C44 Geo-Spatial Information Extracted From Historical Aerial Photographs Aids in Cost Recovery Litigation and Remedial Investigations

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After attending this presentation, attendees will understand the analysis of historical aerial photographs and generation of a geographic information system (GIS) database to support environmental engineering forensic science.

This presentation will impact the forensic community and/or humanity by describing valuable historical and current forensic information, which can be used for environmental engineering and litigation support.

Method: Research, acquisition and comparative stereoscopic analysis of a series of historical aerial photographs and maps. Creation and presentation of the GIS database containing geo-referenced digital images of the conventional, analog aerial photographs.

This abstract illustrates an accepted scientific approach to document onsite activities at two industrial sites utilizing aerial photographs and GIS technology. The first project example outlines the methodology of gathering and displaying historical information at an industrial site associated with cost recovery litigation. The second project example involves the analysis of aerial photographs and the extraction of geo-spatial information to support remedial investigations at a DOD facility.

The methodology employed at both sites included the research, acquisition and detailed stereoscopic analysis of aerial photographs. Historical aerial photographs spanning the period from approximately 1930 to the present is readily available from various government and private sources. Aerial photographic researchers utilized databases and indexes to locate government and private sources of aerial photographs based on the coordinates and/or boundaries of the specific area of interest. Relevant stereo film positives were acquired for analysis. Digital scans of the historical photographs were generated and prepared for the geo-referencing process.

The first project example involving cost recovery litigation utilized the analysis of historical aerial photographs to identify the existence of an industrial facility and to locate onsite environmentally significant activities. The objective of the case was to locate potential responsible parties that may have contributed to onsite contamination and contamination of a creek extending through the study area. From the analysis of the aerial photographs, two trucking facilities were identified as potential contamination sources; however, only one of which was recognized by the owner/operator. The operators of the trucking facility maintained they had no responsibilities of operation or contamination that occurred at the second facility and in the nearby creek. Analysis of aerial photographs identified the existence of liquid filled impoundments, staining, and surface runoff from the second trucking facility toward the creek. Chemical analysis of sample data taken onsite and toward the creek coincided with environmentally significant activities identified from the aerial photographs.

The second project example involving remedial investigation utilized the analysis of historical aerial photographs and GIS database technology to spatially locate a historical burn pit at a DOD facility. No onsite visual evidence identified the location of the burn pit. To assist remediation personnel, x and y coordinates extracted from the GIS database were utilized with a global positioning system (GPS) technology to locate the former burn pit.

These examples illustrate how the analysis of historical aerial photographs and the generation of geo-spatial information can be used to precisely locate and assist in remediation environmentally significant features and activities.

Historical Aerial Photographs, Geo-Referenced Images, Cost Recovery Litigation

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