LANL REMOTE HANDLED WASTE VISUAL EXAMINATION DATA VERIFICATION

PEER REVIEW REPORT

Prepared for the

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Technical Assistance Contractor (CTAC)

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LANL RH WASTE VE DATA VERIFICATION PEER REVIEW REPORT

1.0 ABSTRACT

The LANL RH Waste VE Data Verification Peer Review was conducted to verify visual examination (VE) data that were originally created by technicians at the Los Alamos National Laboratory (LANL) for remote-handled (RH) waste. The RH waste was derived from clean-up and decommissioning of hot cells located in Wing 9 of the Chemistry and Metallurgical Research (CMR) building at LANL during the period 1986-1992[1]. During the clean-up process, LANL technicians recorded in CMR Laboratory Notebook #23744 descriptions of activities they conducted and waste materials they packaged. Data contained in that notebook was later used to assist in documenting the containerized waste so that it could be transported and stored at an onsite facility. The RH waste generated at Wing 9 of the CMR is intended for disposal at the Waste Isolation Pilot Plant (WIPP) located near Carlsbad, New Mexico. The data used by LANL for onsite transportation and storage were not created under the requirements of the current WIPP *Quality Assurance Program Document* (QAPD). Peer reviews are specifically recognized as a means for qualifying data not generated under a WIPP-approved Quality Program (DOE/WIPP-02-3214, section 4.3.). The purpose of this peer review was to support qualification of the VE data.

For this peer review, a Peer Review Plan was developed that met the requirements of the Department of Energy (DOE) Carlsbad Field Office (CBFO) Management Procedure (MP) 10.5, Revision 6. A three-member Peer Review Panel of independent, technically qualified experts was assembled to provide opinions on whether or not the VE data were technically robust enough for making decisions concerning the residual liquid content and physical form of the waste. It is the unanimous opinion of the panel that the VE data may be used for those purposes.

2.0 PURPOSE OF PEER REVIEW

2.1 General Purposes

For the WIPP, a peer review is "A documented, critical review performed by peers who are

[1] While physical work at the CMR may have been completed in 1991, some of the records relied upon bear 1992 dates.

independent of the work being reviewed. The review shall include (as appropriate) in-depth analysis and evaluation of assumptions, calculations, extrapolations, alternate interpretations, methodology, acceptance criteria, and conclusions reached in the original work. It will assess the adequacy of the original work and determine its acceptability for use per 10 CFR Part 194."(CBFO MP 10.5, revision 6, sec 3.2.) Guidance for peer reviews intended to support nuclear waste management and disposal is contained in several documents, including DOE/WIPP-02-3214, section 4.3.1, and NUREG-1297. Under DOE/WIPP-02-3214 and CBFO MP 10.5, revision 6, section 2, peer reviews for the WIPP may be conducted for two purposes: 1) to verify the findings of an important and complex technical activity, such as a performance assessment, and 2) to qualify data that were not obtained under the requirements of an approved Quality Assurance Program Plan. This document describes the processes used and the findings made as the result of a peer review conducted to qualify data that do not conform to the current quality assurance standards.

2.2 Specific Purpose of LANL RH Waste VE Data Verification Peer Review

During the period 1986 to 1992, RH radioactive waste that had been produced at LANL was packaged into containers in preparation for shipping and disposal at the WIPP. While placing the RH waste into containers, LANL technicians recorded inventory information concerning the radioactive content and general physical form of the materials being readied for disposal. The records kept by the LANL technicians do not meet the current requirements of the WIPP QAPD. As a result, without additional verification, WIPP cannot rely on the contents of the records and cannot receive the RH waste for disposal.

Additional verification of the inventory can be achieved by a number of means, including additional radiometry and radiography, and by opening the containers and completing a visual reinspection of the contents. Another alternative is to empanel a group of independent scientists who have education and experience at least equal to those who performed the original packaging and, through a formal peer review process, arrive at an expert opinion as to whether or not the data are technically sufficient to determine if current data quality objectives (DQOs) and quality assurance objectives (QAOs) can be met.

