

## **DRAFT**

### **GROUND WATER DISCHARGE PERMIT BY RULE STATEMENT OF BASIS**

MCW Energy Group  
Bitumen Solvent Extraction Pilot Project  
NW Asphalt Ridge near Vernal, Utah

December 15, 2011

#### **Facility Description**

MCW Energy proposes to conduct a pilot project for solvent extraction of bitumen from oil sands at a processing site located about three miles west of Vernal in the Northwest Asphalt Ridge area of Uintah County, Utah. The proposed pilot operation will test a proprietary solvent extraction process to remove bitumen from 1,000 tons of oil sands ore, and characterize the tailings to determine appropriate uses or disposal options. No mining will be done at the site; 1,000 tons of oil sands ore are stockpiled onsite on a lined pad. Bitumen will be extracted from the oil sands ore using combinations of solvents with high vapor pressures and low specific gravities and therefore, have a low potential to cause ground water contamination. The solvents are proprietary at this time and will not be identified in public documents. Solvents will be trucked to the site and contained in aboveground storage tanks with secondary containment, and will be managed under a Spill Prevention, Control, and Countermeasure Plan. Process solvents and bitumen will be removed from processed sand by a centrifuge and the resulting processed sand will be dried prior to final disposal. No water will be used in the bitumen extraction process. The operation will be located in the NW ¼ of Section 24, Township 4 South, Range 20 East, Salt Lake Base and Meridian. There are no perennial streams near the pilot plant site.

#### **Hydrogeology**

Within the NW Asphalt Ridge area, the Mancos Shale immediately underlies and intertongues with the sandstones and shales of the Mesaverde Group. The stratigraphy at the processing site consists of 25 feet of alluvium overlaying interbedded sandstones and shales of the Mesaverde Group. Boring MCW-1 was drilled at the processing site to a depth of 60 feet below ground surface and did not encounter ground water. Based on the boring log, the site lithology consists of alluvium from the surface to 25 feet, underlain by weathered shale to the total boring depth of 60 feet. The shale formation is most likely an interbed of the Mancos Shale within the Mesa Verde Formation. Borings MCW-4, MCW-5, and MCW-6 were drilled to total depths of 220 feet, 300 feet, and 180 feet respectively, and did not encounter ground water. The Mesa Verde sandstone layers are the most likely reservoirs for bitumen as indicated in boring logs MCW-4, MCW-5, and MCW-6.

#### **Ground Water Quality**

Boring MCW-1 was drilled to a total depth of 60 feet at the processing site, with the lower part of the boring penetrating 35 feet into a shale formation. No ground water was encountered. Available information from the Utah Department of Natural Resources Division of Water Rights database indicates that ground water quality in the area is poor. For example, the closest water well (Water Right 45-5312) was drilled approximately 0.7 miles northeast of the pilot plant site to a depth of 70 feet below ground surface in clay. The well was drilled for irrigation but was plugged and abandoned because the ground water quality was poor and “unusable”. Compliance with the Utah Ground Water Quality Regulations will be demonstrated by isolating any potential ground water contaminants from the subsurface.

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### Containment Technology

The permit-by-rule determination is based on total containment of potential ground water contaminants and discharge prevention to the subsurface. Solvents will be trucked to the site and stored in aboveground tanks with secondary containment, and will be managed under a Spill Prevention, Control, and Countermeasure Plan. Currently, 1,000 tons of unprocessed oil sands ore are stockpiled on a lined ore storage pad constructed in accordance with a Construction Permit dated August 22, 2011. MCW Energy has applied for a Construction Permit to build a lined cell to contain the processed oil sands. The processed oil sands will be placed in an engineered cell 48 feet by 48 feet surrounded by an 18-inch berm with a 40-mil high density polyethylene (HDPE) liner overlain by a heavy duty non-woven geotextile. The HDPE liner will be a single sheet with no field seams and will cover the berms to insure no leakage to the subsurface. Process solvents and bitumen will be removed from processed sand by a centrifuge and the sand will be dried before placement on the liner. Based on TexLoc Library, HDPE is chemically resistant to bitumen and the residual solvents that would be contained in the processed sands. Placement of dried processed sands in the engineered cell will result in little or no hydraulic head on the liner.

### Permit-by-Rule Determination

Considering the factors described above, the proposed bitumen extraction pilot project should have a *de minimis* potential effect on ground water quality and qualifies for ground water discharge permit-by-rule under UAC R317-6-6.2.A(25). If any of these factors change because of changes to the operation or from additional knowledge of site conditions, this permit-by-rule determination may not apply and MCW Energy must inform the DWQ of the changes. If future project knowledge or experience indicates that ground water quality is threatened by this operation, the Executive Secretary may require MCW Energy to apply for a ground water discharge permit in accordance with UAC R317-6-6.2.C.

MCW Energy will need to submit a revised ground water discharge permit application if the pilot operation is scaled up to a production operation. The revised permit application must demonstrate that raw oil sands ore and processed sands are being managed in an appropriate way to prevent ground water contamination. To evaluate the potential for leachate generation from precipitation falling on unprocessed tar sands and processed tailings, MCW Energy must collect representative samples of unprocessed tar sands ore and processed tailings from the pilot project and perform a Synthetic Precipitation Leachate Procedure (SPLP) extraction (EPA Method SW-846 1312) on the samples at a Utah-certified laboratory. The SPLP leachate must be analyzed for residual solvents used in the bitumen extraction process and benzene, toluene, ethylbenzene, xylenes, naphthalene (BETXN), Oil and Grease, total petroleum hydrocarbon- diesel range (TPH-DRO), total petroleum hydrocarbon- gasoline range (TPH-GRO), total recoverable petroleum hydrocarbon (TRPH), total organic carbon (TOC), total dissolved solids (TDS), pH and major ions (Na, Ca, K, Mg, Cl, SO<sub>4</sub>, alkalinity). Laboratory minimum detection limits must be equal to or less than Utah ground water quality standards or other applicable standards to enable meaningful comparisons with the laboratory analytical results.