



Department of Energy  
Carlsbad Field Office  
P. O. Box 3090  
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November 2, 2000



Mr. Steve Zappe, Project Leader  
Hazardous Waste Bureau  
New Mexico Environment Department  
2066 Galisteo  
Santa Fe, New Mexico 87505

Subject: Transmittal of the Final Audit Report for Los Alamos National Laboratory (A-00-16)

Dear Mr. Zappe:

The purpose of this letter is to transmit the Final Audit Report for Los Alamos National Laboratory as required by Section II.C.2.c of the WIPP Hazardous Waste Facility Permit. The audit was conducted on September 25-28, 2000. Closure of Corrective Action Reports resulting from this audit was completed on November 1, 2000.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

Please contact the Carlsbad Field Office Quality Assurance Manager, Sam Vega, at (505) 234-7423 should you have any questions concerning this audit report.

Sincerely,

Dr. Inés R. Triay  
Manager

Enclosures



Mr. S. Zappe

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November 2, 2000

cc w/o enclosures:

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U.S. DEPARTMENT OF ENERGY  
CARLSBAD FIELD OFFICE

FINAL AUDIT REPORT

OF

LOS ALAMOS NATIONAL LABORATORY (LANL)

LOS ALAMOS, NEW MEXICO

AUDIT NUMBER A-00-16

SEPTEMBER 25-28, 2000

FINAL AUDIT REPORT OF WASTE CHARACTERIZATION IN  
ACCORDANCE WITH THE HAZARDOUS WASTE FACILITY PERMIT



Prepared By: John W. Ptacek  
John W. Ptacek  
Audit Team Leader

Date: 11/2/00

Approved By: Samuel A. Vega  
Samuel A. Vega  
Carlsbad Field Office QA Manager

Date: 11/2/00

## **1.0 EXECUTIVE SUMMARY**

Carlsbad Field Office Audit A-00-16 was conducted to evaluate the adequacy, implementation, and effectiveness of Los Alamos National Laboratory (LANL) transuranic (TRU) waste characterization activities for debris waste relative to the requirements detailed in the Waste Isolation Pilot Plant (WIPP) Hazardous Waste Facility Permit (HWFP).

The audit was conducted at LANL facilities during September 25-28, 2000. The audit team concluded that the audited LANL technical and quality assurance (QA) activities, meet the requirements of the HWFP. The deficiencies identified in the Corrective Action Reports (CARs) discussed below have been corrected. The audit team also concluded that the defined QA and technical processes for the audited activities were being implemented in accordance with the LANL Quality Assurance Project Plan (QAPjP) and its implementing procedures. The audited processes were found to be effective.

The audit team identified conditions adverse to quality that resulted in two Corrective Action Reports (CARs), one concerning measuring and test equipment and one the accuracy of Acceptable Knowledge summary reports. Corrective actions relative to these two CARs have been completed by LANL and verified by the audit team. The team also identified eight isolated deficiencies requiring only remedial corrective actions that were Corrected During the Audit (CDA). Four WAP-related Observations and two Recommendations were offered for LANL management action and consideration. The CARs, CDAs, and associated corrective actions are described in section 6.0 and the Observations and Recommendations are discussed in section 7.0.

## **2.0 SCOPE AND PURPOSE**

### **2.1 Scope**

The audit team evaluated the adequacy, implementation, and effectiveness of the LANL TRU waste characterization processes for retrievably stored debris waste relative to the requirements contained in the WIPP HWFP Waste Analysis Plan (WAP), Attachments B through B6. Compliance was documented by completing the Attachment B6 checklist for the applicable LANL activities.

The following LANL program elements were evaluated in accordance with the HWFP:

Quality:

Nonconformance/Corrective Action  
Personnel Qualification and Training  
Documents and Records

Technical:

Data Generation Level Verification and Validation  
Project Level Verification and Validation  
Acceptable Knowledge (AK)  
Headspace Gas Sampling and Analysis  
Real-Time Radiography (RTR)  
Visual Examination (VE)  
WIPP Waste Information System (WWIS) Data Entry

The evaluation of LANL TRU waste activities and documents was based on current revisions of the following documents:

*Waste Isolation Pilot Plant Hazardous Waste Facility Permit*, October 27, 1999, with applicable modifications

*CAO Quality Assurance Program Document*, CAO-94-1012, revision 3, November 1999

*Quality Assurance Project Plan for the Transuranic Waste Characterization Program (QAPJP)*, TWCP-PLAN-0.2.3-002, revision 2

*Transuranic Waste Certification Plan (and TRAMPAC)*, TWCP-PLAN-0.2.4-001, revision 5

Related LANL technical and quality assurance implementing procedures. Attachment 4 contains a list of the LANL procedures audited and enclosure 1 contains the procedures themselves.

## 2.2 Purpose

Audit A-00-16 was conducted to assess whether LANL's retrievably stored waste characterization activities comply with WIPP HWFP requirements.

An earlier Carlsbad Field Office audit (A-00-13) conducted at LANL August 28-31, 2000 determined that LANL procedures not directly relating to compliance with the HWFP were adequate relative to the flow down of requirements from the Carlsbad Field Office Quality Assurance Program Document (QAPD), Waste Acceptance Criteria (WAC), and TRUPACT-II Authorized Methods for Payload Control (TRAMPAC). Audit A-00-13 concluded that these areas of QA program, software quality assurance, nondestructive assay, and transportation were implemented and effective for debris waste streams.