3.0 SCOPE OF THE PEER REVIEW

The scope of the LANL RH Waste VE Data Verification Peer Review is tightly focused. While a number of criteria must be met to assure waste acceptance at WIPP, this peer review was

concerned with only two: 1) residual liquid content, and 2) physical form of the waste. The scope of the peer review was to evaluate whether or not the technical information contained in the original data records prepared by LANL technicians is adequate for evaluating the residual liquid content in the waste and for identifying the waste as either: (a) homogeneous solids, (b) soils/gravel, or (c) debris. The scope did not include determining what the residual liquid content of the waste is or placing the waste into the correct physical form category, nor did it include determining if other (or all) waste acceptance criteria have been met.

4.0 OVERVIEW OF PEER REVIEW PROCESS

4.1 Need for Peer Review Established

Prior to March 7, 2007, the need for a peer review was identified by Washington TRU Solutions LLC (WTS) as a result of their review of the archived LANL RH data sheets. They concluded that the data did not comply with requirements in the CBFO QAPD, Revision 8, and that a peer review was the most desirable first option for trying to qualify the waste for disposal. The peer review option does not subject personnel or the environment to any risk of contamination by hazardous and radioactive substances. The technical benefit of additional radiometry and radiography is doubtful, given the nature of the packaged materials and the DQOs and QAOs in question. Resolving the issue of data sufficiency by peer review was approved by CBFO. On July 25, 2005, CBFO approved a formal process (CBFO MP 10.5, Revision 6; hereafter, MP 10.5) for conducting peer reviews in support of WIPP. That procedure remains in effect, and was used to develop the Peer Review Plan for this peer review (see section 4.4).

4.2 Peer Review Panel Established

4.2.1 Manager Selected and Approved - Following approval of the request to implement a peer review, the first step in the process is to name a Peer Review Manager (PRM). Following award of a contract to Time Solutions Corp, Dr. William E. Coons was approved by CBFO on March 22, 2007. Dr. Coons' resume is contained in Appendix A.

4.2.2 Panel Selection Committee Established- MP 10.5 requires the PRM to head a Selection Committee of at least three independent persons with the appropriate educational background and experience, knowledge of WIPP operations, understanding of the technical scope of the peer review, and ability to assess the

qualifications of individuals considered as candidates for the Peer Review Panel. Selection Committee members Steven Calvert and Randal Steger, from the CBFO Technical Assistance Contractor (CTAC), agreed to support Dr. Coons as PRM.

4.2.3 Panel Candidate Selection - The Selection Committee determined that the scope of work could be effectively completed with a panel composed of three scientists. One of the three originally selected panel members resigned due to illness and the Selection Committee named Dr. William E. Coons, Dr. Edward S. Patera, and Mr. John Thies to the panel.

4.3 Training of Panel

4.3.1 Areas of training - The panelists were trained in four areas: 1) the WIPP Peer Review process (MP 10.5); 2) the DOE, WIPP, and U.S. Environmental Protection Agency (EPA) quality assurance requirements for peer review; 3) the organization of data contained in the LANL documents to be reviewed by the panel and; 4) the method and logic to be used when completing Data Evaluation Forms.

4.3.2 Training methods - Items 1 through 3 in paragraph 4.3.1 were accomplished by completing assigned reading as directed by the PRM. The reading list contained documents explaining quality assurance and technical independence requirements mandated by MP 10.5 and NUREG-1297, along with additional documents that provided technical information concerning WIPP waste acceptance criteria and information on waste streams. Training on these items was completed and certified in writing by the panelists prior to beginning evaluation of the LANL RH waste packaging data.

4.3.3 Certification of training - Training on the organization of the data contained in the files for review (item 4 in paragraph 4.3.1) was completed immediately prior to review of the data. Training was accomplished through an oral presentation on the data organization by Mr. Larry Porter of WTS. Training on the use and logic of the Evaluation Sheet was accomplished in a classroom setting by Dr. William Coons.

