ICF'S PLANT COMPLIANCE ASSESSMENT SYSTEM

S. M. Baker
ICF Technology, Incorporated
Richland, Washington 99352

ABSTRACT

Government and private industrial facilities must manage wastes that are both radioactive and (chemically) hazardous. Until recently, these "mixed" wastes have been managed under rules established under the Atomic Energy Act (AEA) and the Low-Level Waste Policy Act, and rules that derive from environmental legislation have not been applied. Both sets of rules now apply to mixed wastes, creating situations in which significant changes to waste steams must be made in order to bring them into compliance with environmental regulations. The first step in bringing waste streams into compliance is to determine their status with respect to the newly-applicable regulations. This process of compliance assessment is difficult because requirements to minimize human exposure to radiation can conflict with requirements of environmental regulations, many regulations are potentially applicable, the regulations are changing rapidly, and because waste streams designed to operate under AEA rules frequently cannot be easily modified to incorporate the additional regulations. Modern Personal Computer (PC) tools are being developed to help regulatory analysts manage the large amounts of information required to assess the compliance status of complex process plants. The Plant Compliance Assessment System (PCAS), developed at ICF performs this function by relating a data base containing references to regulatory requirements to data bases created to describe relevant aspects of the facility to be assessed. This relationship allows the analyst to create check sheets for field audit of the facility, and to enter the results of the audit into a merged data base from which status reports can be produced. The merged data base can also be used to track corrective action.

INTRODUCTION

Radioactive materials have been used on a wide scale in industrial processes since World War II. The dangers associated with direct exposure to radiation and contamination by radioactive materials were understood when their use first became common, and safety measures were established to prevent risks to human health that have been effective. Materials that are (chemically) hazardous were used in industrial processes long before nuclear materials, but the associated risks were not as well known, and regulatory mechanisms to manage the risks evolved later than for nuclear materials. Design features for handling mixtures that are both radioactive and hazardous have generally been dominated by the radioactive hazard; that is, the design features incorporated to protect people from the radiation risk have generally been adequate to protect them from the chemical hazard. This situation existed for both process materials and waste.

Recently, it has been established that environmental regulations governing the management of hazardous wastes are applicable to any hazardous waste, radioactive or not. This requires that existing radioactive waste streams be assessed with respect to the environmental regulations to see if they are hazardous, and, if so, to bring them into compliance with the additional regulations.

Modern Personal Computers (PCs) and software can be utilized to help regulatory analysts keep track of the large volumes of information required to comprehensively evaluate the compliance status of a facility with respect to regulations. This has been done at ICF, where the Plant Compliance Assessment System (PCAS) was developed to help ICF analysts assess facilities for clients. This paper describes the architecture of the PCAS software, and how the system is utilized to assess compliance status and help make management decisions. It also briefly discusses the other aspects of an effective liability control program.

REGULATORY REQUIREMENTS

Most mixed waste streams become mixed because they contain a component that is hazardous in the sense of the Resource Conservation and Recovery Act (RCRA). Poly Chlorinated Biphenols (PCBs) may be in nuclear waste streams, and emissions to air and water can exist. These situations are governed by environmental regulations (Title 40 of the Code of Federal Regulations), therefore, PCAS development efforts have focused in this area. A data base has been established containing citations from regulations implementing the following areas of federal legislation:

- Resource Conservation and Recovery Act (RCRA);
- Clean Water Act (CWA);
- Safe Drinking Water Act (SDWA);
- Toxic Substances Control Act (TSCA);
- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA): and
- Clean Air Act (CAA).

Each regulatory citation in the data base is keyed with several logical fields that characterize the its applicability. These logical key fields are used to generate check sheets for facilities as described in the following section.

FACILITY DESCRIPTION

In order to use the regulatory data base described above, it is necessary to create a parallel data base describing each facility to be assessed. The PCAS facilitates this description with menus that guide the analyst to answer questions about the facility with "yes" or "no." Each answer corresponds to one of the logical fields set in the regulations

data base. The questions are posed in two tiers. The first set of questions ask the analyst to determine which of the following six situations or items exist in the facility to be assessed:

- hazardous waste generation,
- hazardous waste treatment, storage or disposal (TSD),
- waste streams,
- waste management units,
- PCB or asbestos-containing items, and
- underground storage tanks.

Each of the above is generically referred to as an "item" for simplicity. Once an item is selected, a second tier of questions is presented. Answers to these questions set logical keys that correspond to those set in the regulations data base.

