

**Decision Record**  
**Finding of No Significant Impact**  
**and**  
**Environmental Assessment**  
  
**for**  
  
**Samson Resources Company**  
**Hornbuckle Field Development Program EA Update**

**Bureau of Land Management**  
**Casper Field Office**  
**Casper, Wyoming**

**WY-060-EA12-266**



**UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT  
CASPER FIELD OFFICE  
DECISION RECORD  
for  
Samson Resources Company  
Hornbuckle Field Development Program Update  
WY-060-EA12-266**

In accordance with the Mineral Leasing Act of 1920 (MLA) (30 United States Code (U.S.C) 181 *et seq.*, it is my decision to approve the proposal for the Hornbuckle Field Development Update, based on the analysis conducted in Environmental Assessment (EA) WY-060–EA12-266 and the attendant Finding of No Significant Impact.

Conditioned through mitigation measures, I find that this action will not result in significant impacts on the human environment pursuant to Title 40 of the Code of Federal Regulations (CFR) 1508.27 (a) and (b) (1) through (10) and that an Environmental Impact Statement is not required. I further find this action in conformance with the *Record of Decision and the Approved Casper Resource Management Plan* approved in December of 2007, and that it will not cause unnecessary or undue degradation. The mitigation measures are referenced below.

**Background:**

In October 2011 the BLM Casper Field Office (CFO) completed an EA, WY-060-EA11-181 (BLM 2011), referred to herein as the Original Hornbuckle EA, analyzing the effects of an exploratory oil and gas drilling program proposed by SRC. The Proposed Action (selected alternative) was to drill, complete, and potentially produce up to 96 horizontal wells on 48 well pads within HFDDPA, which is located in northern Converse County, approximately 26 miles northeast of the town of Glenrock in T37N and T38N, R 72W and R73W (Figure 1-1). The BLM issued a Finding of No Significant Impact (FONSI) for the Proposed Action based on information contained in EA WY-060-EA11-181 and all other available pertinent information.

Following the issuance of the FONSI, SRC realized the need to supplement WY-060-EA11-181 to increase field efficiency, maximize drainage, address limitations of the original Hornbuckle Field Development Program, and increase operational flexibility within the Hornbuckle Field. The areas of change include increasing the number of wells per pad from two to as many as six, increasing the percentage of exploratory wells for formations outside the Sussex, adding oil and water pipelines in the same trench as the currently analyzed gas line if needed, and, in addition to approved overhead and buried power supply, use of gas-powered engines to power pumping equipment within the field. The amount of interim reclamation to be undertaken would also change, based on the increased number of wells per pad.

The Hornbuckle EA Update (WY-060-EA12-266) analyzed the impacts of drilling up to 192 new wells on the 48 approved well pads and construction of associated infrastructure consisting primarily of wellhead processing and pumping equipment. The additional wells would be drilled over a period of 5 to 10 years. These new wells would be drilled horizontally to maximize the potential of the Sussex, Muddy, Frontier, Niobrara and other hydrocarbon-bearing formations for commercial oil and gas production at vertical depths up to 13,000 feet.

The overall HFDPA size has not changed from the original EA (Figure 1-1), encompassing approximately 46,080 acres (72 sections) of mixed federal, state and fee (private) lands.

**Proposed Action:**

Specifically, the approval action consists of drilling a maximum of 192 additional wells on the 48 well pads previously approved and evaluated in the Original Hornbuckle EA. Under the Proposed Action, some of the existing 48 pads could be used to drill up to six horizontal wells per pad resulting in up to 192 additional wells. The total number of wells drilled from each pad will depend on variables such as the number of formations targeted, optimal well density in a given area, production success, commodity prices, lease stipulations, and permit availability. Increasing the number of wells drilled from a well pad will expand commercial oil and gas production from the Sussex Formation within the HFDPA while also allowing for exploration and development of other geologic formations within the Project Area. The Parkman, Niobrara, Frontier, Muddy, and other formations have proven productive in this area of the Powder River Basin. Since the Proposed Action involves drilling the 192 additional wells from existing or approved pads, there will be no additional short-term disturbance when compared to what was approved in the Original Hornbuckle EA. Long-term disturbance will increase due to the larger area needed to accommodate installation and operation of the additional wells (the amount of interim reclamation will be decreased). Table 2-1 summarizes the initial and long-term surface disturbance associated with the Original Hornbuckle EA and with the Proposed Action.

Table 2-1. Surface Disturbance Associated with the Proposed Action

	<b>Wells</b>	<b>Pads</b>	<b>Initial Surface Disturbance* (Acres)</b>	<b>Long-Term Surface Disturbance (Acres)</b>
Original Hornbuckle EA (No Action Alternative)	96	48	821.15	177.23
<b>Added by Hornbuckle EA Update</b>	192	0	0	43.20

\*See Table 4-4 in Original Hornbuckle Field EA (BLM 2011)

