6. MONITORING COMPLIANCE

INTRODUCTION

Monitoring compliance — collecting and analyzing information on the compliance status of the regulated community — is one of the most important elements of an enforcement program. Monitoring is essential to:

- Detect and correct violations.
- Provide evidence to support enforcement actions.
- Evaluate program progress by establishing compliance status.

There are four primary sources of compliance information:

- Inspections conducted by program inspectors.
- Self-monitoring, self-recordkeeping, and self-reporting by the regulated community.
- Citizen complaints.
- Monitoring environmental conditions near a facility.

These are described below. Table 6-1 lists the advantages and disadvantages of these four sources. Additional information may come from reports from other national, regional, provincial, or local agencies that have related jurisdiction over the facility; requests for modifications to permits or licenses; and environmental audits reports provided by the facility. However information on compliance status is gathered, the enforcement program will need to develop a system (computerized if possible) to store, access, and analyze the information as needed (see Chapter 4).

INSPECTIONS

Inspections are the backbone of most enforcement programs. Inspections are conducted by government inspectors, or by independent parties hired by and reporting back to the responsible agency. Inspectors plan inspections, gather data in and/or around a particular facility, record and report on their observations, and (sometimes) make independent judgments about whether the facility is in compliance. Inspections can be very resource-intensive, therefore they require careful targeting and planning (see Chapter 4). By standardizing inspection procedures, enforcement officials can help ensure that all facilities are treated equally and that all the appropriate information is gathered. By specifying deadlines for preparing inspection reports, program managers can help ensure that reports can be made available to enforcement personnel without delay if there is a possibility of noncompliance.

Types of Inspections

Inspections may be routine (i.e., there is no reason to suspect that the facility is out of compliance), or "for cause" (i.e., a particular facility is targeted because there is reason to believe it is out of compliance). Inspectors may notify the facility prior to inspection or simply arrive unannounced.

There are many levels of inspection (see Table 6-2). At the simplest level, an inspector can simply walk through a plant. Inspections get progressively more complex and time-consuming as inspectors spend time in the facility to observe operations, interview plant personnel, and take samples for analysis. Inspection goals include:

- Identifying specific environmental problems.
- Making the source aware of any problems.
- Gathering information to determine a facility's compliance status.
- Collecting evidence for enforcement.
- Ensuring the quality of self-reported data.
- Demonstrating the government's commitment to compliance by creating a credible presence.
- Checking whether facilities that have been ordered to comply have done so.

Inspections may focus on one or more of the following:

- Does the facility have an up-to-date permit or license?

TABLE 6-1. ADVANTAGES AND DISADVANTAGES OF PRIMARY SOURCES OF COMPLIANCE INFORMATION

INFORMATION SOURCE	ADVANTAGES	DISADVANTAGES
Inspections	Provide the most relevant and reliable information.	Can be very resource-intensive. Must be carefully targeted and planned.
Self-Monitoring, Self-Recordkeeping, and Self-Reporting	Provide much more extensive information on compliance. Shift economic burden of monitoring to the regulated community. May increase level of management attention devoted to compliance within a facility.	Rely on integrity and capability of source to provide accurate data. Place a burden on the regulated community and increase the paperwork for the compliance program.
Citizens	Can detect violations that are not detected by inspections or industry self-monitoring, -reporting, and -record-keeping.	Sporadic. Cannot control the amount, frequency, or quality of information received. Only a few violations are noticed by citizens.
Area Monitoring	Useful for detecting possible violations without entering the facility. Also useful for determining whether permit or license requirements are providing adequate environmental protection.	Can be difficult to demonstrate a connection between the pollution detected and a specific source. Difficult or impossible to obtain precise information. Resource-intensive in areas of multiple sources.

- Has required pollution monitoring or control equipment been installed?
- Is the equipment being correctly operated?
- Are records of self-reported data properly prepared and maintained?
- Is the facility properly conducting any required sampling and analysis?
- Do the facility's management plans and practices support the required compliance activities?
- Are there any signs of willful violation of regulations and/or falsification of data? (Signs of willful violation or falsification include conflicting data, conflicting stories from different employees at the same facility, monitoring data for which there is no supporting record or documentation, claims that employees are ignorant of the regulations when company files show a knowledge of these requirements, and tips from employees or citizens in the local community.)