GENERATION OF CHECKLISTS

The PCAS utilizes relational data base features that allow the regulations data base and the facility data base to be related or "joined" to create a third data base that describes how the regulations apply to the items in the facility to be assessed. For each item, the data base contains a list of all regulatory citations that may apply. The joined data base is used to produce a set of check sheets for each item that the analyst can take into the field to assist his audit of the facility. Figure 1 illustrates this process. The regulation data base is joined with the facility data base to produce check sheets. The check sheets provide for assessment of each item with respect to each identified regulation. A single-word assessment is made, placing the item into one of four categories:

- Compliant meaning all elements of the requirement are met in full,
- Questionable it is unclear from the data given if the requirement is relevant and current practices compliant without a policy level decision, e.g., whether a waste unit qualifies as an underground injection well,
- Non-compliant one or more elements of the requirement are not met, and
- Insufficient data compliance can not be determined from data currently available, e.g., waste stream characterization is inadequate.

Space is also provided for entry of comments to explain why the category was assigned.

After the check sheets are completed, the information is entered into the joined data base to provide a record of the audit. The joined data base with the audit results entered is shown as the "compliance data base" on Fig. 1. Each of the data bases can be used to produce reports. The reports can include all information in the data base, or the data can be filtered to provide only information of a specified type; for example, the compliance data base can support reports of all items assessed, or can report only those items for which corrective action is required. The compliance data base can be used to track corrective action, or to provide input to an action tracking system.

ASSESSMENT AS A MANAGEMENT TOOL

Assessment of the compliance status of a facility allows the facility operator to correct deficiencies early and avoid risk of regulatory penalties. The assessment process described here can also be used to: (i) guide design of new facilities, (ii) help select regulatory compliance strategies, and (iii) plan for incorporation of new regulatory requirements. Examples to illustrate these uses are given below.

Design of New Facilities

A proposed facility might be configured so that it would be regulated either under final TSD rules or less-than-90-day accumulation rules. Both sets of rules could be entered for the proposed facility and mock assessments performed. The cost of corrective action in each case could be evaluated along with the inconvenience of limited allowable storage time to help make final design decisions.

Compliance Strategies

A given facility might have a large amount of material that is waste that has been designated as hazardous due to a recent change in regulations. Alternately, the material may have been feed stock that was intended for use, and became waste because of a change in the mission or status of the facility. If it is not possible to transfer the material to an authorized hazardous waste TSD operator within 90 days, the facility must establish a regulatory basis for storing it. There may be several options, for example, it may be possible to qualify for interim status, and for either interim or final status, the facility might consider waste pile, tank or surface impoundment storage. Mock assessments could be performed for each option to assess the impact that each option would have on cost to the facility.

Proposed Regulations

The rule-making process provides early warning when additional regulations are going to be issued. For example, rules for hazardous waste tanks (40 CFR 265 Subpart J) were issued by the US EPA some time before the state of Washington issued corresponding rules. The state rules were likely to be different than the federal rules, but facility operators knew that they must be at least as stringent. Some facility operators assessed their tank systems as though the federal rules applied, in order to identify the budget that would be needed when the new rules would be implemented. This provided them with valuable budget planning information.

METHODOLOGY FEATURES

Confidentiality

Aggressive self-assessment allows facility managers to allocate resources to minimize the risk associated with hazardous and radioactive substances. The information might also be valuable to competitors. Therefore, it is important that facility compliance status remain confidential within the company while a strategic plan for allocating resources required to improve operations is being

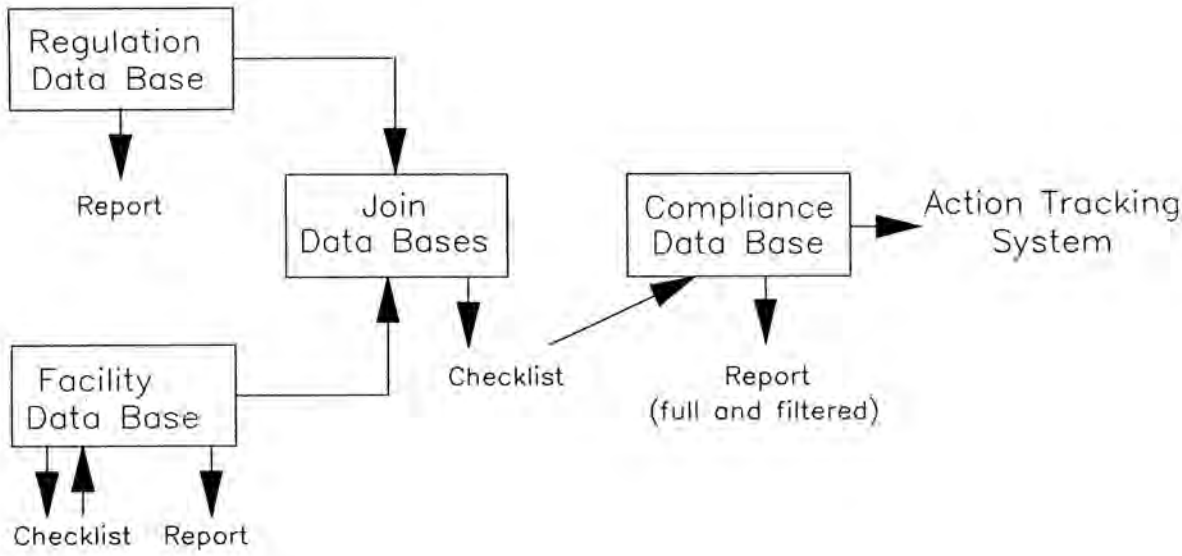

Fig. 1. Compliance Assessment Systesm.

developed and implemented. Implementation of the PCAS on PCs using standard software allows the facility operator to establish close control of the assessment process. Security features such as password access and controlled distribution are completely within the control of the facility manager.

