

Exhibit 16

Exhibit 16

Charles J. Fitzpatrick

From: Charles J. Fitzpatrick [cfitzpatrick@nuclearlawyer.com]
Sent: Tuesday, June 29, 2004 12:22 PM
To: 'H.C. Clark'; 'EGANPC@aol.com'; 'Steve Frishman'; 'Victor Gilinsky'; 'Bob Loux'; 'Susan Lynch'; 'Allen Messenger'; 'Marty Malsch'; 'MICHAEL O'MEALIA'; 'Jonathan Overpeck'; 'Don L. Shettel (donls@netproxy.com)'; 'Eugene L. Smith (gsmith@ccmail.nevada.edu)'; 'MikeThorneLtd@aol.com'; 'Judynwtf@aol.com'; 'Tom Wigley'
Subject: LSN Inclusions/Exclusions

I am attaching the NRC regulation sections pertaining to what is to be included and what may be excluded from our LSN database.

With respect to Section 2.1005, I think the most significant sections are: subparts (b), (f), and (h), which deal with textbooks, references if they are readily available, and journal articles, respectively.

With respect to Section 2.1003, the laundry list which we discussed yesterday is in Section (a)(2).

I am also attaching Section 2.1001 so you will have the definition of documentary material, which generally describes everything that each party must include in its database.

Remember, a party need not put on its database that which has already been put on a database by another party. And we are assuming, for purposes of creating our database, that all relevant documents authored by DOE will be on their database and will not need to be on ours.

Charles J. Fitzpatrick
Egan, Fitzpatrick, Malsch & Cynkar, PLLC
Phone: 210.820.2667
Fax: 210.820.2668
cfitzpatrick@nuclearlawyer.com
www.nuclearlawyer.com

[Code of Federal Regulations]
[Title 10, Volume 1]
[Revised as of January 1, 2004]
From the U.S. Government Printing Office via GPO Access
[CITE: 10CFR2.1001]

[Page 94-96]

TITLE 10--ENERGY

CHAPTER I--NUCLEAR REGULATORY COMMISSION

PART 2--RULES OF PRACTICE FOR DOMESTIC LICENSING PROCEEDINGS AND ISSUANCE OF ORDERS--Table of Contents

Subpart J--Procedures Applicable to Proceedings for the Issuance of Licenses for the Receipt of High-Level Radioactive Waste at a Geologic Repository

Sec. 2.1001 Definitions.

Bibliographic header means the minimum series of descriptive fields that a potential party, interested governmental participant, or party must submit with a document or other material.

Circulated draft means a nonfinal document circulated for supervisory concurrence or signature in which the original author or others in the concurrence process have non-concurred. A "circulated draft" meeting the above criterion includes a draft of a document that eventually becomes a final document, and a draft of a document that does not become a final document due to either a decision not to finalize the document or the passage of a substantial period of time in which no action has been taken on the document.

Document means any written, printed, recorded, magnetic, graphic matter, or other documentary material, regardless of form or characteristic.

Documentary material means any information upon which a party, potential party, or interested governmental participant intends to rely and/or to cite in support of its position in the proceeding for a license to receive and possess high-level radioactive waste at a geologic repository operations area pursuant to part 60 or 63 of this chapter; any information that is known to, and in the possession of, or developed by the party that is relevant to, but does not support, that information or that party's position; and all reports and studies, prepared by or on behalf of the potential party, interested governmental participant, or party, including all related "circulated drafts," relevant to both the license application and the issues set forth in the Topical Guidelines in Regulatory Guide 3.69, regardless of whether they will be relied upon and/or cited by a party. The scope of documentary material shall be guided by the topical guidelines in the applicable NRC Regulatory Guide.

DOE means the U.S. Department of Energy or its duly authorized representatives.

Electronic docket means the NRC information system that receives, distributes, stores, and retrieves the Commission's adjudicatory docket materials.

Image means a visual likeness of a document, presented on a paper copy, microform, or a bit-map on optical or magnetic media.

Interested governmental participant means any person admitted under Sec. 2.715(c) of this part to the proceeding on an application for a license to receive and possess high-level radioactive waste at a geologic repository operations area pursuant to part 60 or 63 of this chapter.

[[Page 95]]

Licensing Support Network means the combined system that makes documentary material available electronically to parties, potential parties, and interested governmental participants to the proceeding for a license to receive and possess high-level radioactive waste at a geologic repository operations area pursuant to part 60 or 63 of this chapter, as part of the electronic docket or electronic access to documentary material, beginning in the pre-license application phase.

LSN Administrator means the person within the U.S. Nuclear Regulatory Commission responsible for coordinating access to and the integrity of data available on the Licensing Support Network. The LSN Administrator shall not be in any organizational unit that either represents the U.S. Nuclear Regulatory Commission staff as a party to the high-level waste repository licensing proceeding or is a part of the management chain reporting to the Director, Office of Nuclear Material Safety and Safeguards. For the purposes of this subpart, the organizational unit within the NRC selected to be the LSN Administrator shall not be considered to be a party to the proceeding.

Marginalia means handwritten, printed, or other types of notations added to a document excluding underlining and highlighting.

NRC means the U.S. Nuclear Regulatory Commission or its duly authorized representatives.

Party for the purpose of this subpart means the DOE, the NRC staff, the host State, any affected unit of local government as defined in section 2 of the Nuclear Waste Policy Act of 1982, as amended (42 U.S.C. 10101), any affected Indian Tribe as defined in section 2 of the Nuclear Waste Policy Act of 1982, as amended (42 U.S.C. 10101), and a person admitted under Sec. 2.1014 to the proceeding on an application for a license to receive and possess high-level radioactive waste at a geologic repository operations area under part 60 or 63 of this chapter, provided that a host State, affected unit of local government, or affected Indian Tribe shall file a list of contentions in accordance with the provisions of Sec. 2.1014(a)(2)(ii) and (iii).

Personal record means a document in the possession of an individual associated with a party, interested governmental participant, or potential party that was not required to be created or retained by the party, interested governmental participant, or potential party, and can be retained or discarded

at the possessor's sole discretion, or documents of a personal nature that are not associated with any business of the party, interested governmental participant, or potential party.

Potential party means any person who, during the period before the issuance of the first pre-hearing conference order under Sec. 2.1021(d), is given access to the Licensing Support Network and who consents to comply with the regulations set forth in subpart J of this part, including the authority of the Pre-License Application Presiding Officer designated pursuant to Sec. 2.1010.

Pre-license application electronic docket means the NRC's electronic information system that receives, distributes, stores, and maintains NRC pre-license application docket materials during the pre-license application phase.

Pre-license application phase means the time period before the license application to receive and possess high-level radioactive waste at a geologic repository operations area is docketed under Sec. 2.101(f)(3).

Pre-License Application Presiding Officer means one or more members of the Commission, or an atomic safety and licensing board, or a named officer who has been delegated final authority in the pre-license application phase with jurisdiction specified at the time of designation.

Preliminary draft means any nonfinal document that is not a circulated draft.

Presiding Officer means one or more members of the Commission, or an atomic safety and licensing board, or a named officer who has been delegated final authority in the matter, designated in the notice of hearing to preside.

Searchable full text means the electronic indexed entry of a document that allows the identification of specific words or groups of words within a text file.

[[Page 96]]

Topical Guidelines means the set of topics set forth in Regulatory Guide 3.69, Topical Guidelines for the Licensing Support System, which are intended to serve as guidance on the scope of "documentary material".

[54 FR 14944, Apr. 14, 1989, as amended at 56 FR 7795, Feb. 26, 1991; 63 FR 71736, Dec. 30, 1998; 66 FR 29465, May 31, 2001; 66 FR 55788, Nov. 2, 2001]

[Code of Federal Regulations]
[Title 10, Volume 1]
[Revised as of January 1, 2004]
From the U.S. Government Printing Office via GPO Access
[CITE: 10CFR2.1003]

[Page 96]

TITLE 10--ENERGY

CHAPTER I--NUCLEAR REGULATORY COMMISSION

PART 2--RULES OF PRACTICE FOR DOMESTIC LICENSING PROCEEDINGS AND ISSUANCE OF ORDERS--Table of Contents

Subpart J--Procedures Applicable to Proceedings for the Issuance of Licenses for the Receipt of High-Level Radioactive Waste at a Geologic Repository

Sec. 2.1003 Availability of material.

(a) Subject to the exclusions in Sec. 2.1005 and paragraphs (b) and (c) of this section, DOE shall make available, no later than six months in advance of submitting its license application to receive and possess high-level radioactive waste at a geologic repository operations area, the NRC shall make available no later than thirty days after the DOE certification of compliance under Sec. 2.1009(b), and each other potential party, interested governmental participant or party shall make available no later than ninety days after the DOE certification of compliance under Sec. 2.1009(b)--

(1) An electronic file including bibliographic header for all documentary material (including circulated drafts but excluding preliminary drafts) generated by, or at the direction of, or acquired by, a potential party, interested governmental participant, or party. Concurrent with the production of the electronic file will be an authentication statement that indicates where an authenticated image copy of the document can be obtained.

(2) In electronic image format, subject to the claims of privilege in Sec. 2.1006, graphic-oriented documentary material that includes raw data, computer runs, computer programs and codes, field notes, laboratory notes, maps, diagrams and photographs, which have been printed, scripted, or hand written. Text embedded within these documents need not be separately entered in searchable full text. A bibliographic header must be provided for all graphic-oriented documentary material. Graphic-oriented documents may include--

- (i) Calibration procedures, logs, guidelines, data and discrepancies;
- (ii) Gauge, meter and computer settings;
- (iii) Probe locations;
- (iv) Logging intervals and rates;
- (v) Data logs in whatever form captured;

- (vi) Text data sheets;
- (vii) Equations and sampling rates;
- (viii) Sensor data and procedures;
- (ix) Data Descriptions;
- (x) Field and laboratory notebooks;
- (xi) Analog computer, meter or other device print-outs;
- (xii) Digital computer print-outs;
- (xiii) Photographs;
- (xiv) Graphs, plots, strip charts, sketches;
- (xv) Descriptive material related to the information identified in this paragraph.

(3) In an electronic file, subject to the claims of privilege in Sec. 2.1006, only a bibliographic header for each item of documentary material that is not suitable for image or searchable full text.

- (4) An electronic bibliographic header for each documentary material--
 - (i) For which a claim of privilege is asserted;
 - (ii) Which constitutes confidential financial or commercial information; or
 - (iii) Which constitutes safeguards information under Sec. 73.21 of this chapter.

(b) Basic licensing documents generated by DOE, such as the Site Characterization Plan, the Environmental Impact Statement, and the license application, or by NRC, such as the Site Characterization Analysis, and the Safety Evaluation Report, shall be made available in electronic form by the respective agency that generated the document.

(c) The participation of the host State in the pre-license application phase shall not affect the State's ability to exercise its disapproval rights under section 116(b)(2) of the Nuclear Waste Policy Act, as amended, 42 U.S.C. 10136(b)(2).

(d) This subpart shall not affect any independent right of a potential party, interested governmental participant or party to receive information.

[63 FR 71737, Dec. 30, 1998, as amended at 66 FR 29465, May 31, 2001]

[Code of Federal Regulations]
[Title 10, Volume 1]
[Revised as of January 1, 2004]
From the U.S. Government Printing Office via GPO Access
[CITE: 10CFR2.1005]

[Page 97]

TITLE 10--ENERGY

CHAPTER I--NUCLEAR REGULATORY COMMISSION

PART 2--RULES OF PRACTICE FOR DOMESTIC LICENSING PROCEEDINGS AND ISSUANCE OF ORDERS--Table of Contents

Subpart J--Procedures Applicable to Proceedings for the Issuance of Licenses for the Receipt of High-Level Radioactive Waste at a Geologic Repository

Sec. 2.1005 Exclusions.

The following material is excluded from the requirement to provide electronic access, either pursuant to Sec. 2.1003, or through derivative discovery pursuant to Sec. 2.1019(i)--

- (a) Official notice materials;
- (b) Reference books and text books;
- (c) Material pertaining exclusively to administration, such as material related to budgets, financial management, personnel, office space, general distribution memoranda, or procurement, except for the scope of work on a procurement related to repository siting, construction, or operation, or to the transportation of spent nuclear fuel or high-level waste;
- (d) Press clippings and press releases;
- (e) Junk mail;
- (f) References cited in contractor reports that are readily available;
- (g) Classified material subject to subpart I of this part;
- (h) Readily available references, such as journal articles and proceedings, which may be subject to copyright.

[63 FR 71738, Dec. 30, 1998]

Exhibit 17

Exhibit 17

EGAN, FITZPATRICK, MALSCH & CYNKAR, PLLC
Counselors at Law

7918 Jones Branch Drive • Suite 600
McLean, Virginia 22102
Tel: (703) 918-4942
Fax: (703) 918-4943

www.nuclearlawyer.com

1777 N.E. Loop 410 • Suite 600
San Antonio, Texas 78217
Tel: (210) 820-2667
Fax: (210) 820-2668

Joseph R. Egan
Martin G. Malsch
Robert J. Cynkar

Charles J. Fitzpatrick

MEMORANDUM

TO: Distribution

FROM: Joe Egan

DATE: July 29, 2004

SUBJECT: **Important Instructions for Your Compliance with LSN Regulations**

As we discussed in some detail at our expert summit last December and on several occasions and emails since then, Nevada is subject to the Nuclear Regulatory Commission's regulations concerning the NRC's licensing support network ("LSN"). As Susan Lynch has previously instructed you, these regulations provide that all those working for the State of Nevada as experts or consultants, as well as staff of the Agency for Nuclear Projects and the Attorney General's Office, must provide Susan with all of their relevant documentary material in their possession concerning Yucca Mountain and their work for the State that in any way pertains to Yucca Mountain licensing or any issues that were or should have been part of DOE's Yucca Mountain Final Environmental Impact Statement. Susan's original deadline for you to produce your documentary material to her has already expired and, though we have received a large amount of documents from most of you, some of you have still not complied. There is no discretion in this requirement, as it could affect Nevada's very right to participate in the Yucca licensing proceeding if we do not comply in good faith. **Therefore, these instructions are mandatory and urgent.** Please read them carefully.

This week, Nevada formally challenged DOE's initial certification of its compliance with LSN regulations. The hearing on July 27 on our challenge went extremely well. We are hopeful that the judges will reject DOE's initial certification, but we cannot presume they will. Moreover, even if we win, DOE may elect to appeal any such rejection to the full NRC Commission. Therefore, we must assume that we are required to comply, and that our date for certifying that we have fully complied is September 30. This means that we must provide the material to NRC's LSN administrator reasonably prior to that date so it can be loaded onto the system. NRC can load approximately 30,000 documents per business day. Moreover, it means that Susan Lynch must have received your documents by now, or no later than August 6 at the very latest. Nevada must create a specialized header for each document, and those also must be loaded onto the system.

MEMORANDUM

July 29, 2004

Page 2

Since Nevada has a small amount of documentary material among its team relative to DOE (which has millions of documents), we should err on the side of over-inclusion rather than under-inclusion. The following are among the types of documents you must provide Susan.

1. All emails in your possession or archives related to Yucca Mountain or your work for Nevada. *As we instructed you in December, no emails related to Yucca should be discarded.* You should be saving all emails in a separate folder from your other emails. The same holds true for paper and electronic files and documents. No document destruction.
2. Correspondence between and among you and the Nevada team.
3. Reports, workpapers, and notes of your work, as well as references you have or will use in your work.
4. Note that you do not have to include references that are copyrighted or otherwise widely available (such as IAEA documents). You also do not have to include documents that you obtained from or received from DOE and NRC, or that were sent to NRC or DOE, as these documents will already have been loaded onto the LSN by DOE and NRC. Finally, you do not need to send in any legal pleadings, cases, decisions, regulations, federal register notices, or other official documents. Nor do you need to send materials that relate solely to the federal court litigation Nevada has had on non-licensing-related issues. The individual expert teams should also coordinate with their team members to try to ensure that duplicates are not sent.
5. Electronic files used in your work. Note that if you have very large electronic files, you should notify us, as these are subject to special instructions.
6. Photos taken in the course of your work.
7. You DO NOT have to submit ~~your contentions or draft contentions~~ contentions. When we are at the stage where we have drafts for general circulation (which is not yet the case), then we must submit these to Susan also.

As a general rule, you should presume that if it is relevant to the Yucca project or your work for Nevada pertaining to the project, it should be provided. If you possibly can, please send your documents in **pdf format** to Susan at [szzee@nuc.state.nv.us](mailto:szee@nuc.state.nv.us), or, for larger collections, on a CD. Electronic submission in any format is preferable to hard copy. However, if you must send hard copies, please send them by priority mail or Federal Express.

There is a duty to supplement, so you should always retain and collect documents for periodic submission to Susan. Before the license proceeding begins officially, we will ask you to make another certification.

MEMORANDUM

July 29, 2004

Page 3

Finally, I have attached a certification form which, if you are a recipient of this email, **you must fill out, date, sign and send** to Susan certifying that you have provided her with all of your documentary material upon your completion of the identification process and transmittal to her.

If you are going to have any problem fulfilling this extremely important legal requirement, please let me know immediately so we can get you the appropriate assistance to enable you to do so.

Attachment (Certification Form)

DISTRIBUTION:

Adams, Marta A.
Barkatt, Aaron
Bartlett, John W.
Bath, Adrian
Butler, Adrian P.
Clark, H.C.
Colatriano, Vince J.
Conway, Norma
Cooper, Charles J.
Cynkar, Robert J.
Fitzpatrick, Charles J.
Frishman, Steve
Gilinsky, Victor
Gorman, Jeffrey A.
Halstead, Robert
Ho, Chih-Hsiang
Jackson, C. Peter
Lehman, Linda L.
Lever, David. A.
Little, Brenda J.
Loux, Robert R.

Lynch, Susan
Malsch, Martin G.
Marks, Charles R.
Messenger, Alan
Moore, Roger B.
Morgenstein, Maury
O'Mealia, Michael K.
Overpeck, Jonathan
Pulvirenti, April L.
Resnikoff, Marvin
Rimstidt, James Donald
Rossmann, Antonio
Sandoval, Brian
Shettel, Don L.
Smith, Gene
Staehle, Roger W.
Strolin, Joe
Thorne, Mike
Treichel, Judy
Wheater, Howard S.
Wigley, Tom

Exhibit 18

Exhibit 18

EGAN, FITZPATRICK & MALSCH, PLLC

Counselors at Law

2001 K Street, N.W. • Suite 400
Washington, D.C. 20006
Tel: (202) 662-2103
Fax: (202) 662-2105

www.nuclearlawyer.com

1777 N.E. Loop 410 • Suite 600
San Antonio, Texas 78217
Tel: (210) 820-2667
Fax: (210) 820-2668

Joseph R. Egan
Martin G. Malsch

Charles J. Fitzpatrick

MEMORANDUM

To: Distribution

From: Joseph R. Egan

Date: June 5, 2007

Re: **Call Memo: Important Instructions for Your Compliance with LSN Regulations**

This is an update of my July 29, 2004 Call Memo regarding LSN compliance.

As you are aware, Nevada is subject to the Nuclear Regulatory Commission's regulations concerning the NRC's licensing support network ("LSN"). As Susan Lynch has previously instructed you, these regulations provide that all those working for the State of Nevada as experts or consultants, as well as staff of the Agency for Nuclear Projects and the Attorney General's Office, must provide Susan with all of their relevant Documentary Material in their possession concerning Yucca Mountain and their work for the State that in any way pertains to Yucca Mountain licensing or issues relating to DOE's Yucca Mountain Final Environmental Impact Statement. Susan's original mid-2004 deadline for you to produce your Documentary Material to her resulted in delivery to her of a substantial quantity of documents, many of which have been placed in Nevada's LSN collection and incorporated in the NRC's LSN, together with documents submitted by other parties. After a hiatus in our focus on populating the LSN database caused by the "decertification" of DOE's initial LSN certification (June 30, 2004), it is necessary at this time to again address and assure compliance with all LSN requirements. There is no discretion in this requirement, as it could affect Nevada's very right to participate in the Yucca licensing proceeding if we do not comply in good faith. **Therefore, these instructions are mandatory and urgent.** Please read them carefully.

At this time, DOE has expressed its intention to recertify its revised and updated LSN collection later this year, sometime between October 1 and December 31, 2007. We must assume that DOE's certification will be successful, and that would make Nevada's deadline for compliance (90 days later) as early as January 1, 2008. This means that we must provide all required material to NRC's LSN administrator reasonably prior to that date so it can be loaded onto the system. NRC can load approximately 30,000 documents per business day. Nevada must also create a specialized bibliographic header for each document, and those also must be loaded onto the system, prior to the time Nevada can certify its compliance.

We are providing, along with this Memo, three other documents which will explain in greater detail the subject matters and document types which need to be, or need **not** be, included in Nevada's LSN collection. They are:

- (1) NRC Reg. Guide 3.69 which is the formal listing of what is considered to be information relevant to the LSN (attached as Exhibit A);
- (2) "Guidelines" which we have prepared in an effort to articulate three practical tests of LSN-worthiness, **all three** of which must apply, or else the document in question may be omitted from the LSN (attached as Exhibit B); and
- (3) A collection of "LSN-Specific Examples" which illustrate the application of the three tests, with an explanation of the analysis applicable to each of the examples (attached as Exhibit C). Implementation of these Guidelines, and utilization of the three tests should enable each recipient to more easily make LSN-inclusion decisions with respect to documents in their possession (not previously delivered to Susan Lynch for inclusion in the LSN). Of course, you may consult Susan or Charlie Fitzpatrick with respect to any document as to which you are uncertain.

In making judgments with respect to LSN-worthiness of documents, you (and we) should resolve any doubts in favor of inclusiveness. The following list is not intended to be comprehensive, but notes some of the kinds of documents you may encounter in the course of your work for Nevada, and therefore in the course of conducting your search for all Documentary Material in your possession which must be on the LSN. Please bear in mind that any documents you have in the following categories will **only** be required to be sent to Susan Lynch for inclusion on the LSN if they first **pass all three** of the tests we discuss in our attached "Guidelines."

1. Emails in your possession or archives related to Yucca Mountain or your work for Nevada. *As we instructed previously in our July 29, 2004 Call Memo, no emails related to Yucca should be discarded.* You should be saving all Yucca-related emails in a separate folder from your other emails. The same holds true for paper and electronic files and documents. No document destruction.
2. Correspondence between and among you and anyone else on the Nevada team.
3. Reports, work papers, and notes of your work, as well as references you have or will use in your work.
4. Note that you do not have to include references that are copyrighted or otherwise widely available (such as IAEA documents). You **may not** have to include documents that have been published by or received from DOE or NRC, or that were sent to NRC or DOE, if these documents already have been loaded onto the LSN by DOE and NRC. Such duplication is not required. The LSN database available online now contains some 3.5 million documents. If you think it likely that a document under consideration has already been put on the LSN by DOE, NRC, or any other party, you should check for it on the LSN to make sure. **You** are responsible to make sure that any document you may wish to cite or rely on is on the LSN. If in doubt, add it, regardless of its author. Finally, you do not need

to send in any legal pleadings, cases, decisions, regulations, federal register notices, or other official documents. Nor do you need to send materials that relate solely to the federal court litigation Nevada has had on non-licensing-related issues. The individual expert teams should also coordinate with their team members to try to ensure that duplicates are not sent.

5. Electronic files used in your work. Note that if you have very large electronic files, you should notify us, as these are subject to special instructions.
6. Photos taken in the course of your work.
7. You DO NOT have to submit draft contentions for LSN inclusion. Any contentions you draft now are extremely preliminary and anticipatory, since your contentions are typically to be responsive to the content of DOE's License Application, which has yet to be filed. Any **final** documents and "circulated draft" documents (i.e., circulated for supervisory approval) need to be put on the LSN. Preliminary drafts do **not**.
8. Any documents in your possession which are LSN-worthy, but which either are privileged, or may be privileged, should be segregated and sent to Susan Lynch who, with the responsible attorneys, will determine its appropriate handling in relation to the LSN. Types of privileged documents include:
 - a. Documents reflecting attorney-client communications, which are confidential communications between any attorney and a client (or a person working for the client) relating to a legal matter in which the attorney is representing the client; and attorney work product, which are documents prepared by or for an attorney in connection with or in anticipation of litigation.
 - b. Deliberative process documents, which are predecisional interagency or intra-agency documents that reflect Nevada's decision-making process.
 - c. Proprietary documents containing confidential trade secrets or commercial or financial information.
9. Under the NRC regulations, even documents which are not required to be included in the LSN may be subject to discovery, such as depositions in the licensing proceeding, or required to be maintained for other purposes. This type of document is described below, and should be segregated and retained in individual offices for possible collection at a later time.
 - a. All preliminary drafts of any documents (e.g., paper, email, electronic, etc.) that are potentially relevant to licensing-related activities.
 - b. All documents, draft or final, that would not meet the LSN criteria we have discussed above, but that have marginalia potentially relevant to licensing-related activities. "Marginalia" means handwritten, printed, or

other types of notations added to a document excluding underlining and highlighting.

- c. All personal records, travel vouchers, and speeches that are potentially relevant to licensing-related activities.

As a general rule, you should presume that if information is relevant to the Yucca project or your work for Nevada pertaining to the project, it is a candidate for LSN inclusion. Again, if in doubt, consult Reg. Guide 3.69 for relevancy and apply the three-test analysis to determine LSN-worthiness. If you possibly can, please send your documents in **pdf** format to Susan at slynch1761@gmail.com, or for larger collections, on a CD. Electronic submission in any format is preferable to hard copy. However, if you must send hard copies, please send them by priority mail or Federal Express.

We have a duty to supplement the LSN on a regular basis after our initial certification, so you should always retain and collect relevant, responsive documents for regular submission to Susan. Before the licensing proceeding begins officially, we will ask you to make another certification that all your relevant documents have been produced.

Finally, I have attached a Certification form (attached as Exhibit D) which, if you are a recipient of this email, **you must fill out, date, sign, and send** to Susan certifying that you have provided her with all of your Documentary Material upon your completion of the identification process and transmittal to her.

If you are going to have any problem fulfilling this extremely important legal requirement, please let me know immediately so we can get you the appropriate assistance to enable you to do so.

DISTRIBUTION:

Adams, Marta A.
Audin, Lindsay
Ballard, James David
Barkatt, Aaron
Bartlett, John W.
Bath, Adrian
Bell, Jimmy T.
Blunt, Martin
Briggs, William
Bromfield, Jacqueline
Butler, Adrian P.
Clark, H.C.
Colatrisano, Vince J.
Collins, Hank
Conway, Norma
Cynkar, Robert J.
Dilger, Fred
Fitzpatrick, Charles J.
Frishman, Steve

Gilinsky, Victor
Gorman, Jeffrey A.
Hall, Jim
Halstead, Robert
Hilton, Judy
Hirsh, Merrill
Ho, Chih-Hsiang
Horstman, Hugh
Jackson, C. Peter
Kelly, Martin
Kendorski, Francis S.
Lambley, Paul H.
Lehman, Linda L.
Lever, David. A.
Little, Brenda J.
Loux, Robert R.
Lynch, Susan
Malsch, Martin G.
Marks, Charles R.

Mathias, Simon
Matthai, Stephan
McDonald, Lou
Messenger, Allen
Montesi, Susan
Moore, Richard C.
Moore, Roger B.
Morgenstein, Maury
O'Mealia, Michael K.
Overpeck, Jonathan
Owen, Dave
Pericola, Jamie
Phillips, Lawrence

Pulvirenti, April L.
Resnikoff, Marvin
Rimstidt, James Donald
Rossmann, Antonio
Shettel, Don L.
Smith, Eugene I.
Staeble, Roger W.
Strolin, Joe
Swanton, Steve
Thorne, Mike
Treichel, Judy
Wheater, Howard S.
Wigley, Tom

Exhibit A



U.S. NUCLEAR REGULATORY COMMISSION

Revision 1
June 2004

REGULATORY GUIDE

OFFICE OF NUCLEAR REGULATORY RESEARCH

REGULATORY GUIDE 3.69

(Draft was issued as DG-3022)

TOPICAL GUIDELINES FOR THE LICENSING SUPPORT NETWORK

A. INTRODUCTION

Subpart J, "Procedures Applicable to Proceedings for the Issuance of Licenses for the Receipt of High-Level Radioactive Waste at a Geologic Repository" (10 CFR 2.1000 to 2.1027), of 10 CFR Part 2, "Rules of Practice for Domestic Licensing Proceedings and Issuance of Orders," sets forth procedures for an adjudicatory proceeding on the application for a license to receive and possess high-level radioactive waste at a geologic repository under 10 CFR Part 60, "Disposal of High-Level Radioactive Wastes in Geologic Repositories," or Part 63, "Disposal of High-Level Radioactive Wastes in a Geologic Repository at Yucca Mountain, Nevada." Pursuant to these regulations, the Licensing Support Network (LSN), an electronic information management system, is being designed and implemented to provide for the entry of and access to relevant documentary material.

The requirements in 10 CFR 63.21 for a license application and the structure and content of the Yucca Mountain Review Plan (NUREG-1804), were considered in developing this regulatory guide. The principal purpose of the Yucca Mountain Review Plan is to ensure the quality, uniformity, and consistency of NRC staff reviews of the license application and any amendments. This regulatory guide defines the scope of documentary material that should be identified in or made available via the LSN. Topical guidelines were adopted by the U.S. Nuclear Regulatory Commission (NRC) as Regulatory Guide 3.69 in September 1996. This revision to the regulatory guide updates the topical guidelines consistent with the license application content specified in 10 CFR 63.21 and the content and structure of the Yucca Mountain Review Plan (NUREG-1804) and Environmental Review Guidance for Licensing Actions Associated with NMSS Programs (NUREG-1748), and the U.S. Department of Energy Final Environmental Impact Statement for a Yucca Mountain repository.

Document is defined in 10 CFR 2.1001 as "any written, printed, recorded, magnetic, graphic matter, or other documentary material, regardless of form or characteristic." In addition, 10 CFR 2.1001 defines documentary material as:

Regulatory guides are issued to describe and make available to the public such information as methods acceptable to the NRC staff for implementing specific parts of the NRC's regulations, techniques used by the staff in evaluating specific problems or postulated accidents, and data needed by the NRC staff in its review of applications for permits and licenses. Regulatory guides are not substitutes for regulations, and compliance with them is not required. Methods and solutions different from those set out in the guides will be acceptable if they provide a basis for the findings requisite to the issuance or continuance of a permit or license by the Commission.

This guide was issued after consideration of comments received from the public. Comments and suggestions for improvements in these guides are encouraged at all times, and guides will be revised, as appropriate, to accommodate comments and to reflect new information or experience. Written comments may be submitted to the Rules and Directives Branch, ADM, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001.

Regulatory guides are issued in ten broad divisions: 1, Power Reactors; 2, Research and Test Reactors; 3, Fuels and Materials Facilities; 4, Environmental and Siting; 5, Materials and Plant Protection; 6, Products; 7, Transportation; 8, Occupational Health; 9, Antitrust and Financial Review; and 10, General.

Single copies of regulatory guides (which may be reproduced) may be obtained free of charge by writing the Distribution Services Section, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by fax to (301)415-2288, or by email to DISTRIBUTION@NRC.GOV. Electronic copies of this guide and other recently issued guides are available at NRC's home page at WWW.NRC.GOV through the Electronic Reading Room, Accession Number ML041770135.

(1) any information upon which a party, potential party, or interested governmental participant intends to rely and/or to cite in support of its position in the proceeding for a license to receive and possess high-level radioactive waste at a geologic repository operations area pursuant to part 60 or 63 of this chapter; (2) any information that is known to, and in the possession of, or developed by the party that is relevant to, but does not support, that information or that party's position; and (3) all reports and studies, prepared by or on behalf of the potential party, interested governmental participant, or party, including all related 'circulated drafts,' relevant to both the license application and the issues set forth in the Topical Guidelines in Regulatory Guide 3.69, regardless of whether they will be relied upon and/or cited by a party. The scope of documentary material shall be guided by the topical guidelines in the applicable NRC Regulatory Guide.

The forms of these materials are listed in Appendix A to this guide, a nonexhaustive list of types of documents that may be included in the LSN.

Regulatory guides are issued to describe to the public methods acceptable to the NRC staff for implementing specific parts of the NRC's regulations, to explain techniques used by the staff in evaluating specific problems or postulated accidents, and to provide guidance to applicants. Regulatory guides are not substitutes for regulations, and compliance with regulatory guides is not required. Regulatory guides are issued in draft form for public comment to involve the public in developing the regulatory positions. Draft regulatory guides have not received complete staff review; they therefore do not represent official NRC staff positions.

The information collections contained in this draft regulatory guide are covered by the requirements of 10 CFR Part 50, which were approved by the Office of Management and Budget (OMB), approval number 3150-3011. The NRC may not conduct or sponsor, and a person is not required to respond to, a request for information or an information collection requirement unless the requesting document displays a currently valid OMB control number.

B. DISCUSSION

PURPOSE OF THE REGULATORY GUIDE

The purpose of this regulatory guide is to provide a list of the topics (in Section C) of documentary material that LSN participants should identify (by bibliographic header only) or make available (by image or searchable full text) via the LSN under 10 CFR 2.1003. Participants in proceedings regarding the proposed issuance of construction authorizations and licenses for the receipt and possession of high-level radioactive waste at a geologic repository include parties, potential parties, and interested governmental participants. The topical guidelines are designed to be broad enough to encompass all potential licensing issues.

This regulatory guide provides the detailed topical index for LSN documentary material. It is not to be used to establish standing in the high-level waste licensing proceeding or to define the scope of contentions that may be proffered under 10 CFR 2.1014.