Inspections usually begin with an opening conference to explain the inspection process to the source. Some inspections end with a closing conference, in which the inspector may make facility managers aware of any violations, how to correct those violations, and what the future consequences of continuing noncompliance may be. Some enforcement programs do not allow closing conferences because they want to avoid the risk that information given by the inspector to the facility may somehow compromise future legal action.

Gathering Evidence

The inspector is responsible for gathering information to determine whether a facility is in compliance and collecting and documenting evidence that a violation may have occurred. This evidence is used to support the development of enforcement cases, as well as to help the inspector prepare for and give testimony when required. Therefore, inspectors are required to follow certain procedures to ensure that whatever evidence they collect will be admissible in a court of law. If standard procedures are not followed, there is a risk that the evidence may be rejected in a court of law and that the time and expense invested in building a case will have been wasted. Standard checklists are often developed for different types of inspections to ensure that the inspections properly covers all the necessary aspects and that inspections are fair and objective. Sometimes inspectors are responsible for determining whether a violation has occurred; sometimes this decision is made by program staff; in other cases, this decision is made by legal staff. Involvement of legal staff is essential when the requirement must be interpreted to determine whether there has been a violation. Because of concern about jeopardizing future enforcement cases, most inspectors in U.S. enforcement programs do not make decisions about whether a violation has occurred.

Written Inspection Report

During the inspection, the inspector records notes on every aspect of the inspection. The inspector may also gather additional evidence, such as physical samples, photographs, and copies of facility documents. As soon as possible following the inspection, the inspector prepares and files an inspection report, which references any additional evidence collected (photographs, documents, etc.). Any samples collected are sent to a laboratory for analysis. Analytical data are interpreted and presented in the final inspection report. This report serves as the basis for any testimony by the inspector and will likely be used as evidence should the case go to trial. Elements of an inspection report may include:

- The specific reason for the inspection.
- Who participated in the inspection.
- That all required procedures for conducting an inspection were complied with.
- The actions taken during the inspection, including the chronology of the actions.
- The evidence obtained during the inspection.
- Observations made during the inspections.
- The results of sample analyses related to the inspection.

Inspection Plan

An inspection plan developed before going on site helps ensure the quality and value of the inspection. An inspection plan provides an organized step-by-step approach to conducting the inspection. However, some

TABLE 6-2. THREE LEVELS OF INSPECTIONS

LEVEL 1: WALK-THROUGH INSPECTION

This type of inspection is limited to a quick survey of the facility. Inspectors simply walk through the facility, for example to check for the existence of control equipment, observe work practices and housekeeping, and verify that there is a records repository. These inspections establish an enforcement presence, and can also serve as a screening process to identify facilities that should be targeted for more intensive inspection.

LEVEL 2: COMPLIANCE EVALUATION INSPECTION

This level involves a thorough inspection of the facility, but does not include sampling. It may include visual observations like those in Level 1, review and evaluation of records, interviews with facility personnel, review and critique of self-monitoring methods, instruments, and data, examination of process and control devices, and collection of evidence of noncompliance.

LEVEL 3: SAMPLING INSPECTION

This includes the visual and record reviews of the other inspection levels, as well as preplanned collection and analysis of physical samples. These inspections are the most resource-intensive.

flexibility is also important to allow the inspector to adapt to unanticipated situations at the facility. Table 6-3 lists some common elements of an inspection plan.

Targeting Inspections

Virtually any enforcement program, no matter how adequately funded, will never have enough resources to inspect all regulated facilities. Therefore, the major issue to be considered in creating an inspection program is how to target the scarce inspection resources to achieve maximum effect (see Chapter 4). Once a source has been targeted for inspection, program officials must decide what level of inspection to conduct.

In the United States, even very simple inspections have been found to have a significant deterrent effect if they succeed in identifying potential violations. Therefore, where appropriate, the U.S. program encourages simpler, less expensive inspections for sources that are thought likely to be in compliance. More expensive and intensive inspections are necessary for sources likely to be out of compliance. In selecting sources for more intensive inspections, enforcement programs can consider several factors:

- A source's potential to harm the environment.
- The complexity of the inspection needed to evaluate compliance.
- The compliance history of the source.
- The compliance history of similar sources.
- The availability of self-reported data.