4.4 Peer Review Plan

The Peer Review Plan, incorporating MP 10.5 as its functional basis, was prepared by the PRM and submitted to CBFO for review and approval. The plan was approved by CBFO on March 30, 2007.

4.5 Quality Assurance

The Peer Review was held in Albuquerque, NM, April 9-12, 2007, at the Nativo Lodge. The peer review process and documents created during the peer review are subject to all of the protocols described in the QAPD and MP 10.5. Audit A-07-22 was conducted concurrent with the Peer Review.

Documents prepared under this scope of work are considered QA documents and are subject to audit. A final audit report related to the adequacy, implementation and effectiveness of the peer review process will be issued.

5.0 RH PACKAGING

5.1 General Description of Waste Stream

The RH waste that was packaged during the activity being reviewed was generated primarily by the clean-up and decommissioning of hot cells located in Wing 9 of the CMR building at LANL. Prior to the cleanup, the hot cells had been used to section nuclear fuel pins and prepare the recovered sections for metallographic inspection and analysis. In addition to the hot cell waste generated by that activity, the RH waste that was packaged included some waste produced by research activities conducted in the Sodium Cooled Fast Reactor (SFR) facility.

5.2 General Description of Packaging Process

For the most part, RH waste was initially placed in labeled, 1-gallon paint cans; 364 1-gallon cans were loaded in this way. The cans were placed in 7-inch tall plastic alpha containers for controlling the surface dose rate during handling. The alpha containers were placed in 1.5-gallon steel cans. The 1.5-gallon cans were numbered, and had lids vented through sintered metal filters. The lids were welded shut. The 1.5-gallon cans were placed in 55-gallon drums, approximately 12 cans to a drum, and approximately three 55-gallon drums were placed in each RH-72B canister.

In addition to the 364 cans, twelve 55-gallon drums were direct loaded with loose waste. The waste was described in CMR Laboratory Notebook #23744, and then also on MTS-14 Waste Description Records (Data Sheets) that were witnessed and signed.

5.3 Data Records Reviewed

Original data records were not reviewed by the Peer Review Panel. Records were provided as Portable Document Files (PDFs) on a compact disc. The data records included a document describing the waste stream and packaging process, and a "road-map" to the other documents.

5.3.1 Technician training records - Training records are contained in a file numbered P122. Training for handling, personnel protection, safety and health protocols, instrument calibration, record keeping, classifying solid waste, and solidifying residual liquids are all certified by the signatures of the technicians. Training on additional procedures was also included. The signatures and initials contained in the training records were used during the panel's review to assure that documents reviewed by the panel were created and/or verified by trained operators.

5.3.2 Procedures - Procedures used in RH waste packaging are documented in files numbered P121 and P123. Administrative procedures for Quality Assurance, Safety and Health, Security, Instrument Calibration, Drum and Can Labeling, Emergency Situations, and Transportation are included, but are of peripheral interest to the panel's review. Of more central interest are procedures for solidification of liquid waste and classification/documentation of solid waste, and those procedures were carefully scrutinized by the panel.

5.3.3 Inventory - Data records for direct-loaded drums and for cans are contained in files numbered U069 and U076. File U069 contains a photocopy of CMR Laboratory Notebook #23744, which contains descriptions of daily hot cell clean-up activities. The data entries contained in this notebook follow an approximate numeric order by can number. File U076 contains data descriptions on individual Data Sheets. The data appear to be re-arranged for load management purposes. Comparison of the data records contained in files U069 versus U076 were used as a completeness check.

5.3.4 Transportation - Data files U111 through U126 contain drawings that show the distribution of numbered cans in each 55-gallon drum. The data were generated primarily for health physics purposes for waste transportation and storage at LANL facilities. These data received cursory attention from the panel.

