Compliance Agreements at the INEL: A Success Story

INTRODUCTION

The Radioactive Waste Management Complex (RWMC), located at the Idaho National Engineering Laboratory (INEL), is the storage facility for approximately 135,000 containers of radioactive mixed waste that must be stored in accordance with Resource Conservation and Recovery Act (RCRA) requirements. Collectively, the compliance and safety basis documents governing the operation of the storage facility contain approximately 2,500 specific, identifiable requirements.

Critical to the compliance with these 2,500 requirements was the development of a process which converted these requirements to a form and format that allowed implementation at the operator level. Additionally, to ensure continued compliance, a method of identifying and controlling implementing documents is imperative. This paper discusses the methods employed to identify, implement, and control these requirements.

BACKGROUND

The RWMC is a 165-acre controlled access facility whose primary mission is to safely dispose of INEL-generated low-level waste (LLW) and to temporarily store transuranic (TRU) and Special Case waste.

In 1953, the Atomic Energy Commission (AEC) decided that solid radioactive waste from its Rocky Flats Plant near Golden, Colorado, would be sent to the RWMC for disposal. The first shipment of waste was received from Rocky Flats in 1954. The waste, which contains transuranic nuclides (principally plutonium), was stacked in pits and covered with earth. Approximately 90,000 containers of contact-handled (CH) TRU waste are stored in this manner at the TSA. In 1970, the AEC directed that all waste contaminated with TRU isotopes be segregated from other types of radioactive waste because of the radiotoxicity and long half-lives of the TRU material. The TRU waste was to be stored in a readily retrievable manner, during an interim storage period of 20 years. In 1984, an air-support building was constructed over a portion of one of the asphalt pads. CH TRU waste received at the RWMC since 1985 has been stored inside air-support buildings. Approximately 35,000 containers of CH TRU waste are stored in this manner in the TSA at the RWMC.

The CH TRU waste stored in the TSA also contains, or is suspected to contain, hazardous materials regulated under RCRA.
DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, make any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.
DISCLAIMER

Portions of this document may be illegible in electronic image products. Images are produced from the best available original document.
In June 1989, the Environmental Protection Agency (EPA) and the State of Idaho Department of Health and Welfare (IDHW) conducted a routine inspection of the INEL to determine compliance with Federal and State hazardous waste requirements.

Through a Notice of NonCompliance (NON), the EPA notified the Department of Energy (DOE) of a number of alleged violations in January 1990. DOE, EPA, and IDHW agreed that the NON would be resolved by execution of a Consent Order, subsequently issued in April 1992.

One alleged violation resolved by the Consent Order related to the storage of radioactive mixed waste at the RWMC. Specifically, the Consent Order states:

"The DOE is storing radioactive mixed waste at the RWMC in violation of the aisle space and inspection requirements set forth in ADAPA 16.01.5009 (40 CFR 265.15 and 265.35). In order to resolve this violation, DOE shall:

1. Increase design capacity at the INEL for the storage of 35,200 containers of radioactive mixed waste stored at the INEL;

2. Complete transfer of the 35,200 containers currently stored in Air-Support Buildings to the new storage buildings as follows;
   a. 50% shall be transferred on or before January 1, 1996, and
   b. The remaining 50% shall be transferred on or before January 1, 1998."

Surveillance and inspection requirements were also agreed to, during the pendency of a RCRA Part B Permit.

CONSENT ORDER COMPLIANCE

Compliance with the Consent Order requirement to construct RCRA-compliant storage facilities at the INEL (increase design capacity) necessitated completion of a number of specific activities, as outlined below.

RCRA Permits

In November 1988, the RCRA Part A Permit (application to operate under interim status) was revised to reflect increased design capacity at the RWMC.
In May 1991, a RCRA Part B Permit application was submitted to the State of Idaho. The permit application was revised in response to notice of deficiencies, in July 1992, November 1992, and March 1995. The Draft permit application was published for public review and comment in June 1995. It is anticipated that the final permit will be issued in October 1995.

RCRA Part B specifies the requirements for (1) maintaining and operating the facility; (2) characterizing, labeling, configuring, and inspecting the stored waste; (3) safeguarding employees, the public, and the environment; and (4) developing training, access control, emergency response, and reporting.

