

WMPO QUALITY ASSURANCE AUDIT REPORT
NNWSI AUDIT OF LOS ALAMOS NATIONAL LABORATORY

AUDIT NUMBER: 87-1

CONDUCTED ON: 3/30/87 - 4/3/87

PREPARED BY J. W. Estella DATE 5/5/87
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1.0 INTRODUCTION

This report contains the results of a Quality Assurance Audit of Los Alamos National Laboratory, Los Alamos, New Mexico. The audit was conducted in accordance with the requirements of the WMPO Quality Assurance Program Plan (NVO-196-18) and Quality Management Procedure (QMP) 18-01, Rev. 1.

2.0 AUDIT SCOPE

The purpose of the audit was to evaluate the effectiveness of the Los Alamos National Laboratory Quality Assurance Program and implementing procedures with respect to the requirements of NNWSI NVO-196-17, Rev. 4, and to verify the implementation of the Quality Assurance Program as it relates to activities on the NNWSI Project. An evaluation was also to be made of Los Alamos Mineralogy/Petrology technical activities to determine if these activities are ready for audit by the NRC.

3.0 AUDIT TEAM PERSONNEL

This audit team consisted of following members:

Lead Auditor: J. W. Estella, SAIC, Las Vegas

Auditors:	C. M. Thompson	Auditor	SAIC, Las Vegas
	W. R. Kazor	Auditor	SAIC, Las Vegas
	J. M. Gromer	Auditor	SAIC, Las Vegas
	F. D. Peters	Auditor	SAIC, Las Vegas
	Gerard Heaney	Auditor	SAIC, Las Vegas
	S. R. Mattson	Technical Specialist	SAIC, Las Vegas
	Dean Eppler	Technical Specialist	SAIC, Las Vegas
	Dow Davidson	Technical Specialist	SAIC, Las Vegas
	D. C. Newton	Auditor	DOE/HQ
	J. R. Rinaldi	Observer	DOE/QAD
	P. T. Prestholt	Observer	NRC/NV
	Paul Bembia	Observer	NRC/HQ

4.0 SUMMARY OF AUDIT RESULTS

Evaluation of the Los Alamos National Laboratory Quality Assurance Program and selected technical activities indicate general compliance with NNWSI NVO-196-17, Rev. 4 requirements. The deficiencies which were identified by the audit team were not concentrated in any one specific programmatic area with the exception of procurement activities in which four deficiencies were identified. The number of deficiencies indicates a need for the Los Alamos staff to evaluate its procurement procedures and activities for compliance to NNWSI Project requirements. Evaluation of the need for training personnel in these activities should also be made.

Eleven deficiencies and 10 observations were identified during the course

of the audit. Additionally, the audit team generated four recommendations for the Los Alamos staff to consider. The deficiencies, observations, and recommendations are delineated in Section 6.0 of this audit report.

The audit team determined that the following program elements of the Los Alamos Quality Assurance Program were in compliance with NNWSI Project Quality Assurance Program requirements:

1. Organization
2. Quality Assurance Program
10. Inspection (Surveillance requirements only)
11. Test Control
16. Corrective Action

Program elements which the audit team identified as being deficient were:

3. Design Control
4. Procurement Document Control
5. Instructions, Procedures and Drawings
6. Document Control
7. Control of Purchased Material, Equipment, and Services
12. Control of Measuring and Test Equipment
13. Handling, Storage and Shipping
15. Nonconforming Materials, Parts or Components
18. Audits

This was the first WMPD audit where deficiencies were qualified by the application of severity levels that are based on the significance of the finding. There are three severity levels which are used. Severity Level 1 is the most severe and is applied to significant deficiencies considered of major importance. These deficiencies require remedial, investigative, and corrective actions to prevent recurrence. Severity Level 2 deficiencies are not of major importance but may also require remedial, investigative, and/or corrective actions. Severity Level 3 is applied to a minor deficiency which only requires remedial action. These deficiencies are generally isolated cases or have a very limited scope.

Nine of the 11 deficiencies identified during the audit were in the programmatic area. The deficiencies identified were due to the lack of implementation of procedural requirements or the lack of procedural detail within the procedures. The SDRs were classified as either Severity Level 2 or 3. They were not considered significant deficiencies. There were no Severity Level 1 deficiencies identified.