6.0 METHOD FOR DATA REVIEW

6.1 Assumptions and Limitations

6.1.1 Assumptions

- The data contained on the data sheets are assumed to correctly and completely record the materials placed in each can. The data under review were generated during the period 1986-1992. Short of opening the several layers of containers and inspecting the contents of the 1-gallon cans, technical questions that might arise are best answered by consulting the daily notebook. Answers obtained through interviews might be unreliable due to the lengthy period between the time of packaging and the interview. Speculation based on the activities that preceded or produced the waste stream is considered useless conjecture.

- If there is no notation concerning the presence or absence of a liquid, then the panel assumes that no residual liquid is present. The procedures under which the LANL technicians were trained emphasized the presence of radiation and particulates. The notation "no particulates" is appropriate under those circumstances. The absence of a similar "no residual liquid" is reasonable given that the training provided to the LANL technicians emphasized the solidification of liquid wastes and not on noting their absence.

- The term "residual liquid" is taken to mean liquid that is visible and that remains after efforts to remove it through decanting, aspiration and other physical means. Liquid that might be absorbed in rags, paper towels, etc., but that is not visible is not considered a residual liquid by the panel.

- Residual liquids that have been treated according to the procedure and training contained in the files P121 through P123 are assumed to be completely removed by the hydrating reactions of the cements with which they were mixed. Notations that the treated can has been inspected at a time at least 24 hours after the solidification treatment is taken by the panel as evidence that there is no remaining residual liquid, unless otherwise noted.

- The ability to estimate relative proportions of various wastes (as might be necessary to determine the proper category of the physical form of the waste) does not require written measurements or estimates of particle sizes if: 1) there is enough information for an experienced hot cell operator to determine likely proportions/sizes, or 2) the assignment of physical characteristics to the waste in the payload container would not be affected by the individual can(s) in question. The physical characteristics are assigned on a payload-by-payload basis based on volume percentage. If there are 16 cans in a drum, and four of those cans are not confidently characterized, but 12 cans are confidently characterized as debris, then no matter what characteristic is assigned to the four cans in question, more than 50% of the volume of the drum will be debris. Under such circumstances, the documentation requirement for adequately describing the physical form of the waste would be met.

- The presence of initials is sufficient to satisfy a signature requirement. The training record contained in P122 provides signature, handwriting and initial examples for comparison with initialed waste inventory documents. The important thing to the panel was not that a full signature was present, but rather that there was an indication that the inventory record was prepared and witnessed by trained technicians. The panel extended the logic behind this assumption to allow the acceptability of a U076 data document with a single signature, so long as that signature was verified by a second signature for the same data in the daily notebook.

6.1.2 Limitations - Conclusions reached by the Peer Review Panel in this report are limited by the substantial time that has passed between the time that the

technicians performed the original work and the convening of the panel. Any interview information that may have been reliable shortly after the original packaging, and that would have provided additional insights and confidence to the panel's opinions, would not be credible if acquired today. Instead, when evaluating the data, panel members applied their collective experience, judgment, and logical assumptions.

6.2 Data Review Process

6.2.1 Background Review - The first step in the data review process undertaken by the Peer Review Panel was to read and understand the background information contained in the road map narrative and in the P121-123 administrative files. Those documents provided an excellent context for understanding the activities that took place to clean up the hot cells. That context is necessary in order to gain a full appreciation for the information contained on the data sheets of U076. In addition, the P121-123 documents allowed the panel to create a list of trained technicians. The documents bore signatures that were compared to signatures on the Data Sheets to determine if work had been performed by trained individuals.

6.2.2 Notebook Review - The second step in the data review process was to review the information contained in the notebook (U069.) Reviewing the day-by-day notes provided the panelist with an understanding of the overall process of hot cell cleanup. Collectively, the understanding acquired by reviewing the training records, procedures, and notebook provided a reasonably comprehensive picture of how the hot cell cleanup proceeded. Review of the data records, therefore, occurred within a framework of knowledge of waste packaging and hot cell operations, understanding of how the packaging practices were supposed to proceed at CMR Wing 9, and an evaluation of how well those practices satisfy the data needs for determining if applicable DQOs and QAOs were met.