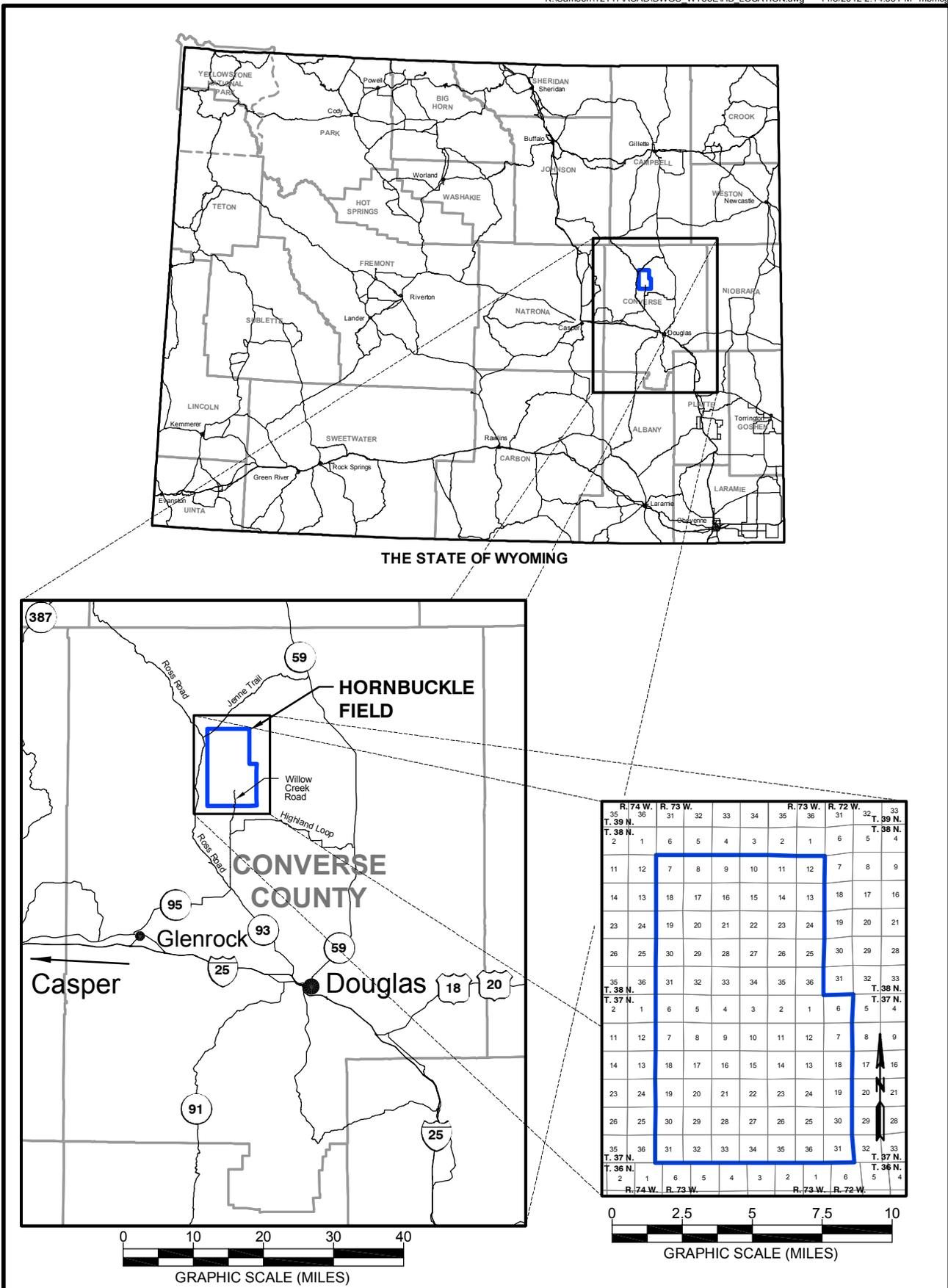


Figure 1-1. HFPDA Vicinity Map

Drilling operations will be initiated as soon as all of the necessary permits have been obtained. It is anticipated that these wells will add from 5 to 10 years to the Original Hornbuckle Field Development Program, subject to a combination of drilling success, rig availability, permit approvals, and market conditions. The average life of a productive well is expected to be 40 years.

Oil will continue to be transported via trucks from storage facilities at each pad to bulk handling facilities in Casper or Douglas. Gas will be transported via subsurface pipelines to centralized compression and treatment facilities. Produced water will be transported by truck to approved water-disposal wells or evaporation ponds, or will be used for potential beneficial use (e.g., drilling operations). Existing arterial roads will provide the main access to and within the project area.

Lease operations will be conducted in full compliance with all applicable laws, regulations (43 CFR, Part 3100 et al.), Onshore Oil and Gas Orders (43 CFR, Part 3160; March 7, 2007), the approved plan of operations, and any applicable Notices to Lessees. Operations on federal lands will be conducted in compliance with 43 CFR, Part 2800 et al.

### ***Construction Activities***

As outlined in the Original Hornbuckle EA, construction activities for the currently approved access road routes and well locations will follow practices and procedures outlined in individual APDs and any appended Conditions of Approval (COAs). Access road and well pad construction activities will follow guidelines and standards set forth in the joint BLM/U.S. Forest Service (USFS) publication: *Surface Operating Standards for Oil and Gas Exploration and Development* (Fourth Edition) (BLM 2007b) and/or the contractual requirements of any affected private (fee) surface owner(s).

### **Access Roads**

Access to the project area will generally be obtained using the Ross Road (Converse County Road #31) and then, to the extent possible, by existing, upgraded oilfield roads (crowned and ditched with gravel running surfaces).

No additional new access roads will be required for the Proposed Action since all new wells will be drilled on existing or approved well pads.

### **Well Pads**

Average disturbance for the 48 evaluated and approved pads will not change from the 5.93 acres analyzed in the Original Hornbuckle EA (not including a road). Well pad construction methods are outlined in the Original Hornbuckle EA. As of July 2012, SRC has completed the construction of four approved pads. The Proposed Action does not include any new well pads.

## ***Drilling Operations***

Well-drilling and completion activities will be in compliance with BLM Onshore Oil and Gas Order No. 2. These guidelines specify the following:

*...proposed casing and cementing programs shall be conducted as approved to protect or isolate all usable water zones, potentially productive zones, lost-circulation zones, abnormally pressured zones, and any prospectively valuable deposits of minerals. Any isolating medium other than cement shall receive approval prior to use (BLM 1988).*

SRC will drill each well with a rotary drilling rig. Up to five rigs could be operating at any particular time to achieve development objectives. Drilling operations, including mobilization, demobilization, and drilling to the target depth, will require approximately 30 days per well. SRC will drill year-round, subject to environmental considerations. Based on SRC's existing experience in the Hornbuckle Field, two to three rigs will be running continuously and, on average, 30 wells per year will be completed and produced.

Drilling operations require an average of 20 personnel and seven vehicles on location at any given time each day during the course of the 30-day drilling period. The average values account for higher traffic during periods of mobilization and demobilization. An additional 10 to 15 personnel and six vehicles will be required on location during the installation of production casing. Technicians and service personnel will commute to the project site daily.

On average, SRC will utilize approximately 2,540 barrels (bbl) of water to drill the initial 2,000 feet of hole on each well. Following installation of surface casing, a water based mud will be used to drill to the intermediate casing point, which is typically the base of the Fox Hills Formation, the deepest geologic formation with the potential to contain fresh water (i.e. TDS concentration < 10,000 mg/L). Water use for the drilling and installation of the intermediate casing will be approximately 2,500 bbl. Drilling water will be obtained from an approved source in the immediate project area. The specific source of this fresh water used in drilling operations for each well will be identified at the time of APD submittal. If conditions allow, SRC may recycle any water remaining in the freshwater mud system for use during drilling of additional wells on a pad. Upon completion of surface hole drilling operations on a pad, any water remaining in the mud tanks will be de-watered for re-use on additional wells, transferred to a reserve pit for evaporation or trucked to an approved disposal facility, as appropriate.