Plant Specificity

Each operating facility has unique features that dictate which regulatory requirements apply. (For example, pretreatment and disposal to a community water treatment system might be appropriate for one plant, while more stringent water quality standards at another location might require that another plant treat similar wastes by evaporation, solidification and disposal in a landfill). The PCAS methodology incorporates features that encourage consideration of process-specific and location-specific information.

Efficiency

The total body of regulatory requirements that may apply to a given facility represents a very large amount of information. Plant features (such as operating parameters and disposition of materials that are processed) that must be considered also constitute a very large amount of information. Much of the information that might be considered is irrelevant to compliance with environmental regulations for any single facility. However, it is not always immediately obvious which information is relevant and which is irrelevant. The ICF methodology provides an automated system to help make the required decisions. The system prompts the analyst to ask the proper questions to identify relevant information and use it to determine compliance status. The administrative workload of the analyst is reduced, allowing him to focus his efforts on analysis of the regulations, not maintaining files and producing reports.

Transferability

The PCAS utilizes standard, low-cost equipment that is available in most offices. The system can be rapidly modified to apply to new tasks.

LONG TERM LIABILITY CONTROL

Facility Assessment

Assessment of facility status is but one of four elements required for a program of long term liability control. PCAS is designed to assist with compliance assessment. The remaining elements are compliance attainment, compliance maintenance, and liability prevention.

Compliance Attainment

Compliance attainment activities are determined by the areas which are found to be out of compliance with regulations, the specific operating parameters of the facility, and the regulatory strategy of the facility operator. As a consequence, the compliance assessment alone does not determine what corrective action is required. For each problem area, a unique deficiency mitigation plan should be developed. Individual elements of plans can include

specified actions enumerated in the regulation (e.g., preparation of a contingency plan, conduct of training for plant staff, and development of procedures and manuals), but management attention is required to determine the corrective action program required.

Compliance Maintenance

Compliance maintenance programs are designed to monitor activity after compliance is achieved and to see that procedures evolve with the regulatory programs. This is accomplished through design and implementation of an internal audit function and a regulatory analysis function. The former constitutes a type of quality assurance/quality control program for compliance activities. It should involve a series of periodic audits to check all areas for compliance. These audits can be conducted by facility staff, but should occasionally involve outside parties. Audits serve both to identify new areas of deficiency and to act as a deterrent to gradual erosion of compliance status.

Regulatory Analysis

The regulatory analysis function is directed to continual review of relevant state and federal actions such that new requirements are identified and entered into the facility compliance maintenance system. In this way, facility staff can quickly identify areas of noncompliance created by changes in requirements and initiate mitigation as appropriate. The compliance program grows and evolves with the requirements. This real-time response feature in the approach prevents facilities from falling so far behind in the future that they return to a fire-fighting mode. The update function is generally performed on a monthly basis. Changes are highlighted in periodic reports to management so that potential new deficiencies can be identified and steps taken to achieve compliance at the outset.

Liability Prevention

Comprehensive liability control plans should include a fifth set of activities, liability prevention. Preventative measures address elements with a high potential for future liabilities that are not precluded merely by complying with regulations. Examples of preventative measures include waste segregation, waste minimization and hazardous substances control systems. Segregation might, for example, focus on keeping radioactive substances out of hazardous wastes and hazardous substances out of radioactive wastes. While waste minimization is addressed in RCRA regulations and implied within the ALARA philosophy, the requirement is largely one of assessing that reasonable efforts have been made to minimize waste production. On the surface this would include process changes that do not impact process economics significantly. However, the cost-benefit analysis does not necessarily incorporate savings accrued through reduction of long term liability. As a liability prevention measure, waste minimization should be based on a broader view that considers the potential for corrective action costs in the future arising from such problems as contamination at disposal sites.

Hazardous substances control systems consist of inventory tracking and contingency programs. Hazardous substances should be tracked from point and time of entry through exit from the plant. An effective tracking system must determine where substances are and in what quantity they are present. An effective contingency program must be able to use the tracking system together with spill information, to provide information on evacuation routes, location of emergency equipment, and environmental hazards to be controlled by the facility response organization. Contingency plans are required for hazardous waste facilities under present law. The integration of those plans with a tracking system is not required. The incentive for integration lies in the reduction of liability risk that can be achieved by reducing the likelihood of release, and by establishing more a more effective response capability to deal with any release that may occur.