Five of the 10 observations identified during the audit were in the programmatic area. The observations identify conditions that are presently not violations of procedural requirements but in the opinion of the audit team, the conditions could lead to violation of requirements in the future.

Program elements not audited at this time were:

8. Identification and Control of Materials, Parts, and Components
9. Control of Special Processes

- 14. Inspection, Test, and Operating Status
- 17. Quality Assurance Records

Elements 8, 9, and 14 do not presently apply to Los Alamos NNWSI Project activities. Element 17 will not be audited until WMPD approves the Los Alamos Quality Assurance Records procedure.

The audit team also audited Los Alamos technical implementing procedures for the following activities:

- 1. Mineralogy/Petrology
- 2. Sorption
- 3. Solubility

Two of the 11 deficiencies identified during the audit were in the technical area. Review of the Los Alamos technical activities indicated that work was being performed, controlled, and documented satisfactorily to ensure adequate traceability throughout the research and experimentation of these activities. However, Los Alamos technical procedures did not exist for all activities. Also, several of the technical procedures which were audited did not contain all necessary quality assurance requirements. Additionally, some technical laboratory notebooks were not receiving a three month peer review as specified by procedures. These deficiencies have been documented on Standard Deficiency Reports (SDRs).

The five observations identified on Los Alamos technical activities document concerns of the audit team with regard to laboratory notebook control, the need for procedure enhancements, scheduling for geostatistical code validation/verification, and sample identification. These concerns were generated for consideration by the Los Alamos staff to preclude future program violations and delays which could occur if the concerns were not given appropriate attention at this time.

The audit team evaluation of Los Alamos technical activities in the Mineralogy/Petrology area indicate that the activity is ready for audit by the NRC.

5.0 AUDIT MEETINGS

5.1 PREAUDIT CONFERENCE

A preaudit conference was held on March 30, 1987, at 10:00 a.m. The purpose, scope, and agenda of the audit were reviewed with the Los Alamos staff and coordinators were assigned to escort audit team members during the audit. (See attachment A for attendees).

5.2 PRELIMINARY POSTAUDIT CONFERENCE

A preliminary postaudit conference was held on April 1, 1987, at 2:00 p.m. The results of the audit of the Los Alamos technical activities were presented at this meeting. (See attachment A for attendees).

5.3 POSTAUDIT CONFERENCE

A postaudit conference was held on April 3, 1987, at 10:00 a.m. Results of the audit and SDRs, observations, and recommendations identified during the course of the audit were presented to the Los Alamos staff. Rough draft copies of the SDRs, observations, and recommendations were presented to Los Alamos management personnel at this time. (See attachment A for attendees).

6.0 SYNOPSIS OF SDRs/OBSERVATIONS/RECOMMENDATIONS

STANDARD DEFICIENCY REPORTS

1. Approved Los Alamos-NNWSI Project procedures were not in effect for the field collection, identification, and control of trench, outcrop, shaft and water samples. Additionally, Los Alamos technical procedures do not delineate appropriate QA requirements for the handling, storage and shipping of samples. Refer to SDR No. 001 - Severity Level 2.
2. Laboratory notebooks were not receiving the three month peer review as required by Los Alamos procedures. Refer to SDR No. 002 - Severity Level 2.
3. Technical reviews of Scientific Investigation Plans were not documented. Additionally, some publication files did not contain all the necessary documentation as required by procedures. Refer to SDR No. 003 - Severity Level 2.
4. The serial numbers of weights used to calibrate balances were not documented as required by NNWSI Project procedure SOP-02-01, QAPP Requirements for Participating Organizations and NTS Support Contractors, Rev. 1. Los Alamos procedures do not specifically address this requirement. Refer to SDR No. 004 - Severity Level 2.
5. Various minor document control deficiencies concerning incorrect procedure dates and effectivity dates were identified. Additionally, inconsistency between procedures governing the control of laboratory notebooks was observed. Refer to SDR No. 005 - Severity Level 3.
6. The technical and QA review of Quality Level I procurement documents is not always documented. Purchase orders are not sent to QA for review prior to issuing the purchase orders as required by procedures. Refer to SDR No. 006 - Severity Level 2.
7. Purchase orders have not specified Quality Assurance requirements to suppliers when purchasing equipment used for Quality Level I activities. Refer to SDR No. 007 - Severity Level 2.
8. Quality Assurance representatives have not witnessed the qualification of purchased equipment used for Quality Level I activities which was purchased from vendors that are not on the acceptable source list. Refer to SDR No. 008 - Severity Level 2.