Another strategy for conserving program resources is to use a "tiered" inspection level, i.e.: *Start with a less expensive inspection. If the source is in violation, take enforcement action to require the source to correct the violation and do more extensive self-monitoring. Inspect again at a more intensive level if the monitoring data indicate continued violation or if there is any other reason to suspect a violation.* This approach assumes cooperation by facilities. It shifts some of the burden of data gathering to the source and postpones resource-intensive inspections until lower-level inspection and monitoring warrant the expense.

Issues To Consider

Policymakers will need to consider many issues when designing an inspection program. For example:

- Selecting Facilities for Inspection. How are facilities chosen for inspection? What proportion of inspections should be "routine," and what proportion should be "for cause?" How can routine inspections be fairly and neutrally distributed across the regulated community?
- Announced Versus Unannounced Inspections. When should inspections be announced versus unannounced? If inspections are announced, the facility's managers can make sure that the information requested and any essential plant personnel will be available when the inspector arrives. Thus, announced inspections can be more efficient. Unannounced inspections, however, are more likely to discover the plant's true operating conditions. They are particularly useful when there is reason to believe the source is in violation and is misrepresenting its self-reported data or likely to destroy evidence if the inspection is announced.
- Frequency of Inspection. How often should a particular facility be inspected? Policymakers will need to balance the cost of inspections with the expected compliance benefit. Sources that are more likely to fall out of compliance may require more frequent inspections.
- Who Should Inspect. Which level of government will provide the most effective inspection force: national, regional, provincial, or local? Would it be more effective for the government to contract with an independent group to perform inspections?
- Legal Authority. What legal authority do inspectors have to enter facilities? What procedures will be taken if the facility refuses to allow the inspection?
- Role of the Inspector. Should the inspector determine whether a violation has occurred or should the inspector simply gather information? The inspection may fail to meet the needs of enforcement if the inspector's role is not clear.
- Comprehensiveness of the Inspection. What data should inspectors gather? Should inspections focus on data needed under a particular regulation, permit, or license, or should inspectors try to gather data relevant to several environmental regulations, permits, or licenses? The advantage of focussed inspections is that it is easier to train inspectors for these

TABLE 6-3. ELEMENTS OF AN INSPECTION PLAN

- OBJECTIVES
  - What is the purpose of the inspection?
  - What is to be accomplished?
- TASKS
  - What information will be reviewed (e.g., permits, licenses, regulations, previous inspection reports, information on the history of compliance)?
  - What coordination with laboratories, other environmental programs, lawyers, or government agencies is required?
  - What information must be collected?
- PROCEDURES
  - What specific facility processes will be inspected?
  - What procedures will be used?
  - Will the inspection require special procedures?
  - Has a quality assurance/quality control plan been developed and understood?
  - What equipment will be required?
  - What are responsibilities of each member of the team?
- RESOURCES
  - What personnel will be required?
  - Has a safety plan been developed and understood?
- SCHEDULE
  - What will be the time requirements and order of inspection activities?
  - What will be the milestones? What must get done vs. what is optional to get done?

inspections. The disadvantage is that more focussed inspections may fail to detect noncompliance in areas not specifically covered by those inspections.

- Inspection of Related Activities. To what extent should inspectors also gather data on company activities that may affect environmental quality, such as preparedness for chemical emergencies, pollution prevention activities, and waste minimization programs?
- Objectivity of the Inspector. Care is needed to ensure that inspectors do not become so familiar with and sympathetic to certain facilities and facility managers that their objectivity is compromised. Some enforcement programs periodically rotate inspectors to avoid this possibility.
- Closing Conference. Should the inspection include a closing conference? A closing conference provides an opportunity for the inspector to make company managers aware of any violations and what the consequences of continuing noncompliance would be. In some cases, the inspector may suggest ways to correct the violation. A closing conference helps educate the regulated community. However, information conveyed by the inspector could undermine subsequent legal taken against the facility. For example, facility managers could claim the information conveyed by the inspector contributed to noncompliance if the information was in any way misleading or not sufficiently comprehensive. Program lawyers may prefer that inspectors draw no conclusions and convey no information about compliance.
- Documenting the Violation. How should the information gathered by the inspector be documented? The information's value to the program may depend on such factors as clarity, completeness, and utility as evidence in a court of law.
- Inspector Training. How can inspectors be adequately trained to gather accurate information and (if relevant) provide technical assistance? What training is needed to ensure the health and safety of inspectors?
- Data Quality. How can the quality of data be assured? Ways to help ensure data quality include initial reporting procedures, processes for review and confirmation of the data, and schedules and procedures for auditing the program's reporting and recordkeeping system. Guidance should also be developed to ensure the quality of the laboratory analysis supporting the inspection.
- Consistency of Sampling and Analytical Procedures. Use of consistent methods and procedures for sampling and analysis is important to ensure data quality, fairness of enforcement, and the value of the results for legal proceedings. Both inspectors and analytical laboratories will require guidance on appropriate procedures.