Upon installation of the intermediate casing, SRC will switch to an oil-based mud (OBM) system to complete the drilling process. Approximately 400 bbl (16,800 gallons) of water will be used in the OBM system. Following the completion of drilling operations, any remaining oil-based fluids will be removed from the well location and either recycled into the OBM system for subsequent wells or disposed of in accordance with appropriate BLM and WOGCC rules and regulations.

Reserve pits will be used to contain water-based drilling fluids, cuttings, and wastewater produced from the well-drilling operations. The reserve pits will be constructed with an impermeable liner to prevent seepage and possible contamination of surface and groundwater. Freshwater may be stored in lined pits or tanks in accordance with WOGCC regulations. Leakage of pit fluids will only occur if the liners were installed incorrectly or the liners were damaged during drilling operations.

As indicated above, surface casing will be set at an approximate depth of 2,000 feet and cemented back to the surface during the drilling operations. This will serve to isolate all near surface freshwater zones or aquifers in the immediate Project Area. Intermediate casing will be set to a measured depth (MD) between 7,000 and 12,000 feet and will also be cemented in place, with the top of cement designed to be above the top of the Fox Hills Formation. This procedure will isolate potential hydrocarbon bearing zones below the Fox Hills Formation from near-surface freshwater aquifers. Cementing operations will be conducted in compliance with Onshore Oil and Gas Order Number 2.

Once production casing has been installed, completion operations will begin. In general, completion consists of perforating the production casing, pressure testing, stimulation of the formation utilizing hydraulic fracturing technology, flow-back of fracturing fluids, flow testing to determine post-fracture productivity, and installation of production equipment to facilitate hydrocarbon recovery. Hydraulic fracturing, which is currently regulated by the BLM and WOGCC, is discussed in detail in Section 2.1.3 of the Original Hornbuckle EA. Discussions regarding possible impacts from defects in either casing installation or cementing are included in Chapter 4 of this EA.

These completion operations will generally require an average of 30 days per well. Following completion, the well will be allowed to flow under natural pressure for one to four months, at which time a pumping system will be installed.

A freshwater pit may be constructed at each well pad to hold the estimated 50,000 bbl (2.1 million gallons) of water required for the hydraulic fracturing operation on each horizontal well. This water will be obtained from existing groundwater wells or private water right sources within the Project Area. Under the Proposed Action no water will be diverted from the North Platte River or its tributaries.

Approximately 55,440 bbl of water will be required for drilling and completion of each well, for a total of approximately 10.6 million bbl (approximately 1,370 acre-feet) of water required for all 192 wells, as discussed in Chapter 4.

## ***Production Operations***

### **Oil Production**

Oil production facilities for multiple wells per pad are essentially a small central facility capable of processing the oil, gas, and water produced from each well. Typical oil production equipment required at the individual well locations will include the following:

- An artificial lift system (e.g., rod pump unit at the well head, typically powered by a gas engine, generator or commercial electric power);
- Combustion chambers; and
- Line heaters.

Each well pad will have:

- A tank battery for the storage of oil and produced water. Total oil storage capacity is anticipated to be 2,000 bbl per well. Total produced water storage capacity is anticipated to be 400 bbl per well. Therefore, for a six well pad configuration, storage capacity will typically be 12,000 bbl of oil and 2,400 bbl of water in up to 36 400-bbl tanks.
- A heater/treater;
- A flare stack for situations where commercial quantities of natural gas are not encountered and the product must be flared;
- A connection point for loading tanker trucks used in hauling oil and water produced by each well;
- A portable lease automatic custody transfer (LACT) unit if an electrical supply is available for the metering system); and
- Up to six metering houses for measuring the natural gas from each well.

Oil will be trucked to the purchaser's designation or to a pre-existing oil terminal for sales. The frequency of trucking activity will depend upon the amount of oil being produced from each individual well. Water will also be required for dust suppression on access and county roads. These needs will increase as a result of the additional traffic generated as a consequence of well service activities for the 192 new wells. Annual water use for dust suppression is estimated at 15,000 bbl.

There is potential for a future interstate oil pipeline to be constructed in the vicinity of the Hornbuckle Field. If that occurs, oil gathering lines may be installed in existing pipeline and road ROWs if feasible. The Original Hornbuckle EA analyzed 60 miles of 25' wide pipeline ROW, 40 miles of 50' wide pipeline ROW and 22.52 miles of 40' wide road ROW (See Table 4-1). SRC anticipates that any oil gathering lines will be installed in existing or previously analyzed ROW, creating no additional disturbance.

SRC is proposing to utilize a tiered approach for supplying power to well pad facilities. As outlined in the Original Hornbuckle EA, SRC will utilize a combination of overhead and buried power lines and temporary generators on well pads to power electric pumping units (when used), the portable LACT unit if utilized, and safety equipment for the production vessels. In instances where electrical power is not available and portable LACT units are not used, oil will be measured manually by measuring tank volumes and gas will be measured using meters that do not require electric power.

To minimize disturbance and for the purposes of safety, buried power lines will be installed in existing road ROW, on the opposite side of gas/oil/water corridors that utilize road ROW.

The pumping units on the majority of the new wells will be powered by natural gas engines utilizing gas produced by the wells. SRC anticipates the use of 115 horsepower (hp) Ajax® gas engines, using the best available control technology (BACT) for stack emissions and noise control. These gas pump engines will be permitted and approved by WDEQ/AQD under standard air permitting practices.

### **Natural Gas Production**

Commercial quantities of natural gas may be expected from horizontal completions in the target formations. Meter houses to facilitate gas sales from each individual well bore will be installed at a centralized pad location (see Appendix A). SRC anticipates that all activity necessary to accommodate additional gas production from the Proposed Action will be accomplished in the approved pipeline or road ROW (See discussion on ROW in Section 2.1.3.1, above).

Some of the produced natural gas may be used to power equipment on the well location including the heater-treater and pumping unit. In situations where commercial quantities of gas are not encountered, small volumes of gas will be flared in accordance with USDI Notice to Lessees 4A (USDI 1980).

