

Appendix G

Huntington Valley Reclamation Plan



**U.S. Department of the Interior
Bureau of Land Management**

RECLAMATION PLAN

**Noble Energy Inc.
Huntington Valley Oil and Gas Exploration Project**

May 2014

Location: Elko County, Nevada

PREPARED FOR:

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Noble Energy Inc. (Noble) will be implementing an oil and gas exploration project in the Huntington Valley Project Area near Jiggs, Elko County, Nevada. This reclamation plan is designed to meet the standards set by the Bureau of Land Management (BLM) and will be in accordance with State of Nevada Division of Environmental Protection laws and regulations. Site specific reclamation plans will be completed at the time the site specific use plan is submitted. The Project Area description (below) provides much of the setting for these site specific use plans. These plans will be submitted as part of and approved through the APD or ROW processes.

1. Project Area Description

The Huntington Valley Project Area is approximately 63,495 acres, including Sections 25 and 36, T. 31 N., R. 55 E., Sections 27-34, T. 31 N., R. 56 E., Sections 1, 12-13, 24-25, and 34-36 T. 30 N., R. 55 E., Sections 3-10, 15-22, 27-35 T. 30 N., R. 56 E., Sections 1-3, 10-15, 22-27, and 34-36 T. 29 N., R. 55 E., Sections 2-11, 14-23, and 26-35, T. 29 N., R. 56 E., Sections 1-3 T. 28 N., R. 55 E., and Sections 2-6 T. 28 N., R. 56 E. The northeastern portion of the Project Area encompasses the town of Jiggs, Nevada. Huntington Creek and Smith Creek intersect the Project Area from the north.

Approximately 55 percent (34,947 acres) of the Project Area is within lands managed by the Bureau of Land Management (BLM) – Tuscarora Field Office; Elko District Field Office. The Project Area has approximately 28,548 acres (45 percent) on private land. Elevation within the Project Area ranges from 5,400 to 5,800 feet above sea level. Topography is variable and is comprised of lower elevation riparian areas used for agriculture, rolling hills, drainages, and sandy erodible hilltops. Sagebrush communities dominate the majority of the landscape.

1.1. Vegetation

Vegetation is primarily comprised of Wyoming big sagebrush (*Artemisia tridentata wyomingensis*) grasslands. Lesser landform coverages include hay fields dominated by orchardgrass (*Dactylis glomerata*), juniper (*Juniperus osteosperma*) with Wyoming big sagebrush, and basin big sage (*A. tridentata tridentata*). Cheatgrass (*Bromus tectorum*) is prevalent and crested wheat grass (*Agropyron cristatum*) has been recorded in several areas.

1.2. Soils

Soils of the Project Area have been classified by the Natural Resources Conservation Service (2009), and are included in the Soil Survey Geographic (SSURGO) database. The NRCS has identified 40 soil series in the Project Area (Table 1), with the following soil series being most common: Dacker-Zevadez-Kelk, Wieland-Enko, and Hunnton-Wieland-Wieland-moderately steep associations.

Table 1
Soil series present within the Huntington Valley Project Area in
Elko County, based on USDA-NRCS SSURGO soils data (NRCS, 2009)

