

## RESOURCE CONSERVATION AND RECOVERY ACT COMPLIANCE AT THE HANFORD SITE

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### ABSTRACT

Successful implementation of the Resource Conservation and Recovery Act (RCRA) at the Hanford Site has been and will continue to be a significant challenge. The 560 square mile Site encompasses over a thousand facilities and waste sites that are influenced by the complex and changing regulatory framework of RCRA. The challenge is enhanced by the relatively new application of RCRA to mixed waste, which contains both radionuclides and hazardous constituents. This paper provides an overview of the approaches being used to achieve and maintain compliance.

### BACKGROUND

The Hanford Site nuclear facilities are located in the semiarid Columbia Basin of Eastern Washington. The facilities include a large variety of operating plants and those awaiting decommissioning. Today's operations range from high-technology research, including advanced reactors, to chemical processing to provide nuclear materials for defense. Numerous waste management activities support the broad-based operations.

A variety of radioactive and nonradioactive wastes are managed at the remote site. The wastes are a result of operations dating back 40 years to the original Manhattan Project and through the cold war era to today.

During the past few years, much of the waste and many facilities at Hanford have become regulated by Resource Conservation and Recovery Act (RCRA). Because the State of Washington has been granted authority to implement RCRA, many of the governing rules are derived from State law. These State rules are often greater in scope than Federal regulations.

### DISCUSSION

The RCRA implications magnified through State regulations are broad for a large industrial complex like the Hanford Site. To provide a basis for clear understanding, the remainder of the discussion will be divided in the following categories:

1. Nonradioactive hazardous waste
2. Mixed solid waste
3. Mixed liquid and solid tank waste
4. Permitting of treatment, storage, and disposal facilities
5. Regulatory agreement
6. The hard spots
7. Conclusions

#### Nonradioactive Hazardous Waste

Nonradioactive hazardous waste is generally treated and disposed of offsite by permitted contractors. About 1.8 million kilograms of solid and liquid hazardous waste such as corrosive or ignitable waste are generated during a typical year. Of course, this will vary depending on what aspects of the site's diverse mission are being emphasized, because

to the fact that chemical use will vary. Significant programs are being undertaken to limit the purchase of chemicals that would become hazardous waste and to recycle materials where practical.

The applicability of RCRA to conventional chemical waste has been recognized for a number of years at the Hanford Site. This time factor, coupled with experience gained from other industries, as allowed development of a modern management program.

Wastes are gathered in satellite accumulation areas and 90-day storage areas around the Site. At these areas, the waste is characterized and designated as to type of hazard and is then packaged to U.S. Department of Transportation standards and transferred to an onsite storage facility. This modern structure is designed to comply with all Federal and State requirements and has been acclaimed by numerous regulators for its quality. The facility has separate storage cells for each waste class and serves as a clearinghouse for shipments to offsite permitted treatment and disposal facilities. This aspect of compliance with RCRA is a clear example of the U.S. Department of Energy (DOE) and its contractors stepping to a modern pace when it becomes clear what rules govern.

#### Mixed Solid Waste

All mixed waste is managed onsite; the Hanford Site has been a resource for materials from other sites. Historically low-level mixed waste was buried as low-level waste. Since 1970, transuranic waste has been stored on asphalt pads and covered with soil. A portion of this is mixed waste. Both low-level and transuranic mixed wastes are now being collected, and RCRA-compliant storage facilities are currently being constructed. These facilities are designed with waste characteristics in mind to ensure containment. For example, flammable wastes are stored in facilities with fire control systems. The Waste Receiving and Processing Facility is being engineered to provide treatment of mixed waste to optimize disposal practices. This facility will be capable of treating and certifying waste for disposal as hazardous, low-level, mixed, or transuranic.

Hanford Site plans to handle solid mixed waste are straight forward. However, implementation is a significant challenge, as is being experienced around the country. Original plans (early to mid-1980's) for processing solid waste were largely oriented toward separating low-level

from transuranic waste and packaging the transuranic waste in compliance with the Waste Isolation Pilot Plant-Waste Acceptance Criteria (WIPP-WAC) for shipment to New Mexico. This planning was based on the premise that treating and containing the radioactive component would adequately control chemical content. Application of RCRA requirements to mixed waste significantly increased the complexity of treatment and disposal engineering. Additional characterization, treatment and disposal steps must now be carried out along with RCRA permitting.

Until a facility can be developed at the Hanford Site to carry out the multifaceted characterization and treatment needed, most wastes will be stored. Older storage facilities for mixed waste were not designed or operated to the technical and administrative requirements of RCRA. New concrete pads and enclosed buildings are being constructed to provide compliance with the prescriptive requirements of RCRA. Priority for use of these storage facilities will go to newly generated waste.

Wastes stored on asphalt pads and covered with soil will be more costly to process upon exhumation than planned. Multiyear delays in establishing processing facilities have resulted in exceeding the design life of this storage mode. Expected deterioration of containers will add to the handling costs.

This is a case where regulation under RCRA in addition to the Atomic Energy Act (AEA) is exacerbating the difficulties already encountered in attaining resources needed to achieve the long-sought final disposal of DOE waste.