### 3.0 AUDIT TEAM AND OBSERVERS

#### AUDITORS/TECHNICAL SPECIALISTS

Samuel Vega	CBFO QA Manager
John Ptacek	Audit Team Leader, CTAC
Steven Calvert	Auditor, CTAC
Pete Rodriguez	Auditor, CTAC
Norman Frank	Auditor, CTAC
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Bill Blanton	Technical Specialist, CTAC
Tom Bearden	Technical Specialist, CTAC
Patrick Moynihan	Technical Specialist (in training), CTAC
Anissa Orozco	Administrative Support, CTAC

#### OBSERVERS

Timothy Harms	DOE-EM
Steve Zappe	NMED
Will Fetner	NMED
Patricia Brown-Derocher	NMED/TechLaw
Robert Thielke	NMED/TechLaw
June Dreith	NMED/TechLaw
William Fear	NMED/TechLaw
Julie Shanahan	NMED/TechLaw
Ben Walker	Environmental Evaluation Group

### 4.0 AUDIT PARTICIPANTS

LANL individuals involved in the audit process are identified in attachment 1. Identification of the auditors, technical specialists, observers, and site personnel involved in each of the audit areas is provided in attachment 2. A pre-audit meeting was held in Technical Area (TA) 3, Building 3-1698, Auditorium A-103 on September 25, 2000. A daily meeting was held with LANL management and staff to discuss issues and potential deficiencies. The audit was concluded with a post-audit meeting held in the TA-48, Building RC-29, Conference Room on September 28, 2000.

## **5.0 SUMMARY OF AUDIT RESULTS**

### **5.1 Program Adequacy and Implementation**

This audit was performed to assess LANL's ability to characterize waste from Summary Category Group S5000 to the requirements specified in the WIPP Waste Analysis Plan (WAP). The characterization methods assessed were headspace gas sampling, headspace gas analysis, AK, radiography, and VE. Data review, validation, and use of those results to perform data quality objective (DQO) reconciliation and prepare a Waste Stream Profile Form (WSPF) were assessed. The audit evaluated only waste streams from Summary Category Group S5000. The processes demonstrated will be used to characterize various retrievably stored debris waste streams, as AK, RTR, VE, and headspace gas sampling and analysis is performed exactly the same on all debris waste streams. However, for newly generated waste streams and waste streams from Summary Category Groups S3000 and S4000, an additional audit will be required because the requirements specific to these areas were not included in this audit scope.

The audit team concluded that the applicable LANL TRU waste characterization activities, as described in corresponding LANL implementing procedures, satisfactorily meet the requirements contained in the HWFP. The deficiencies identified in section 6.0 have been corrected. Details of audit activities, including specific objective evidence reviewed, are described below and in the B6 checklist (attachment 3). Enclosure 2 contains examples of objective evidence that was reviewed during the audit. Attachment 4 contains a listing of the LANL implementing procedures that were assessed during the audit and enclosure 1 contains copies of the procedures, including revisions and/or interim changes made to these procedures to correct deficiencies identified during the audit.

### **5.2 Technical Activities**

Each technical area audited is discussed in the following sections. The objective evidence selected for review is discussed and the objective evidence that was used to assess compliance with the WAP is cited briefly (and in detail on the checklist), and the result of that assessment is provided.

If a question could not be satisfactorily answered, an audit concern was identified. Concerns that were Corrected During the Audit are discussed in section 6.2 and TABS CDA1 through CDA8 in enclosure 2. A CAR was prepared to document those items not adequately addressed during the audit. A CAR allows Carlsbad Field Office to track LANL's efforts to remediate the deficiency identified in the CAR. CARs generated as a result of this audit are addressed in section 6.1. All CARs were satisfactorily closed during subsequent corrective action verification activities. Each deficiency CDA and each CAR is identified in the B6 checklist tables under the corresponding item number.

### 5.2.1 Table B6-1 WAP Checklist

The B6-1 WAP checklist addresses program requirements from an overall management perspective. It documents verification that the waste characterization strategy defined in the WAP is implemented using controlled procedures. This audit was performed to assess LANL's ability to characterize Summary Category Group S5000 debris waste streams. Objective evidence to evaluate the implementation of the associated characterization activities was selected and reviewed. Batch reports, sampling and analysis records, and training documentation for TRU Waste Characterization Program (TWCP) personnel were included in the evaluation. The audit included direct observation of actual waste characterization processes (such as headspace gas sampling and analysis, RTR, and visual examination) and related characterization activities (such as WWIS data entry). Each characterization process involves:

- Collecting raw data
- Collecting quality assurance/quality control (QA/QC) samples or information
- Reducing the data to a useable format, including a standard report
- Review of the report by the data generation facility and the site project office
- Comparing the data against Program DQOs
- Reporting the final waste characterization information to WIPP

The flow of data from the point of generation to inclusion in the WSPF for each characterization technique was reviewed to ensure that all applicable requirements were captured in the site operating procedures. The material in this section is also addressed in more detail in following sections, which provide the specific procedures audited and the objective evidence reviewed.

During the audit, LANL demonstrated compliance with the characterization requirements of the WAP through documentation and by performing the characterization activities. LANL provided the following:

- Headspace gas sampling and analysis batch reports, LA00-HGAS-015 and LA00-HGAS-016 containing sampling and gas analytical batch information. Actual analytical operations were observed on LA00-HGAS-022.
- Radiography batch reports (batch numbers LA00-RTR-004 and LA00-RTR-005).
- VE batch reports (batch numbers LA00-VE-003 through LA00-VE-008).