MU Key	Soil Series	Acreage	Project Area %
21	Betra-McIvey-Heechee association	130.3	0.2
403	Bilbo-Shivlum-McIvey association	257.8	0.4
283	Bloor-Connel-Kelk association	1,514.3	2.4
331	Bunky-Grina-Enko association	1,961.0	3.1
374	Chiara-Wieland-Enko association	4,302.4	6.7
512	Dacker-Zevadez-Kelk association	8,419.9	13.4
443	Devilsgait-Sonoma association	41.7	0.1
440	Devilsgait-Woofus-Devilsgait- gravelly substrate association	939.4	1.5
457	Donna-Gochea-Kleckner association	376.0	0.6
228	Enko-Kelk association	3,910.7	6.2
226	Enko-Rad association	3,224.0	5.1
222	Enko-Zevadez-Puett association	3,237.3	5.1
323	Grina-Kelk-Orovada association	27.8	0.0
324	Grina-Samor association	59.7	0.1
206	Hopeka-Grina-Izod association	304.1	0.5
631	Hunewill-Bilbo-Devils gait association	79.3	0.1
481	Hunnton-Chiara association	71.4	0.1
486	Hunnton-Chiara-Wieland association	0.7	0.0
489	Hunnton-Wieland-Bioya association	513.9	0.8
480	Hunnton-Wieland-Gance association	1,023.9	1.6
485	Hunnton-Wieland-Wieland- moderately steep association	6,146.8	9.7
650	Karpp-Chiara-Rad association	8.7	0.0
651	Karpp-Chiara-Wieland association	2,270.0	3.6
146	Kelk-Bloor-Ocala association	379.6	0.6
145	Kelk-Ocala-Moranch association	993.3	1.6
149	Kelk-Sonoma association	1,264.3	2.0
110	Moranch-Ocala-Orovada association	706.4	1.1
251	Ocala-Kelk-Devilsgait association	143.2	0.2
490	Orovada-Bioya-Haybourne association	1,824.0	2.9
163	Sonoma- freq. flooded-Devilsgait-Sonoma association	1,534.2	2.4
162	Sonoma-Hussa association	1.3	0.0
460	Stampede-Betra-McIvey association	907.2	1.4
467	Stampede-Donna-Gance association	971.8	1.5
465	Stampede-Gochea-Zevadez association	704.9	1.1
W	Water	87.6	0.1
693	Welch-Woofus association	1,342.4	2.1
1271	Wieland-Enko association	7,629.8	12.0
1278	Wieland-Kelk-Wieland- moderately steep association	1,232.0	1.9
839	Woofus-Tweba-Devilsgait association	3,465.1	5.5
135	Zevadez-Enko-Puett association	1,486.8	2.3
Total		63,495.0	100.0

1.3. Ecological Sites

The Huntington Valley Project Area is comprised of ecological sites defined by the NRCS (2009) (Table 2). A loamy 8-10 inch precipitation zone ecological site dominates 75 percent of the Project Area. Soils in this ecological site are comprised of mostly well-drained, clayey or loamy, Mollisols (NRCS, 2006). Other lesser dominant sites include Moist Floodplain, Dry Floodplain, and Loamy 10-12 inch precipitation zone.

Table 2
Ecological Soil Sites Present within the Huntington Valley Project Area
in Elko County, Based on USDA-NRCS SSURGO Soils Data (NRCS, 2009)

Ecological site	Ecological Site Number	Acreage	Project Area %
Dry Floodplain	R024XY006NV	3,916.5	6.2
Saline Bottom	R024XY007NV	379.6	0.6
Sodic Flat 8-10 inch precipitation zone	R024XY008NV	706.4	1.1
Saline Meadow	R024XY009NV	1,534.2	2.4
Juniper/ Association ¹	R024XY059NV	4,446.2	0.1
Pine Association ²	R024XY060NV	1,342.3	0.5
Moist Floodplain	R025XY001NV	260.3	7.0
Loamy Bottom 8-14 inch precipitation zone	R025XY003NV	2,975.7	2.1
Loamy Slope 12-16 inch precipitation zone	R025XY012NV	133.3	0.4
Loamy 10-12 inch precipitation zone	R025XY014NV	47,340.2	4.7
Claypan 12-16 inch precipitation zone	R025XY017NV	68.4	0.2
Loamy 8-10 inch precipitation zone	R025XY019NV	304.2	74.6
Water		87.7	0.1
	Total	63,495.0	100.0

¹Juniperus osteosperma/Artemisia tridentata ssp. wyomingensis/Pseudoroegneria spicata ssp. spicata-Achnatherum thurberianum

²Pinus monophylla-Juniperus osteosperma/Artemisia nova/Pseudoroegneria spicata ssp. spicata-Achnatherum hymenoides

1.4. Geomorphologic Landforms

The most common landforms are floodplains, comprising 86 percent of the Project Area (Table 3). The remaining landforms include fans, fan piedmonts, fan remnants, and fan skirts. Floodplains are classified as nearly level ground adjacent to streams prone to inundation under flooding conditions. Areas classified by the NRCS as fan remnants are remaining parts of older fan landforms. Fan skirts are lower lying areas, formed by water runoff throughout upland areas.