Air Permits

An Environmental Assessment (EA) of the proposed storage facilities resulted in a Finding Of No Significant Impact (FONSI), and following public review and comment, the State of Idaho approved a Permit to Construct (PTC) an Air Pollution Emitting Source in the State of Idaho in December 1990. The PTC is currently in the third revision.

The PTC contains emission limits concerning the release of radionuclides and volatile organics (the containers are vented) and reporting requirements.

Safety Analysis Report (SAR)/Technical Safety Requirements (TSR)

The SAR and TSR, developed for the Waste Storage Facility (WSF) at the RWMC in accordance with DOE Orders 5480.22 and 5480.23, were approved by DOE in July 1994. The WSF is classified "Hazard Category 3."

The SAR and TSRs contain requirements for maintaining and operating the facility; safeguarding employees, the public, and the environment; configuring and inspecting stored waste, and developing training, access control, emergency response, and reporting requirements.

Facility Construction


Each of the 120 × 240-ft (28,800 ft²) modules was designed to contain 19,200 55-gal drums in a negotiated configuration. Segregation and separation requirements decrease this number, as does the mixing of container types and sizes.
Facility Start-Up

The Operational Readiness Review for the first two modules, conducted in accordance with DOE Order 5480.31, was completed in November 1994. Following DOE approval to operate the facility, mixed waste containers were first moved into the WSF in December 1994.

OPERATION

Consent Order Requirements

The Consent Order requirements are as follows: (1) Move approximately 35,200 containers currently stored in air-support buildings at the RWMC into RCRA-compliant storage; and (2) inspect each container in accordance with SAR/TSR and negotiated RCRA requirements.

Compliance Concerns

Current container storage is not in compliance with inspection and aisleway requirements specified in the Consent Order. Containers must be moved into RCRA-compliant facilities and configuration.

Construction of compliant facilities require a PTC, SAR/TSRs, and ultimately a RCRA Part B Permit. Collectively, these documents contain approximately 2,500 specific, identifiable requirements, 47 of which pertain to the inspection or configuration of stored containers. The remaining requirements run the gamut from training and access control to flood protection.

Need

Because of the large number of requirements, there was a need to provide a simple, reliable method of identifying and tracking requirements and identifying and controlling their associated implementing documents. To ensure continued compliance, change control of implementing processes and documents was imperative.
Compliance Approach

1. Tabulate all requirements and identify, specifically, the source (page and paragraph number) of the requirement. Scan requirements to determine duplication, both within a requirements document and between requirements documents. Where similar requirements exist within a requirements document, group them so as to list the requirement only once. Where requirements are similar, but different, implement the most stringent, reference others. Provide a cross-reference when similar requirements exist between requirements documents, such as RCRA and the SAR.

2. Identify the document (procedure, plan, manual, or drawing) that implements the requirement and identify specifically (step, paragraph number, zone, etc.) where implementation is achieved and place that document under RWMC Change Control.

3. Interpret requirements and ensure that the implementing documents tell "how to comply" rather than merely stating the requirement.

IMPLEMENTATION METHOD

Process Analysis

When the need to identify and track requirements and implementing documents was recognized, several methods were assessed. It was agreed that the system employed needed to be "user friendly," easily modified, and cost effective. Several database systems, including Lotus, d-Base, and derivatives were considered.

Following considerable discussion, a simple test was devised to evaluate the merits of the various tracking systems proposed for this activity. Fifty items from the requirements documented (all of which were developed in WordPerfect) were selected and placed in a tabular format on disc. The desired format for the matrix was specified, as was the content of each column. On average, 120 manhours were expended on three different database systems, none of which provided the information in the desired format. Additionally, changes required resubmittal and processing by the owner of the database. Conversely, due to the "block and copy" function in WordPerfect, only one man-day was required to develop the report, in the desired format, in WordPerfect.

Accordingly, although the database systems offered the glamour of a "high-tech" approach and the ability to sort requirements easily, WordPerfect was selected as the tool because of cost and ease of data manipulation. Over the past 18 months, a countless number of changes have been made to the Compliance Agreements at the INEL: A Success Story
matrix. The cost of these changes is typically in the minutes per change and the process happens very rapidly.

