



*KStabkin*

Department of Energy  
Washington, DC 20585  
DEC 5 1989

John J. Linehan, Director  
Repository Licensing and Quality  
Assurance Project Directorate  
Division of High-Level  
Waste Management  
Office of Nuclear Material  
Safety and Safeguards  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Mr. Linehan:

Reference:

- 1) Letter from J. Linehan to R. Stein; dated August 28, 1989; re: request for the EQ3/6 computer tape and associated documentation technical procedures.
- 2) Letter from J. Linehan to R. Stein; dated September 5, 1989; re: request for DOE computer codes and their documentation.

As you requested in your August 28, 1989 and September 5, 1989, letters (References 1 and 2), we are providing you with several computer codes and associated documentation to assist you in developing and maintaining a capability to execute independent analyses of the performance of a high-level waste repository.

The information you requested is administered by contractors to the U.S. Department of Energy (DOE) Office of Civilian Radioactive Waste Management or the DOE Yucca Mountain Project Office. We have asked the appropriate DOE offices to instruct their contractors to transmit the applicable codes and documentation directly to you (Enclosures 1, 2, and 3.)

For future reference, you should also know that most of the material you requested could be obtained from the National Energy Software Center (NESC) at the following address:

Margaret K. Butler  
National Energy Software Center  
Argonne National Laboratory  
9700 South Cass Avenue  
Argonne, IL 60439

Margaret Butler can be reached on (FTS) 972-7172. Ms. Butler indicates that NESC frequently has the most updated version of

*//*

8912140397 891205  
PDR WASTE PDC  
WM-1

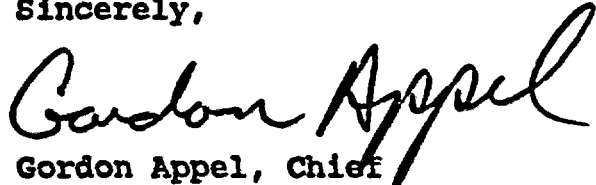
ADD: KStabkin

*WMe1*  
*109*  
*NH01*

computer codes and their associated documentation. However, it would be appropriate for you to call Corinne Macaluso, of my staff, to verify that NESC does have the most recent version of any software package(s) you may request.

If you have any questions or concerns regarding this correspondence, please feel free to contact me on 586-1462 or Corinne Macaluso at 586-2837.

Sincerely,



Gordon Appel, Chief  
Licensing Branch  
Office of Civilian Radioactive  
Waste Management

Enclosures:

- 1) Memorandum from R. Stein to C. Gertz; dated October 13, 1989; re: Transmittal of DOE computer codes and their documentation to NRC.
- 2) Letter from R. Stein to P. Doctor; dated October 16, 1989; re: Transmittal of DOE computer codes and their documentation to NRC.
- 3) Letter from R. Stein to C. Tsang; dated October 16, 1989; re: Transmittal of DOE computer code and its associated documentation.

cc:

King Stablein, NRC  
D. Bechtel, Clark County, NV  
M. Baughman, Lincoln County, NV  
S. Bradhurst, Nye County, NV  
R. Loux, State of Nevada, NV



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

U R # 6.1.2.4  
9/5/89

SEP 05 1989

Ralph Stein  
Associate Director for Systems  
Integration and Regulations  
Office of Civilian Radioactive  
Waste Management  
U.S. Department of Energy  
Forrestal Building, RW-24  
Washington, DC 20545

Dear Mr. Stein:

In September 1988, the U.S. Nuclear Regulatory Commission (NRC) staff initiated an activity to develop further and maintain a capability by the NRC staff and its contractors to execute independent analyses of the performance of a high-level waste repository. This performance assessment activity was initiated so that the NRC staff will be able: (1) to analyze independently aspects of the U.S. Department of Energy (DOE) licensing submittals to evaluate their accuracy and (2) to direct NRC staff evaluations of the DOE program and licensing submittals based on the insights gained from hands-on experience with performance assessment. As discussed in the draft modeling strategy document for the NRC high-level waste program, the sophistication of the NRC quantitative reviews could range from simple scoping calculations to very detailed computations of specific aspects of the case for licensing. The independence of the NRC quantitative reviews could range from using DOE codes with DOE data sets to using NRC codes with NRC data sets, with all other possible permutations, including the use of third-party codes.

To assist us in developing this capability we request that you make available to the NRC, on as timely a basis as practicable, several computer codes and the documentation for them. The primary purpose is so that the NRC staff can become more cognizant of various codes and their general capability. We do not intend to review the applicability of these codes for conducting licensing calculations at this time. Such reviews, if any, depend on DOE submittals to the NRC as part of their licensing documentation.