Table 3
Geomorphologic landforms present within the Huntington Valley Project Area
in Elko County, based on USDA-NRCS SSURGO soils data (NRCS, 2009)

Landforms	Acres	Project Area %
Fans, Fan Piedmonts, Fan Remnants, Fan Skirts	8,838.5	13.9
Floodplains	54,656.5	86.1
Total	63,495.0	100

1.5. Climate

The majority of the Huntington Valley Project Area is nearest to the NOAA Jiggs, Nevada weather station. The highest precipitation months are January, March, and May. Total average annual precipitation, according to the 30 year average, is 32 centimeters (Western Regional Climate Center: <http://www.wrcc.dri.edu/>). Restoration success is often erratic on sites that receive 25 cm or less precipitation annually; climatic conditions during the reclamation process will likely exert an overriding effect on the success of the reclamation efforts (Call and Roundy 1991, Holechek et al., 2010, Roundy 1999).

1.6. Grazing Units

There are 15 grazing allotments present within the Huntington Valley Project Area, summarized in Table 4 (USDI-BLM 2006). Acreages listed in Table 4 are the total number of acres in public land allotments.

Table 4
Grazing Allotments on Public Land Present within
the Huntington Valley Project Area¹

Allotment	Total Allotment Public Acreage	Allotment Public Acreage in Project Area
Crane Springs	21,691	24
El Jiggs	46,716	4,598
Willow	5,238	4,508
Wilson FFR	1,398	362
Willow Creek Pockets	6,684	3,895
Cottonwood Seeding FFR	62	60
Hansel	7,781	267
Merkley-Zunino Seeding	1,950	1,961
Achurra Seeding	2,529	2,490
Barnes Seeding	3,932	3,345
Robinson Mountain	18,661	3,612
Corta FFR	60	25
Frost Creek	10,613	4,919
Corral Canyon Seeding	2,059	956
Robinson Creek	17,263	1,203
Total	146,637	32,225

2. Proposed Activities

The primary activities proposed in the Project Area will be exploratory oil and gas drilling (Noble, 2014). Depending on well pad selection (20 of 39 potential wells sites will be developed), the proposal could include up to 311.8 acres of surface disturbance including 120.0 acres of well pads, 13.13 miles of disturbance along existing roads that will be upgraded, and the

potential construction of up to 17.79 miles of new roads. Existing roads will be utilized as much as possible, minimizing the need for new road construction.

3. Reclamation Objectives

The long-term objective of reclamation is to return the land, following use for energy exploration, to a condition approximating that which existed prior to disturbance. This includes restoration of the landform and natural vegetative community, hydrologic systems, visual resources, habitat, and forage. Reclamation will be considered successful when the site is recontoured and stabilized, protected from erosion, and revegetated with a self-sustaining, vigorous, diverse, native (or otherwise approved) plant community that maintains ecological resilience and the integrity of natural processes.

At a minimum, the established plant community will consist of species included in the seed mix and/or desirable species which occur in the surrounding natural vegetation. Permanent vegetative cover will be determined successful when the basal cover of desirable perennial species is at least 80 percent of the basal cover of the adjacent undisturbed area or of potential basal cover as defined in the National Resource Conservation Service Ecological Site(s) for the area.

Operators and right-of-way holders are required to meet reclamation performance standards. Successful compliance with standards and meeting of objectives will be determined by the BLM. If revegetation is unsuccessful, subsequent treatments and reseeding will be required until objectives are met.

4. Reclamation Schedule

4.1. Interim Reclamation

Interim reclamation will be conducted concurrently with exploration. Disturbed areas will undergo interim seeding as soon as possible during the period optimal for seeding (generally October 1-March 1). These disturbed areas could include: completed pad construction, topsoil storage berms, storm water control features, temporarily disturbed areas along roads and pipelines, and cut and fill slopes. The goal of interim seeding would be to stabilize materials, maintain biotic soil activities, and minimize weed infestations. If interim revegetation is unsuccessful, additional prep and reseeding will be completed annually until standards are met.

Within 6 months following completion of the last well planned on a pad, or after a year has passed with no new wells drilled, interim reclamation will be completed to reduce the well pad to the smallest size needed for production. The interim reclamation timeline can be extended at the discretion of the BLM Authorized Officer to prevent unnecessary reclamation. Trash and equipment unnecessary to production operations will be removed immediately.