The Matrix

A simple four-column format was selected for the matrix (see Tables 1 and 2). The first column identifies the requirement number and responsible work group; the second column presents the requirement, verbatim, and the source of the requirement; the third column identifies the implementing document, specifically; and the fourth column identifies where the requirement is duplicated (cross-referenced) in another requirements document.

Developing the Requirements Matrix

Requirements Identification. The requirements matrix provides a tabulated list of all of the requirements placed upon the facility by the permitting and safety basis documents, as well as commitments made regarding the operation of the facility in those documents.

Toward this end, we simply read the requirements documents, page by page, line by line, and highlighted the requirements and commitments. The highlighted items were then blocked, copied verbatim, and arranged in sequence in a tabular format by a word processor.

Once the requirements were identified and tabulated, they were screened for operational applicability. Those requirements which were related to the design or construction were separated from those which dictated operational requirements, thereby creating a matrix of "design requirements" to complement the list of operational requirements.

By definition, a design requirement is a permit condition that must be maintained, but is not a day-to-day operational consideration. For example, the exhaust stack for the Type II Modules is specified as not less than 36 ft; modification of stack parameters could impact the result of modeling conducted for the Permit To Construct application. Accordingly, stack height is a design requirement that would require a permit change prior to modification of the stack. Stack height is therefore tabulated as a design requirement.

Conversely, the requirement for doors in the Type II Modules to remain closed except when the building is occupied is an operational requirement and is tabulated as such. This sorting process resulted in 986 design requirements and approximately 1,500 operational requirements.
**Matrix Development.** The tabulated list of requirements was then screened to identify duplicate or similar requirements within a requirements document. For example, the requirement for review of RWMC documents is specified twice in the WSF SAR and five times in the RWMC SAR. This requirement is listed once in the matrix, with all reference points identified.

The requirements lists were then screened to identify duplication between requirements documents. For example, training program profiles are required by the RWMC SAR and by RCRA Part B. Accordingly, in the SAR Operational Requirements matrix, RCRA Part B is identified as a requirement cross-reference. Similarly, in the RCRA Requirements matrix, the SAR is identified as a requirement cross-reference.

This screening process reduced the number of design requirements to 432 and the number of operational requirements to approximately 600, pending issue of the final Part B Permit.

The collecting of similar requirements within a document and the cross-referencing of similar requirements between documents was done to simplify the change control process following requirements implementation. For example, if we decide to change the RWMC Document review process, the SARs must be changed in seven places. If only Chapter 13, which pertains to procedures and document review, were changed, the requirement would still exist in Chapter 12. Likewise, if we no longer wish to develop training profiles, both the SAR and the RCRA Permit must be modified.

**Matrix Implementation.** Once the matrix was developed and firmed up, the requirements were screened against existing processes and procedures. Where an existing procedure satisfied the requirement, it was identified as the implementing document. When the screen was completed, requirements that were not covered by existing procedures were easily identified. Existing procedures were then modified or new procedures developed until each requirement could be tied directly to an implementing procedure.

**Matrix Cost.** Except for word processor time, it is difficult to specify a cost for the matrix, since most of the activity required to develop the matrix would have been done as a part of requirements implementation anyway. To date, 108 hours have been spent on word processing to develop the tabulated lists and organize the matrix. Additionally, approximately 380 hours were spent in identifying and screening requirements. In the current configuration, the matrix (Design and Operations) contains approximately 1,000 requirements, each of which is tied to an implementing procedure. The total expenditure on this activity to date is approximately 500 hours, or approximately 1/2 hour per requirement.
Matrix Value. The matrix developed for the Type II Waste Storage Facilities has been tested a number of times since first released in July 1994. The most notable of these tests occurred during the Operational Readiness Review conducted on the first two modules.

The matrix, developed and released as an RWMC-controlled Project Directive, was presented to both the Contractor and DOE ORR Teams during the pre-ORR briefing. The Contractor ORR was completed in 5 days; the DOE ORR was completed in 3 days. There were no significant findings and no findings regarding operational processes and procedures. The matrix was cited as a significant contributor to the operational readiness of the facility.

