

**Greater Natural Buttes  
Final  
Environmental Impact Statement  
FES 12-8**

**Volume II  
(Appendices)**

Vernal Field Office/Utah

Bureau of Land Management

March 2012



### ***BLM Mission Statement***

*The Bureau of Land Management is responsible for the stewardship of our public lands. It is committed to manage, protect, and improve these lands in a manner to serve the needs of the American people for all times.*

*Management is based upon the principles of multiple use and sustained yield of our nation's resources within a framework of environmental responsibility and scientific technology. These resources include recreation, rangelands, timber, minerals, watershed, fish and wildlife, wilderness, air and scenic, scientific, and cultural values.*

**Appendix A**  
**Applicant-Committed Environmental Protection Measures**

## Appendix A

### Applicant-Committed Environmental Protection Measures

Topic(s)	Applicant-Committed Measures
Surface Disturbance	Kerr-McGee Oil & Gas Onshore LP (KMG) would utilize shared well pads to the extent possible, in consideration of technical, environmental, and economic viability, to minimize the amount of total surface disturbance in the Greater Natural Buttes Project Area (GNBPA).
Surface Disturbance	KMG would develop a Transportation Plan that will detail the procedures intended to minimize construction of roads needed to implement Project activities. KMG's Transportation Plan would include construction procedures to prevent/minimize sedimentation that may result from road and/or pad construction. KMG would submit the plan to the Bureau of Land Management (BLM) prior to the initiation of Project activities.
Surface Disturbance	Each new produced water disposal well would be located on existing production locations.
Surface Disturbance	KMG would evaluate deepening existing wells to accomplish Mesaverde-only completions before twinning an existing well.
Surface Disturbance	KMG would strive to continually improve the development processes in order to minimize the surface impact where practical.
Cultural Resources	A Class III archeological survey has been conducted on all federal and/or tribal lands in the GNBPA. All personnel would refrain from collecting artifacts and from disturbing any significant cultural resources in the area. KMG would be responsible for informing all persons in the area who are associated with this Project that they may be subject to prosecution for knowingly disturbing historic or archaeological sites or for collecting artifacts. All vehicular traffic, personnel movement, construction, and restoration activities would be confined to the areas examined, as referenced in the archaeological report, and to the existing roadways and/or evaluated access routes. If historic or archaeological materials were to be uncovered during construction, KMG would immediately stop surface disturbing activities that might further disturb such materials and contact the appropriate Authorized Officer (AO).
Paleontological Resources	KMG would conduct a paleontological survey on all of its federal, state, and tribal locations. All personnel would refrain from collecting fossils and from disturbing any significant fossil in the GNBPA. If fossils were to be uncovered during construction, KMG would immediately stop surface disturbing activities that might further disturb such materials and contact the appropriate AO.
Vegetation / Noxious and Invasive Species	KMG would develop a Pesticide/Herbicide Use Plan for submission to the BLM and State of Utah prior to the initiation of Project activities.
Vegetation / Noxious and Invasive Species	In accordance with the procedures described in its Pesticide/ Herbicide Use Plan, KMG would monitor for the growth of invasive species resulting from surface disturbance caused by Project activities and would control weeds caused by Project activities.
Vegetation / Noxious and Invasive Species	KMG would use its best efforts to control noxious weeds along access road authorizations, pipeline route authorizations, well sites, or other proposed facilities by spraying or mechanical removal. A list of noxious weeds would be obtained from the BLM or the appropriate County Extension Office. On BLM-administered land, a Pesticide Use Proposal would be submitted and approved prior to the application of herbicides or other pesticides or possibly hazardous chemicals.

**Appendix A (Continued)**

<b>Topic(s)</b>	<b>Applicant-Committed Measures</b>
Sedimentation, Erosion, and Stormwater Runoff	KMG would employ industry best management practices ( <b>BMPs</b> ) to control stormwater runoff, including appropriate measures to prevent disturbed sediments from reaching the White River drainage during precipitation events.
Raptors	KMG would adhere to seasonal and spatial buffers applicable to occupied raptor nests in the GNBPA in consideration of guidelines developed by the Utah Division of Wildlife Resources and the United States (U.S.) Fish and Wildlife Service (USFWS).
Migratory Birds	KMG would install bird-excluding devices that prevent the perching and entry of migratory birds on or into its new fired vessel exhaust stacks. In addition, KMG completed retrofitting approximately 1,014 existing exhaust stacks in 2007.
Sage Grouse Protection	KMG would utilize low-profile tanks in areas where sage grouse leks are determined to be active to minimize the opportunities for raptor perching.
Sage Grouse Protection	No surface-disturbing activities would be allowed year-round within 0.25-mile of active Sage-grouse leks.
Pipeline Construction	KMG would utilize the applicable USFWS' BMPs for work in Utah streams where pipelines or roads cross a stream. Additionally, KMG would utilize BLM Hydraulic Considerations for Pipeline Crossings of Stream Channels (prepared by the Utah State Office BLM, Salt Lake City, Utah).
Water Use	KMG would attempt to maximize the use of produced water for completion purposes.
Water Quality/ Soils	KMG would position two 15-foot emergency response spill trailers in areas in or near the GNBPA to respond to accidental spills or releases. At least one of the trailers would be located at a drilling site near the White River, if necessary. Each trailer would be equipped with 300 feet of 10-inch Techniboam, tow bridles, and anchor sets. In addition, the trailers contain sorbent pads, sorbent booms, flash lights, life jackets, Tyvek suits, and other safety equipment. KMG has conducted training sessions that included two days of instruction and field exercises with 15 field employees. The training was conducted by the Texas Engineering Extension Service Emergency Services Training Institute.
Air Quality	KMG would use water or other BLM-approved dust suppression during drilling and completion operations for dust abatement on access roads, as needed. KMG would use water or other BLM-approved dust suppression in high traffic areas during production operations for dust abatement, as needed.
Air Quality	KMG employees would comply with speed limits on unpaved county roads used for access and would use safe vehicle speeds on other access unpaved roads.
Air Quality	KMG would <b>install low-emission glycol dehydrators at all existing and new compressor stations and production wells.</b>
Air Quality	<b>KMG would install electric compression, where feasible (approximately 50 percent of the compression horsepower [hp] to be electrically driven).</b>
Air Quality	KMG would install <b>emission controls having a control efficiency of 95 percent on existing condensate tanks with a potential to emit of greater than 20 tons per year (tpy), and on new condensate tanks with a potential to emit of 5 tpy VOCs.</b>

**Appendix A (Continued)**

<b>Topic(s)</b>	<b>Applicant-Committed Measures</b>
Air Quality	KMG would install low-bleed pneumatic <b>devices at all new compressor stations and production facilities. Within 6 months after signing of the Record of Decision (ROD), all existing high-bleed pneumatic devices would be replaced with low-bleed pneumatic devices. High-bleed devices may be allowed to remain in service for critical safety and/or process reasons.</b>
Air Quality	<b>KMG would use green completions for all well completion activities.</b>
Air Quality	KMG would phase in the use of Tier <i>II</i> drill rig engines ( <b>90 percent by 2010 and 100 percent by 2012</b> ), with <b>phase-in of Tier IV engines or equivalent emission reduction technology as soon as possible thereafter, but no later than 2018.</b>
<b>Air Quality</b>	<b>KMG would implement a natural gas or liquid natural gas drilling rig engine pilot project as soon as operationally feasible, but no later than 1 year after the ROD. This pilot project would ascertain emission reduction benefits, operating experience and, if successful, may result in more natural gas or liquid natural gas engine use in the Uinta Basin.</b>
Air Quality	<b>KMG would install lean-burn natural gas-fired stationary compressor engines or equipment with equivalent emission rates.</b>
<b>Air Quality</b>	<b>KMG would install catalysts on all natural gas fired compressor engines to reduce the emissions of carbon monoxide (CO) and volatile organic compounds (VOCs).</b>
<b>Air Quality</b>	<b>KMG would install dry seals on new centrifugal compressors.</b>
Air Quality	<b>KMG would install and optimize artificial lift.</b>
<b>Air Quality</b>	<p><b>KMG would implement an annual inspection and maintenance program to reduce VOC emissions, including:</b></p> <ul style="list-style-type: none"> <li>• <b>Performing inspections of thief hatch seals and Enardo pressure relief valves to ensure proper operations.</b></li> <li>• <b>Reviewing gathering system pressures to evaluate any areas where gathering pressure may be reduced, resulting in lower flash losses from the condensate storage tanks.</b></li> </ul>

Appendix A (Continued)

Topic(s)	Applicant-Committed Measures
<p><b>Air Quality</b></p>	<p><b>Additionally, KMG would develop a project-specific adaptive management strategy, to be informed by periodic emission inventory updates. Implementation of this strategy and associated application of “enhanced” ozone mitigation measures would be required once the proposed project is initiated if: 1) U.S. Environmental Protection Agency (USEPA) designates the area “nonattainment” for ozone; 2) there is a monitored ozone standard exceedance; 3) the Air Resources Management Strategy (ARMS) modeling shows that additional mitigation is needed to prevent future ozone exceedances; or 4) the ARMS group establishes industry-wide mitigation requirements through ongoing modeling. If implementation of this adaptive management strategy is triggered, the applicant commits to working with the BLM to analyze project-specific “enhanced” mitigation measures and employ them within 1 year. The measures to be considered could include, but would not be limited to, the following:</b></p> <ul style="list-style-type: none"> <li>• <b>Reducing the total number of drill rigs.</b></li> <li>• <b>Installing Tier IV or better drill rig engines.</b></li> <li>• <b>Seasonally reducing or ceasing drilling during specified periods.</b></li> <li>• <b>Using only lower-emitting drill and completion rig engines during specified time periods.</b></li> <li>• <b>Using natural gas-fired drill and completion drill rig engines.</b></li> <li>• <b>Replacing internal combustion engines with gas turbines for natural gas compression.</b></li> <li>• <b>Using electric drill or compression engines.</b></li> <li>• <b>Centralizing gathering facilities.</b></li> <li>• <b>Limiting blowdowns or restricting them during specified periods.</b></li> <li>• <b>Installing plunger lift systems with smart automation.</b></li> <li>• <b>Employing a monthly Forward Looking Infrared, or FLIR, program to reduce VOCs.</b></li> <li>• <b>Enhancing a direct inspection and maintenance program.</b></li> <li>• <b>Employing tank load out vapor recovery.</b></li> <li>• <b>Employing enhanced VOC emission controls with 95 percent control efficiency on additional production equipment having a potential to emit of greater than 5 tpy.</b></li> </ul>
<p><b>Air Quality</b></p>	<p><b>KMG would jointly support (with other active oil and gas industry operators, oil and gas industry vendors, and non-industry emission source contributors) activities undertaken by a BLM/Industry Work Group that may include:</b></p> <p><b>Modeling:</b></p> <ul style="list-style-type: none"> <li>• <b>Model calibration with monitored and meteorological data;</b></li> <li>• <b>Source apportionment sensitivities;</b></li> <li>• <b>Ozone precursor sensitivities; and</b></li> <li>• <b>Mitigation control sensitivities.</b></li> </ul>

Appendix A (Continued)

Topic(s)	Applicant-Committed Measures
Air Quality	<p><b>KMG would implement the following Ozone Awareness and Outreach Plan:</b></p> <p><b>Mobile Sources:</b></p> <ul style="list-style-type: none"> <li>• <b>Refuel vehicles in the evening hours: Employees and contractors would be encouraged to refuel their vehicle fleet during the cooler evening hours;</b></li> <li>• <b>Refuel activities: Operators would not overfill fuel tanks and would ensure that fuel caps are properly installed;</b></li> <li>• <b>Minimize vehicle engine idling: Employees and contractors would minimize vehicle idling when practicable, resulting in the emission of reduced ozone precursors;</b></li> <li>• <b>Minimize vehicle miles traveled: Employees and contractors would plan ahead to consolidate trips and minimize miles traveled between various drilling, production, and compression sites;</b></li> <li>• <b>Double-up vehicle occupancy: Employees and contractors would maximize vehicle occupancy whenever possible to reduce the number of vehicles in operation and to eliminate redundant trips; and</b></li> <li>• <b>Review vehicle maintenance: KMG would review fleet maintenance prior to summer weather to ensure that vehicles operate as efficiently as possible, reducing combustion emissions.</b></li> </ul> <p><b>Training and Outreach:</b></p> <ul style="list-style-type: none"> <li>• <b>Staff Awareness: KMG would conduct annual training for regional staff to ensure increased ozone awareness;</b></li> <li>• <b>Industry Awareness: KMG would participate in forums sharing BMPs for oil and gas sources. Technology and work practices can change dramatically with greater understanding of the creation of ozone. Sharing BMPs would educate all industry partners and facilitates the transfer of technology between industry partners.</b></li> </ul>
Wilderness Characteristics	<p>KMG would not disturb the surface for <b>project-related</b> activities in NENW Section 22, T10S-R23E.</p>
Wildlife	<p><b>Installation of raptor perch deterrents.</b></p> <p>In order to minimize potential of electrocution mortality of raptors, KMG would utilize methods and designs described in <i>Suggested Practices for Raptor Protection on Power Lines</i> (APLIC 2006) and in <i>Mitigating Bird Collisions with Power Lines</i> (APLIC 1994) during construction, operation, and maintenance of power lines.</p>
Surface Disturbance	<p><b>Burying of distribution pipelines and/or flow lines in or adjacent to access roads.</b></p> <p>KMG would evaluate burying pipelines after site-specific evaluation of surface and subsurface conditions with consideration to the materials that would be transported through the pipelines. KMG proposes to bury approximately 10 miles of pipelines transporting produced water and 25 miles of gas-transportation pipelines. In areas where there is sufficient soil to excavate and after consultation with the BLM AO, KMG would consider burying well gathering lines adjacent to access roads.<sup>1</sup></p>

**Appendix A (Continued)**

<b>Topic(s)</b>	<b>Applicant-Committed Measures</b>
Transportation	<p><b>Centralizing production facilities.</b>            Project wells would utilize centralized compression facilities. The proposed use of telemetry would reduce the frequency of well visits and therefore decrease vehicle traffic within the GNBPA, one objective of combining production facilities.</p>
Surface Disturbance	<p><b>Drilling multiple wells from a single pad.</b>            KMG would carefully evaluate drilling multiple wells from a single pad on an ongoing basis and has included the potential to use multiple wells from a shared pad in the GNBPA to the extent that KMG determines technically and economically viable.<sup>2</sup></p>
Wildlife	<p><b>Wildlife monitoring.</b>            KMG would enter into discussions with the BLM to determine how, when and for what species wildlife monitoring may be implemented. KMG would participate in industry groups and projects to support efforts to reduce impacts to wildlife that may result from oil and gas activities in the GNBPA. KMG would enter into discussions with the BLM to mutually investigate possibilities for voluntary offsite mitigation measures for wildlife habitat enhancement after evaluation of the effectiveness of onsite mitigation, including <i>BMPs</i>.</p>
Public Safety Wildlife	<p><b>Seasonal restriction of public vehicle access.</b>            KMG would construct fences to surround its proposed evaporation ponds to prevent the public or animals from accessing these facilities. In consultation with the BLM AO, KMG would comply with applicable Occupational Safety and Health Administration requirements by taking measures such as installing “warning” signs at locations where public access could result in potential safety issues.</p>
Transportation	<p>Most of the unpaved roads within the GNBPA are claimed as Class “B” and “D” roads by Uintah County and are, therefore, public roads. The remaining roads in the GNBPA are short, dead end roads used to access well pads. These roads would not be considered “through” roads by the public, rendering their use by the public unlikely.</p>
Visual Resources	<p><b>Avoiding placement of production facilities on hilltops and ridgelines.</b>            KMG would utilize low-profile tanks in the portions of the GNBPA visible from the White River where the river can be viewed from the location, such as ridgelines, or would utilize topographic features, to the extent available, to prevent viewing the tanks from the White River.</p>
Visual Resources	<p><b>Screening facilities from view.</b>            KMG would utilize topographic features, to the extent available, and utilize screening or other design measures, to the extent practical, to prevent stationary permanent equipment from being viewed from the White River. KMG would develop methods for screening facilities on a site-specific basis.</p>
Surface Disturbance	<p><b>Use of common utility or right-of-way corridors.</b>            KMG would locate gathering lines adjacent to access roads. KMG would locate larger pipelines adjacent to roads or within existing utility corridors.</p>
Floodplains	<p>Exempting existing pipelines and projects previously approved, KMG would bury gas pipelines associated with new and future construction within 100-year floodplains.</p>

**Appendix A (Continued)**

<b>Topic(s)</b>	<b>Applicant-Committed Measures</b>
Noxious and Invasive Weeds	KMG would conduct pre-disturbance weed inventories to identify locations of noxious and invasive weed species.
Sedimentation, Erosion, and Stormwater Runoff	KMG will implement Reasonable and Prudent Practices for Stabilization and develop Storm Water Pollution Prevention Plans for individual new construction sites associated with compressor stations, processing plants, and pipeline projects that disturb more than 5 acres.
Surface Disturbance	KMG would not construct new mancamps within 0.5 mile of floodplains (including the floodplain) of major drainages (Sand Wash, Cottonwood Wash, Bitter Creek, White River, Green River); and within occupied Threatened and Endangered Plant habitat. This mitigation measure would be applied only if there is a demonstrated need (i.e., only if other mitigations do not adequately mitigate impacts).
Threatened and Endangered Fish	<p>KMG would adhere to the following mitigation regarding protection of threatened and endangered fish:</p> <ol style="list-style-type: none"> <li>1. Limit pumping to off-channel locations – ones that do not connect to the river during high spring flows.</li> <li>2. If the pump head is located in the river channel where larval fish are known to occur, the following measures apply:               <ol style="list-style-type: none"> <li>a. Pumps will not be situated in low-flow or no-flow area as these habitats tend to concentrate larval fishes;</li> <li>b. Limit the amount of pumping, to the greatest extent possible, during that period of the year when larval fish may be present (see above); and</li> <li>c. Limit the amount of pumping, to the greatest extent possible, during the pre-dawn hours as larval drift studies indicate that this is a period of greatest daily activity.</li> </ol> </li> <li>3. Screen all pump intakes with ¼” mesh material.</li> <li>4. Report any fish impinged on the intake screen to the Service (801.975.3330) and the:               <p style="margin-left: 20px;">Utah Division of Wildlife Resources Northeastern Region 152 East 100 North Vernal, UT 84078 Phone: (435) 781-9453</p> </li> </ol>

<sup>1</sup> The disturbance associated with these buried gas gathering and water pipelines is considered in the analysis as new disturbance.