The codes requested are:

(codes listed in Table 8.3.5.19-2 of the DOE's Site Characterization Plan and denoted as being available)

ADINAT 1,2  
AIRDOS-EPA  
ARRAY F  
COYOTE  
DACRJK  
EQ3/EQ6  
FEMTRAN  
HDOC

921560

③  
8909130308

MODFE  
NORIA  
PABLM  
PHR81  
SAGUARO  
TRACR3D  
TRUMP  
TRUST  
WAPPA

and the following codes described before the NRC Advisory Committee on Nuclear Waste and the DOE's Nuclear Waste Technical Review Board:

AREST  
PANDORA  
TOSPAC

Because the current focus of the NRC staff efforts is on what is believed to be the most important features of modeling the performance of a waste repository, that is, the isolation ability of the engineered barriers and transport of radionuclides in the geosphere, we are especially interested in obtaining codes modeling these aspects of the repository. Therefore, we are especially interested in obtaining on a priority basis, in the near future, the following subset of codes and their documentation from the above list:

EQ3/EQ6  
HDOC  
MODFE  
NORIA  
PANDORA  
TOSPAC  
TRACR3D  
TRUMP  
WAPPA

and

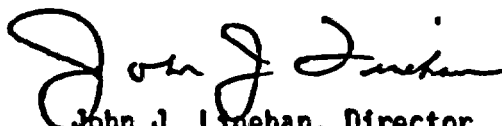
AREST.

We would like to receive the above priority codes within the next 90 days. We would appreciate receiving the other codes as soon as practicable.

We understand that these codes and their documentation may have different states of development. Therefore, to promote progress, we request that these codes and their documentation be transmitted to the NRC as soon as each code package is available, rather than waiting for the information for every code to be available. Also, to promote early progress, we would be interested in receiving code packages, even if the documentation is not available in final form.

We have discussed the forwarding of information on these codes with D. Alexander, DOE-RW, D. Langstaaf, DOE-RL, and A. Van Luik, PNL. If you have questions regarding this request or the mechanics of transferring computer media, please contact: S. Coplan (492-0410), or N. Eisenberg (492-0324), if he is unavailable.

Sincerely,

A handwritten signature in dark ink, appearing to read "John J. Linehan". The signature is fluid and cursive, with the first name "John" being the most prominent part.

John J. Linehan, Director  
Repository Licensing & Quality Assurance  
Project Directorate  
Division of High-Level Waste Management  
Office of Nuclear Material Safety  
and Safeguards

# memorandum

DATE: OCT 13 1989

REPLY TO  
ATTN OF: RW-30SUBJECT: NRC Request For Computer Codes And Associated Documentation To  
Develop Independent Analyses And Performance For a High Level  
Waste RepositoryTO:  
Carl Gertz, YMPO

The Nuclear Regulatory Commission (NRC) asked the U.S. Department of Energy (DOE) to provide listed computer codes and associated documentation to assist them in developing and maintaining a capability to execute independent analyses of the performance of a high-level waste repository. (See September 5, 1989, letter, Reference 1).

Most of the information requested by the NRC is administered by YMP contractors or DOE laboratories acting as YMP contractors. The following list identifies which codes and associated documentation are administered by specific YMP contractors:

ADINAT 1,2, ARRAY F, COYOTE, FEMTRAN, NORIA, SAGUARO,  
TOSPAC - Sandia National Laboratory  
HDOC, PHR81, and TRACR3D - Los Alamos National  
Laboratory  
PANDORA, and TRUMP - Lawrence Livermore National  
Laboratory  
MODFE - U. S. Geological Survey WAPPA - Lawrence  
Livermore or Sandia National Laboratory (per Table  
8.3.5.19-2 of the SCP)

NRC has requested that seven of these codes and their associated documentation be provided within 90 days from the date of their letter. Specifically, NRC has asked to receive HDOC, NORIA, PANDORA, TOSPAC, TRACR3D, TRUMP, and WAPPA by December 4, 1989.

To ensure the most efficient use of resources to provide these codes and their documentation to NRC, we are requesting that you ask the Technical Project Officers (TPOs) in the YMP participants to provide this information directly to the NRC, at the following address:

John J. Linehan, Director  
Repository Licensing & Quality Assurance  
Project Directorate  
Division of High-Level Waste Management  
Office of Nuclear Material Safety and Safeguards  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Please also ask the TPOs to confirm the transmittal of this material to NRC through a carbon copy of the transmittal letter

to Gordon Appel at DOE Headquarters. The transmittal letter should identify the appropriate Records Information System file accession numbers for the tapes and documents transmitted. Our respective staff members will coordinate to ensure that the information has been sent to NRC.