9. Copies of purchase orders for Quality Level I activities are not being sent to WMPO as specified in Los Alamos procedures. Refer to SDR No. 009 - Severity Level 3.
10. The Los Alamos NCR tracking log is not being adequately maintained to reflect the current status of Los Alamos NCRs. Refer to SDR No. 010 - Severity Level 2.
11. The Los Alamos Quality Assurance audit procedure does not contain sufficient detail to ensure NNWSI Project Quality Assurance requirements are being complied with. Additionally, Los Alamos has not implemented requirements to have a system for indicating the status of audit findings. Refer to SDR No. 011 - Severity Level 3.

OBSERVATIONS

Observation No. 1

1. The WMPO audit team identified a concern related to the system in use for submitting scientific "QA" Laboratory Notebooks to the central records management system. Based on conversations with David Vaniman, Dave Bish, Steve Chippera, Bruce Crowe, Suzann Dye, and others it was noted that controlled "QA" Laboratory Notebooks are not required to be duplicated until they are completely filled by the researcher. In some cases that time period (from initiation until filled) may be as great as 24 months. This practice appears to place the information in the Notebooks at a great risk, based on concerns about losses through misplacement or fire. It is recommended that Los Alamos-NNWSI Project consider alternative methods that would capture these unique documents for the records management system in a more timely manner. Even though actual analytical data may in most instances be regenerated if a Notebook loss did occur, it is evident that critical sample traceability information that is unique to a specific Notebook would be difficult, if not impossible to regenerate. This could result in the invalidation of many months of sample data based simply on loss of sample traceability.

Two additional concerns related to Laboratory Notebooks were observed. The use of loose-leaf binders in the Thin Section Laboratory for the filing of forms may lead to the misplacement of these forms. Any use of loose-leaf binders for filing of traceability related information should not be allowed. It was also noted that some of the Laboratory Notebooks used for the Sorption task and the Solubility task contain non-NNWSI Project entries. This is a concern considering the possibility that the Notebooks may ultimately be released to the public and the NRC. It is recommended that separate notebooks be used for NNWSI Project activities.

Observation No. 2

2. This observation covers the following four procedures:

- o TWS-ESS-DP-01, X-Ray Powder Diffraction Analysis, Rev. 2,
- o TWS-ESS-DP-03, Nevada Test Site Core Petrography Procedure, Rev. 2,
- o TWS-CNC-DP-17, Procedure for Samples Required in Their "Natural State," Rev. 1, and
- o TWS-INC-DP-30, Partial CO₂ Atmospheric Control of Groundwater Chemistry, Rev. 0.

It is our understanding that the procedure related to x-ray powder diffraction has not been used for four or five years and that the qualitative data collected at that time has been redone using quantitative x-ray techniques under procedure TWS-ESS-DP-16, Siemens X-ray Diffraction Procedure, Rev. 2. The Nevada Test Site Core Petrography Procedure, Paragraph 3.7 states in part that photographs of thin sections are boxed separately from the thin sections and kept in the same cabinet as their corresponding thin sections. The procedure is unclear in describing if it is a requirement to photograph all thin sections. The audit team recommends that this paragraph be clarified to clearly state the intent of photographing thin sections. It is also our understanding that the procedure covering the use of samples in their "natural state" has never been fully implemented although samples of tuff were used that had been sealed in a nitrogen-water atmosphere. Implementation was determined to be not necessary because initial scoping experiments on oxygen atmosphere core samples indicated that the Kd's determined were so high that "natural state" experiments would add little additional confidence to the measurements previously obtained or on future measurements involving sorption and desorption processes. Finally, procedure TWS-INC-DP-30, Paragraph 4.0, states that a QA logbook is kept with the glovebox so that anomalies can be recorded as they are discovered. Presently this procedure is not being used at Los Alamos. However, if the procedure is to be utilized in the future, Paragraph 4.0 should be expanded to explain how the anomalies are resolved. The procedure should also state that the anomalies are reviewed to determine if the sample was adversely affected.