<sup>2</sup> For the purpose of the EIS analysis, all wells in the Proposed Action Alternative and the Optimal Recovery Alternative are assumed to be drilled vertically.

**Appendix B**  
**Interdisciplinary Team Analysis Record Checklist**

## Appendix B

### Interdisciplinary Team Analysis Record Checklist

**Project Title:** Greater Natural Buttes EIS

**NEPA Log Number:** UT-080-07-785

**File/Serial Number:**

**Project Leader:** Stephanie Howard

**DETERMINATION OF STAFF: (Choose one of the following abbreviated options for the left column)**

NP = not present in the area impacted by the proposed or alternative actions.

NI = present, but not affected to a degree that detailed analysis is required.

PI = present with potential for significant impact analyzed in detail in the EA; or identified in a DNA as requiring further analysis.

NC = (DNAs only) actions and impacts not changed from those disclosed in the existing NEPA documents cited in Section C of the DNA form.

Determination	Resource	Rationale for Determination*	Signature	Date	EIS Section(s)
PI	<b>Air Quality</b>	Compressors are proposed. Generators will initially power the injection pumps and produced water disposal wells. Fugitive dust will also occur.	Stephanie Howard	8/27/2007	3.1 4.1 5.3.1 Appendix G
NP	<b>Areas of Critical Environmental Concern</b>	No existing ACECs are in the project area.	Chuck Patterson	8/27/2007	3.4.2.1 5.3.7
PI	<b>Cultural Resources</b>	Based on current data there are between 8,600 and 8,800 archaeological and historical sites in the project area. There are two (Willow Creek Drainage and Bitter Creek Drainage) highly sensitive areas to the tribes on both BLM and Indian lands. In chapter 3, need to identify sensitivity areas referencing previously done statistical studies (four are available in this office) and also discussions of TCPs. Need a synthesis of impacts based on previous overall inventory. The synthesis needs to be used to determine the potential impacts of maximum development on archaeology. Note: Kerr-McGee has hired a consulting firm to do a Class III (100%) inventory of the project area (12/07/07).	Blaine Phillips	8/27/2007	3.2 4.2 5.3.2
PI	<b>Environmental Justice</b>	Approximately half of the project involves minerals that generate revenue for the Northern Ute Tribe. The various alternatives will have varying impacts on the Tribe depending on the amount of revenue generated. <b><i>Air quality modeling has been conducted to address health concerns near the Ouray area.</i></b>	Stephanie Howard	3/15/11	3.8.9 4.8
NP	<b>Farmlands (Prime or Unique)</b>	All prime farmlands in Uintah County are irrigated. All unique farmlands in Uintah County are orchards. No irrigated lands or orchards are located on BLM-administered land in the project area. No prime or unique farmlands exist in the Vernal Field Office area as documented in the Vernal RMP.	Stephanie Howard	9/30/07	3.11

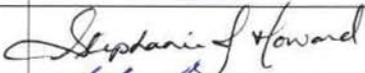
Determination	Resource	Rationale for Determination*	Signature	Date	EIS Section(s)
PI	<b>Floodplains</b>	Cottonwood Wash, Sand Wash, White River, Bitter Creek, Kennedy Wash, and unnamed 100-year floodplain ephemeral tributaries to the White River would potentially be impacted by the proposed project.	Stephanie Howard	9/10/07	3.13.2 4.13 5.3.13
PI	<b>Invasive, Non-native Species</b>	A pre-project weed inventory should be conducted within the project area prior to surface disturbance with a copy of the survey provided to the BLM if it is third party. A Pesticide Use Proposal should be approved before disturbance is authorized. Daily pesticide application records will be kept, summarized, and submitted on an annual basis or as requested by Vernal Field Office weed specialists. Vehicles and equipment should be power washed prior to entering the project area if coming from outside the Uinta Basin. Invasive and noxious weeds will be the responsibility of the operator to control once the ground has been disturbed. Weeds must be controlled prior to seed development.	Jessie Salix	8/27/07	3.11.2 4.11 5.3.11 Appendix J
PI	<b>Native American Religious Concerns</b>	The Hopi has communicated that rock cairns may have cultural and religious importance to them. These are being investigated as resources permit.	Blaine Phillips	8/27/2007	3.2 4.2 5.3.2 6.1
PI	<b>Threatened, Endangered or Candidate Animal Species</b>	High Potential for water depletion for listed fish species. Sedimentation and runoff issues also. Not in BF Ferret Primary Management Zone.	Scott Ackerman	8/27/2007	3.14.1.3 3.14.2.2 4.14 5.3.14.3 6.1 Appendix H
PI	<b>Threatened, Endangered or Candidate Plant Species</b>	Populations of Uinta Basin hookless cactus ( <i>Sclerocactus wetlandicus</i> ) are known in T8S R21E SEC 29 S2S2; T9S R22E SEC 17 SW, SEC 30 SE, SEC 31 NW, SEC 32 S2, SEC 33 S2, SEC 35 NW; T10S R22E SEC 4; and T10S R23E SEC 7 NW. A population of clay reed-mustard ( <i>Schoenocrambe argillacea</i> ) is known in T11S R21E SEC 18 SW.	Clayton Newberry	12/11/2007	3.11.3 4.11 5.3.11.1 6.1 Appendix H Appendix L Appendix M
NI	<b>Wastes (hazardous or solid)</b>	All trash would be picked up and disposed of at an approved site, most likely the Uintah County landfill. No potentially harmful materials or substances would be left on or in the vicinity of the project area. No chemicals subject to SARA title III in amounts greater than 10,000 pounds would be used. No extremely hazardous substances as defined in 40 CFR 355 in threshold planning quantities would be used.	Stephanie Howard	8/27/2007	2.5.6 Appendix D

Determination	Resource	Rationale for Determination*	Signature	Date	EIS Section(s)
PI: Surface PI: Ground	<b>Water Quality (surface/ground)</b>	<p><i>Surface:</i> Potential for sedimentation through construction and contamination through construction and operation to affect surface water quality. Also potential for increased erosion due to surface disturbance resulting in increased sedimentation entering project area drainages.</p> <p><i>Ground:</i> The operator has certified compliance with all Onshore Oil and Gas Orders. Onshore Order No. 2 (Drilling Operations) will assure that the project will not adversely affect groundwater quality. These guidelines specify that "...proposed casing and cementing programs shall be conducted as approved to protect and/or isolate all usable water zones, potentially productive zones, and any prospectively valuable deposits of minerals. Any isolating medium other than cement shall receive approval prior to use." Due to the state-of-the art drilling and well completion techniques, the possibility of adverse degradation of groundwater quality or prospectively valuable mineral deposits by drilling will be negligible. However, there is a potential for ground water contamination from the construction and operation of facilities associated with this proposal. Disclosure of the types and amounts of hazardous materials associated with this field development, spill contingency plans for planned facilities and adherence to Oil and Gas Onshore Order No. 2 will help to lower the potential of adverse impacts to ground water in this area.</p>	Stephanie Howard	9/10/07	<p><i>Surface:</i> 3.13.1 4.13 5.3.13</p> <p><i>Ground:</i> 3.13.3 4.13 5.3.13</p>
PI	<b>Wetlands/Riparian Zones</b>	Wetland/riparian zones occur along Bitter Creek and the White River in the project area. There is also some wetland/riparian in Sections 15 and 16 of T10S R21E. Potential for impacts to these areas from project activities.	Stephanie Howard	9/10/07	3.11.1 3.13.2 4.11 4.13 5.3.11 5.3.13
NP	<b>Wild and Scenic Rivers</b>	No wild or scenic rivers exist in the project area.	Chuck Patterson	8/27/2007	3.4.2.1
NP	<b>Wilderness</b>	No wilderness or wilderness study areas are present	Chuck Patterson	8/27/2007	3.4.2.1
PI	<b>County Transportation Plan</b>	Document should contain travel plan that would address roads issues regarding type, maintenance, and standards, and that the road would be maintained throughout the life of the project. Company should contact Uintah County Planning and Zoning Department for necessary County permits. Contact Road Department if crossing of county roads, and Public Lands Department if maintenance and improvement on County roads is necessary.	Diane Caltharp	8/27/2007	3.10 4.10 5.3.10 Appendix C
PI	<b>Fish and Wildlife including Special Status Species other than FWS Candidate or Listed species (e.g. Migratory Birds)</b>	Migratory bird issues – removal of nesting and foraging habitat, potential for impacts from open pits, vehicles, general activity. Sage grouse habitat fragmentation, direct impacts to lekking areas. Raptors- fragmentation of nesting, wintering and foraging habitat, impacts from vehicles, activity. Big game crucial habitat – primarily antelope, continued fragmentation and additional structures within habitat, loss of forage, increased risk to vehicle collisions. Impacts to sensitive fish species due to increased sedimentation, runoff and increased potential for spills. Scattered white tail prairie dog population.	Scott Ackerman	8/27/2007	3.14 4.14 5.3.14 Appendix H Appendix I
NI	<b>Fuels / Fire Management</b>	No planned Fuel Projects in the area. Access for suppression would not be diminished.	Steven Strong	8/24/07	NA
PI	<b>Geology / Mineral Resources</b>	Within the area of known oil shale and gilsonite.	Jerry Kenczka	8/27/2007	3.3 4.3 5.3.3

Determination	Resource	Rationale for Determination*	Signature	Date	EIS Section(s)
NI	<b>Lands / Access</b>	Access roads, gas pipelines, powerlines, anything off unit requires a right of way. If a well pad or injection facility is applied for an SF 299 and Bond would be required. Does not need to be included in write up in chapters 3 and 4, but recognize that bonds and right- of- ways do need to be addressed. Conflicts with other rights of way are not anticipated, but if they do occur they will be resolved on a site specific basis.  No changes to land use as designated in the Book Cliffs RMP are anticipated to be necessary.	Paul Rodriguez	8/27/2007	2.3 2.5 3.4 4.4 5.3.4
PI	<b>Livestock Grazing</b>	Allotments in the project area include Antelope Draw, Coyote Wash, Olsen AMP, Sand Wash, Seven Sisters, Southern Canyon, Thorne-Ute Broome, and White River Bottom. Previous oil and gas actions have eliminated AUMs from these allotments. The proposed action would eliminate additional AUMs on these allotments. AUM adjustments on these allotments would occur through a process that includes quantitative monitoring and analysis of available forage.	Mike Cutler/ Dusty Carpenter	12/9/2009	3.6 4.6 5.3.6 Appendix K
PI	<b>Paleontology</b>	PFYC Class 4 or 5 (highly sensitive) because most of the surface geology is Uinta Formation. Class 3 along the Bitter Creek where the Green River Formation outcrops and Class 2 along the alluvial deposits along Bitter Creek and the White River flood plains.	Robin Hansen	5/12/2008	3.5 4.5 5.3.5
PI	<b>Rangeland Health Standards and Guidelines</b>	Not all allotments have been assessed in the project area. Allotments that have been assessed are meeting standards with some areas at risk due to oil and gas activity. See the soils, weeds, riparian, and water quality sections.	Mark Wimmer/ Mike Cutler	9/30/2009	4.6
PI	<b>Recreation</b>	A portion of the White River SRMA is located within the project area. Recreational boating is along the river from the beginning of March to the end of June. Disbursed OHVing is found throughout the project area. Hunting is also throughout the area, especially within the Book Cliffs Limited entry elk and deer unit. See the Utah Big game Bucks, Bulls and Once-in-a-lifetime Proclamation for hunting dates and number of permits offered. Hunting is managed by Utah Division of Wildlife Resources.	Chuck Patterson/ Jason West	9/30/2009	3.7 4.7 5.3.7
PI	<b>Socioeconomics</b>	Socio-economics will be impact by this project. Also, implementing the proposed project will positively impact the socioeconomics of the Northern Ute Tribe.	Stephanie Howard	8/27/2007	3.8 4.8 5.3.8
PI	<b>Soils</b>	Increase in sedimentation and erosion likely.	Steve Strong	8/24/07	3.9 4.9 5.3.9
PI Veg. NP SS.	<b>Vegetation including Special Status Species other than FWS Candidate or Listed species</b>	Vegetation will be impacted by the construction of new roads, pads, ponds and facilities.  No Bureau-sensitive special status plants species are known from the area of proposed activity.	Clayton Newberry	8/29/07	3.11.1 4.11 5.3.11 Appendix H
PI	<b>Visual Resources</b>	Class II along the river, disturbances in this are may not be within management objectives. The remainder of the project area is Class III and IV so the project would be within management objectives in those areas. Need to conduct an "as seen" GIS analysis along the White River to determine line-of-sight. Also, conduct an "as seen" analysis on a 5-mile radius from the Goblin City Overlook.	Chuck Patterson/ Stephanie Howard	9/30/2009	3.12 4.12 5.3.12

Determination	Resource	Rationale for Determination*	Signature	Date	EIS Section(s)
PI	<b>Waters of the U.S. (C.O.E.)</b>	Discharge activities within waters of the United States (including wetlands), if any are proposed, and crossings of water of the U.S. may require a Department of the Army permit.	Sue Nall	9/19/07	3.13.2 4.13 5.3.13
NP	<b>Wild Horses and Burros</b>	There are no herd areas, herd management areas, wild horses and burros present in the project area.	Kevin Lloyd	8/27/2007	NA
PI	<b>BLM Natural Areas</b>	A portion of the BLM White River Natural Area is located within the project area.	Jason West	9/30/2009	3.4.1 4.4 5.3.4
PI	<b>Woodland / Forestry</b>	Cottonwood ( <i>Populus fremontii</i> ) is present along rivers and streams in the project area, and would be impacted if ground disturbing activities encroach into river and stream ways and their associated riparian zones.  Small isolated stands of pinyon juniper woodland exist in the project area; these stands could be impacted if development occurred in or near them.	David Palmer	8/27/2007	3.11.1 4.11 5.3.11
PI	<b>Non-WSA lands with wilderness characteristics</b>	The White River non-WSA lands with wilderness characteristics overlaps the project area and may be impacted by the proposed project. No impact to the BLM White River natural area is anticipated.	Stephanie Howard	3/24/2010	3.14 4.14 5.3.14

**FINAL REVIEW:**

Reviewer Title	Signature	Date	Comments
NEPA / Environmental Coordinator		3/8/12	
Authorized Officer		3/8/12	

## **Appendix C**

### **Transportation Plan**

**Appendix C**  
**Greater Natural Buttes Project Area**  
**Natural Gas Development Project**  
**Transportation Plan**

## **Introduction**

In August 2007, Kerr-McGee Corporation (KMG) submitted a proposal to the Bureau of Land Management Vernal Field Office (VFO) to develop hydrocarbon resources underlying oil and gas leases owned, at least in part, by KMG within the Greater Natural Buttes Project Area (GNBPA) in Uintah County, Utah. KMG's intent is to explore and develop all potentially productive subsurface formations underlying the land in the project area. KMG is the designated operator or owns contractual leasehold rights for approximately 85 percent of the lands within the GNB boundary. The project area consists of an existing natural gas producing area located on lands owned by the United States, State of Utah, and private entities. In addition to new road construction, KMG's planned project development would rely upon use of a network of existing highways, county roads, and roads on private, state, and United States lands.