LESSONS LEARNED

The requirements matrix should be generated as a part of the requirements document development, including identification of implementing documents. The process of developing, reviewing, and approving a requirements document is long and arduous, and they are generally developed in parallel. SARs are typically taking a year from preliminary to final, and our RCRA Permit is in the fifth year of review. There is a high probability that the requirements documents will end up having conflicting requirements. The matrix serves well to prevent or minimize conflict between requirements documents.

Co-author

Kevin E. Kooda
Lockheed Martin Idaho Technologies
P.O. Box 1625
Idaho Falls, ID 83415-4201
208-526-8505 (FAX 208-526-7383)

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.
Table 1. RWMC Operational Requirements Contained in WSF SAR, RWMC SAR.

<table>
<thead>
<tr>
<th>Req. No.</th>
<th>Requirement</th>
<th>Implementing Document</th>
<th>Requirement X-Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1°</td>
<td>The RWMC/SWEPP manager or his designated alternate is the EAD. In the absence of the designated EAD, an alternate EAD is also designated. (WSF SAR 12.3)</td>
<td>ER&amp;WM EP/RCRA CP, Add. 1, App. E</td>
<td>RWMC Ops Req, RCRA Part B #2</td>
</tr>
</tbody>
</table>
| 2°     | An RWMC Independent Review Committee (specifically assigned by the RWMC/SWEPP Programs Manager as independent reviewers) shall be established to conduct the independent review of, at a minimum:  
  - Safety Management Program Plans  
  - Operating procedures (normal and abnormal)  
  - Administrative procedures  
  - Emergency action plans  
  - Facility changes and modifications  
  - TSR changes.  
  - Work control procedures  
  - Preventive Maintenance procedures (WSF SAR 13.1.2, 13.1.3)(RWMC SAR 12.2.4; 12.4.3; 13.1.2; 13.1.2.1; 13.2.1) | PD-RS-3.2, Sec. 3.1.2 | NONE |
| 3°     | Individual training program profiles are provided for each RWMC position that requires completion of a formal qualification or certification program. Each profile is developed in accordance with DOE Order 5480.20 and identifies the following:  
  - Eligibility requirements  
  - Qualification and certification prerequisites  
  - Position description  
  - Requirements for initial qualification or certification  
  - Requirements for maintaining qualification or certification  
  - Proficiency requirements  
  - Medical examination requirements. (RWMC SAR 13.1.8) | ER&WM Training Manual, App. C, Sec. 5.1 | RWMC Ops Req, RCRA Part B #3 |

**REQUIREMENT OWNERS**

a - Operations  
b - Maintenance  
c - Compliance  
d - Technical Support  
e - Business Support

Compliance Agreements at the INEL: A Success Story
Table 2. RWMC Operational Requirements Contained in RCRA Part B.

<table>
<thead>
<tr>
<th>Req. No.</th>
<th>Requirement</th>
<th>Implementing Document</th>
<th>Requirement X-Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The RWMC and the TSA are provided with both a 24-hour surveillance system and a physical barrier and means to prevent entry of unauthorized persons to all of the waste management areas. (Page F-2, Line 11-13)</td>
<td>PD-RS-6.1, Sec. 3.5.1.a</td>
<td>NONE</td>
</tr>
<tr>
<td>2</td>
<td>The RWMC Manager is the Emergency Coordinator (EC) and has the authority to appoint alternates to act during his/her absence. (Page G-10, Line 13-14)</td>
<td>ER&amp;WM EP/RCRA CP, Add. 1, App. E</td>
<td>RWMC Ops Req, WSF/RWMC SAR, #1</td>
</tr>
<tr>
<td>3</td>
<td>The training program profile includes the following:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Eligibility requirements</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Qualification/certification prerequisites</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Requirements to achieve initial qualification/certification</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Requirements to maintain qualification/certification. (Page H-15, Line 14-19)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>ER&amp;WM Training Manual, App. C, Sec. 5.1</td>
<td>RWMC Ops Req, WSF/RWMC SAR, #3</td>
</tr>
</tbody>
</table>

**REQUIREMENT OWNERS**

- a - Operations
- b - Maintenance
- c - Compliance
- d - Technical Support
- e - Business Support

Compliance Agreements at the INEL: A Success Story