USE OF THE REGULATORY GUIDE

The regulatory guide is consistent with requirements for the content of a license application in 10 CFR 63.21 and with licensing information specified in the Yucca Mountain Review Plan (NUREG-1804). It is also consistent with Environmental Review Guidance for Licensing Actions Associated with NMSS Programs (NUREG-1748). The actual format of the documents submitted is not specified in this regulatory guide. Requirements regarding electronic formats of LSN documents are defined in 10 CFR 2.1011.

Section C of this regulatory guide lists the topics of documents to be identified in or made available via the LSN. Appendix A to this guide contains a nonexhaustive list of the types of documents to which the topical guidelines in Section C should be applied. Types of documents not included in Appendix A should also be identified in or made available via the LSN if they are relevant to a topic in Section C of this regulatory guide.

Because the topical guidelines of Section C have been kept broad and at a fairly high level of detail, the user should consider each topic to be inclusive rather than exclusive with regard to documents germane to that topic for the site. For example, much of the information that supports the licensing proceeding will be based on the use of methodologies, computer codes, and models. Such information should be made available via the LSN. The Yucca Mountain Review Plan (NUREG-1804), provides guidelines on, and 10 CFR 63.21 sets the requirements for, information that should be submitted in the license application. Section C of this regulatory guide is based, in part, on these provisions.

The topical guidelines also include subcategories for the "Information for a Geologic Repository Environmental Impact Statement." This information should be made available via the LSN pursuant to 10 CFR 2.1003(b).

C. TOPICAL GUIDELINES

1. GENERAL INFORMATION
 - 1.1 General Description
 - 1.2 Proposed Schedules for Construction, Receipt, and Emplacement of Waste
 - 1.3 Physical Protection Plan
 - 1.4 Material Control and Accounting Program
 - 1.5 Description of Site Characterization Work

2. SAFETY ANALYSIS REPORT
 - 2.1 Repository Safety Before Permanent Closure
 - 2.1.1 Preclosure Safety Analysis
 - 2.1.1.1 Site Description as it Pertains to Preclosure Safety Analysis
 - 2.1.1.2 Description of Structures, Systems, Components, Equipment, and Operational Process Activities
 - 2.1.1.3 Identification of Hazards and Initiating Events
 - 2.1.1.4 Identification of Event Sequences
 - 2.1.1.5 Consequence Analyses
 - 2.1.1.5.1 Consequence Analysis Methodology and Demonstration that the Design Meets 10 CFR Parts 20 and 63 Numerical

- 2.2.1.4.3 Analysis of Repository Performance that Demonstrates Compliance with Separate Ground-Water Protection Standards
- 2.3 Research and Development Program To Resolve Safety Questions
- 2.4 Performance Confirmation Program
- 2.5 Administrative and Programmatic Requirements
 - 2.5.1 Quality Assurance Program
 - 2.5.2 Records, Reports, Tests, and Inspections
 - 2.5.3 Training and Certification of Personnel
 - 2.5.3.1 U.S. Department of Energy Organizational Structure as it Pertains to Construction and Operation of Geologic Repository Operations Area
 - 2.5.3.2 Key Positions Assigned Responsibility for Safety and Operations of Geologic Repository Operations Area
 - 2.5.3.3 Personnel Qualifications and Training Requirements
 - 2.5.4 Expert Elicitation
 - 2.5.5 Plans for Startup Activities and Testing
 - 2.5.6 Plans for Conduct of Normal Activities, Including Maintenance, Surveillance, and Periodic Testing
 - 2.5.7 Emergency Planning
 - 2.5.8 Controls To Restrict Access and Regulate Land Uses
 - 2.5.9 Uses of Geologic Repository Operations Area for Purposes Other Than Disposal of Radioactive Wastes
 - 2.5.10 License Specifications
- 3 INFORMATION FOR A GEOLOGIC REPOSITORY ENVIRONMENTAL IMPACT STATEMENT
 - 3.1 Purpose and Need for Proposed Agency Action
 - 3.1.1 Potential Actions and Decisions Regarding the Proposed Repository
 - 3.1.2 Radioactive Materials Considered for Disposal in a Monitored Geologic Repository
 - 3.1.3 National Effort To Manage Spent Nuclear Fuel and High-Level Radioactive Waste
 - 3.1.4 Yucca Mountain Site and Proposed Repository
 - 3.1.5 Environmental Impact Analysis Process
 - 3.2 Proposed Action and No-Action Alternative
 - 3.2.1 Proposed Action
 - 3.2.2 No-Action Alternative
 - 3.2.3 Alternatives Considered but Eliminated from Detailed Study
 - 3.2.4 Summary of Findings and Comparison of the Proposed Action and the No-Action Alternative
 - 3.2.5 Collection of Information and Analyses
 - 3.2.6 Preferred Alternative
 - 3.3 Affected Environment
 - 3.3.1 Affected Environment at the Yucca Mountain Repository Site at the Conclusion of Site Characterization Activities
 - 3.3.2 Affected Environment Related to Transportation
 - 3.3.3 Affected Environment at Commercial and DOE Sites
 - 3.4 Environmental Consequences of Repository Construction, Operation and Monitoring, and Closure
 - 3.4.1 Short-Term Environmental Impacts of Performance Confirmation, Construction, Operation and Monitoring, and Closure of a Repository

- 3.4.2 Short-Term Environmental Impacts from the Implementation of a Retrieval Contingency or Receipt Prior to the Start of Emplacement
- 3.5 Environmental Consequences of Long-Term Repository Performance
 - 3.5.1 Inventory for Performance Calculations
 - 3.5.2 System Overview
 - 3.5.3 Locations for Impact Estimates
 - 3.5.4 Waterborne Radiological Consequences
 - 3.5.5 Atmospheric Radiological Consequences
 - 3.5.6 Consequences from Chemically Toxic Materials
 - 3.5.7 Consequences from Disruptive Events
 - 3.5.8 Nuclear Criticality
 - 3.5.9 Consequences to Biological Resources and Soils
- 3.6 Environmental Impacts of Transportation
 - 3.6.1 Summary of Impacts of Transportation
 - 3.6.2 National Transportation
 - 3.6.3 Nevada Transportation
- 3.7 Environmental Impacts of the No-Action Alternative
 - 3.7.1 Short-Term Impacts in the Yucca Mountain Vicinity
 - 3.7.2 Commercial and DOE Sites
 - 3.7.3 Cumulative Impacts for the No-Action Alternative
- 3.8 Cumulative Impacts
 - 3.8.1 Past, Present, and Reasonably Foreseeable Future Actions
 - 3.8.2 Cumulative Short-Term Impacts in the Proposed Yucca Mountain Repository Region
 - 3.8.3 Cumulative Long-Term Impacts in the Proposed Yucca Mountain Repository Vicinity
 - 3.8.4 Cumulative Transportation Impacts
 - 3.8.5 Cumulative Manufacturing Impacts
- 3.9 Management Actions To Mitigate Potential Adverse Environmental Impacts
 - 3.9.1 Types of Management Actions
 - 3.9.2 Yucca Mountain Repository
 - 3.9.3 Transportation
- 3.10 Unavoidable Adverse Impacts; Short-Term Uses and Long-Term Productivity; and Irreversible and Irretrievable Commitment of Resources
 - 3.10.1 Unavoidable Adverse Impacts
 - 3.10.2 Relationship Between Short-Term Uses and Long-Term Productivity
 - 3.10.3 Irreversible or Irretrievable Commitment of Resources

APPENDIX A
TYPES OF DOCUMENTS TO AVAILABLE VIA THE LICENSING SUPPORT NETWORK

This appendix contains examples of the types of documents that should be identified in or made available via the Licensing Support Network (LSN) by participants. See 10 CFR 2.1003 and the exclusions in 10 CFR 2.1005.

1. Technical reports and analyses by all participants (including those developed by contractors). Note that this applies only to final technical reports and does not include preliminary drafts (including predecisional and other internal review drafts) other than "circulated drafts," as defined in 10 CFR Part 2, Subpart J (Item 6 below). See 10 CFR 2.1019(i)(2), which states that preliminary drafts, although subject to derivative discovery, are excluded from entry in the LSN.
2. Quality assurance records
3. External correspondence
4. Internal memoranda
5. Meeting minutes/transcripts
6. Draft documents circulated for supervisor concurrence or signature on which a nonconcurrence has been registered
7. Other documents (for 7.1 and 7.9, include references to other databases)
 - 7.1 Draft and final environmental evaluations or assessments
 - 7.2 Site characterization plan
 - 7.3 Site characterization study plans
 - 7.4 Site characterization progress reports
 - 7.5 Issue-resolution reports
 - 7.6 License application
 - 7.7 DOE environmental report
 - 7.8 Topical reports, data, and data analyses
 - 7.9 Draft, supplemental, and final environmental impact statements
 - 7.10 NRC preliminary comments on the sufficiency of DOE information for inclusion in a license application for a possible geologic repository at Yucca Mountain, Nevada
 - 7.11 The DOE site recommendation to the President of the United States (e.g., transmittal letter, statutory materials supporting the recommendation)
 - 7.12 Publicly available information on rulemakings
 - 7.13 Public and agency comments on documents
 - 7.14 Responses to comments
 - 7.15 NRC technical positions
 - 7.16 NRC regulatory guides
 - 7.17 The DOE project-decision schedules
 - 7.18 DOE program-management documents

APPENDIX B
EXCLUDED AND PRIVILEGED INFORMATION

In 10 CFR 2.1005, "Exclusions," the types of information excluded from the Licensing Support Network (LSN) are listed. Discovery privileges are discussed in 10 CFR 2.1006(a), (b), and (c). These sections of 10 CFR are reproduced below.

10 CFR 2.1005 Exclusions.

The following material is excluded from the requirement to provide electronic access, either pursuant to 10 CFR 2.1003, or through derivative discovery pursuant to 10 CFR 2.1019(i)—

- (a) Official notice materials;
- (b) Reference books and text books;
- (c) Material pertaining exclusively to administration, such as material related to budgets, financial management, personnel, office space, general distribution memoranda, or procurement, except for the scope of work on a procurement related to repository siting, construction, or operation, or to the transportation of spent nuclear fuel or high-level waste;
- (d) Press clippings and press releases;
- (e) Junk mail;
- (f) References cited in contractor reports that are readily available;
- (g) Classified material subject to Subpart I of this part;
- (h) Readily available references, such as journal articles and proceedings, which may be subject to copyright;
- (i) Correspondence between a potential party, interested governmental participant, or party and the Congress of the United States.

10 CFR 2.1006 Privilege.

- (a) Subject to the requirements in 10 CFR 2.1003(a)(4), the traditional discovery privileges recognized in NRC adjudicatory proceedings and the exceptions from disclosure in 10 CFR 2.390 may be asserted by potential parties, interested governmental participants, and parties. In addition to Federal agencies, the deliberate process privilege may also be asserted by State and local government entities and Indian Tribes.
- (b) Any document for which a claim of privilege is asserted, but is denied in whole or in part by the Pre-License Application Presiding Officer or the Presiding Officer, must be provided in electronic form by the party, interested governmental participant, or potential party that asserted the claim to—
 - (1) The other participants; or
 - (2) The Pre-License Application Presiding Officer or to the Presiding Officer, for entry into a Protective Order file, if the Pre-License application Presiding Officer or the Presiding Officer so directs under 10 CFR 2.1010(b) or 10 CFR 2.1018(c).
- (c) Notwithstanding any availability of the deliberative process privilege under paragraph (a) of this section, circulated drafts not otherwise privileged shall be provided for electronic access pursuant to 10 CFR 2.1003(a).

REGULATORY ANALYSIS

A separate regulatory analysis was not prepared for this regulatory guide. The regulatory analysis prepared for Draft Regulatory Guide DG-3003, "Format and Content for the License Application for the High-Level Waste Repository" (November 1990), provides the regulatory basis for this regulatory guide as well. A copy of the regulatory analysis is available for inspection and copying for a fee at the U.S. Nuclear Regulatory Commission Public Document Room, 11555 Rockville Pike, Washington, DC. The Public Document Room's mailing address is US NRC PDR, Washington, DC 20555; phone (800)397-4209 or (301)415-4737; fax (301)415-3548.

Exhibit B

GUIDELINES FOR INCLUSION OF DOCUMENTS IN THE LSN

- A. Threshold:** Certain categories of material are *excluded* from the universe of "Documentary Material" that must be put on the LSN. The following material is *excluded* from the LSN in accordance with 10 C.F.R. § 2.1005:
1. Reference books and text books.
 2. Material pertaining exclusively to administrative matters.
 3. Press clippings and press releases.
 4. Readily available references, such as journal articles and similar material.
- B. Tests:** If a document is not excluded from the LSN under A, then it is a candidate to be considered for inclusion in the LSN. The document must be included in the LSN *only* if it passes *all three* of the following tests:

Test No. 1: Is the document or information relevant? The relevant documents that may qualify for the LSN are not limited to documents created by or for Nevada. At the same time, just because a document has something to do with Yucca Mountain does not mean that it is relevant. NRC's Regulatory Guide 3.69 sets out a list of specific subjects that effectively define the universe of what is relevant to the Yucca licensing proceeding. While we have attached the complete "Topical Guidelines" list as a reference, those fairly detailed Guidelines encompass the following primary topics:

1. General descriptions of the Yucca project, its development and construction, and its future operations, including anything related to DOE's transportation plans or the socio-economic impacts of the repository.
2. Material related to the safety of the Yucca repository.
3. Material related to the operation of the Yucca repository.
4. Material related to any environmental impact of the repository or its operations, including anything related to DOE's FEIS and any supplements to that FEIS.

Test No. 2: If the document is relevant under Test No. 1, is it also "Documentary Material"? Three categories of information are documentary material:

1. information that Nevada intends to cite or rely on in support of its position in the licensing proceeding (DM-1)

2. information that is relevant under Reg. Guide 3.69, but which does not support Nevada's position (DM-2)
3. all studies and reports prepared by or on behalf of Nevada (whether we intend to use them or not in the licensing proceeding) (DM-3).

Test No. 3: If the document is relevant, and it is documentary material, is it a "preliminary draft"? If so, the document does *not* need to be put on the LSN. A "preliminary draft" is any draft that is not a "circulated draft." As the name suggests, a circulated draft is a draft that has been circulated to supervisors for review to solicit their approval *and* at least one supervisor has not approved. Final documents and circulated drafts go on the LSN; preliminary drafts do not.

The bottom line: a document that is relevant, that is documentary material, and that is either in final form or was a "circulated" draft must be included in the LSN.

Exhibit C

**LSN: Specific Examples to
Analyze LSN-Worthiness of Documentary Material**

The following are ten examples of types of documents likely to be in the hands of members of the Nevada team. The purpose of the examples is to illustrate the implementation of the three tests we have discussed in order to determine whether a document is required to be included in the LSN.

- A. An email from one member of Nevada's licensing team to another discussing a convenient time for a conference call.

✓ Test No. 1: Not relevant.

Conclusion: not for LSN.

- B. Dr. Gene Smith drafts a hypothetical contention relating to volcanism.

✓ Test No. 1: Relevant.

✓ Test No. 2:

- Nevada will not rely on this document in the licensing proceeding, but rather will rely on Dr. Smith's final contention or final report and his oral testimony. Therefore, not DM-1.
- There is nothing substantive in the document which does not support Nevada's position. Therefore, not DM-2.
- The document is a study or a report. Therefore, it is DM-3.

✓ Test No. 3: Dr. Smith's hypothetical contention, drafted at a time long before DOE has even filed its License Application (to which all contentions must be addressed), is neither a final contention nor a draft contention circulated for concurrence for the purpose of finalizing it. Therefore, it fails Test No. 3.

Conclusion: not for LSN.

- C. Gene Smith's preliminary draft volcanism report is circulated, and there are numerous emails sent back and forth among Nevada experts chatting about Dr. Smith's preliminary draft contention.

✓ Test No. 1: The emails are relevant.

✓ Test No. 2:

- Although the emails containing the preliminary draft contention are themselves "final" emails, they will not be relied upon or cited by Nevada in the licensing proceeding. Therefore, not DM-1.

- There is nothing in the emails which is not supportive of Nevada's position or is likely to be used by DOE or another party. Therefore, not DM-2.
- The emails are not studies or reports. Therefore, it is not DM-3.

Conclusion: not for LSN.

D. Mike Thorne is asked to give his opinion regarding the likely criticality factors involved with a nuclear waste rail cask which falls off a bridge and is submerged in the Mississippi River.

- ✓ Test No. 1: Relevant.
- ✓ Test No. 2:
 - Nevada will rely on Dr. Thorne's final reports or contentions in the licensing proceeding, as well as his oral testimony, but **not** this document. Therefore, not DM-1.
 - There is nothing substantive in the document which does not support Nevada's position or is likely to be used by DOE or another party. Therefore, not DM-2.
 - The document is probably a "report," requested by and delivered to Dr. Thorne's client. Therefore, it is DM-3.
- ✓ Test No. 3: Dr. Thorne's report is not intended to be a draft document which is worked over and resubmitted, nor is it a preliminary draft. It is a **final** report or study. Therefore, it meets the third test.

Conclusion: must be included in LSN.

E. Mike Thorne composes a bibliography of those documents which he referenced in what is concededly a final report (e.g., on criticality) prepared for his client, NWPO. The issue is whether the documents **referenced** by Dr. Thorne must be placed on the LSN.

- ✓ Test No. 1: Relevant.
- ✓ Test No. 2:
 - Nevada, through its testifying expert, may well cite and rely on the material in the licensing proceeding. Apparently, DM-1.
 - There is nothing in the document which is not supportive of Nevada's position or is likely to be used by DOE or another party. Therefore, not DM-2.
 - The documents relied upon by Dr. Thorne are studies or reports, but they were not prepared by or on behalf of Nevada. Therefore, not DM-3.

- ✓ Test No. 3: The cited documents were presumably contained in periodicals or learned treatises and are **final** reports.

Conclusion: would normally be required to be placed in LSN, **except for the** enumeration of specific **exclusions** contained in 10 C.F.R. 2.1005. Those exclusions include references cited in contractor reports that are readily available; reference books and text books; and readily available references, such as journal articles and proceedings, which may be subject to copyright. This example is instructive, in that it suggests that, as part of this LSN guidance memorandum, we should probably enumerate the "exclusions" up front, because they are documents which might otherwise "pass the test" for inclusion in the LSN, but are still exempt from inclusion. There is no sense for one to put a document through several "tests" if it can be cast aside at the beginning of the analysis.

- F. Bob Loux transmits Mike Thorne's criticality study to Steve Frishman, and the issue is the characterization of Bob Loux's email.

- ✓ Test No. 1: The email is relevant.
- ✓ Test No. 2:
 - There is nothing substantive in the email which Nevada intends to cite or rely on in the licensing proceeding. Therefore, not DM-1.
 - There is nothing substantive in the email which does not support Nevada's position or is likely to be used by DOE or another party. Therefore, not DM-2.
 - The email is not a study or a report. Therefore, not DM-3.

Conclusion: not for LSN.

- G. Bob Loux asks Steve Frishman to comment on Mike Thorne's criticality report, and he does so by email. The status of Steve's email:

- ✓ Test No. 1: Relevant.
- ✓ Test No. 2:
 - Nevada will not rely on Steve's email in the licensing proceeding. Therefore, not DM-1.
 - There is likely nothing substantive in Steve's email which is not supportive of Nevada's position or is likely to be used by DOE or another party. Therefore, not DM-2.
 - Steve's comments do not rise to the level of a study or report. Therefore, it is not DM-3.

Conclusion: not for LSN.

H. Maury Morgenstein, in 1995, submitted to NWPO the results of a six-month long experiment done at Catholic University, wherein a sample of C-22 alloy was exposed to waters similar in their chemical content to the water likely to be encountered in a Yucca Mountain storage tunnel.

✓ Test No. 1: Relevant.

✓ Test No. 2:

○ Nevada is unlikely to rely on the information in the licensing proceeding which will not commence until more than ten years after the information was supplied by Maury; accordingly, it would not be DM-1 (if however, the information is such that it would likely become part of a contention attacking the viability of C-22, it may well be DM-1).

○ There is nothing in the document which is not supportive of Nevada's position or is likely to be used by DOE or another party. Therefore, not DM-2.

○ This document is a "study," since it was testing commissioned by Nevada and performed on behalf of Nevada. Therefore, it is DM-3.

✓ Test No. 3: If the document reports the results of a requested analysis, it is probably a final report and meets this test.

Conclusion: must be on LSN.

I. Nevada delivers information to DOE and NRC prior to DOE's recommendation of the Yucca Mountain site to the President, which is geared to demonstrate the socioeconomic impacts of the proposed repository on the citizens of Nevada.

✓ Test No. 1: Relevant.

✓ Test No. 2:

○ Nevada is likely to rely on the information in the licensing proceeding. Therefore, it is DM-1.

○ The information is not information that is non-supportive of Nevada's position. Therefore, not DM-2.

○ It likely constitutes a study or report done by or on behalf of Nevada, and therefore, it is DM-3.

✓ Test No. 3: The document, as delivered to the Agencies, was a final document, and therefore meets Test No. 3.

Conclusion: must be on LSN.

J. Assuming that the socioeconomic studies were a composite of analyses made by different consultants in different disciplines (e.g., economists, sociologists, etc.); what is the status

of those deliverables to Nevada, which later are incorporated into a composite socioeconomic report delivered to the federal agencies.

- ✓ Test No. 1: Relevant.
- ✓ Test No. 2:
 - The **information** contained in these inputs is likely to be relied upon by Nevada in the licensing proceeding. Therefore, it is DM-1.
 - There is nothing in the document which is not supportive of Nevada's position or is likely to be used by DOE or another party. Therefore, not DM-2.
 - These inputs are studies or reports done on behalf of Nevada. Therefore, DM-3.
- ✓ Test No. 3: Even though the analyses of sociologists and economists might have been incorporated into some other document, that work, when delivered to NWPO, was intended to be the final report or study of the individual who did the work. Therefore, meets Test No. 3.

Conclusion: must be on LSN.

Exhibit D

**CERTIFICATION OF COMPLIANCE WITH
LSN DOCUMENT REQUIREMENTS**

I, _____, certify that I have provided to Susan Lynch at the Nevada Agency for Nuclear Projects, 1761 E. College Parkway, Suite 118, Carson City, Nevada 89706, the Documentary Material required to be provided to her by Joseph R. Egan's Memorandum to me dated June 5, 2007, and that I have taken in good faith all reasonable efforts to identify such Material.

By: _____

Print Name: _____

Title: _____

Dated: _____

Exhibit 19

Exhibit 19

 Message List
  Delete


Delete & Prev | Delete & Next

 Forward
  Reply
  Reply All
 

Move to: INBOX

 Move

Subject: LSN Compliance
From: "Susan Montes" <smontesi@nuclearlawyer.com>
Date: Fri, August 31, 2007 2:10 pm
To: bloux@nuc.state.nv.us (less)
 jstrolin@nuc.state.nv.us
 steve.friishman@gmail.com
 "MARTA ADAMS" <MAADAMS@ag.state.nv.us>
 cfitzpatrick@nuclearlawyer.com
 smontesi@nuclearlawyer.com
 mmalsch@nuclearlawyer.com
 Jbronfield@rdblaw.com
 bbriggs@rdblaw.com
 jhilton@rdblaw.com
 barkatt@cua.edu
 abath@intellisci.co.uk
 tennbells@gmail.com
 victor@gilinsky.com
 bearhalstead@aol.com
 hugo737@gmail.com
 a.butler@imperial.ac.uk
 h.wheater@imperial.ac.uk
 simon.mathias@imperial.ac.uk
 frankatagapito@sbcglobal.net
 phlamboley@aol.com
 brenda.little@worldnet.att.net
 amessenger@texasdata.net
 memgmi@gmail.com
 jto@u.arizona.edu
 larry_phillips@msn.com
 "April L. Pulvirenti" <alp_chem@hotmail.com>
 david.lever@sercoassurance.com
 cpeter.Jackson@sercoassurance.com
 martin.Kelly@sercoassurance.com
 "Steve Swanton" <steve.swanton@sercoassurance.com>
 dshettel@cox.net
 gene.smith@univ.edu
 rwstaehle@rwstaehle.com
 mikethorneltd@aol.com
 judynwtf@aol.com
 wigley@ucar.edu
 mkoeire@hotmail.com
 lnmcd@att.net
 "Martin Blunt" <m.blunt@imperial.ac.uk>
 "Stephan Matthai" <s.matthai@imperial.ac.uk>
Cc: SZEER@NUC.STATE.NV.US (more)
Priority: Normal
Options: View Full Header | View Printable Version | Download this as a file

To: Nevada Licensing Team

It is our goal to have accumulated from our licensing team as close as is possible to a complete collection of "Documentary Material" for inclusion in Nevada's LSN database by the time of our upcoming expert meeting (October 3-4). In order to assist you in "sorting" your Yucca documents and providing those which meet the definition of "Documentary Material," we are again attaching the "LSN: Specific Examples to Analyze LSN-Worthiness of Documentary Material," which we believe may be used as a good "decision tree" tool for determining LSN inclusion or exclusion. Any draft contentions you have worked on to date are extremely preliminary and need not be included. On the other hand, source materials you know you are likely to rely on in your work should be included. If you have questions about inclusion/exclusion decisions, please feel free to contact me or Susan Lynch.

Finally, you should retain any LSN-excluded material in your Yucca files. Once the licensing proceeding is underway, discovery may extend to any and all Yucca-relevant material in your possession, even if it was not required to be on the LSN.

Attached is a blank "Certification of Compliance with LSN Document Requirements." Please make it your commitment, prior to the expert meeting to ensure that you:

1. Review your files;
2. Provide Susan Lynch with copies of any "Documentary Material" not previously provided to her; and
3. Fill out and sign the attached Certification vouching for your compliance (and deliver it either before or at the meeting).

Charles J. Fitzpatrick
Egan, Fitzpatrick & Malsch, PLLC
Phone: 210.820.2667
Fax: 210.820.2668

cfitzpatrick@nuclearlawyer.com
<<http://www.nuclearlawyer.com/>> www.nuclearlawyer.com

This e-mail and any files transmitted with it are confidential and are intended solely for the use of the individual or entity to which they are addressed. This communication may contain material protected by the attorney-client privilege. If you are not the intended recipient or the person responsible for delivering the e-mail to the intended recipient, be advised that you have received this e-mail in error and that any use, dissemination, forwarding, printing, or copying of this e-mail is strictly prohibited. If you have received this e-mail in error, please notify me immediately.

Attachments:

winmail.dat 62 k [application/ms-tnef] Download

[Add to Contact List](#)

Delete & Prev | Delete & Next

Move to: INBOX

[Move](#)

Exhibit 20

Exhibit 20

Nevada Licensing Support Network Procedures **October 22, 2007**

The Nuclear Regulatory Commission (NRC) regulation at 10 C.F.R. §2.1009 requires that each party to the Yucca Mountain repository licensing proceeding establish procedures to implement requirements for inclusion of Documentary Material contained in §2.1003, and that each party provide training to its staff on the procedures for implementation of the responsibility to provide such Documentary Material.

Nevada has both established procedures and provided training, not only to its staff, but to its cadre of engaged expert consultants for the past several years. While §2.1009 does not mandate that the procedures be in written form, Nevada deems it appropriate to reduce its preexisting procedures to writing at this time. The Department of Energy (DOE) has certified its initial Licensing Support Network (LSN) database (on October 19, 2007), and Nevada must assume that it must **complete** the implementation of the procedures which it has had in place since at least 2004, in order to certify its own initial LSN database on or before January 17, 2008.

Training: Written information has been provided to staff of the Nevada Nuclear Waste Project Office, to counsel, and to contract consultants on a repetitive basis. Detailed memoranda detailing LSN compliance requirements were sent by Mr. Joe Egan on July 29, 2004 and June 5, 2007. "Decision tree" and "question and answer" documents were circulated to every member of the team. Concurrent with DOE's certification and the necessity for Nevada to plan to follow suit, an additional "Memorandum to Area Certification Managers of Nevada's Licensing Team" on the subject of Nevada LSN Training has been prepared and is being distributed concurrently with these Nevada LSN procedures. It will be the responsibility of each Area Certification Manager to further distribute the LSN Training Memorandum (attached to the Memorandum to Area Certification Managers) to the individuals for whom each has responsibility as detailed below.

Certification: Each individual member of the Nevada licensing team has the responsibility of certifying his or her own compliance with the requirements of producing all Documentary Material within his or her possession to Susan Lynch on or before December 21, 2007. Individuals who certified long in the past must recertify and provide any additional documents to Susan Lynch. Individuals who recently certified will be surveyed for the continuing completeness of their production of Documentary Material and the currency of their certifications. It is anticipated that the overall initial LSN certification for the State of Nevada will be made by Bob Loux on or before January 17, 2008. Each and every individual, past and present, on the Nevada licensing team will be surveyed (regarding document delivery and certification) by the responsible Area Certification Manager (see below) within the last 30 days prior to the anticipated overall certification. Responsibilities for the overall certification and supervision of individual certifications are as follows:

1. Overall Certification for the State of Nevada – Bob Loux, Director of the Nuclear Waste Project Office
2. Area Certification Managers for Specific Individuals Comprising the Nevada Licensing Team:

- (a) Responsible for staff of Nuclear Waste Project Office and Nevada state government officials – Bob Loux (assisted by Susan Lynch)
- (b) Responsible for experts/consultants engaged by or on behalf of Nevada – Susan Lynch; assisted by Mike Thorne with respect to experts/consultants from abroad; assisted by Allen Messenger with respect to domestic experts/consultants.
- (c) Responsible for counsel engaged by Nevada – Marty Malsch; assisted by Charlie Fitzpatrick with respect to the Egan, Fitzpatrick & Malsch Yucca document collection.
- (d) In addition, Susan Lynch, assisted by Marty Malsch, will be responsible for all present and past Documentary Material, if any, contained on Nevada NWPO's "What's New" website and links.

All individuals will provide their certifications either directly to Susan Lynch or indirectly to her through their Area Certification Manager (if different).

December 21 Deadline: All individuals are responsible for ensuring completion and delivery of their individual certifications to Susan Lynch – either directly or through their respective Area Certification Managers – not later than December 21, 2007. All Area Certification Managers will assure that individual certifications of compliance have been received from all individuals who fall within their respective areas of responsibility and delivered to Susan Lynch by December 21, 2007.

By December 21, 2007, all Area Certification Managers will have assured that all non-privileged Documentary Material required to be placed on Nevada's LSN database has been delivered to Susan Lynch; and as of the same date, all potentially privileged Documentary Material has been delivered to Marty Malsch.

Susan Lynch will cause all Documentary Material received from individuals or Area Certification Managers to be promptly delivered to Compulit and Project Manager Chad Jones for processing and creation of appropriate headers and delivery by Compulit to the LSN Administrator Dan Graser in ample time to assure his processing of Documentary Material and headers into the overall LSN database **before** the January 17, 2008 deadline.

Susan Lynch and Chad Jones will actively coordinate with the LSN Administrator, both before and after December 21, 2007, to assure delivery of documents and headers to the LSN Administrator with ample lead time to enable Bob Loux to be able to execute the required overall certification on or before January 17, 2008.

Marty Malsch and Charlie Fitzpatrick will prepare appropriate headers for privileged documents in accordance with pertinent PAPO Case Management Order requirements. With respect to any relevant Documentary Material determined to be withheld from full-text availability on the LSN, they will coordinate with Compulit and the LSN Administrator to ensure those privileged document headers are included in Nevada's LSN database prior to the time of initial certification.

Marty Malsch (assisted by Charlie Fitzpatrick) will also ensure the creation of privilege logs in accordance with the pertinent PAPO Case Management Orders and ensure their filing on the same date as Nevada's initial LSN certification.

Susan Lynch will monitor and coordinate non-privileged headers created by Compulit to ensure quality (e.g., no "UNTITLED" document headers).

Documentary Material will be delivered to Susan Lynch (in electronic form, if possible) as soon as possible by those providing Documentary Material, and as soon as possible by Susan Lynch to Compulit, in order to establish a regular flow of documents and avoid the creation of a backlog.

Susan Lynch has heretofore been designated the LSN Point of Contact (POC) for the State of Nevada. Marty Malsch will take the necessary actions to ensure that he is designated the Nevada POC with respect to privileged documents.

Bob Loux will execute the overall initial LSN certification on behalf of the State of Nevada only when he has been (1) informed by each of the Area Certification Managers that the Nevada LSN procedures have been distributed and implemented, that training has been conducted of the Nevada staff and all individuals engaged by the State of Nevada in connection with the Yucca Mountain project licensing proceeding, that individual certifications have been received from each of the individuals from whom they are required, and that the certifications confirm that all Documentary Material required to be present on Nevada's LSN database at the time of its initial certification have been identified, collected, and delivered to the LSN Administrator for inclusion on the LSN; and (2) assured by Marty Malsch that privileged headers have been created for all documents withheld on the basis of privilege and provided to the LSN Administrator and that a privilege log consistent with PAPO requirements has been prepared for filing concurrent with Nevada's LSN certification.

Exhibit 21

Exhibit 21

MEMORANDUM

To: Area Certification Managers of Nevada's Licensing Team

Bob Loux
Susan Lynch
Mike Thorne
Allen Messenger
Marty Malsch

cc: Marta Adams
Joe Egan

From: Charles J. Fitzpatrick

Date: November 28, 2007

Re: Nevada LSN Training

As you know, 10 C.F.R. §2.1009 requires that Nevada implement procedures and train its staff to ensure the collection and inclusion on Nevada's Licensing Support Network (LSN) database of all Documentary Material (DM) that is required by 10 C.F.R. §2.1003.

