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TRU WASTE CERTIFICATION AND TRUPACT-II PAYLOAD VERIFICATION

E. K. Hunter
U.S. Department of Energy
P.O. Box 3090
Carlsbad, NM 88221

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J. E. Johnson
Westinghouse Electric Corporation
WIPP Project
P.O. Box 2078
Carlsbad, NM 88221

ABSTRACT

The Waste Isolation Pilot Plant (WIPP) established a policy (subsequently confirmed and required by DOE Order 5820.2A, "Radioactive Waste Management," September 1988) that requires each waste shipper to verify that all waste shipments meet the requirements of the Waste Acceptance Criteria (WAC) prior to being shipped. This verification provides assurance that transuranic (TRU) wastes meet the criteria while still retained in a facility where discrepancies can be immediately corrected. In this manner, problems that would arise if WAC violations were discovered at the receiver, where corrective facilities are not available, are avoided. Each Department of Energy (DOE) TRU waste facility planning to ship waste to the Waste Isolation Pilot Plant (WIPP) is required to develop and implement a specific program including Quality Assurance (QA) provisions to verify that waste is in full compliance with WIPP's WAC. This program is audited by a composite DOE and contractor audit team prior to granting the facility permission to certify waste.

During interaction with the Nuclear Regulatory Commission (NRC) on payload verification for shipping in TRUPACT-II, a similar system was established by DOE. The TRUPACT-II Safety Analysis Report (SAR) contains the technical requirements and physical and chemical limits that payloads must meet (like the WAC). All shippers must plan and implement a payload control program including independent QA provisions. A similar composite audit team will conduct preshipment audits, frequent subsequent audits, and operations inspections to verify that all TRU waste shipments in TRUPACT-II meet the requirements of the Certificate of Compliance (C of C) issued by the NRC which invokes the SAR requirements.

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INTRODUCTION

The WIPP, located in the southeast corner of New Mexico, is a DOE project with a mission of demonstrating permanent storage of defense TRU waste. The DOE decided early in this program to emphasize individual shipper facility responsibility for their TRU waste to meet the WIPP WAC.

The WAC were intended to be performance requirements rather than specifications, to allow waste generating and shipping sites to develop their own procedures and specifications for preparation of TRU waste for shipment to the WIPP. The WIPP Project Office (WPO) is responsible for ensuring that the TRU waste generators and storage sites comply with the WAC for TRU waste to be emplaced at the WIPP. Compliance with the WAC by the generator or shipping sites is assured in part by actions of the certification committee, referred to as the WACCC. The WACCC is directed through the WPO TRU System Integration and Transportation Branch to provide the necessary assurance that waste received at the WIPP meets operational, safety and environmental requirements as controlled by the WAC.

The WACCC's function originally was to assure generator compliance with the WAC through 1) the review and approval of specific certification and QA plans for all TRU waste generated by the DOE sites; and by 2) conducting independent audits of the sites to verify implementation of their formally approved certification programs.

In 1989 the TRUPACT-II was approved by the NRC and issued a C of C to the DOE for use in transporting TRU waste. New requirements were imposed for transport by NRC's approval and the WACCC was chosen to implement those requirements throughout the DOE TRU Waste Management programs. With the new requirements, the WACCC has been reorganized and is proceeding to increase their presence at all sites planning to ship TRU waste. This will involve more frequent audits and assignment of inspectors to observe operations at some of the sites.

WASTE ACCEPTANCE CRITERIA

The DOE originally established a multidisciplinary steering committee representing the DOE both at headquarters and field offices, defense TRU waste generators, TRU waste storage sites, national laboratories, and the WIPP Project. The final report of this committee included the Waste Acceptance Criteria and was issued in May 1980. Since then, there have been three revisions containing additional and revised criteria determined necessary during the intervening years.

With the aid of the TRU Programs Management Section of DOE Albuquerque (DOE-AL), several other supporting documents were subsequently generated to aid in programs and to specify a format for data packages transmitted to the

WIPP with the shipments. The WPO was assigned the interfacing function among all of the individual organizations involved in the National TRU Waste Programs, including DOE headquarters. Thus, general and specific TRU waste processes, programs, problems, investigations, criteria revisions, etc., have a central focus which disseminates necessary information to those in need of it.

