

## Sensitive Area Determination Checklist

TEP Rocky Mountain, LLC		
<b>Person(s) Conducting Field Inspection</b>	Finn Whiting	
	Geologist	
<b>Site Information</b>		
Location:	GM 42-3 Frac Pad	Time: 8:00
Type of Facility:	Existing Facility/Proposed Frac Pad	
<b>Environmental Conditions</b>	Sunny, Dry ground conditions	
Temperature (°F)	71	

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: Parachute Ditch a USGS identified irrigation ditch, one (1) unnamed USGS identified intermittent drainage, one non-USGS identified ephemeral drainage, and Parachute Creek, a USGS identified perennial stream.

If yes, describe location relative to facility: Parachute Ditch is located 142 feet to the north; the unnamed non-USGS identified ephemeral drainage is adjacent to the eastern edge; one (1) unnamed USGS identified intermittent drainage is located 397 feet to the south, and Parachute Creek is located 909 feet north of the existing 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 release, if it were to migrate off facility, could flow to the north directly into the unnamed irrigation ditch or to the northeast directly into the unnamed non-USGS identified ephemeral drainage.

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

☒ High      ☐ Low

## 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  $\leq 1.0 \times 10^{-7}$  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:**

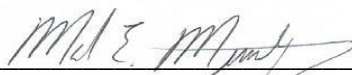
As stated in the surface water portion of this sensitive area determination, Parachute Ditch a USGS identified irrigation ditch, one (1) unnamed non-USGS ephemeral drainage identified during the site visit, one (1) unnamed USGS identified intermittent drainage and Parachute Creek, a USGS identified perennial stream are all located within a ¼ mile of the existing facility. The facility as it is currently constructed and proposed to be expanded, limits the direction of a potential release to the northern and a portion of the eastern sides. If a potential release were to migrate off the northern side, flow would be directly towards Parachute Ditch. If a potential release were to migrate of the northeastern side, flow would be towards the unnamed ephemeral drainage which was identified during the site visit. During facility expansion, 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, especially the northern and eastern sides along with a raised pad entrance. If feasible, a diversion ditch should be constructed along the toe of the fill slope sides as well. All BMPs should be inspected and frequently monitored to ensure proper functionality and ensure site containment in the event of a potential release.

The State Engineers Office and USGS records were reviewed and revealed that no domestic water wells are located within a ¼ mile of the proposed facility which would provide additional information pertaining to the depth to groundwater. The nearest well (permit number 439) was identified as being 2,295 feet to the southeast of the existing facility. The depth to groundwater is noted as being 30 feet below ground surface (bgs). The existing facility is approximately 20 feet higher in elevation which suggests the depth to groundwater could be assumed to be 50 feet, if not greater. Further review of the Colorado Division of Water Resources records revealed 17 monitoring wells have been installed at the Bargath Callahan Compressor Station located approximately 280 feet to the north of the existing facility. The depth to groundwater in these wells ranges from approximately 20 to 30 feet indicating shallow groundwater may be present in the immediate vicinity of the existing facility. However based on the ongoing investigation at the facility, it has been determined that the depth to groundwater fluctuates a substantial amount based on the time of year measurements are collected. This would indicate that the wells are being influenced by the Parachute Creek Ditch due to leakage resulting in higher water levels during the irrigation season. Although the facility is located upgradient of Parachute Ditch, the mounding effect created by Parachute Ditch, could suggest that the depth to groundwater in the immediate vicinity of the facility may be less than 40 feet at certain times of the year.

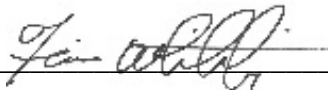
Based on the information collected during the site visit and desktop review, the greatest potential for impacts would be to Parachute Ditch. If a potential release were to migrate off the northern edge of the facility flow could easily enter Parachute Ditch where it could potentially impact the large irrigated fields to the south during periods of flow. However it is not anticipated a potential release, if it were to impact Parachute Ditch, would ever reach either Parachute Creek or the Colorado River as the aerial photography indicates Parachute Ditch terminates in an irrigated field just to the south of the WPX GM 22-12 well pad.

If a potential release were to impact the non-USGS identified drainage feature to the east, flow would be to the north and would terminate in a flat lying area just to the north of the access road to the Callahan Compressor Station due to man-made modifications to the land surface. It should also be noted that, by COGCC decision, the close proximity of Parachute Ditch and the unnamed non-USGS identified ephemeral drainage would classify the facility as being in a sensitive area.

It is not anticipated that groundwater would be impacted by an overland release from the facility due to the fact it would tend to spread out over a large area, would be relatively short in duration and would only infiltrate into the underlying soils a short distance. Again by COGCC decision, the potential for groundwater being less than 40 feet would classify the facility as being in a sensitive area. Therefore, based on the high potential for impacts to Parachute Ditch during periods of flow and by COGCC decision, the facility should be classified as being in a sensitive area.

Inspector Signature(s):  Date: 8/4/2014

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

 Date: 07/31/2014

Finn Whiting, *Geologist*  
HRL Compliance Solutions, Inc.