Gas Production, provides a brief overview of oil and gas production with a focus on recent technological changes that have advanced unconventional methods of oil and gas extraction, primarily through the practice of hydraulic fracturing and horizontal drilling to tap shale oil and gas reserves in the United States.
- Appendix B, Sample Oil and Gas Lease Provisions for On-Airport Development, provides an overview of sample oil and gas lease provisions needed to ensure compliance with grant assurances and to protect the airport use of federally obligated property.
- Appendix C, References, provides additional resources considered in the preparation of this AC.
CHAPTER 2. SPONSOR OIL AND GAS DEVELOPMENT

2.1 Protection of Obligated Airport Land.

2.1.1 Oil and gas development of airport land include any drilling that penetrates the property (surface and subsurface) of federally obligated airports. Whether there is on-airport drilling operations and related construction or the lease is limited to extraction from outside of airport property, the oil and gas lease and production must comply with the airport sponsor’s federal aid obligations and restrictions placed on airport land through a surplus property deed.

2.1.2 When acquiring land or using land for Airport Improvement Program (AIP) assisted projects, the airport sponsor is required to certify that it holds good title for airport development and operations. To meet this requirement airport sponsors will typically hold fee simple title (all surface and subsurface mineral rights) to federally obligated airport land. Title 49 U.S.C. Section 47106(b)(1) states that no federal grant application for airport development may be approved by the Secretary until the Secretary of Transportation is satisfied that the sponsor, a public agency, or the United States Government holds good title to the areas of the airport used or intended to be used for the landing, taking off, or surface maneuvering of aircraft, or that good title will be acquired. The airport sponsor must acquire and maintain good title to the obligated airport property (lands included in the Airport Exhibit A /Airport Property Map).

2.1.3 In those cases where the airport sponsor did not acquire the mineral estate, or where acquired land was subject to an existing mineral lease, the sponsor must ensure that the mineral owner’s use of airport land is subordinated to the airport use of the surface land. Under current requirements (see FAA AC 150/5100-17, Chapter 8), the FAA may accept a title certification in which the airport sponsor shows that the mineral estate is adequately subordinated and the cost to purchase or extinguish the mineral rights is not a necessary expense.

2.1.4 An airport sponsor may also propose to convey its owned mineral rights and permit the development of oil or gas pursuant to an oil and gas lease under the condition that the lease will not encumber its good title for airport use. However, standard industry oil and gas leases provide the driller or developer the right for extensive access to and use of the surface land. Because it permits unrestricted access, a standard oil and gas lease that may be offered by an oil and gas company for airport oil and gas development likely would not be acceptable, as it may violate the airport sponsor’s federal obligations. An acceptable airport oil and gas lease must restrict airport access and well site placement to protect airport operations and ensure compliance with the airport’s federal aid obligations. A change in the FAA-approved airport land use requires an airport sponsor to submit a proposed amendment, revision, or modification of the Airport Layout Plan (ALP) for FAA approval. Certain levels of FAA approval of an ALP change require environmental evaluation under the National Environmental Policy Act (NEPA).
2.1.5 Airport sponsors must comply with their federal aid obligations and the restrictions placed on the use of airport land under federal laws when considering proposals for oil and gas leases and any subsequent operations. In particular, airport sponsors must ensure the following:

- the oil and gas development does not conflict with current or planned aviation uses of the airport land;
- wells and related infrastructure meet airport design standards, are not obstructions to air navigation as defined in 14 CFR Part 77, do not create wildlife attractants, do not create light of radio signal interference, do not impair visibility or flight conditions and are constructed to ensure safe and continuous public airport operations;
- any on-airport allowable well development and related infrastructure (e.g. roads, fencing) must be shown on the approved ALP;
- the well installation, development, and use conform to applicable environmental standards and; as applicable, recommended industry best management practices described in Chapter 3; and
- the revenue generated from leases is collected and spent in accordance with the FAA’s Revenue Use Policy and in compliance with grant assurances 24 and 25, and applicable law. An acceptable lease must provide the airport fair market value for the conveyed mineral rights.

2.2 On-Airport Oil and Gas Development Requirements.

2.2.1 As is the case for any proposed on-airport development or use of obligated airport land, construction of well sites and extraction of oil and gas on obligated airport land is subject to the FAA review and approvals. Locations critical for airport use are not available for oil and gas development, and the oil and gas lease or production agreement must be legally subordinated to the airport sponsor’s (and owner’s) federal grant assurances (obligations) and compatible with the public airport use of airport land.

2.2.2 BEFORE the oil and gas developer may occupy, construct, or operate on airport land, the sponsor shall provide FAA adequate submittal and request to revise or modify the approved airport layout plan (ALP) for the proposed development in compliance to FAA requirements and standards. Failure to provide required submittals to secure compliance with applicable FAA standards and requirements referenced may, at a minimum, delay development.

2.2.3 The following describes a step-by-step process that an airport sponsor should use to assure compliance with FAA requirements and standards when drafting and negotiating an oil and gas lease or production agreement (see Figure 2-1 for an overview of the recommended process). All the steps below apply where the proposed oil and gas lease allows well site or related infrastructure (roads, pipelines, etc.) to be constructed and operated on airport surface land. Oil and gas leases that only convey extraction rights to underlying oil and gas, but do not allow any on-airport construction (i.e., no on-airport well sites or infrastructure allowed on airport), do not involve Step 2, Development...
Planning, or Step 6, Production Planning, described below. The other development steps and requirements listed below apply to all obligated airport oil and gas development and production proposals. Sponsors are encouraged to coordinate with the local FAA Airports District or Regional offices to ensure the development of acceptable on-airport oil and gas projects.
2.2.4 Step 1 – Identify Federal, State, and Local Laws and Requirements for Airport Oil and Gas Development.

Hydraulic fracturing is largely regulated at the state and local levels. In response to the recent increase of shale oil and gas production throughout the United States, however, all levels of government are studying aspects of hydraulic fracturing and have proposed or are considering new legislation and regulations. This section summarizes the range of current laws, regulations, and policies that apply to on-airport oil and gas development, but is not necessarily exhaustive. Given the dynamic nature of the legislative and regulatory landscape concerning hydraulic fracturing, the current legal environment should be carefully examined. Close coordination with FAA Airports staff is particularly important.

2.2.4.1 Federal Laws.

2.2.4.1.1 Oil and gas drilling and production activities on airport property are treated the same as other non-aviation related airport activities, and are subject to all applicable federal laws and regulations. Airport sponsors are required to comply with airport design and construction standards, in particular those that address storm water management and spill prevention requirements. In addition, airport sponsors must ensure compliance with operational safety and design criteria for airport operations.

2.2.4.1.2 Airport sponsors seeking to lease mineral rights for oil and gas production must incorporate specific lease provisions to restrict surface use and development and must ensure that oil and gas developers are held to applicable airport design, safety and construction standards when conducting activities on airport. For more details on these and other federal requirements for mineral leases see Section 2.2.3.1 below.

2.2.4.1.3 FAA approval of proposed amendments, revisions, or modifications to ALPs as a result of proposed oil and gas development activities would be considered major federal actions subject to NEPA review.

2.2.4.1.4 Although some other federal environmental laws cover certain aspects of oil and gas production activities, there are many statutory exemptions. For example, the Clean Water Act (CWA) (33 U.S.C. §§ 1251 to 1387) requires the treatment of flow back water that returns to the surface from hydraulic fracturing, if such water would violate water quality standards. Oil and gas production and well site operations, however, are exempted from other parts of the CWA that regulate storm water discharge. The Clean Air Act (42 U.S.C. §§ 7401 to 7671q) contains an exemption for aggregation of emissions from oil and gas exploration and production operations. Further, hydraulic fracturing was specifically exempted from the Safe Drinking Water Act (42 U.S.C. §§ 300f to 300j-26) pursuant to the Energy Policy Act of 2005 (Pub.L. 109-58), unless the fracturing fluids contain diesel fuel.
State and Local Laws.

State law controls the permitting of oil and gas exploration and production, while local laws and regulations typically control land use, zoning, environmental for site development and set back requirements. Airport sponsors should identify applicable state and local laws, ordinances, and regulations concerning oil and gas permitting, development and operations as early in the process as possible.

Airport Federal Financial Assistance Obligations.

2.2.4.3.1 Title 49 U.S.C. § 47101, et seq., provides for Federal airport financial assistance for the development of public-use airports under the Airport Improvement Program (AIP) established by the Airport and Airway Improvement Act of 1982, as amended. Title 49 U.S.C. § 47107, et seq., sets forth assurances to which an airport sponsor agrees as a condition of receiving Federal financial assistance.

2.2.4.3.2 As a condition precedent to providing airport development assistance under the Airport Improvement Program, 49 U.S.C. § 47107, et seq., the Secretary of Transportation and, by extension, the FAA must receive certain assurances from the airport sponsor. Title 49 U.S.C. § 47107(a) sets forth the statutory sponsorship requirements to which an airport sponsor receiving Federal financial assistance must agree. Presently, there are 39 airport sponsor assurances.

2.2.4.3.3 Upon acceptance of an AIP grant, the assurances become a binding contractual obligation between the airport sponsor and the Federal Government. The assurances made by airport sponsors in AIP grant agreements are important factors in maintaining a viable national airport system.