The Bureau of Land Management (BLM) is currently preparing an Environmental Impact Statement (EIS) to analyze potential environmental, cultural, social, and economic impacts likely to be associated with KMG's proposal. Additionally, the EIS will identify alternatives to KMG's proposal that meet the purpose and need of the project and develop mitigation strategies to address the impacts of KMG's proposal and any alternatives developed.

This transportation plan incorporates the BLM's Road Manual 9113 and the Surface Operating Standards for Oil and Gas Exploration and Development, Fourth Edition (Gold Book – BLM and USFS 2007). BLM's Road Manual 9113 and the Gold Book provide KMG with a combination of guidance and standards for ensuring compliance with agency policies and operating requirements. As such, these are reference documents and the associated guidance and standards serve as a basis for identifying appropriate road design, construction, and maintenance standards following site-specific analysis. This plan outlines the construction and maintenance actions that KMG would employ. If conditions warrant, KMG would cooperate with the appropriate surface management agency or private surface owner to identify and apply additional measures.

## **Purpose and Scope**

The objective of KMG's transportation planning for the GNB project area is to minimize resource conflicts and development costs within the project area through proper road design, construction, and maintenance activities. This plan describes KMG's anticipated use of existing roads and construction and use of proposed access roads. In addition to this plan, BLM manuals, the Gold Book, and county transportation codes and standards would be used as appropriate in planning and design efforts for each new access road.

KMG recognizes that, in addition to BLM, existing roads to and within the GNB project area are under the jurisdiction of other governmental agencies (e.g., Uintah County and Uintah and Ouray Tribal Government) who may have specific design and maintenance requirements for roads under their jurisdiction. Construction standards and maintenance agreements for roads under private agreements may or may not exist. In these cases, KMG would strive to implement road design, construction, and maintenance standards consistent with adjacent jurisdictional government agencies unless otherwise requested by private surface owners.

The transportation plan objectives include:

- Maximize use of the existing road system;
- Facilitate identification of roads not needed for operations;
- Construct roads to the minimum standard necessary to accommodate anticipated traffic and weather;

- Minimize the number of loop roads;
- Minimize the crossing of side slopes greater than 40 percent;
- Minimize profile grades;
- Minimize drainage crossings, with emphasis placed on drainages with potentially large runoff flows and floodplains;
- Meet the needs and requirements of KMG, the BLM, Uintah County, Northern Ute Tribe, the State of Utah, and private surface owners;
- Incorporate environmental and resource considerations; and
- Provide for inspection and maintenance activities.

## General Location Information

The GNB project area is located in central Uintah County south of Vernal, Utah. The project area includes U.S. Highway 40, State Highway 45 and 88, and Uintah County roads 3260, 3410, and 3420 as major access routes (see **Map C-1**). Additional developed access roads within the GNB project area are owned or managed by Uintah County, the BLM, the Northern Ute Tribe (administered by the Bureau of Indian Affairs [BIA]), the State of Utah, and private entities. Additionally, there are numerous undeveloped roads/routes within and adjacent to the area.

Primary access to the GNB project area is via Glen Bench Road, State Highway 45, and State Highway 88. Access within the project area would be via the existing road network, which consists of arterial roads and individual well access roads. County roads within the project area include Class 1-B gravel roads (Seven Sisters Road, Fildar Road, Bitter Creek Road, and Seep Ridge Road) and a Class 1-B paved and graveled road (Glen Bench Road).

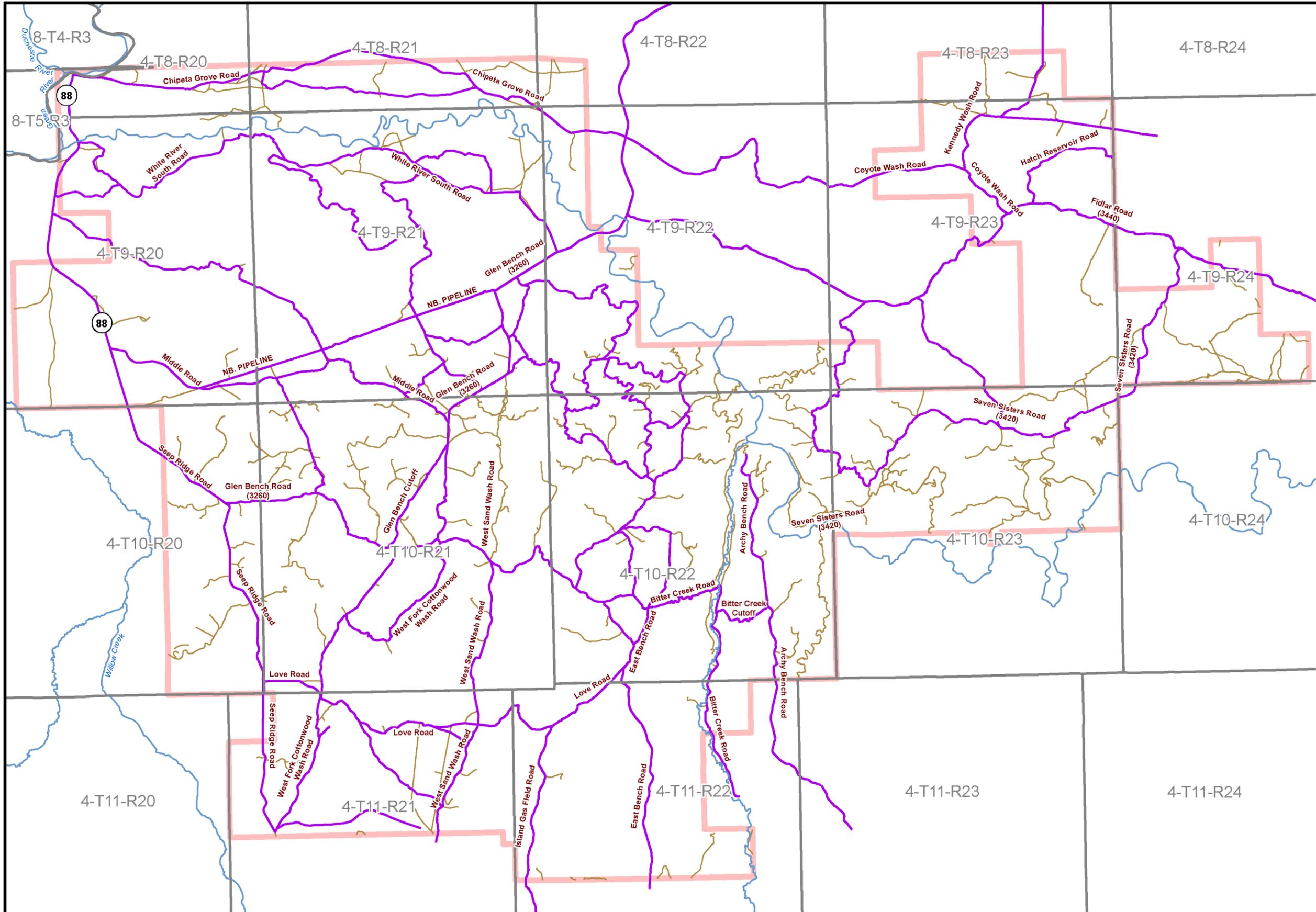
The GNB project area consists of approximately 162,911 acres in an existing gas producing area located in T8S/R20-23E, T9S/R20-24E, T10S/R20-23E, and T11S/R21-22E in Uintah County, Utah. The proposed wells would be drilled and facilities would be constructed within 88,565 acres of federal land; 39,399 acres of land owned by the Northern Ute Tribe and administered by the BIA; 32,755 acres of land owned by the State of Utah; and 2,192 privately owned acres of land, which includes allottees. The BLM administers 79 percent, the State of Utah owns 20 percent, and the private owners or tribal allottees own 1 percent of the subsurface minerals below the project area. Surface and mineral ownership is summarized in **Table 2.1-1** of the EIS.

## Existing Development

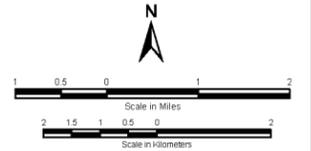
Based on current Utah Department of Oil, Gas, and Mining (UDOGM) information (October 2007) for existing oil and gas infrastructure in the GNB project area, 1,562 vertical productive wells have been drilled on single well pads and are in operation. **Table 2.2-1** of the EIS identifies those existing or approved oil and gas facilities that are present within the GNB project area.

## Summary of Proposed Development

Although actual operations are subject to change as the project proceeds, KMG's plan is to drill additional wells at an average rate of approximately 334 wells per year over a period of 10 years, or until the resource base is fully developed, with a maximum total of 3,496 wellbores. KMG estimates that each proposed new well would require an average of 0.25 miles of new or upgraded road construction. The plan also assumes that a total of 179 new wells would be drilled by other operators having leasehold rights in the GNB project area. This plan does not obligate those operators.



- Named Streams and Rivers
- Township/Range
- EIS Project Area
- Trunk Roads
- Other Roads



**Greater Natural Buttes Area Gas Development Project EIS**

Map C-1  
Transportation Plan Roads

The ultimate pace, location, timing, and total number of wells developed within the GNB project area may be affected by factors outside of KMG's control such as permit approvals, production success, geology, engineering technology, economic factors, commodity prices, rig availability, and lease stipulations. Because of this uncertainty, future transportation routes would be developed incrementally as wells are developed and additional information becomes available. KMG would coordinate with government agencies having jurisdiction over transportation routes to accomplish the goals of this plan. The productive life of each well is estimated to be approximately 30 to 50 years.

## **Access Road Construction and Maintenance Overview**

### **Evaluation of Existing Roads**

The existing road network within the GNB project area is discussed in more detail in Chapter 3.0, Affected Environment. KMG would upgrade, reconstruct, and/or maintain existing roads utilizing standards consistent with those of the appropriate surface management agency or private surface owner on which the road occurs. Upgrading, reconstruction, and maintenance may include some or all of the procedures as identified below in the section: "Access Road Construction and Maintenance Practices and Procedures."

Existing roads requiring upgrading would meet standards appropriate to the anticipated traffic flow and all weather road requirements. Construction or upgrading would not occur during muddy conditions.

### **Road Types**

BLM recognizes several functional classifications for roads in Road Manual 9113. They are:

- 1) Collector Roads. These roads normally provide primary access to large blocks of land and connect with or are extensions of a public road system. Collector roads accommodate mixed traffic and serve many uses. They generally receive the highest volume of traffic of all the roads in the Bureau road system. User cost, safety, comfort, and travel time are primary road management considerations. Collector roads usually require application of the highest standards used by the Bureau.
- 2) Local Roads. These roads normally serve a smaller area than collectors, and connect to collectors or public road systems. Local roads receive lower volumes, carry fewer traffic types, and generally serve fewer uses. User cost, comfort, and travel time are secondary to construction and maintenance cost considerations. Low volume roads in mountainous terrain may be single-lane roads with turnouts.
- 3) Resource Roads. These are normally spur roads that provide point access and connect to local or collector roads. They carry very low volume and accommodate only one or two types of use. Use restrictions are applied to prevent conflicts between users needing the road and users attracted to the road. The design of these roads is governed by environmental compatibility and minimizing Bureau costs, with minimal consideration for user cost, comfort, or travel time. Roads servicing individual oil/gas exploration and production locations fall within this classification, and they are often referred to as well access roads.

### **Road Construction Planning**

Terrain, well spacing, surface use restriction, and other constraints may prevent KMG from locating future well sites adjacent to or nearby existing roads. However, most new road construction would likely consist of short segments to connect proposed well sites to existing access routes. New roads would be built and maintained to provide year-round access.

KMG in cooperation with the appropriate surface management agency and/or private surface owner would conduct field evaluations to select routes to best serve the respective management needs of the approving entity. Access roads would be designed to accommodate the anticipated use (e.g., light vehicles and/or heavy

truck). Design criteria include, but may not be limited to roadway structure, travel-way width, shoulders, slopes, curve radius, safety, traffic requirements, vehicle characteristics, maintenance costs, snow removal, sight distances, and environmental and resource considerations. Vehicle speeds would be limited to be consistent with the road's intended designed use (BLM Manual 9113).

The location access roads would be planned to the extent practicable to avoid sensitive areas and to minimize impacts to water, soil, vegetation, sensitive species, wildlife habitat, and land management prescriptions. When sensitive areas cannot be avoided, KMG would strive to employ practices to prevent, reduce, or mitigate all potential adverse effects caused by construction and use of the road.

### **Road Construction Procedures**

On BLM-managed lands, KMG proposes to construct required new access roads across public lands in accordance with BLM Manual 9113 and the Gold Book standards and as appropriate for site-specific conditions. BLM has the option of determining whether professional engineering design and construction oversight is necessary or whether the road can be constructed by the operator consistent with site-specific standards and approved road design. The need for professional engineering design and oversight would be based on factors such as topography, soils, hydrology, safety, and levels and types of use by the operator and general public.

Based on pre-construction onsite reviews that may include surface owner representatives and cooperating agencies, roads would be located to minimize disturbances and maximize transportation efficiency. New well site access roads would be designed and constructed to resource road standards to facilitate reclamation should the well be a dry hole. Roads located on private lands would be constructed in accordance with standards imposed by the private land owner. The number of roads would be limited to decrease potential impacts by discouraging development of looped roads and by accessing wells from short resource roads off the local roads. Roads would be designed to minimize disturbance and would be built and maintained as specified by the BLM to provide safe operating conditions at all times. Surface disturbance would be contained within the road ROW.

Construction equipment and techniques used by KMG would be to the standards found in the BLM Road Manual 9113 (e.g., crown-and-ditch method). Should soft spots develop on the roadway during construction or drilling operations, they would be immediately covered with crushed rock or gravel. Where identified during on-site review by the BLM, problem areas on access roads to producing well sites would be graveled to a depth of 4 to 6 inches to reduce erosion and sedimentation. Graveling would be accomplished within a time period specified by BLM. Surfacing and base course materials would be obtained from existing, operational gravel pits located on private or federal lands near the project area. Topsoil would be spread and vegetation would be windrowed to the side slopes of the newly constructed access roads, and revegetation would begin the first appropriate season following the well going into production.

Small drainage crossings on access routes within the project area would utilize culverts sized to accommodate a 25 year storm event. Low water crossings also may be used in shallow channel crossings. Low water crossings of channels would consist of excavating an area approximately 4 feet deep under the travel way and filling it with rock and gravel to the level of the drainage bottom. Channel banks on either side of such crossings would be cut down to reduce grade where necessary. Generally, culverts would be installed on smaller, steeper channel crossings. Topsoil would be saved before channel-crossing construction occurs. Also, the total area to be disturbed would be flagged on the ground before construction begins.

In the event drilling is non-productive, all disturbed areas, including the well site and new access road, would be reclaimed to the approximate landform that existed prior to construction. Reclamation and site stabilization techniques (e.g., topsoil application and seed mixture) would be implemented as specified in the APD Surface Use Plan or the ROW Plan of Development (POD). If drilling is productive, all access roads to the well site would remain in place for well servicing activities (i.e., maintenance, improvements, etc.). Partial reclamation

would be completed on segments of the well pad and access road ROW no longer needed. Reclamation of resource roads would be implemented the first growing season after well abandonment.

### **Vehicle Use and Road Maintenance**

Monitoring road use plays an important role in a maintenance plan. KMG would conduct regular inspections to identify road problems such as ruts, holes, crown and ditch elements, standing water on road surface, surfacing materials, blockage of water into and from culverts, interim reclamation, and control of noxious and invasive weeds. Inspections would be routinely conducted following rapid snowmelt and prolonged rain events. Maintenance activities could include but not be limited to blading, resurfacing, dust abatement, spot repairs, culvert cleaning, noxious and invasive weed control, reseeding, regading, and snow removal. The road surface and shoulders would be kept in a safe and usable condition and would be maintained in accordance with the original construction standards. All drainage ditches and culverts would be kept clear and free-flowing and would be maintained according to original construction standards. The approved use authorization route for the access road would be kept free of trash during operations.

### **Reclamation and Abandonment**

When the GNB project area or portions thereof are ready to be abandoned (est. 30 to 50 years), final disposition of the access roads would be determined. KMG's preference would be to abandon and reclaim all resource roads; however, management needs of surface management agencies and/or private surface owners may dictate otherwise. Anticipated future uses could include access to accommodate ranching and livestock operations, recreation, or administrative needs. Reclamation protocols are described in Appendix E of the EIS.

