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The fundamental objective of many inverse problems is to extract information about a medium of interest by analyzing the measurements collected at the periphery based on a physical models linking the internal structure of the medium to the observed data. In the case of shape based inverse problems, the specific goal is to characterize the geometry and contrast of obstacle located in the medium. Of particular interest to us in this talk are inverse obstacle problems for which multiple sensing modalities are employed. We will focus on an approach to such joint inverse problems in which we extend our recent use of parametric level set representations concentrating on the reconstruction of subsurface chemical contaminant plumes contamination using two physical modalities, i.e., the Electrical Resistance Tomography and Hydrological observations. (Received September 22, 2011)