2.2.4.3.4 An airport sponsor’s federal financial assistance obligations apply whether they have originated under the Federal Aid to Airports Program (FAAP), the Airport Development Aid Program (ADAP), or under the current Airport Improvement Program (AIP). Additionally, an airport may be federally obligated by surplus and non-surplus property conveyances.

2.2.4.3.5 An airport sponsor must abide by its existing obligations at all times. The most common assurances at issue when examining proposed oil and gas extraction on federally obligated airports include:

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1 See [http://www.faa.gov/airports/aip/grant_assurances/media/airport_sponsor_assurances.pdf](http://www.faa.gov/airports/aip/grant_assurances/media/airport_sponsor_assurances.pdf)

2 Grant Assurances are described in FAA Order 5100.38, Airport Improvement Program Handbook and FAA Order 5190.6, The Airport Compliance Handbook.
1. **Good Title (#4) 49 U.S.C. § 47106(b)(1).**

   a. This grant assurance requires a sponsor to hold good title to the airport (landing area of the airport or site thereof) satisfactory to the FAA or to give satisfactory assurance to the FAA that good title will be acquired. The sponsor must maintain adequate right, title and interest to airport land for the use, maintenance and development of airport property in compliance to FAA requirements. The airport sponsor is required to certify that notwithstanding the mineral rights conveyed under oil and gas lease, the airport sponsor retains good title to airport land mineral.

   b. The certification is required in order to comply with the sponsor's Preserving Rights and Power (grant assurance 5 obligations described below) that:

       “…the sponsor may not sell, lease, encumber, or otherwise transfer or dispose of any part of its title or other interests in the [obligated] property shown on Exhibit A [Property Map] for the duration of the terms, conditions, and assurances in this grant agreement without approval by the Secretary, nor may the sponsor permit any action which will operate to deprive it of any of the rights and powers necessary to perform any or all of the terms, conditions, and assurances in the grant agreement without the written approval of the Secretary, and will act promptly to acquire, extinguish or modify any outstanding rights or claims of right of others which would interfere with such performance by the sponsor.”

2. **Preservation of Rights and Powers (#5) 49 U.S.C. § 47107(g).** As noted above, the sponsor must certify that the lease with the third party does not cede the sponsor’s rights and powers to maintain control over the airport. The sponsor must continually ensure that it will not cause or permit any activity or action thereon which would interfere with its use of airport land for airport purposes. This assurance will be met by the proposed oil and gas lease and gas development and operation plan adhering to FAA airspace notification and on-airport construction requirements and making it subordinate to the sponsors grant assurances.

3. **Hazard Mitigation (#20) 49 U.S.C. § 47107 (a)(9).**

   a. Under this assurance, the design, construction, and operation of the gas/oil development project and related improvements shall not create a hazard.

   b. In particular the use of ponds (on and off airport) and waste water management due to hydraulic fracking of wells shall not create a hazardous wildlife attractant to the airport.

   c. Hazardous wildlife and criteria for hazardous wildlife attractants are defined in FAA Advisory Circular (AC) 150/5200-33, Hazardous
Wildlife Attractants on or Near Airports. All design, construction, and operation of the facility and all facility components shall comply with FAA AC 150/5200-33, Hazardous Wildlife Attractants On or Near Airports.

d. FAA AC 150/5200-33 advises a 5,000 or 10,000 foot separation distance between the airports air operations area and a hazardous wildlife attractant. Additionally, it is recommended that a 5-mile separation distance be considered when the attractant could cause wildlife movement into or across the approach or departure airspace.³

e. In cases where a wildlife biologist is consulting on wildlife management and hazard elimination, the wildlife biologist must meet the qualifications identified in FAA AC 150/5200-36, Qualifications for Wildlife Biologist Conducting Wildlife Hazard Assessments and Training Curriculums for Airport Personnel Involved in Controlling Wildlife Hazards on Airports.

4. Fee and Rental Structure (#24) 49 U.S.C. § 47107(a)(13) (See also, Revenue Use Policy at 64 FR 7696). This assurance requires the oil and gas lease to secure payments to the airport for the fair market value (FMV) of the “paid-up”3 lease signing bonus, oil and gas royalties, any production delay payments and rents, and the rent of any surface lands for nonaeronautical purposes (e.g., FMV rent paid for well site, roads, pipeline and utilities lines serving well sites).

5. Airport Revenues (#25) 49 U.S.C. § 47107(b) and 47133 (see also, Revenue Use Policy at 64 FR 7696). This assurance requires the sponsor to ensure the revenues generated from the extraction of minerals on the airport property will be retained for airport, airport system, and/or aviation system uses in accordance with applicable statute and the revenue use policy.⁵


a. This assurance requires the sponsor to submit proposed amendments, revisions, or modifications to the ALP to FAA for

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³ Note that some states have regulations for controlling wildlife and attractants at airports.

⁴ A “paid-up” lease is a common term in oil and gas leases, in which the lump sum delay rentals for the primary lease period is paid at the commencement of the lease.

⁵ Note that the FAA Modernization and Reform Act of 2012 (PL. 112-95, Section 813) required the FAA to develop procedures to permit certain general aviation airports to use revenue generated by mineral extraction, production, or lease subject to certain conditions. These procedures were published May 16, 2012 and the toolkit including this guidance is available on the FAA’s Airport Compliance website at http://www.faa.gov/airports/airport_compliance/mineral_revenue/.
approval, prior to altering the use of airport land designated for an aeronautical use to a nonaeronautical use or constructing above grade structures, such as surface roads. The sponsor must submit proposed amendments, revisions, or modifications to the ALP identifying location(s) of activities, buildings, and associated infrastructure that alter the surface of the airport or impact the aeronautical use of the surface property.

b. Approval of an ALP showing future nonaeronautical land use does not constitute FAA approval for that nonaeronautical use. The ALP is a planning document and FAA approval will be required at the time the land is to be used for a non-aeronautical purpose, such as a well site, (see Airport Compliance Handbook chapter 21, paragraph 21.6(f)(5), page 21-9.) Please note when an airport sponsor wishes to change land use from aeronautical to nonaeronautical, the airport sponsor is required to comply with applicable requirements governing such changes in use. (See FAA Order 5190.6B, Section 22.31, Procedures for Public Notice for a Change in Use of Aeronautical Property at page 22-22 to 22-23).

7. **Disposal of Airport Land (#31) 49 U.S.C. § 47107(c)(2).**

As described above, the FMV of mineral rights and any surface land use conveyed shall be paid the airport under an acceptable oil and gas lease. Oil and gas leases permitting the extraction of oil and gas on and from federally obligated airport property constitute sales of real property, are not an interim use of airport property, and are not temporary arrangements for the use of airport land for nonaeronautical purposes. As such, the lease must comply with grant assurance 31.

**2.2.5 Step 2 – Development Planning.**

2.2.5.1 Prior to drafting or negotiating a lease, airport sponsors should coordinate with the FAA to determine where oil and gas drilling and related activities may and may not occur on airport property. There are areas of the airport that cannot be drilled on due to height restrictions, current operations, or future airport development activities. Airport sponsors should maintain the airfield operations area, runway and taxiway safety areas and object free areas, runway protection zones, and obstacle free zones defined in AC 150/5300-13 (current edition) free of oil and gas development activities to assure preservation of the Airport’s rights and powers (grant assurance #5) and minimize any potential for disruption to safe and efficient aviation operations.

2.2.5.2 Airport sponsors should prepare a drawing that depicts areas on the airport that are available for oil and gas development and operations that would not interfere with future aviation development.
2.2.5.3 In addition, airport sponsors should notify the FAA Airports Regional or District Office early in the planning process to determine the need or requirements for Safety Risk Management (SRM). Safety Management System (SMS) and SRM principals apply to any oil and gas extraction proposals that could affect safe airport operations. FAA SRM procedures are described by Order 5200.11, FAA Airports (ARP) SMS. In accordance with this Order, SRM may be required prior to review and approval of any proposed amendment, revision, or modification of an ALP that includes oil and gas extraction facilities. Additionally SRM may be needed for well site construction project coordination as may be determined by FAA Air Traffic.

2.2.6 Step 3 – Draft Acceptable Oil and Gas Lease.

The airport sponsor should develop and draft its proposed oil and gas lease to incorporate the airport safety and design standards, environmental controls, and all other necessary terms and conditions necessary to adequately protect and ensure continued aeronautical use. Lease provisions must subordinate the lease and mineral rights conveyed to the sponsors existing and future grant assurances. Standard oil and gas leases in common use by oil and gas companies likely are not acceptable for airport lease situations without modifications to make them compliant with the requirements outlined in this AC.

2.2.6.1 Lease Provision Requirements.

2.2.6.1.1 Appendix B provides sample lease checklist and terms and conditions for an acceptable oil and gas lease to ensure compatible surface use of airport land. Airport sponsors may want to engage legal counsel to develop and negotiate oil and gas leases and proposals.

2.2.6.1.2 The airport sponsor must maintain adequate control over the surface use of airport land for aeronautical use at all times. As described below, the required lease terms and conditions depend on whether the oil and gas lease proposes on-airport development or only proposes the sale of the minerals without any on-airport construction or permanent development, e.g., an under-the-Fence Lease.

1. **Lease Allows On-Airport Development.** If on-airport development is part of a proposed oil and gas lease arrangement, the oil and gas lease must be expressly subordinated to the airport use of the obligated land. Appendix B contains sample lease terms required to restrict access and require adherence to FAA requirements for on-airport construction and non-aeronautical operations. Surface land disturbance and occupancy for development and operations requires an ALP change, which in turn requires an evaluation of environmental impacts under NEPA (see Step 5 below).