KMG anticipates that county roads would likely be retained in an upgraded status (local/collector roads), as would improvements to surface management agency designated roads. Resource roads developed as access to individual wells sites are likely to be reclaimed and returned to conditions similar to those existing prior to natural gas development activities. If KMG has assumed any maintenance responsibilities for roads that would be retained, those responsibilities would revert to Uintah County, the surface management agency, and/or the private surface owner as appropriate.

### **Access Road Construction and Maintenance Practices and Procedures**

KMG would employ the following as part of its transportation planning:

- The location of each well and access road for each well will be shown on maps and described in the site-specific Application for Permit to Drill (APD) and/or Right-of-Way (ROW). The access road will be centerline flagged during the time of staking.
- All improvements requested for existing access roads will be described in the site-specific APD and/or ROW.
- All existing roads will be maintained and kept in good repair during all drilling and completion operations associated with this well.
- Access roads and surface disturbing activities will conform to standards outlined in the BLM Gold Book: Surface Operating Standards for Oil and Gas Exploration and Development, 2007.
- On Northern Ute Tribal, private, and/or state surface, access roads will be constructed according to the surface owner's specifications.
- New access roads on BLM surface will be: Crowned (2 to 3 percent), ditched, and constructed with a running surface of 18 feet and a maximum disturbed width of 45 feet.

- The disturbed width may be wider than 45 feet when approved by the appropriate Authorized Officer to accommodate large equipment, or to allow for intersections, sharp curves, steep grades, or other safe road construction and maintenance practices. These situations will be discussed and a decision made at the on-site field review. Site-specific proposals will be included in the APD and/or ROW.
- Graveling or capping the roadbed will be performed as necessary to provide a well-constructed, safe road.
- Prior to construction or upgrading, the proposed road will be cleared of any snow and allowed to dry completely.
- Unless specified in the site-specific APD and/or ROW, the following specifications will apply:
  - No pipelines will be crossed with the new construction.
  - The maximum grade will be less than 8 percent.
  - There will be no turnouts.
  - If it becomes necessary to install a culvert, it will be specified in the APD or the BLM will be notified of the installation via Sundry Notice.
  - Appropriate water control features will be constructed to control erosion.
  - There will be no gates, cattleguards, fence cuts, or modifications to existing facilities.
- Surfacing material may be necessary, depending upon weather conditions.
- Surface disturbance and vehicular traffic will be limited to the approved location and approved access route and travel surface. Any additional area needed will be approved in advance.
- Road drainage crossings will be of the typical dry creek drainage crossing type. Crossings will be designed so they will not cause siltation or accumulation of debris in the drainage crossing nor will the roadbed block the drainage.
- Erosion of drainage ditches by runoff water will be prevented by diverting water off at frequent intervals by means of cutouts.
- Should mud holes develop, they will be filled in and detours around them avoided.
- When snow is removed from the road during the winter months, the snow will be pushed outside of the borrow ditches, and the cutouts kept clear so that snowmelt will be channeled away from the road.
- The use of topsoil for construction activities will not be allowed.
- Surface and subsoil materials in the immediate area will be utilized.
- Any gravel will be obtained from a commercial source.

The use of materials under BLM jurisdiction will conform to 43 CFR 3602.33. Mineral materials displaced in the ordinary course of conducting operations and/or construction activities may be used for oil and gas development purposes within the subject lease in accordance with BLM approved actions. Mineral materials also may be obtained by making application for a mineral material sale under the provisions of 43 CFR Subpart 3602, Mineral Materials Sales.

**Appendix D**  
**Example Spill Prevention Control and Countermeasures Plan**

**SPILL PREVENTION, CONTROL AND  
COUNTERMEASURE PLAN**

PREPARED FOR:

**COMPANY NAME**

**FACILITY OR AREA NAME  
FACILITY OR AREA ADDRESS LINE 1  
FACILITY OR AREA ADDRESS LINE 2  
CITY, STATE, ZIP CODE**

PLAN TYPE:

**§112.8 Requirements for Onshore Facilities  
(excluding Production Facilities)**

**IF AN EMERGENCY OR SPILL,  
CONTACT  
FACILITY OR AREA NAME AT PHONE NUMBER OR  
DESIGNATED PERSON AT PHONE NUMBER  
AND REFER TO SECTION A.2. FOR SPILL REPORTING  
AND RESPONSE PROCEDURES**

PREPARED ON **MM/DD/YYYY**

## **LIST OF FACILITIES COVERED BY THIS PART A**

## ACTION ITEM SUMMARY

Throughout this Spill Prevention, Control and Countermeasure (“SPCC”) Plan (the “Plan”), items that require specific attention because of inspection, training and recordkeeping requirements, are presented in bold print and underlined. These ‘Action Items’ are summarized below.

### PART A – GENERAL PLAN REQUIREMENTS

- **Section A.1.1. – (At all times)** Maintain a complete copy of the SPCC Plan at the nearest field office.
- **Section A.1.3. – (After change to a Facility)** The SPCC Plan will be revised whenever there are design, construction, operation, or maintenance changes to a Facility. See Log of Plan Review and Amendments.
- **Section A.1.3. – (Every 5 years)** Management must review, evaluate and re-certify the Plan for its adequacy.
- **Section A.1.5. - (At all times)** Inspection procedures, tests and records, signed by the appropriate supervisor or inspector, will be kept with the SPCC Plan for a period of no less than three years.
- **Section A.1.5. – (Annual)** Leak test all buried metallic storage tanks.
- **Section A.1.5. – (Annual)** Inspection of SPCC Facilities (e.g. bulk storage containers, oil-filled equipment, oil and oily-water containing process units, and containment structures) will be conducted.
- **Section A.1.5. – (On a regular basis)** Conduct a non-destructive integrity test on aboveground bulk storage container systems.
- **Section A.1.5. – (On a regular basis)** Test liquid level sensing devices.
- **Section A.1.6. - (Prior to assignment of responsibilities)** All oil-handling personnel will be trained in discharge prevention and spill response prior to the assignment of job responsibilities.
- **Section A.1.6. – (Annual)** Discharge prevention briefings for oil-handling personnel will be conducted.
- **Oil Spill Contingency Plan and/or Facility Response Plan will be updated on an as-needed basis**

### PART B – FACILITY INFORMATION

- **Section B.1.5.1. - (Upon installation or repair)** Wrap, coat and, if feasible, cathodically protect buried piping.
- **Section B.1.5.4. - (Annual)** Inspection of aboveground piping will be conducted.
- **Section B.1.5.4. - (As necessary)** Integrity and leak testing of buried piping must be conducted at the time of installation, modification, construction, relocation, or replacement.
- **Section B.1.8. - (After repair or change)** Field constructed containers must be reevaluated for brittle fracture failure potential.
- **Section B.1.10. - (Each drainage/discharge event)** All discharges of stormwater from secondary containment must be evaluated and recorded.

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LIST OF FACILITIES COVERED BY THIS PART A  
ACTION ITEM SUMMARY  
TABLE OF CONTENTS  
LOG OF PLAN REVIEW AND AMENDMENTS - PART A  
FEDERAL REGULATORY REQUIREMENTS / SPCC PLAN CROSS-REFERENCE

### PART A – GENERAL PLAN REQUIREMENTS

- A.1. GENERAL INFORMATION
  - A.1.1. Plan Copy [§112.3(e)]
  - A.1.2. Management Approval [§112.7]
    - A.1.2.1. Designated Person Accountable for Oil Spill Prevention at the Facility [112.7(f)(2)]
  - A.1.3. Amendment of Plan by Owner or Operator [§112.5]
  - A.1.4. Oil Spill Contingency Plan [§112.7(d)]
  - A.1.5. Inspections, Tests And Records [§112.7(e), §112.8(c)(4), (6), (8), (10)]
  - A.1.6. Personnel Training [§112.7(f)]
  - A.1.7. Security [§112.7(g)]
  - A.1.8. Conformance with State Requirements [§112.7(j)]
- A.2. SPILL REPORTING AND RESPONSE [§112.7(a)]
  - A.2.1. Emergency Contact Information [§112.7(a)(3)(vi)]
  - A.2.2. Spill Reporting Requirements and Amendment of Plan by Regional Administrator [§112.4(a), §112.7(a)(4) and §112.7(a)(5)]
    - A.2.2.1. Spill Reporting and Response Requirements
  - A.2.3. Emergency Response Procedures [§112.7(a)(3)(iv) and (a)(5)]
    - A.2.3.1. Spill Discovery and Response
    - A.2.3.2. Spill Response Resources
  - A.2.4. Recovered Materials Management [§112.7(a)(3)(v)]
- A.3. Substantial Harm Determination [§112.20]
- A.4. Facility Response Plan [§112.20]

### FIGURES

- Figure A-1 Emergency Response Flowchart and Responsibilities
- Figure A-2 Substantial Harm Criteria Checklist

### APPENDICES

- Appendix A Forms
  - Spill Report Form
  - Regional Administrator Reporting Form
  - Annual SPCC Inspection Checklist
  - SPCC Drainage Inspection and Discharge Log

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### PART B – FACILITY INFORMATION

#### B.1. FACILITY NAME AND LOCATION [§112.7(a)(3)]

- B.1.1. Designated Person at Facility [§112.7(f)(2)]
- B.1.2. Professional Engineer Certification [§112.3(d)]

#### LOG OF PLAN REVIEW AND AMENDMENTS - PART B

- B.1.3. Facility Conformance with SPCC Rule [§112.7(a)(1) and (a)(2)]
- B.1.4. Facility Description [§112.7(a)(3)]
- B.1.5. Facility Transfer Operations [§112.8(d)]
  - B.1.5.1. Buried Piping Protection and Examination [§112.8(d)(1)]
  - B.1.5.2. Not-In-Service and Standby Service Terminal Connections [§112.8(d)(2)]
  - B.1.5.3. Design of Pipe Supports and Protection from Vehicular Traffic [§112.8(d)(3) and 5)]
  - B.1.5.4. Aboveground Piping and Appurtenance Protection and Examination [§112.8(d)(4)]
  - B.1.5.5. Loading/Unloading Racks [§112.7(h)]
- B.1.6. Facility Storage and Bulk Storage Containers [§112.7(a)(3)(i), 112.7(i), 112.8(c)(1) and (8)]
  - B.1.6.1. Tank Compatibility with Contents [§112.8(c)(1)]
  - B.1.6.2. Engineer or Update Each Container [§112.8(c)(8)]
  - B.1.6.3. Buried or Partially Buried Metallic Tanks [§112.8(c)(4) and (5)]
  - B.1.6.4. Internal Heating Coils [§112.8(c)(7)]
- B.1.7. Fault Analysis [§112.7(b)]
- B.1.8. Brittle Fracture Evaluation [§112.7(i)]
- B.1.9. Secondary Containment [§112.7(c) , §112.7(k) and §112.8(c)(2) and (11)]
- B.1.10. Facility Drainage [§112.8(b) and (c)(9)]

### TABLES

Table B-1 Site Specific Data and Containment Calculations

### FIGURES

Figure B-1 Facility Diagram  
Figure B-2 Facility Map (optional)

**LOG OF PLAN REVIEW AND AMENDMENTS - PART A**

**NON-TECHNICAL AMENDMENTS**

- Non-technical amendments are not certified by a Professional Engineer.
- Examples of changes include, but are not limited to, phone numbers, name changes, or any non-technical text change(s).

**TECHNICAL AMENDMENTS**

- Technical amendments are certified by a Professional Engineer (§112.5(c)).
- Examples of changes include, but are not limited to, commissioning or decommissioning containers; replacement, reconstruction, or movement of containers; reconstruction, replacement, or installation of piping systems; construction or demolition that might alter secondary containment structures; changes of product or service; or addition/deletion of standard operation or maintenance procedures related to discharge prevention measures. It is the responsibility of the field to determine, and confirm with the regulatory authority as necessary, what constitutes a technical amendment. The preamble of the rule states that an amendment is required only “when there is a change that materially affects the facility’s potential to discharge oil” (67 FR 47091).
- An amendment made under this section will be prepared within six (6) months of the change and implemented as soon as possible but not later than six (6) months following preparation of the amendment.
- Technical Amendments affecting various pages within the Plan will require P.E. certification of the Plan and will be documented on the log form below.

**MANAGEMENT REVIEW**

- Management will review this SPCC Plan at least every five (5) years and document the review on the form below (§112.5(b)).
- By signature below, signor confirms that management has completed a review and evaluation of this SPCC Plan.

Review/ Amend Date	Signature* (Specify)	Amend Plan (will/will not)	Description of Review/Amendment	Affected Page(s)	P.E. Certification (Y/N)

\*Typically signed by Manager, Professional Engineer or Plan Reviewer

Area Name: Operating Area Name

**FEDERAL REGULATORY APPLICABILITY / SPCC PLAN CROSS-REFERENCE**

Citation	Description	Heading (Page)	
		Part A	Part B
Subpart A	Applicability, Definitions, and General Requirements for All Facilities and All Types of Oil	(See Below)	
§112.3(d)	Professional Engineer Certification		B.1.2.
§112.3(e)	Plan Copy	A.1.1.	
§112.4	Amendment of SPCC Plan by Regional Administrator	A.2.2.	
§112.5	Amendment of SPCC Plan by Owners or Operators	A.1.3., (vi)	(B-2)
§112.7	General requirements for SPCC Plans for all facilities and all oil types	A.1., (vii)	B.1.3.
§112.7(a)	General requirements: discussion of facility's conformance with rule requirements; deviations from Plan requirements; facility characteristics that must be described in the Plan; spill reporting information in the Plan; emergency procedures and waste management	A.2., A.2.1, A.2.2., A.2.3., A.2.4.	B.1., B.1.1., B.1.3., B.1.4.
§112.7(b)	Fault analysis		B.1.7.
§112.7(c)	Secondary containment		B.1.9.
§112.7(d)	Contingency planning	A.1.4.	
§112.7(e)	Inspections, tests, and records	A.1.5.	
§112.7(f)	Employee training and discharge prevention procedures	A.1.6.	
§112.7(g)	Security (excluding oil production facilities)	A.1.7.	
§112.7(h)	Loading/unloading (excluding offshore facilities)		B.1.5.5.
§112.7(i)	Brittle fracture evaluation requirements		B.1.8.
§112.7(j)	Conformance with State requirements	A.1.8.	
§112.7(k)	Qualified Oil-filled Operational Equipment		B.1.9.
Subpart B	Requirements for Petroleum Oils and Non-Petroleum Oils, Except Animal Fats and Oils and Greases, and Fish and Marine Mammal Oils; and Vegetable Oils (Including Oils from Seeds, Nuts, Fruits, and Kernels)	(See Below)	
§112.8	Requirements for onshore facilities (excluding production facilities)	(See Below)	
§112.8(a)	General and specific requirements	(See Below)	
§112.8(b)	Facility drainage		B.1.10.
§112.8(c)	Facility bulk storage containers	A.1.5.	B.1.6., B.1.9.
§112.8(d)	Facility transfer operations, pumping and facility processes		B.1.5.
§112.9	Requirements for onshore production facilities	NA	NA
§112.10	Requirements for onshore oil drilling and workover facilities	NA	NA
§112.11	Requirements for offshore oil drilling, production, or workover facilities	NA	NA
Subpart C	Requirements for Animal Fats and Oils and Greases, and Fish and Marine Mammal Oils; and Vegetable Oils, Including Oils from Seeds, Nuts, Fruits, and Kernels	(See Below)	
§112.12	Requirements for onshore facilities (excluding production facilities)	NA	NA
§112.13	Requirements for onshore oil production facilities	NA	NA
§112.14	Requirements for onshore oil drilling and workover facilities	NA	NA
§112.15	Requirements for offshore oil drilling, production, or workover facilities	NA	NA
Subpart D	Response Requirements	(See Below)	
§112.20	Facility response plans	A.3., A.4.	
§112.21	Facility response training and drills/exercises	NA	NA

# SPILL PREVENTION, CONTROL, AND COUNTERMEASURE PLAN

Company Name  
Facility or Area Name

## PART A – GENERAL PLAN REQUIREMENTS

### A.1. GENERAL INFORMATION

The regulations requiring preparation of SPCC Plans were revised by USEPA on July 17, 2002 and December 26, 2006. The SPCC regulations are intended to prevent the discharge of oil into or upon the navigable waters of the United States. The regulations, which are codified in 40 CFR 112 (each relevant regulatory citation is identified by brackets), require that facilities that have the potential to impact navigable waters and with aboveground oil storage capacity of 1,320 gallons or more, exclusive of exempt containers, prepare and implement an SPCC Plan.