WASTE CERTIFICATION

When it became apparent to the project that the controls would be required to ensure that wastes shipped to the WIPP site actually would meet all of the WAC, a program strategy was established requiring waste shipping facilities to develop waste certification programs to be reviewed by the WACCC. This committee:

1) Provides direction and requirements for TRU waste certification programs including maintenance and revision of controlling documents such as the WAC

2) Identifies correspondence and records; how distributed and retained

3) Satisfies requirements of DOE 5820.2A, "Radioactive Waste Management"

4) Satisfies requirements of DOE 5700.6A, "Quality Assurance" and AL 5700.6B, "Quality Assurance"

5) Satisfies certain requirements of WPO Management Directive 4.6.1, "Quality Assurance Audit Program"

The DOE and WIPP Project management decided not to produce a detailed guide instructing sites how, on a step-by-step basis, to write their individual certification plans describing certification programs, but rather to allow each site to develop a specific program tailored to its own operations. Some general guidelines were provided, however, with examples of how to meet certain criteria. Thus, each site examined its own operations and developed programs to meet the WAC without a formal methodology imposed from outside.

Facilities describe their individual certification programs with certification plans, which contain all of the control elements used for waste certification at their facility. The WACCC examines each certification plan submitted and comments on that submittal. Similarly, QA plans (which may be contained in the certification plan) are considered necessary to demonstrate how each generator (or storage) facility implements the QA requirements.

The WACCC was originally set up to consist of a chairperson from the DOE-AL, WIPP Project Office (DOE-WPO) and other DOE and contractor members from the WIPP. Members were chosen from technical functions and QA. These members provide a background of waste management, waste operations, QA management, and technical expertise in health physics and safety. Thus, reviews of

certification and QA plans aimed at providing assurance to the WIPP and other concerned organizations (e.g., state of New Mexico) that all of the WAC are being met for the waste forms described.

When satisfied that the certification and QA plans from a site were acceptable, a recommendation for DOE-WPO approval was submitted by the WACCC according to Fig. 1. A letter was also sent to the facility granting preliminary approval and instructing it to begin implementing all of the details covered in its plans (procedure writing, process changes, etc.). The plans were simultaneously sent to the state of New Mexico for review and comment. The DOE has an agreement with the state that no TRU waste (described in a facility's plans) will be accepted at the WIPP until the state has had the opportunity to review and comment upon those plans. The WACCC is responsible for reviewing the state's comments and recommending a DOE-WPO response. Even after the DOE-WPO sends a formal approval letter to the facility, waste is not certified until a full-scale operational audit is conducted at the site to satisfy the committee that the procedures and operations are actually implemented according to the plan.

Fig. 1. Waste Certification Flowchart

COMPLIANCE VERIFICATION AUDITS

The WACCC began with and still conducts formal audits or appraisals (since these are not just record reviews) of each facility planning to ship certified TRU waste to the WIPP. Specific audit plans and checklists are developed for each facility, based on the contents of their certification and QA plans, because of the complexity and technical nature of the processes and operations supporting those plans. These audit plans and checklists contain detailed questions on specific areas, including operations personnel interviews, so that the facility is thoroughly reviewed by qualified DOE and contractor personnel, who then judge whether the processes and procedures as implemented, do in fact, qualify the facility to certify its waste.

The initial certification audit was performed to ensure that each facility's production and/or processing of TRU waste was carried out in compliance with 1) its certification and QA plans, previously approved by WACCC and DOE-WPO; and 2) all of the required project documents. This initial audit included any material covered in general by the certification and QA plans such as procurement, organization, etc., and all specific waste form(s) covered in the plans.

Subsequent periodic audits are continually being conducted for three purposes: 1) to determine improvement in weaker areas found during prior audits; 2) to determine if the facility should retain its authorization to certify TRU waste; and 3) to audit the processing of any waste forms added as attachments to the plans since the last audit was performed.

Audit teams, including the team leader (a certified DOE lead auditor), are selected by the chairperson of the WACCC. The team consists of at least one DOE member of the WACCC, one WIPP contractor member, DOE or contractor technical experts as required for specific needs, and an invited observer from the host DOE field or area office. Audit team members do not have to be WACCC members, but are required to be familiar with the TRU programs, the site plans, and the WAC. They also have to be an observer on an audit prior to becoming a team member. Additional contractor technical advisors may be added, as needed. A representative of the state of New Mexico is also invited as an observer on each audit by DOE agreement with the state.

