

On Camera for EPA¹

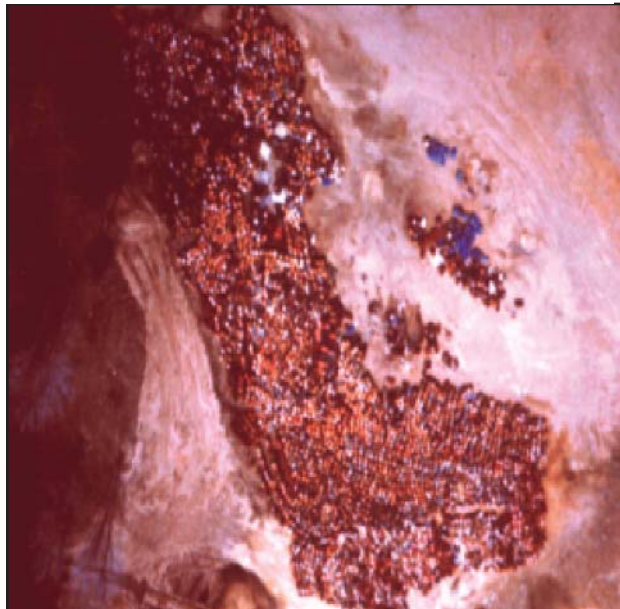
If Gertrude Stein had said, "A dump is a dump is a dump," she would have been wrong. In fact, a dump may once have been a farm or a forest, and it may become a playground or a parking lot. How can an investigator find out if today's ballfield is yesterday's hazardous waste site? One way is by asking EPA's Environmental Photographic Interpretation Center (EPIC).

A field station of the Environmental Sciences Division (ESD) in Las Vegas, the center is staffed by EPA personnel located at the U.S. Geological Survey in Reston, VA and at the ESD-LV. EPIC provides remote sensing technical support to EPA's Regional and Program offices.

EPIC was set up 25 years ago. Today EPA staffers and contract employees carry out EPIC's mission: to collect and interpret aerial imagery in support of EPA regulatory and enforcement programs.

Of what possible use are a bunch of old pictures?

"Without EPIC, we would have had to put a search party in a boat on a river that was raging out of control," says Dr. Joe Lafornera, recalling the turbulent floods that devastated Johnstown, PA in 1977.



Lafornera, a member of EPA's Environmental Response Team, helped track oil and chemical spills caused by the flood.

"The flights went on every day for two or three weeks," Lafornera relates. Using photos from the flights, "we could pinpoint the precise locations of spills and floating barrels, and dispatch cleanup crews only where they were needed. Without the aerial photography, it would have been impossible." "Some of the barrels would probably still be there." Says Jim Butch, who works on wetlands protection issues in EPA's Region 3 office in Philadelphia, "for permitting purposes, we use aerial imagery to learn about the details of an ecosystem. We also use it to identify high-value wetlands," that should not be filled.

In a large building near ESD-LV stand units of industrial shelving, stacked with thousands of canisters of film. In another part of the same room are file cabinets filled with flat frames of film. This is EPIC's archive and film library, full of a lot more than just film. The canisters and frames on the shelves also contain history.

EPA has exposed more than 5,000 rolls of film. Over the years, other federal agencies have also been amassing aerial photographs. The U.S. Geological Survey, Soil Conservation Service, NASA, U.S. Forest Service,

Figure 1 shows the Kingston Drum Site located in New Hampshire. This site was used over a period of many years to recycle and dispose of drums and barrels containing a variety of materials including hazardous wastes. This high resolution natural color aerial photograph shows sufficient detail for counting the number of drums and barrels on site at the time the photograph was acquired. Any changes in the number of drums or barrels, their removal or burial, can be determined with the use of sequential historical aerial photographs taken over a period of time. Stereoscopic image analysis and photogrammetry enable accurate measurements to be made by viewing the height (stacking) of the features in relation to the surrounding terrain. Aerial photographs of this type are accepted as evidence in court.

¹ Originally authored by Susan Tejada and published in the March 1986 issue of the EPA Journal, this article has been modified and updated to reflect changes in EPIC's organization, operations and activities.

On Camera for EPA¹

and National Oceanic and Atmospheric Administration have photographed the United States from the air for such purposes as preparing county soil maps, topographic maps, and navigation charts. Some of this photography is preserved at the National Archives, some at the agencies themselves, and some at EPIC's film library.

So what? Of what possible use are a bunch of old pictures? For starters, they can help answer the question posed earlier: Is today's ballfield yesterday's dump? EPIC's trained image interpreters/analysts can spot drainage patterns, stressed vegetation, impoundments, land scars, and other signs that might indicate the presence of hazardous chemicals, even if those chemicals were buried long ago.

"EPIC puts such a professional product together that it impresses both the prosecution and the defense."

The use of historical imagery is "fantastic," claims Joe Laforana who had to look for traces of dioxin at the site of a former pesticide manufacturer in Edison, NJ. The manufacturing had begun there in the 1940s and stopped in the 1960s. By the time Laforana arrived on-site, "there was nothing there but a few concrete pads overgrown with weeds. Without historical photography, we would have had to take random samples over the entire site, almost five acres." EPIC analyzed aerial photographs of the site going back to the 1940s. As a result, Laforana explains, "we could pinpoint where the loading and unloading docks had been--the area where one could expect the most spillage. We know where the lagoons had been, what the historical drainage patterns had been, even which buildings had been used for which chemical processes. So we knew exactly where we would have the highest probability of finding dioxin."