2. **Under the Fence Only Leases (i.e., no on-airport development).** If the lease prohibits any surface development of airport land and is
limited to the subterranean lateral wellbores from off-airport well sites, the development process is far less complex. The airport sponsor must apply adequate engineering analysis and standards to ensure that subsurface drilling, well boring and oil and gas extraction will not cause any subsidence or adverse effects on the airport facilities or use. With an “Under-the-Fence” oil and gas lease, required lease terms described in Appendix B may be limited, as applicable, to any proposed surface land use or disturbance. If exploration activities may occur on airport surface lands, adequate lease terms are required to restrict access and ensure no conflict with airport operations. Under-the-fence leases still require FMV payments to the airport in compliance with the Revenue Use Policy (64 FR 76956, February 16, 1999), applicable statute and off airport airspace clearance (14 CFR Part 77).

2.2.6.2 Airport Sponsor Lease Submittal Requirements.
FAA review of an oil and gas lease prior to entering into it can help ensure that applicable Grant Assurances will be continuously met. The following (1-4) are required to be submitted to the FAA to ensure the proposed lease conforms to FAA grant assurances.

1. **Airport certification of Good Title.** An oil and gas lease is a sale of the mineral rights that encumbers an airport sponsor’s title to airport land. As such, prior to solicitation of an oil and gas lease, an airport sponsor’s attorney must certify to FAA that the airport retains good title in all airport land for public use airport purposes (landing area, etc). The certification requires the airport sponsor’s attorney to review the proposed lease documents, the proposed construction of oil and gas wells and facilities, and changes to the ALP to determine whether the airport owner has the right to enforce lease restrictions and meet FAA requirements.

2. **Draft ALP.**
   a. A proposed amended, revised, or modified ALP should identify the current location and elevation of any property or facilities affected by the proposed gas or oil production plan (e.g., aeronautical or non-aeronautical). The submittal must indicate how the affected property was acquired and any federal funding invested in affected property or improvements (e.g., if federally funded fencing is to be relocated or gate and access road installed). The ALP should identify any impacts to current and future planned uses and how such impacts would be accommodated and mitigated.

   b. The ALP should show, to the extent known, the proposed location of all well sites and related above-ground structures and related access and support right of way. A separate drawing sheet depicting subsurface horizontal lines should be maintained by the lessee and the airport sponsor, but is not required to be submitted to FAA as part of the ALP drawing set.
c. Additional changes to the ALP may be required at subsequent stages of the oil and gas development process, including exploration and well-site production.

3. **Fair Market Value (FMV) Documentation.**

   a. Competitive Bid / Request for Proposal. The proposed solicitation should be submitted to FAA for review. The solicitation and bid items must reflect FMV payment levels and terms for the proposed mineral resource. The lease solicitation and bid will also need to include FMV rents for any use of surface lands (e.g. well sites, roads, pipelines, other infrastructure or facilities allowable for occupancy on airport land.)

   b. Negotiated leases must be shown to require FMV lease and royalty payments to the airport as well as surface land rents. Where the airport has not sought or had not received adequate competitive bids, an appraisal report and determination of the FMV lease payments and royalty rates must be submitted.

4. **Payment Terms and Revenue Use.** The oil and gas lease must provide FMV payment terms. As noted in the Interim Guidance on Mineral Extraction and Request for Data Update, dated August 24, 2012, the FAA Modernization and Reform Act of 2012 (PL 112-95, Section 813) requires the FAA to permit certain general aviation airports to use revenue generated by mineral leases, production, or lease for eligible transportation infrastructure projects, subject to certain conditions.  

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assurances and applicable FAA requirements. Adequate oil and gas
appraisals may be required to support negotiated leases or where the FAA
ADO or Region determines that there is a lack of competitive bids.
Appraisal report documentation must meet American Petroleum Institute
and the Security and Exchange Commission requirements for description
and valuation of oil and gas reserves, as well as other applicable appraisal
standards.

2.2.8 Step 5 – On-Airport Oil and Gas Exploration.

2.2.8.1 Some initial oil and gas exploration activities on-airport, such as
environmental testing, would not alter the airport surface and would not
require an ALP change. However, geophysical exploration activities
involving on-airport heavy equipment (thumper trucks, bull dozers, etc.) use
and any clearing and grading work to access and occupy airport land for
gophysical exploration must be assessed by the FAA.

2.2.8.2 Additionally, on-airport exploration impacts that are likely to be followed
by on-airport oil or gas development may need to be reviewed in any NEPA
documentation as a connected action.

2.2.8.3 Construction.

2.2.8.3.1 The sponsor should escort all exploration crews at all times while on airport
property to ensure safe airport operating conditions are maintained. If this
is not possible, a Construction Safety Phasing Plan (CSPP) should be
prepared. The sponsor is required to review AC 150/5370-2F, Operational
Safety on Airports during Construction, for regulatory guidance associated
with construction activity on the airports as well as the CSPP.

2.2.8.3.2 An airport sponsor proposing any type of construction or alteration of a
structure that may affect the National Airspace System (NAS) is required
under 14 CFR Part 77 to notify the FAA by completing the Notice of
Proposed Construction or Alteration form (FAA Form 7460-1). Depending
on the location of the construction activity, the form should be sent to the
local FAA Airports District Office or Regional Office for review. The FAA
Form 7460-1 and completion instructions can be obtained at
http://www.faa.gov/forms/index.cfm/go/document_information/
documentID/186273.

2.2.8.4 ALP.

An ALP change may or may not be required at this stage. Airport sponsors
should advise FAA Airports Division or Region staff of any proposed
surface disturbance and/or infrastructure development to determine whether
an ALP change is necessary.
2.2.8.5 Environmental Documentation.

Even if exploration activities do not necessitate ALP changes, such activities may need to be examined under NEPA. If exploration activities on-airport property are likely to result in drilling (which would require an ALP change and FAA approval thereof), then these may be considered connected actions under NEPA. In this case, the NEPA review must be completed prior to allowing the oil and gas producer to conduct exploration activities. An FAA Record of Decision for NEPA may contain additional stipulations that should be conveyed in subsequent lease agreements.

2.2.9 Step 6 – Developing an On-Airport Oil and Gas Well Site Location and Production Plan.

The airport sponsor should engage FAA throughout the development of an oil and gas well site selection and production plan. Depending on the scope of the proposed oil and gas drilling operations, early and frequent involvement with FAA will aid in the development of an acceptable plan. The sponsor should develop the plan with future airport development in mind to ensure appropriate aeronautical uses take precedence over non aeronautical uses such as oil and gas extraction activities. Once a well site location and production development plan is drafted, it should be coordinated with the FAA with respect to whether it complies with FAA guidance, standards, and other requirements.

2.2.9.1 Construction.

All construction proposed for well drilling, site development and associated infrastructure must be submitted in the form of a Construction Safety Phasing Plan (CSPP) to FAA for review and airspace determination. The CSPP should be prepared by the lessee/developer in accordance with AC 150/5370-2 Operational Safety On Airports During Construction (current edition) for review and approval by the Airport Sponsor, and submitted to the FAA for airspace determination. The sponsor may submit the CSPP to FAA online at oeaaa.faa.gov. The complete CSPP must include but not be limited to the following:

- Emergency/Fire/Medical Response
- Blowout Response
- Storm water runoff management
- Spill Control Prevention and Countermeasure Plan (SPCC)
- Disposal and containment of hazardous materials
- Compliance with federal, state and local airport rules and regulations
- Wildlife and uncovered ponds and waterway management
- Airport areas and operations affected by the construction activity
- Personnel and vehicle access
• Foreign Object Debris (FOD) management
• Haul routes, roads and excavation material storage and management
• Notification of construction activities (Form 7460-1) per 14 CFR Part 77 “Safe, Efficient use and Preservation of Navigable Airspace”.
• Site monitoring, inspection and enforcement responsibilities.
• AC 150/5370-2F Appendix 3. Safety and Phasing Plan Checklist must be consulted with to include the appropriate provision that is relevant to the location of the oil and gas extraction project at the airport.

2.2.9.2 ALP Change.

On-airport oil and gas production is likely to require an ALP change with requisite federal approvals. Development of a production plan should include proposed ALP changes. The proposed ALP change must detail the areas determined off limits to well installations and supporting infrastructure. Areas that will be used for exploration and areas that may be used for well site development must be identified. In conjunction with the Form 7460 submittal for actual well site construction and drilling, the airport must submit an ALP change showing the well site and all supporting on airport infrastructure.

2.2.9.3 Environmental Documentation.

2.2.9.3.1 The airport sponsor must consult and assist the FAA in complying with the requirements of all applicable environmental laws and regulations, including, without limitation, the National Environmental Policy Act, 42 U.S.C. 4321 et seq. (NEPA), the Council on Environmental Quality Regulations for Implementing the Procedural Provisions of NEPA, 40 CFR parts 1500-1508; Department of Transportation Order DOT 5610.1C, Procedures for Considering Environmental Impacts, FAA Order 1050.1E, Environmental Impacts: Policies and Procedures, Order 5050.4, NEPA Implementing Instructions for Airport Actions, and all other applicable environmental statues, regulations, orders, and directives.