Inspector Training

Inspectors have a great influence on the success of a compliance monitoring program. They are responsible for identifying facilities that are out of compliance and gathering evidence for enforcement actions. They are often the only environmental officials that a facility manager will ever see in person, and may serve as the key witness in enforcement cases. Inspectors require training in a broad range of skills: legal, technical, administrative, and communication (see Table 6-4). They will need to be technically competent in the subject(s) of the inspections they perform, and skilled in obtaining crucial facts and in collecting and preserving evidence of noncompliance. Also, they need to be skilled in managing projects, working in a team, and effective communications ranging from entry conversations to complex cross examination in cases of serious violations. The training and integrity of inspectors are therefore critical to effective enforcement programs.

Support Resources

The kind of equipment required to support an inspection varies depending on the type and purpose of inspection. Equipment needed may include:

- Safety equipment to protect the inspector from any hazards that may be encountered during the inspection.
- Documentation equipment, including cameras, film, pocket calculators, tape measures, and logbook, to record information and evidence.
- Sampling equipment to take samples of soil, water, and/or air.

TABLE 6-4. ELEMENTS OF INSPECTOR TRAINING

BASICS OF COMPLIANCE AND ENFORCEMENT

- Introduction to Environmental Compliance
- Summary of Environmental Requirements
- Components of an Enforcement Program
- Organizational Structure for Compliance and Enforcement
- Role of the Inspector/Field Investigator

LEGAL ASPECTS OF RESPONSE INSPECTIONS AND ENFORCEMENT

- Enforcement Litigation
- Entry and Information-Gathering Tools
- Evidence

PRE-INSPECTION ACTIVITIES

- Pre-inspection Planning and Preparation
- Administrative Considerations for Inspectors

ON-SITE ACTIVITIES

- Gaining Entry and Opening Conference
- Ensuring Inspector Health and Safety
- Records Review
- Physical Sampling
- Interviews
- Observations and Illustrations
- Closing Conference/Travel Security Measures

POST-INSPECTION ACTIVITIES

- Reports and Files
- Laboratory Analysis
- Enforcement Proceedings

COMMUNICATIONS

- Serving as an Expert Witness at Enforcement Proceedings
- Press and Public Relations
- Communications Skills

- Analytical equipment to analyze the environmental samples taken at the facility.

SELF-MONITORING, -RECORDKEEPING, AND -REPORTING BY THE REGULATED COMMUNITY

Self-monitoring, -recordkeeping, and -reporting are three ways in which sources can be required to track their own compliance and record or report the results for government review. Increasingly, self-monitoring, -recordkeeping, and -reporting are being recognized as providing essential data to supplement and support inspections.

- In *self-monitoring*, sources measure an emission, discharge, or performance parameter that provides information on the nature of the pollutant discharges or the operation of control technologies. For example, sources may monitor groundwater quality, or may periodically sample and analyze effluent for the presence and concentration of particular pollutants. Sources may also be asked to monitor operating parameters on pollution control equipment (such as line voltage and electrical current used) that indicate how well the equipment itself is operating. Operating parameters are generally inexpensive to monitor and provide reliable data that give a more accurate and representative picture of emissions than occasional sampling and analysis of the emissions themselves. This type of monitoring has proven to be a cost-effective way for enforcement programs and sources to assure themselves that controls are operating correctly.
- *Self-recordkeeping* means that sources are responsible for maintaining their own records of certain regulated activities (e.g., shipment of hazardous waste).
- *Self-reporting* requires that sources provide the enforcement program with self-monitoring or -recordkeeping data periodically and/or upon request.

Self-monitoring, -recordkeeping, and -reporting provide much more extensive information on compliance than can be obtained with periodic inspections. Self-monitoring, -recordkeeping, and -reporting requirements also shift some of the economic burden of monitoring to the regulated community, and they provide a mechanism for educating this community about the compliance requirements. Self-monitoring, -recordkeeping, and
-reporting may also increase the level of management attention devoted to compliance, and may inspire management to improve production efficiency and prevent pollution.

