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| **Environmental Enlightenment #70** By Ami Adini - Reissued July 27, 2015   |  | | --- | | This is a SHORT, LIGHT and SIMPLE newsletter. Its purpose is to rekindle in the initiated terminology they have once learned, and enlighten the uninitiated on terms they may have heard but never known the meaning of. | | **How to Find Buried Objects  Electromagnetic Methods**  *(The text in this article has been extracted from a publication by the United States Environmental Protection Agency.)*   Electromagnetic (EM) methods, also referred to as electromagnetic induction methods, are some of the most diverse and useful geophysical techniques.  Although they are commonly subject to cultural interferences, they can:   * Locate buried objects (metal and non-metal); * Obtain geologic and hydrogeologic information; and * On rare occasions, delineate residual and floating product.   http://amiadini.com/NewsletterArchive/150727-NL70/ee-70-1.jpg  The conductivity of a substance is its ability to transfer electricity by *conduction*.  *Conduction* means the transfer of energy by a medium without bulk movement of the medium itself.   In electrical conduction, energy is transferred by the movement of electrons or ions through substances (media); for example, soil, rocks, water, concrete…, anything.  EM methods here refer to the measurement of subsurface conductivities by low frequency electromagnetic induction.   A transmitter coil radiates an electromagnetic field, which induces electrical currents in the subsurface.   The electrical currents, in turn, induce a secondary electromagnetic field. The secondary field is then intercepted by a receiver coil.   The voltage measured in the receiver coil is related to the subsurface conductivity. These conductivity readings can then be related to subsurface conditions.  http://amiadini.com/NewsletterArchive/150727-NL70/ee-70-2.jpg  The conductivity of geologic materials is highly dependent upon the water content and the concentration of dissolved electrolytes.   Clays and silts typically exhibit higher conductivity values because they contain a relatively large number of ions.  http://amiadini.com/NewsletterArchive/150727-NL70/ee-70-3.jpg  Sands and gravels typically have fewer free ions in a saturated environment and, therefore, have lower conductivities.  http://amiadini.com/NewsletterArchive/150727-NL70/ee-70-4.jpg  Metal objects, such as steel underground storage tanks (USTs), display very high conductivity measurements, which provide an indication of their presence.  http://amiadini.com/NewsletterArchive/150727-NL70/ee-70-5.jpg  Source: [scantec.co.nz](http://www.scantec.co.nz/)  The EM receiver and transmitter coils can be configured in many different ways, depending on the objectives of the survey.   One common configuration for shallow environmental investigations utilizes transmitter and receiver coils that are attached to the ends of a rigid fiberglass rod at a fixed distance (*i.e.*, fixed-coil separation). The equipment is then moved across the area of investigation.  http://amiadini.com/NewsletterArchive/150727-NL70/ee-70-1.jpg  This configuration is particularly suitable for detection of USTs and metal pipes.   The limitations of EM methods are primarily a result of the interferences, typically caused when this method is applied within 5 to 20 feet of power lines, buried metal objects (including rebar), radio transmitters, fences, vehicles, or buildings.   Its success depends upon subsurface conductivity contrasts: the difference in conductivity between an UST and surrounding natural or fill material is typically adequate for detection.  5248193_xl | | You can find past issues of our "Environmental Enlightenment" at [amiadini.com](http://www.amiadini.com/) Wealth of information about environmental site assessments in the real estate transactions and issues concerning assessment and cleanup of contamination in the subsurface soil and groundwater. |  |  | | --- | | Call me if you have any questions. There are **no obligations.**  Ami Adini Environmental Services, Inc. Environmental Consultants & General Engineering Contractors California Lic. #1009513 A B HAZ ASB **818-824-8102**; [**mail@amiadini.com**](mailto:mail@amiadini.com) [www.amiadini.com](http://amiadini.com/)  Ami Adini is a veteran environmental practitioner with over 40 years of experience. He carries a Bachelor of Science degree (B.Sc.) in Mechanical Engineering including academic credits in Nuclear and Chemical Engineering and postgraduate education in these fields. His career includes design and construction of nuclear plant facilities, chemical processing plants and hazardous wastewater treatment systems. He is a former California Registered Environmental Assessor Levels I & II in the 1988-2012 registry that certified environmental professionals in the assessment and remediation of environmentally impacted land, and a Registered Environmental Professional (REP) since 1989 with the National Registry of Environmental Professionals (NREP). He is a California Business & Professions Code Qualifying Responsible Managing Officer (RMO) in the General Engineering Contractor classification with Hazardous Substance Removal and Asbestos certifications, and president of AMI ADINI ENVIRONMENTAL SERVICES, INC. (AAES), a general engineering contractor and consulting firm specializing in environmental site assessments, rehabilitation of contaminated sites and removal of environmental risks from real-estate transactions. (Contact Ami for a complete resume.) **AAES provides practical solutions to environmental concerns using the highest standards of ethics and integrity while providing its clients with maximum return on their investments.** | |