Copies of these batch reports are included in enclosure 2.

All steps of the process for verification, validation, reconciliation, and reporting data were evaluated, including data generation, level 1 verification and validation (V&V),



level 2 V&V, reconciliation, WSPF preparation, and WWIS reporting. A few minor deficiencies were identified at various steps of the process. These were Corrected During the Audit (CDA) and are reported as CDAs 3 through 7 in section 6.2 and in enclosure 2. There were also four concerns identified by the audit team that had the potential to become deficiencies in the future. These are identified in Observations 1 through 4 in section 7.0. LANL fully resolved these concerns during the audit.

The sampling and analysis batch reports LA-HGAS-015 and -016 for headspace gas were found to be acceptable. The observed sampling and analysis processes were acceptable.

AK and the auditable record were reviewed in detail for two Summary Category Group S5000 retrievably stored debris waste streams (LA-TA-55-19 and LA-TA-55-20). The AK record was reviewed to demonstrate that the required information was present and correctly interpreted. The batch reports cited above were used to demonstrate confirmation of AK, to reconcile DQOs, to prepare a draft WSPF, and to transmit data to WIPP using the WWIS.

A draft WSPF and the summarized characterization information related to it were reviewed to establish the objective evidence for reporting waste characterization information to WIPP. The form was completed using information from current characterization processes. LANL was requested to prepare the draft WSPF so that the procedure could be audited (see enclosure 2). An actual WSPF will be prepared and submitted to Carlsbad Field Office prior to any shipments, as required. This form is an example developed to allow the audit team to assess the process used to prepare the form; actual WSPFs are reviewed and approved by the Carlsbad Field Office when the waste stream has been fully characterized and the site is approved to ship waste.

The audit team determined that LANL satisfactorily implements the WIPP WAP requirements for data handling, management, and reporting.

#### 5.2.2 Table B6-2 Solids and Soils/Gravel Sampling Checklist

No solids or soils/gravel waste streams are currently being addressed by LANL. These areas were not audited; therefore, no LANL S3000 or S4000 waste will be accepted for disposal at WIPP until the procedures and processes have been audited and accepted by Carlsbad Field Office and a final audit report for those processes has been approved by NMED.

#### 5.2.3 Table B6-3 Acceptable Knowledge Checklist

This audit was performed to assess LANL's ability to characterize Summary Category Group S5000 retrievably stored debris waste streams. Items on the AK checklist are intended to ensure that LANL has an AK process in place to:

- Train personnel in the data collection requirements
- Assemble those data into a coherent narrative detailing the waste generation and constituents
- Segregate the waste into like waste streams
- Provide Resource Conservation and Recovery Act (RCRA) characterization for those waste streams
- Confirm those characterizations using sampling and analysis
- Provide an auditable set of records to support the characterization

The following procedures relating to the AK process were evaluated:

*TWCP-QP-1.1-021, Acceptable Knowledge Documentation*

*TWCP-QP-1.1-024, Reporting Summarized Characterization Data and Waste Stream Summaries to CAO*

*TWCP-DTP-1.2-064, Waste Characterization Data Reconciliation With Acceptable Knowledge*

The AK summary documentation contained in the auditable record and container-specific information were reviewed. The audit was limited to two debris waste streams (LA-TA-55-19 and LA-TA-55-20). Traceability of the AK documentation was accomplished by selecting a random sample of reference documents. The summary document and supporting documentation identify the waste stream and point of generation for the containers. Several of the references were selected to ensure they are available in the auditable record and to ascertain if the source documents support the characterization determination. These sources include such items as published reports, process flow diagrams, interviews with site personnel concerning use of hazardous materials, and reports of previous waste characterization sampling and analysis efforts.

The AK process was evaluated by reviewing one AK summary report for debris waste streams LA-TA-55-19 and LA-TA-55-20, titled *Acceptable Knowledge Summary Report for Waste Streams TA-55-19 and TA-55-20, LA-UR-4291*, dated 8/31/00. The auditable record was searched to ensure that the cited references were available and that the reviewer could come to the same hazardous waste determination as presented in the AK summary. Information from the debris waste stream was selected and the AK information for its characterization was traced from the summary through the AK source document reviews to the original records. The information for containers 55851 and 56611 were traced to verify the characterization as determined by the AK. The information was available in the record files and supported the AK determination.

The AK process includes provisions to identify information that conflicts with what is expected in a waste stream (confirmation processes) and a method by which these conflicts can be resolved. The discrepancy resolution procedure is *TWCP-DTP-1.2-064, Waste Characterization Data Reconciliation With Acceptable Knowledge*.

The AK checklist was completed, in part, by reviewing the waste stream summary report and the six supporting process reports. Additional documentation supporting the AK summary documents and AK source document review summaries are contained in enclosure 2 to support the entries in table B6-3.

A draft WSPF, LA-TA-55-19.01, and the information related to it were reviewed to establish the objective evidence for reporting characterization information to WIPP. Procedure TWCP-QP-1.1-024, *Reporting Summarized Characterization Data and Waste Stream Summaries to CAO*, was evaluated during the audit.

The procedures cited above, which are used by LANL to assemble, evaluate, document, and reconcile sampling and analysis results, were reviewed for adequacy and their implementation was assessed during the audit. The AK requirements include procedure content and specific requirements for retrievably stored waste and ensure that the AK summary includes all mandatory information required by the WAP. A review of the training status for the AK personnel identified two contractors needed refresher training. This deficiency was Corrected During the Audit and is addressed as CDA 8.