Audit entrance and exit meetings are held with facility management. Entrance meetings are conducted by the team leader with facility management to describe the purpose and scope of the audit. All audit team potential findings, observations, and recommendations are presented and discussed at the exit meeting, held with the same site personnel at the conclusion of the audit team's efforts.

Auditors interview facility personnel (at the operational level); review records; evaluate the adequacy of procedures for controls on waste handling and associated activities; and observe in-process activities, as necessary, to perform their evaluations. Auditors identify apparent discrepancies, as they are found, to facility personnel accompanying them, in addition to reporting and discussing them at the exit meeting.

AUDIT REPORT

The audit report is prepared by the audit team leader or designee and includes input from all audit team members, and the draft is reviewed by all team members and is finally approved by the WACCC chairman prior to distribution. Copies of the audit reports are distributed to the DOE-WPO Project Manager, the DOE-WPO QA Manager, the WACCC, the cognizant DOE area or field office, all audit team members, and the management of the audited facility.

The audit report either provides written approval of the facility's certification program, authorizing it to certify its waste (within the limits of those waste forms audited), or identifies areas where certification requirements were not met, which must be resolved prior to certifying the waste.

Management of the audited facility is expected to respond formally to the WACCC regarding all discrepancies noted in the audit report, indicating the corrective action to be taken to preclude recurrence of each discrepancy. Failure to respond results in a backlog of uncertified waste, an unacceptable condition at most facilities. The response must indicate the date that the action was or will be completed. The lead auditor assures by reviews and subsequent facility audits that the corrective action has been satisfactorily

implemented. These audits may be conducted by a small audit team on a rapid-response basis as conditions warrant. However, the same formal audit checklist procedure is followed.

NEW MEXICO STATE MONITORING

The DOE entered into several agreements with the state of New Mexico, one of which contains provisions for DOE financial support for an independent review group of qualified technical personnel who answer to the state government's executive branch. This organization is known as the Environmental Evaluation Group (EEG). There is also an agreement for Consultation and Cooperation between DOE and the state which contains provisions for conflict resolution between the parties, as well as the extent of and mechanisms used for the exchange of information between the project and the state. The Supplemental Stipulated Agreement Resolving Certain State Off-site Concerns over WIPP was signed approximately one and one half years after the above stipulated agreement.

Of particular interest to shippers is the portion of the Supplemental Stipulated Agreement which permits point-of-origin monitoring by the state for specific items. Such monitoring is separate from the waste certification audit process and conducted under procedures generated by DOE-WPO. Personnel assigned by DOE-WPO accompany the state on such monitoring trips. The Supplemental Stipulated Agreement specifically states:

1) ". . . monitor packaged waste and the condition of the trucks to be used and containers in which the waste is to be transported to New Mexico for emplacement at WIPP."

2) ". . . review pertinent shipping records and records and documents kept by the DOE, relating to the type, source, curie content and nature of the waste to be shipped . . . to ensure compliance with DOT or DOE standards for shipping nuclear waste."

The activity covered by item 1 is for the state of New Mexico and appropriate WIPP personnel to visit the facility (whose waste is certified) after the initial audit to observe the certified waste packages and the loading operations into the TRUPACT-II (or other shipping cask). This is still a future activity as no wastes have been shipped yet. The trucks or railcars on which the TRUPACTs are shipped may be inspected for general appearance and any safety item that might be observed. The team is charged to also observe the TRUPACT-II closing and leak test operations. If the TRUPACT-II is loaded while separated from the vehicle, the attachment of the TRUPACT-II to the vehicle may also be observed.

Conduct of the activity covered by agreement 2 above generally involves a visit by the state of New Mexico to the WIPP facility, where access is provided for their scrutiny of the computer-stored records. These records

contain the data generated for each waste package, which is required by the WAC prior to the waste being shipped. All WIPP computer systems that review those data package entries are also available for the state's inspection. However, this activity may also impact the shipper because it is not specific only to the WIPP's data.