Nevada has been implementing such procedures and conducting such training on a formal basis since at least 2004 and on an informal basis before that time, both for its staff and for its engaged experts/consultants and attorneys.

Recently, Nevada deemed it appropriate to reduce its procedures to written form. You have previously received these written procedures. Because DOE has again certified its LSN database (the adequacy of which has been challenged by Nevada), Nevada must plan to initially certify its own LSN database on or before January 17, 2008.

To that end, and in accordance with the Nevada LSN procedures (October 22, 2007), you will each immediately take the necessary steps to implement those procedures and ensure that all individual members of the Nevada licensing team in your area of responsibility (both present and, as necessary, past members) receive and review a copy of the Nevada procedures (an additional copy is attached for your convenience), as well as the Final Training for Initial Certification (also attached), and that they comply with the requirements of both. You will each ensure that implementation and compliance has been completed in your area of responsibility in a timely fashion to facilitate the overall certification by Bob Loux on or before January 17, 2008.

Nevada Licensing Support Network Procedures
October 22, 2007

The Nuclear Regulatory Commission (NRC) regulation at 10 C.F.R. §2.1009 requires that each party to the Yucca Mountain repository licensing proceeding establish procedures to implement requirements for inclusion of Documentary Material contained in §2.1003, and that each party provide training to its staff on the procedures for implementation of the responsibility to provide such Documentary Material.

Nevada has both established procedures and provided training, not only to its staff, but to its cadre of engaged expert consultants for the past several years. While §2.1009 does not mandate that the procedures be in written form, Nevada deems it appropriate to reduce its preexisting procedures to writing at this time. The Department of Energy (DOE) has certified its initial Licensing Support Network (LSN) database (on October 19, 2007), and Nevada must assume that it must **complete** the implementation of the procedures which it has had in place since at least 2004, in order to certify its own initial LSN database on or before January 17, 2008.

Training: Written information has been provided to staff of the Nevada Nuclear Waste Project Office, to counsel, and to contract consultants on a repetitive basis. Detailed memoranda detailing LSN compliance requirements were sent by Mr. Joe Egan on July 29, 2004 and June 5, 2007. "Decision tree" and "question and answer" documents were circulated to every member of the team. Concurrent with DOE's certification and the necessity for Nevada to plan to follow suit, an additional "Memorandum to Area Certification Managers of Nevada's Licensing Team" on the subject of Nevada LSN Training has been prepared and is being distributed concurrently with these Nevada LSN procedures. It will be the responsibility of each Area Certification Manager to further distribute the LSN Training Memorandum (attached to the Memorandum to Area Certification Managers) to the individuals for whom each has responsibility as detailed below.

Certification: Each individual member of the Nevada licensing team has the responsibility of certifying his or her own compliance with the requirements of producing all Documentary Material within his or her possession to Susan Lynch on or before December 21, 2007. Individuals who certified long in the past must recertify and provide any additional documents to Susan Lynch. Individuals who recently certified will be surveyed for the continuing completeness of their production of Documentary Material and the currency of their certifications. It is anticipated that the overall initial LSN certification for the State of Nevada will be made by Bob Loux on or before January 17, 2008. Each and every individual, past and present, on the Nevada licensing team will be surveyed (regarding document delivery and certification) by the responsible Area Certification Manager (see below) within the last 30 days prior to the anticipated overall certification. Responsibilities for the overall certification and supervision of individual certifications are as follows:

1. Overall Certification for the State of Nevada – Bob Loux, Director of the Nuclear Waste Project Office
2. Area Certification Managers for Specific Individuals Comprising the Nevada Licensing Team:

- (a) Responsible for staff of Nuclear Waste Project Office and Nevada state government officials – Bob Loux (assisted by Susan Lynch)
- (b) Responsible for experts/consultants engaged by or on behalf of Nevada – Susan Lynch; assisted by Mike Thorne with respect to experts/consultants from abroad; assisted by Allen Messenger with respect to domestic experts/consultants.
- (c) Responsible for counsel engaged by Nevada – Marty Malsch; assisted by Charlie Fitzpatrick with respect to the Egan, Fitzpatrick & Malsch Yucca document collection.
- (d) In addition, Susan Lynch, assisted by Marty Malsch, will be responsible for all present and past Documentary Material, if any, contained on Nevada NWPO's "What's New" website and links.

All individuals will provide their certifications either directly to Susan Lynch or indirectly to her through their Area Certification Manager (if different).

December 21 Deadline: All individuals are responsible for ensuring completion and delivery of their individual certifications to Susan Lynch – either directly or through their respective Area Certification Managers – not later than December 21, 2007. All Area Certification Managers will assure that individual certifications of compliance have been received from all individuals who fall within their respective areas of responsibility and delivered to Susan Lynch by December 21, 2007.

By December 21, 2007, all Area Certification Managers will have assured that all non-privileged Documentary Material required to be placed on Nevada's LSN database has been delivered to Susan Lynch; and as of the same date, all potentially privileged Documentary Material has been delivered to Marty Malsch.

Susan Lynch will cause all Documentary Material received from individuals or Area Certification Managers to be promptly delivered to Compulit and Project Manager Chad Jones for processing and creation of appropriate headers and delivery by Compulit to the LSN Administrator Dan Graser in ample time to assure his processing of Documentary Material and headers into the overall LSN database **before** the January 17, 2008 deadline.

Susan Lynch and Chad Jones will actively coordinate with the LSN Administrator, both before and after December 21, 2007, to assure delivery of documents and headers to the LSN Administrator with ample lead time to enable Bob Loux to be able to execute the required overall certification on or before January 17, 2008.

Marty Malsch and Charlie Fitzpatrick will prepare appropriate headers for privileged documents in accordance with pertinent PAPO Case Management Order requirements. With respect to any relevant Documentary Material determined to be withheld from full-text availability on the LSN, they will coordinate with Compulit and the LSN Administrator to ensure those privileged document headers are included in Nevada's LSN database prior to the time of initial certification.

Marty Malsch (assisted by Charlie Fitzpatrick) will also ensure the creation of privilege logs in accordance with the pertinent PAPO Case Management Orders and ensure their filing on the same date as Nevada's initial LSN certification.

Susan Lynch will monitor and coordinate non-privileged headers created by Compulit to ensure quality (e.g., no "UNTITLED" document headers).

Documentary Material will be delivered to Susan Lynch (in electronic form, if possible) as soon as possible by those providing Documentary Material, and as soon as possible by Susan Lynch to Compulit, in order to establish a regular flow of documents and avoid the creation of a backlog.

Susan Lynch has heretofore been designated the LSN Point of Contact (POC) for the State of Nevada. Marty Malsch will take the necessary actions to ensure that he is designated the Nevada POC with respect to privileged documents.

Bob Loux will execute the overall initial LSN certification on behalf of the State of Nevada only when he has been (1) informed by each of the Area Certification Managers that the Nevada LSN procedures have been distributed and implemented, that training has been conducted of the Nevada staff and all individuals engaged by the State of Nevada in connection with the Yucca Mountain project licensing proceeding, that individual certifications have been received from each of the individuals from whom they are required, and that the certifications confirm that all Documentary Material required to be present on Nevada's LSN database at the time of its initial certification have been identified, collected, and delivered to the LSN Administrator for inclusion on the LSN; and (2) assured by Marty Malsch that privileged headers have been created for all documents withheld on the basis of privilege and provided to the LSN Administrator and that a privilege log consistent with PAPO requirements has been prepared for filing concurrent with Nevada's LSN certification.

Final Training for Nevada's Initial LSN Certification
(prepared for distribution to all members of Nevada's licensing team
through its Area Certification Managers)

NRC regulation 10 C.F.R. §2.1009 requires that each party in the licensing proceeding implement procedures and conduct training of its staff in order to ensure that, at the time of its initial LSN certification, it can certify that these steps have been taken and that the Documentary Material required by §2.1003 is publicly available on the LSN.

Nevada has been implementing such procedures and training for the last several years. It has recently reduced its LSN compliance procedures to written form (copy attached). Nevada's Area Certification Managers will be contacting you to ensure that you receive and review Nevada's procedures and this Final Training Memorandum and that you are currently in compliance (or receive your reassurance, if your compliance was already completed previously and remains complete). The deadline for such compliance is Friday, December 21, 2007.

You have received LSN training in numerous forms, and in numerous forums, over the past four years. Most all of you have been present at our numerous expert "summit" meetings conducted over the past several years. A presentation on the purposes and scope of Nevada's LSN database, and specific requirements of your compliance, was made at each of those meetings. In addition, formal memoranda were sent to the licensing team by Joe Egan on July 29, 2004 and June 5, 2007, detailing the definitions and requirements of LSN compliance as they apply to the members of the Nevada licensing team. In addition, individual conversations or email exchanges have taken place with a large number of you clarifying LSN requirements and/or responding to your questions. Susan Lynch, Allen Messenger, Marty Malsch, and Charlie Fitzpatrick remain available at any time to answer your questions with respect to your and our obligations with respect to the Nevada LSN database.

As we draw close to the date of required initial certification, it is appropriate to again remind you of the requirements which each of us must meet, in order to produce our Documentary Material for inclusion in the Nevada LSN, and to certify that we have done so, in order to enable Bob Loux to certify more broadly the State's compliance. To that end, we are attaching the essential sources of information regarding your LSN compliance, which we ask that you read carefully one more time, including:

1. Mr. Egan's July 29, 2004 correspondence;
2. Mr. Egan's June 5, 2007 correspondence;
3. The Decision Tree analysis tool (attached to No. 2 above);
4. Sample LSN questions and answers (attached to No. 2 above);
5. DOE's November 3, 2006 LSN instructions to its staff and contractors; and
6. DOE's current Frequently Asked Questions (FAQs) regarding LSN compliance.

In addition, aside from your current compliance with LSN requirements to facilitate Nevada's initial certification, there are at least two very important additional requirements which we have discussed before, but which bear repeating:

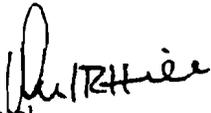
1. **Monthly updates:** after its initial certification, Nevada will be required to update its certification on a monthly basis. This requires **both** that any member of the team producing or receiving from any source that which meets the definition of Documentary Material must deliver it to Susan Lynch, who will ensure its addition to Nevada's LSN database. The deadline for delivery to Susan Lynch will be the 21st day of each month, to facilitate Nevada's filing its required monthly updated certification to the PAPO Board as of the last day of each month (on the first day of the next month).
2. **Derivative discovery:** to reinforce our prior instruction in this regard, we are far from identifying who may ultimately become testifying witnesses in the licensing proceeding. All members of the Nevada licensing team must for the present assume they could be expert or fact witnesses, as appropriate, at some point. Therefore, you should retain **all** documents in your possession relating to the Yucca Mountain project or your work for the State of Nevada, even that which does not meet the definition of Documentary Material for the LSN, for possible derivative discovery (for example, your deposition could be taken by DOE) at a later time.



Department of Energy
Washington, DC 20585

November 3, 2006

MEMORANDUM TO: Distribution

FROM: David R. Hill 
General Counsel

SUBJECT: Ongoing Licensing Support Network ("LSN") Obligations

This memorandum and its attachments provide further guidance concerning LSN obligations of personnel in affected Department of Energy (DOE) and contractor organizations working on the Yucca Mountain project. DOE and contractor organizations previously have been given guidance through the May 5, 2003 memorandum of the DOE General Counsel ("Call Memo") and the May 24, 2005 memorandum of the DOE Assistant General Counsel ("Refresher Guidance") regarding the submittal and retention of documents for the Yucca Mountain license proceeding.

You are required to distribute a copy of this guidance to each person in your organization who is working on matters concerning the Yucca Mountain project. You also are required to distribute a copy to all contractors of your organization who work on matters concerning the Yucca Mountain project, with instructions that these contractors distribute copies to their affected personnel and subcontractors. Upon doing so, provide written verification (using the accompanying form) to the DOE LSN Project Manager, Dong Kim, in the DOE Office of Civilian Radioactive Waste Management ("OCRWM"), that (i) your organization has appropriately distributed this guidance to its personnel and contractors, and (ii) your organization's affected contractors have similarly verified in writing to you that they have appropriately distributed this guidance to their personnel and subcontractors.

Computer-based training on this guidance will soon be available for all affected organizations and personnel. Also, LSN project members will soon contact the LSN Responsible Manager and LSN Point of Contact for your organization to provide additional information regarding implementation of this guidance.

Please contact Dong Kim (202-586-1223) if you have any questions.

Attachments



Printed with soy ink on recycled paper

Distribution

Office of the Secretary
Office of the Deputy Secretary
Office of the Under Secretary
Office of the Under Secretary for Science
Administrator, National Nuclear Security Administration
Deputy Administrator for Naval Reactors
Director, Office of Civilian Radioactive Waste Management
Assistant Secretary, Office of Nuclear Energy, Science and Technology
Assistant Secretary for Energy Efficiency and Renewable Energy
Assistant Secretary for Environmental Management
Assistant Secretary for Congressional and Intergovernmental Affairs
Assistant Secretary for Policy and International Affairs
Director of Public Affairs
Office of Inspector General
Administrator, Energy Information Administration
Office of Health, Safety and Security
Director, Office of Management
Acting Chief Financial Officer
Office of the Chief Human Capital Officer
Director, Office of the Executive Secretariat

cc:

Manager, Sandia Site Office
Manager, Albuquerque Site Office
Manager, Livermore Site Office
Manager, Los Alamos Site Office
Manager, Nevada Site Office
Manager, Chicago Operations Office
Manager, Idaho Operations Office
Manager, Oak Ridge Operations Office
Manager, Oakland Operations Office
Manager, Ohio Field Office
Manager, Richland Operations Office
Manager, Savannah River Operations Office
Manager, Office of River Protection

GUIDANCE CONCERNING ONGOING LSN OBLIGATIONS

A. DOCUMENTS TO BE INCLUDED ON THE LSN

DOE needs to make available on the LSN its “documentary material” prior to submitting its license application for a geologic repository for spent nuclear fuel and high level radioactive at Yucca Mountain. Generally speaking, a document qualifies as “documentary material” and is “LSN-Relevant” if it falls into any of the following three categories:

- (1) Class 1: It contains information that DOE intends to cite or rely on in the license application or in support of its positions in the license proceeding.
- (2) Class 2: It contains information that is adverse to, contradictory of, or inconsistent with the information in the first category.
- (3) Class 3: It is a report or study prepared by or for DOE that is relevant to both the license application and the issues in the Topical Guidelines in NRC Regulatory Guide 3.69 (including “circulated drafts” of such reports and studies).

To enable DOE to collect the documents that potentially qualify as “documentary material,” personnel need to follow the document submittal procedures below. A one-page summary of these document submittal requirements is attached for reference as Attachment I.

1. **Follow project procedures for submittal of documents to the OCRWM Records Processing Center (“RPC”).** If you perform work on the Yucca Mountain project that is subject to procedures that require records to be submitted to the RPC, *e.g.*, Procedure AP-17.1Q, you must follow those procedures. When you submit a record to the RPC, you are required to designate on the transmittal form whether you consider the document to be LSN-Relevant, *i.e.*, that it qualifies as documentary material. You are also required to mark appropriately, and identify on the transmittal form, all submitted documents that you believe may be privileged.

Personnel in the RPC review all submitted documents and forward copies as appropriate to DOE’s Automated Litigation Support (“ALS”) Contractor, *i.e.*, CACI, Inc., for inclusion on the LSN. Accordingly, submittal of a record to the RPC satisfies your LSN obligations for that document. You do not need to retain for purposes of derivative discovery a copy of any document that is submitted to the RPC.

2. **Submittal of other potentially LSN-Relevant documents to the ALS Contractor.** If you author a final document that is not submitted to the RPC, you must assess whether the document falls within any of the three classes of documentary material and therefore is LSN-Relevant. You must make the same assessment for all documents that you receive from persons outside the Yucca Mountain project in the course of your work on the project (*e.g.*, letters or studies received from universities) that are not submitted to the RPC.

For any such document that you believe is LSN-Relevant, you must submit a copy to the LSN Point of Contact for your organization, who will provide the documents to DOE's ALS Contractor. Each document that you provide to your organization's LSN Point of Contact should be accompanied by a copy of the form provided as Attachment 3, on which you should note all privileges that you believe may apply to the document. You should note the following regarding this document submittal requirement:

- This obligation applies to any type of document, *e.g.*, memoranda, letters, faxes, electronic files, etc. Whether a document qualifies as documentary material depends on its content, not its form.
- With one exception, you do not need to submit drafts and should submit only final versions of documents. The one exception is a "circulated draft" of an LSN-Relevant report or study. A "circulated draft" of a report or study is a presumptively final version that has been distributed for organizational approval and that received a formal, written non-concurrence.
- This obligation does not apply to documents that are submitted to the RPC (whether by you or someone else).
- This obligation does not apply to documents you receive that are authored by Yucca Mountain project personnel. That is because each project member has the independent duty to submit LSN-Relevant documents that member authors. Your submittal obligation applies to (i) documents you author and (ii) documents you receive from persons outside the project.

NOTE: If you plan to submit LSN-Relevant documents with either Protected Personal Identifying Information (Protected PII) or Safeguards Information (SGI), you must identify those documents to your organization's LSN Point of Contact in advance, so special arrangements can be made for them.

Protected PII is information that can be used to distinguish or trace an individual's identity, such as their social security number, date and place of birth, mother's maiden name, personal financial information, biometric records, medical history, and any other personal information that is linked or linkable to an individual (or that could be used for identity theft).

SGI is information that is authorized by §147 of the Atomic Energy Act (AEA) of 1954, as amended, to be protected from inadvertent release and unauthorized disclosure, and that is further governed by 10 C.F.R. Part 73.

NOTE: Do not submit any documents that contain classified information even if they are LSN-Relevant. Preserve these documents, and contact your organization's LSN Point of Contact to receive special handling instructions.

3. **Submit potentially “non-supporting” and “supporting” emails.** You must submit all emails you author that you believe may contain either “non-supporting” or “supporting” information. Emails in either category should be treated as LSN-Relevant.

“Non-supporting” emails are those that contain information that may be adverse to, inconsistent with, or contradictory of--or that otherwise call into question--the information or analyses relied upon or used in preparation of the license application or documents underlying the license application, *e.g.*, AMRs. These also include emails that may call into question DOE’s compliance with QA requirements or DOE’s ability to satisfy the requirements of NRC’s Part 63 regulations for the Yucca Mountain repository.

“Supporting” emails are those that it might be useful for DOE to cite and rely on in the license proceeding. For example, DOE may cite emails that explain or otherwise put in context emails or other information cited by opponents in connection with their contentions. Accordingly, you should identify emails you believe may assist DOE in the license proceeding (*e.g.*, emails that put into context or resolve an issue raised in a non-supporting email) as LSN-Relevant and submit those emails.¹

For each email that you submit--whether non-supporting or supporting--that you believe may be privileged under the deliberative process privilege, attorney client communication privilege, litigation work product doctrine or other applicable privilege, you should mark the email as privileged. If you do not have an OCRWM Lotus Notes email account, you can do this for emails that you author by writing in the beginning of the email that the email is “Privileged and Confidential.”

If you have an OCRWM Lotus Notes email account, that system employs a template that requires you to categorize for LSN relevance and privilege each email you send as well as each email you receive from outside that system. All emails that you categorize as LSN-Relevant through the OCRWM Lotus Notes system are sent to the ALS Contractor, which fulfills your submittal requirement for such emails. Because of this feature, you should use your OCRWM Lotus Notes account to the extent practicable for matters related to the Yucca Mountain project.

The OCRWM Lotus Notes system template, in addition to requiring users to determine whether the email is “LSN-Relevant” and/or “Privileged,” also requires you to indicate whether the email is a “Federal Record.” You generally should mark all emails that pertain to your work for the Federal government as a “Federal Record.” Further, the template also requires you to indicate whether the email reflects a “Condition Adverse to Quality,” and you must also make this determination for all emails.

¹Emails that merely distribute copies of reports and studies do not need to be submitted to the ALS Contractor. DOE’s reports and studies that need to be produced on the LSN are obtained either through the RPC or by direct submittal to the ALS Contractor. Any copies attached to emails are therefore duplicates.

If your organization uses an email system other than the OCRWM Lotus Notes system, you can submit LSN-Relevant emails from that system by sending a copy to one of the OCRWM Lotus Notes addresses established to capture external email. Personnel working for the lead lab should cc: "LEAD_LAB@notes.ymp.gov". Personnel other than those working directly for the lead lab should cc: OCRWM_RPC@notes.ymp.gov". Alternatively, you can submit copies of LSN-Relevant emails from these other systems to your organization's LSN Point of Contact in either paper or electronic form, using the transmittal form for submittal of documents discussed in the preceding section. You should denote whether you consider any such submitted emails from these other networks to be privileged. (Note: You are not required to denote such emails as a "Federal Record" or "Condition Adverse to Quality." Those designations are a function of the template on the OCRWM Lotus Notes system.)

You should not use personal email accounts (*e.g.*, Yahoo, AOL, MSN) for matters related to the Yucca Mountain project.

The following kinds of emails do **NOT** contain supporting or non-supporting information and should **NOT** be categorized as LSN-Relevant or otherwise submitted:

- Emails that solely concern the schedule or process for preparing or reviewing the license application or other documents.
- Emails that solely concern the date, time, location and topic of meetings.
- Emails that merely distribute a draft of a document for review with no substantive analysis or commentary about the draft.
- Emails that solely concern internal administrative matters such as budgets, financial management, personnel matters, office space or payroll information.
- Emails that solely concern procurement matters.
- Emails that solely concern DOE's processes to collect documents for the LSN.

B. DOCUMENTS TO BE RETAINED. While they do not need to be submitted to the ALS Contractor at this time, there are 6 categories of other documents that need to be preserved for potential use in the "derivative discovery" phase of the license proceeding. That phase will follow docketing of the license application. Unless copies of these documents are submitted to the RPC or are otherwise retained by your organization--such as by the LSN Point of Contact for your organization--you (or your organization) must retain one copy of any documents in the following 6 categories **THAT YOU CREATE**. A one-page summary of these document retention requirements is attached for reference as Attachment 2.

1. **Preliminary drafts.** If you are writing a report, study, or other document that is likely to qualify as documentary material when finalized, you must save drafts of these documents that are distributed to others for comment **AND** that are not submitted to the RPC.

2. **Marginalia on documents.** If you write on a document, you must retain that copy of the document if your notation reasonably could be construed as non-supporting information--that is, a reasonable person could think that an opposing party could use the notation to help frame or support a contention against DOE in the license proceeding. This does not mean that you must save a copy of every document that you write on. You need to retain a copy only if your notations contain substantive information that could reasonably be construed as non-supporting information in the license proceeding. The following rules also apply to and limit the scope of this retention obligation:

- If your marginal notations are comments on draft work product that will be collected and submitted to the RPC as part of a records package, you do not need to retain a copy of the draft with your notations.
- If you have submitted to the ALS Contractor a document that includes marginalia, you do not need to retain a copy.
- Highlighting and underlining are not marginalia, and you do not need to retain a copy of a document merely because you have highlighted or underlined text.

3. **Notes for personal use.** If you write a note for your personal use--either on paper or electronically--you must retain a copy of your note if it contains substantive content that reasonably could be construed as non-supporting information--that is, if a reasonable person could think that an opposing party could use the note as evidence to help frame or support a contention against DOE in the license proceeding. This does not mean that you must save a copy of all your personal notes. For example, you do **NOT** need to retain the following kinds of personal notes:

- Notes that are merely a to-do list or other type of action item list.
- Schedules or calendars, or notes that merely recite the date and topics of meetings.
- Notes that solely concern administrative or personal matters.
- Notes that merely list attendees and topics discussed in a meeting, with no substantive information pertaining to the merits of the license application.
- Notes that are reminders to call someone.

As these examples illustrate, you do not need to retain every note that you write during a meeting, presentation or phone call. You need to retain your notes **ONLY IF** they contain specific, substantive information from the discussion that could be considered non-supporting evidence.

4. **Speeches.** If you give a speech concerning the Yucca Mountain project, you (or your organization) should keep a copy of any text and presentation materials you prepared for the speech.

5. **Yucca Mountain-related travel vouchers.** If you travel on Yucca Mountain-related business, you (or your organization) should retain a copy of the travel vouchers for the trip.
6. **Offsite transportation documents.** As noted in the Call Memo, documents concerning offsite transportation of spent nuclear fuel or high-level radioactive waste to Yucca Mountain are not to be submitted to the ALS Contractor. However, if you work on offsite transportation matters, you (or your organization) must retain all documents that contain substantive information concerning the environmental effects of offsite transportation to Yucca Mountain. You do not need to retain such documents that are submitted to the RPC or that are included in the administrative record for an Environmental Impact Statement.

C. POST-PROJECT EMPLOYMENT. If you discontinue working on the Yucca Mountain project, you should advise your organization's LSN Point of Contact so appropriate arrangements can be made for the safekeeping of the documents you have retained for derivative discovery. As a general matter, if you discontinue work on the project because you are leaving the employment of DOE or a DOE contractor, the documents you have retained for derivative discovery, including personal notes, should remain in the custody of DOE or the DOE contractor, and should not be taken with you.

If you have questions concerning this guidance, contact either the LSN Point of Contact for your organization or Martha Crosland (202-586-5793) or Angela Kordyak (202-586-4301) in the Office of the General Counsel.

Attachments

SUMMARY GUIDANCE FOR LSN DOCUMENT SUBMITTAL

1. Follow project procedures for submittal of documents to the Records Processing Center (RPC). If a document is submitted to the RPC, no further action is required.
2. Submit to your organization's LSN Point of Contact all other "LSN-Relevant" documents that (i) you author or (ii) you receive from outside the Yucca Mountain project. A document is "LSN-Relevant" if it is:
 - a. A final report or study relevant to both the Yucca Mountain license application and the issues set forth in the Topical Guidelines in NRC Regulatory Guide 3.69;
 - b. A "circulated draft" of any report or study identified in item 2.a above. A "circulated draft" is a presumptively final version of a report or study distributed for organizational approval but that receives a formal, written non-concurrence; or
 - c. Any other final document that contains "non-supporting" information.
3. If you send or receive emails on the OCRWM Lotus Notes system, you do not need to retain copies of these emails because they are automatically retained. However, you must complete a template to categorize emails on the OCRWM Lotus Notes system. You should:
 - a. Categorize as "LSN-Relevant" all emails that contain "non-supporting information," *or* contain "supporting information" that could be helpful to DOE in the license proceeding, such as emails that put in context or resolve issues raised by "non-supporting" emails;
 - b. Categorize as "Privileged" all emails that you believe may contain information that is privileged under the deliberative process privilege, attorney client communication privilege, litigation work product doctrine or any other applicable privilege.
 - c. Categorize as a "Federal Record" all emails that pertain to your work for the Federal government.
4. If you send or receive an LSN-Relevant email on another system, you must either (a) send a copy to one of the addresses on the OCRWM Lotus Notes system designated for receipt of outside relevant emails; or (b) submit a copy to your organization's LSN Point of Contact.

NOTE: Consult your organization's LSN Point of Contact before you submit any documents with either Protected Personal Identifying Information or Safeguards Information.

NOTE: Do not submit documents with classified information. Preserve these documents, and contact your organization's LSN Point of Contact for instruction.

SUMMARY GUIDANCE FOR DOCUMENT RETENTION

1. Preliminary drafts. Retain a copy of drafts of potentially relevant documents if:
 - a. The draft was distributed for comment; and
 - b. A copy has not been submitted to the RPC.
2. Personal records/notes. Retain any notes or other personal records that you write if they contain substantive information that could reasonably be considered “non-supporting” of the license application.
3. Marginalia. If you write on a document, retain a copy of the document with your marginalia if the marginalia contains substantive information that could reasonably be considered “non-supporting” of the license application.
4. Speeches. Retain a copy of all speeches that you give that concern Yucca Mountain (unless your organization already retains them in a central location).
5. Travel vouchers. Retain a copy of your travel vouchers for Yucca Mountain-related business (unless your organization already retains them in a central location).
6. Offsite transportation. Retain a copy of any document that contains substantive information concerning the environmental effects of offsite transportation to Yucca Mountain (unless the document is in the administrative record of an environment statement prepared for the Yucca Mountain project or the document has been submitted to the RPC).

LSN Document Shipment Form

Custodian: _____

Date Shipped: _____

The attached document is subject to the following privileges
(mark all that apply):

____ Attorney-client communication

____ Litigation work product

____ Deliberative process

____ Protected Personal Privacy Information (PII)

____ Other privacy information

____ Proprietary privilege

____ Safeguards Information (SGI)

____ Other security privilege (OUO, UCNI, etc.)

____ Archeological privilege

**VERIFICATION FORM FOR LICENSING SUPPORT NETWORK GUIDANCE
DISTRIBUTION**

I hereby verify that I have (1) distributed the guidance from the DOE General Counsel regarding Ongoing Licensing Support Network Obligations dated November 3, 2006, to all personnel in my organization who work on matters concerning the Yucca Mountain project; (2) distributed the guidance to all contractors of my organization who work on matters concerning the Yucca Mountain project, with instructions that these contractors distribute copies to their affected personnel and subcontractors; and (3) received written verification from those contractors that they have appropriately distributed the guidance to their personnel and subcontractors. I will continue to distribute the guidance to new personnel and contractors who work on matters concerning the Yucca Mountain project.

Signature: _____

Title: _____

Date: _____

HEADER VIEW: NEV000004126 - NEV0003881



ONGOING LICENSING SUPPORT NETWORK ("LSN") OBLIGATIONS

LSN Accession # NEV000004126

Information Source NEV

Participant Accession # NEV0003881

Title ONGOING LICENSING SUPPORT NETWORK ("LSN") OBLIGATIONS

Document Date 11/03/2006

Comments

Non-Digital Media

QA Record Indicator

Of Images 12

Descriptors

Access Controls

Addressee Names OFFICE OF THE SECRETARY,OFFICE OF THE DEPUTY SECRETARY,OFFICE OF THE UNDER SECRETARY,OFFICE OF THE UNDER SECRETARY FOR SCIENCE,ADMINISTRATOR,DEPUTY ADMINISTRATOR OF NAVAL REACTORS,OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT,OFFICE OF NUCLEAR ENERGY SCIENCE & TECHNOLOGY,ASSISTANT SECRETARY FOR ENERGY EFFICIENCY & RENEWABLE ENERGY,ASSISTANT SECRETARY FOR ENVIRONMENTAL MANAGEMENT,ASSISTANT SECRETARY FOR CONGRESSIONAL & INTERGOVERNMENTAL AFFAIRS,ASSISTANT SECRETARY FOR POLICY & INTERNATIONAL AFFAIRS,DIRECTOR OF PUBLIC AFFAIRS,OFFICE OF INSPECTOR GENERAL,ENERGY INFORMATION ADMINISTRATION,OFFICE OF HEALTH SAFETY & SECURITY,OFFICE OF MANAGEMENT,OFFICE OF THE CHIEF HUMAN CAPITAL OFFICER,OFFICE OF THE EXECUTIVE SECRETARIAT NATIONAL NUCLEAR SECURITY ADMINISTRATION,,,,,,,,,,,,,

Addressee Orgs

Author Names HILL DR

Author Orgs US DEPT OF ENERGY

Document Numbers

Document Types Correspondence

Packages Ids

Related Record #s

Related Record Codes

Traceabilities

Versions

Frequently Asked Questions

Background

The Department of Energy (DOE) is responsible for implementation of the Nuclear Waste Policy Act (NWPA), Public Law 97-425, as amended. The NWPA provides for the siting, construction, and operation of a repository for the permanent disposal of high-level radioactive waste and spent nuclear fuel, in a manner that fully protects the health and safety of the public and the quality of the environment.

The President has designated Yucca Mountain, in Nevada, as the site for the first repository; the Congress has affirmed this designation. DOE is preparing an application to obtain a license from the U.S. Nuclear Regulatory Commission (NRC) to construct the Yucca Mountain repository. The NRC has issued a regulation, "Procedures Applicable to Proceedings for the Issuance of Licenses for the Receipt of High-level Radioactive Waste at a Geologic Repository," in 10 CFR 2, Subpart J, which defines the scope and process of discovery for the licensing proceeding to adjudicate DOE's anticipated license application. This regulation includes provisions that require DOE to make electronically available through the Licensing Support Network (LSN) its "documentary material" relevant to the licensing proceeding. The NRC also has issued regulatory guidance regarding the LSN, Regulatory Guide 3.69.

Purpose of the FAQs

The DOE Office of General Counsel (OGC) has provided guidance dated November 3, 2006, (OGC LSN Guidance) that addresses the ongoing LSN responsibilities of individuals and organizations working on the Yucca Mountain Project, which is managed by the Office of Civilian Radioactive Waste Program (OCRWM). Mr. Dong Kim has been designated as the DOE LSN Project Manager. This Frequently Asked Questions (FAQs) document is intended to provide additional assistance to persons working on the Yucca Mountain Project. This document is not intended as a comprehensive presentation of LSN requirements or the OGC LSN Guidance. The user should refer to the NRC regulations and guidance and the OGC guidance memoranda, which are linked to this FAQ document.

Points of Contact

As organizations involved in the repository program address their ongoing LSN responsibilities, additional questions may arise, and updates to this document may be issued. Questions can be directed to the LSN point of contact for your organization; to Ms. Martha Crosland ((202) 586-5793) or Ms. Angela Kordyak ((202) 586-4301) of the DOE OGC; or to the LSN Project Manager, Mr. Dong Kim ((202) 586-1223).