### **Produced Water Disposal**

Water produced along with the oil and gas will be separated on the pad and temporarily stored in tanks at the well site prior to transport by trucks to a permitted collection/disposal facility. Anticipated average water production is estimated to be 30 bbl per day per well (annual production of 10,950 bbl per well). At peak, 2.1 million bbl of water may be produced per year from 192 wells. Produced water will be disposed of via subsurface injection, surface evaporative pits, or will be used for potential beneficial use (e.g., drilling operations). Depending on the method of disposal, permits are required from WDEQ/Water Quality Division (WQD) (surface) or WOGCC (subsurface) for disposal of produced water. SRC may rely on approved and permitted third-party vendors for produced water disposal.

### **Interim Reclamation During Production**

Interim reclamation of each well location will be conducted in accordance with Onshore Order #1, Instruction Memoranda WY-2012-007, Management of Oil and Gas Exploration and Production Pits and WY-2012-032, Wyoming Bureau of Land Management Reclamation Policy, and The Gold Book, prepared by the U.S. Forest Service and BLM for Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development (BLM 2007c). Interim reclamation is required to be performed within 6 months of completion of the well, weather permitting. However, the BLM's Authorized Officer may grant an exception and more time for performing interim reclamation on a case-by-case basis with a properly filed Sundry Notice and qualifying circumstances.

It is possible that some interim reclamation will be performed after the 6-month time frame, if an exception were applied for and granted. The proposed co-location of multiple wells on each well pad has the potential to combine both drilling and production activities simultaneously. When more than one well for the same location are approved at the same time, interim reclamation will be performed within 6 months of the completion of the last well or the expiration of the APD, whichever occurs first.

Solidification, back filling, and capping of the cuttings pits will be accomplished within 6 months following the completion of each individual well. Erosion control measures for the road, pad, and topsoil pile will be performed within 30 days of the initial disturbance. Reseeding of stockpiled topsoil will occur within 6 months following the initial disturbance, regardless of exceptions. Approximately 1.3 acres of each well pad will be reclaimed in the manner indicated above.

### ***Abandonment and Final Reclamation***

Final reclamation will be performed in accordance to BLM Instructional Memorandum No. WY-2012-032 within 6 months of completion of plugging each well as explained in the Original Hornbuckle EA.

### ***Ancillary Facilities***

*No changes as a result of the update – refer to Original Hornbuckle EA.*

### **Mitigation Measures:**

The approval of the Proposed Action is subject to the conduct of all phases of construction, installation, operation, maintenance, reclamation and abandonment activities in accordance with applicant committed environmental protection measures, mitigation and monitoring proposed in the Original Hornbuckle EA (BLM 2011) and the Hornbuckle EA Update WY-060–EA12-266. Additional site specific mitigation measures, as necessary, will be included with APDs as Conditions of Approvals (COAs).

### **Public Involvement:**

Comments were solicited on the Original Hornbuckle EA (WY-060-EA11-181), and only two comments were received within the 30-day comment period, neither of which were substantive or objected to the project. Due to the nature of the Hornbuckle Update it was expected that this action will render the similar comments, so public involvement was limited.

### **Decision:**

This decision record does not grant final approval for the project components in the Hornbuckle EA Update. Approval of the Proposed Action and individual project actions are conditioned upon and subject to the following pre-authorization administrative requirements:

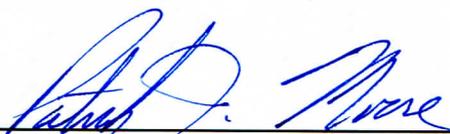
1. *Before any permit is issued authorizing an action on public lands (i.e. Application for Permit to Drill, Sundry notice and Report on Wells, or Right-of-Way) the final location for each well site, access road, pipeline, header, production unit, utility line, or other facility, the BLM Casper Field Office shall make a site-specific evaluation specifically through a documentation of NEPA adequacy (DNA), Energy Action Section 390 Categorical Exclusion (CX) or an environmental assessment (EA) that may be required to conduct the site-specific evaluation.*
2. *Any modification of development beyond the specified levels outlined in this decision may require further NEPA analysis of the Hornbuckle EA Update (WY-060 –EA12-266).*

**Rationale for the Decision:**

I have reviewed the Hornbuckle EA Update (WY-060–EA12-266) and the attendant FONSI for the Hornbuckle Field Development Program. I have determined that the proposed project is in conformance with the *Record of Decision and Approved Casper Resource Management Plan* dated December 7, 2007, and it will not cause unnecessary or undue degradation.

**Administrative Review and Appeal:**

This decision is subject to administrative review according to 43 CFR 3165. Request for administrative review of this decision must include information required under 43 CFR 3165.3(b) (State Director Review) including all supporting documentation. Such a request must be filed in writing with the State Director, Bureau of Land Management P.O. Box 1828, Cheyenne, WY 82003, no later than 20 business days after this Decision Record is received or considered to have been received. Any party who is adversely affected by the State Director's decision may appeal that decision to the Interior Board of Land Appeals, as provided in 43CFR 3165.4.

  
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Assistant Field Manager, Minerals and Lands  
Casper Field Office

  
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Date

**UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT  
CASPER FIELD OFFICE  
FINDING OF NO SIGNIFICANT IMPACT**

Hornbuckle Field Development Program Update  
WY-060-EA12-266

The Bureau of Land Management (BLM) completed an Environmental Assessment (EA) (WY-060-EA12-266) which analyzed the effects of Samson Resource Company's (SRC) proposal to drill up to an additional 4 wells on the 48 well pads previously evaluated and approved in the Original Hornbuckle EA, for a maximum of 192 additional wells, within the Hornbuckle Field Development Program Area (HFDPA).

The Hornbuckle Field Development Program Update EA (WY060-EA12-266) tiers to and incorporates by reference the information and analysis contained in the *Samson Resources Company's Field Development Program in and adjacent to the Hornbuckle Field* (WY-060-EA11-181, BLM 2011), which is located at the BLM Casper Field Office for review.