Reports and records used to document the basis of LANL AK were evaluated; copies of pages used for objective evidence are in enclosure 2 of this report. The reports were generally satisfactory, with the exception of several inaccuracies in the AK data that are addressed in Corrective Action Report (CAR) 00-036. LANL corrective actions in response to this CAR have been verified complete and the CAR has been closed. For details, refer to section 6.1 of this report and TAB CAR-2 in enclosure 2. An additional number of discrepancies were identified that were of only an editorial or typographical nature that did not affect the data. Recommendation 1, in section 7.2 of this report, suggests a thorough editorial review of the AK documents. The AK records are properly maintained as QA records. The list of AK documentation reviewed is included in enclosure 2.

LANL was found to be satisfactorily using sampling and analysis data to confirm the waste characterization designations made using AK. LANL has an adequate process in place to resolve discrepancies and document changes. Waste characterization designations were confirmed by reviewing the batch reports documenting the characterization activities. If the characterization results do not support the AK waste stream description, a non-conformance report (NCR) is prepared.

This audit and follow-on corrective action verification determined that LANL is satisfactorily implementing the AK process to delineate, characterize, and confirm the characterization of waste for disposal in accordance with WIPP WAP requirements.

#### 5.2.4 Table B6-4 Headspace Gas Checklist

This audit was performed to assess LANL's ability to characterize Summary Category Group S5000 debris waste streams. Headspace gas sampling and analysis operations at LANL were observed during actual collection and analysis of samples. The following procedures were evaluated:

TWCP-QP-1.1-017, *Chain of Custody*

TWCP-QP-1.1-040, *Tracking and Reporting Tentatively Identified Compounds*

TWCP-DTP-1.2-025, *Headspace Gas Analysis Batch Data Preparation.*

TWCP-DTP-1.2-038, *Headspace Gas Filter Removal and Replacement*

TWCP-DTP-1.2-041, *Headspace Gas Sampling and Analysis Using an Automated Manifold.*

TWCP-DTP-1.2-063, *Preparing and Handling Waste Containers.*

Headspace gas sampling and analysis was audited by evaluating the sampling equipment, observing sampling and analysis activities, and reviewing available headspace gas batch reports. Sampling and Analysis Batch Reports LA00-HGAS-015 and LA00-HGAS-016 were reviewed to evaluate sampling and analysis results against WAP requirements. The following batch reports are included in enclosure 2:

Batch report LA00-HGAS-015 (containing drums 862286, 862286-DUP, 56636, 55969).

Batch report LA00-HGAS-016 (containing drums 57704, 57704-DUP, 57719, 57185, 57710, 57720, 57712, 57701, 57159, 57151, 56892, 57171).

Documentation specific to these activities (e.g., calibration records, maintenance logbooks, and instrument logbooks) were reviewed to ensure that laboratory operations met QA requirements, as specified in the WAP. Copies of the applicable documentation reviewed are included in the batch reports. The gas cylinder used as the internal calibration standard for the headspace gas analysis system had expired. CAR 00-035 was issued to address this deficiency. LANL corrective actions in response to this CAR have been verified complete and the CAR has been closed. For details, refer to section 6.1 of this report and TAB CAR-1 in enclosure 2.

The table B6-4 headspace gas checklist was completed by assessing the implementation of the procedures listed above. Sampling and analysis operations were observed and records from these activities were reviewed.

At LANL, headspace gas is sampled using an automated, integrated sampling and analysis system installed at the Waste Resizing, Repackaging, and Characterization Facility (WCRRF) in Technical Area-50. The system consists of an integrated manifold with passivated canisters. Side port needle sampling assemblies are used for sampling. Samples are collected by inserting the side-port needle through the drum

filter. More detail concerning the sampling system can be found in the LANL QAPjP and the applicable procedures.

Equipment is controlled to ensure that it does not contaminate the sample. Sample integrity is protected using procedure TWCP-QP-1.1-017, *Chain of Custody*, and TWCP-DTP-1.2-063, *Preparing and Handling Waste Containers*. The implementation of these procedures was observed and determined to be satisfactory.

Sample collection and analysis is controlled by procedure TWCP-DTP-1.2-041, *Headspace Gas Sampling and Analysis Using an Automated Manifold*. Review of the results to ensure they meet program QAOs is controlled by TWCP-DTP-1.2-025, *Headspace Gas Analysis Batch Data Preparation*. Sampling QAOs are assessed after the QC samples are analyzed and are documented in the analytical batch report. Recommendation 2, in section 7.2 of this report, proposes that the drum age criteria information also be included in the headspace gas batch data reports.

The process used to clean, leak-check, and maintain sampling equipment (procedure TWCP-DTP-1.2-041, *Headspace Gas Sampling and Analysis Using an Automated Manifold*) was evaluated and found to adequately meet WAP requirements. Field records associated with sampling activities were also found to be acceptable. Copies of pages from the field records are in the batch reports in enclosure 2.

This audit and follow-on corrective action verification determined that the headspace gas sampling and analysis process at LANL satisfactorily implements the WIPP WAP requirements.

#### 5.2.5 B6-5 Radiography Checklist

This audit was performed to assess LANL's ability to characterize Summary Category Group S5000 retrievably stored debris waste streams. LANL radiography operations are performed using a real-time system located in the WCRRF facility. LANL has controls to allow the operator to enhance the image quality of the radiograph, annotate the videotape with text, provide narration with video, rotate the drum as it is imaged, enlarge the image, and pan up and down the container. These systems allow site personnel to view drums while recording the examination on an audio/video tape.