In addition to the codes that are administered by YMP contractors, NRC has asked for five more codes and their associated documentation. These codes include AIRDOS-EPA, AREST, DACRIN, PABLM, and TRUST. AIRDOS-EPA will be sent directly to NRC by Barry Parks, of EPA, at FTS 545-2443. For your information, his address is provided below:

Barry Parks, Health Physicist  
Office of Radiation Programs  
U.S. Environmental Protection Agency  
Las Vegas Facility  
P. O. Box 98517  
Las Vegas, Nevada 89193-8517

AREST, DACRIN, and PABLM were developed by Pacific Northwest Laboratory; Lawrence Berkley Laboratory administers TRUST. These codes and their associated documentation will be sent to NRC under separate transmittal letters. Copies for YMP use in fulfilling the associated State of Nevada request for copies will be sent to Dave Dobson.

We have worked with Dave Dobson of your staff and Mike Glora of SAIC to assemble this information. Dave Dobson has also assisted us in determining that the State of Nevada wishes to receive information on the computer codes and associated documentation. (The State of Nevada has been contacted and has indicated that they would like to receive this material.) Please ask the TPOs to provide them with code packages and documentation.

If you have any questions or concerns regarding this correspondence, please feel free to contact Gordon Appel on my staff at FTS 896-1462.

*Ralph Stein*

for Ralph Stein  
Associate Director for Systems  
Integration and Regulations  
Office of Civilian Radioactive  
Waste Management

**Reference:**

1) Letter from J. Linehan to R. Stein; dated September 5, 1989;  
re: Request for DOE computer codes and their documentation



**Department of Energy**

Washington, DC 20585

**OCT 16 1989**

**Mr. Chin Fu Tsang  
Earth Science Division  
Lawrence Berkley Laboratory  
Berkely, California 94720**

**Dear Mr. Tsang:**

The Nuclear Regulatory Commission (NRC) asked the U.S. Department of Energy (DOE) to provide listed computer codes and associated documentation to assist them in developing and maintaining a capability to execute independent analyses of the performance of a high-level waste repository. (See September 5, 1989, letter, Reference 1).

One code with associated documentation that NRC has requested is administered by your laboratory. Specifically, you are responsible for the administration of TRUST.

To ensure the most efficient use of resources to provide this code and its associated documentation to NRC, we are requesting that you provide this information directly to NRC, at the following address:

**John J. Linehan, Director  
Repository Licensing & Quality Assurance  
Project Directorate  
Division of High-Level Waste Management  
Office of Nuclear Material Safety and Safeguards  
U. S. Nuclear Regulatory Commission  
Washington, D.C. 20555**

In addition to the request from the NRC, the State of Nevada has also requested copies of the same codes. Please send a copy of TRUST and its associated documentation to the DOE Yucca Mountain Project Office (YMP) at the addresss below. The YMP will transmit the materials to the appropriate state office.

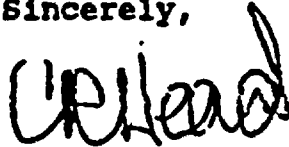
**Mr. David Dobson  
U.S. Department of Energy  
Yucca Mountian Project Office  
101 Convention Center Drive,  
Phase 2, Suite 200  
Las Vegas, NV 89109**

Please confirm the transmittal of this material to NRC through a carbon copy of the transmittal letter to Gordon Appel on my



staff. If you have any questions or concerns regarding this correspondence, please feel free to contact Gordon at FTS 896-1462.

Sincerely,



for Ralph Stein  
Associate Director for Systems  
Integration and Regulations  
Office of Civilian Radioactive  
Waste Management

Reference:

1) Letter from J. Linehan to R. Stein; dated September 5, 1989;  
re: Request for DOE computer codes and their documentation



**Department of Energy**

Washington, DC 20585

**OCT 16 1989**

**Ms. Pam Doctor, Mail Stop K601  
Battelle  
P. O. Box 999  
Richland, Washington 99352**

**Dear Ms. Doctor:**

**The Nuclear Regulatory Commission (NRC) asked the U.S. Department of Energy (DOE) to provide listed computer codes and associated documentation to assist them in developing and maintaining a capability to execute independent analyses of the performance of a high-level waste repository. (See September 5, 1989, letter, Reference 1).**