1. REGULATORY REQUIREMENTS

1a. Purpose of LSN

Q. What is the LSN?

A. The NRC regulations that govern the licensing proceeding for DOE's license application, 10 CFR Part 2, Subpart J, "Procedures Applicable to Proceedings for the Issuance of Licenses for the Receipt of High-Level Radioactive Waste at a Geologic Repository," require DOE to make available its "documentary material" on the LSN six months before DOE submits the license application. The production of documentary material on the LSN is intended to be a substitute for the traditional NRC document discovery process.

1b. NRC Guidance

Q. Has the NRC provided guidance for complying with the LSN regulations in 10 CFR Part 2?

A. Yes. In June 2004, the NRC issued Revision 1 of the Regulatory Guide 3.69, which provides NRC guidance on the scope of documentary material. This Regulatory Guide lists topics and types of documents that should be considered as potential documentary material for production on the LSN.

1c. Documentary Material – Definition

Q. What is the definition of "documentary material" that DOE must make available on the LSN?

A. There are basically three classes of documentary material:

(1) Documents with information that DOE intends to cite or rely on in the License Application, or that DOE otherwise intends to cite or rely on in the licensing proceeding (referred to as, Supporting Information);

(2) Documents in DOE's possession, or that DOE develops, that contain information that DOE is aware contradicts, is inconsistent with, or otherwise undermines the Supporting Information (referred to as Non-Supporting Information).

(3) Reports and studies developed by DOE that contain information on the topics addressed in Regulatory Guide 3.69 and relevant to the License Application, regardless of whether they contain Supporting or Non-Supporting Information and also regardless of whether DOE intends to cite or rely on them.

1.d Segregating and Retaining Documents – Purpose

Q. What is the purpose of segregating and retaining documents that are not submitted for potential inclusion in the LSN?

A. In addition to the LSN, other forms of discovery will be available to the parties during the NRC licensing process. Certain classes of documents – as set forth in the OGC LSN Guidance – must be preserved for potential use during the “derivative discovery” phase of the licensing proceeding.

1e. Segregating and Retaining Documents – Individual and Organizational Responsibilities

Q: With whom does the responsibility lie for segregating and retaining documents?

A: You are responsible for ensuring documents you author, or receive from outside the project, are retained in accordance with the OGC LSN Guidance. You must personally retain these documents unless your organization has alternative arrangements for retaining the documents. If you stop working on the Yucca Mountain Project, you are responsible for advising your organization’s LSN Point of Contact of any documents you have retained for potential derivative discovery, so arrangements can be made for their preservation.

2. DOE GUIDANCE

2a. DOE Direction

Q. Has the Department provided direction on which documents should be submitted for inclusion in LSN and through what process they should be provided?

A. Yes. Since 2002, the DOE Office of General Counsel has provided guidance regarding DOE's LSN obligations. On November 3, 2006, the DOE General Counsel issued a memorandum entitled "Ongoing Licensing Support Network Obligations" (the OGC LSN Guidance). This guidance clarifies ongoing document submittal and retention obligations of personnel working on matters related to the Yucca Mountain Project. As directed by OGC and DOE management, **the November 2006 memorandum should be used as the primary reference for ongoing DOE LSN obligations of personnel in affected DOE and contractor organizations working on the Yucca Mountain Project.**

2b. Records Management Procedure – Effect on LSN Submittal and Retention Obligations

Q. How does the recently revised Records Management procedure (AP 17.1Q) affect the submittal of documents for the LSN and the retention of other documents for derivative discovery?

A. Individuals that perform Yucca Mountain Project work that is subject to procedures that require records to be submitted to the Records Processing Center (e.g., Procedure AP 17.1Q) must follow those procedures. When submitting records to the Records Processing Center, the organization's Records Coordinator must designate on the transmittal form whether they are LSN-Relevant and whether they contain privileged information. Submitting a document to the Records Processing Center fulfills the owner's LSN obligations with regard to that document. The Records Processing Center staff will review submitted documents and forward copies as appropriate for inclusion in LSN. Also, you do not need to retain copies of documents submitted to the Records Processing Center for potential use in derivative discovery, since the Records Processing Center will permanently retain a copy of such documents.

2c. Guidance for Work Not Subject to OCRWM Procedures

Q. What are the submittal requirements for work products that are not subject to the OCRWM Records Management procedures?

A. DOE and contractor personnel who create a document that is not subject to OCRWM Records Management procedures are required to submit a copy of the document, once finalized, to their organizations' LSN Point of Contact IF the document is LSN-Relevant. Each document should be accompanied by a copy of the submittal form attached to the OGC LSN Guidance, on which the privileges, if any, thought to be applicable to the document should be noted.

2d. Emails — Obligations for Emails Sent or Received on the OCRWM Lotus Notes System

Q. What guidance has been given for applying the Managing Electronic Mail Records procedure (AP 17.3Q) to the submittal of documents for LSN?

A. AP 17.3Q provides a procedure to ensure that email records are appropriately created, retained, and dispositioned. OCRWM Lotus Notes email account users must use the template within Lotus Notes to categorize for potential relevance and privilege each email they send, as well as each email they receive from outside that system. All emails categorized as potentially relevant are sent to DOE's Automated Litigation Support (ALS) Contractor, which fulfills the submittal requirement for such emails.

2e. Emails – Obligations for Emails Sent or Received Outside the OCRWM Lotus Notes System

Q. What are the LSN submittal obligations for emails neither sent nor received on the OCRWM Lotus Notes system?

A. Personnel at affected DOE organizations and contractors without OCRWM Lotus Notes email accounts are required to submit LSN-Relevant emails from their respective email systems. They can do so by sending a copy to one of the OCRWM Lotus Notes addresses established to capture external email. For example, personnel working for the lead lab should cc: "lead_lab@notes.ymp.gov"; others may cc: "ocrwm_rpc@notes.ymp.gov. Alternatively, emails can be submitted in paper or electronic form to the organization's LSN Point of Contact, using the transmittal form provided in the November 3, 2006, DOE OGC guidance.

Personal email accounts should not be used for matters related to the Yucca Mountain Project.

3. INDIVIDUAL AND ORGANIZATIONAL RESPONSIBILITIES FOR SUBMITTING DOCUMENTS FOR INCLUSION IN LSN

3a. Individual Responsibilities — General

Q. Is each individual participant in the Yucca Mountain Project responsible for submitting potentially relevant documents for inclusion in the LSN?

A. Yes. Each individual is responsible for:

- Submitting documents to the Records Processing Center (if subject to OCRWM Procedure AP 17.1Q) and identifying the potential relevancy and privilege status of those documents
- Submitting to the organization's LSN Point of Contact any other LSN-Relevant documents the individual creates or receives from sources outside the Yucca Mountain Project
- Categorizing emails using the ERMS template on the OCRWM Lotus Notes system
- Submitting LSN-Relevant emails from other email systems

3b. Individual Responsibilities – Documents Received from Others

Q. If I am the recipient of and not the author of a potentially LSN-Relevant document, do I still have to submit it?

A. If the author of the document is a Yucca Mountain Project participant, then the author is responsible for submitting the document. Each project member has the independent duty to submit LSN-Relevant documents which that member authors or receives from outside the project. You are required to submit LSN-Relevant documents authored by someone else only if that person is not a Yucca Mountain Project participant.

3c. Individual Responsibilities -- Email

Q. Are email messages potentially relevant to the licensing proceeding for Yucca Mountain required to be submitted for inclusion in the LSN?

A. Yes. NRC defines the term “document” to include emails, so email messages and attachments that meet the regulatory definition of “documentary material” must be made available in the LSN.

The OCRWM Lotus Notes electronic mail system is an official OCRWM project record-keeping system. Users should use this system to create, maintain, use, and disposition email records in accordance with AP 17.3Q. Users with OCRWM Lotus Notes email accounts must complete the categorization template supplied upon creation of the e-mail (or receipt of email from outside sources) to categorize the e-mail for LSN relevance and privilege.

Users who do not have OCRWM Lotus Notes email accounts can submit LSN-Relevant emails from other email systems by sending a copy to one of the OCRWM Lotus Notes addresses established to capture external email. For example, personnel working for the lead lab should cc: “lead_lab@notes.ymp.gov”. Alternatively, emails can be submitted in paper or electronic form to the organization’s LSN Point of Contact, using the transmittal form provided in the OGC LSN Guidance. Personal email accounts should not be used for matters related to the Yucca Mountain Project.

3d. Email Exclusions

Q. What types of email should not be treated as LSN-Relevant?

A. Emails should be treated as LSN-Relevant only if the email message or its attachments contain either Supporting or Non-Supporting Information. The following kinds of emails do **NOT** contain Supporting or Non-Supporting Information and should **NOT** be categorized as LSN-Relevant:

- Emails that solely concern the schedule or process for preparing or reviewing the License Application or other documents
- Emails that solely concern the date, time, location and topic of meetings
- Emails that merely distribute a draft of a document for review with no substantive analysis or commentary about the draft
- Emails that merely distribute copies of reports or studies (as the record copies of these reports or studies are to be submitted to the Records Processing Center for inclusion in the LSN)
- Emails that solely concern internal administrative matters such as budgets, financial management, personnel matters, office space or payroll information
- Emails that solely concern procurement matters
- Emails that solely concern DOE’s processes to collect documents for the LSN

3e. Privileged Information in Emails

Q. How should privileged information in emails be handled?

A. LSN-Relevant emails that contain any potentially privileged information, including privacy-protected information or information that is sensitive unclassified, must be accompanied by the notation that they are privileged. The Lotus Notes email template prompts the user to designate whether an email is privileged. It is also recommended that the sender state the privileged status of the email in the subject or body of the email.

3f. Individual Responsibilities – Electronic Records

Q. How should electronic records be submitted for inclusion in the LSN?

A. Individuals performing work under AP 17.1Q should submit records to the Records Processing Center in accordance with that procedure by providing a file directory listing

all files contained on the electronic media and two copies on compact disks, digital videodiscs, DLT, or 3-1/2" diskettes (see Attachment 1 of the procedure). LSN-Relevant records are to be submitted to the Records Processing Center within 14 calendar days of completion. Submittal to the Records Processing Center fulfills the obligation to submit the electronic records with regard to LSN. Individuals working for organizations not subject to OCRWM's Records Management procedures should provide electronic files on disk to the organization's LSN Point of Contact.

3g. Electronic Documents with Hidden Text

Q: If I submit an electronic Word file for which the "track changes" function has been activated, will the "track changes" information (specifically edited information, superseded text, or comments) appear when the file is made available on the LSN?

A: Yes. The process the Automated Litigation Services (ALS) Contractor uses to format electronic files for production on the LSN captures all metadata text associated with an electronic file, including hidden information such as comments and modifications. Because drafts are not required to be produced on the LSN, it is not necessary to produce the edited information. Therefore, you should print out the document and submit a paper copy as required by the Records Processing Center. For certain types of data that are not easily printed, submit the electronic document with the metadata (i.e. edited information) removed.

3h. Replacing Documents with Hidden Text

Q: I have submitted an electronic document to the ALS Contractor in the past that contains metadata (i.e. edited information) that is not relevant but is privileged. Can I replace the document with another version that does not contain the metadata (i.e. edited information)?

A: Possibly. Contact the OCRWM Information Center at 1-800-255-6972 and provide them with specific document identification information and the privileged information of concern included. If the document has been released on the LSN, then the participant accession number is the best way to uniquely identify the document. Removal of the document or protection of the privileged information depends on where the document is in production. You will be contacted by the ALS Contractor if resubmittal or additional actions are required

3i. Individual Responsibilities – Paper Documents

Q: What are the responsibilities with regard to submittal of paper records?

A: Individuals who perform Yucca Mountain Project work that is subject to procedures that require records to be submitted to the Records Processing Center (e.g., Procedure [AP 17.1Q](#)) must follow those procedures. LSN-Relevant records are to be submitted to the Records Processing Center within 14 calendar days of completion. When submitting records to the Records Processing Center, the organizational Records Coordinator must designate on the transmittal form whether they are considered LSN-Relevant and contain potentially privileged information. Submitting a document to the Records Processing

Center fulfills the LSN obligations with regard to that document, and a copy does not need to be retained for potential derivative discovery. The Records Processing Center staff will review all submitted documents and forward copies as appropriate to the ALS Contractor for inclusion in LSN.

3j. Organizational Responsibilities – Records Belonging to Former Employees

Q. Is the organizational LSN Responsible Manager responsible for reviewing the archived personal records of people no longer employed by the Responsible Manager's organization to identify, segregate, and ship potentially LSN-Relevant documents?

A. Assuming such archived records have not already been reviewed for LSN-Relevance, the organization's LSN Responsible Manager is obligated to ensure that appropriately trained personnel review the documents and submit those that are potentially LSN-Relevant.

4. DRAFT AND FINAL DOCUMENTS

4a. Draft Documents

Q. Are draft documents required to be submitted for inclusion in the LSN?

A. With one exception, draft documents are **NOT** required to be submitted for inclusion in the LSN. Only final versions are required to be submitted. The one exception is the "circulated draft" of a report or study. A "circulated draft" is defined at 10 CFR 2.1001 as "a nonfinal document circulated for supervisory concurrence or signature in which the original author or others in the concurrence process have non-concurred." As defined by the NRC, this definition refers to reports and studies that have received an official non-concurrence in a process similar to DOE's formal concurrence procedure.

NOTE: The only documents that can potentially be a "circulated draft" under the LSN regulations are reports and studies. Drafts of other kinds of documents (e.g., memoranda, letters) cannot qualify as a "circulated draft."

NOTE: Although drafts are excluded from the LSN, drafts of documents that are likely to qualify as LSN-Relevant when finalized should be segregated and retained.

4b. Final Documents

Q. When does a document become a "final document?"

A. A document becomes a "final document" when all work on that document by the authoring organization is completed. A document may be a "final document" regardless of whether it is published or issued for distribution by the authoring organization.

4c. Nonconcurring Comments

Q. If pen-and-ink comments on a document clearly state "won't concur for X reason," should that document be considered a "circulated draft"?

A. Such a draft does not qualify as a "circulated draft" unless the document is (1) a report or study; and (2) the non-concurrence was part of a formalized process, and (3) the decision-making process on the document is completed.

4d. Comments on Draft Documents

Q. Do pen and ink mark-up comments on preliminary draft documents potentially relevant to the Yucca Mountain licensing proceeding need to be submitted?

A. No. If such comments appear as a physical mark-up on the draft document, the document remains a preliminary draft and does not need to be submitted. If the document or comments are potentially relevant to licensing, they should be segregated and retained.

4e. Comments Provided Separately from a Document

Q. Do comments submitted separately from the document being commented upon (e.g., a list of comments transmitted in an email) need to be submitted?

A. A document providing stand-alone comments (as opposed to interlinear or handwritten comments on the draft itself) is regarded as a final document and must be categorized as LSN-Relevant if such comments are substantive and potentially contain Non-Supporting Information.

4f. Comments on Final Documents

Q. Do documents that provide comments on final documents potentially relevant to the Yucca Mountain licensing proceeding need to be submitted?

A. Such comments must be submitted if the substance of the comments contains potentially Non-Supporting Information.

5. DOCUMENTS FROM SPECIFIC SOURCES

5a. Documents in RIS

Q. Do copies of documents in the possession of DOE offices, contractors, or laboratories, which are known to be in the OCRWM Records Information System (RIS or RISWEB) or are slated under project procedures to be submitted to those databases, need to be submitted to the ALS Contractor?

A. No. The ALS Contractor will obtain those documents from the Records Processing Center.

5b. Archived Documents

Q. Do potentially LSN-Relevant documents stored in archives need to be reviewed and submitted for inclusion in the LSN?

A. Yes, unless they already have been reviewed in connection with prior document collection activities for the LSN. This includes documents in off-site storage or records centers. The indices of what is stored in archives may be helpful in identifying potentially relevant documents.

5c. Contractor-Prepared Reports

Q. Are reports prepared by a contractor pursuant to a contract Statement of Work final documents?

A. If the report is produced and made available to DOE as the final deliverable product under a contract, that report is a final document.

5d. Other Contractor-Prepared Documents

Q. Are other contractor-prepared documents required to be submitted?

A. Yes, if LSN-Relevant. Any contractor-prepared documents that are final documents potentially relevant to the licensing of Yucca Mountain and that fall within the definition of "documentary material" in the NRC regulations at 10 CFR 2.1003 are required to be submitted.

5e. Documents From External Organizations

Q. Are documents in DOE's possession from other Federal agencies, State and local governments, and Indian tribes required to be submitted for inclusion in LSN?

A. Yes, if the documents are LSN-Relevant.

5f. Congressional Correspondence

Q. Should Congressional correspondence about Yucca Mountain be submitted?

A. No. Correspondence between DOE and the Congress of the United States (including congressional staff personnel) is excluded by 10 CFR 2.1005(i).

5g. Expert, Peer Review, or Advisory Panels or Boards

Q. Should documentary material created by expert, peer review, and advisory panels or boards, (e.g., the Igneous Consequences Peer Review Panel) be submitted for inclusion in LSN?

A. Yes, to the extent they create final documents with LSN-Relevant content.

5h. Official Notice Material Originating Outside OCRWM

Q. Should official notice material be submitted for inclusion in LSN?

A. No. Official notice material is excludable from the LSN pursuant to the general exclusion criteria contained in 10 CFR 2.1005. Examples of official notice material are:

- Federal Register notices
- Government-wide guidance documents, such as OMB circulars
- DOE Orders
- DOE-wide guidance documents, such as DOE Standards, the Radiological Control Manual, etc.
- DOE-wide distribution of draft Orders or proposed revisions to Orders for comment
- Other Federal agency regulations, guidance, or proposed rules such as those from EPA and OSHA
- Congressional Record excerpts

5i. Records of Court Proceedings and Hearings

Q. Should official transcripts and exhibits of court proceedings or agency hearings and any related depositions be submitted for inclusion in LSN?

A. No.

6. DOCUMENTARY MATERIAL FORMATS

6a. Presentation Materials

Q. Should presentation materials (e.g., viewgraphs, slides, charts, etc.) be submitted for inclusion in the LSN?

A. Yes, if the content of those materials is LSN-Relevant. Whether a document is LSN-Relevant depends on its content, not its form.

6b. Photographs and Videos

Q. Should photographs and videos be submitted for inclusion in LSN?

A. Yes, if the content of the photographs and videos is LSN-Relevant.

6c. Personal Notes

Q. Are personal notes required to be submitted for inclusion in LSN?

A. No. However, electronic and paper notes that contain substantive content that reasonably could be construed as Non-Supporting Information must be segregated and retained by the author for future derivative discovery purposes.

Personal notes that do not contain substantive content or cannot otherwise be reasonably construed as Non-Supporting Information do not need to be retained for purposes of the Yucca Mountain licensing proceeding. For example, the following types of personal notes do **NOT** contain Non-Supporting Information and do **NOT** need to be kept for purposes of the Yucca Mountain licensing proceeding:

- Notes that are merely to-do lists or other types of action item lists
- Schedules or calendars, or notes that merely recite the date and topics of meetings
- Notes that solely concern administrative or personal matters
- Notes that merely list attendees and topics discussed in a meeting, with no substantive information
- Notes that are reminders to call someone.

7. DOCUMENT TOPICS: SCIENTIFIC, TECHNICAL, AND REGULATORY ACTIVITIES

7a. Quality Assurance – Software Validation

Q. Are documents related to validation and verification of software used in support of the Total System Performance Assessment required to be submitted for inclusion in LSN?

A. Yes. Such documents are part of DOE's Quality Assurance program and are required by 10 CFR 63, Subpart G--Quality Assurance. See also Supplement I to DOE's Quality Assurance Requirements and Description (QARD) DOE/RW-0333P.

7b. Research and Development – Science and Technology Program

Q. Is the OCRWM Science and Technology Program exempt from LSN requirements?

A. No. Final documents created by the program that contain content that qualifies them as LSN-Relevant must be submitted.

7c. Reviews – Expert, Peer Review, or Advisory Panels or Boards

Q. Are documents related to expert elicitation and peer review required to be submitted for inclusion in LSN?

A. Yes, if they are final versions of documents and contain content that qualifies them as documentary material. Documents concerning the administration of such processes are not LSN-Relevant.

8. PRIVILEGED, CLASSIFIED, AND CONTROLLED DOCUMENTS

8a. Classified Documents

Q. Should classified documents be submitted for inclusion in LSN?

A. No. Classified material (restricted data and national security information) is excluded from the LSN under 10 CFR 2 Subpart I. Do not submit documents containing classified information even if they are LSN-Relevant. Contact your organization's LSN POC to receive instructions.

8b. OUO Documents

Q. Do potentially LSN-Relevant "official use only" (OUO) documents need to be submitted?

A. Yes. LSN-Relevant OUO documents are one category of privileged documents and will be handled according to the public disclosure exemptions appropriate for such documents. Such documents should be submitted to the ALS Contractor segregated from other potentially LSN-Relevant documents. Both the boxes and the documents should be clearly labeled as privileged.

8c. Privileged Information on LSN

Q. How will privileged documents be presented in the LSN?

A. For documents with privileged information, an electronic bibliographic header will appear on the LSN, and the text of the document will either be excluded altogether or available in redacted form with the privileged information removed.

8d. Privileged Information

Q. What information is considered privileged, and how should it be handled?

A. In its Second Case Management Order, the NRC Pre-license Application Presiding Officer (PAPO) Board defined "primary privilege" as (1) the attorney-client privilege, (2) the litigation work product privilege, and (3) the deliberative process privilege. Secondary privileges include exceptions from disclosure for such things as (4) privacy, (5) proprietary information, (6) law enforcement, and (7) archaeological protection concerns. Each category of privileged information has specific requirements that must be met in order to claim the privilege.

When submitting a document to the Records Processing Center, the submitting organization's Records Coordinator must note on the transmittal form whether the document is believed to be privileged. The document itself should also be marked as privileged. For documents submitted to an organization's LSN POC rather than to the Records Processing Center, each document should be accompanied by the LSN

Document Shipment Form (included as an attachment to the OGC LSN Guidance), which requires the submitter to identify any applicable privileges.

8e. Safeguards Information

Q. How should LSN-Relevant documents containing safeguards information be handled?

A. Safeguards information is information that is authorized by Section 147 of the Atomic Energy Act of 1954, as amended, to be protected from inadvertent release and unauthorized disclosure, and is further governed by 10 CFR Part 73. If you plan to submit to your organization's LSN Point of Contact an LSN-Relevant document that contains safeguards information, you must notify your LSN Point of Contact in advance so that special arrangements can be made.

8f. Protected Personal Identifying Information

Q. What is Protected personally identifiable information (PII) and how should it be handled?

A. Protected PII is information that can be used to distinguish, or trace, an individual's identity, such as their SSN, date and place of birth, mother's maiden name, personal financial information, biometric records, medical history, and any other personal information that is linked, or linkable, to an individual (or that could be used for identity theft).

As a rule, Protected PII should not be included in the LSN. If you plan to submit LSN-Relevant documents containing Protected PII, you must identify those documents to your organization's LSN Point of Contact in advance so that special arrangements can be made.

8g. Removing Personal Identifying Information

Q. If Protected PII is already in the LSN, can it be removed?

A: If you are aware that PII has been submitted for inclusion in DOE's LSN collection, call (800) 225-6972 to identify the document and request removal or redaction.

Questions? Comments?

Contact Ms. Martha Crosland ((202) 586-5793) or Ms. Angela Kordyak ((202) 586-4301) of the DOE OGC; or Dong Kim, LSN Project Manager ((202) 586-

1223).

NOTE:

Though current when inserted in this document, the links below are not live-linked to the project's Controlled Document Information System, and may not contain the most current revision of the linked document. It is your responsibility to ensure you are using the most current revision of project procedures prior to conducting activities governed by the procedure.

Quality Assurance Requirements and Description (DOE/RW-0333P)



QARD.pdf (762 KB)

Records Management (AP-17.1Q)



AP17-1Q R4
ICN4.pdf (534 KB)

Managing Electronic Mail Records (AP-17.3Q)



AP17-3Q R0
ICN3.pdf (313 KB)

Department of Energy Office of General Counsel License Support Network Guidance



OGC LSN
uidance.pdf (599 KB)

Exhibit 22

Exhibit 22

**Summary of the History and Status of TSPA for Yucca Mountain
March 12, 2007
Peter Swift**

Brief history of TSPA for Yucca Mountain

Viability Assessment: Iterations of TSPA for Yucca Mountain began in the latest 1980s, and the first complete system analyses were in the early 1990s. These early TSPAs culminated in a large effort supporting the 1998 Viability Assessment (VA), which provided an assessment of the viability of the site that led to a decision by the DOE to proceed with the site recommendation process.

The TSPA-VA (1998) received a detailed external review by an external panel chaired by Chris Whipple, completed in 1999. Copies of that review will be provided to the panel.

Site Recommendation and Environmental Impact Statement: In 2000 and 2001, the DOE prepared a TSPA to support the Site Recommendation, TSPA-SR. The origins of the current TSPA are readily visible in the TSPA-SR. TSPA-SR was reviewed by an International Review Team (IRT) in 2001. Mel Gascoyne was a member of that review panel. The IRT review is available on the internet at http://www.ocrwm.doe.gov/documents/ymipr_a/index2.htm and copies will be provided to the IPAR.

This TSPA was updated in 2001 with supplemental science and performance analyses (SSPA) to provide a more realistic treatment of uncertainty (with relaxed conservatism), and the TSPA-SSPA provided the basis for the 2002 Final Environmental Impact Statement (FEIS) that accompanied the 2002 Site Recommendation. TSPA-SR and TSPA-FEIS together form the last published version of the TSPA.

TSPA work since 2002: All TSPA work since 2002 is unpublished, and all is categorized by the DOE General Counsel as privileged, in anticipation of future litigation. No results have been presented in public since 2002, and all TSPA-related material provided to this panel that postdates the TSPA-FEIS must be treated as privileged.

Following the Site Recommendation in 2002, DOE began a schedule of work that would lead to submittal of a license application (LA) to the NRC in December 2004. Preparation of the LA included an update to the TSPA-FEIS to fully qualify models used in the SSPA (the 2001 SSPA used a more realistic treatment of uncertainty that included a relaxing of the model validation requirements believed necessary for licensing). This work led to completion of a draft TSPA-LA Rev 00 in December 2004; however, the DOE chose, for multiple reasons, to delay submittal of an application until the fall of 2005, and work continued on updates to the TSPA. This eventually became TSPA-LA Rev 01E, which was archived in May 2006 without publication and which will not be used to support a license application.

Deliberative Process Privileged

As part of the preparation of TSPA-LA in 2004, the DOE convened an “Independent Validation Review Team” (IVRT) that was tasked with evaluating the adequacy of the TSPA-LA model with respect to a broad range of criteria, and in accordance with specific model validation requirements specified by the DOE quality assurance program. Charles Fairhurst was a member of the IVRT. The chair and co-chair of the panel, Mel Marietta and Tito Bonano, are currently working for the Lead Laboratory as a senior advisor and Licensing Manager, respectively. The final report of the IVRT will be provided to the IPAR.

The IVRT reviewed the 2004 iteration of the TSPA-LA, and found it adequate to support licensing, with reservations. When the 2004 LA submittal was delayed until the fall of 2005, the project undertook additional work to address IVRT concerns, and the IVRT itself reconsidered its initial conclusion. In August 2005, the IVRT provided a draft report to the project in which it concluded that the 2005 iteration of the TSPA should not be used to support a license application. After iterating with the IVRT during the fall of 2005, the project prepared the TSPA-LA Rev 001E draft report that included both project’s best and final documentation of that iteration of the TSPA and the IVRT’s final report (still concluding that the TSPA-LA was not suitable for use in licensing as it then stood). That report will be provided to the IPAR on DVD: it is many thousands of pages in total length.

Beginning in February 2006, the project undertook new work in various areas of postclosure science in response to multiple factors, including the IVRT conclusion, but also including development of a million-year model in response to the newly-proposed EPA and NRC rules (note that the IVRT did not review a 1-million-year model), design changes to the waste package, and modeling changes derived from the development of a new infiltration model required to address concerns over the pedigree of the model the project had been using. The DOE also announced plans in January 2006 to transition management of the postclosure science programs, including TSPA, from Bechtel-SAIC Company to Sandia National Laboratories, serving as the Lead Laboratory for the DOE Office of Civilian Radioactive Waste Management. This transition occurred October 1, 2006.

The current TSPA that the IPAR will review is derived closely from the 2006 TSPA-LA-Rev 01E, but it will have significant updates in most model components, based in part on responses to the IVRT concerns and also on new information from multiple sources. The model will now be run to 1 million years, consistent with the proposed EPA and NRC regulations.

Current Status of TSPA

The TSPA-LA that the IPAR will review is in the final stages of model development. Model changes are final in almost all areas, and specification of parameter input values will be complete by the end of March. Documentation of the inputs to the TSPA will be

Deliberative Process Privileged

provided to the IPAR after the March 26-28 meeting, in the form of draft Model and Analysis Reports (AMRs) and TSPA Data Input Packages (TDIPs).

We anticipate beginning system-level calculations with the new model in early April, and we anticipate having preliminary results in late May, available for the IPAR to review at their second meeting. We anticipate having final results in August 2007, ready for IPAR review at their third meeting.

The current project schedule calls for TSPA results to be released for public comment as part of the Draft Supplement to the Environmental Impact Statement in October 2007. Final documentation of the TSPA-LA will occur in the fall of 2007, and text and results will be incorporated in the Safety Analysis Report (the primary component of the License Application) for delivery to DOE in January 2008. DOE anticipates delivering the License Application to NRC no later than June 30, 2008.

LSN Accession # DN2002440331
Information Source DN2
Participant Accession # ALA.20070515.5253
Title Privileged Summary of the History and Current Status of TSPA
Document Date 03/12/2007
Comments
Non-Digital Media
QA Record Indicator
Of Images 3
Descriptors
Access Controls
Addressee Names
Addressee Orgs
Author Names
Author Orgs
Document Numbers
Document Types EMAIL-ATT
Packages Ids
Related Record #s ALA.20070515.5252,ALA.20070515.5021
Related Record Codes ATT-TO,ATT-TO
Traceabilities
Versions

Exhibit 23

Exhibit 23

In conjunction with an upcoming audit of the TSPA, the Lead Lab has asked whether the Draft TSPA-LA AMR and technical input documents for the TSPA (such as TDIPs) are privileged. The following provides guidance on these questions.

- Drafts of documents are subject to withholding under Exemption 5 of the Freedom of Information Act (FOIA) as preliminary, predecisional documents. Additionally, the NRC regulations for the Licensing Support Network (LSN) expressly exclude all drafts from the LSN (with the exception of "circulated drafts" of reports and studies, which does not apply to this context as a practical matter). 10 CFR 2.1019 (i) (2). Therefore, the Draft TSPA-LA AMR and drafts of any technical input documents are not required to be released under FOIA. Nor are they required to be made available on the LSN. The withholding of these documents from non-Yucca Mountain personnel during the audit of the TSPA would be consistent with the protected status of these documents.
- Once a technical document such as an AMR or TDIP is finalized under project procedures, it is no longer a draft and therefore no longer exempt from disclosure under exemption 5. Similarly, if the document meets the criteria for documentary material in 10 CFR 2.1001, the final version of the document must be included on the LSN at the time of DOE's certification. However, this applies to the final version of the technical document only. The drafts of the document remain exempt from FOIA and the LSN even though the document has been finalized.

5/22/07

LSN Accession # DN2002431184
Information Source DN2
Participant Accession # ALA.20070712.1698
Title Draft guidance on TSPA and DPP_v1
Document Date 05/22/2007
Comments
Non-Digital Media
QA Record Indicator
Of Images 1
Descriptors
Access Controls
Addressee Names
Addressee Orgs
Author Names
Author Orgs
Document Numbers
Document Types EMAIL-ATT
Packages Ids
Related Record #s ALA.20070712.1696
Related Record Codes ATT-TO
Traceabilities
Versions

Exhibit 24

Exhibit 24

Charles Fitzpatrick

From: Dan Graser [Dan.Graser@nrc.gov]
Sent: Wednesday, February 20, 2008 6:56 AM
To: Charles Fitzpatrick
Cc: Matthew Schmit
Subject: RE: NEI's Total LSN Database Population

666

From: Charles Fitzpatrick [mailto:cfitzpatrick@nuclearlawyer.com]
Sent: Monday, February 18, 2008 10:24 AM
To: Dan Graser; Matthew Schmit
Subject: NEI's Total LSN Database Population

Mr. Graser...the recent six-month report from LSNA to the Commission reported the ADDITIONAL numbers of documents added by each participant to its LSN collection, during 2007. Earlier "load statistics" from your office which I have seen on the "Announcements" link on the LSN show total populations and DOE populations of the LSN for various periods. I have not been able to locate total current populations of individual participants, in particular that of NEI. A search of the NEI database for all documents suggests the total is 660, but those "search by date" numbers are sometimes inaccurate, especially when large numbers are in question. Could you or Matt please confirm the current population of NEI's LSN collection? Thank you very much.

Charles J. Fitzpatrick
Egan, Fitzpatrick & Malsch, PLLC
Phone: 210.496.5001
Fax: 210.496.5011
cfitzpatrick@nuclearlawyer.com
www.nuclearlawyer.com

This e-mail and any files transmitted with it are confidential and are intended solely for the use of the individual or entity to which they are addressed. This communication may contain material protected by the attorney-client privilege. If you are not the intended recipient or the person responsible for delivering the e-mail to the intended recipient, be advised that you have received this e-mail in error and that any use, dissemination, forwarding, printing, or copying of this e-mail is strictly prohibited. If you have received this e-mail in error, please notify me immediately.

