



Engineering Sciences Section – 2003

C5 The Use of Aerial Photography to Determine Contamination Events at Agricultural Chemical Facilities

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The goals of this presentation are to discuss examples from environmental cases involving four different agricultural chemical facilities at which historical aerial photography was used to determine the timing of environmental damage and to allocate remedial costs among litigants.

Method: Comparative stereoscopic analysis of a series of historical aerial photographs to identify former activities or features potentially responsible for contamination on site. Overlay contaminant information to a time series of digital aerial images to show correlations between contaminant distribution and/or waste removal areas with historical releases and disposal activities.

Former agricultural chemical facilities abound in the southeastern U.S. and range in size and scope. Some facilities formulated pesticides onsite, while others were only involved with the storage, resale, mixing, and dispensing of fertilizers and pesticides. Common soil and ground water contamination associated with these facilities include agricultural chemicals such as Toxaphene, BHC, DDT, Dieldrin, and Aldrin. In the following case histories, three of the facilities were involved in insurance coverage litigation, and the fourth site was a PRP case filed under CERCLA.

The first facility began formulating pesticides onsite in the 1930s. Aerial photography from the 1930s to the 1990s was acquired and analyzed stereoscopically to show the development of the facility's infrastructure and the location and timing of the storage, release, and disposal of materials. The analysis revealed the presence of various tanks, drums and other containers with associated releases; open storage of uncontained raw materials and products; a wash water discharge ditch and unlined pit; a disposal trench; and releases in loading areas.

The second related facility was used for disposal of off-spec pesticides. The primary legal issue at this site was the timing of the environmental damage (i.e., when did the groundwater contamination occur). The historical aerial photographic analysis showed that solid material (off-spec BHC) was dumped on the surface of the site from the mid-1950s to the mid-1960s. Then sometime in the late 1960s to early 1970s the waste material, along with other containerized wastes, were consolidated and buried in trenches. It was believed that burying the wastes brought it into contact with the groundwater and initiated the groundwater contamination. During remediation of the site these buried wastes were excavated leaving large depressions onsite. By overlaying a time series of digital aerial images, it was possible to show the jury the precise correlation between the trench scars present in the 1972 photography with the depressions indicating where the wastes had been excavated in the late 1980s. This resulted in the jury determination that environmental damage occurred close to the 1972 time period, well out of the insurance policy coverage period.

The third facility was also a disposal site for off-spec pesticides and other wastes. At this site the historical aerial photographic analysis documented waste disposal and the associated environmental damage during an approximate 25-year time period. Wastes were buried in pits and trenches and dumped on the surface. Severe vegetation damage resulting from surface run-off and leachate springs was evident. Consequently the remediation costs were allocated across the entire time period of activity.

The fourth facility consisted of several contiguous parcels of land owned by a railroad company. The parcels were leased to different entities from the 1940s to the 1980s. The property was utilized at different times for the formulation, distribution and storage of agricultural chemicals; for parking equipment and tank trailers used to transport and/or spread agricultural chemicals; and for the storage of petroleum products. Aerial photography spanning the time period from the 1940s to the 1990s was analyzed stereoscopically and combined with site data from other sources. The locations of soil and ground water samples indicating high levels of pesticides (BHC, DDT, Toxaphene, and Dieldrin) were registered to digital aerial images representing different dates of photographic coverage.

As expected, some of the contamination correlated with the portion of the property associated with a former agricultural chemical formulation plant. However, the plant was only in operation for a short period of time and not all the contamination could be attributed to these former operations. Another portion of the property was utilized as a farm market for approximately 20 years. Primary operations at the farm market consisted of bulk storage of fertilizers that were distributed to local farmers. The farm market conceded that small quantities of pre-packaged pesticides were stored and sold at the facility; however, they contended that these operations did not contribute to those contaminants that drove the corrective action across the majority of the site.

The historical photographic analysis revealed that the farm market used portions of the railroad property, which were not leased to them, to park tank trucks and tank trailers - equipment used to transport agricultural chemicals to local farms. In addition, the analysis revealed that the farm market leased equipment such as spreaders to local farmers, and that these spreaders were also parked on railroad property not leased by the farm market. The farmers could purchase chemicals from other sources and use the farm market's spreaders to dispense pesticides on their fields. Contaminants were found in high concentrations in areas where these



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spreaders were washed and parked. This source of contamination was only discovered through identification of the agricultural equipment and a washing area onsite using stereoscopic analysis of the historical photography.

The preceding examples demonstrate the value of using historical aerial photography in conjunction with other site environmental data to document the timing of various contamination events.

Historical Aerial Photography, Stereoscopic Analysis, Agricultural Chemical Facilities