DETECTION OF DIESEL CONTAMINATION FROM STORAGE TANKS AT TWO MINING SITES USING GEOPHYISICAL TECHNIQUES[1]

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Abstract. Mining sites are often impacted by leaky storage tanks containing diesel that can adversely effect nearby groundwater. Remediating the effected area requires accurate characterization of the contamination plume. Determining the extent of hydrocarbon spills is typically done by hand sampling events. Though this method can provide useful results, it is a labor intensive activity and allows for the possibility of introducing error in mapping the actual impact in a given area. Likewise, sampling involves intrusive, destructive practices such as mechanical coring. Often, this can lead to the introduction of mobile contaminants into previously undisturbed areas. The practice of using electromagnetic induction surveys has shown that is possible to map the extent of hydrocarbons in a nondestructive, noninvasive way. This study was designed to provide a model to show the response of diesel contamination on such a survey.

Geophysical surveys were undertaken at two coal mining sites near Gillette, Wyoming, using the EM34-XL™. Surveys were conducted using 10 m and 20 m coil separations in both dipole orientations. Areas known to contain diesel contamination were shown as resistive anomalies. Samples from monitoring wells at the two sites were correlated to the survey results for validation. It was shown that electromagnetic induction surveys could be used under the circumstances to map the diesel contamination plume and that ground conductivity could be successfully correlated to obtain a general concentration of subsurface diesel.

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[1] Poster was presented at the 2007 National Meeting of the American Society of Mining and Reclamation, Gillette, WY, 30 Years of SMCRA and Beyond June 2-7, 2007. R.I. Barnhisel (Ed.) Published by ASMR, 3134 Montavesta Rd., Lexington, KY 40502.

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