4.2. Final Reclamation

Final reclamation will be initiated within no more than 1 year following plugging and abandonment of the final well on pads no longer having a producing well. All equipment, facilities, and trash will be removed from the location immediately following plugging and abandonment. Roads that are no longer essential to the proposed activities will also undergo final reclamation within 1 year. Prior to final reclamation, an inspection of the disturbed area will be

held to review the existing reclamation plan or agree to an updated plan. Seed tags will be submitted for BLM approval at least 14 days before proposed seeding date. The BLM will be notified at least 48 hours prior to commencing final reclamation work and within 48 hours of completion of reclamation work.

For both Interim and Final Reclamation, earthwork and revegetation are limited by the time of year during which they can be effectively implemented. Site conditions and yearly climatic variations may require that the proposed schedule be modified to achieve revegetation success. Interim and Final Reclamation will be ongoing until reclamation objectives are met or the BLM’s Authorized Officer determines reclamation efforts have been sufficient. It is possible that these sites will need to be monitored for 5 years or more before they achieve reclamation objectives. Monitoring will end once reclamation standards have been met.

**Table 5
General Final Reclamation Schedule**

TECHNIQUES	Quarter				Year(s)
	1 Jan-Mar	2 Apr-Jun	3 Jul-Sep	4 Oct-Dec	
Soil Surface Restoration					Within 1 year of project completion
Seeding					Within 1 year of project completion
Monitoring					5 years following reseeded

5. Reclamation Requirements

The requirements listed in Chapter 519A – *Reclamation of Land Subject to Mining or Exploration Projects* (NAC 519A) are designed to facilitate successful reclamation.

Requirements include:

1. Manage waste materials.
2. Ensure subsurface integrity (geology & hydro-geology).
3. Ensure biological, chemical, physical integrity of soil.
4. Re-establish stable water courses and drainage features.
5. Blend visual composition with surroundings.
6. Re-establish slope stability and topographic diversity.
7. Prepare site to meet the needs for plant establishment.
8. Re-establish desired, self-perpetuating plant community.
9. Prevent introduction/establishment of invasive plants.
10. Implement a monitoring and management protocol.

Operators are obligated to follow requirements 1-5 from the initiation of proposed activities. Requirements 6-10 will be completed concurrent with Interim and Final Reclamation.

5.1. Waste Materials

All waste materials will be managed according to Best Management Practices. Product and wastes would be containerized or otherwise stored such that precipitation or run-off would not come in contact with any industrial, petroleum or chemical material. Equipment will be properly maintained to reduce the possibility of leaks and hose ruptures. In the event of a discharge or spill, cleanup procedures will be implemented immediately to ensure that no materials would be available for transport by stormwater run-off. All drilling fluids will be directed to tanks (part of the closed loop system) eliminating the possibility to enter drainages. Drill cuttings and fluids will be contained on site within the closed loop drilling system.

Contaminated soil will be segregated, treated, and/or bio-remediated, following guidance from the BLM. The BLM will be notified if contamination occurs. The BLM must authorize any waste materials to be buried on site. Similarly, the disposal of waste (including trash) off site will be to an authorized disposal facility. All hazardous waste material identified by the Comprehensive Environmental Response Compensation Liability Act (CERCLA) removed from the site will be disposed of at a hazardous waste facility that is approved by the U.S. Environmental Protection Agency (Noble, 2014).

5.2. Sub-surface Integrity

Noble will ensure the integrity of sub-surface resources by plugging drill holes and surface openings, and filling/capping any other openings to ensure that contamination of ground and surface water does not occur. Dry hole markers will be subsurface, to prevent their use as perching sites by raptors. Noble will prepare a Spill Prevention Plan and a Storm Water Pollution Prevention Plan with the approval of the state regulator agency and BLM (Noble, 2014).

5.3. Soil Integrity

Topsoil will be stripped following removal of vegetation during construction of well pads, roads, or other surface facilities. This will include all growth medium - at a minimum, the upper 2-6 inches of soil - but will also include stripping of any additional topsoil present at a site, such as indicated by color or texture. Stripping depth may be specified during the onsite inspection. Stripped topsoil will be stored separately from subsoil or other excavated material. Contractors will reference the site-specific document to determine salvage strategies.