## **BACKGROUND**

In October 2011 the BLM Casper Field Office (CFO) completed an EA, WY-060-EA11-181 (BLM 2011), referred to herein as the Original Hornbuckle EA, analyzing the effects of an exploratory oil and gas drilling program proposed by SRC. The Proposed Action (selected alternative) was to drill, complete, and potentially produce up to 96 horizontal wells on 48 well pads within HFDPA, which is located in northern Converse County, approximately 26 miles northeast of the town of Glenrock in T37N and T38N, R 72W and R73W (Figure 1-1). The BLM issued a Finding of No Significant Impact (FONSI) for the Proposed Action based on information contained in EA WY-060-EA11-181 and all other available pertinent information.

Following the issuance of the FONSI, SRC realized the need to supplement WY-060-EA11-181 to increase field efficiency, maximize drainage, address limitations of the original Hornbuckle Field Development Program, and increase operational flexibility within the Hornbuckle Field. The areas of change include increasing the number of wells per pad from two to as many as six, increasing the percentage of exploratory wells for formations outside the Sussex, adding oil and water pipelines in the same trench as the currently analyzed gas line if needed, and, in addition to approved overhead and buried power supply, use of gas-powered engines to power pumping equipment within the field. The amount of interim reclamation to be undertaken would also change, based on the increased number of wells per pad.

The Hornbuckle EA Update (WY-060-EA12-266) analyzed the impacts of drilling up to 192 new wells on the 48 approved well pads and construction of associated infrastructure consisting primarily of wellhead processing and pumping equipment. The

additional wells would be drilled over a period of 5 to 10 years. These new wells would be drilled horizontally to maximize the potential of the Sussex, Muddy, Frontier, Niobrara and other hydrocarbon-bearing formations for commercial oil and gas production at vertical depths up to 13,000 feet.

The overall HFDPA size has not changed from the original EA (Figure 1-1), encompassing approximately 46,080 acres (72 sections) of mixed federal, state and fee (private) lands.

## PROPOSED ACTION

SRC is proposing to drill a maximum of 192 additional wells on the 48 well pads previously evaluated in the Original Hornbuckle EA. Under the Proposed Action, some of the existing 48 pads could be used to drill up to six horizontal wells per pad resulting in up to 192 additional wells. The total number of wells drilled from each pad would depend on variables such as the number of formations targeted, optimal well density in a given area, production success, commodity prices, lease stipulations, and permit availability. Increasing the number of wells drilled from a well pad would expand commercial oil and gas production from the Sussex Formation within the HFDPA while also allowing for exploration and development of other geologic formations within the Project Area. The Parkman, Niobrara, Frontier, Muddy, and other formations have proven productive in this area of the Powder River Basin. Since the Proposed Action involves drilling the 192 additional wells from existing or approved pads, there would be no additional short-term disturbance when compared to what was approved in the Original Hornbuckle EA. Long-term disturbance would increase due to the larger area needed to accommodate installation and operation of the additional wells (the amount of interim reclamation would be decreased). Table 2-1 summarizes the initial and long-term surface disturbance associated with the Original Hornbuckle EA and with the Proposed Action.

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\*See Table 4-4 in Original Hornbuckle Field EA (BLM 2011)

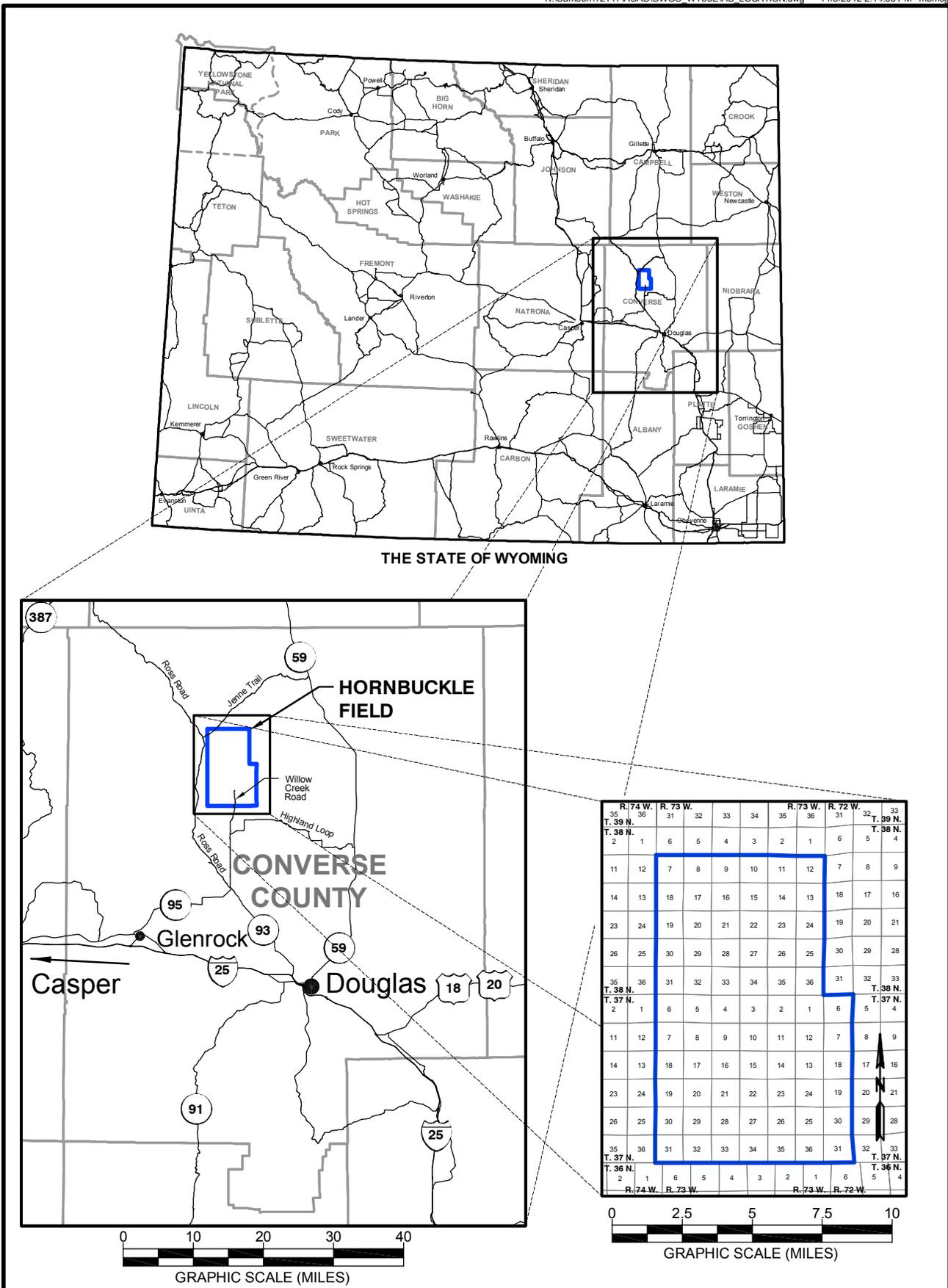


Figure 1-1. HFPDA Vicinity Map

Drilling operations would be initiated as soon as all of the necessary permits have been obtained. It is anticipated that these wells would add from 5 to 10 years to the Original Hornbuckle Field Development Program, subject to a combination of drilling success, rig availability, permit approvals, and market conditions. The average life of a productive well is expected to be 40 years.