This Plan is presented in two parts: 1) a Part A that contains Area-specific information that is associated with all of the Facilities within that Area, and 2) a Part B for each Facility in the Area that contains the SPCC information specific to that Facility. Thus, Part A in its entirety is fully incorporated into each Part B and each Part B relies on and incorporates the information contained in Part A. In accordance with 40 CFR 112, a Cross-Reference Table is included in Part A of this Plan and indicates which provisions are located in the Part A and/or Part B. The Table of Contents for this Plan also serves as a cross-reference.

#### A.1.1. Plan Copy [§112.3(e)]

**A complete copy of the SPCC Plan will be maintained either at the facility, if normally attended at least four hours per day, or at the nearest manned office** and will be available for onsite review during normal working hours.

#### A.1.2. Management Approval [§112.7]

I hereby certify that this document and all attachments have full management approval and will be fully implemented under my direction or supervision. Based on my inquiry of the person or persons who manage the Facilities, or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. Should a discharge occur, Management is committed to provide the necessary manpower, equipment, and resources required to expeditiously control and remove any harmful quantity of oil discharged.

Name: \_\_\_\_\_ **Management Name** \_\_\_\_\_ Signature: \_\_\_\_\_

Title: \_\_\_\_\_ **Management Title** \_\_\_\_\_ Date: \_\_\_\_\_

A.1.2.1. Designated Person Accountable for Oil Spill Prevention at the Facility [112.7(f)(2)]

The following Designated Person is accountable for discharge prevention and reports to the management personnel listed above.

Name: \_\_\_\_\_ **Designated Person**

Title: \_\_\_\_\_ **Designated Person Title**

**A.1.3. Amendment of Plan by Owner or Operator [§112.5]**

**The SPCC Plan will be revised whenever there is a change to facility design, construction, operation, or maintenance that materially affects the Facility's potential for discharge** as described in 40 CFR 112.1(b) and/or as described in the Log of Plan Review and Amendments of this Plan. As required by the regulations, the Plan will be revised within six (6) months of such facility change.

All amendments will be properly authorized by Facility management and will be implemented as soon as possible, but not later than six (6) months following the preparation of the amendment. Technical amendments will be certified by a Professional Engineer as required by 40 CFR 112.5(c) and kept as an attachment to this plan. The completion of the Plan reviews will be documented on Log of Plan Review and Amendments attached to the Plan.

**Facility management will review and evaluate the entire Plan for its adequacy at least once every five (5) years.** At the conclusion of this review, management must affirmatively document the review by completing the Log of Plan Review and Amendments.

If as a result of this review and evaluation, the Plan requires amendment, it must be amended within six (6) months of the completion of the review to include more effective prevention and control technology, if the technology has been field-proven at the time of the review and will significantly reduce the likelihood of a discharge as described in 40 CFR 112.1(b).

**A.1.4. Oil Spill Contingency Plan [§112.7(d)]**

The operator has determined that for its bulk storage and process containers, the use of containment and/or diversionary structures to prevent discharged oil from reaching navigable waters is practical and effective at the facilities covered under this Part A. The operator has implemented an Oil Spill Contingency Plan for those facilities that have wellheads, oil-filled equipment, truck loading areas, flowlines and gathering lines not equipped with secondary containment. The Oil Spill Contingency Plan serves as a written commitment of manpower and resources as discussed in each facility's SPCC Part B, Section B.1.9. Facilities are visited on a frequent basis and any spills or accidental releases of oil are properly cleaned up.

#### **A.1.5. Inspections, Tests And Records [§112.7(e), §112.8(c)(4), (6), (8) and (10)]**

**Inspection procedures and a record of the inspections and tests, signed by the appropriate supervisor or inspector, will be kept with the Plan for a period of three years.** If during any inspection, equipment or a containment system is found to be malfunctioning, resulting in a loss of oil from the container, including but not limited to seams, gaskets, piping, pumps, valves, rivets, and bolts, the tank or structure will be removed from service and appropriate repairs completed.

**A documented leak test for every buried metallic storage tank will be completed annually.** Defects discovered in the course of the testing will result in the tank being removed from service and repaired as soon as practicable.

**A documented visual inspection for every bulk storage container system, oil and water containing process unit, and containment structure will be completed annually.** Tank, heater treater, separator and other process container inspections will seek out evidence of wear, defect, and releases in the oil and water containing units and their support system. Inspections of containment areas will seek out general damage, breach of the floor, breach of the walls and releases. Defects discovered in the course of the inspections will be repaired as soon as practicable. See Appendix A for sample Annual Inspection forms.

**A non-destructive integrity test will also be conducted on a regular basis on all aboveground bulk storage container systems.** Options include hydrostatic testing, radiographic testing, ultrasonic testing, or acoustic emission testing. The frequency of and type of testing must take into account container size and design, and should follow manufacturer's recommendations or industry accepted practices. Process Safety Management (PSM) facilities may also have recommended testing frequencies for bulk storage containers. Defects discovered in the course of the testing will result in the tank being removed from service and repaired as soon as practicable.

**Liquid level sensing devices, installed in storage containers, will be tested on a regular basis.** The frequency of testing should follow manufacturer's recommendations or industry accepted practices. Process Safety Management (PSM) facilities may also have recommended testing frequencies for these types of devices. Malfunctioning devices will be removed from service and repaired or replaced as soon as practicable.

#### **A.1.6. Personnel Training [§112.7(f)]**

**Appropriate oil-handling personnel will be trained in discharge prevention and spill response prior to the assignment of job responsibilities.** Training will be completed under the charge of the **Designated Person**, as identified in Section A.1.2.1 of this Plan, (Designated Person) or a qualified, designated representative. Training may be done in conjunction with other materials handling training. At a minimum the training will include:

- Operation and maintenance of equipment to prevent discharges;
- Discharge emergency protocols;
- Applicable pollution control laws, rules, and regulations;
- General Facility operations; and

- The contents of the SPCC Plan.

**A discharge prevention briefing for appropriate oil-handling personnel will be scheduled at least annually** (this may be done in conjunction with other required annual training) and will be documented in the Area training logs. At a minimum, annual briefings will include:

- The contents of the SPCC Plan;
- Descriptions of known discharges or failures and their corrective actions;
- Malfunctioning components; and
- Recently developed precautionary measures.

#### **A.1.7. Security [§112.7(g)]**

The Facilities operate 24 hours per day, 365 days per year. Each facility handling, processing or storing oil is fully fenced. Entrance gates are locked when the facility is unattended. All valves, including master and drain valves that allow for the direct flow of oil from a container to the surface, are secured in the closed position when not in operation. When not in operation, controls for oil pumps will be locked in the "off" position. Pump controls are located at sites accessible only by authorized personnel. Loading and unloading oil pipelines will be securely capped or blanked-flanged when not in service. Where practicable, lighting is provided commensurate with the type and location of the facility.

#### **A.1.8. Conformance with State Requirements [§112.7(j)]**

This SPCC Plan conforms to all State rules, regulations, and guidelines. Appropriate state reporting guidelines are provided in the Oil Spill Contingency Plan.

### **A.2. SPILL REPORTING AND RESPONSE [§112.7(a)]**

Pursuant to Section 112.2, the term 'discharge' means 'spilling, leaking, pumping, pouring, emitting emptying or dumping of oil'. For the purpose of this Plan the terms discharge, spill and release shall be synonymous. Additional information with regard to spill reporting and response can be found in the Oil Spill Contingency Plan.

#### **A.2.1. Emergency Contact Information [§112.7(a)(3)(vi)]**

The emergency contact lists for responding to spills are provided in the Oil Spill Contingency Plan.

#### **A.2.2. Spill Reporting Requirements and Amendment of Plan by Regional Administrator [§112.4(a), §112.7(a)(4) and §112.7(a)(5)]**

The requirements for spill notification and reporting to local, state, and/or federal officials depend upon the nature and extent of the spill. Notification of and reporting to federal, state, and local agencies may be required as referenced in the Oil Spill Contingency Plan. A copy of the spill report form is provided in Appendix A and should be used to assist in meeting the reporting requirements identified below. Non-reportable spill events must be addressed immediately by containing, removing, and disposing of the released material according to applicable regulations.

Also note, that there are special reporting requirements for facilities that experience reportable spills to navigable waters as reference in 40 CFR 112.1(b) of 1,000 gallons (238 bbls) or more or that experience two (2) reportable spills as reference in 40 CFR 112.1(b) of greater than 42 gallons (1 bbls) each within a 12-month period. Those facilities meeting one or both of these criteria are required to submit a report to the Regional Administrator within 60 days of the spill event (see Regional Administrator Reporting Form in Appendix A).

After review of the information submitted, or after an on-site review of the Plan, the Regional Administrator may require an amendment to the Plan if the Regional Administrator finds that the Plan does not meet the requirements of 40 CFR 112 or if an amendment is necessary to prevent and contain discharges at the Facility.

#### A.2.2.1. Spill Reporting and Response Requirements

Following discovery of a spill, on-scene personnel should notify their Supervisor and/or the Designated Person as soon as practicable. If the situation allows, on-scene personnel should also attempt to control or eliminate the source of the spill.

A preliminary spill assessment is to be conducted by on-scene personnel to provide the Designated Person with the information necessary to initiate the appropriate response. A Spill Report Form (see Appendix A) should be completed, provided to the Designated Person and include the following information:

- Date and time of incident;
- Type and estimated total quantity of material released;
- Source and cause of the release;
- Description of all affected media and assessment of environmental conditions such as precipitation, wind speed and direction, and temperature;
- Estimated spill destination and local topography;
- Assessment of immediate danger to human life or health or to the environment, including outside the Facility, and extent of damages or injuries, if any and
- Actions being used to stop, remove, and mitigate the effects of the release.

#### **A.2.3. Emergency Response Procedures [§112.7(a)(3)(iv) and (a)(5)]**

If a spill occurs, Facility personnel trained in accordance with the training requirements of this Plan, or their Contractors listed in the Oil Spill Contingency Plan, will respond as outlined in Figure A-1 Emergency Response Flowchart and Responsibilities.

##### A.2.3.1. Spill Discovery and Response

In the event of a release, the observer will move to a place of safety in relation to the spill. Only if trained to do so and if it is safe, the observer will take reasonable efforts to stop or control the source of the spill.

The observer will immediately report the spill to their Supervisor and/or Designated Person. If necessary, the Designated Person, or his designee, will notify the On-Scene Commander to assess the situation and initiate response actions. The Designated Person, or his designee, will then determine if the spill is reportable, notify the appropriate Agencies, and provide the information listed on the spill report form in Appendix A.

The spill will be isolated and cleaned up as directed by the Designated Person and/or On-Scene Commander. In general, the procedures to be used are as follows:

- Identify the material spilled and its source;
- Remove all sources of ignition;
- Take appropriate measures to stop the flow of material;
- Quickly determine the size and flow direction of the spill;
- If possible, contain the spill with equipment and materials located within the area;
- Determine if the spill can be handled by Facility personnel or whether an emergency clean-up contractor must become involved;
- Recover spilled material and dispose of properly; and
- Complete the Spill Reporting Form (Appendix A) as directed by the Designated Person and/or On-Scene Commander.

#### A.2.3.2. Spill Response Resources

The necessary response personnel, materials, contractors, and equipment are listed in the Oil Spill Contingency Plan and will be mobilized as needed to respond to each spill. Resources are as follows:

- Emergency Response Personnel - Manage and/or conduct emergency response actions. All emergency response personnel have full authority to implement response actions.
- Emergency Response Contractors - Emergency response personnel utilize emergency response contractors to supplement internal resources.
- Emergency Response Authorities - Emergency response personnel have access to a number of external emergency response authorities who can provide assistance during spill response events.
- Spill Response Equipment and Materials - Various spill response materials are maintained in the area of the Facilities. These materials are stored either at the facility or supplied by contractors and are available for use by Company Emergency Response Personnel and Emergency Response Contractors.

#### A.2.4. Recovered Materials Management [§112.7(a)(3)(v)]

Following an emergency response incident, the On-Scene Commander and any involved contractors will ensure that any material recovered is properly characterized and managed in accordance with applicable regulations. Additionally, following the completion of spill response and cleanup activities,

emergency equipment and supplies will be decontaminated and returned to storage or replaced, as appropriate.

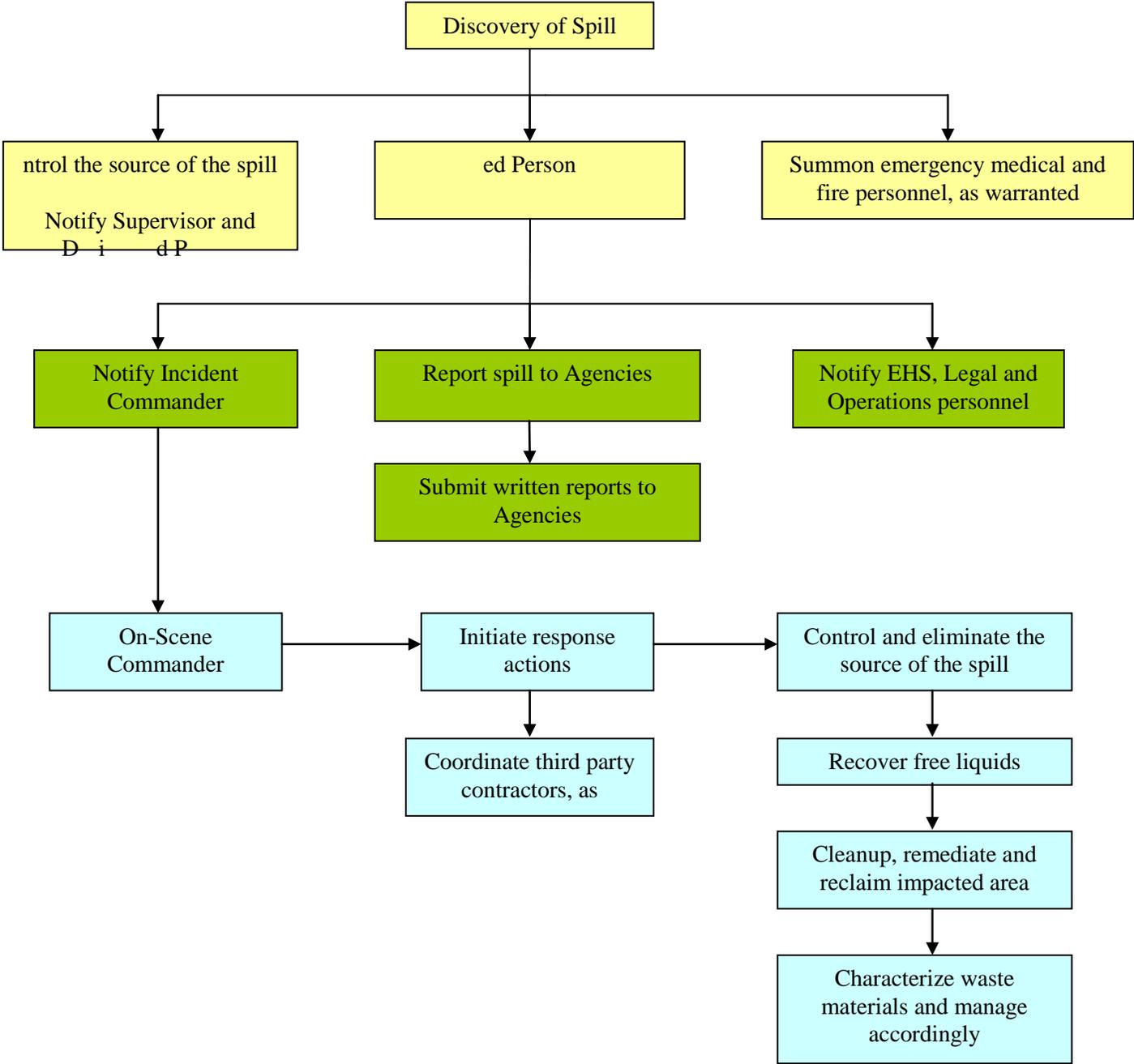
**A.3. Substantial Harm Determination [§112.20]**

A Substantial Harm determination has been conducted for all SPCC Facilities covered by this Part A. A certified Substantial Harm Checklist has been signed and attached as Figure A-2.

**A.4. Facility Response Plan [§112.20]**

In accordance with 40 CFR 112.20, it has been determined that a Facility Response Plan is not required for any SPCC Facility covered by this Part A. To support this determination, a certified Substantial Harm Checklist has been signed and attached as Figure A-2.

