Sensitive Area Determination Checklist

WPX Energy Rocky Mountain, LLC (WPX)		
Person(s) Conducting Field Inspection	Finn Whiting Geologist	6-5-2013
Site Information		
Location:	RWF 23-25	Time: 9:00 am
Type of Facility:	Proposed frac support pad	
Environmental Conditions	Sunny, clear skies, slight breeze, dry soil	
Temperature (°F)	68°	

Has the proposed, new or existing location been designated as a sensitive area?
☐ Yes ☒ No

SURFACE WATER

1. Are there any surface water features or SWSAs adjacent to or within ¼ mile of the proposed/new or existing facility?
   ☒Yes ☐ No

   If yes, list type of surface water feature(s), i.e. rivers, creeks, streams, seeps, springs, wetlands: There are four (4) unnamed USGS identified intermittent drainages

   If yes, describe location relative to facility: One is located 337 feet to the southeast, the second is located approximately 1,205 feet to the east , the third is located approximately 1, 092 feet to the south and the fourth is located approximately 1,004 feet to the west of the proposed facility.

2. Could a potential release from the facility reach surface water features?
   ☒Yes ☐ No

   If yes, describe the pathway a release from the facility would likely follow to determine if the potential to impact surface water is high or low. A potential large release, if it were to migrate off the eastern side of the facility, could impact the unnamed intermittent drainage to the southeast of the proposed facility.

3. Is the potential to impact surface water from a facility release high or low?
   ☐ High ☒ Low

WPXENERGY

GROUNDWATER

1. Will the proposed/new or existing facility have any pits which will contain hydrocarbons and chlorides or other E&P wastes?
   ☐ Yes ☒ No
   If yes, List the pit type(s):

2. Is the site of the proposed facility underlain by an unconfined aquifer or recharge zone?
   ☒ Yes ☐No

3. Is the hydraulic conductivity of the underlying soil or geologic material $\leq 1.0x10^{-7}$ cm/sec?
   ☐ Yes ☒No

4. Is the proposed facility located within 1/8 mile of a domestic water well or 1/4 mile of a public water supply well which would use the same aquifer?
   ☐ Yes ☒No

5. Is the proposed facility located within a 100 year floodplain?
   ☐ Yes (*Sensitive Area*) ☒No (*If no, proceed to question #6.*)

6. Is the depth to groundwater known?
   ☐ Yes (*If yes, follow instructions provided in 6(a) of this section).*
   ☒No (*If no, follow instructions provided in 6(b) of this section*).

   (a) If yes, could a potential release from the proposed facility reach groundwater?
   ☐ Yes ☐ No
   If yes, explain:

   (b) If no:
   (i) Evaluate surrounding soils, topography, and vegetation which may suggest the presence of shallow groundwater.
   (ii) Gather information from surrounding well data in order to determine a depth to groundwater, i.e. State Engineers Office.

7. Is the potential to impact ground water from the facility in the event of a release high or low?
   ☐ High ☒ Low

Additional Comments:

As stated in the surface water section of this sensitive area determination, there are four (4) unnamed USGS identified intermittent drainages located within ¼ mile of the proposed frac support facility. Based on the topographical setting of the proposed facility, only one (1) of the four identified intermittent drainages would be impacted by a potential release. The greatest potential for impacts would be to the unnamed intermittent drainage located 337 feet to the south east of the proposed facility. The facility as it is currently proposed, limits the direction of a potential release to the northern and portions of the eastern and western sides. A potential release, if it were to migrate of the northern and western sides of the proposed facility, would migrate out onto a heavily vegetated wooded area where it would infiltrate into the underlying soil a short distance. A potential release, if it were to migrate off the eastern side of the proposed facility, would tend to migrate to the northeast following the natural contours of the area into a periodically irrigated field. A majority of flow would tend to be parallel to the unmanned intermittent drainage. Therefore, a potential release would have to be fairly large to have any potential to impact the intermittent drainage in closest proximity to the proposed facility.

During facility construction, it is recommended that Best Management Practices (BMPs) be installed in the form of an earthen perimeter berm along the graded edge of the fill slope sides. A diversion ditch should also be installed along the toe of the fill slope sides of the facility as well. All installed BMPs should be monitored and maintained to ensure site containment in the event of a potential release.

The State Engineers Office and USGS records were reviewed and no records were revealed which would provide additional information pertaining to the depth to groundwater. The topographical setting of the proposed facility and the vegetative cover in the immediate vicinity of the proposed facility does not suggest the presence of shallow groundwater.

Based on the information collected during the site field investigation and desktop review, the potential to impact groundwater has been deemed to be low. As noted above, the greatest potential for impacts is to the unnamed intermittent drainage located 337 feet to the east of the proposed facility. By COGCC decision this would classify the facility as being in a sensitive area. However, the field investigation revealed the drainage exhibits more ephemeral characteristics in the immediate vicinity of the proposed facility. The lack of an ordinary high water mark and a heavily vegetated bottom, including some woody species, indicates the drainage does not flow a majority of the time if at all. Man-made modifications to the land surface has altered and eliminated the original channel in some areas as well. In addition, the proposed facility will not be utilized to store large amounts of fluids. The primary equipment on the facility will be pumping equipment to support water transfers to other nearby facilities, further reducing any potential impacts to the unnamed intermittent drainage. With proper BMP installation and maintenance, the potential to impact surface water features can be deemed as

low. With the low potential for impacts to groundwater and surface water, the facility can be designated as being in a non-sensitive area.

Inspector Signature(s): _____ Date: 6/8/2013

Mark E. Mumby, *Project Manager/RPG*
HRL Compliance Solutions, Inc.

_____ For Finn Whiting Date: 6/5/2013

Finn Whiting, Geologist
HRL Compliance Solutions, Inc.