Oil would continue to be transported via trucks from storage facilities at each pad to bulk handling facilities in Casper or Douglas. Gas would be transported via subsurface pipelines to centralized compression and treatment facilities. Produced water would be transported by truck to approved water-disposal wells or evaporation ponds, or would be used for potential beneficial use (e.g., drilling operations). Existing arterial roads would provide the main access to and within the project area.

Lease operations would be conducted in full compliance with all applicable laws, regulations (43 CFR, Part 3100 et al.), Onshore Oil and Gas Orders (43 CFR, Part 3160; March 7, 2007), the approved plan of operations, and any applicable Notices to Lessees. Operations on federal lands would be conducted in compliance with 43 CFR, Part 2800 et al.

### ***Construction Activities***

As outlined in the Original Hornbuckle EA, construction activities for the currently approved access road routes and well locations would follow practices and procedures outlined in individual APDs and any appended Conditions of Approval (COAs). Access road and well pad construction activities would follow guidelines and standards set forth in the joint BLM/U.S. Forest Service (USFS) publication: *Surface Operating Standards for Oil and Gas Exploration and Development* (Fourth Edition) (BLM 2007b) and/or the contractual requirements of any affected private (fee) surface owner(s).

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No additional new access roads would be required for the Proposed Action since all new wells would be drilled on existing or approved well pads.

### **Well Pads**

Average disturbance for the 48 evaluated and approved pads would not change from the 5.93 acres analyzed in the Original Hornbuckle EA (not including a road). Well pad construction methods are outlined in the Original Hornbuckle EA. As of July 2012, SRC has completed the construction of four approved pads. The Proposed Action does not include any new well pads.

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On average, SRC would utilize approximately 2,540 barrels (bbl) of water to drill the initial 2,000 feet of hole on each well. Following installation of surface casing, a water based mud would be used to drill to the intermediate casing point, which is typically the base of the Fox Hills Formation, the deepest geologic formation with the potential to contain fresh water (i.e. TDS concentration < 10,000 mg/L). Water use for the drilling and installation of the intermediate casing would be approximately 2,500 bbl. Drilling water would be obtained from an approved source in the immediate project area. The specific source of this fresh water used in drilling operations for each well would be identified at the time of APD submittal. If conditions allow, SRC may recycle any water remaining in the freshwater mud system for use during drilling of additional wells on a pad. Upon completion of surface hole drilling operations on a pad, any water remaining in the mud tanks would be de-watered for re-use on additional wells, transferred to a reserve pit for evaporation or trucked to an approved disposal facility, as appropriate. Upon installation of the intermediate casing, SRC would switch to an oil-based mud (OBM) system to complete the drilling process. Approximately 400 bbl (16,800 gallons) of water would be used in the OBM system. Following the completion of drilling operations, any remaining oil-based fluids would be removed from the well location and either recycled into the OBM system for subsequent wells or disposed of in accordance with appropriate BLM and WOGCC rules and regulations.

Reserve pits would be used to contain water-based drilling fluids, cuttings, and wastewater produced from the well-drilling operations. The reserve pits would be constructed with an impermeable liner to prevent seepage and possible contamination of surface and groundwater. Freshwater may be stored in lined pits or tanks in accordance with WOGCC regulations. Leakage of pit fluids would only occur if the liners were installed incorrectly or the liners were damaged during drilling operations. As indicated above, surface casing would be set at an approximate depth of 2,000 feet and cemented back to the surface during the drilling operations. This would serve to isolate all near surface freshwater zones or aquifers in the immediate Project Area. Intermediate casing would be set to a measured depth (MD) between 7,000 and 12,000 feet and would also be cemented in place, with the top of cement designed to be above the top of the Fox Hills Formation. This procedure would isolate potential hydrocarbon bearing zones below the Fox Hills Formation from near-surface freshwater aquifers. Cementing operations would be conducted in compliance with Onshore Oil and Gas Order Number 2.

Once production casing has been installed, completion operations would begin. In general, completion consists of perforating the production casing, pressure testing, stimulation of the formation utilizing hydraulic fracturing technology, flow-back of fracturing fluids, flow testing to determine post-fracture productivity, and installation of production equipment to facilitate hydrocarbon recovery. Hydraulic fracturing, which is currently regulated by the BLM and WOGCC, is discussed in detail in Section 2.1.3 of the Original Hornbuckle EA. Discussions regarding possible impacts from defects in either casing installation or cementing are included in Chapter 4 of this EA.

These completion operations would generally require an average of 30 days per well. Following completion, the well would be allowed to flow under natural pressure for one to four months, at which time a pumping system would be installed.

A freshwater pit may be constructed at each well pad to hold the estimated 50,000 bbl (2.1 million gallons) of water required for the hydraulic fracturing operation on each horizontal well. This water would be obtained from existing groundwater wells or private water right sources within the Project Area. Under the Proposed Action no water would be diverted from the North Platte River or its tributaries.

Approximately 55,440 bbl of water would be required for drilling and completion of each well, for a total of approximately 10.6 million bbl (approximately 1,370 acre-feet) of water required for all 192 wells, as discussed in Chapter 4.

## ***Production Operations***

### **Oil Production**

Oil production facilities for multiple wells per pad are essentially a small central facility capable of processing the oil, gas, and water produced from each well. Typical oil production equipment required at the individual well locations would include the following:

- An artificial lift system (e.g., rod pump unit at the well head, typically powered by a gas engine, generator or commercial electric power);
- Combustion chambers; and
- Line heaters.