2/20/2008

Exhibit 25

Exhibit 25

NEI Doc

From: Kessler, John [JKESSLER@epri.com]
Sent: Friday, October 26, 2007 8:29 AM
To: Rossref@aol.com
Cc: McCULLUM, Rodney; Mick Apted; Eileen Supko
Subject: RE: Feigenbaum on TSPA

Thanks, Al, for the party line.

John

From: Rossref@aol.com [mailto:Rossref@aol.com]
Sent: Friday, October 26, 2007 2:27 AM
To: Kessler, John
Subject: Feigenbaum on TSPA

John -

Here is the comments made by Ted Feigenbaum on the latest TSPA situation.

"You may have heard that the TSPA model is going to be rerun by Sandia. During the checking of the draft TSPA model report, some inconsistencies were identified that were determined to be significant enough to warrant re-running the model to evaluate compliance with the post-closure standards. The additional analyses are intended to be documented in an addendum to the TSPA model report and are expected to enhance the quality of the report.

Re-running the TSPA and completing the addendum will add a few weeks to Sandia's schedule for delivering two of its sections to BSC - the two that require information from the TSPA model report. The effect of these additional weeks is being incorporated into our schedule.

The results needed from the re-run will only affect those two LA sections. BSC will continue to complete LA sections within our control per our original schedules. We are closely monitoring progress and making resource adjustments as needed. We have the right people, the right plans, and the right resources to complete high quality products to support our customers plans for a June 30, 2008 LA delivery to the NRC."

See what's new at AOL.com and [Make AOL Your Homepage](#).

Exhibit 26

Exhibit 26

LAB ACTIVITY
CUA Corrosion
3/19/2001 - 12/31/2002

Notebook Designation CUA-QAN-8407
Title Daily Activity Notebook
Volume Number 1

Address 001 Maloney Hall, CUA, Wash, DC
20064
National® Brand
Computation Notebook
11 3/4" x 9 1/4", 4 x 4 Quad., 75 Sheets **43-648**



0 73333 43648 8



EVERY DENNISON
Office Products
Chicopee, MA 01022

Monday, March 19, 2001

C-22

8407-2

GMI

Karen M. Neelam

8:00 Boil 3 PTFE liners in Deionized Water - for C-22 w/bands

8:09 Record oven temperatures

8:14 Make test solutions for I75, I77, I79, I81
I83, I85, I87, I89, I91, I93

8:41 Change di. water for boiling liners

9:02 Record pH of I75-I93 before test solutions (DET-QAN1012
pH notebook)

9:25 Change di water for boiling liners

9:35 Cut and mount I506 and I556 for metallography

11:30 Plug in Lestrade Lindberg Blue M 2126-50863 J-2K
set to 230°C

3/19/01 KMN

KMN

Thursday, June 14, 2001

8407-02	7:49	Record oven temperatures	KMN
GMI YMP	8:02	Remove I160, I161 from Watson	KMN
	8:03	Masking experiment	KMN
	8:15	Remove I141, I127 EDTA from Manna Blue	KMN
	8:33	Observe I171, I173, I181. See DEFOAN 012 vol 1	KMN
	8:57	Record oven temperature of Heraeus 6A	DSW
	8:57	Remove I168b from Heraeus 6A	DSW
	9:01	Remove I167a, I167b, I169b from Lestrade	DSW
	9:03	Remove I169a from Manna	DSW
	9:04	Remove I168a from ^{old flask} Watson	DSW
	9:35	Take digital pictures of I171, I173, I181 vials	KMN
	10:29	I171, I173, I181 back in Holmes	KMN
	10:30	Remove I160, I161 disks from solutions	KMN
	10:56	Open I167, I168, I169 for observations and pH measurements	DSW
	11:02	Remove I141, I127 vials from EDTA solution	KMN
	11:10	Weigh I127, I141. See balance notebook vol 2	KMN
	11:20	Send I160, I161 BFAF solutions & I141, I127 EDTA solutions to Adel for ICP	KMN
	11:34	Dimension I127, I141. See Cliper notebook vol 1	KMN
	11:40	Take digital pictures of I168b, I169	DSW
	11:47	Clean	KMN
	12:16	Closed I167 I168 I169	DSW

Notebook Designation CUA-QAN-8407

Title Daily Activity Notebook

YMP project notebook

Volume Number 2

Department Oxides Group, Dept of Chemistry

Subject Daily Activity Notebook

Name CUA-QAN-8407 vol 2

Address 001 Maloney Hall

National® Brand

Computation Notebook

11³/₄" x 9¹/₄", 4 x 4 Quad., 75 Sheets

43-648



0 73333 43648 8



Office Products
Chicopee, MA 01020

Monday, August 27, 2001 8407-02 GMI YMP

8:10 Record oven temperatures. See CUA-QAN-004 vol 1-2 KMW

9:00 dissolve J5 EDTA and Ascorbic Acid KMW

9:50 Put J6 - J13 EDTA into Heraeus GA KMW

10:10 Iodine / H₂O₂ determination KMW

11:40 Vibro-etch A59a-m, A59b-m, A70a-m, A70b-m, A70d-m, A70c-m KMW

12:05 Clean KMW

8/27/01
KMW

Department CUA - QAN - 8407

Subject Daily Activity NB

Name EMP Project NB

Address vol 3

National Brand

Computation Notebook

11 1/2" x 9 1/4", 4 x 4 Quad., 75 Sheets

43-648



0 73333 43648 8



Office Products
Chicopee, MA

2

Tuesday, February 19, 2002

8407-02 GMI VMP

8:09 Record oven temperatures as per DEI-QAP-244 r.o. See CUA-QAN-004 vol 1+2 KMW

8:34 Send 10.0 mL samples of EJ-13 12/4/01, JS3, J70 to be re-analyzed as per DEI-QAP-8407-02-2 r.l. sec 4.10. See DEI-QAN-007 vol. 1 KMW

8:44 Make J103 EDTA as per DEI-QAP-8407-02-3 r.l. sec. 8.2 and DEI-QAP-205 r.l. See CUA-QAN-002 vol. 1
200 mL diH₂O / NH₄OH (Fisher 882S13; cat A669^c-212)
10 g EDTA
12 g Ascorbic Acid KMW

8:58 Start electrochemical test of J107a See Electrochemical notebook A.L.P

9:32 Organize solutions returned from Adel. KMW

9:59 Take digital photographs of J78-J80 disks as per DEI-QAP-8402-02-3 r.l. sec. 9.6 and Appendix B. KMW

DSCN	Sample	View	File: c:\My documents\c22\digital pictures\cua-qan-004\22 set of
8749	J78a	top face	J78a final top face dig pic. jpg
8750	J78a	bottom face	J78a final bottom face dig pic. jpg
8751	J78b	top face	J78b final top face dig pic. jpg
8752	J78b	bottom face	J78b final bottom face dig pic. jpg
8753	J79a	top face	J79a final top face dig pic. jpg
8754	J79a	bottom face	J79a final bottom face dig pic. jpg
8755	J79b	top face	J79b final top face dig pic. jpg
8756	J79b	bottom face	J79b final bottom face dig pic. jpg
8757	J80a	top face	J80a final top face dig pic. jpg
8758	J80a	bottom face	J80a final bottom face dig pic. jpg
8759	J80b	top face	J80b final top face dig pic. jpg
8760	J80b	bottom face	J80b final bottom face dig pic. jpg

10:20 Transfer J78-J80 photos to April's computer as per DEI-QAP-8407-02-3 r.l. sec B7 KMW

10:50 Remove 10.0 mL of J103 EDTA and put in labelled vial to be analyzed as per DEI-QAP-8407-02-3 r.l. sec 8.2.6.

10:56 Pour 80 mLs of solution for each: J104 disk and 15 mLs for each Teflon liner cup as per DEI-QAP-8407-02-3 r.l. sec 8.2.3. J103 EDTA KMW

11:04 Put J104 a+b EDTA into Baby Blue (N^o 95°C) KMW

11:38 Clean. KMW

Notebook Designation CUA-QAN-8407

Title Yucca Mountain Project
Daily Activity Notebook

Volume Number 4

Department CUA-QAN-8407 vol 4

Subject Yucca Mountain Project NB

Name _____

Address Maloney Rm.1

National® Brand

Computation Notebook

11³/₄" x 9¹/₄", 4 x 4 Quad.; 75 Sheets

43-648



0 73333 43648 8



Office Products
Chicopee, MA 01022

Thursday, July 25, 2002 GMI YMP 8407-02

- 8:14 Record oven temperatures as per DEI-QAP-244 r.o. KMW
See CUA-QAN-004 vol 1+2
- 8:33 Remove J63-9 from Watson as per DEI-QAP-8407-02-3 r.1 KMW
sec 6.6.1
- 9:31 Remove J63-9 from test solutions as per DEI-QAP-8407-02-3 r.1 KMW
sec 6.6.2
- 9:48 Take digital pictures of J63-9 as per DEI-QAP-8407-02-3 KMW
r.1 sec 6.6.2 and appendix B.
- | DSCN | Sample | View | File | ic:c22 8407 7.10.02\digital pictures\dig.pix c22\dig.pix c22 ubens |
|------|--------|------|----------------------------|--|
| 9018 | J63 | Apex | J63 obs 9 apex dig pic.jpg | ... |
| 9019 | J64 | Apex | J64 obs 9 apex dig pic.jpg | |
| 9020 | J65 | Apex | J65 obs 9 apex dig pic.jpg | |
| 9021 | J67 | Apex | J67 obs 9 apex dig pic.jpg | |
| 9022 | J68 | Apex | J68 obs 9 apex dig pic.jpg | |
| 9023 | J69 | Apex | J69 obs 9 apex dig pic.jpg | |
- 10:23 Observe appearance of J63-9 ubends as per DEI-QAP-8407- KMW
02-3 r.1 sec 6.6.2
- J63: no change from obs 8 (6/25/02)
 - J64: no change from obs 8 (6/25/02)
 - J65: no change from obs 8 (6/25/02)
 - J67: no change from obs 8 (6/25/02)
 - J68: no change from obs 8 (6/25/02)
 - J69: no change from obs 8 (6/25/02)
- 10:55 Measure pH of J63-9 test solutions as per DEI-QAP- KMW
8407-02-3 r.1 sec 6.6.2 and DEI-QAP-223 r.3 sec 7.0.
See DEI-QAN-012 vol. 1
- 11:19 Return J63-9 to test solutions as per DEI-QAP-8407-02-3 KMW
r.1 sec 6.6.3.
- 11:34 Return J63-9 ubends to Watson as per DEI-QAP-8407- KMW
02-3 r.1 sec 6.6.3
- 12:08 Clean KMW

CUA-QAN-8407
Volume 5

Department Catholic University of America
Subject Dept of Chemistry - Oxides Group
Name Yucca Mountain Project Lab Notebook
Address Maloney Room 1

National® Brand

Computation Notebook

11³/₄" x 9¹/₄", 4 x 4 Quad., 75 Sheets

43-648



0 73333 43648 8



Office Products
Chicopee, MA 01022

CUA-QAN-8407 vol. 5

Yucca Mountain Project

Laboratory Activity Notebook

24 Tuesday, December 31, 2002

8407-02 GMI YMP

11:17 Record oven temperatures as per DE1-QAP-244 r.0. See CUA-QAN-004 vol 1+2. KMW

12:55 Make 2.0L of rewetted J13 according to Ronnik's recipe as per DE1-QAP-205 r.1 sec 4.0. See CUA-QAN-002 vol.1 p.144. K44 KMW

13:35 Add 1866 mL diH₂O to K44 J13 KMW

13:43 Add 99.6 mL of NaOH (Aldrich 05419J0, cat 31, 951-1) to K44 KMW

13:50 Setup K44 distillation. KMW

14:12 Start K44 distillation. See DE1-QAN-012 vol.1 p.80. KMW

14:43 Take K44 FL sample. Note: some solids at bottom of flask had not dissolved even after boiling rapidly for several minutes. KMW

HEADER VIEW: NEV000001054 - NEV5000101CATHOLIC UNIVERSITY CORROSION NOTEBOOK, LAB ACTIVITY MARCH 2001 TO
DECEMBER 2002

LSN Accession #	NEV000001054
Information Source	NEV
Participant Accession #	NEV5000101
Title	CATHOLIC UNIVERSITY CORROSION NOTEBOOK, LAB ACTIVITY MARCH 2001 TO DECEMBER 2002
Document Date	07/19/2004
Comments	
Non-Digital Media	
QA Record Indicator	
# Of Images	628
Descriptors	
Access Controls	
Addressee Names	
Addressee Orgs	
Author Names	
Author Orgs	
Document Numbers	
Document Types	ADOBE ACROBAT FILE
Packages Ids	
Related Record #s	
Related Record Codes	
Traceabilities	
Versions	

Additional examples of notebooks can be found at:

NEV000001609
NEV000000863
NEV000001539
NEV000001910
NEV000003017
NEV000000764
NEV000001091
NEV000002514
NEV000000910
NEV000001880
NEV000000225
NEV000002367
NEV000001232

Exhibit 27

Exhibit 27

Balance Calibrations

Ohaus Corporation
19A Chapin Road
Pine Brook, NJ
07058-9878
Phone: 1-973-377-9000
Fax: 1-973-966-6143



University of America
Chemistry Department

To Whom it May Concern

This is to certify that scale model AR2140, shipped on order number 2001-10-146 was calibrated by the manufacturer with weights traceable to the National Institute of Standards and Technology Traceability Number 822/253561. This product conformed to the specifications as outlined in our catalog and instruction manual at the time the scale left the factory. Local environment, i.e. gravitation, may influence the calibration. Calibration should be verified in the field before the first use of the scale. Refer to the instruction manual.

Sincerely,

A handwritten signature in black ink, appearing to read 'Tom J. Lang'.

Tom J. Lang
Technical Support Representative
OHAUS CORPORATION

Attachment to Form DEI-QA-108: Balance Weight Check Record
(Revision 0)

Date: February 1, 2004 Analyst: KM Needham Balance (Serial #): F0171200480342

Nominal weight:	0.01 gram Std	0.1 gram Std	1 gram Std	10 gram Std	100 gram Std
Weight standard designation (Serial #):	45885	45885	45885	45885	45884
Actual weight of standard (g):	0.0100g	0.1000g	1.0000g	10.0000g	100.0000g
Measurement (before internal calibration):	0.0103g	0.0999g	0.9999g	10.0003g	100.0024g
Difference between measured and actual	0.0003g	0.0001g	0.0001g	0.0003g	0.0024g
Acceptable? (Y/N) (Note 2)	Y	Y	Y	Y	N
Measurement (after calibration; Note 1):	0.0100g	0.1000g	1.0001g	10.0003g	100.0000g
Difference between measured and actual	0g	0g	0.0001g	0.0003g	0g
Acceptable? (Y/N) (Note 2)	Y	Y	Y	Y	Y

Balance check is complete and acceptable: KM Needham 2/1/04 OR Balance check failed & balance was removed from service:
Signature Date Signature Date

Date: March 1, 2004 Analyst: KM Needham Balance (Serial #): F0171200480342

Nominal weight:	0.01 gram Std	0.1 gram Std	1 gram Std	10 gram Std	100 gram Std
Weight standard designation (Serial #):	45885	45885	45885	45885	45885
Actual weight of standard (g):	0.0100g	0.1000g	1.0000g	10.0000g	100.0000g
Measurement (before internal calibration):	0.0098g	0.0997g	0.9999g	9.9999g	99.9975g
Difference between measured and actual	0.0002g	0.0003g	0.0001g	0.0001g	0.0025g
Acceptable? (Y/N) (Note 2)	Y	Y	Y	Y	N
Measurement (after calibration; Note 1):	0.0099g	0.0999g	0.9999g	10.0001g	99.9996g
Difference between measured and actual	0.0001g	0.0001g	0.0001g	0.0001g	0.0004g
Acceptable? (Y/N) (Note 2)	Y	Y	Y	Y	Y

Balance check is complete and acceptable: Karen M. Needham 3/1/04 OR Balance check failed & balance was removed from service:
Signature Date Signature Date

Date: April 22, 2004 Analyst: KM Needham Balance (Serial #): F0171200480342

Nominal weight:	0.01 gram Std	0.1 gram Std	1 gram Std	10 gram Std	100 gram Std
Weight standard designation (Serial #):	45885	45885	45885	45885	45885
Actual weight of standard (g):	0.0100g	0.1000g	1.0000g	10.0000g	100.0003g
Measurement (before internal calibration):	0.0096g	0.0996g	0.9997g	9.9995g	99.9929g
Difference between measured and actual	0.0004g	0.0004g	0.0003g	0.0005g	0.0074g
Acceptable? (Y/N) (Note 2)	N	N	Y	Y	N
Measurement (after calibration; Note 1):	0.0101g	0.1002g	1.0003g	10.0004g	100.0002g
Difference between measured and actual	0.0001g	0.0002g	0.0003g	0.0004g	0.0001g
Acceptable? (Y/N) (Note 2)	Y	Y	Y	Y	Y

Balance check is complete and acceptable: Karen M. Needham 4/22/04 OR Balance check failed & balance was removed from service:
Signature Date Signature Date

Note 1: For the low-precision Ohaus balance in the hot lab, the "after calibration" measurement does not apply.
Note 2: Acceptance Criteria are documented in DEI-QAP-206 (current revision).

HEADER VIEW: NEV000000796 - NEV5000095

OHAUS LETTER TRANSMITTING BALANCE CALIBRATIONS

LSN Accession #	NEV000000796
Information Source	NEV
Participant Accession #	NEV5000095
Title	OHAUS LETTER TRANSMITTING BALANCE CALIBRATIONS
Document Date	07/27/2004
Comments	
Non-Digital Media	
QA Record Indicator	
# Of Images	22
Descriptors	
Access Controls	
Addressee Names	
Addressee Orgs	
Author Names	
Author Orgs	
Document Numbers	
Document Types	ADOBE ACROBAT FILE
Packages Ids	
Related Record #s	
Related Record Codes	
Traceabilities	
Versions	

Calibration Log Form

Equipment Type: K thermocouple
 Supplier / Model: Omega part # GK055-116U-18-CL5
 Serial Number: Probe ID# 990043 WO# 2059 39 771 *notk*
 Purchase Date: 5/24/02
 Supplier Phone / Contact Person: _____
 DEI Calibration Procedure: 233

Calibration Date: 5/24/02 Calibration sign-off: Karen M. Needham Next calibration date: 5/24/03

 _____ use for distillation exp. 9/02 a2p _____

 _____ Expired 5/24/03 _____
 _____ Removed from service 6/03 a2p _____

Unleaded thermocouple

 The Omega Drive, PO Box 4047
 Stamford, CT 06907 (203) 359-1660
 -mail: info@omega.com
 http://www.omega.com



Calibration Report
 Probe I.D. 990043

Nominal temperature		Departure	
°F	°C	°F	°C
-320	-196	N/A	
32	0	.6	
212	100	.5	
449	232	-.5	
787	419	1.6	

Certified By: CM
 Note: To calculate actual temperature
 • Add departure when negative (-)
 • Subtract departure when positive (+)
 EXAMPLE: Nominal Temperature = 419°C
 Departure Temperature = -2°C
 Actual Temperature = 417°C

HEADER VIEW: NEV000000826 - NEV5000097

DOMINION ENGINEERING CALIBRATION LOGS - THERMOCOUPERS, 2002-2004

LSN Accession #	NEV000000826
Information Source	NEV
Participant Accession #	NEV5000097
Title	DOMINION ENGINEERING CALIBRATION LOGS - THERMOCOUPERS, 2002-2004
Document Date	07/27/2004
Comments	
Non-Digital Media	
QA Record Indicator	
# Of Images	32
Descriptors	
Access Controls	
Addressee Names	
Addressee Orgs	
Author Names	
Author Orgs	
Document Numbers	
Document Types	ADOBE ACROBAT FILE
Packages Ids	
Related Record #s	
Related Record Codes	
Traceabilities	
Versions	

SAMPLE ID: JB-BS-2 T226-7

Date of Analysis: 6/24/92

Raw Probe Data		Raw Probe Data (FeO to Fe2O3)	Recalculated to 100%	
SiO2	75.129		SiO2	76.56
Al2O3	12.665		Al2O3	12.91
FeO	0.985*1.1113=Fe2O3	1.095	Fe2O3	1.12
MgO	0.019		MgO	0.02
MnO	0.037		MnO	0.04
CaO	0.519		CaO	0.53
TiO2	0.074		TiO2	0.08
Na2o	3.962		Na2o	4.04
K2O	4.628		K2O	4.72
TOTAL (O)	98.018	TOTAL (N) 98.128	TOTAL (R)	100.02

20 Best Matches:

1	0.9936	1/30/92	FLV-200-LC T249-4
2	0.9933		YOS-1, T13-1
3	0.9932		BO-16
4	0.9912	10/25/83	KRL82282A, T66-5
5	0.9909	9/3/88	FLV-64-CS T170-7
6	0.9907		DR-64
7	0.9907	1/30/92	FLV-199-BC T249-3
8	0.9889	6/8/91	SS-91-1-1 T232-2
9	0.9889	09/06/83	KRL91882B, T64-12
10	0.9889		HC-10
11	0.9886		BO-11
12	0.9885	10/23/85	BL-RSA-2 T112-7
13	0.9883		LD-12, T3,4
14	0.9880	10/21/91	JB-BS-12 T241-3
15	0.9877	10/22/85	KRL 82182 (A1) (599) T112-1
16	0.9877	5/21/88	WL-4-58 (144.77m) T164-1
17	0.9875		LD-12
18	0.9871		GS-32
19	0.9870	1/30/92	FLV-201-TO T249-5
20	0.9869	6/13/91	JB-BS-7 T227-4

Elements used in the calculation are:

Na2o
Al2O3
SiO2
K2O
CaO
FeO

***** This sample has been added to the data base *****

SAMPLE: T226-7 J^r 2

PT	BEAM	1	9	MG	8	AL	3	SI	7	K	2	Ca	6	TI	5	MN	1	FE	4	
COUNTS	COUNTS	SD	COUNTS	SD	COUNTS	SD	COUNTS	SD	COUNTS	SD	COUNTS	SD	COUNTS	SD	COUNTS	SD	COUNTS	SD	COUNTS	SD
1	14564	2562	51	151	12	15320	124	27025	164	8959	95	1028	32	27	5	96	10	652	26	
2	14563	2758	138	157	4	15294	19	27914	628	9064	74	932	68	24	2	108	9	652	0	
3	14573	2672	98	181	15	15286	18	27290	456	9151	96	993	49	28	2	89	10	540	65	
4	14577	2672	80	190	18	15043	129	27876	439	9363	172	988	40	31	3	96	8	602	53	
5	14584	2670	69	150	18	14781	232	27748	393	9038	155	990	35	32	3	94	7	694	59	
6	14591	2767	74	190	19	15100	208	27972	388	9195	142	966	32	24	3	88	7	596	54	
7	14601	2735	71	162	18	15156	190	27985	378	9500	191	997	30	36	4	117	11	658	52	
8	14602	2588	75	159	17	14718	231	27415	363	9147	177	941	32	30	4	101	10	654	49	
9	14595	52	878	168	16	507	****	38607	****	142	****	170	271	16	6	62	15	92	185	
10	14600	2612	831	160	15	15009	****	27732	****	9240	****	895	256	25	6	84	15	531	175	
11	14593	2633	791	168	14	15078	****	28379	****	9219	****	989	245	34	6	90	14	636	167	
12	14585	2708	759	171	14	15051	****	28402	****	9112	****	1012	235	38	6	108	14	639	161	
13	14574	2649	729	166	13	14835	****	28608	****	9134	****	966	226	25	6	97	14	626	154	
14	14564	2685	702	180	13	15089	****	28348	****	9198	****	998	218	19	6	87	13	601	149	
15	14564	2634	678	162	13	14918	****	27903	****	9234	****	953	211	29	6	85	13	639	144	
16	14555	2683	657	152	13	15073	****	27931	****	9216	****	959	204	30	6	89	13	641	140	
17	14549	2644	637	187	13	15217	****	27790	****	8959	****	991	198	19	6	73	13	647	136	
18	14541	2543	618	171	13	15171	****	28471	****	9036	****	973	192	23	6	85	13	619	132	
19	14551	2717	602	167	13	15211	****	27944	****	9179	****	963	187	29	6	99	13	674	129	
20	14544	2303	588	184	13	14617	****	26647	****	9323	****	988	182	27	6	105	13	432	131	

LINE DELETED:

LINE DELETED: 2 9 20

Ave. BEAM CURRENT/SEC = 729

DATA REDUCED USING #B-AL:

#GL9M

ON SPECIMEN: T226-7 JB-RS-2

#B-AL VERSION 1.0

OXIDE FORM.	WEIGHTZ (OXIDE)	STD.DEV. (%)	HOMO. INDEX	FORMULA	K-RATIO	UNKN PEAK (COUNTS)	UNKN BKGD (COUNTS)	COUNTING TIME (SEC)	STD PEAK (COUNTS)	STD BKGD (COUNTS)	COUNTING TIME (SEC)	STANDARD FILENAME
NA2O	3.962	2.84	1.154	0.000 1.03044		2657.5	46.7	20.00	2579.8	46.2	20.00	ZRGSC
MGO	0.019	130.45	1.001	0.000 0.00510		168.7	154.9	20.00	2859.9	155.1	20.00	ZRGSC
AL2O3	12.665	1.17	1.380	0.000 0.96975		15062.2	249.5	20.00	15523.8	249.1	20.00	ZS831
SI02	17.270	0.86	2.567	0.000 1.04874		27930.5	87.9	20.00	26636.5	87.9	20.00	ZS831
K2O	4.628	1.61	1.408	0.000 1.26822		9169.3	140.2	20.00	7267.9	148.4	20.00	ZRGSC
CaO	0.519	4.44	0.978	0.000 0.10129		976.6	182.0	20.00	8037.0	192.7	20.00	ZRGSC
TI02	0.074	55.82	1.008	0.000 0.00067		28.5	16.5	20.00	17895.8	23.7	20.00	ZTI02
MNO	0.037	67.68	1.059	0.000 0.00036		93.0	73.9	20.00	52602.4	137.9	20.00	ZMN20
FEO	0.985	5.45	1.707	0.000 0.15397		626.4	102.9	20.00	3509.7	109.8	20.00	ZRGSC

HEADER VIEW: NEV000002099 - NEV0000903

RAW PROBE DATA

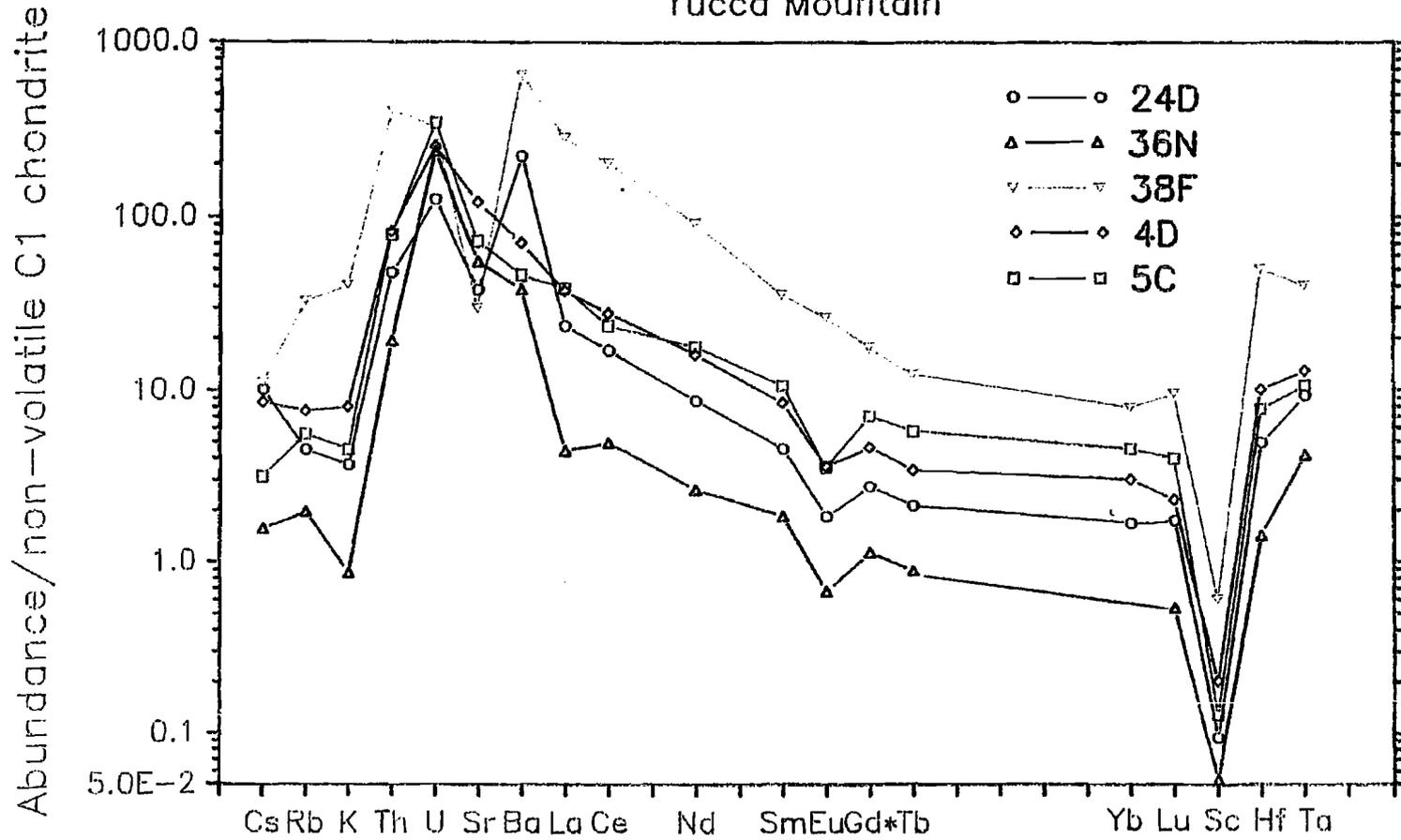
LSN Accession #	NEV000002099
Information Source	NEV
Participant Accession #	NEV0000903
Title	RAW PROBE DATA
Document Date	06/24/1992
Comments	
Non-Digital Media	
QA Record Indicator	
# Of Images	2
Descriptors	
Access Controls	
Addressee Names	
Addressee Orgs	
Author Names	
Author Orgs	
Document Numbers	
Document Types	Chart
Packages Ids	
Related Record #s	NEV0000891
Related Record Codes	PARENT
Traceabilities	
Versions	

0
0

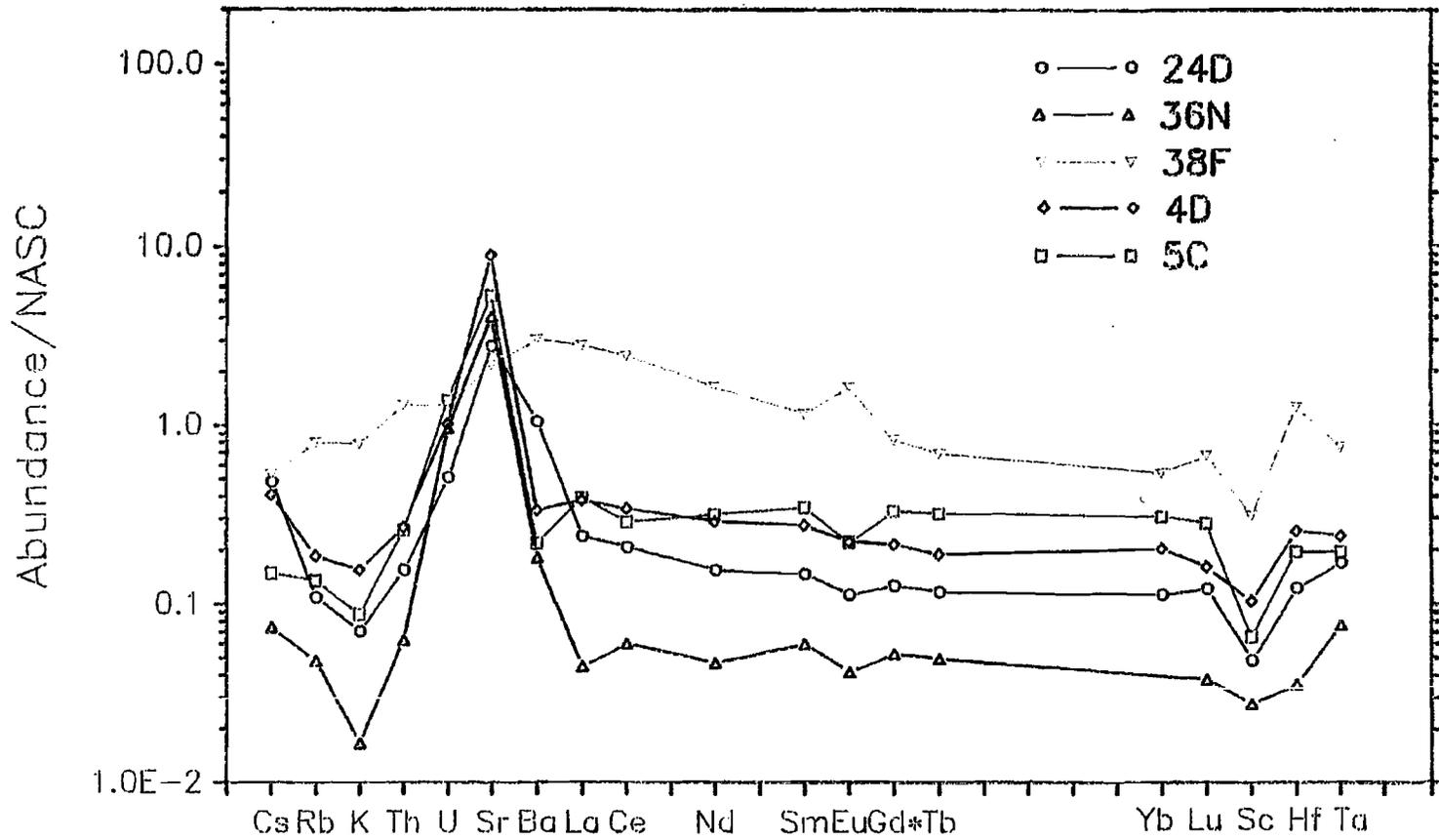
926.WK1 Yucca Mountain Donald Livingston

