

## Oxygen Release Compound (ORC<sup>®</sup>)

### PCP Bioremediation at Eastern Virginia DoD Wood Dip Tank Site

#### SITE SUMMARY

This site is the location of a former Department of Defense dip tank with associated storage racks that has been used to treat wood with a mixture of pentachlorophenol (PCP), diesel fuel and kerosene. The dip tank was dismantled in 1982 and the area was paved with asphalt and converted to a storage area. Subsequent soil and groundwater sampling indicated that PCP was present in both media, with soil concentrations greater than USEPA Region III Risk-Based Contaminant Levels and groundwater concentrations greater than USEPA Maximum Contaminant Levels (MCLs). In 1999, a soil excavation took place at the site removing all the soil above the water table with a PCP concentration greater than 16 mg/kg and the removal of one to three feet of soil below the water table. In 2000, a treatability study was conducted to evaluate the *in-situ* aerobic bioremediation of PCP in the groundwater using Oxygen Release Compound (ORC<sup>®</sup>).



Figure 1. ORC Injection

#### REMEDIATION APPROACH

- ¾ **Remediation Objective:** Determine the efficacy of using ORC for the reduction of PCP concentrations in groundwater.
- ¾ **Application Type:** Grid (direct-push injection)
- ¾ **Product:** ORC
- ¾ **Quantity Applied:** 1,400 lbs
- ¾ **Application Rate:** Upper Aquifer: 6.3 lb/ft  
Lower Aquifer: 3.0 lb/ft
- ¾ **Product Cost:** \$14,000

#### SITE CHARACTERISTICS

##### General

- ¾ **Name:** DOD Wood Dip Tank Site
- ¾ **Location:** Eastern, VA
- ¾ **Industry:** Wood Treatment
- ¾ **Contaminants of Concern:**

Well	PCP Concentration	Cleanup Goal
MW 21S	450 ug/L	1 ug/L
MW 26S	730 ug/L	
MW 27S	460 ug/L	

##### Hydrogeology

- ¾ **Treatment Area:** 5,000 ft<sup>2</sup>
- ¾ **Soil Type:** Fine to medium sands
- ¾ **Groundwater Velocity:** 0.3 ft/day
- ¾ **Groundwater Flow Direction:** Southwest
- ¾ **Depth to Groundwater:** 5.3 ft

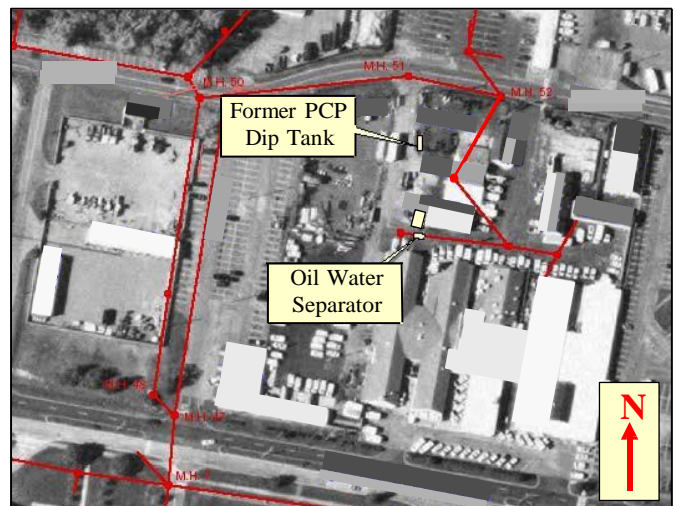


Figure 2. Site Map

## RESULTS

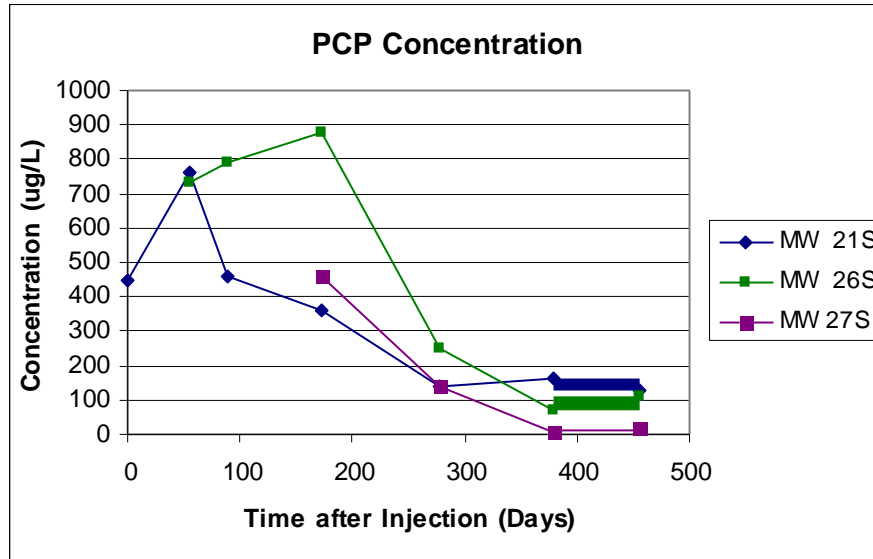
### Percent Contaminant Reduction

Well	Percent Reduction
MW 21S	71%
MW 26S	85%
MW 27S	96%

### Post Treatment Concentrations

Well	Concentration
MW 21S	130 µg/L
MW 26S	110 µg/L
MW 27S	19 µg/L

### Concentrations vs. Time



Monitoring for MW 26S did not occur at day 0.

Monitoring for MW 27S did not occur at the first 3 sampling events (day 0, 55, 89)

## CONCLUSION

The treatability study performed at the site validated the prediction that ORC-facilitated bioremediation could successfully degrade existing PCP concentrations. After 250 days of observation, sampling of the source well, MW-27S, indicated the successful degradation of PCP by 95.9%. Other wells further from the source also responded well to ORC treatment. Data for each well begins at different time periods following the treatment date because some wells were added after treatment occurred, specifically MW-26S and MW27S. Due to the likely remediation that took place before concentrations were monitored, it is hypothesized that initial concentrations and overall contaminant reduction in MW-26S and MW-27S were higher than existing data indicates. Therefore, it is assumed that the ORC treatment could have performed even better than data indicates.