**FIGURE A-1  
EMERGENCY RESPONSE FLOWCHART AND RESPONSIBILITIES**



# FIGURE A-2 SUBSTANTIAL HARM CRITERIA CHECKLIST [§112.20]

AREA NAME: Operating Area Name

AREA ADDRESS Area Address Line 1  
City, State

1. Do any of the facilities covered in this plan transfer oil over water to or from vessels and does the facility have a total oil storage capacity greater than or equal to 42,000 gallons?  
 Yes \_\_\_\_\_ No \_\_\_\_\_
  
2. Do any of the facilities covered in this plan have a total oil storage capacity greater than or equal to 1 million gallons and does the facility lack secondary containment that is sufficiently large to contain the capacity of the largest aboveground oil storage tank plus sufficient freeboard to allow for precipitation within any aboveground oil storage tank area?  
 Yes \_\_\_\_\_ No \_\_\_\_\_
  
3. Do any of the facilities covered in this plan have a total oil storage capacity greater than or equal to 1 million gallons and is the facility located at a distance (as calculated using the formula in Attachment C-III, Appendix C, 40 CFR 112 or a comparable formula<sup>1</sup>) such that a discharge from the facility could cause injury to fish and wildlife and sensitive environments? For further description of fish and wildlife and sensitive environments, see Appendices I, II, and III to DOC/NOAA's "Guidance for Facility and Vessel Response Environments" (§10, Appendix E, 40 CFR 112 for availability) and the applicable Area Contingency Plan.  
 Yes \_\_\_\_\_ No \_\_\_\_\_
  
4. Do any of the facilities covered in this plan have a total oil storage capacity greater than or equal to 1 million gallons and is the facility located at a distance (as calculated using the formula in Attachment C-III, Appendix C, 40 CFR 112 or a comparable formula<sup>1</sup>) such that a discharge from the facility would shut down a public drinking water intake<sup>2</sup>?  
 Yes \_\_\_\_\_ No \_\_\_\_\_
  
5. Do any of the facilities covered in this plan have a total oil storage capacity greater than or equal to 1 million gallons and has the facility experienced a reportable oil spill in an amount greater than or equal to 10,000 gallons within the last 5 years?  
 Yes \_\_\_\_\_ No \_\_\_\_\_

### CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document, and that based on my inquiry of those individuals responsible for obtaining information, I believe that the submitted information is true, accurate, and complete.

Certifying Person Name  
 Name (please type or print)

\_\_\_\_\_  
 Signature

Certifying Person Title  
 Title

\_\_\_\_\_  
 Date

\_\_\_\_\_  
 From 40 CFR 112 Appendix C, Attachment C-II

<sup>1</sup> If a comparable formula is used, documentation of the reliability and analytical soundness of the comparable formula must be attached to this form.  
<sup>2</sup> For the purposes of 40 CFR part 112, public drinking water intakes are analogous to public water systems as described at 40 CFR 143.2(c).

## **ATTACHMENT A**

### **FORMS**

Spill Report Form  
Regional Administrator Reporting Form  
Annual Inspection Checklist  
SPCC Drainage Inspection and Discharge Log

**REGIONAL ADMINISTRATOR REPORTING FORM [§112.4(a)]**

When reporting a discharge under 40 CFR 112.4(a), the information listed in the Regional Administrator Reporting Form must be submitted to the Regional Administrator within 60 days. (Check as appropriate)

This Facility has experienced a reportable spill as referenced in 40 CFR Part 112.1(b) of 1,000 gallons (23.8 bbls) or more

This Facility has experienced two (2) reportable spills as referenced in 40 CFR Part 112.1(b) of greater than 42 gallons (1 bbls) each within a 12-month period.

FACILITY NAME AND LOCATION: \_\_\_\_\_  
\_\_\_\_\_

CONTACT PERSON (NAME, ADDRESS/PHONE NUMBER): \_\_\_\_\_  
\_\_\_\_\_

MAXIMUM STORAGE/HANDLING CAPACITY: \_\_\_\_\_

NORMAL DAILY THROUGHPUT: \_\_\_\_\_

CORRECTIVE ACTION/COUNTERMEASURES: \_\_\_\_\_  
\_\_\_\_\_

FACILITY DESCRIPTION (Include maps and facility diagrams as needed): \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

CAUSE OF DISCHARGE/FAILURE ANALYSIS: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

PREVENTIVE MEASURES TAKEN: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
Name (please type or print)

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Title

\_\_\_\_\_  
Date

# SPILL PREVENTION, CONTROL AND COUNTERMEASURE PLAN

Company Name  
Facility or Area Name  
**PART B – FACILITY INFORMATION**

**B.1 FACILITY NAME AND LOCATION [§112.7(a)(3)]**

Facility or Area Name

WINS No: NA

Legal Location (Section / Township / Range)

County/Parish, State

Latitude: Latitude

Longitude: Longitude

Directions to the Facility:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**B.1.1 Designated Person at Facility [§112.7(f)(2)]**

Name: Designated Person Name

Title: Designated Person Title

**B.1.2 Professional Engineer Certification [§112.3(d)]**

By means of this Professional Engineer Certification, I hereby attest to the following:

- I am familiar with the requirements of Title 40, Part 112 of the Code of Federal Regulations (40 CFR 112);
- That I, or my agent, has visited and examined the above referenced Facility;
- That this Spill Prevention, Control and Countermeasure Plan, Parts A and B, (the Plan) has been prepared in accordance with good engineering practice, including applicable industry standards, and with the requirements of 40 CFR 112;
- That procedures for inspections and testing have been established; and
- This Plan is adequate for the Facility.

Date: \_\_\_\_\_

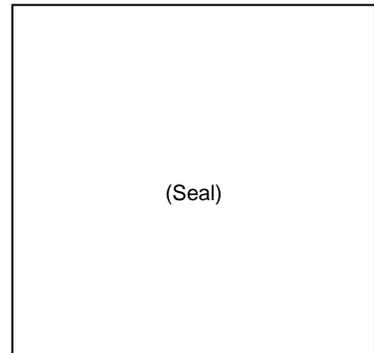
Name: \_\_\_\_\_

Signature: \_\_\_\_\_

Company: \_\_\_\_\_

Registration No.: \_\_\_\_\_

State: \_\_\_\_\_



The Facility recognizes that, in accordance with 40 CFR 112.3(d)(2), engineer certification in no way relieves the Facility of the responsibility to prepare and fully implement the Plan.

## LOG OF PLAN REVIEW AND AMENDMENTS - PART B

### NON-TECHNICAL AMENDMENTS

- Non-technical amendments are not certified by a Professional Engineer.
- Examples of changes include, but are not limited to, phone numbers, name changes, or any non-technical text change(s).

### TECHNICAL AMENDMENTS

- Technical amendments are certified by a Professional Engineer (§112.5(c)).
- Examples of changes include, but are not limited to, commissioning or decommissioning containers; replacement, reconstruction, or movement of containers; reconstruction, replacement, or installation of piping systems; construction or demolition that might alter secondary containment structures; changes of product or service; or addition/deletion of standard operation or maintenance procedures related to discharge prevention measures. It is the responsibility of the field to determine, and confirm with the regulatory authority as necessary, what constitutes a technical amendment. The preamble of the rule states that an amendment is required only “when there is a change that materially affects the facility’s potential to discharge oil” (67 FR 47091).
- An amendment made under this section will be prepared within six (6) months of the change and implemented as soon as possible but not later than six (6) months following preparation of the amendment.
- Technical Amendments affecting various pages within the Plan will require P.E. certification of the Plan and will be documented on the log form below.

### MANAGEMENT REVIEW

- Management will review this SPCC Plan at least every five (5) years and document the review on the form below (§112.5(b)).
- By signature below, signor confirms that management has completed a review and evaluation of this SPCC Plan.

Review/ Amend Date	Signature* (Specify)	Amend Plan (will/will not)	Description of Review/Amendment	Affected Page(s)	P.E. Certification (Y/N)

\*Typically signed by Manager, Professional Engineer or Plan Reviewer

Facility Name: \_\_\_\_\_ Facility Name \_\_\_\_\_

### **B.1.3. Facility Conformance with SPCC Rule [§112.7(a)(1) and (a)(2)]**

This Plan is presented in two parts: (1) a Part A which contains Area-specific information that is associated with all of the Facilities within that Area and (2) a Part B for each Facility in the Area that contains the SPCC information specific to that Facility. Thus, Part A in its entirety is fully incorporated into each Part B and each Part B relies on and incorporates the information contained in Part A. In accordance with 40 CFR 112.7, a Cross-Reference Table is included in Part A of this Plan and indicates which provisions are located in the Part A and/or Part B.

As an onshore natural gas processing facility, the following sections of SPCC regulations apply: Sections 112.1 through 112.8. Section 112.9 does not apply because it addresses onshore oil production facilities. Section 112.10 is not applicable to this Facility and is only applicable to those Facilities where the company is the owner and/or operator of an onshore oil drilling and workover facility. Section 112.11 does not apply because it specifically applies to offshore facilities. Sections 112.12 through 112.15 are not applicable because the Facility does not store, use or process animal fats and oils and greases. Sections 112.20 and 112.21 do not apply because this facility is not required to maintain a Facility Response Plan.

The Facility is in conformance with all applicable requirements specified in 40 CFR 112.7 and 112.9 unless noted in Table B-1.

### **B.1.4. Facility Description [§112.7(a)(3)]**

**EXAMPLE:** Natural gas produced in the surrounding field is routed to the Facility via the gas collection system (Figure B-2). Natural gas enters the Facility through the inlet scrubber, where liquids are gravity separated from the stream. The natural gas is then compressed in three stages from approximately 0.5 pounds per square inch gauge (psig) to 500 psig. Between the second and third stages of compression, the natural gas is diverted to the amine system for the removal of hydrogen sulfide (H<sub>2</sub>S) and carbon dioxide (CO<sub>2</sub>). Diethanolamine is utilized to absorb the H<sub>2</sub>S and CO<sub>2</sub> from the natural gas stream. Once removed from the natural gas stream, the H<sub>2</sub>S and CO<sub>2</sub> are piped to the sulfur recovery system. A modified Claus process is employed to convert the H<sub>2</sub>S into elemental sulfur.

Upon exiting the amine system, the natural gas is routed to the third stage compressors and then to the lean oil system. Lean oil is utilized to absorb the propane, butane and natural gasoline contained in the natural gas stream. Methane and ethane exit the main absorber and are sent to the plant fuel system. The propane, butane and natural gasoline are recovered by heating the lean oil and flashing the mix from the oil.

The mixed propane, butane and natural gasoline stream is combined with third party natural gas liquids and piped to the fractionation system. Following the consolidation of the streams, the new stream enters the caustic system to remove any residual H<sub>2</sub>S and other sulfur compounds. The combined stream is then returned to the fractionation system where propane, butane and natural gasoline products are separated and directed to storage. The three products are trucked offsite.

Triethylene glycol is utilized to remove water vapor from various gas streams at the Facility.

Operations at the Facility are controlled from a centralized control room. A Foxboro computer control system and associated pneumatic controls allow an operator to monitor and adjust the processes from the control room.

#### **B.1.5. Facility Transfer Operations [§112.8(d)]**

##### **B.1.5.1. Buried Piping Protection and Examination [§112.8(d)(1)]**

**Newly installed or repaired buried piping will be wrapped, coated** to minimize corrosion. The buried piping will also be cathodically protected unless it is determined that cathodic protection is not appropriate considering site-specific conditions, facility configuration, and other engineering factors. If cathodic protection is determined infeasible, other protective measures to assess and ensure the continued fitness for service of piping will be implemented. Additionally, any exposed buried piping will be inspected for deterioration and repaired/replaced as appropriate.

##### **B.1.5.2. Not-In-Service and Standby Service Terminal Connections [§112.8(d)(2)]**

If piping is taken out of service or is put in standby service for an extended time, all terminal connections at the transfer point will be capped or blind-flanged, and marked as to origin.

##### **B.1.5.3. Design of Pipe Supports and Protection from Vehicular Traffic [§112.8(d)(3) and (5)]**

Pipe supports are designed to minimize abrasion and corrosion and allow for expansion and contraction of the associated piping. The aboveground piping at the Facility is protected from vehicular traffic.

##### **B.1.5.4. Aboveground Piping and Appurtenance Protection and Examination [§112.8(d)(4)]**

**The Facility's aboveground piping is inspected annually** for wear, failure and leakage. During the course of inspection, valves, joints and other connections will be assessed by the inspector, as well as external pipe supports. The Inspection Checklist included in Part A, Appendix A will be utilized to guide and document the inspection of SPCC Facilities. Completed checklist forms will be maintained in the nearest field office along with the Plan.

**Integrity and leak testing of buried piping must be conducted at the time of installation, modification, construction, relocation, or replacement.**

##### **B.1.5.5. Loading/Unloading Racks [§112.7(h)]**

This Facility is not equipped with loading/unloading racks; therefore this section is not applicable.

#### **B.1.6. Facility Storage and Bulk Storage Containers [§112.7(a)(3)(i), 112.7(i), 112.8(c)(1), (4), (5), (7) and (8)]**

The Facility is equipped with the petroleum product containers listed in Table B-1.

##### **B.1.6.1. Tank Compatibility with Contents [§112.8(c)(1)]**

All containers are compatible with the material stored within and the conditions of storage. See Table B-1 for a listing of each container type.

#### B.1.6.2. Engineer or Update Each Container [§112.8(c)(8)]

'Good engineering practice' for container installations at non-production facilities includes four elements: (1) high liquid level alarms, (2) high liquid level pump cutoff devices, (3) direct audible or code signal communications and (4) a fast response system for determining the liquid level of each bulk storage container. In accordance with 112.8(c)(8), every container installation must be equipped with at least one of four 'good engineering practice' elements. The Facility employs at least one of the above 'good engineering practices'.

#### B.1.6.3. Buried or Partially Buried Metallic Tanks [§112.8(c)(4) and (5)]

If present, buried and partially buried metallic storage tanks will be protected from corrosion through coatings or cathodic protection compatible with local soil conditions.

#### B.1.6.4. Internal Heating Coils [§112.8(c)(7)]

If present, steam and exhaust return lines associated with internal heating coils must be monitored if the system discharges to a waterway. If the system does not discharge to a waterway, then the steam and exhaust return lines must be routed through a settling tank, skimmer or other separation or retention equipment.

#### **B.1.7. Fault Analysis [§112.7(b)]**

Where there exists a reasonable potential for equipment failure, the Plan must include a prediction of the direction, rate of flow and total quantity of oil which could be discharged from each type of failure. For this Facility, potential discharges of oil include container and/or pipe failure and spills. Potential spill sources (equipment), total quantity of oil (capacity), rate of flow (rate) and prediction of the flow path (flow direction) are summarized in Table B-1.

#### **B.1.8. Brittle Fracture Evaluation [§112.7(i)]**

**Field constructed containers must be reevaluated after each repair or change of service to confirm that they are not vulnerable to a brittle fracture failure.** A qualified professional will be secured to do each evaluation and, should risk of brittle fracture be found during evaluation, the container will be repaired or taken out of service and replaced, as appropriate. This reevaluation procedure will be performed in addition to the annual inspections. See Table B-1 for a listing of those containers at the Facility that were field constructed.

#### **B.1.9. Secondary Containment [§112.7(c), §112.7(k) and §112.8(c)(2) and (11)]**

All dikes and berms are constructed of material (i.e. metal, compacted earth, concrete) that is sufficiently impervious to contain oil. Secondary containment is considered practicable for the Facility with the exception of the following:

- Inlet flowlines and some facility piping may not be provided with a means of secondary containment as specified by 112.8. The long distances involved along with physical, geographical and road/fenceline right-of-way constraints make secondary containment impracticable. Furthermore, such permanent containment structures would create land erosion and access problems for landowners.
- Undiked areas within the facility may not be provided with secondary containment due to limited space and/or safety hazards.

Some oil-filled operational equipment may not be provided with secondary containment. Examples of oil-filled operational equipment include, but are not limited to, hydraulic systems, lubricating systems (i.e., those for pumps, compressors and other rotating equipment, including pumpjack lubrication systems), gear boxes, machining coolant systems, heat transfer systems, transformers, circuit breakers, electrical switches, and other systems containing oil solely to enable the operation of the device.

For the equipment and/or areas listed above, an Oil Spill Contingency Plan has been prepared and will be implemented in case of a spill. An inspection and monitoring plan has been established for the oil filled equipment that does not have secondary containment. Drain lines from diked areas or catchment basins must utilize manual open and close valves. Mobile and portable oil storage containers should be positioned within the facility to prevent a discharge. A description of the secondary containment is provided in Table B-1 and in the facility diagram.

