

Remote Sensing Support for RCRA

Introduction

Since the passage of the Resource Conservation and Recovery Act (RCRA), the U.S. EPA has employed aerial remote sensing techniques to assess the suitability of sites for disposal of hazardous wastes. Remote sensing in the form of interpreted aerial imagery provides key information necessary for RCRA personnel to respond to problems at waste disposal sites, to assess the risks of those sites to their neighboring communities, and to evaluate new sites proposed for the disposal of hazardous waste. Aerial photographs and other sensor imagery are the most economical source of information that is required by Agency officials for permit reviews, litigation support, site operations monitoring, and general environmental assessments. Acquisition and interpretation of aerial imagery data for this and other Agency programs are conducted by the National Exposure Research Laboratory in Las Vegas (NERL-LV) through its Environmental Photographic Interpretation Center (EPIC).



Figure 1. Image is a 1957 aerial photograph which reveals disposal operations located at the center of the site. A large impoundment, excavated areas and active disposal areas are visible. As the significant features and disposal activity are traced through time with eight subsequent sets of photographs, the active area within the site becomes larger in extent.

EPIC provides aerial imagery acquisition and interpretation support for hazardous waste site analysis to the Regional offices and to the Office of Solid Waste and Emergency Response (OSWER). Typical OSWER activities that have been supported include emergency response to hazardous materials release situations, current site condition assessments, historical reviews of site development (see Figures 1 and 2), waste site inventories for large geographical areas, topographic mapping of sites, and criminal and civil litigation under RCRA. The remote sensing support provided is typically paid for by reimbursable funding from the office supported.

Remote sensing is a key tool for addressing RCRA enforcement and response issues. The Environmental Photographic Interpretation Center (EPIC) in Virginia, a facility of the Landscape Ecology Branch (LEB) at NERL-LV, provides:

- A team of scientists with the critical skills that are required for addressing unique environmental/enforcement issues;



Figure 2. By 1997 the original active disposal area is dormant and an area to the south is now active. The remainder of the site consists of former disposal areas that are now inactive.

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- The applications research that is necessary to keep the Agency at the state-of-the-art and a capability to transfer this technology to the Regions; and,
- The ability to respond quickly to emergency spills of hazardous materials.

Enforcement Requirements

The NERL-LV program also supports special enforcement requirements. Once a site analysis is completed by EPIC and a final report is produced, it may be several years before the associated RCRA case comes up for litigation. For more than 23 years, the NERL-LV has contributed to the production and maintenance of hazardous waste disposal site image analysis reports and records. The NERL-LV program thus provides a team with an "institutional memory" that offers reliable and consistent support to enforcement cases throughout extended litigation under RCRA. In this role, the NERL-LV provides support to EPA's National Enforcement Investigations Center (NEIC), to Regional Offices of Criminal Investigation (OCI's) and to the Department of Justice.

EPA's attorneys prefer using a centralized EPA remote sensing program for criminal prosecutions. In their opinion, such a program is sensitive to the security requirements of enforcement cases, is involved in fewer conflicts of interest, uses proper chain-of-custody procedures for handling cameras, film, and photographs, and develops long term working relationships with the EPA attorneys.

Technology Transfer Activities

NERL-LV also provides technology transfer support to EPA Headquarters and Regional program offices in the form of RCRA training workshops and technical advice. This includes sending NERL-LV scientific staff to the Regions to demonstrate the use of interpreted aerial imagery in addressing RCRA requirements in the Region. This activity ensures that new RCRA staff are properly informed and current staff are kept up-to-date with the technologies.

Emergency Response Capability

EPIC also uses the capability of the NERL-LV to respond to emergency requests, usually in response to hazardous material releases or other emergencies at waste sites. These actions provide quick pictorial information on conditions at the site. Information on the extent and location of visible spillage, vegetation damage, and threats to natural drainage and human welfare are typical of the types of information gathered during emergency response activities.

Enforcement

The Agency has special enforcement requirements for civil and criminal litigation and many of these requirements have direct policy implications. For example, there are specific security requirements of EPA criminal cases, as outlined in the Federal Rule of Criminal Procedure 6(e), which requires protection of grand jury material. NERL-LV provides protection of these materials through the use of proper chain-of-custody procedures which is crucial to the success of EPA cases.