The table B6-5 radiography checklist was completed by assessing operating procedure TWCP-DTP-1.2-008, *Performing Nondestructive Testing Using the Mobile Real-Time Radiography System*. Actual RTR operation was observed, videotapes of operations were reviewed, and the documentation provided by these activities was evaluated. The following batch reports are included in enclosure 2:

Batch report LA00-RTR-001 (containing drums 52653, 54460, 55955, 55955-IO, 56137, 56141, 56167, 56189, 56199, 56222, 56234, 56322, 56335, 56338, 56338-R, 56367)

Batch report LA00-RTR-004 (containing drums 52032, 52108, 52154, 52879, 54163, 54481, 54491, 54521, 54524, 54718, 54722, 54903, 54903-IO, 54907, 54907-R)

Batch report LA00-RTR-006 (containing drums 853295, 853559, 853832, 853834, 855627, 855627-R, 855630, 855810, 862004, 862274, 862286, 862286-IO, 862456, 864268, 864342)

Batch report LA00-RTR-008 (containing drums 55624, 55851, 56607, 56611, 56626, 56668, 850153, 850158, 850177, 850182, 850474, 850584, 850584-R, 856103, 856103-IO, 856107, 856113, 856114, 856115).

Training course material and the RTR test drums were reviewed for adequacy.

Objective evidence was evaluated for RTR equipment and operations. The RTR process was observed during operation. Batch reports and RTR videotapes were selected to evaluate the documentation of the RTR process.

Radiography equipment maintenance and daily checks were evaluated against the WAP requirements as implemented in the RTR procedures and were found to be satisfactory. Radiography results are properly reported on standard forms and are adequately reviewed, as required by the WAP. Copies of the forms are included in the batch reports listed in enclosure 2.

Three minor deficiencies were corrected during the audit and are detailed as CDA 1, CDA 2, and CDA 7, in section 6.2 and in enclosure 2.

LANL satisfactorily implements the WIPP WAP radiography requirements.

#### 5.2.6 B6-6 VE Checklist

This audit was performed to assess LANL's ability to characterize Summary Category Group S5000 retrievably stored debris waste streams. Visual examinations include both the QC check performed on radiography results and observations made during initial waste packaging. LANL was audited to determine the effectiveness of VE as the QC check on RTR. VE to support radiography is recorded on audio/video tape and documented on standard forms.

LANL VE activities were evaluated by observing actual examinations, reviewing videotapes, and evaluating all of the VE batch reports. The batch reports reviewed are listed below. These batch reports are included in enclosure 2.

Batch report LA00-VE-003 (containing drums: input 55851; output 57572)

Batch report LA00-VE-004 (containing drums: input 56607; output 57573)

Batch report LA00-VE-005 (containing drums: input 56611; output 57574)

Batch report LA00-VE-006 (containing drums: input 56636; output 57575)

Batch report LA00-VE-007 (containing drums: input 55969; output 57576)

Batch report LA00-VE-008 (containing drums: input 862286; output 57577)

The VE procedures are TWCP-DTP-1.2-001, *Visual Examination* and TWCP-DTP-1.2-002, *WCRRF Video System Operations*. The procedures were found to be adequate in meeting the WAP requirements.

The training course content for operators and VE experts was reviewed to verify that all WAP requirements were captured in the course. No deficiencies were noted in the area of VE.

LANL is satisfactorily implementing the WIPP WAP VE requirements.

## **6.0 SUMMARY OF DEFICIENCIES**

### **6.1 Corrective Action Reports (CARs)**

Two CARs were initiated during the audit. Conditions adverse to quality have been corrected by LANL, verified by CBFO, and closed.

#### **6.1.1 Carlsbad Field Office CAR 00-035**

Relating to the Headspace Gas Sampling and Analysis process, the certification for the cylinder of gas used as an internal standard for calibration of the headspace gas analysis equipment had expired.

LANL analyzed samples from the expired cylinder and compared the results with analyses of samples from unexpired cylinders of the same gas. The results confirmed that the expired cylinder remained within published tolerances and the cylinder was extended in service. No impacts on previous data were identified.

To identify and correct any similar deficiencies and to prevent future occurrences of this type, LANL conducted a surveillance of all TWCP operations to ensure that calibration equipment and standards are now included in the M&TE Database. LANL procedure TWCP-DTP-1.2-041 was modified to require chemical verification on an annual basis to ensure that they are not deteriorating.



Completion of corrective action for the CAR was verified by the audit team. Information used in closing this CAR is in TAB CAR-1 of enclosure 2.