Sample:	24D	36N	38F	4D	5C	Uncertainty
Wt. g	1.1721	0.8192	0.9507	0.9722	1.2736	%
Fe %	0.25	0.13	0.85	0.61	0.32	3
Ca	25.5	21.9	3.7	14.0	18.4	5-10
Na	0.22	0.059	1.97	0.31	0.27	2
K %	0.32	0.075	3.57	0.70	0.40	5-10
Sc ppm	0.71	0.40	4.55	1.51	0.97	2
Cr	7.8	2.3	4.8	7.0	7.6	3-5
Co	1.00	0.78	0.73	6.39	3.59	2
As	4.2	4.6	6.7	10.6	8.3	5-10
Sb	0.24	0.49	0.29	0.77	0.47	5-10
Rb	13.4	5.9	98.8	22.7	16.8	5-10
Sr	392	567	306	1244	754	5-10
Cs	2.5	0.38	2.7	2.1	0.77	5-10
Ba	660	114	1924	209	139	5-10
La	7.3	1.36	87.1	11.5	12.1	2
Ce	13.7	4.0	163.1	22.3	19.1	5-10
Nd	5.2	1.6	55.1	9.6	10.7	5-10
Sm	0.88	0.36	6.97	1.64	2.11	2
Eu	0.133	0.049	1.94	0.26	0.26	3
Tb	0.098	0.041	0.58	0.157	0.27	5-15
Yb	0.34	-	1.64	0.62	0.94	5-15
Lu	0.055	0.017	0.31	0.072	0.13	5-15
Hf	0.76	0.22	7.8	1.56	1.22	3-5
Ta	0.19	0.084	0.82	0.26	0.22	3-5
Th	1.88	0.76	15.9	3.23	3.16	3-5
U ppm	1.3	2.5	3.4	2.6	3.7	5-15
Ce ^{A*}	0.98	1.34	1.01	0.98	0.78	
CaCO ₃ (%)	64	55	9	35	46	
(Eu/Sm) _{NN}	0.78	0.70	1.44	0.82	0.64	
(La/Yb) _{NN}	2.1	-	5.3	1.9	1.3	
(Eu/Sm) _{cn}	0.40	0.36	0.74	0.42	0.32	
(La/Yb) _{cn}	13.7	8.3	29.1	16.5	9.6	

Oregon State University Radiation Center
#926/Donold Livingston
Yucca Mountain



Oregon State University Radiation Center
#926/Donold Livingston
Yucca Mountain



HEADER VIEW: NEV000002227 - NEV0000377



OREGON STATE UNIVERSITY RADIATION CENTER #926 / DONALD LIVINGSTON YUCCA MOUNTAIN

LSN Accession # NEV000002227
Information Source NEV
Participant Accession # NEV0000377
Title OREGON STATE UNIVERSITY RADIATION CENTER #926 / DONALD LIVINGSTON YUCCA MOUNTAIN
Document Date 01/01/1901
Comments
Non-Digital Media
QA Record Indicator
Of Images 3
Descriptors
Access Controls
Addressee Names
Addressee Orgs
Author Names
Author Orgs
Document Numbers
Document Types Chart
Packages Ids
Related Record #s
Related Record Codes
Traceabilities
Versions

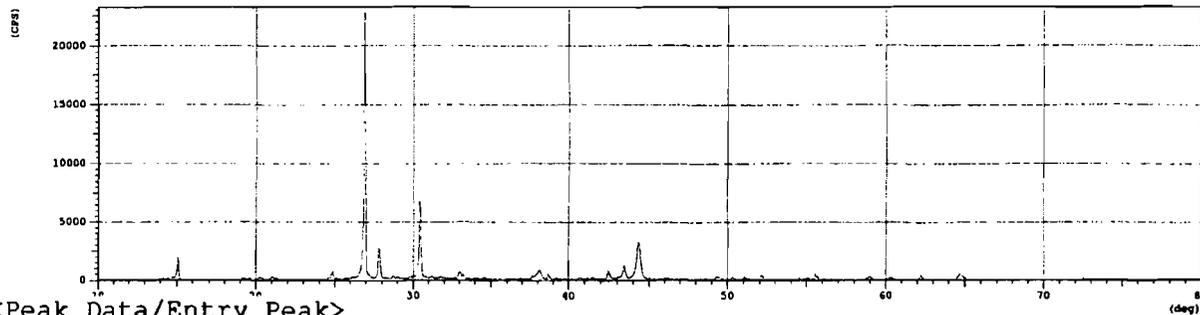
SEARCH / MATCH RESULT

<Unknown Data>

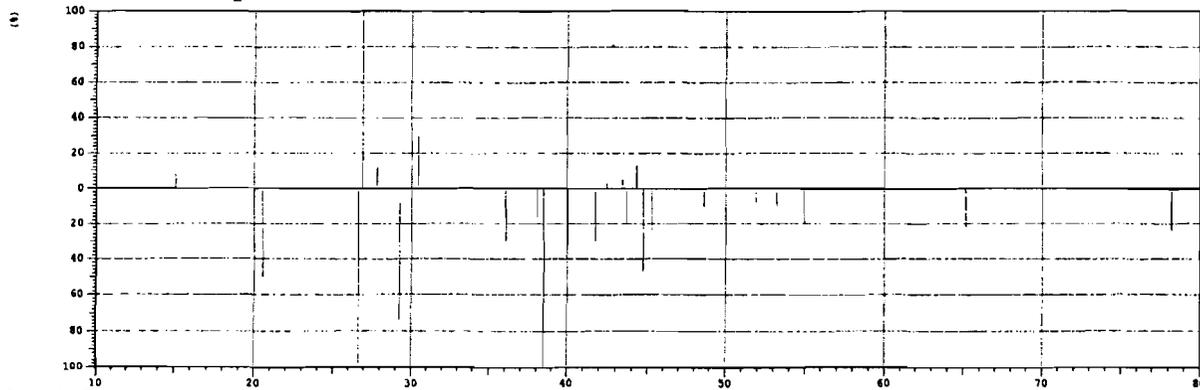
Group Name : Standard20040204
Data Name : Standard33134242
File Name : Standard33134242.PKR
Sample Name : Mg(NO3)2.6H2O wet
Comment : wet Sigma Aldrich
Date & Time : 02-04-04 13:24:44

Corrosion Data
Catholic University
x-ray data
Mg(NO₃)₂

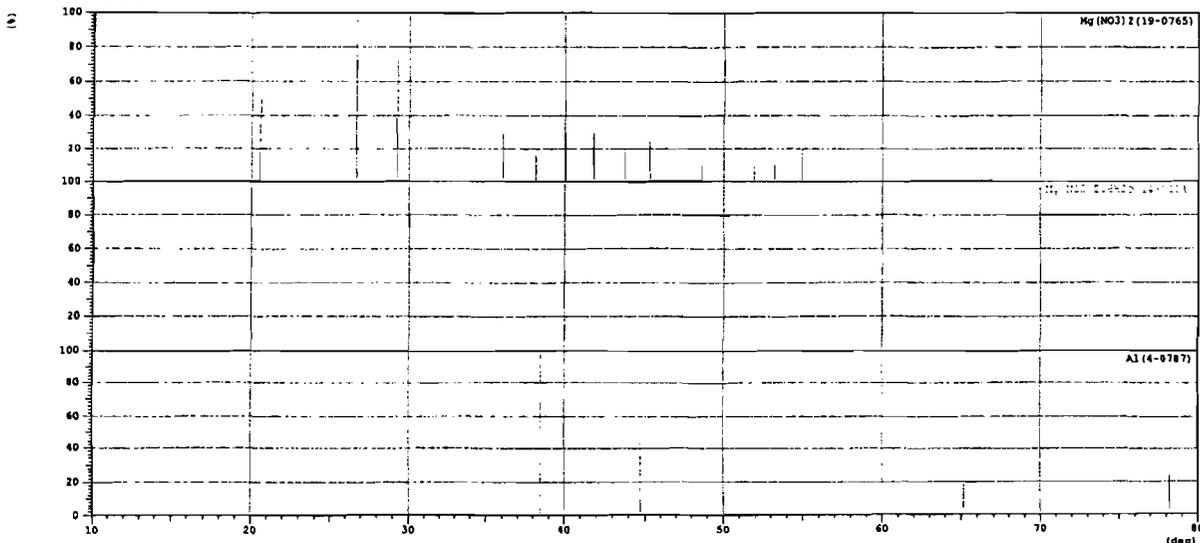
<Raw Data>



<Peak Data/Entry Peak>



<Card Data>

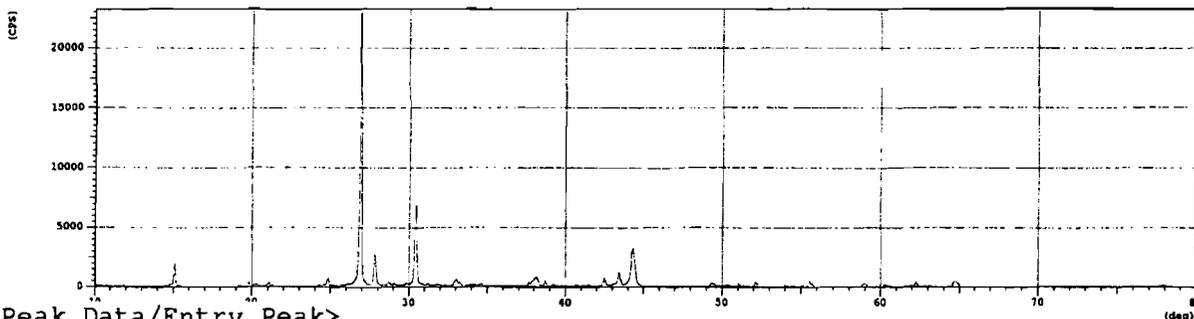


SEARCH / MATCH RESULT

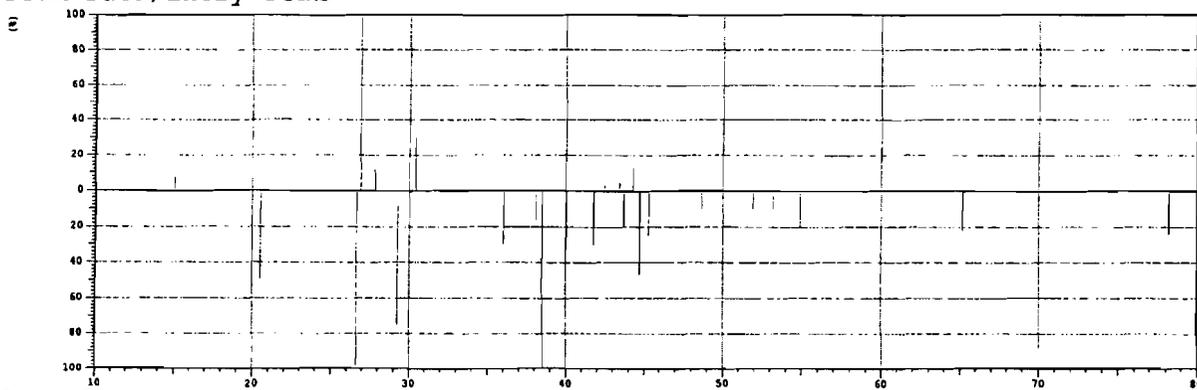
<Unknown Data>

Group Name : Standard20040204
Data Name : Standard33134242
File Name : Standard33134242.PKR
Sample Name : Mg(NO3)2.6H2O wet
Comment : wet Sigma Aldrich
Date & Time : 02-04-04 13:24:44

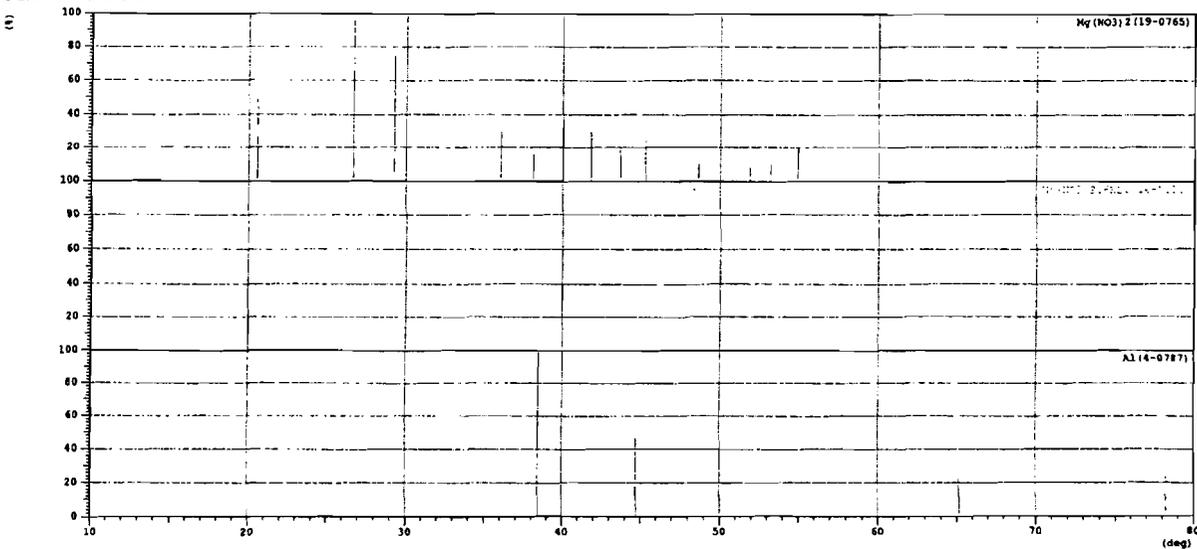
<Raw Data>



<Peak Data/Entry Peak>



<Card Data>

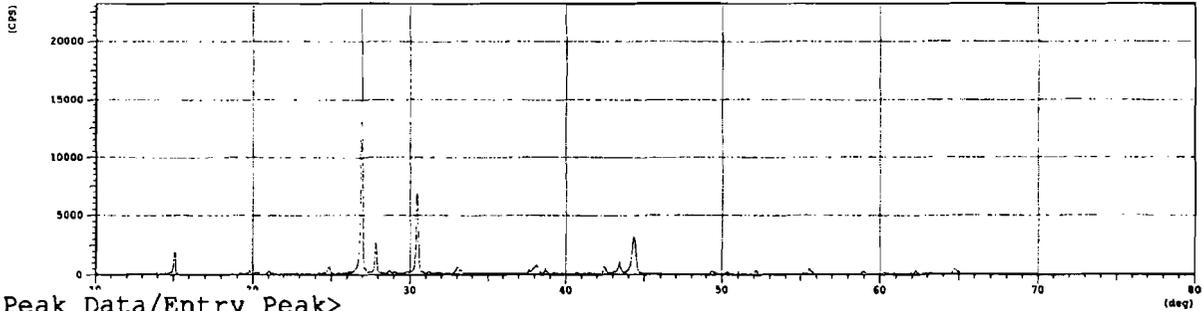


SEARCH / MATCH RESULT

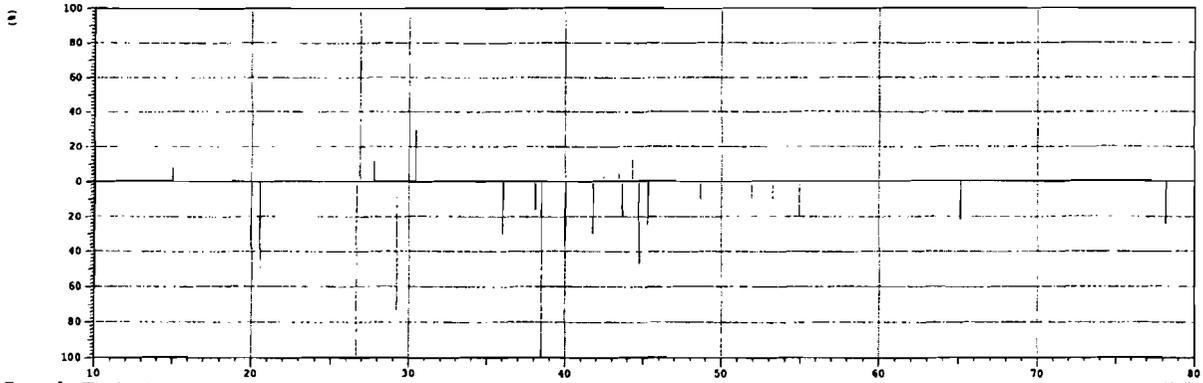
<Unknown Data>

Group Name : Standard20040204
Data Name : Standard33134242
File Name : Standard33134242.PKR
Sample Name : Mg(NO3)2.6H2O wet
Comment : wet Sigma Aldrich
Date & Time : 02-04-04 13:24:44

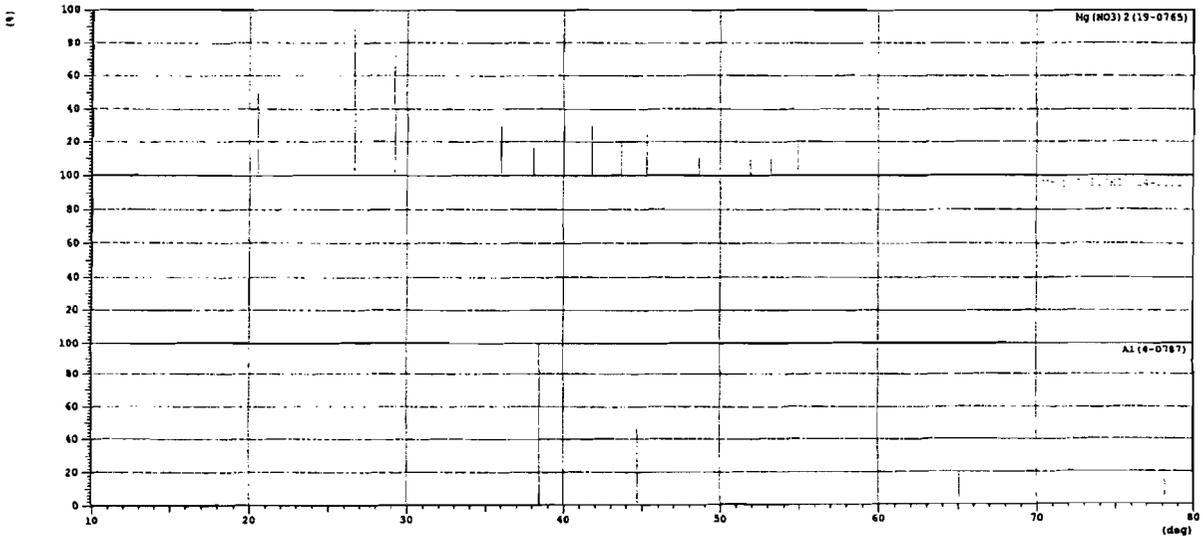
<Raw Data>



<Peak Data/Entry Peak>

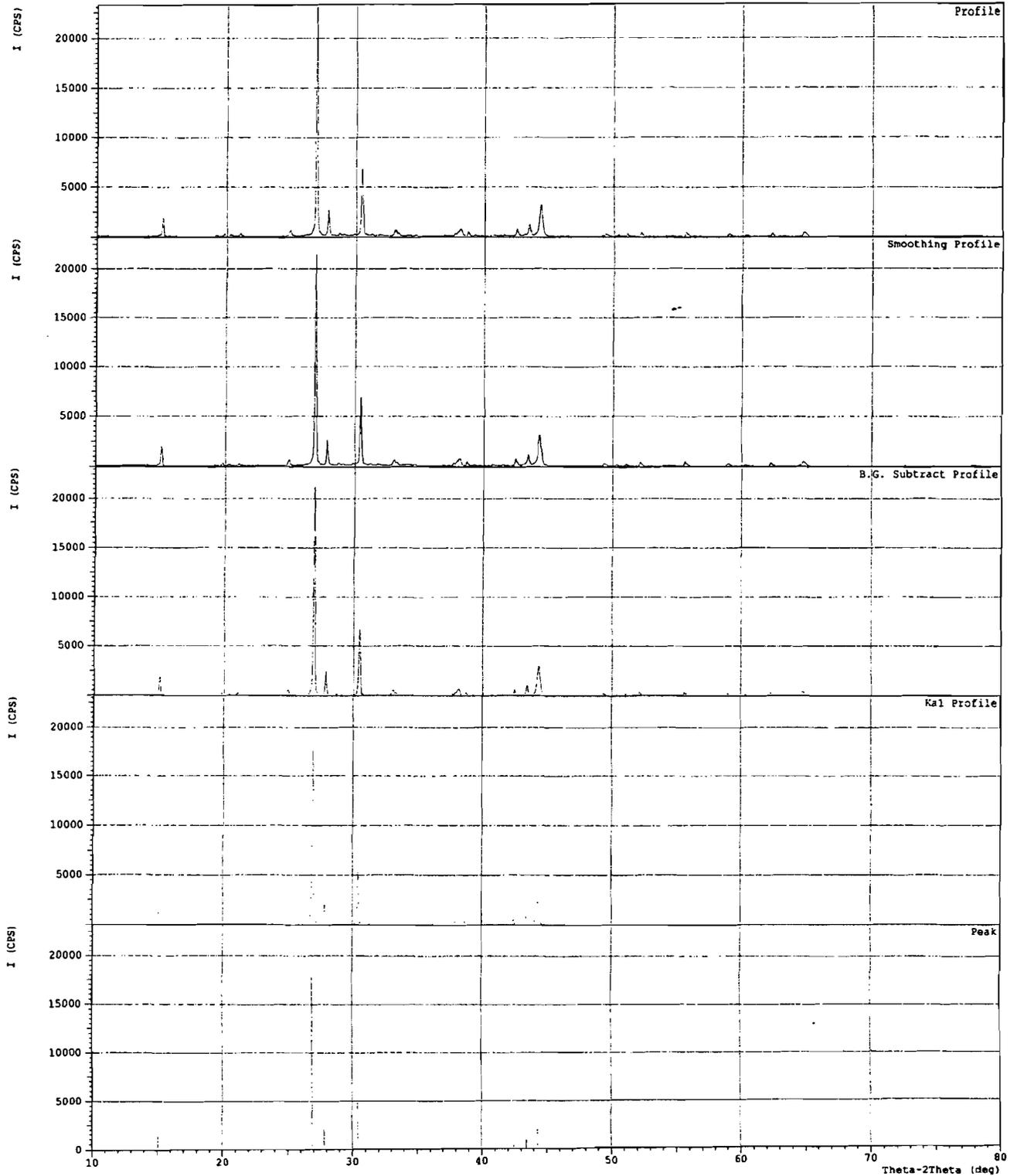


<Card Data>



*** Basic Data Process ***

Group Name : Standard20040204
Data Name : Standard33134242
File Name : Standard33134242.PKR
Sample Name : Mg(NO3)2.6H2O wet
Comment : wet Sigma Aldrich

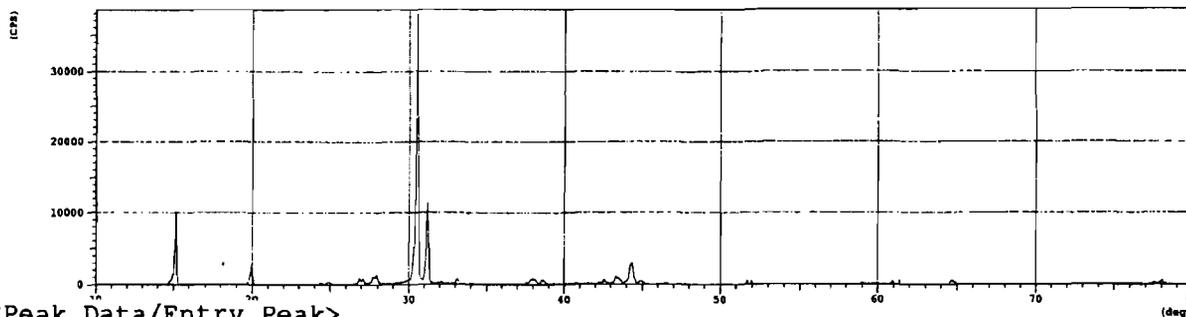


SEARCH / MATCH RESULT

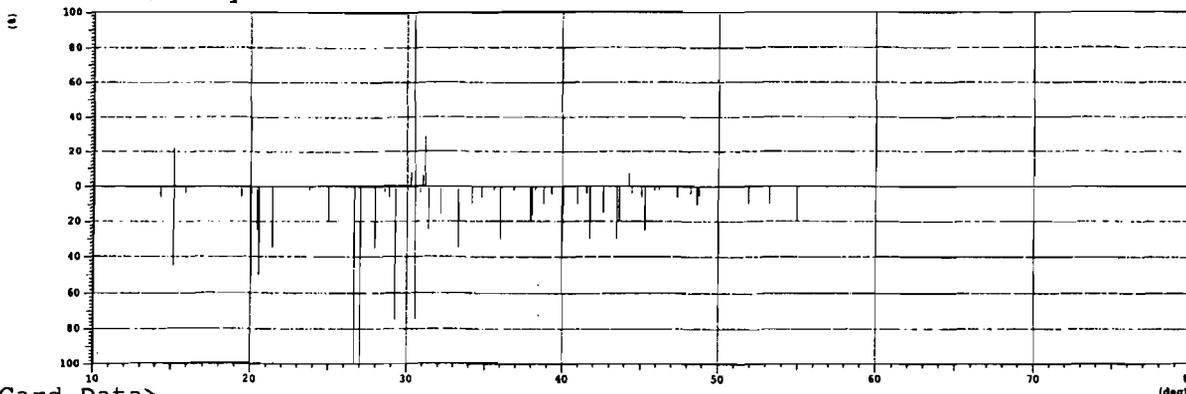
<Unknown Data>

Group Name : Standard20040204
Data Name : Standard31124053
File Name : Standard31124053.PKR
Sample Name : Mg(NO3)2.6H2O
Comment : Sigma Aldrich 99% ACS reagent
Date & Time : 02-04-04 12:22:55

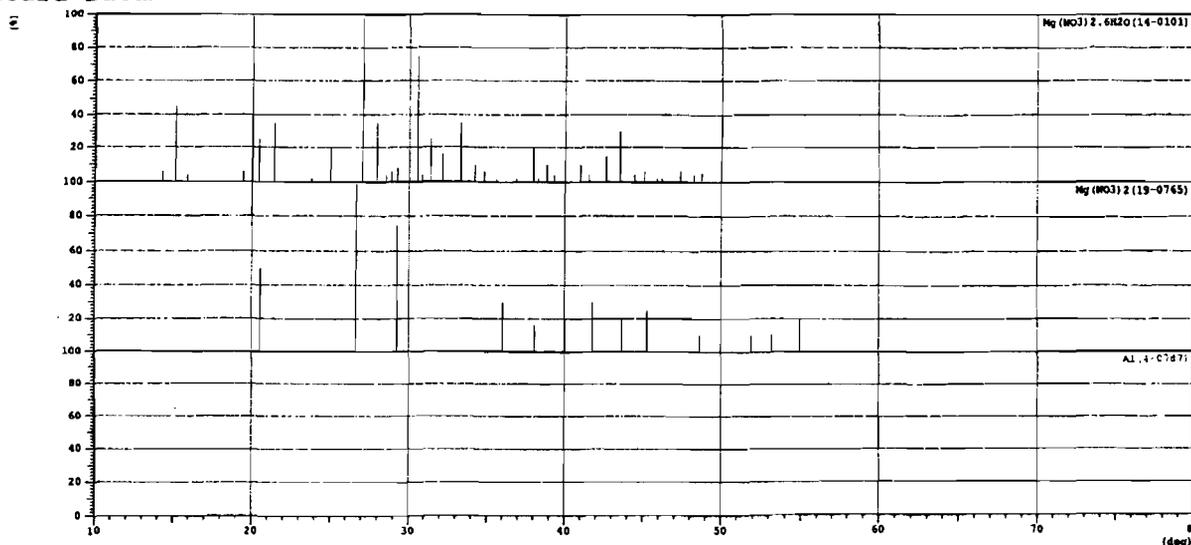
<Raw Data>



<Peak Data/Entry Peak>



<Card Data>



LSN Accession # NEV000001607
Information Source NEV
Participant Accession # NEV5000127
Title CORROSION DATA (X-RAY) CATHOLIC UNIVERSITY
Document Date 07/27/2004
Comments
Non-Digital Media
QA Record Indicator
Of Images 30
Descriptors
Access Controls
Addressee Names
Addressee Orgs
Author Names
Author Orgs
Document Numbers
Document Types ADOBE ACROBAT FILE
Packages Ids
Related Record #s
Related Record Codes
Traceabilities
Versions

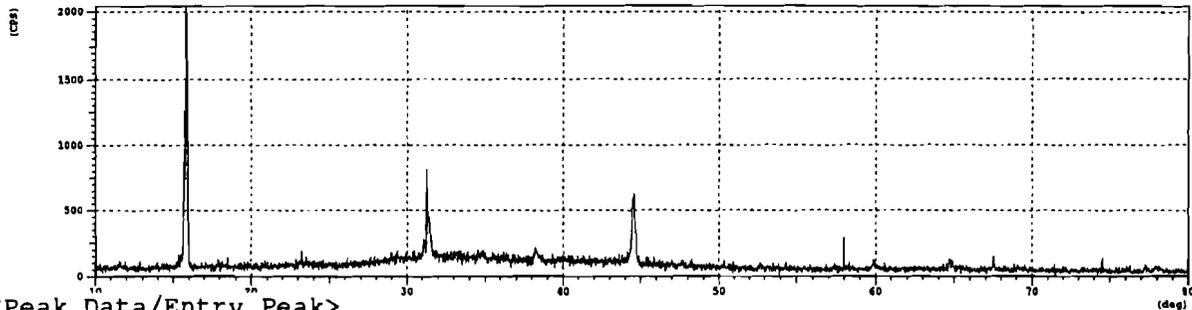
***** SEARCH / MATCH RESULT *****

<Unknown Data>

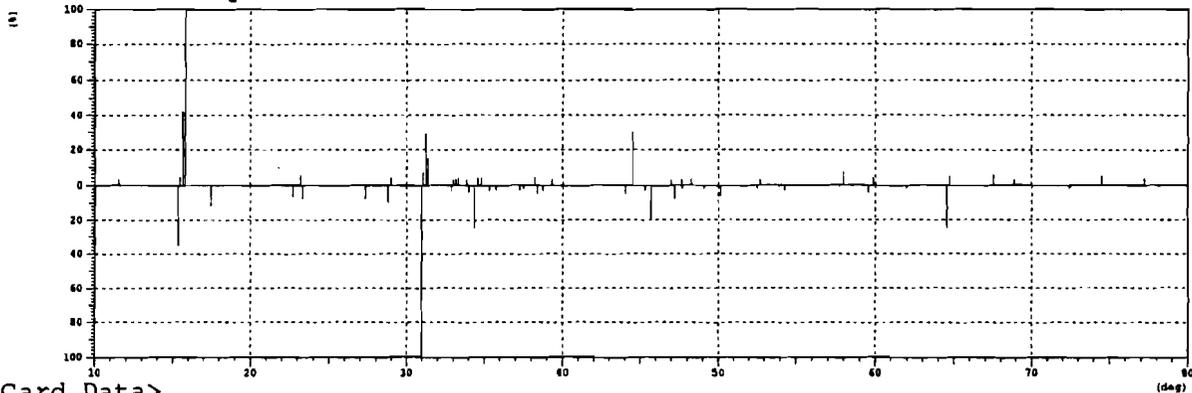
Group Name : Standard20030627
Data Name : Standard TH-5122145
File Name : Standard TH-5122145.PKR
Sample Name : TH-5
Comment :
Date & Time : 06-27-03 12:03:48