2.2.9.3.2 The FAA encourages airport sponsors proposing oil and gas production activities on federally obligated airport property to consult with the FAA about environmental review and documentation as early in the process as possible. The FAA will determine the appropriate level of environmental review and NEPA documentation based on the facts and circumstances of each proposed oil and gas operation. Depending on the level of NEPA documentation required, either the FAA or the airport sponsor will take the lead in preparing the NEPA documentation. See Chapter 3, Section 4 for additional detail on environmental review considerations.
2.2.10 Step 7 – Oil and Gas Lease Signed and Development Approved.

With an executed lease, the oil and gas exploration and well site development may proceed as described below in conformance to airport obligations and FAA requirements.

2.2.11 Step 8 – Individual Well Site Approvals.

2.2.11.1 As provided under an acceptable oil and gas lease, the airport sponsor must have approval authority for each individual well prior to drilling, regardless of whether the state, county, or municipality issues individual well permits for drilling. The airport sponsor’s approval is contingent on FAA’s ALP approval following an environmental determination for the proposed on-airport well site.

2.2.11.2 For the FAA approvals, the following submittals are required prior to well site construction and operation. The FAA approval process, described in Chapter 3, will consider all individual well site activities including on-airport construction and drilling of the well, hydraulic fracturing, and oil and gas production.

2.2.11.2.1 Construction.

Form 7460-1 must be submitted to the FAA by owner/operators for any proposed facilities on airport owned property that will be above grade. Form 7460-1 must be received at least 45 days prior to oil and gas developers erecting drilling rigs or other towering structures. The sponsor and owner/operator of any identified FAA system or facility should agree to the advance notification time of construction activities and delineate it in the CSPP in order to address or mitigate any impact caused by drilling activity. The oil and gas developer/driller shall complete a Safety Plan Compliance Document (SPCD) for all construction on airport property and submit the plan to the Sponsor. The Airport Sponsor shall approve the CSPP and the SPCD prior to issuance of a notice-to-proceed/construction.

2.2.11.2.2 Well Site Approval (per Form 7460 / ALP Approval).

The sponsor must approve each individual well prior to drilling activities. This is in addition to any state, county, or municipality well drilling and production permitting and inspection authority. The airport’s construction approvals and inspection control on-airport well site construction, drilling, fracturing, and operating of that particular well. Approved well sites are to be shown on the ALP and the revised ALP approved by FAA prior to construction.

2.2.11.2.3 Environmental Documentation.

If any on-airport drilling site or other on-airport facility related to oil and gas operations was not examined in the initial NEPA documentation (described in Step 6, and below in Chapter 3 Section 4), separate NEPA
environmental analysis must be undertaken and documentation developed for each of the new drilling sites. In this event, the airport sponsor should notify the FAA as soon as possible about the proposed location of a new well site or facility. The FAA will determine the appropriate level of environmental review and NEP documentation required based on the facts and circumstances of each proposed new well site or facility and the extent of previous review. Drilling operations occurring in the same time frame may need to be addressed in one environmental document to avoid segmentation under NEPA (see Order 5050.4B, paragraph 905.c.(1) and (2)).

2.2.12 Step 9 – Interim Well Site Reclamation.
Once the well has been drilled, the sponsor may want the oil and gas company to conduct interim reclamation to minimize the footprint of disturbance by the well site. The portions of the cleared well pad site that are not needed for operational and safety purposes can be re-contoured to blend with the surrounding area. This area can then be re-vegetated within a few feet of production facilities.

2.2.13 Step 10 – Well Closure and Reclamation.
The well closure and site restoration must be done in accordance with the regulatory requirements of the state and local agency with jurisdiction over oil and gas production. Upon well closure, the airport should secure a “clean closure” or “no further action” letter from the state regulatory agency.

2.2.13.1 Construction.
The reclamation process will involve a certain amount of reconstruction efforts to restore property to previous operational standard. The airport sponsor will once again approve a CSPP as part of the well closure and reclamation process. Details for the CSPP can be obtained from AC 150/5370-2F, Operational Safety on Airports During Construction.

2.2.13.2 ALP.
Once a well site has been closed and abandoned, the airport sponsor must submit the corresponding changes to the ALP and must reference reclamation requirements.

2.2.13.3 Environmental Documentation.
Well closure and reclamation activities should be anticipated and addressed in any NEPA documentation completed during the development of the oil and gas production planning process. Depending on the amount of time that has passed since the initial production plan was prepared and the associated NEPA documentation completed, a new NEPA document may need to be prepared for well closure and ALP approval. If closure activities were reviewed at the outset, and remain applicable, a written re-evaluation may be adequate. If conditions have changed substantially, additional review of closure activities and/or ALP changes may be required.
2.3 Airport Sponsor Compliance.

2.3.1 Failure to adhere to any of the requirements described in this AC, the airport sponsor’s grant assurances, or the instruments of surplus and non-surplus property conveyances may cause the airport sponsor to violate its federal obligations. If the FAA finds an airport sponsor violated its federal obligations, the FAA may require corrective action to bring the sponsor back into compliance.

2.3.2 If the airport sponsor chooses not to initiate voluntary corrective action, which may include terminating or amending the oil and gas lease to ensure the sponsor holds sufficient rights, title and interest in the land to operate and maintain the airport in compliance with FAA requirements, the FAA may take formal procedural action under 14 CFR Part 16. If the FAA finds the sponsor in formal noncompliance, the FAA may issue an order terminating eligibility for grants pursuant to 49 U.S.C. §§ 47106(d) and 47111(d), and order a suspension of the payment of grant funds. Additionally, costs to restore or replace facilities damaged or to restore adequate title to airport land are not eligible for funding under the Airport Improvement Program. Corrective actions would be funded by oil and gas revenues secured and other non-airport funds. Site remediation may not be supported with AIP funds or airport revenue.
CHAPTER 3. FAA REVIEW PROCESS

3.1 Compliance Reviews.

The FAA will review the lease and the proposed oil and gas production plan for incorporation of sufficient restrictions for the sponsor to maintain compliance with its federal aid obligations and assurances, including the following.

3.1.1 Airport Attorney’s Certification of Good Title.

The airport attorney’s re-certification must be explicit that the lease restrictions are enforceable under state law and that the airport maintains good title for public airport purposes (Grant Assurance 4). The certification should identify and describe the sponsor’s ability to ensure the following:

- **No Access or Use to Restricted Areas.** The lease must describe those areas of the airport that the developer/lessee has no surface access, e.g., the AOA, other areas where there is risk of conflict with safe airport uses and operations. (grant assurance 5, 19 and 20)

- **Subordination of Mineral Estate to Aeronautical Use.** The lease must acknowledge the airport use of the property and that the developer/lessee use of the surface is subordinate to the airport use of the property. The lease must include a clause requiring all oil and gas activities and operations is subordinate to the airport sponsor’s federal obligations.

- **Permitting.** All construction and use of airport property is subject to approval by the airport sponsor and must comply with airport rules and regulations (incorporated by reference). FAA Form 7460, CFR Title 14 Section 77.9 and CSPP determinations are required prior to commencing any construction (grant assurance 20).

  - The lease should include a clause that incorporates by reference the airport’s rules and regulations governing on-airport construction that apply to oil and gas operations.

- **Compliance with Airport Revenue Requirements.** All use of airport property for nonaeronautical purposes must be at FMV and in accordance with the FAA’s Policy and Procedures Concerning the Use of Airport Revenue (Revenue Use Policy at 64 FR 7696).

- **Insurance.** The developer/lessee must maintain adequate insurance for general liability and environmental remediation for the proposed development; production and ultimate closing of wells (grant assurance 20 and 21).

- **Indemnity and Hold Harmless Clause.**

- **Bonding.** The lessee should maintain adequate bonding to cover its liabilities and obligations incurred under the lease.

- **Environmental Representations, Warranties.** These provisions concern representations and warranties each party to the lease makes concerning the
environmental condition of the leased property prior to, during, and after oil and gas drilling operations. These provisions also apportion liability between the parties to the lease in the event of environmental contamination resulting from oil and gas drilling operations.

- **No Warranty of Title.** The airport provides no assurance of title for the lessee. The lessee (gas/oil developer) will have to insure adequate title for its gas/oil production.

- **Compliance with Laws.** The lessee must construct all facilities and conduct all operations in strict compliance with all applicable federal (including FAA), state, and local laws, codes, rules, regulations, ordinances, permits, as well as the airport’s design criteria and the airport’s rules and regulations regarding oil and gas operations. This includes the instrument(s) entered into between the sponsor and the United States creating and/or perpetuating the sponsor’s federal obligations.

- **Assignment and Subletting.** The lessee must not assign the lease or sublet the land (leased premises) without the prior written approval of the airport.

### 3.1.2 Federal Register Notice for Modification of Assurances.

A Federal Register Notice is required when there is a change from aeronautical use to non-aeronautical use of (1) federal surplus property (47151(d)), (2) non-surplus property (47125), or (3) property purchased with federal assistance (47107(h)). In addition, environmental notices must be filed in the Federal Register. Notice is not required for a release of aeronautical property that is part of a major environmental action in which public notice and comment is an integral part of the environmental review. Please refer to CGL 2003-2 for Procedures for Public Notice for a Change in Use of Aeronautical Property.

### 3.2 Safety and Construction Reviews.

#### 3.2.1 The Construction Safety Phasing Plan (CSPP) must be prepared by the lessee/developer in accordance with AC 150/5370-2F and Appendix 3 (current edition) for review and approval by the Airport and submitted to the FAA for the airspace determination. The developer’s CSPP should contain, but not limited to the following.