6.2.3 Data Sheet Review - The third step in the data review process was to read through all of the data sheets twice before beginning the evaluation. Multiple readings led to one important realization that was shared by the panel. Although nearly 400 individual data sheets were evaluated, there is really a much smaller number of unique data types. For example, data sheets for cans containing cladding were

nearly identical when compared to each other. Similarly, cans containing solidified residual liquid are virtually all the same, as are data sheets for sample tubes, parts of manipulators, grinding equipment and media, and general trash and debris. The level of detail is different for the different types of waste. For example, there is considerable detail with respect to cladding waste, while descriptions of hot cell clean-up waste (such as rags and paper towels) is scant. Nevertheless, the most significant impression is that the levels of detail within each subset of the waste types is similar. Recognition of these similarities, when taken in the context of the training that the technicians received, adds confidence that waste was documented, handled and treated as prescribed in the LANL procedures.

6.2.4 Data Sheet Evaluation - The fourth step in the review process was a sheet-by-sheet evaluation of the data sheets contained in file U076. A form was generated by the panel to help standardize data sheet evaluation by different panel members and at the same time keep panel members focused on answering the questions critical to the purpose of the peer review.

6.2.5 Completeness and Accuracy Check - The fifth and last step in the review process was to perform a completeness and accuracy check on the data. Completeness and accuracy were gauged by comparing data contained in the notebook (U069) with data for the same can number recorded in the individual data sheets (U076). A number of data records sufficient to express 95% confidence were checked.

6.3 Form for DQO and QAO Data Evaluations

6.3.1 Purpose - The purpose of this peer review evaluation was to qualify the waste profiling data compiled for materials removed from Wing 9 of the CMR building with respect to: 1) the residual liquid content, and 2) the physical form of the RH waste. The data do not meet prevailing quality assurance requirements. To be qualified, the data must be judged by the Peer Review Panel to be technically sufficient for use in decision-making.

6.3.2 Logic - The logic behind the design of the Data Evaluation Sheet is to focus the Peer Review Panel on key issues of technical substance. The first question,

derive from the DQOs, is: “Are the data technically sufficient to determine if the residual liquid content of the payload container is less than 1% by Volume?” The second question is: “Are the data technically sufficient to classify the physical form of the waste into one of three categories: 1) homogeneous solid, 2) soil/gravel, and 3) debris?” Embedded within the answers to those questions are additional questions posed by quality assurance objectives for reliability: ”Do the data exhibit comparability? Are the data consistent with the waste stream? Are the data sufficiently accurate and precise?”

The Data Evaluation Sheet contains questions aimed at reviewing the data sheets with specific purposes in mind: “Are the descriptions adequately detailed? Is the description consistent with the described cleanup activity?” Those questions get at the heart of the ability to judge if the data are technically reliable. “Is residual liquid present?” If so, “Was the amount of liquid estimated and was the prescribed treatment for solidification followed by trained personnel?” Those questions illuminate that the waste was being inspected for liquid and that liquid, when detected, was being treated by a process specifically designed to eliminate the liquid by means of chemical reaction. The last question is then easy to answer: “Are the data adequate for decision-making with respect to the one percent threshold for residual liquid?” If the data sheet lacks sufficient detail to determine if the waste is part of the waste stream, or if liquid is present but is not addressed using an approved treatment procedure by a trained individual, then the answer to the last question is “No.” Similar logic was used for the physical form DQO.

The Data Evaluation Sheet is also designed to address the QAOs contained in the WCPIP section 2.2.4 and Table 2.1. That table suggests that precisions can be addressed by verification of and agreement concerning observations (i.e. two signatures and no disagreements). As with the examples given above, the test questions are derived directly from Table 2.1. The questions that pertain to satisfying the QAO lead directly to the question: “Are the data credible and usable?”