"Instead of 800 sampling stations, we only needed 50. Sampling that could have taken up to two months to complete took only one week." The historical photos, Laforana concludes, "make it immeasurably easier to do an extent-of-contamination survey."

Jim Butch cites another solid reason for using "a bunch of old pictures": they are, he says simply, "great evidence." Once a wetland has been filled Butch explains, "it's hard to trace where the original wetland met upland. People will tell you the fill has been there for

years and years. But through historical photography, we can establish that the fill has not been there for years and years. The photographic evidence is incontrovertible and court admissible. It helps us get compliance from violators."

Dave Riggs, in 1986 a criminal investigator based in EPA's Region 4 office in Atlanta, confirmed the enforcement-critical nature of historical imagery. "EPIC puts such a professional product together," Riggs said, "that it impresses both the prosecution and the defense. It can be extremely valuable in convincing the U.S. Attorney's office to prosecute a case for EPA, or in convincing a defendant to make a plea."

In a 1994 Superfund case involving contamination from the Salford Quarry in Pennsylvania, EPIC performed several types of analyses that were critical to the government's overall case. EPIC performed a historical analysis of the Quarry which showed its development from a gravel quarry in the 1930's to a municipal dump in the 1950's to an industrial landfill in the 1970s. Historical aerial photographs were introduced as evidence that clearly showed truck dumping debris at the site. From historical and current aerial photographs, EPIC was able to use photogrammetric techniques to measure and calculate the total volume of debris and fill material at the site and measure the depth of the empty quarry which was critical in determining whether contact with the ground water could occur. Finally, EPIC performed some photo geologic analyses to determine areas of fractured bedrock near the site that could act as contaminant pathways. Several impressive displays of photographs, maps and geographic information system plots were introduced as evidence during the trial. According to Phil Karmel, a DOJ Attorney, EPIC's data played a critical role in the government's case.

When one of the longest federal environmental enforcement liability trials in this country finally ended, the photographic work of EPIC had played an important role in a decision that confirmed the authority of EPA to hold hazardous waste generators, transporters, and facility owners and operators responsible for past and future costs of a cleanup and for protection of health and the environment.

The case involved the Ottati and Goss, Inc., and Great Lakes Container Corporation (GLCC) sites in Kingston, NH. Operations at the GLCC site included a barrel reconditioning plant which functioned for nearly 30 years until 1980. On the adjacent parcel of land, a waste

On Camera for EPA¹

storage and treatment facility operated from March 1978 to June 1979, when Ottati and Goss abandoned operations there.

The U.S. Department of Justice filed a civil action in U.S. District Court in Concord, NH, seeking injunctive relief and costs on behalf of EPA against responsible parties associated with the two sites. EPA had spent about \$1.5 million on removal of the drums from the site, and some \$850,000 on ground-water and related studies and on preparation of a preliminary engineering plan for a permanent cleanup.

According to Philip Boxell, an attorney with EPA's Region 1 office based in Boston, EPIC's involvement in the Ottati and Goss case "illustrates the invaluable and even critical role it can play in Superfund enforcement." That role focused on documenting the existence of a waste lagoon on the GLCC site, and thousands of drums filled with waste on the Ottati and Goss site.

The generators sued by EPA claimed that few drums had accumulated on the Ottati and Goss site during 1978. Aerial photography proved that this was not so. At the request of the regional office, EPIC had overflown and photographed the site once each year from 1978 to 1980. For the trial, EPIC's Terry Slonecker analyzed photos from those trips (Figure 1). Viewing positive film transparencies, or negatives, through a stereoscope, Slonecker could see the images in three dimensions and actually count the drums, even those stacked two or three deep.

The aerial photograph is only as valuable as the information which can be extracted from it by skilled imagery analysts.

The images revealed that, contrary to the generators' claim, at least 2,048 drums were on site in September 1978, and that number had increased to more than

4,000 by November 1979. Along with generator invoices, said Boxell, "aerial photography of the site was critical to demonstrate that, during the early stages of the operation, thousands of drums were on the site contributing to soil, surface-water, and ground-water contamination. The photographs were very important to establish liability."

Historical photography also came into play in the trial. Hazardous liquids from a caustic wash operation and residue from an incinerator had been dumped into a waste lagoon on the GLCC property. The corporation that bought the site in 1973 argued that it did not operate the lagoon. The government disagreed, contending that the lagoon had not been closed until at least the spring of 1974. During the trial, an aerial photograph of the lagoon area taken for the county in April 1974 by a Massachusetts surveying firm was located. Slonecker rushed to Concord to analyze the photo on the spot, later confirming the results back at EPIC on an analytical stereo plotter.

The photograph showed that in April 1974 a lagoon containing liquid did exist. It was a depression about 20 by 25 feet, diked on three sides, with light-toned material on the fourth side. Debris and drums were located in the general area.

According to Sheila Jones, a Justice Department attorney who also tried the case, Slonecker's testimony played a critical role in determining how long the lagoon had been in operation.

The sophisticated equipment at EPIC's command seems like pretty high-tech stuff. However, the aerial photograph is only as valuable as the information which can be extracted from it by skilled imagery analysts.

As the defendants in Ottati and Goss and others are finding out, the photography does yield that information, and seeing is believing.