- Emergency/Fire/Medical Response
- Blowout Response
- Storm water runoff management
- Spill Control Prevention and Countermeasure Plan (SPCC)
- Disposal and containment of hazardous materials
- Compatible Land Use and Mitigation of Hazardous Wildlife Attractants
- Personnel and vehicle access
- Foreign Object Debris management
- Haul routes, roads and excavation material storage and management
• Site monitoring, inspection and enforcement agency

3.2.2 The CSPP may be submitted on-line at oeaaa.faa.gov. Approval of the CSPP to proceed with construction is the airport sponsor’s responsibility.

3.2.3 **Form 7460 / Airspace Notification.**
The Form 7460 and other airspace notification requirements may be submitted on-line at oeaa.faa.gov.

3.2.4 **Safety Risk Management** (as applicable at the airport).

3.3 **ALP Change.**

3.3.1 Oil and gas well sites and related facilities need to be shown on the ALP, if any component of the operation is to be located on airport property (See AC 150/5070-6, paragraph 1002). Sponsors should show all components of the gas/oil production process even if only one component is actually on airport property and the remainders are off of airport property. Accurate representation of the facilities on the ALP will eliminate confusion about the planned location for the various components of the system.

3.3.2 The following oil/gas well site and supporting facilities should be included on the ALP:
- Well site
- Well heads, including injection wells should be indicated
- Tanks (Storage, compression, wastewater, etc)
- Fracturing fluids storage pits and ponds
- Dehydrator and compressor stations
- Buildings or facilities
- Collector oil and gas pipelines
- Fracturing fluid pipelines
- Utilities lines/right of way serving the well site
- Gas Transmission lines

3.3.3 Proposed or planned on-airport oil/gas extraction operations often cannot specify the exact location of facilities until the exploration phase is complete. In these cases, show the proposed areas for oil/gas extraction on the land use drawings and label the known components that would be located in each area. Note that this may result in a “conditional” ALP approval until additional details of the production plans are better known and an “unconditional” ALP can be approved (see Environmental Considerations).
3.3.4 The only parts of steps 1-10 (chapter 2) appropriate for inclusion on the ALP are Step 8 well sites approved and Step 10 for the removal and closure/reclamation of a well site. The remaining phases are construction phases that would undergo separate airspace reviews as would any on-airport construction activity. It is expected that most oil/gas well sites and any supporting construction on airports require environmental review to meet requirements of NEPA as described in FAA Orders 1050.1E and 5050.4B, (see below).

3.4 Environmental Considerations.

3.4.1 Airport sponsors should coordinate with FAA staff early in the process of considering oil and gas extraction activities so that any necessary environmental review is undertaken efficiently. The extent of the environmental review and the timeframe for issuance of a decision by the FAA, if any, will depend on the scope and nature of the proposed oil and gas operations. NEPA review must be complete in accordance with CEQ’s NEPA regulations and FAA Orders 1050.1E and 5050.4B at the time of FAA’s decision on a major federal action, such as an ALP change (see FAA Order 5050.4B, paragraph 9.g.(3) and Section 202).

3.4.2 Oil and gas production involves geotechnical exploration and testing, drilling, and construction of well heads to produce the resource. Initial exploration activities are similar to planning and may not require federal involvement. However exploration activity with on airport occupancy and/or disturbance of resources, as necessary for the construction, drilling and production will require NEPA review as a precursor to ALP approval. These actions are all ultimately connected to production of the oil or gas. A NEPA review should evaluate as much of the proposed oil and gas development cycle as possible when the ALP decision is required, avoiding segmentation of the process.

3.4.2.1 Unconditional, Conditional, or Mixed ALP Approval.

There are three types of ALP approvals that can be issued by the FAA – conditional, unconditional, or mixed – and the level is based on the extent of planning and environmental review possible at the time.

3.4.2.1.1 Unconditional Approval.

If the locations of the well sites are known, and changes to the ALP can be clearly defined to show all development infrastructure, a NEPA document should be prepared for an unconditional ALP approval.

3.4.2.1.2 Conditional or Mix Approval.

- A NEPA evaluation for conditional or mixed approval may be the most effective method of environmental review, if a proposal involves considerable exploration, well sites are undetermined, or the proposed oil and gas development project is especially large or phased. The exact locations of individual well sites on airport property may not be known until after seismic and other testing have determined the locations.
Even when precise well locations are unknown, other information such as geological testing methods, as well as drilling methods, drill rigs, and equipment to be used for the proposed operations, will be well known at the outset.

- NEPA review for conditional approval should include as much information about the proposed oil and gas development as possible, with the anticipation that supplemental details, such as specific well head locations, will be reviewed when they are known. The NEPA documentation for a conditional approval should be developed in such a way as to anticipate and facilitate, to the best extent possible, any subsequent reviews such that they can be completed in an efficient manner. In this light, a programmatic NEPA document might be considered as the most appropriate and efficient approach for multi-phased and long-term oil and gas development projects.

- Note that while a conditional ALP approval normally qualifies as a categorical exclusion (CE), oil and gas exploration on airport land is done in anticipation of establishing wells and there is reasonable expectation that ALP changes will need to depict those facilities, making an administrative CE inappropriate. When a conditional ALP approval is given, the approving FAA official has not authorized the airport sponsor or project proponent to begin building the facilities shown on the conditionally approved ALP. The sponsor or proponent may start building those facilities only after the FAA completes its environmental analysis of those facilities and the approving FAA official issues an unconditional approval of the ALP depicting those facilities (Order 5050.4B, Section 202c).

### 3.4.2.2 FAA EIS.

If significant impacts are anticipated from proposed oil or gas development project, or an environmental assessment (EA) finds there may be significant impacts which cannot be mitigated to reduce such impacts below applicable significance thresholds, an environmental impact statement (EIS) will be necessary to satisfy NEPA requirements. While EAs may be prepared by sponsors, preparation of an EIS must be directed by the FAA. In these circumstances airport sponsors should coordinate with FAA staff on how best to proceed with environmental review.

### 3.4.2.3 NEPA Record of Decisions for Proposed Oil and Gas Development.

If an EA finds no significant impacts, the FAA may conclude its NEPA review for the proposed project with a Finding of No Significant Impact (FONSI) or a FONSI and a Record of Decision (ROD; FONSI/ROD). For some EAs and all EISs the FAA concludes its NEPA review with a Record of Decision (ROD).
3.4.3 Content of NEPA Documents for On-airport Oil/Gas Development

NEPA documents should, as applicable:

- State that on-airport development of oil and gas production is subordinated to the airport use of the obligated land, including restricted access and adherence to FAA requirements for on-airport construction and non-aeronautical operations (see Appendix B, for applicable lease terms).
- Describe the entire lifecycle of proposed oil and gas operations including exploration activities, construction schedule and methods, facilities for development and production, and plans for well closure.
- Describe the proposed facilities including:
  - any new access roads
  - the well design and site preparation,
  - the drilling methodologies to be employed,
  - water and fracturing fluid preparation and storage,
  - the hydraulic fracturing details including geologic strata and drilling depths,
  - the collection, handling, and proper disposal of flow-back and waste water,
  - the infrastructure for collection of oil and gas, and
  - Disclosure of other relevant processes that may have impacts to the airport or environmental resources
- Proposed oil and gas projects are likely to involve collector pipelines, which will have distinct considerations with regard to construction and maintenance, such as clearing, trenching, stringing of pipe, grading, and right-of-way maintenance.
- The need for compliance monitoring or maintenance procedures as may be described in the sponsor's approved CSPP should be explained in the NEPA document, along with anticipated well closure and site reclamation. Materials submitted as part of the CSPP may provide details on these processes.
- In addition to the standard components of an FAA NEPA evaluation stipulated in Order 5050.4B, it may be necessary to cross reference or include as appendices components of the CSPP, such as the spill prevention, containment, and counter measures plans.

3.4.4 Public Involvement

The public involvement requirements of FAA Order 5050.4B will apply to EAs and EISs for mineral extraction, and actions to meet applicable public involvement requirements should be clearly demonstrated in the NEPA document, (see Order 5050.4B paragraph 9(i)).
3.4.5 Noise Evaluation.

3.4.5.1 FAA policies for evaluating noise recognize that there are settings where the 65 DNL standards for noise measurement may not apply. Mineral extraction is one of these circumstances.

3.4.5.2 For mineral extraction projects, the responsible FAA official will determine the appropriate noise assessment criteria based on specific uses in that area. For mineral extraction projects, the vast majority of noise is generated during construction. Mineral extraction projects should expect 1) construction noise impacts from construction activities at the well pad sites including drilling and hydraulic fracturing as well as heavy truck traffic, and 2) from operation of the well pad sites including compressor stations and truck traffic traveling to and from the sites. Noise from drilling rigs should be treated as stationary construction noise, and the guidance on construction noise from non-aviation sources in Order 5050.4B and its companion Environmental Desk Reference for Airport Projects should be followed.

3.4.5.3 In addition, there may be state or municipal construction noise ordinances that apply. In general, ambient noise levels should be compared to estimated construction noise levels at various distances for horizontal drilling and for well pad preparation. This assessment should be based on an assumption that all pieces of construction equipment typically used for horizontal drilling and well pad preparation activities would operate at the same time.