#### **B.1.10. Facility Drainage [§112.8(b) and (c)(9)]**

Small quantities of stormwater collected inside berms are typically lost through evaporation. Water accumulated in the secondary containment areas will be inspected prior to discharge to confirm that it does not pose a threat of a harmful discharge. A harmful discharge is defined as one that violates applicable water quality standards or causes a film or sheen upon or discoloration of surface water or adjoining shorelines.

Field drainage systems and road ditches will be visually inspected on a regular basis for accumulation of oil or oil impacted soil. Accumulations of oil will be recovered promptly and placed in the production system or taken to an approved disposal site. Discharges of stormwater will occur using the following procedures:

- Prior to discharge, the water must be visually inspected for the presence of oil or oily sheen. If oil is present, the water cannot be discharged and must be recovered and placed into the production system or taken to an approved disposal site.
- **All discharges of stormwater from secondary containment must be recorded.** The date of the discharge must be noted on the SPCC Drainage Inspection and Discharge Log form.

If the secondary containment is equipped with a drain, the drain must be closed and sealed when it is not in use.



## CONTAINMENT CALCULATION

### Western Side of Facility

Surface flow within the confines of the western side of the Facility is collected by the drainage channels and is then directed to either a Collection Basin or Gully.

#### (1) Calculate Total Containment Capacity

Containment = Length x Width x Height

Collection Basin = 100 ft x 100 ft x 2 ft = 20,000 ft<sup>3</sup>

20,000 ft<sup>3</sup> x 7.48 gal/ft<sup>3</sup> x 1 bbl/42 gal = **3562 bbl**

Gully = 120 ft x 13 ft x 5 ft = 7800 ft<sup>3</sup>

7800 ft<sup>3</sup> x 7.48 gal/ft<sup>3</sup> x 1 bbl/42 gal = **1389 bbl**

#### (2) Calculate Net Containment Capacity

Net Capacity = Total Capacity – Displacement of single largest tank?

Displacement = Footprint (of what?) x Dike Height

No Additional Equipment in Containment Structures

Net Capacity = **3562 bbl + 1389 bbl = 4951 bbl**

#### (3) Calculate Freeboard

Required Freeboard = Storm Event x Dike Footprint

The 24-hour 25-year storm event for the area is expected to produce 2.6 inches (0.22 ft) of precipitation.

0.22 ft x 1100 ft x 550 ft = 133,100 ft<sup>3</sup> (Dimensions of fenced area)

133,100 ft<sup>3</sup> x 7.48 gal/ft<sup>3</sup> x 1 bbl/42 gal = 23,704 bbl

Approximately 20 percent of the runoff is assumed to enter the Collection Basin and Gully via the Drainage Channels, based on Facility topographical features.

Required Freeboard = 23,704 x 0.20 = **4741 bbl**

#### (4) Calculate Excess Containment Capacity

Excess Capacity = Net Capacity – Rain Freeboard – Volume of Largest Container

4951 bbl – 4741 bbl – 45 bbl = **165 bbl of Excess Containment Capacity**

### Eastern Side of Facility

Surface flow within the confines of the eastern side of the Facility is contained by a series of berms, the Evaporation Pit and the Catch Basin.

#### (1) Calculate Total Containment Capacity

Containment = Length x Width x Height

Earthen Berm DS = 190 ft x 60 ft x 1 ft = 11,400 ft<sup>3</sup>

11,400 ft<sup>3</sup> x 7.48 gal/ft<sup>3</sup> x 1 bbl/42 gal = **2030 bbl**

Earthen Berm DS drains to the Evaporation Pit; therefore the berm capacity is limited by the capacity of the pit.

Evaporation Pit = 60 ft x 40 ft x 3.7 ft = 8880 ft<sup>3</sup>

8880 ft<sup>3</sup> x 7.48 gal/ft<sup>3</sup> x 1 bbl/42 gal = **1581 bbl**

Earthen/Concrete Berm LA = 165 ft x 200 ft x 1.7 ft = 56,100 ft<sup>3</sup>

56,100 ft<sup>3</sup> x 7.48 gal/ft<sup>3</sup> x 1 bbl/42 gal = **9991 bbl**

Earthen Berm CB (Catch Basin) = 380 ft x 270 ft x 3 ft = 307,800 ft<sup>3</sup>

307,800 ft<sup>3</sup> x 7.48 gal/ft<sup>3</sup> x 1 bbl/42 gal = **54,818 bbl**

**(2) Calculate Net Basin Capacity**

Net Capacity = Total Capacity – Displacement

Displacement = Footprint x Dike Height

Earthen Berm DS/Evaporation Pit Displacement = No Additional Equipment in Evaporation Pit

Net Capacity = **1581 bbl**

Earthen/Concrete Berm LA Displacement =  $(\pi/4) \times (21.5 \text{ ft})^2 \times 1.7 \text{ ft} = 617 \text{ ft}^3$

$617 \text{ ft}^3 \times 7.48 \text{ gal/ft}^3 \times 1 \text{ bbl}/42 \text{ gal} = 110 \text{ bbl}$

Net Capacity = 9991 bbl – 110 bbl = **9881 bbl**

Earthen Berm CB (Catch Basin) Displacement = No Additional Equipment in Catch Basin

Net Capacity = **54,818 bbl**

Because of the configuration of the berms, once they fill with fluids, they will overflow into the Catch Basin. Therefore, only the Catch Basin capacity can be evaluated. Due to the large amount of equipment within the Facility, a displacement equal to one-third of the surface area (12 inches high) is conservatively assumed. Also, only 80 percent of the surface area is utilized for this evaluation since 20 percent is assumed to be addressed by the western containment structures.

Facility Surface Area Displacement =  $(1100 \text{ ft} \times 550 \text{ ft}) \times 0.33 \times 1 \text{ ft} \times 0.80 = 159,720 \text{ ft}^3$

$159,720 \text{ ft}^3 \times 7.48 \text{ gal/ft}^3 \times 1 \text{ bbl}/42 \text{ gal} = 28,445 \text{ bbl}$

Net Capacity = 54,818 bbl – 28,445 bbl = **26,373 bbl**

**(3) Calculate Freeboard**

Required Freeboard = Storm Event x Dike Footprint

The 24-hour 25-year storm event for the area is expected to produce 2.6 inches (0.22 ft) of precipitation.

$0.22 \text{ ft} \times 1100 \text{ ft} \times 550 \text{ ft} = 133,100 \text{ ft}^3$  (Dimensions of fenced area)

$133,100 \text{ ft}^3 \times 7.48 \text{ gal/ft}^3 \times 1 \text{ bbl}/42 \text{ gal} = 23,704 \text{ bbl}$

Approximately 80 percent of the runoff is assumed to enter the Catch Basin, based on Facility topographical features.

Required Freeboard = 23,704 x 0.80 = **18,963 bbl**

**(4) Calculate Excess Basin Capacity**

Excess Capacity = Net Capacity – Freeboard – Volume of Largest Container

$26,373 \text{ bbl} - 18,963 \text{ bbl} - 837 \text{ bbl} = \mathbf{6573 \text{ bbl of Excess Containment Capacity}}$

## FIGURES

**FIGURE B-1**

**FIGURE B-2 (optional)**

## **Appendix E**

### ***BLM Green River District Reclamation Guidelines and KMG Draft Reclamation Plan***

## **BLM Green River District Reclamation Guidelines**



# United States Department of the Interior

BUREAU OF LAND MANAGEMENT

Green River District

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January 26, 2009

In Reply Refer To:  
3042 (LLUTG00000)

Instruction Memorandum No. GR-2009-002  
Expires: September 30, 2009

To: All Employees

From: Green River District Manager

Subject: Green River District Reclamation Guidelines for Reclamation Plans

The purpose of this memorandum is to formalize the Green River District Reclamation Guidelines, which are to be used when surface disturbing activities occur within the lands managed by the Green River District Office.

Each surface disturbing activity or action, which occurs on public lands managed by the Green River District Office, will be required to have a developed Reclamation Plan that shall reflect the complexity of the project, the environmental concerns generated during project review, and the reclamation potential of the site. The Reclamation Plan will be considered adequate and complete, when the plan addresses in detail the reclamation actions and techniques pertinent to that site. Therefore, the reclamation plan will meet the reclamation objectives described in the Reclamation Guidelines.

Monitoring and documentation of reclamation actions are required elements of the Reclamation Plan. Reclamation actions/techniques should adhere closely to the reclamation actions described in the GRD Reclamation Guidelines. Variances in reclamation actions may be considered for approval, but the reclamation plan should describe in detail how the action/technique will be documented and monitored.

Attachment: GRD Reclamation Guidelines

# *Green River District Reclamation Guidelines*

The Green River District Office Guidelines applies to all surface disturbing activities upon BLM administered surface lands. These activities include all actions authorized, conducted, or funded by the BLM, and that disturb the soil resources on the public lands. This policy is intended to be compatible with other BLM program objectives.

A reclamation plan shall be developed for all surface disturbing activities. The level of detail for the reclamation plan shall reflect: the complexity of the project, the environmental concerns generated during project review, and the reclamation potential for the site. These plans shall also incorporate any program or regulatory specific requirements for reclamation. The reclamation plan will address short term stabilization to facilitate long term reclamation. The reclamation plan is considered complete when all the reclamation requirements described below have been addressed, the techniques needed to meet the reclamation standards are described in detail, and the BLM concurs with the reclamation plan.

Compliance with the requirements of this document will be a Surface Use Condition of Approval (COA) and approved mitigation actions for all future BLM authorizations within the jurisdiction of the Green River District Office.

## A. RECLAMATION GOAL

1. The long term goal for reclamation is to facilitate eventual ecosystem reconstruction by returning the land to a safe, stable, and proper functioning condition.
2. The short-term reclamation goal is to immediately stabilize disturbed areas and to provide the necessary conditions to achieve the long term goal.

## B. RECLAMATION OBJECTIVES

1. Establish a desired self-perpetuating diverse plant community. The objective is to attain **75% basal cover** based on similar undisturbed adjacent native vegetative community, and comprised of desired species and/or seeded species within 5 years of initial reclamation action. However if after three (3) growing seasons there is less than **30%** of the basal cover based on similar undisturbed native vegetative community, then the Authorized Officer may require additional seeding efforts.
2. Establish slope stability and desired topographic diversity.
3. Reconstruct and stabilize altered water courses and drainage features.
4. Ensure the biological, chemical, and physical integrity of the topsoil resource during all phases of construction, operation, and reclamation. BMP's designed to minimize and

prevent erosion, compaction, and contamination of the topsoil resource should be used to maintain the topsoil resource.

5. Re-establish the visual composition and characteristics to blend with the natural surroundings.
6. Control the occurrences of noxious weeds and undesirable invasive species by utilizing principles of integrated weed management including prevention, mechanical, chemical, and biological control methods.
7. Manage all waste materials.
8. Conduct monitoring that is able to assess the attainment or failure of reclamation actions.

### C. RECLAMATION ACTIONS

*The following Reclamation Actions are intended to facilitate the achievement of the Reclamation Objectives. These actions shall be adhered to during reclamation activities.*

*Changes/alterations to the Reclamation Actions should be detailed in the submitted reclamation plan as to why the changes/alterations are necessary and approved by the Authorized Officer.*

#### **Objective 1. Establish a desired self-perpetuating plant community.**

Action 1a. Use of non native plant species is allowed, however, selected non native species should be selected that will not displace or offer long-term competition to the native plants.

Action 1b. Drill Seeding is the preferred method of seed application unless site conditions preclude the use of drill seeding equipment. Drill seeds at the rate of 45 Pure Live Seeds (PLS) per linear foot. Seeds should be drilled to a depth of .25 to .50 inches. Some plant seeds should not be drilled and if incorporated the application method should fit the seed type requirements.

Action 1c. Areas in excess of 40% slope or are excessively rocky will be broadcast seeded at 80-90 PLS and covered to a maximum of .25 inches by harrowing, drag bar, or roller.

Action 1d. Seeding efforts must be conducted between August 15 and prior to winter freezing of the soil.

Action 1e. All seed utilized will be tested prior to application to ensure BLM specifications for PLS, purity, noxious weeds, etc. have been met. Seed tags will be provided to the Authorized Officer prior to initiation of seeding activities.

Action 1f. As determined in cooperation with the Authorized Officer, fencing may be required to exclude livestock/big game grazing until seeded species have become established. Fencing would be constructed to BLM standards.

Action 1g. As determined in cooperation with the Authorized Officer mulching may be required. Mulch should be applied within 24 hours following completion of seeding. Mulching should consist of crimping certified weed-free straw or certified weed-free native grass hay into the soil. Hydro-mulching may be used in areas where crimping is impracticable, in areas of interim reclamation that were hydro-seeded, and in areas of temporary seeding regardless of seeding method.

**Objective 2. Ensure slope stability and topographic diversity**

Action 2a. Reconstruct the landscape to approximate the original contour and topographic diversity.

Action 2b. Identify necessary erosion controls designed to prevent sediment transport from the reclaimed areas.

**Objective 3. Reconstruct and stabilize altered water courses and drainage features.**

Action 3a. Reconstruct drainage basins to have similar features found in nearby properly functioning basins, including: basin relief ratios, valley gradients, sinuosity, and drainage densities for all reclaimed basins.

Action 3b. Reconstruct drainages to have similar hydraulic characteristics found in properly functioning drainages, including: flow depth, water surface top width, cross-section area of flow, water surface slope, mean channel velocity, desired vegetation, and channel roughness.

**Objective 4. Ensure the biological, chemical, and physical integrity of the topsoil resource during all phases of construction, operation, and reclamation. BMP's designed to minimize and prevent erosion, compaction, and contamination of the topsoil resource should be used to maintain the topsoil resource.**

Action 4a. Segregate topsoil from subsoil without mixing them, based on site specific conditions.

Action 4b. Where possible, integrate stored topsoil into existing production landscape.

Action 4c. Stabilize all stored topsoil from erosion, and seed topsoil stored beyond one growing season with an approved seed mixture.

Action 4d. Identify topsoil storage with appropriate signage, to prevent improper use of the stored topsoil.

Action 4e. Redistribute the topsoil to pre-disturbance depth.

Action 4f. Reduce soil/subsoil compaction to the anticipated root depth of the desired plant species. Compaction relief typically should be designed for 18-24 inches in depth. Compaction relief should be designed to create a cross hatch pattern, and distance between furrows should not be greater than 2 feet.

Action 4g. If the topsoil to be re spread is greater than 6" in depth, then topsoil should be applied and then compaction relief implemented. If the topsoil to be re spread is less than 6" , then compaction relief should be implemented prior to top soil application. Avoid leaving large clumps/clods, if this exists, discing may be necessary.

**Objective 5. Re-establish the visual composition and characteristics to blend with the natural surroundings.**

Action 5a. Ensure the overall location, landform, scale, shape, color, and orientation of major landscape features blends into the adjacent area and meets the needs of the planned post disturbance land use.

**Objective 6. Control the occurrences of noxious weeds and undesirable invasive species by utilizing principles of integrated weed management including prevention, mechanical, chemical, and biological control methods.**

Action 6a. Inventory and document noxious and invasive plant infestations before reclamation actions begin.

Action 6b. Control and manage Invasive and Noxious weed infestations using principles of integrated weed management including chemical, mechanical, and biological control methods. An approved Pesticide Use Proposal (PUP) is required for all planned herbicide applications. Herbicides must be applied by a certified applicator with a current Utah Pesticide Applicators License. A Biological Use Proposal is required for new biocontrol agents in the Field Office area.

**Objective 7. Manage all waste materials.**

Action 7a. Segregate all waste materials from the subsoil and topsoil.

Action 7b. All waste materials transported and disposed of off-site, must be placed in an authorized disposal facility in accordance with all local, State and Federal requirements.

**Objective 8. Conduct monitoring that is able to assess the attainment or failure of reclamation actions.**

Action 8a. Monitoring methodology should be an approved BLM method designed to monitor basal vegetative cover.

Action 8b. In cooperation with the Authorized Officer, an undisturbed reference site should be selected prior to monitoring. One reference site may be used for multiple reclamation sites as long the site potentials are similar.

Action 8c. Evaluate monitoring data for compliance with the reclamation plan objectives

Action 8d. Document and report monitoring data and recommend revised reclamation strategies, if necessary. Each applicant will submit an annual reclamation report to the Authorized Officer by March 31<sup>st</sup>. The report will document compliance with all aspects of the reclamation objectives and standards.

Action 8e. Implement revised reclamation strategies as needed.

Action 8f. Repeat the process of monitoring, evaluating, documenting/reporting, and implementing, until reclamation goals are achieved, as determined by the Authorized Officer.