Self-monitoring requires that reliable and affordable monitoring equipment be available to the regulated community. Self-monitoring, -recordkeeping, and -reporting rely on the integrity and capability of the source to provide accurate data. The data will be misleading if the source either deliberately falsifies the information or lacks the technical capability to provide accurate data. Therefore, programs using self-monitoring, -reporting, and -recordkeeping will need to establish some way to help ensure accuracy, e.g., by requiring self-monitoring only in facilities with the appropriate technical capability, by developing quality control standards for monitoring and recordkeeping, etc.

In the United States, self-monitoring, -recordkeeping, and -reporting are often required by environmental regulations (see Table 6-5). Enforcement officials translate these regulatory requirements to facility-specific requirements via permits. Information from self-monitoring, -recordkeeping, and -reporting is used primarily to target inspections. It is also sometimes used as a basis for enforcement actions. Usually, it is supplemented by inspections to corroborate the accuracy of the data.

Issues

To use self-monitoring, -recordkeeping, and/or -reporting as part of an enforcement program, program officials will need to provide guidance to the regulated community on the standard procedures, methods, and instruments that should be used to obtain the data; on how frequently data should be collected; and on how the data should be recorded and reported. Some issues to consider in developing these requirements are:

- Cost. What will the cost and paperwork burden be to industry and government? What will the benefits be? Are the benefits worth the cost?

TABLE 6-5. EXAMPLES OF SELF-MONITORING, -REPORTING, AND -RECORDKEEPING REQUIREMENTS IN THE UNITED STATES

WATER POLLUTION. The national water program relies heavily on source self-monitoring and self-reporting. All sources discharging into the surface waters of the United States must perform self-monitoring and self-reporting. The regulations require monitoring of discharges, use of a standard form to report monitoring results, a minimum reporting frequency of once a year, and a requirement to maintain records for at least 3 years. The specific parameters, methods, and frequency of monitoring and reporting are tailored to the source and described in the individual permits. For example, a permit may require a source to perform continuous monitoring of temperature, flow, and pH, and specific sampling of the effluent for solids, organic compounds, toxic metals, and oil and grease. Most major sources must report on a monthly or quarterly basis. Minor sources generally report once or twice a year.

DRINKING WATER. Drinking water suppliers must test drinking water for specific chemical, microbiological, and radioactive contaminants for which national standards have been set. To ensure quality, all systems must use government-certified laboratories to perform the monitoring. The frequency with which the sampling results must be reported to the government varies depending on the size of the water system and the contaminant being monitored. The reporting frequencies range from daily to every 3 or 4 years. Once reported, the results become public information. If a standard is exceeded, the public health consequences of the violation must be reported by the system to its customers.

AIR POLLUTION. Because of the high cost of monitoring air pollutants, program officials have generally imposed minimal self-monitoring requirements and limited self-reporting requirements for stationary sources. Stationary sources may be required to test their emissions for sulfur dioxide, nitrogen oxides, carbon monoxide, lead, particulate matter, volatile organic carbons, and other specific hazardous air pollutants. This testing may be occasional, periodic, or (where technology allows) continuous. For mobile sources (i.e., engines from motor vehicles), self-monitoring and self-reporting requirements are imposed primarily on institutions that can easily affect the emissions of many vehicles at once, e.g., the vehicle manufacturers, maintenance shops, and fuel suppliers.

HAZARDOUS WASTE. This program regulates tens of thousands of different waste handlers who handle a wide variety of wastes. Self-monitoring, -reporting, and -recordkeeping are very important because of the immense size and variability of the regulated community. A single recordkeeping document must accompany a shipment of hazardous waste wherever the waste travels. Each individual handler of the waste (generators, transporters, storage facilities, treatment facilities, and disposal facilities) must sign the document and keep one copy. Generators must keep a copy of this document for 3 years after shipment. Every other year, generators must also provide information on their activities to their authorized state agencies or to the U.S. Environmental Protection Agency. Treatment, storage, and disposal facilities must perform self-monitoring. For example, groundwater monitoring is often required to detect leaks at landfills; waste incinerators may be required to continuously monitor the temperature and carbon monoxide content of their emissions.

PESTICIDES. This program focuses on ensuring that pesticides are tested and registered. It has important recordkeeping requirements so that inspectors can make sure that the product labels and advertising do not violate any restrictions on pesticide use. Pesticide manufacturers must also test their product for potential health effects and submit and maintain testing records to help trace any harmful effects of pesticides in use back to the manufacturer.