TRUPACT-II AUTHORIZED METHODS FOR PAYLOAD CONTROL

As stated in the introduction, the NRC has issued a C of C for the use of TRUPACT-II. That C of C invokes the TRUPACT-II SAR and other documents containing additional requirements on the use of this transportation system. The payload technical requirements are included in one Appendix of the SAR, entitled TRUPACT-II Authorized Methods for Payload Control (TRAMPAC). These are very similar to the requirements of the WAC, but have some more restrictive limits in areas like gas generation, fissile gram loading, and package size and weight. Chemical compatibility has also been added to the requirements.

The WACCC has imposed upon the shipping sites the need for a transportation certification system very similar to the WAC certification system. The sites will produce site specific "TRAMPAC" and QA documents for WACCC review and approval, stating all of the controls placed upon payload certification and assembly. Each TRUPACT-II can only be loaded with 14 drums of waste or two Standard Waste Boxes (SWB), and all of the contents must conform to the same "shipping category" defined in the SAR.

The SAR also contains requirements for loading, seal testing, transporting, unloading, and maintenance of the TRUPACT-IIs. While any major TRUPACT-II maintenance must be conducted at WIPP where the facilities and tooling exist, some minor maintenance may have to be conducted at the shipping sites, e.g., O-ring seal replacement. Proper equipment must also be available for lifting the outer and inner heads off and controlling the payload as it is lowered into the inner containment vessel. After replacing the inner and outer heads, the seals must be helium leak tested to 1×10^{-7} cubic centimeters per second before the shipment can be released for transport.

Another task the WACCC will undertake this year is to consolidate all the waste criteria into one document, so that each site has only one set of requirements to meet. The development of the criteria in separate documents was necessary at their conception; the WAC were developed originally in 1980 and the TRAMPAC in August, 1989. Now all waste criteria from every source need to be integrated so that the DOE TRU waste programs can proceed to implement them on an efficient basis and be ready to ship TRU waste to the WIPP at the proper time. The WAC will be restated to be more prescriptive (like the TRAMPAC) as part of this consolidation effort. Options for methods of meeting the criteria will be included, but if a site wants to submit any different operational methods than those contained in the requirements, they must submit their proposals to the WACCC for approval and revision of the criteria before they can implement the new method.

REVISIONS TO AUDIT AND INSPECTION PLANS

Audit frequencies will be sharply increased beginning this year; not only in response to the additional areas to be verified at shipping sites, but as a DOE commitment to regain public confidence. Inspections (or surveillances) are another new activity beginning in 1990. Similar to NRC personnel at power plants, certain WACCC members may remain on a site after the audit to conduct continued observations of activities, or they may arrive for spot inspections at any time.

Other observers will be invited to accompany the WACCC audits, such as representatives of the host state's Department of Public Health and New Mexico's Environmental Improvement Division (EID). Representatives from the New Mexico Environmental Evaluation Group (EEG), separate from EID, are currently participating in audits and site reviews. Upcoming audits may also take additional time to complete, as opposed to the one week informal limit practiced in the past on waste certification audits. Other DOE contractor and outside consultants with specific areas of expertise will be invited to participate with the audit team as needed. In addition to the formally announced audits, audit team members may appear on a site at any time for an unannounced audit. Unannounced audits and inspection visits will be no less formal than their counterparts.

CONCLUSION AND POTENTIAL APPLICATIONS

The execution of the above described waste certification review and control activities has resulted in sizable DOE and WIPP Project commitments of manpower and resources, but the DOE believes that the relative efficiency of certifying TRU waste as early as possible in the waste handling cycle will produce the greatest benefit over the operating lifetime of the WIPP.

First, verifying that the waste meets the WAC, TRAMPAC, and other waste criteria, as generated and packaged, vastly reduces total personnel exposures, downstream handling, and overall DOE system-wide processing costs.

Second, inspecting and processing of previously stored TRU waste will reduce the total volume that has to be shipped to the WIPP, because much of the waste currently in retrievable storage is low-level waste and does not meet the definition of TRU waste.

Third, any violations of the criteria are corrected at the shipper rather than the receiver, almost totally eliminating the necessity for returning shipments and incurring extra transportation and handling costs.

Fourth, control measures taken prior to shipment of waste provide assurance that only certifiable wastes that comply with all state and federal requirements are processed by the WIPP.