#### 6.1.2 Carlsbad Field Office CAR 00-036

The following issues related to the information compiled for acceptable knowledge data for TRU waste stream LA-TA-55-19.01:

- Attachment 4, page 9-process chart did not show the SBB process.
- Site-wide map was missing in LA-UR-4291.
- TA-55 map was missing in LA-UR-3941.
- Section 9 of each process report erroneously referred to "waste packaging report" instead of Section 13 of LA-UR-4291.
- Paragraph 2.5.2 of Special Process Summary Report referred to "Table 2" instead of "Table 1."
- LA-UR-4000 needed a table of radionuclides and ratios.
- LA-UR-4291, Section 2.2, Att. 4, and Att. 5 were not consistent in listing the process codes.
- Road maps in most of the process AK reports and the AK Summary Report did not contain all of the references cited in the report narratives.
- Attachment 3 (road map) of TWCP-3939 (pyrochemical) referenced a voided document, TWCP-AK-2.1.1-001, R0, which was also shown as TWCP-3689).
- Different LANL documents assigned drums 56611 and 55851 to waste stream 19 and to waste stream 20. LA-UR-4291 showed them as 19. WSDP Summary TA-55-19.01.xls (procedure TWCP-DTP-064, R2) showed them as 19. TWCP-04024 (FRAM 55851) showed them as 20. TWCP-04021 (RTR) showed them both as 20. VE (TWCP-03948 and TWCP-03947) shows them as 19.
- Document N-81, process status code VP2, erroneously read "polyethylene" instead of "polystyrene."

LANL revised the AK documentation to correct each of the above errors. A thorough technical review of the documents was conducted to identify similar deficiencies. These deficiencies were also corrected. LANL procedure TWCP-QP-1.1-021 was revised to provide better detail concerning AK report content, and the existing reports were revised to be consistent with the revised requirements.

Investigation of the impacts on the data identified no impact on past data. Data for waste to be shipped in the future was affected and changes have been made to those packages.

Completion of the corrective action for Carlsbad Field Office CAR 00-036 was verified by the audit team. Information used in closing the CAR is in TAB CAR-2 of enclosure 2.



## 6.2 Deficiencies Corrected During the Audit

Eight WAP-related concerns were identified and Corrected During the Audit. Additional CDA information and objective evidence is contained in TABS CDA1 through CDA8 of enclosure 2.

1. The Independent Technical Reviewer for the RTR batches reviewed during the audit had performed some of the initial scans of some drums in the batches. During the audit, the suspect scans within of the batch reports were re-reviewed by an individual who had not performed the work and this was verified by the audit team. Details are contained in TAB CDA1 of enclosure 2.
2. RTR Operators had not reviewed detailed AK information on a waste stream prior to data collection. Sufficient AK information was not available at the RTR Operators location. During the audit, the audit team confirmed that there was no impact on data collected to date and verified that complete AK data had been provided to the RTR Operators. Details are contained in TAB CDA2 of enclosure 2.
3. Change to VE and RTR Comparison Table for data package LA00-VE-004 was not initialed and dated. The deficiency was Corrected During the Audit and verified by the audit team. Details are contained in TAB CDA3 of enclosure 2.
4. In Batch Data Report LA00-RPK-011, the SPQAO had not marked the applicable acceptance criteria for completeness on the SPQAO Summary for Packaging (TWCP-1.1-QP-010, R.9, Attachment 7, Item III.a). The SPQAO retrieved the batch data report, reviewed the data, determined that the description of the container was acceptable, marked the summary data sheet appropriately, and submitted the change to the records system during the audit. This was verified by the audit team. Details are contained in TAB CDA4 of enclosure 2.
5. The SPQAO Summary for BDR LA00-TGS-003 had a calculated ratio of <1 which was contrary to the requirements of the LANL TGS procedure (TWCP-DTP-1.2.-011). The summary data sheet was changed by hand and initialed to indicate that a ratio of <1 was acceptable due to a known calculation spreadsheet variance and the spreadsheet was modified to yield calculation ratios in accordance with the procedure. This was verified by the audit team. Details are contained in TAB CDA5 of enclosure 2.
6. AK per-cent accuracy was not covered in the DQO review form (QP-024, Attachment 4) and completeness was not covered in section 7.8 of QP-024. An Interim Change Notice (ICN) was issued to address this issue during the audit. This was verified by the audit team. Details are contained in TAB CDA6 of enclosure 2.

7. All VE results need to be sent to RTR, not only “when problems are identified” as was required by QP-028. This deficiency was Corrected During the Audit and verified by the audit team. Details are contained in TAB CDA7 of enclosure 2.
8. Two sub-contractor personnel performing AK work for LANL had no documented training for revised (post-permit) LANL AK procedures. This deficiency was Corrected During the Audit and verified by the audit team. Details are contained in TAB CDA8 of enclosure 2.

## **7.0 OBSERVATIONS AND RECOMMENDATIONS**

### **7.1 Observations**

An Observation documents marginally acceptable conditions that, if not controlled, might later escalate into a deficiency. The following are four WAP-related Observations identified during the audit:

1. The Technical Supervisor Checklist for VE batch data report LA00-VE-005, item 4 was marked “Yes” for the checklist item concerning initiation of NCRs/PWRs, when in fact no NCRs/PWRs were issued. The cause was a misunderstanding of the checklist language that said “NCRs and PWRs initiated as required.” The “No” response was interpreted as meaning that required NCRs/PWRs had not been issued. This concern was resolved during the audit by revision of the subject batch data report and the issuance of an ICN for modification of the review checklist format in the LANL procedure for visual examination (TWCP-DTP-1.2-001, Revision 10) providing an option for “Not Applicable.”
2. The SPQAO Summary for LAAO-RPK-011, page 4, reported the correct number of significant digits (00.0) for the weights and balance being used, but this was different from the number of significant digits indicated in the procedure (00.00). The procedure did not recognize that different scales and balances being used have different numbers of significant digits. This concern was resolved during the audit by revision of the LANL procedure to allow the actual number of significant digits (00.0 or 00.00) to be recorded depending on the specific type of balance/scale being used. TWCP-QP-1.1-010, revision 9, now specifies the correct number of digits for each type of balance/scale.
3. Section X of Attachment 6 of the AK summary TA55-19.01 did not provide a “conclusions” section for the SPM to document potential conclusions that might be made during implementation of LANL data reconciliation procedure TWCP-DTP-1.2-064, section 6.2.7. The concern was that, without a specific “conclusions” section that could be completed with an actual conclusion or a “none,” it would be unclear whether there were in fact no significant conclusions or whether a conclusion had

been needed but forgotten. This concern was resolved during the audit by revision attachment 6 of the procedure to include a "conclusions" section.