3.4.5.4 During construction phase of a project, drill rigs are generally in operation around the clock and 7 days a week. The estimated time to drill a single well is 15 – 20 days, with another 7 – 10 days for the hydraulic fracturing process after the drilling is complete. NEPA documents will be able to discuss this as construction noise.

3.4.5.5 Guidance on modeling surface transportation noise can be found in the Environmental Desk Reference for Airport Actions, Chapter 1, Sections 6.h and 6.i. In the absence of specific federal, state, or local noise requirements applicable to a particular mineral extraction project, use the FAA’s criteria for significant noise exposure in FAA Order 1050.1E to evaluate the potential impacts at noise sensitive receptors as a result of the proposed project. Noise from single events generally has little impact on the calculation of DNL noise contours. However, tables and formulas can

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7 FAA Order 5050.4B, paragraph 9(n).
8 [http://www.faa.gov/airports/environmental/environmental_desk_ref/media/desk_ref_chap17.pdf](http://www.faa.gov/airports/environmental/environmental_desk_ref/media/desk_ref_chap17.pdf)
be used to gain an estimate of how loud noise will be at certain distances, and whether or not it is likely to exceed 65 dB. If mitigation such as sound barriers cannot bring estimated noise to a less than significant level, or if finer resolution assessment of noise levels is needed, noise modeling may be required or an EIS may need to be prepared.

3.4.5.6 If the NEPA review has established environmental mitigation commitments to reduce potential impacts below a threshold of significance, these will be reiterated in the FAA ROD and must be stipulated in the subsequent lease terms.

3.4.6 Subsequent Review and Approval of Well Sites.
Subsequent review and approval, such as to add specific well site locations, will be treated as written supplement or re-evaluations as applicable in accordance with Order 5050.4B section 1401.

3.5 Best Management Practices.
Best management practices in oil and gas development can improve technical and operational efficiency while ensuring safety and environmental protection. Best management practices are actions that most efficiently, practically, and cost-effectively accomplish the task of oil and gas development with the least amount of associated impacts. With respect to oil and gas operations, best management practices can vary based on differences in geology, land use, water resources, and regulations. Since the unconventional development of oil and natural gas resources are a rapidly growing and evolving set of practices and the environmental impacts are not fully understood, best management practices are still being developed. Airport sponsors are encouraged to identify those best management practices that could be effectively implemented with respect to the proposed oil and gas operations. FAA ADOs and Regional Offices reviewing proposals for such oil and gas operations should also identify applicable best management practices, which may also be used as mitigation measures contained within the NEPA documentation. For more information on best management practices in the context of shale gas production, see Department of Energy, Secretary of Energy Advisory Board, Shale Gas Production Subcommittee 90-Day Report, August 18, 2011; Second Ninety Day Report, November 18, 2011.
APPENDIX A. UNCONVENTIONAL OIL AND GAS PRODUCTION

A.1 Oil and Gas Production in the U.S.

A.1.1 Conventional oil and natural gas production is “crude oil and natural gas that is produced by a well drilled into a geologic formation in which the reservoir and fluid characteristics permit the oil and natural gas to readily flow to the wellbore.” Conventional production involves high quality reserves of oil and gas that are relatively easy to develop using conventional drilling and extraction methods.

A.1.2 Unconventional oil and gas production is an umbrella term for oil and natural gas produced by means that do not meet the criteria for conventional production. Beginning in the 1980s and expanding through the present, “unconventional oil and gas production” has developed lower quality oil and gas reserves from shale, tight sand (low permeable sandstone), and coal bed methane gas and oil deposits in the United States. Figure A-1 describes petroleum industry distinctions between conventional and unconventional oil and gas production.

Figure A-1. The Resource Triangle for Oil and Gas Reserves

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10 What is termed "unconventional" at any particular time is dependent on resource characteristics, exploration and production technologies, the current economic environment, and the scale, frequency, and duration of production from the resource. (DOE EIA Glossary).

Shale Oil and Gas Production.

A.2.1 Production of oil and gas from shale formations relies on technological advances that combine hydraulic fracturing and horizontal drilling to produce marketable quantities of oil and gas. In contrast to conventional or traditional well sites, shale oil and gas wells employ horizontal drilling of multiple wellbores from a single surface well site radiating in different directions and different depths to maximize production. The hydraulic fracturing process fractures the underlying oil- and gas-holding shale layer to release oil and gas to the wellbore for extraction.

A.2.2 Hydraulic fracturing involves firing explosive charges along the horizontal bores (3,000 to 15,000 feet below the surface) to fracture the underlying shale formation holding the oil and gas. Then fracturing or stimulation fluid (which contains water, sand, and various chemicals, some of which may be toxic) is pumped through the wellbore under high pressures to further fracture the shale formation, allowing gas or oil to escape and flow to the wellbore. Hydraulic fracturing uses large volumes of water (between 2 and 5 million gallons for horizontal wells). Hydraulic fracturing is largely regulated at the state level, and most states with shale formations have regulatory programs for oil and gas exploration and production. More information on hydraulic fracturing is available from the references included in Appendix C.

A.2.3 The lower 48 states have a wide distribution of oil and gas shale formations. The most currently active shale formations include the Barnett Shale (in Texas), the Haynesville/Bossier Shale (in Louisiana), Bakken Shale (in North Dakota) and the Marcellus Shale in portions of New York, Pennsylvania, Ohio, West Virginia, and Maryland. While there are shale formations in northern Alaska, there are no known formations in Hawaii. Figure A-1 provides the 2010 Energy Information Administration map of the “Shale Plays” in the lower 48 states.

Figure A-1. 2010 Energy Information Administration Shale Play Map

Source: Energy Information Administration based on data from various published studies. Updated May 9, 2011
APPENDIX B. SAMPLE OIL AND GAS LEASE PROVISIONS FOR ON-AIRPORT DEVELOPMENT

<table>
<thead>
<tr>
<th>Term/Condition</th>
<th>Description/Sample Language</th>
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<tbody>
<tr>
<td><strong>A. Subordination of Mineral Estate; Limited Access (Required)</strong></td>
<td>Lessee acknowledges that Lessor operates a public use airport on the Land and that Lessor has or may have plans to construct new structures and improvements on the Land, or to expand the structures and improvements currently existing on the Land. As such, Lessee’s leasehold interest as described herein, including, without limitation, its use of and access to the Land for the purpose of exploring, drilling, and producing oil and gas, laying pipelines, and buildings roads, tanks, and other facilities thereon to produce, store, treat, and process oil and gas, are hereby expressly subordinated in all respects to the use of the Land as a public use airport and current and future Federal grant obligations. Drill site operations and all related operations shall be limited to designated portions of the Land that are currently undeveloped and not planned to be developed as detailed in the airport’s most recent master plan. Such locations are identified on Exhibit ___ to this Lease. Lessee agrees to conduct its operations so as not to interfere with Lessor’s use of the Land as is consistent with the operations of a public use airport. Lessee shall not make, allow, or permit any operations that involve a use of the Land’s surface that would or might interfere with any actual or contemplated use of the surface of the Land by Lessor, without the prior written consent of Lessor. Lessee’s right of ingress and egress to and across the Land shall not be permitted without the prior written consent of Lessor. Such consent shall not be unreasonably withheld, as long as such ingress and egress does not interfere with the use of the Land a public use airport and the sponsor’s federal obligations. Moreover, all access to the Land shall occur so as not to violate security procedures in place at the time the access is sought and so as not to contravene any FAA regulations, rules or orders. Lessee shall construct all facilities, including roads, in</td>
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<td>strict compliance with all applicable federal, state, and local laws, codes, rules, regulations, ordinances, permits, and [the Airport’s design criteria and rules]. Lessee shall take no action that could compromise the safe and efficient use of the Land as a public use airport with concurrent commercial development. No signage, other than that required by law and posted so as not to conflict with or distract from required airport signage, shall be allowed without the prior written approval of Lessor. Lessee agrees that in the event the location of any well drilled on the Land pursuant to this Lease interferes with Lessor’s future use or development of the Land, then Lessee shall, upon Lessor’s request, plug and abandon such well and associated facilities, within one hundred twenty (120) days of such request. (Establish amortization of cost terms and purchase and valuation methods).</td>
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<td><strong>B. Compliance with laws (Required)</strong></td>
<td>Lessee shall conduct all operations hereunder in strict compliance with the laws, codes, rules, regulations, ordinances, and permits, as applicable, of [the applicable state regulatory agencies] and the FAA, and in accordance with all other federal, state, and local laws, codes, rules, regulations, ordinances, permits, and [the Airport’s design criteria and rules] and the airport sponsor’s federal obligations. The terms of the lease must comply with the airport sponsor’s federal obligations. This also includes abiding by FAA’s Policy and Procedures Concerning the Use of Airport Revenue (Revenue Use Policy, 64 FR7696). This policy sets forth the permitted and prohibited uses of airport revenue, set forth in statute, in accordance with grant assurance 25.</td>
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<td><strong>C. Permitting (Required)</strong></td>
<td>All construction and use of airport property under this Lease shall be subject to the prior approval by Lessor, and must comply with the Airport rules and regulations, which are incorporated herein by reference. Further, all construction and use of airport property as contemplated by this Lease shall comply with all FAA rules, regulations and orders, including,</td>
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</table>
D. Airport Rules and Regulations

All current and future [Airport’s rules and regulations], including, without limitation, all rules and regulations concerning oil and gas exploration, development, transportation, or any other related operations or activities, are hereby incorporated into this Lease by reference and made a part hereof.

