

Permit condition 181 – for potential large water withdrawal.

If the on-site water supply is intended to produce a cumulative total of over 100,000 gallons of water per day when averaged over a consecutive 30-day period, the permittee shall:

A. If there are one or more water supply wells within 1320 feet, install a monitor well between the water withdrawal well and the nearest water supply well. The permittee shall measure and record the water level in the monitor well daily during water withdrawal and weekly thereafter until the water level stabilizes. The permittee shall report the water level data weekly to the District Supervisor.

B. Conduct an evaluation utilizing the water withdrawal assessment tool accessed at <http://www.miwwat.org/> and provide the withdrawal report to the District Supervisor at least 10 days prior to beginning water withdrawal. If the assessment tool indicates that the proposed withdrawal is likely to cause an adverse resource impact, or designates the proposed withdrawal as a zone B withdrawal in a cold-transitional river system or a zone C or zone D withdrawal, the permittee shall not utilize the withdrawal well except as specifically approved by the District Supervisor. The application for such approval and the decision by the District Supervisor shall be in accordance with the provisions of Section 32706c of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended.

Permit condition 516 – for potential Antrin formation fracturing.

This well will be drilled in an area where the Antrim Formation will likely subcrop below the glacial drift. In order to protect the integrity of the bedrock and surface casing, the following conditions apply to the drilling and completion of this well: Production casing shall be set not less than 50 feet below the shoe of the surface casing and shall be cemented to surface. Fracturing shall be restricted to at least 50 feet below the shoe of the surface casing. The zone between the surface casing shoe and 50' below the shoe may be perforated after all fracturing has been completed.

Permit condition 12 – for shallow scour completions

Since this well is to be located within identified areas of glacial bedrock scours and potential bedrock fresh water zones, produced water monitoring is necessary and shall include gas and water volume and water quality reporting. The chemical analysis of produced water shall be based upon parameters required by U. S. EPA UIC program and EPA approved analytical methods shall be required. Water quality sampling shall be performed within 60 days of well completion and thereafter on a semi-annual basis (March and September) or as approved by the Supervisor. The permittee shall submit the results of the well's produced water chemical analysis and a report of the daily water and gas production rates for a monitoring period to the MDEQ OGS Cadillac District Supervisor within 30 days of the initial sampling and by March 31 and September 30 of each year or as approved by the Supervisor. So long as the total dissolved solid (TDS) concentration in the produced water is not less than 1,000 mg/L, the well may be produced. Should the tested TDS concentration be less than 1,000 mg/L, sampling shall then be required every 60 days while the well is producing. However, should the TDS concentration in the produced water be less than 1,000 mg/L for 3 consecutive sampling periods, the well shall be shut-in. If the well cannot be remediated so that the TDS concentration in the produced water is at least 1000 mg/L, the Supervisor may require the well to be plugged.