6.4 Data Review

6.4.1 Overview - The schedule for completion of this peer review was aggressive. The scope required a significant amount of background reading as preparation. After completing the reading task, data sheets for 364 cans and 12 direct loaded drums had to be evaluated, also a time consuming process. In addition to judging the content of the data, panel members agreed that there had to be an assessment of the completeness and accuracy of the data contained in the final data sheets against the data contained in the daily notebook. There was no assurance that items in the notebook were ultimately packaged and readied for disposal. With that task in mind, the panel concluded that the only way to complete all of the tasks was to divide the labor. Two panel members would score the data sheets, and one would test completeness and accuracy. Despite the division of labor described above, no panelist labored in isolation. Collaboration and discussion was frequent and unfettered.

6.4.2 Technical Evaluation - The panel evaluated all 376 data records (364 cans and 12 direct-loaded drums.) The process used was to lay out a sheet containing the names and signatures of trained technicians and to evaluate the data sheets, one by one, applying the assumptions and logic described in previous sections. Panel members conferred whenever one had a technical question on anything contained on a data sheet. They also conferred on more routine data sheets to ensure that their individual evaluations were comparable. All data sheets were evaluated.

6.4.3 Completeness and Accuracy - The panel performed a completeness and accuracy check. The number of records checks required to achieve 95% confidence was determined statistically. The function and method used to determine the required number of inspections (a hypergeometric distribution function) was the same as that used to quality check manufactured parts for defects. The matrix is a function of the number of actual missing or faulty records in the total collection of 376 records in the notebook versus the sample size used to verify the records. The function then is used to calculate the probability of finding no errors after comparing a verification sample of a specific size of the total population (e.g., finding no errors or omissions in a verification sample of 15 records taken randomly from the total population of 376 records.) The hypergeometric function

produces a 95% confidence level if no defects are detected in 20 randomly selected verification samples contained within the total population of 376 records. The panel selected 20 samples at random and made a detailed, documented comparison of the notebook and data sheet records. No defects were observed in the 20 verification samples. Therefore, there is at least 95% confidence that the data sheet evaluations are based on accurate and complete information.

7.0 PEER REVIEW MEETING

A peer review meeting was convened at the Nativo Lodge in Albuquerque, NM, April 9-12, 2007. The goals of the meeting were to complete the training and orientation of the panelists, describe the method that would be used to complete the review, and demonstrate the review process to interested parties. Organizations represented at the meeting included the DOE-CBFO, EPA, WTS, and CTAC. Representatives of EPA and some representatives from DOE-CBFO and CTAC participated through electronic media (LiveMeeting). Protocols specified in MP 10.5 for attendance, questions and answers, and meeting minutes were followed.

8.0 DATA EVALUATION

As expected, the data sheets were not without flaws, including failure to have two signatures on each data record, scribbled cross-outs rather than single line strike-throughs, uninitialed corrections, unknown handwriting on the records, and inconsistent detail from record to record.

It is the Peer Review Panel's opinion that the administrative errors cited above do not render the data untrustworthy. All but one data sheet that was missing a signature was found to have two signatures in the documentation contained in the daily notebook. Most of the scribbled cross-outs, after careful scrutiny, did not totally obliterate the original record and the change could be discerned. As noted in section 6.2, when viewed in the context of the type of waste being described (e.g., cladding, sample tubes, grinding equipment, manipulators parts, liquid waste, clean-up trash) the level of description within each type of waste was, in the panel's opinion, internally consistent. However, the level at which cladding waste was described was much more detailed than the descriptions provided for clean-up trash.

8.1 DQOs

8.1.1 Residual liquid - In all cases, the Peer Review Panel determined that there were

sufficient data to determine if the waste contained liquid in excess of 1% by volume. This evaluation must be considered within the context of assumptions, limitations, and the data review process used, as described in sections 6.1 and 6.2.