E. Insurance

Lessee shall acquire and, at all times while this Lease is in effect, maintain insurance covering all of its operations on the Land, including, without limitation, all work performed by it or on its behalf by contractors, subcontractors, and others, naming Lessor and related individuals and entities designated by Lessor as additional insureds. The policies shall include coverage for comprehensive general liability for bodily injury and property damage, environmental pollution liability, control of well or blowout coverage for the cost of cleanup and surface remediation, workers’ compensation, and any other coverages and insurance reasonably required by Lessor. Any insurance policy obtained and maintained as required in this Lease shall not be subject to limitations, conditions, or restrictions deemed inconsistent with the intent of the insurance requirements to be fulfilled by Lessee. The bankruptcy, insolvency, or denial of liability by any insurance company providing coverage hereunder shall not exonerate or in any way relieve Lessee from liability.

F. Bond, Irrevocable Letter of Credit

Prior to the commencement of any construction or
drilling operations under this Lease, Lessee shall provide to Lessor a security instrument in the form of a bond or letter of credit in the form and amount reasonably acceptable to the Lessor; provided, however, that such security instrument shall, at a minimum, adequately cover Lessee’s obligations and liabilities for the construction, drilling or other activity under this Lease for which the security instrument was obtained. Any such security instrument shall remain in full force and effect throughout the period of performance, and for a reasonable period thereafter, of the construction, drilling or other activity under this Lease for which the security instrument was obtained.

G. Indemnity and Hold Harmless Clause

Lessee agrees to indemnify, defend and hold harmless Lessor, and Lessor’s representatives, board members, council members, agents, employees, contractors, and any other person or entity acting by, through or under Lessor’s direction or control, Lessor’s independent contractors, and Lessor’s successors and assigns, against all expenses, claims, demands, liabilities, and causes of action of any nature for injury to or death of persons and loss or damage to property, including, without limitation, attorneys’ fees, experts’ fees, and court costs, caused by Lessee’s operations on the [Land] or Lessee’s marketing of production from the [Land] or any violation of any environmental requirements by Lessee. As used in this paragraph, the term “Lessee” shall include Lessee, its agents, employers, contractors, and any other person acting under its direction or control, and its independent contractors. This indemnity shall be as great as the law allows, and Lessee shall indemnify and hold harmless for all loss, cost, damage, or expense of every kind and nature, whether the result of the sole negligence, concurrent or comparative negligence, or strict liability of Lessee. To the extent, and only to the extent, the foregoing indemnities are, by law, only enforceable if supported by available liability insurance, Lessee agrees that the insurance provided for in this Lease is intended to satisfy any coverages and dollar limits of liability provided by applicable statutes. To the extent, and only to the extent, the foregoing indemnities are, by law, either inapplicable
or not enforceable, Lessee and Lessor shall each be responsible for the results of its own actions and for the action of those persons and entities over which it exercises direction and control. Lessee’s indemnities set forth herein shall survive the termination or expiration of this Lease.

H. No Warranty of Title

Lessor makes no warranty or assurance of any kind with respect to title to the Land. By acceptance of this Lease, Lessee acknowledges that it has been given full opportunity to investigate and has conducted sufficient investigation to satisfy itself as to the title to the Land, and Lessee assumes all risk of title failures.

I. Assignment and Subletting

Lessee shall not assign this Lease or sublet the [Land] without the prior written consent of Lessor. In the event Lessor consents in writing to any assignment or sublease, the assignee or sublessee shall assume all of Lessee’s liabilities, obligations, and duties under this Lease. Further, Lessee shall remain liable for its obligations regardless of any assignment or sublease and any assignee or sublessee shall be jointly and severally liable with Lessee, unless Lessor expressly releases the original Lessee in writing from such liabilities, obligations, and duties.

J. Construction and Surface Restoration

All construction and surface restoration work performed by Lessee shall be undertaken so as to restore the Land to as near its original condition as is reasonable practicable and in strict compliance with all applicable laws, codes, regulations, ordinances, permits and the [Airport’s design criteria and rules] and the airport sponsor’s federal obligations. Throughout the term of this Lease, including, without limitation, during all drilling activities, Lessee shall keep the Land in as clean a condition as practicable and free from foreign object debris (FOD) and other hazards that may impair the safety of airport operations.

K. Environmental Matters, Environmental Representations and Warranties (AS APPLICABLE TO ON-AIRPORT)

1. The lessee/developer represents, warrants, and covenants the following:
   a. Lessee has obtained and throughout the term of this Lease shall obtain and maintain all
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<td>CONSTRUCTION AND OPERATING</td>
<td>licenses, permits, exemptions, registrations, and other authorizations required under Environmental Laws (as defined below) and shall provide any notices required under Environmental Laws for conducting its operations on the Land. Lessee shall require its sublessees, if any, and contractors to obtain and maintain all licenses, permits, exemptions, registrations and other authorizations required under Environmental Laws for conducting operations on the Land.</td>
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<td>b. Lessee shall comply and shall cause all of its employees to comply, and shall exercise best efforts to cause its agents, contractors, sublessees or other parties under Lessee’s direction and control to comply, and shall include in all subleases a provision requiring the sublessee to comply and all employees, contractors, sublessees or other parties under sublessee’s control to comply with all Environmental Laws pertaining to Lessee’s (and including third parties under Lessee’s direction and control) use of and operations on the Land.</td>
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<td>c. Lessee shall not cause, contribute to, or permit any Release (as defined below) of any Hazardous Substances (as defined below) or Solid Waste (as defined below) by Lessee or its employees, agents, contractors, sublessees or other parties under sublessee’s direction and control, on, at, or from the Land, except in compliance with Environmental Laws.</td>
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<td>d. Lessee, prior to vacating or surrendering any portion of the Land or as sooner required by Environmental Laws or this Lease, shall remove and dispose of and shall require its employees to exercise its best efforts to require its agents, contractors, sublessees, or any other party under Lessee’s direction and control at the Land to remove and dispose of, any materials, debris, tanks, equipment, ponds, vessels, and containers placed by Lessee or its agents, contractors, sublessees,</td>
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or any other party under Lessee’s direction and control at the Land that are composed of or contain Solid Waste or Hazardous Substances (as distinct from actual Releases which have resulted in contamination of the environment and are subject to the provisions herein pertaining to response and compliance actions), at no cost to Lessor and in compliance with Environmental Laws.

e. Lessee shall conduct and shall require its employees to conduct, and shall exercise best efforts to cause its agents, contractors, sublessees or other third parties under Lessee’s direction and control to conduct its/their activities and operations in a manner consistent with Lessor’s duties and obligations under Environmental Laws, including, without limitation, environmental permits issued to Lessor and Lessor’s commitments under the State Implementation Plan and the National Environmental Policy Act.

f. Lessee acknowledges that Lessor is or may be subject to the [State Discharge Elimination System Program], the National Pollution Discharge Elimination Program (NPDES), and state and federal regulations relating to stormwater discharges, including, without limitation, 40 CFR Part 122, for operations that occur at the Airport. Lessee further acknowledges that it will conduct operations and activities (and shall require its employees to conduct operations and activities, and shall exercise its best efforts to cause its agents, contractors, sublessees or other third parties under Lessee’s direction and control to conduct operations and activities) on or related to the Land in compliance with applicable regulations, including 40 CFR Part 122, and any applicable [State Discharge Elimination System Program] and NPDES permits, as these may be amended from time to time.
Lessee acknowledges that its cooperation is necessary to ensure compliance with any [State Discharge Elimination System Program] and NPDES permits. Lessee acknowledges that it may be necessary to use best efforts to minimize the exposure of stormwater to materials generated, stored, handled, or otherwise used by Lessee (including third parties under its direction and control), by implementing and maintaining effective “Best Management Practices” as defined in 40 CFR Part 122.2, depending upon the applicability to Lessee’s operations or any activities conducted by Lessee at the Land and as required by any applicable [State Discharge Elimination System Program] or NPDES permit, as these may be amended from time to time. Lessee further acknowledges that any existing [State Discharge Elimination System Program] or NPDES permit issued to Lessor, and any subsequent permit(s), amendments, extensions or renewals thereto, is incorporated by reference in this Lease to the extent affecting Lessee’s operations at or related to its use of the Land. Lessor agrees to notify Lessee of any changes to any portions of such permits applicable to, or that affects Lessee’s operations at or use of, the Land.

g. Lessee shall not create or maintain any wildlife attractants without appropriate coverings or other effective mitigation measures. Further, Lessee shall locate all water storage facilities (pits or ponds) in accordance with applicable FAA airport design standards to ensure compatibility with airport operations.