## GLOSSARY

***Surface Disturbing Activities*** – An action that alters the mineral soil resource, and/or surface geologic features, beyond natural site conditions and on a scale that affects other Public Land values. Examples of surface disturbing activities may include: operation of heavy equipment to construct well pads, roads, pits and reservoirs; installation of pipelines and power lines; and the conduct of several types of vegetation treatments. Surface disturbing activities may be either authorized or prohibited.

***Federal Action*** - Approval of specific projects, such as construction or management activities located in a defined geographic area. Projects include actions approved by permit or other regulatory decision as well as federal and federally assisted activities.

*National Environmental Policy Act (NEPA) [42 U.S.C. 4321 et seq.]*

***Invasive Species*** - A species that is not native (or is alien) to the ecosystem under consideration and whose introduction causes or is likely to cause economic or environmental harm or harm to human health.

*Executive Order 13112*

***Reclamation Plan*** – A written document that addresses the reconstruction of disturbed ecosystems by returning the land to a condition approximate or equal to that which existed prior to disturbance, or to a stable and productive condition compatible with the land use plan.

***Waste materials*** – Any material that can interfere with successful reclamation, safety, and long term stability of a site (contaminated soil or water, drilling muds, solid waste).

*Adapted from various sources*

***Contamination*** - The presence of man-made chemicals or other alterations in the natural soil or water environment (pesticides, hazardous substances, petroleum, salts).

*Adapted from various sources*

## **KMG Draft Reclamation Plan**

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## **1. Introduction**

- 1.1 For the purposes of this Program, Reclamation is defined as the process of returning lands that have been disturbed to a condition that will meet specified regulatory requirements and other binding agreements. Anadarko's Reclamation Program establishes the expectations, conditions, guidelines and performance standards for reclamation following company activities.
- 1.2 Anadarko operates in multiple regulatory jurisdictions with various reclamation requirements. This document has been prepared to allow flexibility in order to comply with the various agency requirements.
- 1.3 This document does not modify government regulatory requirements, other internal reporting requirements outside of Environmental, Health and Safety (EHS) and Operations, or any specific binding agreement (e.g., lease obligations, surface use agreements).

## **2. Applicability**

- 2.1 The Federal Land Policy Management Act of 1976 (FLPMA) mandates that the public lands be managed in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archeological values.
- 2.2 This Program applies to disturbed lands on federal-owned surfaces, state-owned surfaces and privately-owned surfaces. Reclamation should be conducted on disturbed surface that is not necessary for continued production and operation.
- 2.3 Typical areas requiring reclamation covered under this Program include:
  - Well Locations
  - Transportation Corridors (e.g., roads)
  - Pipelines / Flowlines
  - Right-of-Ways (ROWs)
  - Pits/Reservoirs
  - Utility Corridors (e.g., water, electricity, communication)
  - Facilities (e.g., compressor stations, tank batteries)

## **3. Goals and Objectives**

- 3.1 By implementing a Reclamation Program, it is Anadarko's goal to maintain stewardship to the environment, foster good-will with federal, state and local

regulatory agencies, be a “good neighbor” with surface owners, and comply with all applicable regulations.

- 3.2 Stabilization (Short-Term) Reclamation – The objective of Short-Term Reclamation is to stabilize a disturbed area, protect adjacent areas from undue degradation during construction and development phases and reduce the cost and effort of Interim and Final Reclamation.
- 3.3 Interim (Long-Term) Reclamation – The objective of Interim Reclamation is to shape, stabilize, re-vegetate, or otherwise treat disturbed areas in order to provide a self-sustaining and productive use of the land during production operations.
- 3.4 Final Reclamation – After production and operations cease, the goal of final reclamation is to return the land to a condition that approximates that which existed prior to disturbance and maintain a stable and productive condition compatible with the land use.

#### **4. Responsibilities**

- 4.1 Production Superintendents – Production Superintendents are accountable for assuring compliance with this Program.
- 4.2 Operations Department – The Operations Department will be responsible for, topsoil management, minimizing disturbance, and stabilization of disturbed soil throughout project and facility development and operation.
- 4.3 Regulatory Department – The Regulatory Department is responsible for permitting, notice of intent, subsequent reports of activities and final abandonment. The appropriate environmental or reclamation analyst should be contacted to follow up any onsite inspections.
- 4.4 Regional EHS Department – The Regional EHS Department is responsible for designing, implementing, monitoring and tracking the progress of reclamation including erosion and weed control measures. The Regional EHS Department will also provide the necessary training to the Operations Department.

#### **5. Pre-Construction and Pre-Disturbance Activities**

- 5.1 Reclamation begins prior to surface disturbing activity commencement.
- 5.2 A Baseline Vegetation Survey may be conducted prior to soil disturbing activity. The inventory should include the species composition, cover and density. This

- inventory will aid in the selection of a suitable seed mix and aid in determining when final reclamation is complete.
- 5.3 Preliminary site information may be gathered prior to any soil disturbing activity. This information may include, but is not limited to, weeds and soil conditions, precipitation maps, soil survey maps, county maps, land use maps, topographic maps, survey plats of the proposed project, and an outline of impacts.
- 5.4 The Bureau of Land Management's (BLM's) placement Best Management Practices (BMPs) for Fluid Mineral Operations should be considered. Examples of placement BMPs include the following.
- Locations should be selected that will minimize disturbance. The disturbed area should be large enough to conduct a safe drilling and production operations. Use existing roads whenever possible. Site access should be planned for the minimum width.
  - Use corridors when possible, (one route for the power line, pipeline, and access road).
  - Consolidating and reducing facility size.
- 5.5 The selection of the best soil erosion and sediment controls for the specific site should be primarily based on the nature of the construction activity and the conditions that exist at the site. Minimum BMPs that should be utilized at each site include:
- Minimize the amount of soil disturbed and preserve existing vegetation,
  - Prevent soil (or sediment) movement from leaving the original location within the construction site by the proper installation of erosion controls,
  - Complete scheduled inspection as required by the Storm Water Pollution Prevention Plan (SWPPP), and
  - Maintain erosion and sediment control until vegetation has been re-established.
- 5.6 Prior to site disturbing activities Operations, Regulatory, and EHS Departments should meet to discuss:
- An outline of expectations to operation personnel and contractors
  - Safety issues
  - Top soil management
  - Review BMPs for erosion control, soil stabilization, and Short-Term Reclamation
  - Review of any site specific Conditions of Approval

## **6. Short-Term Reclamation**

- 6.1 Short-Term Reclamation commences as soon as soil disturbing activities begin up to completion of construction and drilling activity.
- 6.2 Soil erosion and sediment controls may be implemented to reduce the amount of soil that is carried off-site and to reduce the disturbance of the top soil.
- 6.3 Topsoil is an important component of the reclamation process. Topsoil is typically the most fertile portion of soil. Minimal topsoil disturbance will aid in the reclamation process. Whenever possible, the first 6 to 12 inches of top soil should be side cast (never piled) for replacement at a later date. The salvaged topsoil should be applied as soon as possible to the area being reclaimed and generally within one year. A more detailed description of topsoil management can be found in the Handbook of Western Reclamation Techniques (see Section 15, References).

## **7. Long Term Reclamation**

- 7.1 Long -Term Reclamation can occur during production operations. The long-term reclamation of an area helps stabilize and reduce final reclamation costs. Examples of long-term reclamation are listed below.
- Utility corridors should be backfilled and re-vegetated.
  - The size of the well site should be reduced, if possible, to the area that is necessary for safe ongoing operation. Un-used areas at the well site should be re-vegetated.
  - Linear features along side roads, such as borrow ditches and utility corridors should be re-vegetated. In some cases roads may be narrowed and the un-needed portions re-contoured and re-vegetated.
  - Pits, when possible should be closed and backfilled. The surface area re-contoured and re-vegetated.
- 7.2 A complete description of long-term reclamation projects can be found in the Bureau of Land Management's Goldbook and the Handbook of Western Reclamation Techniques (see Section 15, References).

## **8. Final Reclamation**

- 8.1 Final Reclamation can generally be judged complete when the landscape features meet the post-disturbance land use and vegetation shows signs of being self-

sustaining, vigorous, diverse, and established with a density sufficient to retain fundamental resources.

- 8.2 All disturbed areas, including well pads, access roads, pipeline ROWs, should be reclaimed per the surface owner standards and /or requirements.
- 8.3 Final reclamation may include re-contouring the area to its original contour, seeding, controlling noxious weeds, and other reclamation practices described in the Handbook of Western Reclamation Techniques (see Section 15, References).
- 8.4 Reclamation activities will be considered complete when applicable standards have been met, when vegetation has reached a minimum of 75 percent of background vegetation (undisturbed areas), or as approved by surface owner.
- 8.5 Once Final Reclamation has been achieved, the appropriate regulatory agencies should be notified. For example,
  - BLM and/or Bureau of Reclamation – Sundry (Final Abandonment Notice)
  - State Departments of Environmental Quality – Notice of Termination
  - State Oil & Gas Conservation Commissions – Bond release
  - Landowners – Cessation of surface use payments

## **9. Seeding and Re-vegetation**

- 9.1 The goal of seeding is to re-vegetate and stabilize a disturbed site. The result of seeding should be a self-sustaining community of perennial vegetation.
- 9.2 Seeding and re-vegetation is a component of short-term, long-term, and final reclamation.
- 9.3 Seeding should occur as quickly as possible during the first appropriate seeding season.
- 9.4 The seed mix selected for re-vegetation should include a diverse mix of perennial species specified by the surface management agency or surface owner and are adapted to the region and consistent with the current land use. The seed mix selection should be guided by experiences in similar location and observation of undisturbed vegetation in the area and at the discretion of the surface owner.
- 9.5 Certified weed free seed mix should be used. Seeding rates can be calculated using the Natural Resource Conservation Service's Technical Notes Reading Seed Packaging Labels and Calculating Seed Mixtures (see Section 15, References).

- 9.6 The methodology for seeding should generally be site specific. The methodologies for seeding techniques are described in the Handbook for Western Reclamation Techniques and Dryland Pastures in Montana and Wyoming (see Section 15, References).
- 9.7 Predatory grazing on areas being newly established should be avoided if possible.

## **10. Monitoring and Performance Assurance**

- 10.1 Monitoring is the orderly and quantitative collection, analysis and interpretation of resource data to evaluate progress toward a goal.
- 10.2 The purpose of monitoring is to assess and assure performance and in progression toward final reclamation.
- 10.3 Monitoring methodologies and frequency generally should be scientific, according to surface use agreements, Bureau of Land Management (BLM) methodology, other regulatory requirements, or according to the project Conditions of Approval document.
- 10.4 Monitoring should continue until at least 75 percent or greater of vegetation, as compared to surrounding undisturbed areas, is established. If after two growing seasons, progression toward this standard has not been accomplished, further site evaluation may be necessary to determine if re-seeding or other actions are required to improve reclamation success.
- 10.5 Geospatial databases should be used to track the reclamation process. Data that should be tracked includes, but not limited to the following.
- Areas of disturbance
  - Seeding data
  - Vegetation progress
  - Construction information
  - Inspection information
  - Well Data
  - Weed Data

## **11. Training**

- 11.1 Awareness training of this Program should be conducted by the Regional EHD Departments for the Operations Group. Individuals with responsibilities involving construction and surface disturbing activities may receive additional training beyond awareness training.

11.2 Training of field level personnel will take place at the following frequency:

- A. Initial Training will involve awareness of the Reclamation Program.
- B. Refresher Training will be conducted on an annual basis.

11.3 Training topics can include, but are not limited to:

- Weeds
- Top soil management
- Reclamation practice
- Erosion control

## **12. Relationship to Contractual Agreements**

12.1 Nothing contained in this Program document shall be construed as altering in any way the rights, duties, and/or obligations contained in any applicable contract or master service agreement (Contract) between parties. Where a conflict arises between this Program document and the Contract, the language in the Contract will be controlling.

## **13. Relevant APC Programs**

13.1 The following Programs are referenced within the Anadarko Reclamation Program:

- A. Applicable Stormwater Pollution Prevention Plans (SWPPP)
- B. The Reasonable and Prudent Practice (RAPPS) for Stabilization of Oil & Gas Construction Sites.

## **14. Document Management**

14.1 Reclamation documentation forms, information, and data will be retained in Anadarko Field and/or Regional office files in accordance with the Anadarko Records Retention Policy (DRM-1).

## 15. References

### 15.1 U.S. Federal Regulations

A. 43 CFR §3160, *Bureau of Land Management – Onshore Oil and Gas Operations*.

### 15.2 Oil and Gas – Surface Operating Standards for Oil and Gas Exploration and Development (Gold Book).

15.1 Handbook of Western Reclamation Techniques – Second Edition. 2006.

15.1 Draft - Solid Minerals Reclamation Handbook.

15.1 Natural Resource Conservation Service's Technical Notes – Wyoming. Reading Seed Packaging Labels and Calculating Seed Mixtures. June 2001.

15.1 Guidebook to the Seed of Native and Non-Native Grasses, Forbs and Shrubs of the Great Basin. U.S. Department of the interior, Bureau of Land Management. 2005.

15.1 Dryland Pastures of Montana and Wyoming; Montana State University Extension Service, 2003

**Appendix F**  
**Soil Mapping Data**

## Appendix F

### Detailed Soil Mapping Unit Information for the SSURGO Survey Area within the GNBPA

Unit	Area (acres)	% of Area	Soils	Slopes	% Comp	Landscape Position	Constraint Category
154	19,309.5	15.71%	Motto-RO Complex	2>25	75 - 10	Structural bench, hill / Escarp, cliff	High
36	16,390.6	13.34%	Cadrina ext stl-RO Complex	25>50	65 - 20	Hill / Escarp, ledge, eros rem, cliff	High
126	13,602.6	11.07%	Lanver-Walknolls aassoc	2>25	50 - 35	Plateau / Hill	High
62	9,500.0	7.73%	Crustown-Motto Complex	2>25	50 - 35	Hill / Structural bench, hill	High
266	8,881.7	7.23%	Walknolls-Uendals assoc	2>25	55 - 30	Hill / Hill	High
159	7,073.5	5.76%	Muff-Cadrina, Cool assoc	1>25	50 - 35	Strath terrace / Hill	High
12	6,613.4	5.38%	Badland-RO complex	1>100	50 - 35	Eros rem, hill, ridge / Escarp, cliff	High
152	5,804.1	4.72%	Motto-Casmos complex	2>25	55 - 30	Structural bench, hill / Hill	High
38	5,317.7	4.33%	Cadrina-Casmos-RO complex	2>40	40-30-15	Hill / Hill / Escarp, ledge, eros rem, cliff	High
13	3,833.4	3.12%	Badland-Tipperary assoc	1>8	60 - 25	Eros rem, hill, ridge / Structural bench	High
264	3,757.4	3.06%	Walknolls-RO complex	2>50	75 - 15	Hill / Escarp, ledge, eros rem, cliff	High
33	3,451.1	2.81%	Cadrina assoc	2>25	55 - 30	Hill	High
80	3,397.8	2.76%	Gilston-Muff-Cadrina, Cool compl	1>25	30-30-30	Drainageway / Strath ter / Hill	High
262	2,967.4	2.41%	Walknolls-Gilston assoc	2>25	55 - 35	Hill / Drainageway	High
14	2,603.0	2.12%	Badland-Walknolls-RO complex	50>90	50 - 35	Eros rem, hill, ridge / Hill / Escarp, cliff	High
42	2,525.7	2.06%	Casmos-Cadrina-Badland comp	4>25	35-30-20	Hill / Hill / Escarp, ledge, eros rem, cliff	High
120	1,501.6	1.22%	Jenrid sandy loam	0>2	85	Alluvial flat	Medium
179	1,324.2	1.08%	Pherson-Hickerson complex	1>8	45 - 40	Drainageway / Flood plain, alluv flat	Medium
121	1,112.3	0.91%	Jenrid -Eghelm complex	0>3	60 - 25	Alluvial flat / Flood plain	Medium
173	1,021.3	0.83%	Pariette gravelly sandy loam	2>8	85	Strath terrace, fan remmant	Medium
113	899.3	0.73%	Ioka gravelly sandy loam	0>3	85	Alluvial flat	Low
158	458.0	0.37%	Muff gravelly sandy loam	2>8	85	Strath terrace	High
241	365.2	0.30%	Turzo complex	2>4	60 - 25	Alluvial flat	Medium
242	261.2	0.21%	Turzo loam	0>4	85	Alluvial flat	Medium
79	233.7	0.19%	Gilston-Chalkcliff assoc	2>25	50 - 40	Drainageway / Fan remnant	High
285	206.2	0.17%	Water				
	488.8	0.40%	12 minor map units comprised of soils, riverwash, and rock outcrop				Low to High
<b>TOTAL</b>	122,900.7	100.00%					