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NUCLEAR WASTE MANAGEMENT PROCEDURE

NP 20-2 SCIENTIFIC NOTEBOOKS Revision 4

Effective Date: 05/06/04

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1.0 Purpose and Scope

This procedure prescribes requirements for the preparation and use of a Scientific Notebook (SN) to document SNL WIPP scientific investigations, or other SNL WIPP associated activities where this format would facilitate recording information.

Scientific Notebooks are intended to be used to record information associated with new research, data collection, prototyping, new methodologies, or other non-routine activities typically conducted in laboratories or field activities.

Acronyms and definitions for terms used in this procedure may be found in the Glossary located at the Sandia National Laboratories (SNL) WIPP Online Documents web site.

1.1 Definitions

Authorized users. Authorized users are laboratory and field staff that have been trained, qualified and approved by the principal investigator/owner of the notebook to make entries in the subject scientific notebook.

Research project. The research project is a set of related activities that is designed to provide data describing the phenomenological behavior of a physical or chemical system. The research project must be described in a Test Plan. The experiments that are carried out to satisfy the goals of the research project are defined as research activities.

Research activity. A research activity is a subset of a research project. A research activity consists of a single procedure, experiment, or closely related subset of experiments that are carried out to accomplish one or more goals of the research project. Examples of research activities include sample preparation and analysis, measurement of physical or chemical properties by chemical or instrumental analysis, and hydraulic well tests.

2.0 Implementation Actions

2.1 Initial Training

Before recording observations or data in an SN, the notebook user must have completed the Qualification and Training form NP 2-1-1. In addition, the notebook user must complete the training module for this procedure (NP 20-2 Scientific Notebooks).

2.2 Initiation of Scientific Notebooks

The principal investigator (PI) determines when an SN is to be used, and references the SN in the appropriate Test Plan in accordance with NP 20-1 (Test Plans). The information recorded in an SN should be related, i.e., a single SN should not be used for recording information from different investigations, analyses, projects, etc.

2.3 General Requirements for Scientific Notebooks

The information recorded in an SN shall be related to a single research project. The PI is the judge as to when the clear organization of data is best served by segregating research activities of the research project into different notebooks.

Scientific Notebooks shall contain:

- a statement of the objectives and description of work to be performed;
- the identity of the associated Test Plan or other approved planning document describing the work to be performed.
- the names of individuals performing the work and dated initials or signature, as appropriate, of individuals after making the entries;
- identification of measuring and test equipment used, including serial numbers;
- identification of the computer programs used (name, version, platform);
- a detailed description of the work performed, observations made, and the results obtained;
- identification of the method(s) used;
- a description of changes made to methods used, as appropriate;
- identification of manufacturer name, lot number, expiration date (if applicable) of chemicals used to prepare samples, and any specific non-standard handling control and maintenance;
- identification of samples; and
- a description of the potential sources of uncertainty and error in test plans, procedures, and parameters that must be controlled and measured to assure that tests are valid.

The SN and supporting documentation should be periodically copied and the copy stored at a separate location from that of the original. The frequency is to be determined by the PI.

Note: In addition to the procedure requirements, a set of recommended **Guidelines** for SNL WIPP Scientific Notebooks is given in Appendix A.

2.4 Corrections

Corrections to SN entries shall be made in accordance with NP 17-1 (Records). All supplements, changes, or corrections shall include initials or signature and the date of the correction.

2.5 Supporting Documentation

Some research activities may produce documents such as computer outputs or alternative media i.e., photographs, digital images, and magnetic media. An SN may not be the appropriate place to display these documents. In these circumstances, documents supporting an SN may be organized in a ring-binder notebook or by any other method that is suitable for collecting and storing the media. All such supporting documents must be cross-referenced in the SN. If practical, the supporting documents should remain in the proximity of the SN they support.

2.6 Technical and QA Reviews of Scientific Notebooks

Scientific Notebooks and supporting documentation shall be reviewed periodically by an independent, technically-qualified individual to verify technical adequacy and to ensure there is sufficient detail to:

- retrace the investigations and confirm the results; or
- repeat the investigation and achieve comparable results without recourse to the original investigator.

The QA reviewer shall assure that appropriate QA requirements and process controls have been implemented. Both the QA and technical reviewers shall follow the Document and Review Process NP 6-1.

The frequency of technical and QA reviews shall be determined by the PI and should be documented in the SN or Test Plan. The PI may change the frequency of the review cycle as work dictates. Any changes to review period must be documented in the SN.

Technical and QA reviews should refer to Test Plan and required documents to verify compliance of SN content.

The technical and QA reviewers shall document that the review was performed, what part(s) of the notebook were reviewed, the comments/concerns, and responses by the PI. Once resolution of reviewer comments has occurred the reviewer must sign and date the SN in an appropriate location. The review may be documented on a Document Review and Comment (DRC) form, Form NP 6-1-1. However, the DRC is only a tool to detail the review and the review must still be referenced in the SN.