Each well pad would have:

- A tank battery for the storage of oil and produced water. Total oil storage capacity is anticipated to be 2,000 bbl per well. Total produced water storage capacity is anticipated to be 400 bbl per well. Therefore, for a six well pad configuration, storage capacity would typically be 12,000 bbl of oil and 2,400 bbl of water in up to 36 400-bbl tanks.
- A heater/treater;
- A flare stack for situations where commercial quantities of natural gas are not encountered and the product must be flared;
- A connection point for loading tanker trucks used in hauling oil and water produced by each well;
- A portable lease automatic custody transfer (LACT) unit if an electrical supply is available for the metering system); and
- Up to six metering houses for measuring the natural gas from each well.

Oil would be trucked to the purchaser's designation or to a pre-existing oil terminal for sales. The frequency of trucking activity would depend upon the amount of oil being produced from each individual well. Water would also be required for dust suppression on access and county roads. These needs would increase as a result of the additional traffic generated as a consequence of well service activities for the 192 new wells. Annual water use for dust suppression is estimated at 15,000 bbl.

There is potential for a future interstate oil pipeline to be constructed in the vicinity of the Hornbuckle Field. If that occurs, oil gathering lines may be installed in existing pipeline and road ROWs if feasible. The Original Hornbuckle EA analyzed 60 miles of 25' wide pipeline ROW, 40 miles of 50' wide pipeline ROW and 22.52 miles of 40' wide road ROW (See Table 4-1). SRC anticipates that any oil gathering lines would be installed in existing or previously analyzed ROW, creating no additional disturbance.

SRC is proposing to utilize a tiered approach for supplying power to well pad facilities. As outlined in the Original Hornbuckle EA, SRC would utilize a combination of overhead and buried power lines and temporary generators on well pads to power electric pumping units (when used), the portable LACT unit if utilized, and safety equipment for the production vessels. In instances where electrical power is not available and portable LACT units are not used, oil would be measured manually by measuring tank volumes and gas would be measured using meters that do not require electric power.

To minimize disturbance and for the purposes of safety, buried power lines would be installed in existing road ROW, on the opposite side of gas/oil/water corridors that utilize road ROW.

The pumping units on the majority of the new wells would be powered by natural gas engines utilizing gas produced by the wells. SRC anticipates the use of 115 horsepower (hp) Ajax® gas engines, using the best available control technology (BACT) for stack emissions and noise control. These gas pump engines would be permitted and approved by WDEQ/AQD under standard air permitting practices.

### **Natural Gas Production**

Commercial quantities of natural gas may be expected from horizontal completions in the target formations. Meter houses to facilitate gas sales from each individual well bore would be installed at a centralized pad location (see Appendix A). SRC anticipates that all activity necessary to accommodate additional gas production from the Proposed Action would be accomplished in the approved pipeline or road ROW (See discussion on ROW in Section 2.1.3.1, above).

Some of the produced natural gas may be used to power equipment on the well location including the heater-treater and pumping unit. In situations where commercial quantities of gas are not encountered, small volumes of gas would be flared in accordance with USDI Notice to Lessees 4A (USDI 1980).

### **Produced Water Disposal**

Water produced along with the oil and gas would be separated on the pad and temporarily stored in tanks at the well site prior to transport by trucks to a permitted collection/disposal facility. Anticipated average water production is estimated to be 30 bbl per day per well (annual production of 10,950 bbl per well). At peak, 2.1 million bbl of water may be produced per year from 192 wells. Produced water would be disposed of via subsurface injection, surface evaporative pits, or would be used for potential beneficial use (e.g., drilling operations). Depending on the method of disposal, permits are required from WDEQ/Water Quality Division (WQD) (surface) or WOGCC (subsurface) for disposal of produced water. SRC may rely on approved and permitted third-party vendors for produced water disposal.

### **Interim Reclamation During Production**

Interim reclamation of each well location would be conducted in accordance with Onshore Order #1, Instruction Memoranda WY-2012-007, Management of Oil and Gas Exploration and Production Pits and WY-2012-032, Wyoming Bureau of Land Management Reclamation Policy, and The Gold Book, prepared by the U.S. Forest Service and BLM for Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development (BLM 2007c). Interim reclamation is required to be performed within 6 months of completion of the well, weather permitting. However, the BLM's Authorized Officer may grant an exception and more time for performing interim reclamation on a case-by-case basis with a properly filed Sundry Notice and qualifying circumstances.

It is possible that some interim reclamation would be performed after the 6-month time frame, if an exception were applied for and granted. The proposed co-location of multiple wells on each well pad has the potential to combine both drilling and production activities simultaneously. When more than one well for the same location are approved at the same time, interim reclamation would be performed within 6 months of the completion of the last well or the expiration of the APD, whichever occurs first. Solidification, back filling, and capping of the cuttings pits would be accomplished within 6 months following the completion of each individual well. Erosion control measures for the road, pad, and topsoil pile would be performed within 30 days of the initial disturbance. Reseeding of stockpiled topsoil would occur within 6 months following the initial disturbance, regardless of exceptions. Approximately 1.3 acres of each well pad would be reclaimed in the manner indicated above.

### ***Abandonment and Final Reclamation***

Final reclamation would be performed in accordance to BLM Instructional Memorandum No. WY-2012-032 within 6 months of completion of plugging each well as explained in the Original Hornbuckle EA.

### ***Ancillary Facilities***

*No changes as a result of the update – refer to Original Hornbuckle EA.*

### **FINDING OF NO SIGNIFICANT IMPACT**

On the basis of the information contained in WY-060-EA12-266, and all other information available to me, it is my determination that: (1) the implementation of the Proposed Action will not have significant environmental impacts beyond those already addressed in the *Record of Decision and Approved Casper Resource Management Plan (RMP)* approved in December of 2007; (2) the Proposed Action is in conformance with the Casper RMP; and (3) the Proposed Action does not constitute a major federal action having a significant effect on the human environment. Therefore, an environmental impact statement is not necessary and will not be prepared.

This finding is based on my consideration of the Council on Environmental Quality's (CEQ) criteria for significance (40 CFR 1508.27), both with regard to the context and to the intensity of the impacts described in the EA.