Topsoil will not be piled more than 10 feet high, as the resulting compaction and anaerobic conditions can result in soil degradation (Ghose, 2001). Precautions will be taken to protect soil from erosion, degradation and contamination, including covering piles with mulch, and diverting water runoff around piles. If mulching is necessary, a certified weed-free straw or hay mulch will be applied (Noble, 2014). Topsoil piles will be labeled to avoid confusion. Soil that will be stored for more than one growing season will be seeded with short-lived species to compete against weeds in accordance to NAC 519A.325. Early successional natives such as bee plant or slender wheatgrass are recommended (Norton et al., 2009). Seedbed prep is not generally required for topsoil storage piles or other areas of temporary seeding.

5.4. Water Courses and Drainages

Depending on site specific needs, culverts, wing ditches, and channels will be utilized to manage water. Waterbars, slope breakers, erosion control blankets, fencing, mulch, straw bales, and rolls may also be used to manage soil erosion. Soil erosion control will be implemented on sites in highly erosive soils and steep areas. Mulching, netting, tackifiers, hydromulch, matting, and excelsior are common methods used to limit erosion on slopes that may be employed. The type of control measure will depend on slope gradients and the susceptibility of soil to wind and water erosion. All runoff and erosion control structures will be inspected periodically, cleaned out, and maintained in functional condition throughout the duration of construction and drilling.

All drainages affected by the well pad or access road will be maintained by culverts and other methods as described in *Surface Operating Standards and Guidelines for Oil and Gas Development*, also known as the Gold Book (BLM and Forest Service). All roads will be constructed in a manner that does not result in grading within and parallel to drainages. To avoid depositing fill material in drainages, roads will be constructed at a height above drainage channels (BLM, 2012). During the reclamation phase, drainages will be reconstructed and stabilized to function similar to pre-disturbance levels. Drainages and riparian areas will be addressed in greater detail in the site-specific reclamation plans.

5.5. Visual Composition

Pads, roads, pipeline, and production facilities will be located and placed to avoid or minimize visibility from travel corridors, and other potentially sensitive observation points, unless directed otherwise by the BLM due to other resource concerns, and will be placed to maximize reshaping of cut-and-fill slopes and interim reclamation of the pad.

To the extent practical, existing vegetation will be preserved when clearing and grading for pads, roads, and pipelines. The BLM Authorized Officer may direct that cleared rocks be salvaged and redistributed over reshaped cut-and-fill slopes or along linear features.

Aboveground facilities will be painted a natural color in a non-reflective finish selected to minimize contrast with adjacent vegetation or rock outcrops. The color will be specified by the BLM.

5.6. Slope Stability and Topographic Diversity

In all areas where the soil has been compacted, the soil will be ripped to a minimum of 18-24 inches, with a furrow spacing of 18-24 inches. Where possible, soil will be ripped in two passes at perpendicular directions. After mitigating compaction, contours will be reshaped to blend with natural topography, to the extent possible. Fill material will be pushed into cuts and up over the backslope of the cuts, leaving no depressions where water could pond. Erosion control structures will be installed where necessary to maintain hydrologic function.

5.7. Site Preparation

In all disturbed areas where soil has been stripped, stored subsoil and topsoil will be restored according to their original orientation in the soil profile, i.e. subsoil below the topsoil. Topsoil will be spread to a depth of 6 inches across the disturbed areas or to a depth similar to what existed pre-disturbance in consultation with the BLM. The BLM may require soil amendments.

Final seedbed preparation will consist of scarifying (pitting, raking or harrowing) the spread topsoil prior to seeding. Scarification will be repeated no more than 24 hours prior to seeding to break up any crust that has formed if the area is to be broadcast-seeded or hydro-seeded, or if more than one season has elapsed since final seedbed preparation.

To enhance vegetative establishment and control erosion on slopes steeper than 3:1 (i.e. 15 degrees), seedbed preparation will consist of pocking or pitting. Surface soil material will be completely and uniformly pocked or pitted with small depressions, to form micro-basins scaled to site and materials. Depressions will be constructed in rows, in a "fish scale" pattern. This pattern will be constructed perpendicular to the natural flow of water down a slope and/or to prevailing winds.