- Technology Requirements. Is technology available for monitoring? How much does it cost? How accurate and reliable is it? How easy is it to learn how to operate the equipment to get accurate results?
- Data Use. How exactly will enforcement officials use the data? What information will the data provide about violations or compliance success? What is the minimum amount of data that will be useful?
- Extent of Requirements. Should the source be required to report all data or just data that indicate a potential violation? Proponents of the "all data" requirement argue that more management attention will be paid with routine reporting and that enforcement officials can better control the quality of data. Proponents of exceptional reporting argue that this is much less expensive, and that the "all data" approach may discourage sources from voluntarily conducting additional monitoring that they feel may be valuable.
- Public Disclosure. Should the self-reported data be made available to the public? Most U.S. environmental laws require that self-reported data be made available to the public. This publicity effectively deters violations and failure to report, especially when the law also gives citizens the right to sue sources.
- Self Certification. Should senior industry officials be required to certify that the facility is in compliance? Increasingly, U.S. laws are introducing this requirement and making senior officials personally liable for false reporting. This is an effective way to elicit the attention and cooperation of senior management in achieving compliance. Such requirements will be meaningful only if they are backed by clear guidance on and procedures for self-certification. Self-certification may also include a requirement to report violations and efforts to correct them.

CITIZEN COMPLAINTS

Citizen complaints are an important way of detecting violations that are unlikely to be detected through self-reporting or inspections. These include violations that take place in isolated areas, and illegal acts within an organization. Enforcement programs can help educate and train citizens to detect and report problems. One U.S. program encourages citizen involvement by providing a financial reward for any report that leads to a conviction of the violator.

AREA MONITORING

Information on compliance status can be gained by area monitoring, i.e, monitoring environmental conditions near a facility. Area monitoring includes ambient monitoring, remote sensing, and overflights.

Ambient Monitoring

This includes any monitoring to detect pollutant levels in the ambient air, ground, or surface waters near a facility. The main problem with ambient monitoring is that it can be difficult to demonstrate that the pollutants measured came from a particular facility. Ambient monitoring is most useful when a source is the only significant polluter in the area, or when its emissions have a characteristic composition that serves to "fingerprint" them. In these cases, ambient measurements clearly suggest potential violations at a facility, and can be used to target inspections. In the United States ambient data are rarely used alone to prove a violation because of the difficulty of proving a connection with the source.

Remote Sensing

Remote-sensing techniques can provide positive proof from outside a facility's boundaries that the facility is violating an environmental requirement. The most developed remote-sensing technique is laser-beam radar, also known as "Lidar," for "light detection and ranging." This technique measures the density of a smoke

plume by day or night. It is relatively inexpensive compared to other air monitoring methods such as stack tests.

Overflights

Both satellites and aircraft can be used to measure ambient and source-specific conditions. Satellites have been useful for detecting large discharges of water pollutants and are most often used to trigger inspections. Satellite images are usually too coarse to calculate the magnitude of the violation.

Aircraft overflights can be even more effective than satellites for compliance monitoring. Airborne cameras can detect and record the densities, temperatures, and area of air and water discharges. Even some biological effects in streams can be detected from the air. Perhaps most significantly, overflights can be used to observe the physical characteristics and work practices at a facility. For example, dikes and fences can be observed and checked against permit records for correct location and condition. Practices such as the loading and unloading of hazardous materials can be observed. Production levels can be estimated from the air and compared to assumptions used in permits or licenses.

Overflights may also be used to detect facilities subject to environmental requirements, to detect facilities that may not have registered for a program or filed required notifications, and to define the relative locations of wastewater discharges, air emissions, hazardous waste management facilities, water supply intakes, populated areas, etc., in specific geographic areas.

Overflights have been used very successfully for enforcement in the Netherlands. Airplanes and helicopters have been used to detect illegal discharges and dumps, many of which are clearly visible from the air. The responsible parties are notified about the detected violations and requested to act where necessary. Success was considerably improved when helicopters began to work simultaneously with ground vehicles. Sighted violations were reported to ground personnel who then immediately proceeded to the scene and dealt with the situation. Periodic aerial photographs of wrecked yards and dump sites have provided a good record of these operations and how they are changing. Where appropriate, these photographs can be used in later investigations.