Corrosion Data
Catholic University
x-ray data
Tachyhydrite

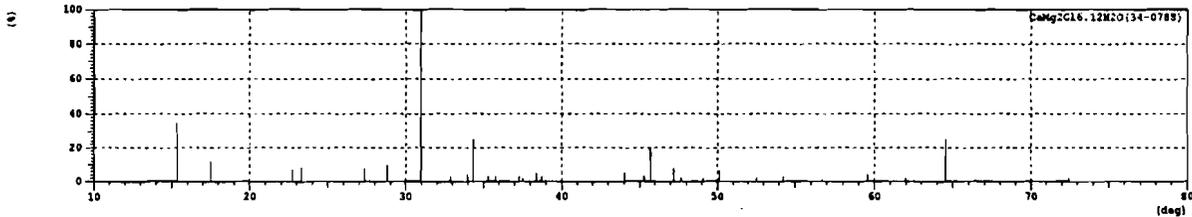
<Raw Data>



<Peak Data/Entry Peak>



<Card Data>

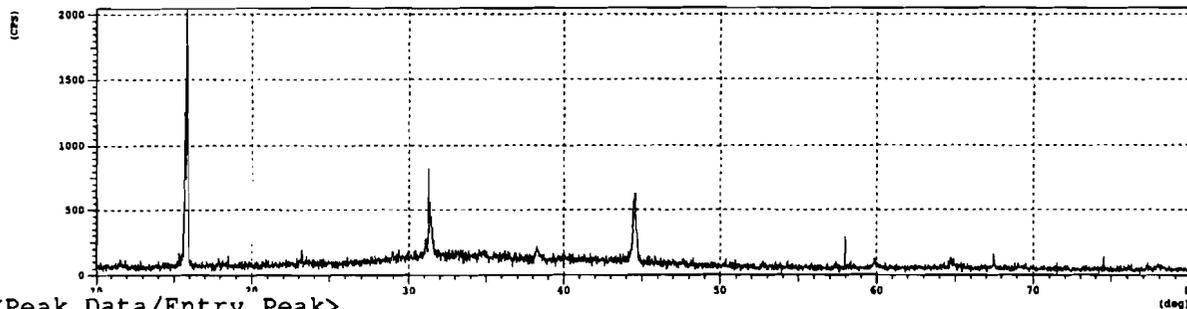


***** SEARCH / MATCH RESULT *****

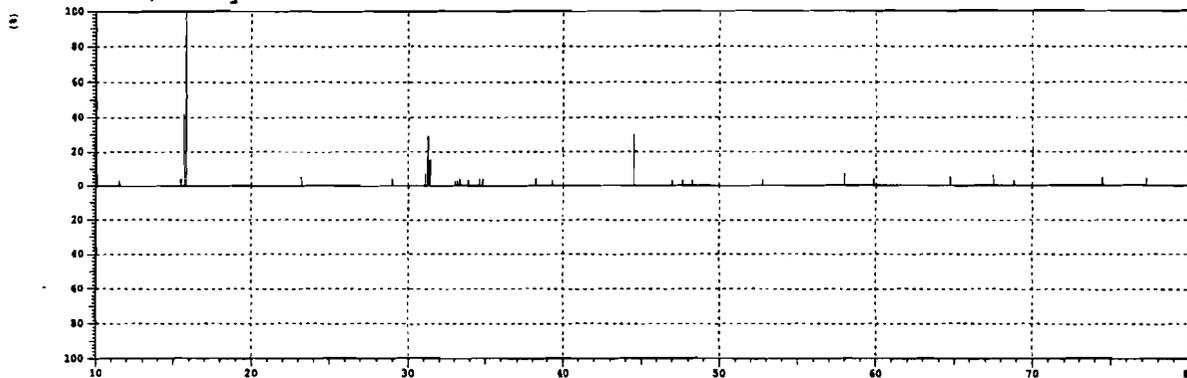
<Unknown Data>

Group Name : Standard20030627
Data Name : Standard TH-5122145
File Name : Standard TH-5122145.PKR
Sample Name : TH-5
Comment :
Date & Time : 06-27-03 12:03:48

<Raw Data>



<Peak Data/Entry Peak>



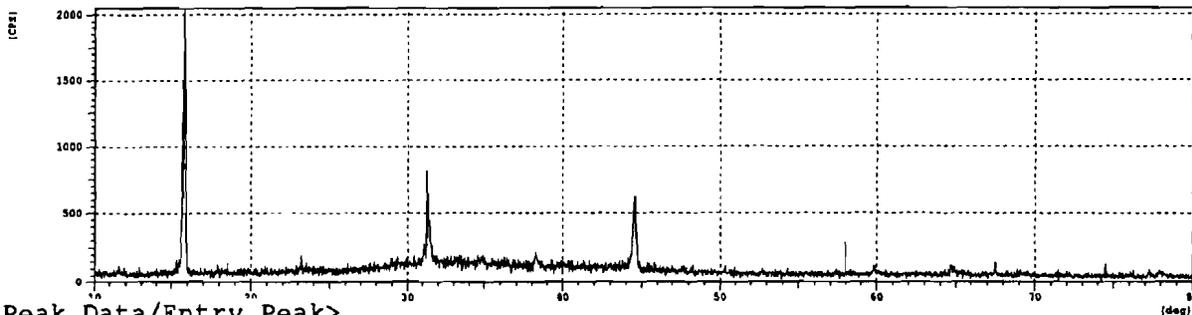
<Card Data>

***** SEARCH / MATCH RESULT *****

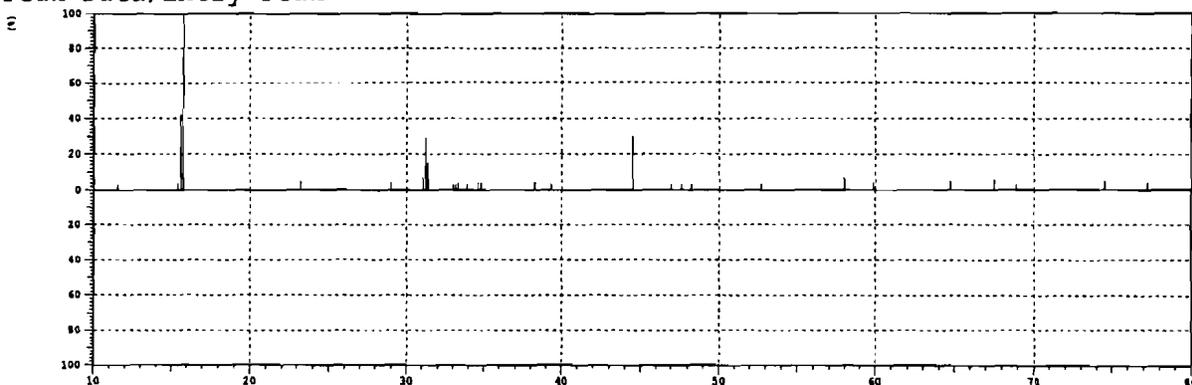
<Unknown Data>

Group Name : Standard20030627
Data Name : Standard TH-5122145
File Name : Standard TH-5122145.PKR
Sample Name : TH-5
Comment :
Date & Time : 06-27-03 12:03:48

<Raw Data>



<Peak Data/Entry Peak>



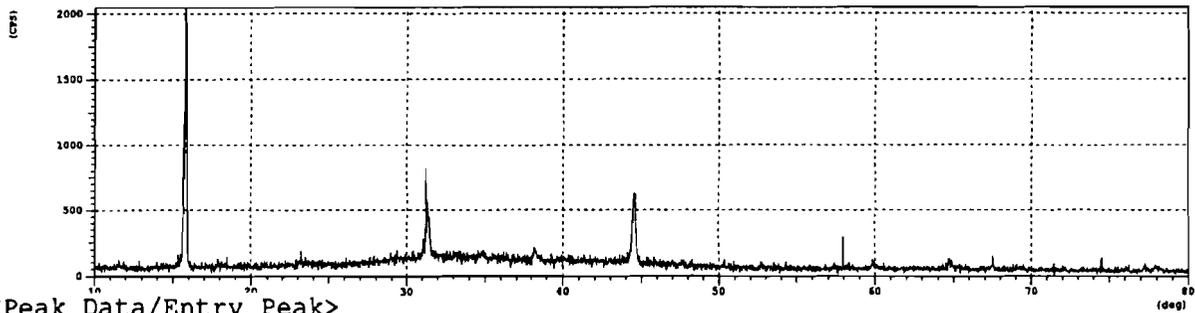
<Card Data>

SEARCH / MATCH RESULT

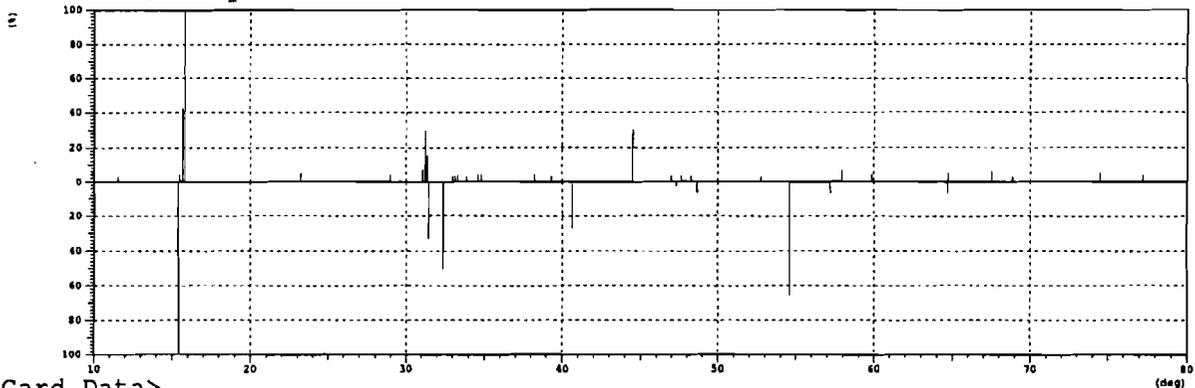
<Unknown Data>

Group Name : Standard20030627
Data Name : Standard TH-5122145
File Name : Standard TH-5122145.PKR
Sample Name : TH-5
Comment :
Date & Time : 06-27-03 12:03:48

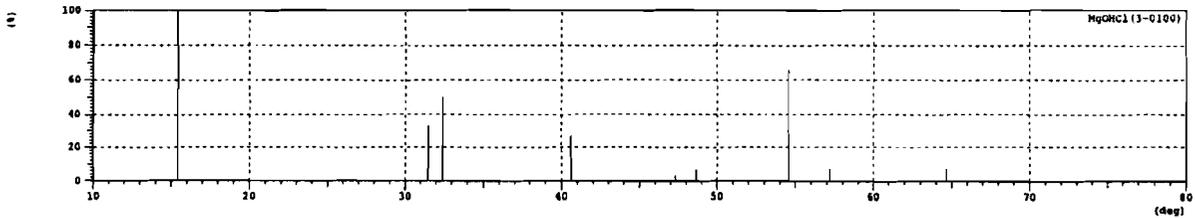
<Raw Data>



<Peak Data/Entry Peak>



<Card Data>



LSN Accession # NEV000000379
Information Source NEV
Participant Accession # NEV5000128
Title CORROSION DATA
Document Date 06/27/2003
Comments
Non-Digital Media
QA Record Indicator
Of Images 4
Descriptors
Access Controls
Addressee Names
Addressee Orgs
Author Names
Author Orgs
Document Numbers
Document Types ADOBE ACROBAT FILE
Packages Ids
Related Record #s
Related Record Codes
Traceabilities
Versions

PLIO-PLEISTOCENE VOLCANISM IN THE SOUTHERN BASIN-AND-RANGE PROVINCE: IMPLICATIONS FOR THE PROPOSED HIGH-LEVEL NUCLEAR WASTE REPOSITORY AT YUCCA MOUNTAIN, NEVADA

BY

E.I. SMITH, J.E. FAULDS, D.L. FEUERBACH, T.R. NAUMANN

**CENTER FOR VOLCANIC AND TECTONIC STUDIES
UNIVERSITY OF NEVADA, LAS VEGAS**

PURPOSE OF STUDIES DURING 1990

- 1. Source of basaltic magma**
- 2. Ascent of magma from source to surface**
- 3. Volcanic hazard assessment**

TOPICS

- 1. Pb, Nd, and Sr isotopes - source of magma**
- 2. Magma ascent**
- 3. AMRV, Buckboard Mesa, and Risk Zones**

TOPICS

1. Pb, Nd, and Sr isotopes - source of magma

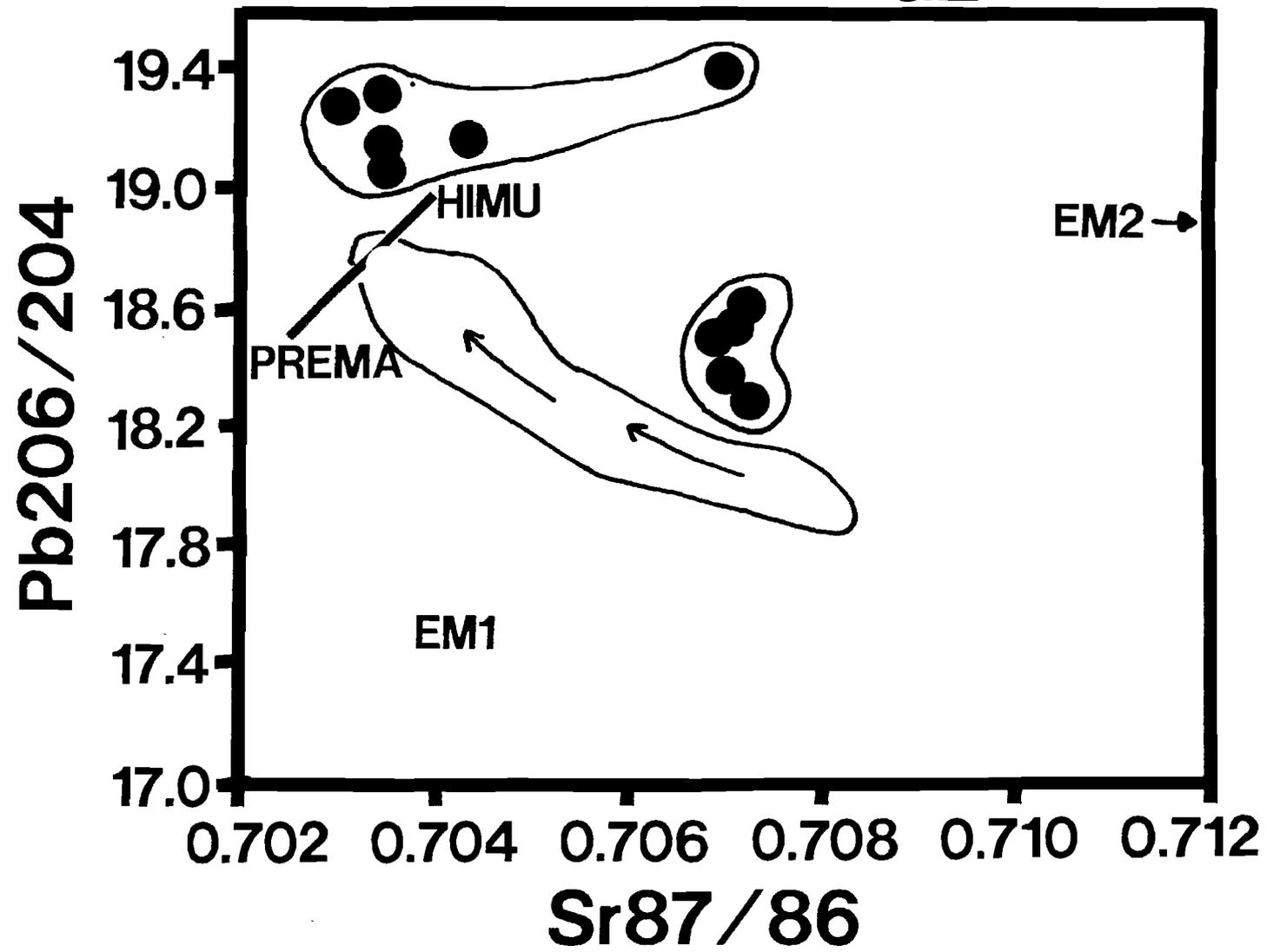
2. Magma ascent

3. AMRV, Buckboard Mesa, and Risk Zones

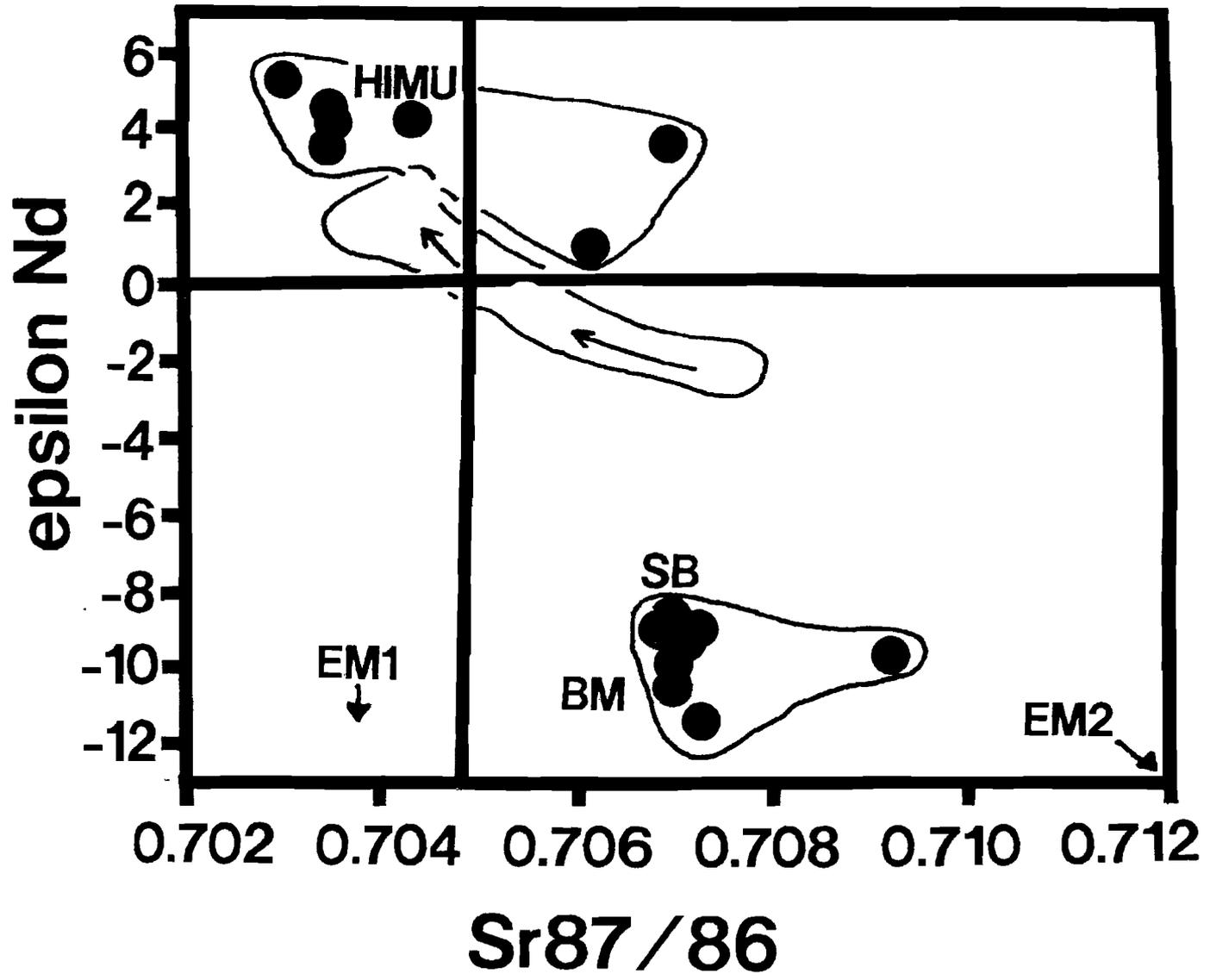
FORTIFICATION HILL

● CRATER FLAT

● REVELLE RANGE



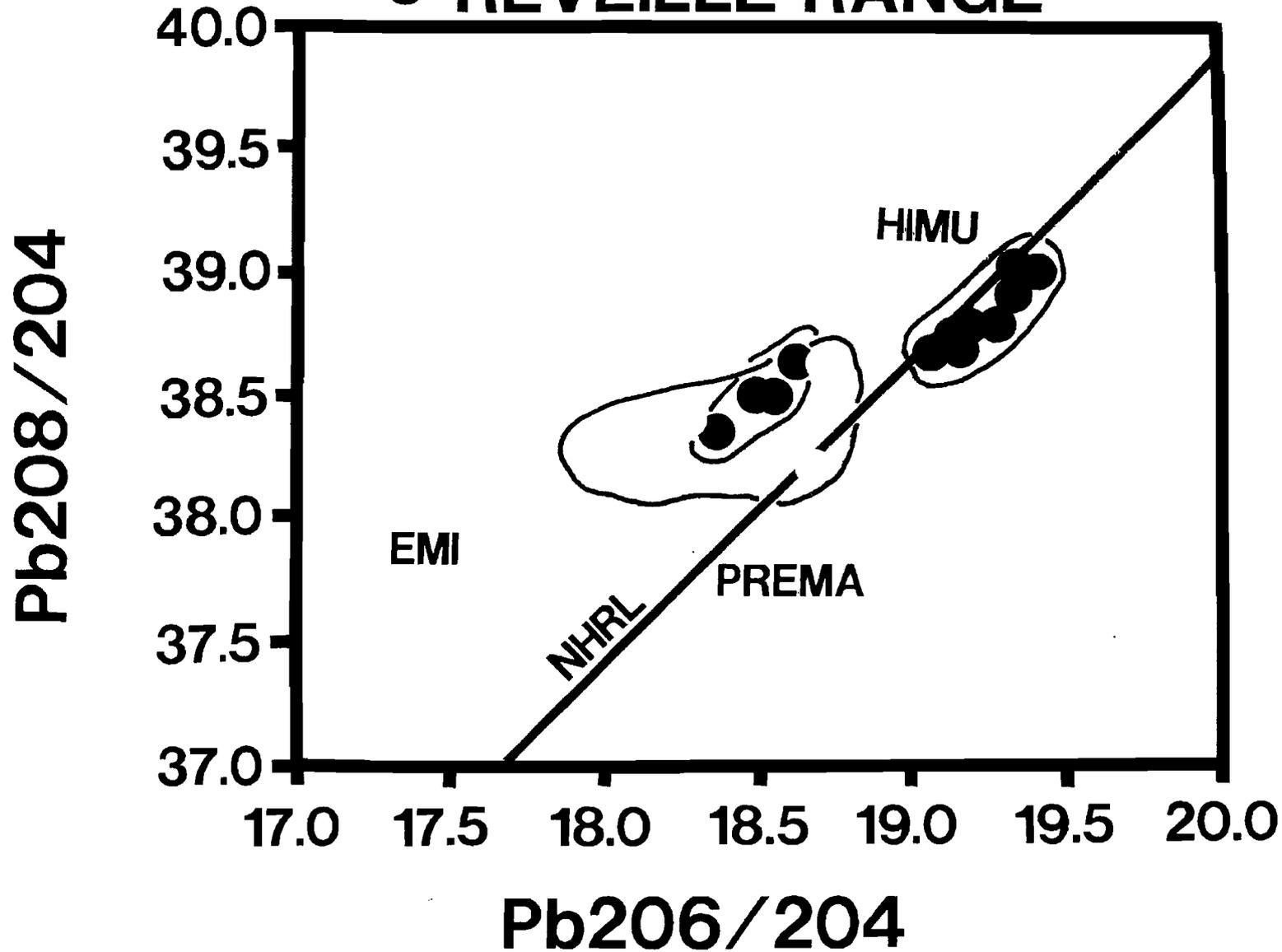
FORTIFICATION HILL
● **CRATER FLAT**
● **REVEILLE RANGE**



FORTIFICATION HILL

● CRATER FLAT

● REVEILLE RANGE



ISOTOPIC STUDIES

- 1. Crater Flat - lithospheric mantle (Farmer et al., 1989).**
- 2. Reveille Range - lithospheric mantle (HIMU).**
- 3. Fortification Hill - lithospheric mantle to a mixture of asthenosphere and HIMU with time. Lithospheric erosion?**

LSN Accession # NEV000001211
Information Source NEV
Participant Accession # NEV0001699
Title PLIO-PLEISTOCENE VOLCANISM IN THE SOUTHERN BASIN-AND-RANGE PROVINCE: IMPLICATIONS FOR THE PROPOSED HIGH-LEVEL NUCLEAR WASTE REPOSITORY AT YUCCA MOUNTAIN, NEVADA
Document Date 01/01/1990
Comments
Non-Digital Media
QA Record Indicator
Of Images 24
Descriptors
Access Controls
Addressee Names
Addressee Orgs
Author Names SMITH EI,FAULDS JE,FEUERBACH DL,NAUMANN TR
Author Orgs UNIV OF NV LAS VEGAS,UNIV OF NV LAS VEGAS,UNIV OF NV LAS VEGAS,UNIV OF NV LAS VEGAS
Document Numbers
Document Types Report
Packages Ids
Related Record #s
Related Record Codes
Traceabilities
Versions

APPENDIX 3

Article (3): Volcanic Time Trend Analysis

VOLCANIC TIME TREND ANALYSIS

Chih-Hsiang Ho

Department of Mathematical Sciences

University of Nevada, Las Vegas

4505 Maryland Parkway

Las Vegas, NV 89154

Fax: (702) 895-4343

Tel: (702) 895-0396

E-mail: chho@nevada.edu

ABSTRACT

I propose test statistics to quantitatively test whether the time-trends of two or more sets of volcanic events are similar or dissimilar. Specifically, the results of the tests provide the following information: (1) Are the volcanic events Poissonian or non-Poissonian? (2) Do the volcanic events show a significantly increasing (or decreasing) time-trend during the observation period? (3) Is the difference between two sets of volcanic recurrence intervals statistically significant? (4) Can we test whether a group of volcanoes (≥ 3) show the same time-trend (increasing, decreasing, or random)? (5) Is there a clear-cut guideline for volcanic model selection process? Furthermore, an empirical example using volcanic data provides efficient computation algorithms for producing informative time-trend analyses.

KEY WORDS: Nonhomogeneous Poisson process, Power-law process, Test statistics, Volcanic time-trend.

INTRODUCTION

Volcanoes and their processes cover an enormous spectrum: from inconspicuous fissures to majestic peaks and from mild steaming to terrifying paroxysms. To understand volcanism - an essential step towards either combating its dangers or utilizing its resources - we must gauge its full breadth and attempt to wrestle its elements into some kind of framework (Simkin and Siebert, 1994). This paper is one of many efforts toward that end.

The subject of volcanic hazards has received increased attention in the past decade. Because of widespread interest in the subject, the use of the nonhomogeneous Poisson process (NHPP) has recently gained popularity in volcanic data analysis as a simple

and versatile tool to assess the waxing or waning time-trends of a volcano and to assess its volcanic hazards (see e.g., Ho 1990, 1995). As I argued in an earlier work (Ho, 1991), a general population of volcanoes can be related to an NHPP. I proposed a new method for time-trend analysis and demonstrated its usefulness on some real data. The method was designed to model a single volcano (or a volcanic system treated as one point process). The main purpose of this article is to propose statistical tests for quantitative comparison of time-trends of several volcanic processes.

The article is organized as follows: (1) The first major section gives notation and reviews of an NHPP to model the time-trend of a single volcano; (2) The second major section introduces an F-test for testing the similarity of two volcanoes; (3) The third major section provides computation algorithms for comparison of more than two volcanoes; (4) The fourth major section illustrates the train of analyses and the numerical computations that are involved in the proposed methods using an empirical example; and (5) the last section presents summary remarks and generalizations.

TREND ANALYSIS FOR ONE VOLCANO

A homogeneous Poisson process (HPP) assumes a constant recurrence rate, λ , for the volcanic events. If the volcanism is waning or developing, the model should be generalized to allow λ to be, respectively, a decreasing or increasing function of t . If one replaces the constant λ with a function of t , denoted by $\lambda(t)$, then another type of Poisson process can be derived, known as an NHPP. An NHPP has a mean value function denoted by $\mu(t|\Theta)$, where Θ is a vector of parameters. The nondecreasing function $\mu(t|\Theta)$ represents the expected number of events to time, t . Once the functional form of $\mu(t|\Theta)$ is specified, the NHPP is fully characterized. An alternate characterization of the NHPP is through its intensity function $\lambda(t|\Theta)$,

where

$$\lambda(t|\Theta) = \frac{d}{dt}\mu(t|\Theta).$$

For volcanism, I (see Ho, 1991) let $\Theta = (\theta, \beta)$ and write

$$\mu(t|\Theta) = (t/\theta)^\beta,$$

so that

$$\lambda(t|\theta, \beta) = (\beta/\theta) (t/\theta)^{\beta-1}.$$

This form, termed the *power law*, has found applications in reliability due to its flexibility (in the sense that the intensity function can be constant, decreasing, or increasing) and the fact that the distribution of the time to first arrival in the process is a Weibull. It is because of this latter property that the underlying Poisson process has sometimes been referred to as the “Weibull process” (Crow, 1974). A noteworthy feature of my approach by replacing the expected number of events in an HPP, λt , with $\mu(t) = (t/\theta)^\beta$ is that I let the volcanic data speak the time-trend for themselves: increasing ($\beta > 1$), decreasing ($\beta < 1$), or random ($\beta = 1$ which assumes a no-memory property). To model the volcanic time-trend using a power-law process (PLP), let t be predetermined and suppose $n > 1$ eruptions are observed during $[0, t]$ at time $0 < t_1 \leq t_2 \leq \dots \leq t_n \leq t$. Some useful theoretical results to be used later are summarized as follows:

(1) Let $S = \sum_{i=1}^n \ln(t/t_i)$, then the maximum likelihood estimators (MLEs) of β and θ are given (Crow, 1974) by:

$$\begin{aligned}\hat{\beta} &= n/S \\ \hat{\theta} &= t/n^{1/\hat{\beta}}.\end{aligned}$$

(2) Under the null hypothesis $H_0 : \beta = 1$, $2S \sim \chi^2(2n)$. Therefore, a size α test of $H_0 : \beta = 1$ against $H_A : \beta \neq 1$ is to reject H_0 if $2S \leq \chi_{\alpha/2}^2(2n)$ or $2S \geq \chi_{1-\alpha/2}^2(2n)$,

where $\chi_{\alpha/2}^2(2n)$ is the $100\alpha/2$ percentile of a chi-square distribution with $2n$ degrees of freedom.

(3) If PLP is assumed during the observation time period $[0, t]$, the intensity (instantaneous recurrence rate) is $\lambda(t) = (\beta/\theta)(t/\theta)^{\beta-1}$ at time t . In the application of the PLP to volcanic eruptive forecasting, the estimate of $\lambda(t)$ is of considerable practical interest because $\lambda(t)$ represents the instantaneous eruptive status of the volcanism at the end of the observation time t . Crow (1982) derives the MLE for $\lambda(t)$ as

$$\hat{\lambda}(t) = (\hat{\beta}/\hat{\theta}) (t/\hat{\theta})^{\hat{\beta}-1} = n\hat{\beta}/t.$$

Clearly, the PLP generalizes the HPP, because when $\beta = 1$ the PLP reduces to an HPP. The chi-square test defined in (2) provides us a quantitative method to objectively evaluate whether the time-trend of the volcanic activities during the observation period (a) remains approximately Poissonian? or (b) shows a significantly increasing (or decreasing) time-trend? I note that in a simulation study, Bain et al. (1985) conclude that the chi-square test which is derived as an optimal test for the PLP also is rather powerful as a test of trend for general NHPP's. In other words, the test is "robust" against other model assumptions. This is the rationale of choosing a PLP to model the volcanic eruptions.

F-TEST FOR TESTING SIMILARITY OF TWO VOLCANOES

If data are obtained from a single volcano and inferences are made only for that volcano, then a PLP with fixed values of the parameters is an appropriate model. However, there are many situations in which more than one volcano are involved in a simple exploratory analysis. For example, Klein (1982) compares repose times for differences between large and small, summit and flank, and Kilauea and Mauna Loa eruptions.

Engineers are able to compare several repairable systems based on statistical methods. Volcanic eruptions are individually unique, but volcanism as a whole is a nonunique process in which repeated combinations of rate balances give rise to categorically similar patterns worldwide. Given sufficiently redundant information, pattern recognition and comparisons with the observed patterns become automatic. I expect to also demonstrate a generalized method of quantitative description and comparisons of the volcanic processes.

Suppose now that independent volcanic repose time series of sizes n_1 and n_2 are observed, and two PLPs with shape parameters β_1 and β_2 are assumed respectively for each process. Let S_1 and S_2 be the corresponding statistics as described in (1), then the overall time-trends of these two volcanic processes can be quantitatively compared using the following test.

(4) Let $F = n_2 S_1 / n_1 S_2$, then under the null hypothesis $H_0 : \beta_1 = \beta_2$, $F \sim F(2n_1, 2n_2)$. And, a size α test of $H_0 : \beta_1 = \beta_2$ against $H_A : \beta_1 \neq \beta_2$ is to reject H_0 if $F \leq F_{\alpha/2}(2n_1, 2n_2)$ or $F \geq F_{1-\alpha/2}(2n_1, 2n_2)$, where $F_{\alpha/2}(2n_1, 2n_2)$ is the $100\alpha/2$ percentile of an F -distribution with $2n_1$ and $2n_2$ degrees of freedom. Dot plots showing the visible time-trends of the volcanoes in the empirical studies section will demonstrate the usefulness of the F -test.

TEST STATISTIC FOR MORE THAN TWO VOLCANOES

Suppose $k (> 2)$ volcanoes are observed for a fixed length of time, t , and volcano i has n_i eruptions at successive time $0 < t_{i1} \leq t_{i2} \leq \dots \leq t_{in_i} \leq t$. Again, some useful theoretical results to be used later are summarized as follows:

(5) Let $S_i = \sum_{j=1}^{n_i} \ln(t/t_{ij})$, then the maximum likelihood estimator (MLE) of β_i derived by Engelhardt and Bain (1987) is

$$\hat{\beta}_i = n_i / S_i,$$

which has the same form as the MLE of the parameter β , as described in (1), for a single PLP model. Also, the useful relationship to the chi-square distribution for $\hat{\beta}_i$, in the PLP case carries over to the case with more than one PLP. Namely, the chi-square test described in (2) is also applicable for testing $H_0 : \beta_i = 1$ against $H_A : \beta_i \neq 1$ for any $i = 1, 2, \dots, k$.