h. **Right of Entry and Inspection.**

i. Lessor shall have the full right at all reasonable times, and in Lessor’s sole discretion, to enter the sites where Lessee’s operation are located for the
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<td>purpose of conducting an inspection, assessment, investigation, and regulatory compliance audit. Lessor or its authorized agents may perform testing of the Land as needed, including test borings of the ground and chemical analyses of air, soil, water, and waste discharges. Lessor will provide advance written notice of such entry and inspections, except in case of emergencies, when notice shall not be required.</td>
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<td>ii. Lessee shall cooperate (and shall require its employees and shall exercise its best efforts to require its agents, contractors, sublessees, or any other third party under Lessee’s direction and control to cooperate) in allowing prompt reasonable access to Lessor to conduct such inspection, assessment, audit, or testing. Lessee remains solely responsible for its environmental compliance, notwithstanding any inspection, assessment, audit, or testing.</td>
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<td>i. Information to be Provided.</td>
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<td>i. If Lessee receives any notice, correspondence, citation, order, warning, complaint, inquiry, claim or demand that is not legally privileged, made confidential by applicable law, or protected as trade secrets (a) concerning any alleged Release of Hazardous Substances or Solid Waste at, on, or from the Land, or into the environment from the Land, or (b) alleging that Lessee or any employee, agent, contractor, sublessee, or any other party under either of the party’s direction and control has violated or is about to violate any Environmental Law(s) pertaining to Lessee or third party operations at or use of the Land,</td>
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<td>or (c) asserting that Lessee or any party under Lessee’s direction and control is liable for the cost of remediation or investigation of a Release of Hazardous Substances or Solid Waste on, at, or from the Land, Lessee shall immediately provide written notice to Lessor of the same, including a copy of any related documents.</td>
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<td>ii.</td>
<td>Lessee shall provide to Lessor simultaneously with any submittal to any governmental agency, a complete copy (including exhibits and attachments) of any reports or notices required by Environmental Laws, and which are not legally privileged, made confidential by applicable law, or protected as trade secrets, regarding (a) alleged failure to comply with any Environmental Laws or (b) the Release of any Hazardous Substance or Solid Waste in, on, or into the environment, arising out of the past or present operations at or use of the Land by Lessee or any party under Lessee’s direction and control.</td>
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<td>iii.</td>
<td>Each party shall provide the other with reasonable advance notice of any scheduled meeting with any governmental agency regarding, in whole or in part, compliance or alleged non-compliance with Environmental Laws or use of or operations at the Land.</td>
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<td>iv.</td>
<td>Lessor reserves the right to notify or consult any appropriate governmental authority or agency regarding conditions on the Land or concerns relating to Lessee’s operations at or use of the Land, including operations of Lessee’s employees, agents, contractors, sublessees, or any other third party under Lessee’s control, if</td>
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<td>Lessor believes those conditions or operations do or may violate applicable Environmental Laws, may pollute or contaminate the environment, or may adversely affect the health, welfare, or safety of persons.</td>
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j. **Response and Compliance Actions.**

i. If the Land or other property is or becomes contaminated or otherwise damaged or injured as a result of a Release of Solid Waste or Hazardous Substances on, at, or from the Land by Lessee or by its employees, agents, contractors, sublessees, or any other party under Lessee’s direction and control, Lessee shall (a) orally notify Lessor immediately of such contamination or damage upon Lessee’s discovery of such contamination or damage, (b) promptly take reasonable actions to control any such Release or contamination, (c) immediately take all reasonable actions necessary or required under Environmental Laws to mitigate any immediate threat to human health or the environment. Lessee shall then undertake any further repairs or corrective actions, in a timely manner and in full compliance with Environmental Laws, as are necessary to remove or remediate contamination to, at a minimum, return the Land to its prior condition.

ii. If Lessee does not take immediate action or other timely action as necessary to mitigate or prevent any imminent actual or potential threat to human health or the environment caused by Lessee or its agents, contractors, sublessees, or any other party under Lessee’s direction or control, then Lessor, in addition to its
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| rights and remedies described elsewhere in this Lease, at its election, may enter the Land and take whatever reasonable action to eliminate the threat or return of the Land to at least its prior condition, as applicable. All Costs (as defined below) associated with any action by Lessor in connection with this section shall be subject to the reimbursement and indemnification requirements of this Article.

k. Corrective Action Process. Before commencing any remedial or corrective action under this Article, and except for immediate preventative action required hereunder, Lessee shall obtain prior written approval of the Lessor. The work shall be performed at Lessee’s expense, and Lessor shall have the right to review and inspect all such work at any time using consultants and representatives of Lessor’s choice. Lessee shall remove or remediate the Land to, at a minimum, its prior condition. Lessee shall, at Lessee’s sole cost and expense, make all tests, reports, and studies and shall provide all information to any appropriate governmental agency as may be required pursuant to the Environmental Laws pertaining to Lessee’s response actions. This obligation includes but is not limited to any requirements for a site characterization, site assessment and remediation plan that may be necessary.

In the event Lessor undertakes any action or incurs any costs in the exercise of its rights hereunder, Lessee shall promptly reimburse Lessor in the manner determined by Lessor in its reasonable discretion at the time such reimbursement is sought, for all reasonable and documented costs associated with such response, repairs, corrective action or remediation, including, but not limited to, consultants’ fees, contractors’ fees,
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<td>attorneys’ fees, penalties, costs of investigation or other costs incurred hereunder by it or its agents.</td>
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1. **Environmental Indemnification.**

   Notwithstanding any other provision in this Lease to the contrary, Lessee agrees to indemnify, defend and hold harmless Lessor from and against any and all claims, demands, penalties, fines, suits, actions, administrative proceedings, settlements reached, government orders, judgments, losses, damages, liabilities, costs, and expenses (including, but not limited to, reasonable attorneys’ and consultants’ fees, litigation costs, expert witness fees, and expenses of investigation, removal, remediation, or other required plan or response action) to the extent resulting from (a) the breach of an representation or warranty set forth herein by Lessee or any employees, agents, contractors, sublessees, or any other party under Lessee’s direction and control, (b) the failure of Lessee to meet its obligations hereunder, (c) the violation of any Environmental Law by Lessee or its agents, contractors, sublessees, or any other party under Lessee’s direction and control, and (d) documented loss by Lessor to a third party or governmental entity from any Environmental Impact Claim (as defined below), to the extent resulting from the operations, activities, actions or inaction of Lessee or its employees, agents, contractors, sublessees, or any other party under Lessee’s direction and control at or related to the Land.

   In the event that Lessee fails or refuses to defend Lessor as provided herein, Lessor shall have full right to undertake its own defense and to settle any such claims or lawsuits. In such event, Lessee shall be liable to Lessor, and shall promptly pay any resulting judgment against, or settlement by
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<td>Lessor, and shall reimburse Lessor for all reasonable attorneys’ fees and costs in undertaking such defense or settlements.</td>
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<td>m. Reimbursement.</td>
<td>In the event Lessor undertakes any action, including, but not limited to, response or corrective action, repairs, or remediation, in the exercise of its rights hereunder, Lessee shall reimburse Lessor, upon written notice, for all costs Lessor incurs in association with such action.</td>
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<td>n. Survival of Environmental Provisions.</td>
<td>Unless specifically stated elsewhere herein, the provisions of this Lease concerning environmental matters, including the representations, warranties, covenants and indemnities of Lessor and Lessee, are intended to and shall survive the termination of this Lease.</td>
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<td>o. Defined Terms.</td>
<td>The following defined terms used herein shall have the following meanings:</td>
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<td>i. Costs</td>
<td>means all costs and expenses, including, but not limited to, attorneys’ and consultants’ fees, litigation costs, expert witness fees, and expenses of investigation, removal, remediation, or other required environmental plan or response or remedial action.</td>
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<td>ii. Environmental Impact Claim</td>
<td>means any claim, suit, judgment, penalty, fine, loss, administrative proceeding, request for information, citation, notice, cost, or expense (including, but not limited to, any costs of investigation, study, cleanup, removal, response, mitigation, remediation, transportation, disposal, restoration, monitoring, consultants’ fees, contractors’ fees, and attorneys’ fees) which arises out of, is related to, alleges, or is based on the presence, handling, treatment, storage, or actual or threatened Release, dispersal,</td>
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iii. **Environmental Laws** means all federal, state and local laws, court or administrative decisions, statutes, rules, regulations, ordinances, FAA ACs and orders, court orders and decrees, administrative orders and any administrative policies, guidelines or guidance documents now or hereafter in effect relating to the environment, wildlife, public health, occupational safety, industrial hygiene, and Hazardous Substance or Solid Waste (including, without limitation, the disposal, generation, manufacture, presence, processing, production, release, storage, treatment or use thereof at the Land), or the environmental conditions on, under or about the Land, as amended and as in effect from time to time.

iv. **Hazardous Substances** means (i) all chemicals, materials and substances defined as or included in the definition of “hazardous substances,” “hazardous wastes,” “hazardous materials,” “extremely hazardous wastes,” “restricted hazardous wastes,” “toxic substances,” “toxic pollutants,” “contaminants,” “pollutants,” “regulated substances,” or words of similar import, under any applicable Environmental Law and (ii) all other chemicals, materials and substances that are prohibited, limited or regulated by any governmental authority, including, without limitation, asbestos, radioactive materials (including naturally occurring radioactive materials), petroleum, petroleum products, and substances and
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<td>compounds containing polychlorinated biphenyls.</td>
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<td>v. Release</td>
<td>means any depositing, spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment, or threat of release such that a release may enter the environment.</td>
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<td>vi. Solid Waste</td>
<td>shall have the same meaning as in the Resource Conservation and Recovery Act.</td>
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APPENDIX C. REFERENCES

There are a multitude of studies, commentary, and articles on oil and gas production and particularly on hydraulic fracturing. The following sources have been consulted in the preparation of this AC and may be useful sources of further information in the analysis and documentation of environmental considerations.

- The National Petroleum Council, An Oil and Gas Advisory Committee to the Secretary of Energy, Website, www.npc.org
- FracFocus, Chemical Disclosure Registry, Website, www.fracfocus.org
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