It is our general opinion that these procedures should be (1) modified and updated, or (2) discontinued as procedures. The procedures should only be discontinued if, through evaluation, it is determined that they will not be used in the future. If the procedures are to be activated in the future then the procedures should be revised and reissued.

Observation No. 3

3. The WMPO audit team identified a concern related to the development of geostatistically-based computer codes to be used in extrapolating the results from the mineralogy/petrology investigations between individual boreholes. At present, Kathy Campbell of Los Alamos S-Division is developing these codes with the assistance of Dave Vaniman of ESS-1. These codes will need to be validated and verified to bring them to QA Level I before the actual mineralogy/petrology data is processed to produce three-dimensional models of Yucca Mountain Stratigraphy. The misconception existed prior to this audit that these codes would be "off-the-shelf" and would consequently not need extensive verification/validation. However, it was found during the audit that the codes are being developed in-house, and Campbell felt that it could take up to a year to complete the

validation/verification. This could result in a delay in developing three-dimensional models if the verification/validation exercise were left until late in site characterization. It is recommended that the Los Alamos-NNWSI Project factor the time and material/personnel resources required for geostatistical code validation/verification into both WBS and site characterization planning to avoid this delay.

Observation No. 4

4. It was observed during a check of a Research Laboratory Notebook belonging to David Hobart (VI-88, TWS-INC-11-1/85-2), Page 15 that there was a reference to a "Crushed Rock" sample. There was no unique sample identification assigned to this sample reference. David Hobart related that this was an NNWSI Project sample. Hobart also made clear that the data derived from the sample was never utilized for NNWSI Project purposes and was discarded. The sample was identified in the notebook as having been received from Joe Thompson. The concern is that sample traceability could be lost if a system for assigning unique sample identification is not utilized. NNWSI Project samples must maintain sample identification and traceability throughout the process from receipt to disposal. If sample traceability is lost, the sample and related data run the risk of being challenged and possibly found to be unacceptable for use during licensing activities.

Observation No. 5

5. This observation covers the counting methods discussed in TWS-INC-DP-02, Quality Control in Counting Radioactive Nuclides, Rev. 3. It has come to our attention that there are several different types of counting equipment and, therefore, several types of counting methods being used in this work. It is recommended that the procedure be modified to reflect the different types of methods being used. In addition, the procedure should clearly reference which counting method is being discussed in the text.

It is not recommended that separate procedures be written for each type of method, but further details may be necessary in order to describe the methods. One suggestion would be to acquire the procedures already written by the Weapons Counting Laboratory and include them as an appendix. Additionally, on Page 2 of the procedure there are two alpha-numerical listings which are the same. One of these probably refers to the counting of background activity. This minor correction should be made when the procedure is revised.

Observation No. 6

6. The justification of the assignment of Quality Level III to items being purchased (using purchase request, Los Alamos form 838) has not been documented adequately. Statements that the item will be used only in research activities, or that only relative (not absolute) measurements will be made with the item, are not sufficient justification. Details as to specific tasks the equipment is being purchased for should be stated and commitments made (and controls instituted) that will assure the item cannot be used in Quality Level I activities.

The procurement requests reviewed during the audit for items assigned to Quality Level III were:

4631K
4638K
4636K
4637K
4639K
4629K
4635K

Observation No. 7

7. In a supplementary response to a 1985 WMPD audit finding (AFS No. 8511-4) Los Alamos committed to performing both technical and administrative surveillances weekly. (Reference Letter No. TWS-ERA-NP-05-86-87, dated May 27, 1986). In a subsequent letter (dated October 1, 1986, D. T. Oakley to Donald L. Vieth), Los Alamos committed to performing three surveillances a month. However, to date Los Alamos has only performed seven surveillances in the past six months of FY 87. It was also observed by the audit team that these seven surveillances were not yet finalized and issued.

Observation No. 8

8. NNWSI Project SOP-02-01 "QAPP Requirements for Participating Organizations and NTS Support Contractors", Rev. 2, paragraph 1.1.2 states the following:

"The persons and organizations performing QA functions shall have sufficient authority and organizational freedom to identify quality problems; to initiate, recommend, or provide solutions; to verify implementation of the solutions; and to stop unsatisfactory work."

Los Alamos does not currently have a Stop Work procedure in place. Accordingly, Los Alamos should develop and be prepared to issue a procedure for Stop Work upon receipt of the WMPD approval of Los Alamos-NNWSI Project QAPP, Rev. 1.