2.7 Closure of Scientific Notebooks

The PI is responsible for submitting the completed SN and supporting documentation to the records center. The final SN entry shall be immediately followed by the printed names and dated signatures of the PI, the technical reviewer, and the QA reviewer. The final reviews will be conducted as described above in section 2.6 (Technical and QA Reviews of Scientific Notebooks).

3.0 Records

The following QA records, generated through implementation of this procedure, shall be prepared and submitted to the WIPP Records Center in accordance with NP 17-1 (Records):

| <u>QA Record</u> | <u>Preparer</u> | <u>Records Submitter</u> |
|--|-----------------|--------------------------|
| <ul style="list-style-type: none">Scientific Notebook and supporting documentation | Author | Author |

4.0 Appendices

Appendix A: Guidelines for SNL WIPP Scientific Notebooks

The following pages contain guidelines designed to improve the quality and consistency of the notebooks. These guidelines are in addition to the requirements stated in the main body of the procedure.

Appendix A

Guidelines for SNL WIPP Scientific Notebooks

Scientific Notebooks (SNs) create a permanent record that provides sufficient information for an independent person with adequate technical background to understand the work, evaluate the technical quality of the work, continue unfinished work, and reproduce the work and its primary results. The Guidelines are provided to improve the quality and consistency of these notebooks.

FORMAT, ENTRY AND PROTECTION: The PI or notebook owner determines the format, since some activities may require a ring-binder notebook to allow incorporation of computer output or alternative media. However, the following guidelines are recommended for implementation:

- Use a bound notebook with consecutively numbered pages
- All entries should be permanent, black or dark blue ink is preferred except when activities may require black lead or colored pencils, as in geologic mapping or core logging.
- If corrections are substantial (e.g. a paragraph or larger), an explanation should be provided.
- Areas or pages left blank should have a line drawn diagonally through the blank area with the PI's or authorized user's initials and date.
- Handling and storage of an SN is the responsibility of the PI and all authorized users, in general, when not in regular use, notebooks should be stored in a secure, fire resistant area.

INTRODUCTION: It is recommended to start the SN with an introduction, which includes:

- Unique scientific notebook identifying number determined by the PI.
- Initiation date.
- Work activity title.
- Principal investigator(s) - notebook owner's name(s).
- Table of Contents.
- Clear statement of the work objectives.
- Specify whether the SN is a continuation of another SN and document the title and identification number of the previous SN.
- Summary description of the work process.
- List of authorized users (if more than one individual will be making entries in the notebook).
- A sample of each user's printed name, signature, and initials (documented in the front of the notebook).

BODY: The body of the SN contains the technical data. The organization of this section should be tailored to the particular activity. For example, the body could be broken into research activities, which contain data from a series of experiments, a group of measurements, or a series of chronological observations. Each section should be clearly delineated with a tab/introductory page. The following information should be included in the body of the SN as appropriate:

- For each research activity, there should be a description of work, list of materials and apparatus, procedures, and results,
- description of the experimental or measurement system and process,
- identification of samples collected or used,
- description of required environmental conditions,
- pertinent equipment calibration information,
- listing or reference to data supplied by others, and
- documents pasted or attached to the SN should be labeled with the SN title and the page number of the SN where the document is inserted to insure long term traceability (i.e. if the

document becomes separated from the SN then the document can be easily identified and returned to the SN and page it was pasted to).

Signatures, initials, and dates. Every block of daily entries should be dated. If a day's entries exceed a page then each page should be dated. Each block of entries performed by one individual should be initialed or signed and dated. In addition, each page of work should be reviewed for clarity, accuracy, and quality control by the PI and signed and dated at the time of the review.

Cross-referencing. A series of related research activities may have sufficient commonality that a single written description of some aspects of the work, such as a method, may be written in the first subsection describing the work, and subsequently referenced using page numbers. Each SN should be self-contained. However, if cross-referencing between SNs becomes necessary a short paragraph should be included that summarizes the method, experimental description, etc. being referenced. It is permissible to reference other notebooks that are primarily a logbook, e.g. balance calibrations, temperature logs, etc., and supporting documentation.

CLOSE-OUT: This part of the SN should contain a brief wrap-up statement summarizing results, and the printed names and dated signatures of the principal investigator(s) and final technical and QA reviewer. If appropriate, a more detailed summary of results and reference(s) to related reports or papers may be included. Indicate if a new SN will be opened and identify the next SN by label. All remaining blank pages should be crossed-out, Initialed, and dated to prevent further entry.

TECHNICAL and QA REVIEWS: An independent and knowledgeable technical review is the best way to ensure that the work described in the SN is technically sound and reproducible. Both technical and QA reviewers shall follow the process as described in NP 6-1, use of the DRC is optional. If possible, it is important that resolution occur between the reviewer and the author before the continuation of a research activity. A DRC can be used to report the reviewer comments and comment resolution. However, if a DRC is used, a statement must be included in the SN documenting the review was done using the DRC format. In addition the DRC should be inserted into the SN so that the form accompanies the notebook at the time of its submittal to records.

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