4. Some of the NDA and HGAS requirements in the LANL PDP procedure were addressed in a manner that presented the potential for confusion or misunderstanding during implementation. The concern was that sections 6.1.2.2, 6.3.2.8, 6.3.2.9, 6.3.2.12, and 6.3.2.13 had language that placed additional requirements on the PDP process that were not needed and could cause confusion in reporting in accordance with current PDP requirements. The requirements pertained to details in the reporting TICs, compounds intentionally not analyzed, and the use of qualifying data flags. This concern was resolved during the audit by revision of the LANL PDP procedure (TWCP-QP-1.1-022, revision 3) to appropriately revise the language in these sections.

## **7.2 Recommendations**

The following two WAP-related Recommendations were provided to LANL management during the audit:

1. A number of typographical and editorial errors were identified in the Acceptable Knowledge summary and supporting data. It is recommended that these documents receive a thorough editorial review.
2. It is recommended that the Headspace Gas Batch Data Reports include information on drum aging criteria as well as in the WWIS entry summary data where it is currently documented.

## **8.0 LIST OF ATTACHMENTS**

Attachment 1: Personnel Contacted During the Audit  
Attachment 2: Audit Participants by Characterization Area  
Attachment 3: WIPP Hazardous Waste Permit B6 Checklist  
Attachment 4: List of LANL Procedures Audited (A-00-16)

## **9.0 LIST OF ENCLOSURES**

Enclosure 1: LANL Audited Implementing Procedures  
Enclosure 2: Objective Evidence and Content Map

**PERSONNEL CONTACTED DURING THE AUDIT**

<b>PERSONNEL CONTACTED DURING A-00-16</b>				
<b>NAME</b>	<b>ORG/TITLE</b>	<b>PREAUDIT MEETING</b>	<b>CONTACTED DURING AUDIT</b>	<b>POST AUDIT MEETING</b>
Adams, Andrew	LANL/EET VE Ops Leader	X	X	X
Allen, Garry	LANL/EET Project Manager			X
Bailey, Jim	LANL/EET QA Staff			X
Baker, Michael	LANL/EET NDA Specialist	X		
Baros, Ricky	LANL/EET VE Expert		X	
Bayhurst, Greg	LANL/EET QA Staff	X	X	X
Betts, Stephen	LANL/EET NDE Ops Leader		X	X
Canfield, Tom	LANL/EET SQA			X
Chandler, Karen	Benchmark Inc. Subject Matter Expert		X	
Chavez, Mario	LANL/EET Software QA Engineer	X	X	X
Cossey, Stephen	LANL/EET VE Ops Leader	X	X	X
Drypolcher, Tony	LANL/NMT-7 Technical Staff Member		X	X
Estill, Wesley	LANL/EET Waste Certification Support	X	X	X
Fabryka-Martin, June	LANL/EET TWCP Deputy SPM	X	X	X
Fernandez, Ruby Ann	LANL/EET Training Specialist	X	X	X
Foxx, Charles	LANL/NMT-7	X	X	X
Garcia, Mel	LANL/EET Test & Measuring Tech		X	

PERSONNEL CONTACTED DURING A-00-16				
NAME	ORG/TITLE	PREAUDIT MEETING	CONTACTED DURING AUDIT	POST AUDIT MEETING
Gavett, Marji	LANL/EET QA Officer	X	X	X
Glenn, Rosemary	John Hart & Assoc. Subject Matter Expert		X	
Harper, Johnny	LANL/EET Deputy Group Leader			X
Hawkinson, David R.	LANL/EET TWCP Support (Team-21)	X		
Herrera, Jennifer	LANL/EET RMDC Staff			X
Hollis, Kirk	LANL/C-12 Analyst		X	
Janecky, David	LANL/EET Software QA Specialist		X	
Lacy, Keith	LANL/EET Transportation Official	X		
Liebman, Chris	LANL/EET C-12 HGAS Ops lead	X	X	X
Lin, Mavis	LANL/EET TWCP Assistant SPM	X	X	X
Lopez, Joshua	LANL/EET VE Expert		X	
Makarule, Hanna	LANL/EET TSM	X		X
Martin, Beverly	LANL/E-WMOSR Project Leader			X
Martinez, David	LANL/C-12 Chemical Technician	X	X	X
Martinez, Manuel	LANL/EET RMDC Team Leader	X	X	X
Martinez, Paul	LANL/EET Test & Measurement Technician		X	X
Montoya, Andrew	LANL/NMT-3 Team Leader		X	