(6) A test of equality of shape parameters, $H_0 : \beta_1 = \beta_2 = \dots = \beta_k$ rejects this hypothesis at the approximate level α if

$$M \geq c\chi_{1-\alpha}^2(k-1)$$

where

$$c = 1 + \frac{1}{3(k-1)} \left(\sum_{i=1}^k \frac{1}{2n_i} \right) - \frac{1}{2N}$$

$$M = 2N \left[\ln \left(\sum_{i=1}^k n_i / \hat{\beta}_i \right) - \ln N \right] + 2 \sum_{i=1}^k n_i \ln(\hat{\beta}_i)$$

and

$$N = \sum_{i=1}^k n_i, \text{ the total number of eruptions for all } k \text{ volcanoes.}$$

Interested readers are referred to the article of Engelhardt and Bain (1987) for theoretical development and further references. In the next section, I apply these computation algorithms to volcanic data to produce informative time-trend analyses.

EMPIRICAL EXAMPLE

Data

Simkin et al. (1981) constructed a chronology of known volcanic events over the past 8,000 years. The record has been updated through December 31, 1993 (Simkin and Siebert, 1994). The eruption records (adopted from *Volcanoes of the World*, 2nd edition, Simkin and Siebert, 1994) of the following three volcanoes in New Zealand

are studied for time-trend analyses: White Island, Tongariro, and Ruapehu. (New Zealand contains the world's strongest concentration of youthful rhyolitic volcanoes, and voluminous ignimbrite sheets blanket much of North Island.)

The record of volcanic activity analyzed in this article has the form of a point process (i.e., a record of the month and year during which each eruption occurred). Several simplifying assumptions must be made in treating eruptions as a point process in time: (1) Although the onset date of an eruption is generally well-defined by the time when lava first breaks the surface, the duration is harder to determine because of such problems as slowly cooling flows or lava lakes and the gradual decline of activity. I adopt the same definition for repose time as defined by Klein (1982). I, therefore, ignore eruption duration; instead, I take the onset date as most physically meaningful, and measure repose times from one onset date to the next. Thus, my definition of "repose time" differs from the classic one (a noneruptive period). This procedure seems justified because most eruption durations are much shorter than typical repose intervals (Klein, 1982). Each data set of a PLP consists of the cumulative length of time (measured in months) over which the eruptions occur. (2) On several occasions, the months during which eruptions occurred are uncertain and were therefore assigned somewhat arbitrarily. (3) The first eruption on the record of volcano White Island was on the first day of December, 1826. Therefore, this date becomes my choice of the starting point for the observation period for all three volcanoes. And the last day of year 1993 is the end of the observation period, which is the same as that of the listed volcanoes in Simkin and Siebert (1994).

Time-Trend Analyses

To be consistent with the mathematical notations presented in (1) through (6), I label volcanoes White Island, Tongariro, and Ruapehu as volcano no. 1, 2, and 3

respectively for the following analyses and discussions.

(1) During the observation period, December 1, 1826 to December 31, 1993, the data for the number of recurrence intervals are $n_1 = 32$, $n_2 = 70$, and $n_3 = 50$. The estimated shape parameters for the time-trend are $\hat{\beta}_1 = 1.913$, $\hat{\beta}_2 = 1.305$, and $\hat{\beta}_3 = 3.516$ (see Table 1). The result implies that all three volcanoes show an increasing trend (i.e., $\beta > 1$) during the observation period. The two-sided p-values summarized in Table 1 indicate that Tongariro volcano provides only moderate evidence against $H_0 (\beta_2 = 1)$ with p-value = 0.037, while the other two volcanoes show strong evidence against H_0 . Dot diagrams presented in Figure 1 reconfirm the quantitative results.

(2) Interestingly enough, the instantaneous recurrence rate estimated on December 31, 1993 for Ruapehu volcano ($\hat{\lambda}_3 = 0.088/\text{month}$) is higher than that of Tongariro ($\hat{\lambda}_2 = 0.046/\text{month}$), although Tongariro volcano produced twenty more eruptions than volcano Ruapehu during the same observation period. It is because that the PLP incorporates the time-trend, evidence of additional events will not increase necessarily the instantaneous recurrence rate as it would for the HPP recurrence rate. This noteworthy feature of the PLP model is of considerable practical interest in volcanic risk/hazard assessment studies (e.g., see Ho, 1995).

(3) For the pairwise comparisons, let's consider volcanoes White Island and Tongariro: $n_1 = 32$, $n_2 = 70$, $S_1 = 16.725$, $S_2 = 53.647$ (see Table 1) and the degrees of freedom for the F distribution are $2n_1 = 64$ and $2n_2 = 140$. The test does not reject $H_0 : \beta_1 = \beta_2$ because $F = 0.682$ and the two-tailed p-value is 0.086 (see Table 2). Thus, we consider that the shape parameter, β , is statistically the same for volcanic activities of White Island and Tongariro volcanoes during the observation period. However, comparisons (see Table 2 and Figure 1) between Tongariro versus Ruapehu, and White Island versus Ruapehu show that the differences are significant with p-values 0.006 and ≈ 0 respectively. (Note that these still stand up nicely to a

Bonferroni corrected alpha of $0.05/3 = .0166\dots$, if one chooses to do the adjustment of alpha for multiple tests.)

(4) Now, recall from (6) of the previous section that a test of equality of shape parameters, $H_0 : \beta_1 = \beta_2 = \beta_3$ rejects this hypothesis at the approximate level 0.05 if

$$M \geq c\chi_{.95}^2(2).$$

For this study, I get $c = 1.002$, $\chi_{.95}^2(2) = 5.99$, and the critical value $c\chi_{.95}^2(2)$ is approximately 6.002. Because the test statistic M is 26.359, H_0 is rejected at $\alpha = 0.05$ as I have expected from the previous results of pairwise comparisons. Actually, the test is significant at any level since the p-value is ≈ 0 . Therefore, I conclude that these volcanoes do not share a common shape parameter, β , which serves as an indicator for the time-trend of the volcanic activities.

(5) Finally, what are the merits of performing the above tests? I shall discuss this issue based on the following scenarios that one might conclude from the trend analyses.

$$\text{Case 1: } \beta_1 = \beta_2 = \beta_3 = 1$$

$$\text{Case 2: } \beta_1 = \beta_2 = \beta_3 = \beta \neq 1$$

$$\text{Case 3: } \beta_i \neq \beta_j \text{ for some } i, j, \text{ where } 1 \leq i < j \leq 3.$$

For Case 1, a compound homogeneous Poisson process (CHPP) can be used to model the aggregate behavior of these Poissonian volcanoes ($\beta = 1$). In a CHPP model, the recurrence rate for a given volcano or group of volcanoes is described by a gamma distribution (prior) rather than treated as a constant value as in the assumptions of an HPP. I performed Bayesian analysis (Ho, 1990) to link these two distributions together to give the aggregate behavior of the volcanic activity. When the HPP is expanded to accommodate a gamma mixing distribution on λ , a consequence of this mixed (or compound) Poisson model is that the frequency distribution of eruptions in any given time-period of equal length follows the negative binomial distribution

(NBD). Applications of the model and comparisons between this generalized model and an HPP were discussed based on the historical eruptive count data of volcanoes Mauna Loa and Etna (Ho, 1990). Several relevant facts led to the conclusion that the generalized model is preferable for practical use both in space and time. A similar situation can occur with a group of non-Poissonian volcanoes ($\beta \neq 1$). If one replaces the underlying distribution in a CHPP with an NHPP distributed according to a PLP and also let the intensity parameter vary according to a gamma distribution as described in the model of Ho, 1990, then a new model called compound power-law process (CPLP) provides a better fit than a CHPP. Statistical analysis of a CPLP for repairable systems has been presented in an article by Engelhardt and Bain (1987). This model requires several assumptions including the one that I described in Case 2 (i.e., $\beta_1 = \beta_2 = \beta_3 = \beta \neq 1$). My efforts for future studies are to develop the volcanological aspect of a CPLP and to point the potential usefulness of this model in volcanology. For Case 3, to my best knowledge, a single model such as a CHPP for Case 1 and a CPLP for Case 2 is not available.

CONCLUSIONS

Volcanic activity is governed by the complex interaction of several geological, geophysical and geochemical factors. Because of this complexity, even with the present knowledge, eruptions cannot theoretically be predicted. Therefore, the evaluation of eruptive probabilities for a given volcano or a volcanic center remains an open problem in the definition of volcanic risk. There are many unknown areas with respect to geologic understanding of volcanic activity, despite the fact that there are well recognized means of gathering data (field mapping, determinations of the eruptive history of basaltic centers, petrology, geochemistry, geochronology including magnetic polarity determinations, tectonic setting, and geophysical studies) that are well advanced.

Present understanding of eruptive mechanisms is not yet advanced enough to allow deterministic predictions of future activity to be put forward. The only attempts at long-term forecasting have been made on statistical grounds, using historical records to examine eruption frequencies, types, patterns, risks and probabilities. This paper extends my previous work (Ho, 1991) on testing the significance of increasing or decreasing time-trends of volcanoes. I now add two new test statistics to the geological literature which represents a good cross-application of statistics to geosciences. In summary, the significance of this work is: quantitative comparisons between (or among) volcanoes become possible and a clear-cut guideline for volcanic model selection process evolves.

REFERENCES

- Bain, L.J., Engelhardt, M., and Wright, F.T., 1985, Tests for an increasing trend in the intensity of a Poisson process: a power study: *Jour. Am. Statist. Assoc.*, v. 80, no. 390, p. 419-422.
- Crow, L.H., 1974, Reliability analysis for complex, repairable systems, in Proschan, F., and Serfling, R.J., eds., *Reliability and biometry*: SIAM, Philadelphia, p. 392-410.
- Crow, L.H., 1982, Confidence interval procedures for the Weibull process with applications to reliability growth: *Technometrics*, v. 24, no.1, p. 67-72.
- Engelhardt, M., and Bain, L.T., 1987, Statistical analysis of a compound power-law model for repairable systems: *IEEE Transactions on Reliability*, v. R-36, no. 4, p. 392-396.

- Ho, C.-H., 1990, Bayesian analysis of volcanic eruptions: *Jour. Volcan. Geotherm. Res.*, v. 43, no. 2, p. 91-98.
- Ho, C.-H., 1991, Time trend analysis of basaltic volcanism for the Yucca Mountain Site: *Jour. Volcanol. Geotherm. Res.*, v. 46, no. 2, p. 61-72.
- Ho, C.-H., 1995, Sensitivity in volcanic hazard assessment for the Yucca Mountain high-level nuclear waste repository site: the model and the data: *Math. Geology*, vo. 27, no. 2, p. 239-258.
- Klein, F.W., 1982, Patterns of historical eruptions at Hawaii volcanoes: *J. Volcanol. Geotherm. Res.*, v. 12, no. 1, p. 1-35.
- Simkin, T., and Seibert, L., 1994, *Volcanoes of the World* (2nd ed.): Smithsonian Institution, Global Volcanism Program published by Geoscience Press, Tucson, 349 p.

Table 1. Summary Statistics for Trend Analysis

	Volcano		
	White Island	Tongariro	Ruapehu
n_i	32	70	50
S_i	16.725	53.647	14.219
$\hat{\beta}_i$	1.913	1.305	3.516
$\hat{\lambda}_i$ (no. of eruptions/month)	0.031	0.046	0.088
Chi-square test statistic (for $H_0: \beta_i = 1$)	33.450	107.293	28.438
p-value (two-tailed)	0.001	0.037	≈ 0

Table 2. Results of F Tests for Pairwise Comparisons

	White Island	White Island	Tongariro
	vs. Tongariro	vs. Ruapehu	vs. Ruapehu
F-statistic	0.682	1.838	2.695
p-value (two-tailed)	0.086	0.006	≈ 0

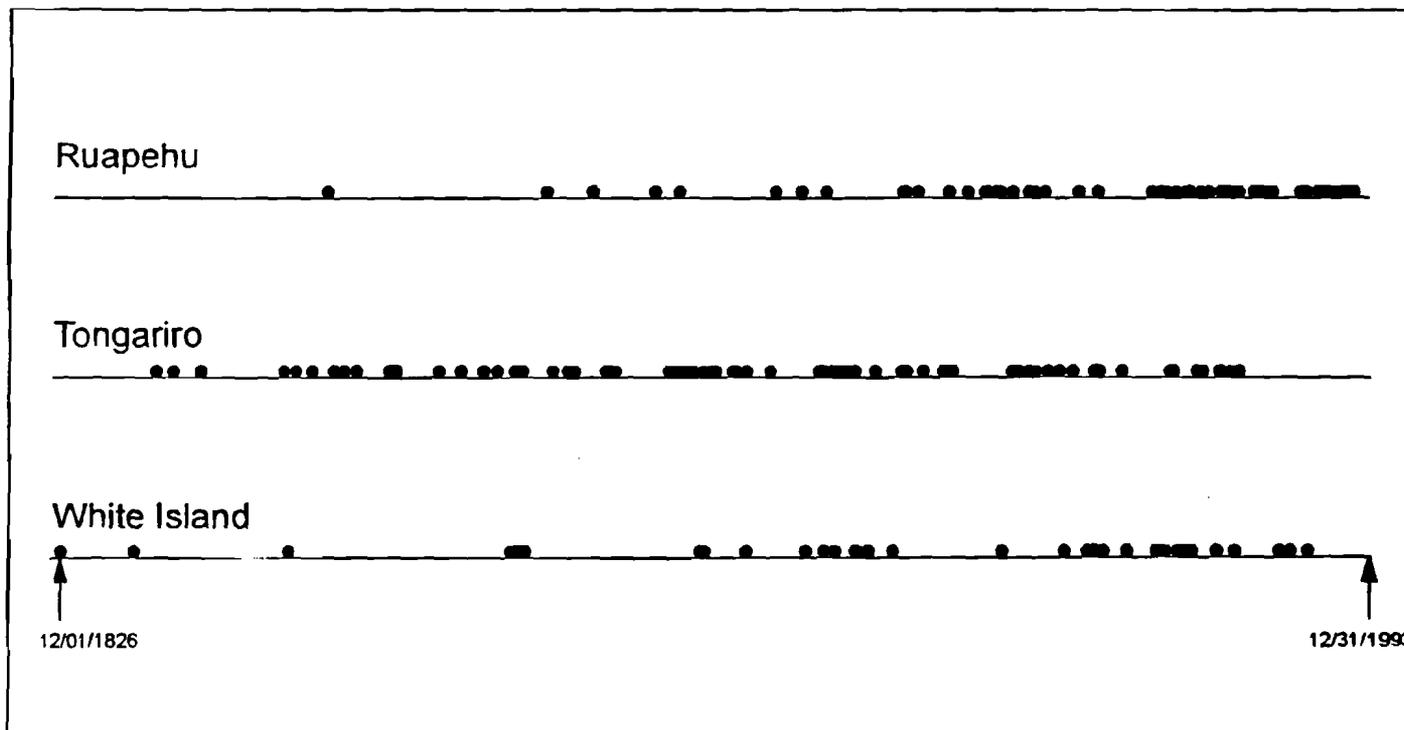


Figure 1. Dot diagrams of recurrence intervals (in months) of volcanoes Ruapehu, Tongariro, and White Island in their original chronological orders observed during December 1, 1826 to December 31, 1993.

LSN Accession # NEV000001107
Information Source NEV
Participant Accession # NEV0001132
Title VOLCANIC TIME TREND ANALYSIS
Document Date 01/01/1995
Comments
Non-Digital Media
QA Record Indicator
Of Images 16
Descriptors
Access Controls
Addressee Names
Addressee Orgs
Author Names HO C
Author Orgs UNIV OF NV
Document Numbers
Document Types Report
Packages Ids
Related Record #s
Related Record Codes
Traceabilities
Versions

MIKE THORNE AND ASSOCIATES LIMITED

(Director: Dr M C Thorne; Company No. 4155738; Registered in England and Wales)

Abbotsleigh
Kebroyd Mount
Ripponden
Halifax
West Yorkshire
HX6 3JA

Telephone and Fax: 01422 825890

e-mail: MikeThorneLtd@aol.com

EXTERNAL MEMORANDUM

Date: 14 May 2007
From: M C Thorne
To: V Gilinsky
Copies: Standard Conference Call Distribution List
Subject: Convergence

Victor

Having looked at your recent e-mails on this issue, I thought that it would be useful to develop a simple calculation to illustrate the issue as I see it. For this illustrative purpose, I adopt a lognormal distribution, as this is commonly observed in model outputs, is positive definite and can be made as positively skew as you like by a suitable choice of the standard deviation. The probability density function, $P(x)$, is given by:

$$P(x) = \exp(-[\ln(x) - \mu]^2 / 2\sigma^2) / \{x\sigma(2\pi)^{0.5}\}$$

where μ defines the median of the distribution (as it is symmetric in $\ln(x)$ about μ) and σ is the standard deviation of the distribution in $\ln(x)$.

An important property of the lognormal distribution is that the true arithmetic mean is given by $\exp(\mu + \sigma^2/2)$. Note that the arithmetic mean is always larger than the median and that the difference between them increases as the value of σ increases.

In my analysis, I have, without loss of generality, set μ to be zero. However, on the accompanying spreadsheet, you can set both μ and σ , as required.

I have set up a spreadsheet that first calculates the integral of $P(x)$ (down the left hand side). I then calculate 250 random numbers uniformly distributed from 0 to 1.0 (across the top). For each random number, I calculate the 'bin' of the cumulative probability distribution within which it falls. This allows me to build up a sample of 250 equally weighted estimates of the parameter x (i.e. I uniformly sample on $P(x)$ and use this to

give the distribution of associated x values). Based on these 250 samples, I then calculate the arithmetic mean value of x (calculation on the right hand side). Pressing F9 selects a new set of random numbers and hence gives a new estimate of the arithmetic mean. Note that the spreadsheet also includes graphs of $P(x)$ and the integral of $P(x)$ that may be useful for examining the skewness of the distribution.

I have applied this spreadsheet to estimate the arithmetic mean for ten sequential sets of 250 samples. I have repeated this for different values of σ . In each case, I have then calculated the ratios of the estimated means to the true mean and have found the minimum and maximum ratio for the ten samples. Results of this analysis are shown in the following table.

σ	5.00E-01	1.00E+00	2.00E+00	3.00E+00	4.00E+00	5.00E+00	6.00E+00
Estimated Means:	1.22E+00	1.72E+00	1.07E+01	1.47E+02	3.21E+03	3.77E+03	4.60E+04
	1.13E+00	1.63E+00	9.42E+00	4.24E+01	1.77E+02	1.53E+03	2.26E+07
	1.29E+00	1.85E+00	5.18E+00	1.29E+02	7.03E+02	6.55E+04	2.49E+04
	1.24E+00	1.55E+00	4.78E+00	5.32E+01	4.33E+02	2.01E+04	1.77E+04
	1.18E+00	1.70E+00	8.63E+00	9.67E+01	3.36E+02	1.22E+05	3.24E+05
	1.22E+00	1.88E+00	6.20E+00	9.54E+01	1.17E+03	8.22E+03	4.66E+05
	1.14E+00	1.73E+00	6.88E+00	1.72E+02	1.47E+03	4.15E+03	8.63E+04
	1.21E+00	1.74E+00	6.78E+00	7.70E+01	7.56E+02	1.70E+04	2.20E+04
	1.24E+00	1.47E+00	7.97E+00	3.67E+01	4.91E+02	5.80E+04	1.74E+04
	1.12E+00	1.68E+00	1.13E+01	5.65E+01	7.30E+03	2.12E+03	7.50E+05
True Mean	1.13E+00	1.65E+00	7.39E+00	9.00E+01	2.98E+03	2.68E+05	6.57E+07
Ratio Estimated: True	1.08E+00	1.04E+00	1.45E+00	1.63E+00	1.08E+00	1.41E-02	7.00E-04
	1.00E+00	9.88E-01	1.27E+00	4.71E-01	5.94E-02	5.71E-03	3.44E-01
	1.14E+00	1.12E+00	7.01E-01	1.43E+00	2.36E-01	2.44E-01	3.79E-04
	1.10E+00	9.39E-01	6.47E-01	5.91E-01	1.45E-01	7.50E-02	2.69E-04
	1.04E+00	1.03E+00	1.17E+00	1.07E+00	1.13E-01	4.53E-01	4.93E-03
	1.08E+00	1.14E+00	8.39E-01	1.06E+00	3.93E-01	3.07E-02	7.09E-03
	1.01E+00	1.05E+00	9.31E-01	1.91E+00	4.93E-01	1.55E-02	1.31E-03
	1.07E+00	1.05E+00	9.17E-01	8.56E-01	2.54E-01	6.34E-02	3.35E-04
	1.10E+00	8.91E-01	1.08E+00	4.08E-01	1.65E-01	2.16E-01	2.65E-04
	9.91E-01	1.02E+00	1.53E+00	6.28E-01	2.45E+00	7.91E-03	1.14E-02
Minimum Ratio	9.91E-01	8.91E-01	6.47E-01	4.08E-01	5.94E-02	5.71E-03	2.65E-04
Maximum Ratio	1.14E+00	1.14E+00	1.53E+00	1.91E+00	2.45E+00	4.53E-01	3.44E-01

When σ is small, the distribution is close to symmetric, but as σ increases the distribution becomes more and more skewed, with a lengthening tail toward high values. For small σ , 250 samples are sufficient to give a reasonable estimate of the true mean. However, when σ is increased, the variation in the estimated mean relative to the true mean increases. Furthermore, in most samples the estimated mean is less than the true mean. This latter effect arises because as σ increases, the true mean becomes increasingly dominated by samples from the long tail of the distribution, and it becomes less and less likely that one or more samples out of 250 will be drawn from the relevant region of the

tail. Note that for $\sigma = 6.0$, the ten sets of 250 samples yield mean values between $2.65E-4$ and $3.44E-1$ of the true mean. Furthermore, eight out of the ten sets yield an estimated mean that is less than one percent of the true mean.

In context, although we cannot know whether the results from the TSPA will be lognormally distributed, we can be sure that they will exhibit a distribution that is strongly positively skewed. In these circumstances, there is a high *a priori* likelihood that many hundreds or thousands of samples will be required to achieve a converged estimate of the mean.

HEADER VIEW: NEV000004357 - NEV5000141

CONVERGENCE

LSN Accession #	NEV000004357
Information Source	NEV
Participant Accession #	NEV5000141
Title	CONVERGENCE
Document Date	05/14/2007
Comments	
Non-Digital Media	
QA Record Indicator	
# Of Images	3
Descriptors	
Access Controls	
Addressee Names	GILINSKY V
Addressee Orgs	
Author Names	THORNE MC
Author Orgs	MIKE THORNE & ASSOCIATES LTD
Document Numbers	
Document Types	Correspondence
Packages Ids	
Related Record #s	
Related Record Codes	
Traceabilities	
Versions	

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of)
)
U.S. DEPARTMENT OF ENERGY) Docket No. PAPO-00
)
(High-Level Waste Repository:)
Pre-Application Matters))

CERTIFICATE OF SERVICE

I hereby certify that the foregoing State of Nevada's Exhibits 16 through 27 have been served upon the following persons either by Electronic Information Exchange or electronic mail (denoted by an asterisk (*)).

U.S. Nuclear Regulatory Commission
Atomic Safety and Licensing Board Panel
Mail Stop - T-3 F23
Washington, DC 20555-0001
Thomas S. Moore, Chair
Administrative Judge
Email: PAPO@nrc.gov
Alex S. Karlin
Administrative Judge
Email: PAPO@nrc.gov
Alan S. Rosenthal
Administrative Judge
Email: PAPO@nrc.gov &
rsnthl@comcast.net
G. Paul Bollwerk, III
Administrative Judge
Email: PAPO@nrc.gov
Anthony C. Eitreim, Esq.
Chief Counsel
Email: PAPO@nrc.gov
James M. Cutchin
Email: PAPO@nrc.gov
Jered Lindsay
Email: PAPO@nrc.gov
Marcia Carpentier*
Email: PAPO@nrc.gov
Margaret Parish
Email: PAPO@nrc.gov
Debra Wolf
Email: PAPO@nrc.gov
Bradley S. Baxter*
Email: bxh@nrc.gov
Daniel J. Graser

LSN Administrator
Email: djg2@nrc.gov
ASLBP HLW Adjudication
Email: ASLBP_HLW_Adjudication@nrc.gov

U.S. Nuclear Regulatory Commission
Office of the Secretary of the Commission
Mail Stop - O-16 C1
Washington, DC 20555-0001
Hearing Docket
Email: hearingdocket@nrc.gov
Andrew L. Bates
Email: alb@nrc.gov
Adria T. Byrdsong
Email: atb1@nrc.gov
Emile L. Julian, Esq.
Email: elj@nrc.gov
Evangeline S. Ngbea
Email: esn@nrc.gov
Rebecca L. Gütter
Email: rll@nrc.gov

U.S. Nuclear Regulatory Commission
Office of Congressional Affairs
Mail Stop O-17A3

U.S. Nuclear Regulatory Commission
Office of Public Affairs
Mail Stop O-2A13
David McIntyre
Email: dtm@nrc.gov

U.S. Nuclear Regulatory Commission
Office of the General Counsel
Mail Stop - O-15 D21
Washington, DC 20555-0001
Karen D. Cyr, Esq.*
General Counsel
Email: kdc@nrc.gov
Gwendolyn D. Hawkins
Email: gxh2@nrc.gov
Janice E. Moore, Esq.
Email: jem@nrc.gov
Trip Rothschild, Esq.*
Email: tbr@nrc.gov
Mitzi A. Young, Esq.
Email: may@nrc.gov
Marian L. Zobler, Esq.
Email: mlz@nrc.gov
Andrea L. Silvia, Esq.
Email: alc1@nrc.gov
Daniel Lenehan, Esq.
Email: dwl2@nrc.gov
Margaret J. Bupp
Email: mjb5@nrc.gov
OGCMailCenter
Email: OGCMailCenter@nrc.gov

Hunton & Williams LLP
Counsel for the U.S. Department of Energy
Riverfront Plaza, East Tower
951 East Byrd Street
Richmond, VA 23219
W. Jeffery Edwards, Esq.
Email: jedwards@hunton.com
Kelly L. Faglioni, Esq.
Email: kfaglioni@hunton.com
Melissa Grier
Email: mgrrier@hunton.com
Donald P. Irwin, Esq.
Email: dirwin@hunton.com
Stephanie Meharg
Email: smeharg@hunton.com
Edward P. Noonan, Esq.
Email: enoonan@hunton.com
Audrey B. Rusteau
Email: arusteau@hunton.com

Michael R. Shebelskie, Esq.
Email: mshebelskie@hunton.com
Pat Slayton
Email: pslayton@hunton.com
Belinda A. Wright
Email: bwright@hunton.com

U.S. Department Of Energy
Office of General Counsel
1551 Hillshire Drive
Las Vegas, NV 89134-6321
George W. Hellstrom
Email: george.hellstrom@ymp.gov

U.S. Department of Energy
Office of General Counsel
1000 Independence Avenue, S.W.
Washington, DC 20585
Martha S. Crosland, Esq.
Email: martha.crosland@hq.doe.gov
Angela M. Kordyak, Esq.
Email: angela.kordyak@hq.doe.gov
Mary B. Neumayr, Esq.*
Email: mary.neumayr@hq.doe.gov

Carter Ledyard & Milburn, LLP
Counsel for Lincoln County
1401 Eye Street, N.W., Suite 300
Washington, DC 20005
Barry S. Neuman, Esq.
Email: neuman@clm.com

U.S. Department of Energy
1000 Independence Avenue, S.W.
Washington, DC 20585
Eric Knox, Associate Director, Systems
Operations and External Relations, OCRWM*
Email: eric.knox@hq.doe.gov
Dong Kim, LSN Project Manager, OCRWM*
Email: dong.kim@rw.doe.gov

Churchill, Esmeralda, Eureka, Mineral
and Lander Counties
1705 Wildcat Lane
Ogden, UT 84403
Loreen Pitchford, LSN Coordinator
for Lander County
Email: lpitchford@comcast.net

U.S. Department of Energy
Office of Civilian Radioactive Waste Mgmt
Office of Repository Development
1551 Hillshire Drive
Las Vegas, NV 89134-6321
Timothy C. Gunter
Email: timothy_gunter@ymp.gov

City of Las Vegas
400 Stewart Ave.
Las Vegas, NV 89101
Margaret Plaster, Management Analyst
Email: mplaster@LasVegasNevada.gov

Clark County (NV) Nuclear Waste Division
500 S. Grand Central Parkway
Las Vegas, NV 89155
Irene Navis*
Email: iln@co.clark.nv.us
Engelbrecht von Tiesenhausen
Email: evt@co.clark.nv.us

Nuclear Waste Project Office
1761 East College Parkway, Suite 118
Carson City, NV 89706
Robert Loux
Email: bloux@nuc.state.nv.us
Steve Frishman, Tech. Policy Coordinator
Email: steve.frishman@gmail.com

Eureka County and Lander County, Nevada
Harmon, Curran, Speilberg & Eisenberg
1726 M. Street N.W., Suite 600
Washington, DC 20036
Diane Curran, Esq.
Email: dcurran@harmoncurran.com

Nevada Nuclear Waste Task Force
P.O. Box 26177
Las Vegas, NV 89126
Judy Treichel, Executive Director
Email: judynwtf@aol.com

Talisman International, LLC
1000 Potomac St., N.W., Suite 300
Washington, D.C. 20007
Patricia Larimore
Email: plarimore@talisman-intl.com

Nuclear Energy Institute
1776 I Street, NW, Suite 400
Washington, DC 20006-3708
Michael A. Bauser, Esq.
Associate General Counsel
Email: mab@nei.org
Anne W. Cottingham, Esq.
Email: awc@nei.org
Ellen C. Ginsberg, Esq.
Email: ecg@nei.org
Rod McCullum*
Email: rxm@nei.org
Steven P. Kraft*
Email: spk@nei.org

White Pine County
City of Caliente
Lincoln County
P.O. Box 126
Caliente, NV 89008
Jason Pitts
Email: jayson@idtservices.com

Nuclear Information and Resource Service
6930 Carroll Avenue, Suite 340
Takoma Park, MD 20912
Michael Mariotte, Executive Director*
Email: nirsnet@nirs.org

Radioactive Waste Watchdog
Beyond Nuclear
6930 Carroll Avenue, Suite 400
Takoma Park, MD 20912
Kevin Kamps*
Email: kevin@beyondnuclear.org

Yucca Mountain Project, Licensing Group,
DOE/BSC
Regulatory Programs
1180 North Town Center Drive
Las Vegas, NV 89144
Jeffrey Kriner
Email: jeffrey_kriner@ymp.gov

Abigail Johnson*
612 West Telegraph Street
Carson City, NV 89703
Email: abbyj@gbis.com

National Congress of American Indians
1301 Connecticut Ave. NW - Second floor
Washington, DC 20036
Robert I. Holden, Director*
Nuclear Waste Program
Email: robert_holden@ncai.org

Ross, Dixon & Bell
2001 K Street N.W.
Washington D.C. 20006-1040
William H. Briggs*
Email: wbriggs@rdblaw.com
Merril Hirsh, Esq.
Email: mhirsh@rdblaw.com

Churchill County (NV)
155 North Taylor Street, Suite 182
Fallon, NV 89406
Alan Kalt*
Email: comptroller@churchillcounty.org

Inyo County Water Department
Yucca Mtn Nuclear Waste
Repository Assessment Office
163 May St.
Bishop, CA 93514
Matt Gaffney, Project Associate*
Email: mgaffney@inyoyucca.org

Environmental Protection Agency
Ray Clark*
Email: clark.ray@epa.gov

Nuclear Waste Technical Review Board
Joyce Dory*
Email: dory@nwtrb.gov

Intertech Services Corporation
(for Lincoln County)
P.O. Box 2008
Carson City, NV 89702-2008
Dr. Mike Baughman*
Email: bigboff@aol.com

Nye County (NV) Department of Natural
Resources & Federal Facilities
1210 E. Basin Road, Suite 6
Pahrump, NV 89048
David Swanson*
Email: dswanson@nyecounty.net

Lincoln County (NV) Nuclear Oversight Prgm
100 Depot Ave., Suite 15; P.O. Box 1068
Caliente, NV 89008-1068
Lea Rasura-Alfano, Coordinator*
Email: jcciac@co.lincoln.nv.us

Nye County (NV) Regulatory/Licensing Adv.
18160 Cottonwood Rd. #265
Sunriver, OR 97707
Malachy Murphy*
Email: mrmurphy@cmc.net

Mineral County (NV) Board of County
Commissioners
P.O. Box 1600
Hawthorne, NV 89415
Linda Mathias, Administrator*
Office of Nuclear Projects
Email: yuccainfo@mineralcountynv.org

State of Nevada (NV)
100 N. Carson Street
Carson City, NV 89710
Marta Adams*
Email: maadams@ag.state.nv.us

White Pine County (NV) Nuclear
Waste Project Office
959 Campton Street
Ely, NV 89301
Mike Simon, Director*
(Heidi Williams, Adm. Assist. *)
Email: wpnucwst1@mwpower.net

Fredericks & Peebles, L.L.P.
1001 Second Street
Sacramento, CA 95814
916-441-2700
FAX 916-441-2067
Darcie L. Houck
Email: dhouck@ndnlaw.com
John M. Peebles*
Email: jpeebles@ndnlaw.com
Joe Kennedy, Chairman*
Email: chairman@timbisha.org
Barbara Durham*
Tribal Historic Preservation Officer
Email: dvdurbarbara@netscape.com

(signed electronically)
Susan Montesi