### **Rationale for Finding of No Significant Impact**

The primary purpose for conducting an environmental assessment (EA) is to determine whether or not a proposed action will have a significant impact on the human environment and therefore will require the preparation of an EIS. As defined in 40 CFR 1508.13, the Finding of No Significant Impact (FONSI) is a document that briefly presents the reasons why an action will not have a significant effect on the human environment. The regulations further define the term "significantly" in 40 CFR 1508.27 and require that the context and intensity of impacts be considered in analyzing significance.

“a) Context. This means that the significance of an action must be analyzed in several contexts such as society as a whole (human, national), the affected region, the affected interests, and the locality. Significance varies with the settling of the proposed action. For instance, in the case of a site-specific action, significance would usually depend upon the effects in the locale rather than in the world as a whole. Both short-term and long-term effects are relevant”. (40 CFR 1508.27(a))

“(b) Intensity. This refers to the severity of impact. Responsible officials must bear in mind that more than one agency may make decisions about partial aspects of a major action. The following should be considered in evaluation intensity.” (40 CFR 1508.27(b))

I have considered the potential intensity/severity of the impacts anticipated from the proposed action relative to each of the ten areas suggested for consideration by the CEQ.

**1. *Impacts that may be both beneficial and adverse.***

Chapter 4 of the Hornbuckle EA Update (WY060-EA12-266) identifies the impacts from the updated Hornbuckle Field Development Program. Impacts associated with the development of this project are generally considered to be negligible. In addition to the impacts, the EA also demonstrates conformance with the Casper RMP, compliance with federal, state and local laws, mitigation measures, and conditions of approvals, as identified in the EA, while not causing impacts that rise to the level of significance as defined by the Council on Environmental Quality.

**2. *The degree to which the proposed action affects public health and safety.***

The Hornbuckle EA Update (WY060-EA12-266) analyzed impacts to public health and safety and concluded that due to the development and implementation of a comprehensive spill prevention, control and counter measure plan, and installation of casing to protect groundwater resources, public health and safety will not be affected by the proposed action. Specific detail of the impacts and mitigation measures analyzed for public health and safety can be found in the Hornbuckle EA Update (WY060-EA12-266), in Section 4.11.12 Public Health & Safety.

**3. *Unique characteristics of the geographic area such as proximity of historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.***

Historic and cultural resources are addressed specifically below in number 8. There are no known park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas located in proximity of the geographic area or within the Hornbuckle Field Development Program project area. Specifics regarding the affected resources and the general environment of the project area can be found in Chapter 3 of the Hornbuckle EA Update (WY060-EA12-266).

**4. *The degree to which the effects on the quality of the human environment are likely to be highly controversial.***

The Proposed Action, which adds wells to previously approved pad locations, conforms to the plans and policies of the Casper RMP (BLM 2007). Specifically,

the Proposed Action is in accordance with the objectives outlined in the RMP for managing leasable minerals:

- MR: 2.1 - Maintain oil and gas leasing, exploration, and development, while minimizing impacts to other resource values;
- MR: 2.4 - Facilitate the evaluation of public lands for oil and gas potential; and
- MR: 3.1 - Maintain opportunities to explore and develop federal oil and gas resources and other leasable minerals.

The Proposed Action involves an update to a recently evaluated EA (WY-060-EA11-181). Comments were solicited on the Original Hornbuckle EA, and after the 30 day comment period, only two comments were received, neither of which were substantive or objected to the project, indicating that the Hornbuckle EA Update would not be considered controversial.

No anticipated effects have been identified that are considered “highly controversial”. The term “highly controversial” refers to instances in which “a substantial dispute exists as to the size, nature, or effect of the major federal action rather than the mere existence of opposition to a use” *Hells Canyon Preservation Council v. Jacoby*, 9F.Supp.2d 1216, 1242 (D.Or. 1998).

**5. *The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.***

Oil and gas development has been ongoing in the Hornbuckle Field Development Program Area since the early 1980s. SRC is applying state-of-the-art drilling and completion techniques to further develop previously exploited reservoirs. Plans presented in Chapter 2 and Chapter 4 of the Hornbuckle Update EA (WY060-EA12-266) will serve to eliminate or reduce direct and indirect impact to the maximum extent practicable.

The proposed activities in the Hornbuckle EA Update (WY060-EA12-266) are not highly uncertain and do not involve unknown or unique risks.

**6. *The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.***

The Hornbuckle Field Development Program Area has a 30+ year history of oil and gas development. The proposed activities in the Hornbuckle EA Update (WY060-EA12-266) do not establish a precedent or represent a decision in principle about future considerations.

**7. *Whether the action is related to other actions with individually insignificant but cumulatively significant impacts.***

Cumulative impacts are described in Chapter 4 of the Hornbuckle EA Update (WY060-EA12-266). The affected resources analyzed are not approaching conditions where additional horizontal wells within the Hornbuckle Field Development Program Area when added to the past, present and reasonably

foreseeable future action have consequential cumulative effects that rise to the level of significance as defined by the Council on Environmental Quality.

8. ***The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historic resources.***

At the time of APD processing, and prior to authorizing future actions, the BLM will insure the requirements of the National Historic Preservation Act, as amended, are met. Any effects to historic properties (those eligible for or listed on the NRHP) would be avoided or minimized to the maximum extent. If adverse effects are unavoidable, a plan to mitigate those effects would be developed and implemented prior to the authorization. The specific procedures for these actions will follow the State Protocol Agreement between the Wyoming BLM and Wyoming SHPO dated March 8, 2006. In summary, the proposed action will have a minimum impact to historic properties.

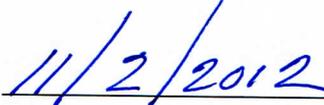
9. ***The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973.***

The potential occurrence of threatened, endangered, and other special status species evaluated by the analysis presented in the Hornbuckle EA Update (WY060-EA12-266) is unlikely within the project area. Potential habitat for the Ute ladies-tresses orchid is believed to occur along selected stretches of several drainages within the HFDPA, although there has been no recent historical record of this species' occurrence in the project area. Inventories for the orchid will be conducted prior to disturbance and the areas would be avoided if the orchid is identified. Therefore, project development will have a "may affect, not likely to adversely affect" on federally listed species.

10. ***Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.***

The proposed action is consistent with all federal, state, and local laws.

  
Assistant Field Manager, Lands and Minerals  
Casper Field Office

  
Date