

INFORMATION SHEET

ORDER R5-2013-XXXX
UNIVAR USA INC.
IN-SITU GROUNDWATER BIOREMEDIATION PROJECT
1152 G STREET, FRESNO
FRESNO COUNTY

Univar USA Inc. (Univar) is proposing in-situ bioremediation for groundwater impacted by tetrachloroethene and its breakdown products. Amendments will be injected into groundwater to create reducing conditions and an appropriate bacteria culture will be added to groundwater to optimize the breakdown of volatile organic compounds.

Background

Univar leased property at 1152 G Street, Fresno from 1965 to 1986. An aboveground storage tank (AST) was located in the northeast corner and was used to store tetrachloroethene (PCE). The AST has since been removed. PCE was initially detected in soil samples during a 1994 assessment. Numerous assessments of soil, soil gas, and groundwater have been conducted since that time to delineate the extent of PCE in soil and groundwater.

PCE impacted groundwater forms a plume extending approximately 1,400 feet to the north and 1,800 feet to the northwest, toward City of Fresno well 22A. PCE has been detected at depths up to 250 below ground surface in the vicinity of City well 22A. Concentrations of PCE detected in City well 22A are well below State of California drinking water standards.

Univar's clean-up remedy is a three-pronged approach, and will include anaerobic (oxygen deficient) breakdown of volatile organic compounds (VOCs) with downgradient plume polishing by aerobic (oxygen rich) degradation and natural attenuation. This approach is expected to remediate most, if not all, of the plume over time (7+ years). A carbon substrate is used to provide food for the existing and introduced bacteria to grow. The bacteria will break down the PCE and other VOCs. Univar has tested several variations of the in-situ biodegradation process at dozens of its own properties across the US and has conducted laboratory testing to ensure success at its Fresno project site. The process has shown significant success in reducing the bulk of PCE concentrations in the aquifer to innocuous end products (ethane and carbon dioxide).

Anaerobic biodegradation is not occurring to any significant extent because the groundwater is aerobic. As such, sufficient electron donor (carbon substrate) must be added to the impacted zone to enhance anaerobic biodegradation. Univar will use an amendment mixture of alcohol and soybean vegetable oil as the carbon substrate. Alcohols serve as excellent electron donors, and also keep the wells clean by acting as disinfectant in the immediate vicinity of the well. The alcohol may be emulsified (on-site or off-site) with vegetable oil (which is also food-grade soybean oil). Other additives include small amounts of potassium hydroxide for pH buffering and di-ammonium phosphate to enhance microbial growth. Groundwater will be extracted (4 extraction wells), amended, and reinjected into a network of approximately 11 wells. Carbon source addition may also occur in a batch basis followed by groundwater recirculation.

Univar's laboratory microcosm studies indicated that bioaugmentation is also required to remediate groundwater. As such, once anaerobic conditions have been established, Univar proposes to bioaugment the impacted zone with a NJ-14 bacteria culture. To further enhance aerobic conditions in the downgradient portion of the plume, oxygen will be added. Note that this oxygen (introduced by a sparging compressor and an oxygen generator) will be utilized for the co-metabolic degradation; but more importantly, it will re-oxidize any reduced metals (iron mostly) to minimize the possibility of iron

migration towards City well 22A. The portion of the plume downgradient of Tuolumne Street is generally expected to naturally attenuate at a much more rapid rate because of the proposed upgradient remedial system. Due to the proximity of City well 22A, Univar does not believe that it is advisable to actively (anaerobically) remediate groundwater that is downgradient of Tuolumne Street, particularly since iron will be reduced as part of any active remediation and may impact the City well.

Groundwater Conditions

Groundwater monitoring has been ongoing since at least 1996. Groundwater occurs at a depth of approximately 100 to 110 feet below ground surface. More than 45 monitoring wells are currently gauged and sampled semi-annually. The monitoring and reporting program requires sampling of the existing wells on a quarterly, semi-annual, or annual basis, depending on the specific well. Groundwater samples will be analyzed for general mineral, metal, and volatile organic constituents, along with constituents associated with the amendments to be injected.