Observation No. 9

9. It was noted that the Los Alamos Scientific Investigation Plans (SIPs) typically contain a section which describes previous work that is to be used in support of the current scientific investigation. These SIPs also state that if the previous work was produced prior to August of 1980 (the implementation date of the NNWSI Project QA Plan) or if the work was produced by non-NNWSI Project personnel, it would be "qualified" for use in licensing activities in accordance with the requirements of NNWSI-SOP-03-03, Acceptance of Data or Data Investigations Not Developed Under the NNWSI Project QA Plan. NNWSI-SOP-03-03 requires that data produced prior to the implementation date of the NNWSI QA Plan (August, 1980) or data produced by non-NNWSI Project personnel must be "qualified" within four years of the effective date of the procedure (January 31, 1987) if it is to be used in licensing activities. The concern is that Los

Alamos has not yet begun to "qualify" any of the previous work referenced in their SIPs or determined which work will be used in support of licensing activities. There is no evidence to indicate that the completion of this effort is being planned, scheduled, or coordinated, as appropriate, to ensure that the four year time limit will be met. Given the potential magnitude of this task, it is imperative that timely and appropriate consideration be focused in this area.

Observations No. 10

10. Los Alamos procedure TWS-QAS-QP-21, "Corrective Action", Rev. 0 does not contain sufficient detail for the preparation issuance and effective control of Corrective Action Reports (CAR) ie:

Preparation:

1. There is no requirement for the initiator to sign the CAR
2. There is no requirement or place on the form for the person providing the corrective action response to sign the CAR

Issuance:

1. The QAIM is required to distribute CARs to Los Alamos NNWSI Project management, WMPO, QASC, and others as determined by the QAIM, however, there is no guidance as to when this is to be accomplished.

Control

1. CARs can be cancelled before they are issued by the QAS; however, there are no requirements for QAS to retain a copy of the CAR or to provide justification for cancelling the CAR before returning it to the initiator.
2. A CAR Status Log is required to be maintained; however, the Log only identifies "Issued Date" and "Closed Date." No interim status is indicated.
3. The responses to three CARs have been pending the concurrence of the QAIM since September 1986. One CAR appears to have been pending close-out action since October 1986.

RECOMMENDATIONS

Recommendation No. 1

1. It is recommended that the procedures TWS-ESS-DP-06, Operating Instructions for DV-502 Vacuum Evaporator Used in Carbon Coating Samples, Rev. 0, and TWS-ESS-DP-50, Sputter Coater Operating Procedure for Gold Coating Samples, Rev. 0, both be shortened, modified, and incorporated into the TWS-ESS-DP-07, Microprobe Operating Procedure, Rev. 2.

This change is being suggested for several reasons: (1) both coating

procedures are lengthy and contain an unnecessary amount of detail in comparison to their importance to the data obtained from the microprobe, (2) the improper application of the coating procedures results in a situation where no data can be acquired, and (3) the lengthy procedure (as presently written) could be done in several ways, all of which would result in a successful coating of the sample. Thus, the procedure could be interpreted as being crucial to the data obtained, which it is not, or the exact steps listed in the present procedure being incontrovertible, which they are not.

Furthermore, it is recommended that the procedure listed in TWS-ESS-DP-04, Thin Section Preparation Procedure, Rev. 0, on the calibration of the Logitech LP-30 lapping and polishing machine be revised. This machine is not calibrated and does not need to fall under the TWS-MSTQA-QP-15, NNWSI Project Calibration Control Procedures, Rev. 0. As with most equipment that receives hard use (e.g., saws, boring machines, etc.) the trained technician is the one who makes the qualitative judgement as to whether a piece of equipment should be replaced, repaired, or new parts procured. The quality of the product is the basis for the technician to make these qualitative judgements. In this same view, the phrase "The Logitech LP-30 Lapping and Polishing Machine" should include the phrase "or other similar machines" so as not to limit the technicians or investigators with hasty reviews to a technical procedure where a standard and nonsensitive (to data acquisition) piece of equipment may have to be replaced.