5.8. Plant Establishment

5.8.1. Seed Mix Development

All disturbed areas on public lands will be seeded with a seed mixture approved by the BLM, consistent with BLM standards in terms of species and seeding rate for the specific habitat type within the Project Area.

- Seed will contain no noxious, prohibited or restricted weed seeds and contain no more than 0.5 percent by weight of other weed seeds.
- Only viability-tested, certified seed for the current year, with a minimum germination rate of 80 percent and a minimum purity of 90 percent will be used, i.e. pure live seed (PLS) must be ≥ 72 percent.
- Seed that does not meet the above criteria will not be applied to public lands.

Where possible, seed will be selected that is locally adapted and genetically appropriate (i.e. choose a local seed supplier if possible, and ensure genetic compatibility with local plants. Seed from lower elevations/warmer climates may not be adapted for Nevada growing conditions).

5.8.2. Seeding Methods

Seeding will be conducted no more than 24 hours following final seedbed preparation. In general, seeding will take place immediately preceding the season with the highest chance of precipitation, typically October through December. Specialized rangeland equipment, such as rangeland drills, Truax drills, surface seeders, hydro-seeders, scarifiers, dozers, or other appropriate equipment will be used in reseeding disturbed areas.

The main purpose of seeding methods is to place the seed in direct contact with the soil, cover the seed with soil, and firm the soil around the seed to eliminate air pockets. Most species can be successfully drill seeded into the soil. Seeding depth in the soil depends on seed size and species specific requirements; where possible, drill seed following the contours of the site. Drill seeding will be followed with culti-paction or crimped weed-free straw mulch, to enhance seed-to-soil contact and prevent loss of seeds and soil. The NRCS recommendation for drill-seeding rate on arid and semi-arid rangelands with large seeded species is 20-40 PLS per square foot, and for small seeded species (most seed mixes), the rate is 30 to 50 PLS per square foot.

In areas that cannot be drilled, broadcast seeding will occur within 24 hours of soil work at the applicable rate. If seeding takes place later than within 24 hours of dirt work, the seed will be covered ½ to 1 inch deep with a harrow or drag bar, unless pocking. When pocking is used as seedbed preparation, the seed will be broadcast within 24 hours of soil prep. Broadcast or aerial seedings will be at the rate of 60 to 95 PLSs per square foot (approximately double the drill-seeding rate).

Hydro-seeding and hydro-mulching may be used in areas of temporary seeding or in areas where drill-seeding or broadcast-seeding/raking are impractical. Hydro-seeding and hydro-mulching will be conducted in two separate applications to ensure adequate seed-to-soil contact. Note that temporary seeding allows use of a seed mix containing sterile hybrid non-native species or approved cover crop, in addition to native perennial species.

5.9. Invasive Species

Noble will be held accountable for the spread of noxious weeds caused by disturbances on federal lands associated with the proposed activities (BLM, 2012). Noxious weeds will be documented during the pre-disturbance survey, and site-specific management will be addressed. Noble will follow the Huntington Valley Integrated Weed Management Plan. This plan outlines management goals, methods, and monitoring of weeds of site specific applications. Weed surveys will be completed annually for the life of the project following these protocols. Herbicide use must be approved by the BLM.

5.10. Monitoring

Noble will annually survey and report vegetative cover on all disturbed sites, to monitor reclamation success and weed management. An annual report will be submitted to the BLM Tuscarora Field Office no later than December 1 of each year.

1. Reclaimed areas will be monitored annually. The annual report will document whether attainment of reclamation objectives appears likely. If one or more objectives appear unlikely to be achieved, the report will identify appropriate corrective actions. Upon review and approval of the report by the BLM, Noble will be responsible for implementing the corrective actions or other measures specified by the BLM Authorized Officer.
2. Adaptive management techniques to support reclamation success and standards may be required. Reclamation will be considered successful when the site is protected from erosion and revegetated with a self-sustaining, vigorous, diverse, native (or otherwise approved) plant community that minimizes loss of habitat, visual resources, and forage.

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