8.1.2 Physical form - In the vast majority of cases, the data provided on the sheets were sufficient for an individual experienced in waste profiling and hot cell operations to make reasonable estimates to support classification of the waste's physical form. This statement applies to classifying the waste's physical form at the can level. Each can does not necessarily need to be classified in order to classify a drum or canister correctly. In those cases where the ability to make a reasonable estimate of the proportions of waste types in a can was not certain, the classification of the other cans included in the same payload container was overwhelmingly sufficient to correctly classify the payload. This evaluation must be considered within the context of assumptions, limitations, and the data review process employed, as described in sections 6.1 and 6.2.

8.2 QAOs

8.2.1 Precision - As noted in section 8.0, the lack of two signatures was one of the more common flaws with the data reviewed. However, it is the opinion of the panel that this flaw is substantially mitigated by two facts: 1) the notebook signatures provide assurance that two individuals observed the same materials in the drum, and there is no record that any substitution occurred; and 2) there is no definition of the specific level of precision required for packaging RH waste.

8.2.2 Accuracy - All records were prepared by trained operators. One disagreement between operators was noted. One record identified a paintbrush in the waste contents. The verifier noted that he did not see a paintbrush. There was no correction of the record indicated by a signature and date. That disagreement was not considered by the panel to be significant.

8.2.3 Representativeness - The most substantial finding of the Peer Review Panel in their record review concerns this QAO. The vast majority of the waste descriptions reviewed by the panel were entirely consistent with the clean-up of a hot cell where fuel samples were prepared for metallurgical analyses. Three cans

(438, 439 and 440) were identified as containing "Mixed fission products" "Floor sweepings" and "slag". The notebook entries for these cans were somewhat unclear if the slag was associated with the mixed fission products. More importantly, the notebook entry was "suspected fission products," and neither the notebook nor the data sheets contained two signatures. The total uncertainty and inconsistency of the material descriptions for cans 438, 439, and 440, when compared with descriptions contained on other data sheets, caused the panel to request that WTS provide additional information for these data sheets. WTS provided additional records to the panel; including measurements of the radiation emitted by the can containing "suspected fission products". The measured radiation emitted from the suspect material was at the low end of that measured from the 364 cans. Such a measurement, in the panel's opinion, would not be consistent with any substantial presence of fission product material. It is the panel's opinion that while the identity of the material is unknown, either the quantity of radioactive material is very small or the level of radioactivity is very low. It is reasonably probable that the material represents floor sweepings of slag generated during research at the SRF. The panel concluded from the data that these cans contain materials similar in radiologic nature and physical properties to the materials disposed in the other 361 cans.

8.2.4 Completeness - The Peer Review Panel agreed to assume that each data sheet be accepted as an accurate and complete description of the contents placed in the waste can for which the description was written. However, that assumption does not remove the possibility that all the items contained in the notebook are not contained in the data sheets. To address that issue, a statistically valid sample of notebook entries and data sheets was compared (see section 6.4.3). The statistical approach indicates at least a 95% confidence that the data sheets reviewed represent a complete and accurate record of waste packaging descriptions contained in the daily notebook.

9.0 CONCLUSIONS

As a result of a peer review conducted according to the procedures contained in MP 10.5, and subject to the assumptions and limitations contained in sections 6.1 and 6.2 of this report, the Peer Review Panel concludes without dissent that, with respect to the LANL RH Waste VE

Data:

- The data are sufficient for decision-making with respect to the volume of residual liquid contained in the RH waste;
- The data are sufficient for decision-making with respect to classifying the physical form of the RH waste; and
- The data are complete with respect to the RH waste generated during hot cell cleaning and decommissioning at Wing 9 of the CMR at LANL.

10.0 APPENDICES

A. Peer Review Panel Member's Qualifications and Independence

APPENDIX A

Peer Review Panel Member's Qualifications and Independence