Finally, it is recommended that procedure TWS-ESS-DP-28, Nevada Test Site Fracture Filling Studies Procedure, Rev. 0, be incorporated into the general procedure on making thin sections and other sample preparations and procedure TWS-ESS-DP-03, Nevada Test Site Core Petrography Procedure, Rev. 2, as it is very similar and would require only minor modifications to the general procedure (e.g., the thin section laboratory will be notified on its instructions for the orientation of the thin section to be prepared). Efficiency and minimizing the effort in writing procedures should be a general goal, where it is determined that sample traceability and the quality of work being performed is not affected.

Recommendation No. 2

2. It is recommended that the procedures in the (1) mineralogy/petrology, (2) sorption, and (3) other technical areas be reviewed with respect to the following: specific types of samples, specific instruments of standard nature, and specific forms of tests that are described which need not be so restrictive that major modifications to the procedures will be required in order to (1) test other types of samples, (2) replace equipment with a different manufacturer's make, or (3) where a similar test is being performed with a minor or slight change to the test technique. A thorough review of the procedures may alleviate any of these problems in the future without having any effect on the quality or nature of the work being performed.

A specific example of these include:

- 1) References to only J-13 water where it is highly probable that other water samples obtained from other drillholes, the exploratory shaft, or distilled water may be used. Reference to "water samples" would be adequate in most cases.
- 2) References to specific brand names of equipment should be avoided where that equipment is not crucial to the preparation procedures or data acquisition phase of the work being done; an example of this is a reference to a "Logitech LP-30 Lapping and Polishing Machine" in the Thin Section Preparation procedure where a general reference to a lapping and polishing machine is adequate. An additional example, is a reference in procedure TWS-ESS-DP-53, Rev. 0, to a SPEX 8500 shatterbox where reference simply to a shatterbox would be more appropriate.
- 3) Specific definitions of all phases of a mechanical procedure being performed in a standard analytical technique should be avoided because they could be unnecessarily restrictive and are not usually crucial or important to the preparation or analysis being performed.
- 4) Concerning procedure TWS-CNC-DP-05, The Determination of Sorption and Desorption Coefficients, Rev. 1, or other procedures, where applicable, it is recommended that specific references made to individual radionuclides, samples, chemical species, or other similar parameters should be preceded by an (e.g.) or the statement "For Example." This allows the researcher the greatest latitude in performing the experiments which are necessary or that may be necessary in the future. These types of specific parameters should be found in a researcher's laboratory notebook.
- 5) On the same procedure in number 4 above and applicable to other procedures, the amount of detail provided in the procedure is extreme. A review should be conducted that identifies procedures documented in such detail that they may be extremely restrictive in what experiments may be accomplished or overly restrictive because a standard technical procedure has been overly specified for the steps involved in the procedure. General laboratory manuals might be an appendix to such procedures or more generic procedures written.
- 6) Concerning the procedure on x-ray powder diffraction analyses (TWS-ESS-DP-01, Rev. 2), on page one, one might get the impression that x-ray powder diffraction analysis would only be carried out on samples that have been petrographically analysed and analysed by the microprobe. In some cases this might be true, but in most instances an x-ray powder diffraction analysis would be carried out without application of these other techniques.

Furthermore, the procedure includes figures that are unnecessary for the implementation and performance of the procedure. Except in the most unusual cases figures are not necessary.

A detailed description of the theory behind performing this type of analysis is also included. For example, Braggs Law is a part of this procedure. Procedures, in general, do not need to include the common theory or theories being applied in the practice of the procedure. This is an unnecessary amount of detail and should be eliminated. Additionally, there is no description of how data shall be recorded and maintained. This should be included in the procedure. It is recommended that this procedure be reviewed with these concerns in mind and revised as appropriate.

- 7) Procedure TWS-ESS-DP-03 only discusses core samples. The procedure should be modified to include other samples including core, subsurface, exploratory shaft, or other samples as the procedure may be limiting the researcher as presently written.

On Page 1, polished sections are described and it is implied that all thin sections will be polished. This should be modified to allow for cases where thin sections are not polished (e.g., additional kinds of analyses may be performed or an outside contractor who implements your procedure may not polish his thin sections).

On Page 2 the purpose of obtaining core is mentioned. It would be more appropriate to discuss the general purpose of petrographic analysis on all kinds of samples.

In section 3.7, it states in part that photographs of thin sections are boxed separately from the thin sections and kept in the same cabinet as their corresponding thin sections. The procedure is unclear in describing if it is a requirement to photograph all thin sections. It is recommended that this paragraph be clarified to clearly state the intent of photographing thin sections.