Fourteen monitoring wells outside of the treatment and transition zones or on the outside edges of the transition zone have been selected as compliance wells. Several of the compliance wells are located upgradient of Fresno City well 22A to ensure that the remediation systems do not cause impacts to that well. The compliance wells will be monitored to ensure that injected materials do not affect the beneficial uses of groundwater outside of the treatment and transition zones.

Basin Plan, Beneficial Uses, and Regulatory Considerations

The Water Quality Control Plan for the Tulare Lake Basin (second edition) (the "Basin Plan") designates beneficial uses, establishes water quality objectives, and contains implementation plans and policies for all waters of the basin. The receiving water is groundwater. Beneficial uses include municipal and domestic water supply, agricultural supply, industrial service supply, industrial process supply, and water contact and non-contact water recreation. Discharges shall not cause groundwater at the compliance points to exceed drinking water primary or secondary standards unless background concentrations already exceed the primary or secondary standards. Discharges shall not cause concentrations of metals, total dissolved solids, or electrical conductivity to increase more than 20% over their background concentrations.

Antidegradation

State Water resources Control Board Resolution 68-16 (hereafter Resolution 68-16) requires the Regional Water Board to maintain high quality waters of the State until it is demonstrated that any change in quality will be consistent with the maximum benefit to the people of the State, will not unreasonably affect beneficial uses, and will not result in water quality less than that described in State and Regional Water Board policies (e.g., quality that exceeds water quality objectives).

The Central Valley Water Board finds that these WDRs authorize limited temporal groundwater degradation, but that such degradation is consistent with Resolution 68-16 since: (1) the purpose of the discharge is to accelerate and enhance remediation of the existing groundwater pollution, and such remediation is consistent with the maximum benefit to the people of California; (2) the degradation is limited in scope and duration; (3) this Order requires use of best practicable treatment or control of the wastes to be discharged, including adequate monitoring and contingency plans to assure protection of water quality; and (4) this Order does not allow discharges of waste to exceed water quality objectives, other than the temporary exceedances that will occur as a result of the treatment process. If the monitoring conducted pursuant to the MRP shows that the discharge causes or threatens to cause degradation of water quality (other than those temporarily permitted by these WDRs), then the Discharger will be required to cease the discharge, implement source control, change the method of

discharge, or take other action. A slight residual increase in salts may occur, but will be limited to a maximum 20 percent increase over background and will not be permitted to impact beneficial uses.

Proposed Order Terms and Conditions

Discharge Prohibitions, Discharge Specifications, and Provisions

The proposed Order would prohibit discharge to surface waters and water drainage courses.

Injection of substances other than those specifically allowed in the Order is prohibited.

Neither the treatment nor the discharge shall cause a nuisance or condition of pollution as defined by Water Code section 13050, outside of the treatment and transition zones.

The release, injection, discharge or addition of constituents from the remediation system shall not cause the groundwater at the compliance wells listed in B.1 to contain concentrations of constituents added as amendments, and by-products of the in-situ treatment process, in amounts that exceed the limits specified in the WDRs.

The release, injection, discharge or addition of constituents from a remediation system shall not cause the groundwater at the compliance wells to contain concentrations of metals, total dissolved solids, or electrical conductivity that are more than 20% greater than their respective background concentrations, as established by the Monitoring and Reporting Program.

Monitoring Requirements

Water Code section 13267 authorizes the Central Valley Water Board to require monitoring and technical reports as necessary to investigate the impact of a waste discharge on waters of the State. Water Code section 13268 authorizes assessment of civil administrative liability where appropriate.

The proposed Order includes discharge and groundwater monitoring. The monitoring is necessary to ensure that any potential degradation from the discharge is minimized.