PERSONNEL CONTACTED DURING A-00-16				
NAME	ORG/TITLE	PREAUDIT MEETING	CONTACTED DURING AUDIT	POST AUDIT MEETING
Mroz, Gene	LANL/EET TSM		X	X
Musgrave, John	LANL/C-11 AK Lead	X	X	X
Nunz, James	DOE-LAO WM Program Manager	X	X	X
Ortega, Laura	LANL/EET QA Staff	X	X	X
Ortiz, Patrick	LANL/NMT-7 Observer		X	
Owczarek, Robert	LANL/EET TSM	X		X
Palomares, Jose	LANL/EET Material Handler		X	
Pickrell, Mark	LANL/EET Group Leader	X	X	
Quintana, Doris	LANL/EET QA Staff	X	X	
Riggs, Matt J.	LANL/EET WCO	X	X	X
Rios, Robert	LANL/EET (Butler Inc) VE Expert		X	
Robbins, Scott	LANL/EET Training Coordinator		X	
Rogers, Pamela	LANL/EET SPM	X	X	X
Romero, Myrna	LANL/EET Ops Manager		X	
Saunders, Lori	LANL/EET Senior QA Engineer	X	X	X
Souza, Larry	LANL/EET Senior QA Engineer	X	X	X
Spitzmiller, Ted	LANL/CIC-18 Analyst	X		
Strietelmeier, Betty	LANL/EET Deputy	X	X	

PERSONNEL CONTACTED DURING A-00-16				
NAME	ORG/TITLE	PREAUDIT MEETING	CONTACTED DURING AUDIT	POST AUDIT MEETING
	SPM			
Tallarico, Antonia	LANL/EET SPQAO	X	X	X
Trujillo, Barbara	LANL/EET Waste Certification Support	X	X	
Valdez, Joseph	LANL/EET (Butler Inc) VE Expert		X	
Vigil, Jack	LANL/EET NDE Ops Leader	X	X	X
Weyerman, C. Wade	LANL/EET Transportation Certification Official	X		X
Willette, Mark	LANL/C-12 Chemical Technician	X	X	X
Zoltai, John	LANL/CIC-15 Information Systems			X

**LIST OF LANL PROCEDURES AUDITED (A-00-16)**

ITEM #	PROCEDURE NUMBER	REVISION	DATE	TITLE
1.	PLAN-0.2.7-001	3	9/12/00	TRU Waste Characterization Sampling Plan
2.	DTP 1.2-001	10 ICN1 ICN2 ICN3	8/24/00 9/19/00 9/26/00 9/27/00	Visual Examination Procedure for TWCP
3.	DTP 1.2-002	3 ICN1	5/4/00 8/3/00	WCRRF Procedure for Video System
4.	DTP 1.2-006	6 ICN1 ICN2	8/15/00 9/18/00 9/27/00	Calculation of UCL <sub>90</sub> Values for HGAS VOC, Total VOC, SVOC, and Metals Data
5.	DTP 1.2-008	8 ICN1	9/7/00 9/19/00	Detailed Operating Procedure for Performing NDT Using the Mobile Real Time Radiography System
6.	DTP 1.2-015	4	8/24/00	Calculation for Determining the Number of Containers for VE
7.	DTP 1.2-025	4	9/18/00	Headspace Gas Analysis Batch Data Report Preparation
8.	DTP 1.2-038	2 ICN1 ICN2	9/19/00 7/6/00 8/3/00	HGAS Filter Removal and Replacement for TWCP
9.	DTP 1.2-041	4 ICN1	9/18/00 10/26/00	Headspace Gas Sampling & Analysis Using an Automated Manifold
10.	DTP 1.2-053	0 ICN1 ICN2 ICN3	6/6/00 6/29/00 8/3/00 8/11/00	Assignment of Waste Matrix Codes
11.	DTP 1.2-063	0 ICN1	6/16/00 8/3/00	Preparing and Handling Waste Containers
12.	DTP 1.2-064	2	9/22/00	Waste Characterization Data Reconciliation with AK
13.	QP 1.1-003	7 ICN1	2/3/00 8/3/00	TWCP Training
14.	QP 1.1-004	6 ICN1	1/21/00 8/23/00	Records Management
15.	QP 1.1-007	7 ICN1 ICN2	6/8/00 8/10/00 8/22/00	Nonconformance Reporting and Tracking
16.	QP 1.1-010	9 ICN1 10	9/5/00 9/26/00 10/17/00	Project Level Data Validation and Verification
17.	QP 1.1-012	5 ICN1 ICN2	6/28/00 7/20/00 8/7/00	Laboratory Notebooks and Logbooks
18.	QP 1.1-017	5 ICN1	3/15/00 8/4/00	Chain of Custody
19.	QP 1.1-021	4 ICN1 5	6/8/00 8/9/00 10/16/00	Acceptable Knowledge Documentation



**LIST OF LANL PROCEDURES AUDITED (A-00-16)**

<b>ITEM #</b>	<b>PROCEDURE NUMBER</b>	<b>REVISION</b>	<b>DATE</b>	<b>TITLE</b>
20.	QP 1.1-022	3 W/ICN1 ICN2	3/10/00 9/28/00	PDP Blind Audit Sample Management
21.	QP 1.1-024	5 ICN1	9/21/00 9/28/00	Reporting Summarized Characterization Data to CAO
22.	QP 1.1-028	6 ICN1	8/10/00 9/28/00	Reconciliation of VE and RTR Information
23.	QP 1.1-034	5 ICN1 ICN2 ICN3	8/1/00 9/20/00 9/25/00 10/18/00	WWIS Data Entry
24.	QP 1.1-035	2	4/4/00	Qualification of TWCP NDE Personnel
25.	QP 1.1-039	0 ICN1	6/6/00 8/10/00	Conversion of Waste Volumes to Weights
26.	QP 1.1-040	1	9/15/00	Tracking and Reporting of Tentatively Identified Compounds