- 8) Procedure TWS-ESS-DP-04, Paragraph 3.1.2, states that samples will be placed in rows. Although a minor concern, sample traceability is the point of interest and should be emphasized here and not that the samples be placed in rows.

In general, this procedure was too detailed and overly specified. Standard procedures should be treated as such. Safety concerns and general technical aspects of common procedures may not need to be cited in detail. A general reference or manual may be used to illustrate these procedures or a general summary of the procedure provided. Procedures TWS-ESS-DP-06, Rev. 2, and TWS-ESS-DP-07, Rev. 2, and TWS-ESS-DP-51, Rev. 0 were also found to have similar characteristics. A review and revision of these and other procedures is recommended especially where the detail of the procedure restricts the analyst in his capabilities on such common applied procedures.

Recommendation No. 3

3. During a successful investigation into calcite-silica trench sample

traceability, it was noted that there is not a method in place that allows an efficient and timely determination of exactly where a sample is located. This does not necessarily pose a problem with sample traceability in general, but the logging technique used is not explicit enough to direct a search to a specific room or drawer. Currently the location of a sample may only be narrowed down to three or four choices without physical search. All of the possible locations are controlled, therefore, sample integrity is not compromised.

It is recommended that some type of system be put in place that will document the specific building, room, and drawer location of NNWSI Project samples.

Recommendation No. 4

4. Los Alamos Procedure TWS-MSTQA-QP-12, "NNWSI RECEIVING INSPECTION PROCEDURE," Rev. 0, Section 5.1, requires Quality Level I purchases to have two forms completed: A Receiving Inspection Report and a Delivery Receipt. These forms are only filled out for receipt of items, equipment, and hardware. They are not completed for services or analyses that are procured as Quality Level I.

It is recommended the procedure be reviewed and revised as appropriate.

7.0 RECOMMENDED ACTION

A written response is required for each Standard Deficiency Report delineated in Part 6 above. Copies of the SDRs were forwarded by mail to the Los Alamos Technical Project Officer on April 15, 1987. Response is due on May 13, 1987. Upon response acceptance and satisfactory completion and verification of all remedial and corrective action, the SDRs will be closed and Los Alamos will be notified by letter of the SDR closure.

A written response is required for each observation delineated in Part 6 above. Responses are due within 20 working days of the date of the transmittal letter for this audit report.

Written responses are not required for recommendations contained within this audit report. The recommendations were generated by the audit team for the Los Alamos staff to consider during implementation of its Quality Assurance Program.

NAME	ORGANIZATION	TITLE	PRE-AUDIT CONFERENCE	DURING AUDIT	PRELIMINARY AUDIT EXIT	POST AUDIT EXIT
Adams, Andrew	Los Alamos	Chem. Tech.			X	
Aderberg, Gail A.	Los Alamos	Staff	X			X
Adrich, M.	Los Alamos	Assoc. Group Leader				X
Barber, Jan	Los Alamos	Asst. Grp. Leader	X		X	
Bembia, Paul J.	NRC	Staff Geochemist	X		X	X
Blaylock, Jim	DOE/NV	WMPO PQM				X
Bish, David	Los Alamos	Staff Minerologist	X	X	X	X
Broxton, David	Los Alamos	Staff Geologist	X		X	X
Bryant, E.	Los Alamos	Group Leader				X
Bustos, E. J.	Los Alamos	Group Leader	X	X		X
Byers, Frank M.	Los Alamos	Staff Member	X		X	X
Campbell, Katherine	Los Alamos	Staff Member	X	X		
Carlos, Barbara	Los Alamos	Staff Geologist	X			X
Cederberg, G.	Los Alamos	Staff PI				X
Chipera, Steve	Los Alamos	Chem. Tech. III	X	X	X	X
Cisneros, M.	Los Alamos	Chem. Tech.		X	X	X
Cornelius, Susan	Los Alamos	Deputy Group Leader	X			X
Crowe, B.	Los Alamos	Asst. Group Leader	X	X	X	X
Daniels, W. R.	Los Alamos	Group Leader	X		X	X
Davidson, E. Dow	SAIC, Las Vegas	QA Coordinator	X		X	X

