





**DORE & ASSOCIATES CONTRACTING, INC.**  
NATIONWIDE SPECIALISTS · CONTRACTING & ENGINEERING

Paul Rosenbaum  
SWR Corporation  
127 E. Washtenaw  
Lansing, MI 48933

RE: SWR One Performance  
Soil Washing  
North Buckeye Oil Field  
Remediation Project  
Gladwin, Michigan

Dear Mr. Rosenbaum:

We have been using SWR One to remediate soils contaminated with petroleum hydrocarbons and are very impressed with the effectiveness of your product. As you are aware, we are remediating thousands of tons of soil contaminated with petroleum hydrocarbons with concentrations in the range of 1,100 to 220,000 parts per million (ppm) of diesel range organics (i.e. DRO's are used as an indicator parameter for the petroleum hydrocarbons). We are also achieving concentrations well below the state mandated cleanup criterion of 220 ppm DRO. Also, the SWR One is effective in removing benzene, toluene, ethylbenzene and xylene from soils and we are achieving concentrations less than the state required cleanup criteria (e.g. benzene: 0.100ppm; toluene: 18ppm; ethylbenzene: 1.5ppm; and xylene: 5.6ppm).

We couldn't be more pleased with your product and its performance on this remediation project. We look forward to continuing to work with your product on other projects.

Very truly yours,

A handwritten signature in black ink, appearing to read 'Edward M. Dore', written over a horizontal line.

Edward M. Dore  
*Vice President of Operations*

## Soil Washing Operations

Soil washing will be accomplished using two InProve Spill Killer™ mobile soil-washing units. Each unit is capable of processing 50 tons of soil per hour. The units are designed for washing of petroleum hydrocarbon-impacted soils to levels acceptable for returning the soils to their original location. It is intended that each unit will process an average of 35 tons of soil per day.

The process utilizes the following components:

- A "live bottom" intake hopper and conveyor
- Two vibrating screens with a spray wash system (the first screen removes oversized materials such as rocks and debris, the second screen pulverizes small soil clumps and further separates smaller rocks)
- A washing unit where a combination of an auger screw and water pressure mixes the soil with the washing solution
- An auger screw which begins the dewatering process
- A second stage dewatering screen and discharge conveyor.

Electronic monitors and instrumentation provide control over a wide variety of machine functions, including the time the soil is subjected to the washing process. This provides optimum efficiency and cleaning effectiveness of the system.

An important component of the system is the ability to remove petroleum hydrocarbons and suspended solids from the washing solution, such that the water can be recycled. The wastewater treatment system will consist of a coalescing oil water separator (for hydrocarbon removal), and an inclined plate settler with chemical feed/flocculation capabilities for removal of suspended solids. Solids removed from the waste stream will be dried, sampled, and if acceptable, will be returned to the excavation areas.

Washwater generated from the cleaning operations will initially be processed through a hydrocyclone (part of the soil-washing unit) for removal of solids to the dewatering screen. From the hydrocyclone, washwater will be discharged to a 20,000-gal mobile frac tank. In this tank, heavy solids will be removed through settling.

From the frac tank, the water will be pumped through an oil water separator for removal of the hydrocarbons. Collected oil will be drained into drums for off-site disposal at Key Services in Kalkaska, Michigan. Following the oil water separator, the wastewater will pass through an inclined plate separator. The inclined plate separator will have chemical feed and flocculation capabilities to allow for polymer addition to enhance the solids settling process.

From the inclined plate separator, the clarified wastewater will be directed to a second frac tank (clean tank) for storage and distribution to the soil washing units.

Solids removed from the frac tank, oil water separator and inclined plate separator will be stockpiled for sampling. Upon receipt of acceptable analytical results, the solids will be dried and returned to the excavation areas.

At the soil washing units, the selected surfactant SWROne will be added proportional to the flowrate using a chemical metering pump.