Applications of the described DOE TRU waste strategy may be applied to other programs. Low-level waste disposal sites may begin to implement similar restrictions on wastes that are acceptable to them, particularly in light of EPA regulations and enforcement. The high-level waste programs, even under NRC regulation, are very likely to have parallel waste acceptance criteria which pose similar shipper programs to show compliance, especially within the DOE complexes, because the NRC doesn't regulate those sites or have on-site inspectors. State involvement is also bound to increase in the area of transportation, as it has for the WIPP.

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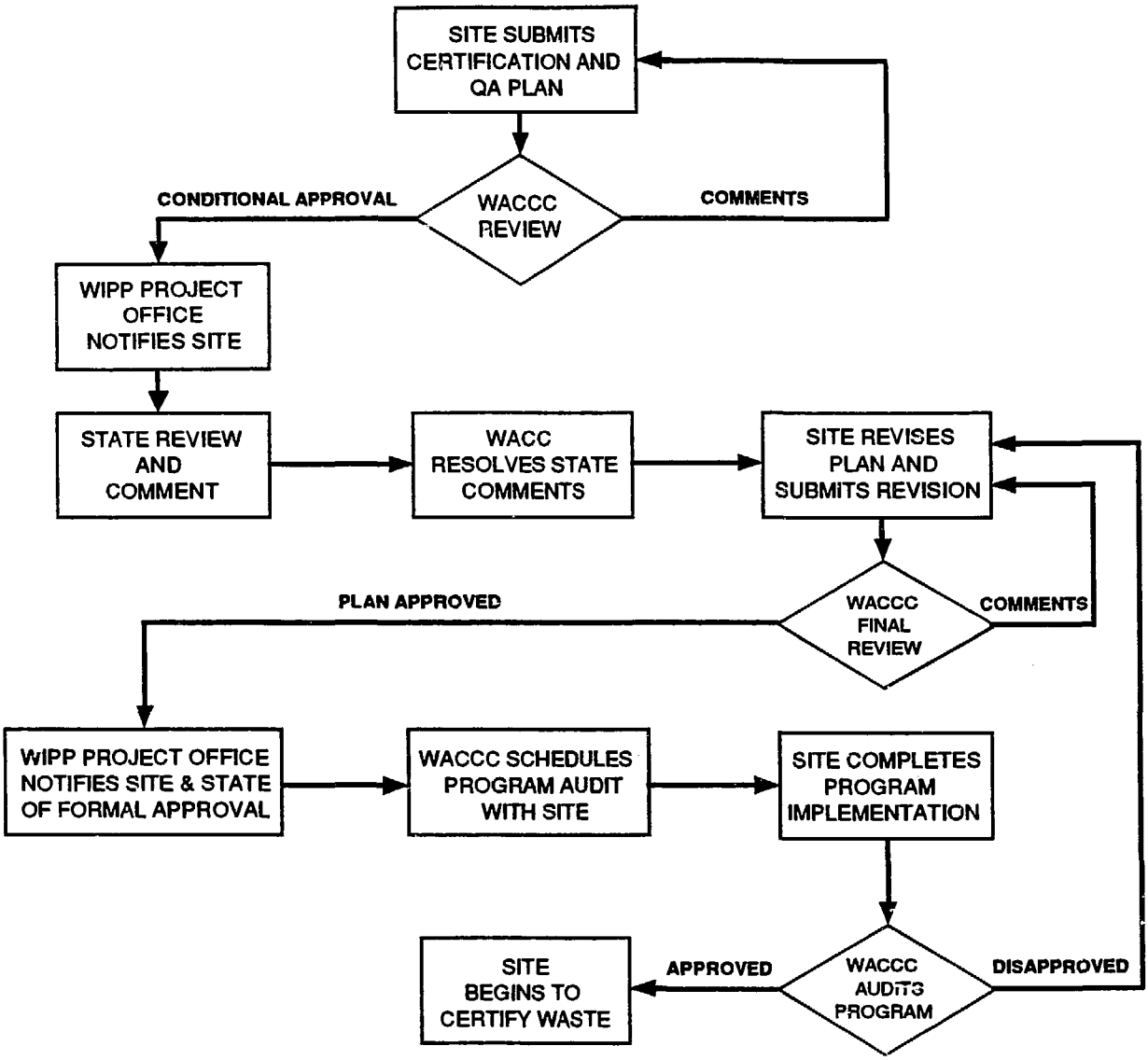

FIG. 1. Waste Certification Flowchart