NAME	ORGANIZATION	TITLE	PRE-AUDIT CONFERENCE	DURING AUDIT	PRELIMINARY AUDIT EXIT	POST AUDIT EXIT
De Poorter, Gerald	Los Alamos	Geochm. Proj. Mgr.	X	X	X	X
Dye, Suzann	Los Alamos	QAL	X		X	X
Eppler, Dean	SAIC, Las Vegas	Senior Staff Geol.	X		X	X
Essington, E. H.	Los Alamos	Staff Member	X	X		X
Estella, John W.	SAIC, Las Vegas	QA Engr. Br. Mgr.	X		X	X
Gonzales, Sylvia M.	Los Alamos	Group Secretary	X			
Gromer, Jim	SAIC, Las Vegas	QA Geologist	X		X	X
Guthals, Paul	Los Alamos	QAIM	X	X	X	X
Hagan, R.	Los Alamos	Staff Member				X
Heaney, Gerard	SATC, Las Vegas	QA Engr.	X		X	X
Herbst, Dick	Los Alamos	Staff Memver			X	
Hersman, Larry E.	Los Alamos	Staff Member	X			
Hobart, Dave	Los Alamos	PI-Solubility	X	X		X
Hirons, Tom	Los Alamos	N. Division Leader	X			
Jones, M.	Los Alamos	Staff Memver				X
Kazor, Walter R.	SAIC, Las Vegas	Branch Mgr. Audits	X		X	X
Knight, Sylvia	Los Alamos	Staff Member	X	X	X	X
Langhorst, Gary	Los Alamos	Data Analyst	X			
Lawrence, F.	Los Alamos	Staff Member			X	

NAME	ORGANIZATION	TITLE	PRE-AUDIT CONFERENCE	DURING AUDIT	PRELIMINARY AUDIT EXIT	POST AUDIT EXIT
Levy, Schon	Los Alamos	Staff Geologist	X	X	X	X
Luedemann, Gary	Los Alamos	Technician	X			X
Maassen, Larry	Los Alamos	Staff Geologist	X	X	X	X
Mann, Dave	Los Alamos	Technician			X	
Mathieson, Marcella	Los Alamos	Property Admin.	X			
Mattson, Steven R.	SAIC, Las Vegas	Senior Staff Geochem.	X		X	
Merson, Tom	Los Alamos	Staff Member	X			X
Mitchell, Alan J.	Los Alamos	Technician	X	X		
Morris, David	Los Alamos	Staff Member	X			X
Morris, Wayne	Los Alamos	Staff Member	X		X	X
Neuman, Brent	Los Alamos	Staff Member	X	X		X
Newton, D. Carl	DOE/HQ	QA Manager	X		X	X
Norris, A. E.	Los Alamos	PI	X			X
Nunes, H. P.	Los Alamos	QAS	X	X	X	X
Oakley, D. T.	Los Alamos	TPO	X	X		X
Ott, Martin A.	Los Alamos	Technician	X	X		
Ortiz, G.	Los Alamos	Records Coordinator				X
Palmer, Phill D.	Los Alamos	Chem. Tech.	X			X
Palzer, W. L.	Los Alamos	Staff Member	X	X		X
Pendergrass, Ann	Los Alamos	QAL	X	X	X	X

NAME	ORGANIZATION	TITLE	PRE-AUDIT CONFERENCE	DURING AUDIT	PRELIMINARY AUDIT EXIT	POST AUDIT EXIT
Peters, Forrest D.	SAIC, Las Vegas	QA Geologist	X		X	X
Prestholt, Paul	NRC	On Site Rep.	X		X	X
Ray, James M.	Los Alamos	Staff Member	X			
Rinaldi, John R.	DOE	Director, QAD	X		X	X
Skaggs, Barbara J.	Los Alamos	PI	X			
Springer, Everett P.	Los Alamos	Staff Member	X			X
Thomas, Kimberly W.	Los Alamos	Asst. G. I.	X	X	X	X
Thompson, C. M.	SAIC, Las Vegas	QA Engr.	X	X	X	X
Tillery, Patricia	Los Alamos	QAS	X	X	X	X
Vaniman, Dave	Los Alamos	Staff Member	X	X	X	X
Vigil, R.	Los Alamos	Staff Member				X
Wheeler, Merlin	Los Alamos	QAL	X		X	
York, D. A.	QAL	Staff Member PL	X		X	X