#### **Mixed Liquid and Solid Tank Waste**

Liquid radioactive waste storage systems at the Hanford Site are comprised of the old and the new. Because the contents of some of these tanks have been determined to be mixed waste, the management of tanks at the Hanford Site is being influenced by RCRA.

Applying RCRA to the old tanks is very challenging. There are 149 large underground tanks each comprised of a single carbon steel liner in a concrete encasement. From preliminary characterization data, it appears that the majority of these tanks contain RCRA wastes. These tanks were phase out of active service when leaks began to occur in the late 1960's. Although out of service, a Part A permit application was submitted for these tanks because they continue to store mixed waste.

Total compliance with RCRA is proving difficult if not impossible to achieve. The RCRA does not allow alternatives to be based on risks associated with both chemical and radiological hazards as is basic to the requirements under the AEA process. Two examples follow.

1. Compliance with RCRA interim status requirements for tanks, such as retrofitting of tanks with secondary containment is infeasible.
2. The RCRA tank systems and tank wastes cannot be left in place upon closure. However, removal would incur

unacceptable radiation exposure risks with little benefit to the environment.

All parties need to remain open minded in the time ahead to ensure the protection of workers [and the environment] and that the best interest of society is served. However, the DOE remains committed to pursuance of closure alternatives that represent the least risk to human health and the environment from chemical and radiological hazards. Resolution of these issues may require application of Section 1006 of RCRA, which allows that RCRA must yield to the AEA where it is inconsistent with this Act's goals and policies.

Plans for treatment and disposal of waste in the newer tank systems are consistent when applying RCRA and AEA regulation because the waste is readily transported, treated, and disposed by means that meet the intent of both laws. This waste is stored in tanks that generally meet or exceed RCRA standards and is planned to be treated and disposed of in accordance with RCRA land-disposal restriction standards in RCRA-permitted facilities. The waste will be moved through doubly contained piping to a pretreatment facility to separate low and highly radioactive components. The low-level component then will be processed in a grout matrix and solidified in double-contained vaults. This process has already been used to solidify nonhazardous low-level liquid waste. The high-level component of this new tank waste will be vitrified. Resulting glass logs will be stored in cooled systems until a high-level waste repository is available for permanent disposal. All facilities used for processing or disposing of this newer tank waste are planned to be operated with State permits issued under RCRA.

#### **Permits and Compliance**

Most facilities that treat, store over 90 days, or dispose of hazardous or mixed waste are being permitted for operation. Facilities intended to be closed will be closed under an interim status closure plan or will receive a postclosure permit under Washington State implementing regulations. Interim status has been obtained through submittal of Part A permit applications.

Fifty-seven facilities have been identified as requiring a closure or permit action. Negotiations are under way with Washington State and U.S. Environmental Protection Agency (EPA), Region 10 to establish a schedule for completing permits and closure plans.

There is much more to interim status than simply submitting a Part A. When you submit the Part A, which is a document of only a few pages, you are committing to comply with a broad range of regulatory requirements that eventually become permit requirements. Hanford Site management has taken an aggressive approach to assessing interim status compliance at the numerous facilities for which we have filed Part A permit applications. Expert consultants have systematically reviewed each operation and documented areas requiring additional actions. Actions required range from hardware modifications to modifying the format of inspections and training records. Much of the documentation, including action plans, has been submitted voluntarily to the State and EPA, Region 10. This activity

has proven to be very rewarding and has removed much of the compliance mystery for DOE, contractors, and regulators. This type of open self-assessment is likely to be a permanent part of Hanford Site operations.

#### **Regulatory Agreement**

To integrate the regulatory and compliance responsibilities of DOE, EPA, and the State of Washington, the parties are attempting to negotiate a very detailed compliance agreement. Due to overlapping legal requirements, the agreement is designed to integrate compliance activities of both RCRA and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). If successful as one agreement, it will cover site remediation under CERCLA or RCRA, site closures under RCRA, and RCRA permitting. When signed, this agreement will serve as a foundation for all three agencies to manage their responsibilities at the Hanford Site.

#### **The Hard Spots**

It should come as no surprise that it is a significant challenge to apply a complex regulation to a complex operation for which it was not written. It is apparent that DOE and EPA both value the progress that has been made and both are also beginning to confront the more challenging aspects. The EPA has stated in several recent rulemakings the recognition that flexibility is required. They have also invited the regulated community to bring forth information

on areas of potential inconsistency between the requirements of RCRA and the AEA. For DOE sites, such areas can arise principally from two sources:

- The AEA may provide adequate protection in a slightly different manner or for a different time frame than RCRA. In this case, strict application of RCRA would not be cost effective.
- The AEA may require material to be handled in a particular way due to radiation. Some requirements of RCRA do not provide consideration of the radioactive hazard and strict application could increase total risk.

#### **CONCLUSIONS**

Great challenges and opportunities lie ahead as we all learn to achieve RCRA compliance. For the Hanford Site, the difficulties will be in acquiring the resources in dollars, personnel, and knowledge to achieve permits and closure decisions. The significance of this challenge includes resources needed by the agencies with the responsibility to regulate. It is estimated that these and other compliance activities will cost on the order of \$50 billion during the next 30 to 50 years.

Success will require flexibility among all the parties and a striving for standards and technology that will result in cost-effective decisions.