**Three of the codes and associated documentation that NRC has requested are administered by your laboratory. Specifically, you are responsible for the administration of AREST, DACRIN and PABLM. NRC has requested that the code package and documentation of AREST be provided within 90 days from the date of their letter, i.e., by December 4, 1989.**

**To ensure the most efficient use of resources to provide these codes and their associated documentation to NRC, we are requesting that you provide this information directly to NRC, at the following address:**

**John J. Linehan, Director  
Repository Licensing & Quality Assurance  
Project Directorate  
Division of High-Level Waste Management  
Office of Nuclear Material Safety and Safeguards  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555**

**In addition to the request from the NRC, the State of Nevada has also requested copies of the same codes. Please send a copy of each code and its associated documentation to the DOE Yucca Mountain Project Office (YMP) at the addresss below. The YMP will transmit the materials to the appropriate state office.**

**Mr. David Dobson  
U.S. Department of Energy  
Yucca Mountain Project Office  
101 Convention Center Drive  
Phase 2, Suite 200 Las Vegas, NV 89109**

**Please confirm the transmittal of this material to NRC through a carbon copy of the transmittal letter to Gordon Appel on my**

staff. If you have any questions or concerns regarding this correspondence, please feel free to contact Gordon at FTS 896-1462.

Sincerely,



FOR Ralph Stein  
Associate Director for Systems  
Integration and Regulations  
Office of Civilian Radioactive  
Waste Management

**Reference:**

1) Letter from J. Linehan to R. Stein; dated September 5, 1989;  
re: Request for DOE computer codes and their documentation



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

AUG 28 1989

OSIR #6.1.2.4  
8/28/89

Mr. Ralph Stein, Associate Director for  
Systems Integration & Regulations  
Office of Civilian Radioactive Waste  
Management  
U. S. Department of Energy RW 30  
Washington, D.C. 20545

Dear Mr. Stein:

The Nuclear Regulatory Commission (NRC) through the Center for Nuclear Waste Regulatory Analyses (CNWRA) is presently conducting geochemical experimentation and modeling under its Geochemistry Research Project. To proceed expeditiously with those research activities, NRC has an immediate need for certain DOE computer tapes and technical procedures.

The first item needed is the latest officially released standard version of the geochemical modeling package EQ3/6 and associated documentation. The DOE organization responsible for this code is the Geochemical Modeling Group at Lawrence Livermore National Laboratory (LLNL). NRC needs the EQ3/6 code and associated data bases furnished on a magnetic 9-track tape with standard characteristics (e.g., EBCDIC, 1600 bpi, blocked, or other specified characteristics).

NRC also needs the DOE contractor technical procedures listed in the Enclosure to this letter for potential uses in confirmatory and exploratory experiments which the CNWRA conducts in the Geochemistry Research Project. All of the technical procedures requested were listed in Chapter 8 of the Site Characterization Plan (SCP) for the Yucca Mountain, Nevada Site. Priorities are noted in the Enclosure for access to the requested procedures, in the event that they cannot all be obtained at this time. As we explained in a telephone discussion with Gordon Appel of your staff, since NRC is seeking these procedures for information rather than for regulatory review, preliminary or draft procedures would be acceptable for its purpose if final versions are not available. In such instances, NRC would request that updated procedures be transmitted when available to replace the earlier versions sent to NRC.

In view of NRC's pressing need for the items described in this letter, I request that DOE provide them to NRC as soon as practicable. In the event that the items are not readily available, please inform me of this situation promptly and provide an estimate of when those items will be available.

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If you have any questions regarding the requests in this letter, please contact King Stablein (FTS 492-0446) of my staff.

Sincerely,

A handwritten signature in cursive script that reads "John Linehan".

John Linehan, Director  
Repository Licensing & Quality  
Assurance Project Directorate  
Division of High-Level Waste Management

Enclosure:  
As stated

cc: R. Loux, State of Nevada  
D. Bechtel, Clark County, NV  
M. Baughman, Lincoln County, NV  
S. Bradhurst, Nye County, NV  
C. Gertz, DOE-NV/YMPO

## TECHNICAL PROCEDURES REQUESTED

Technical Procedure*			
Number	Title	Date	Priority**
TWS-CNC-DP-02,R3	Quality control in counting radionuclides	3 Jan 84	1
TWS-CNC-DP-05,R1	Sorption, desorption ratio determination of geologic materials by batch methods	30 Aug 82	1
TWS-CNC-DP-15,R1	Crushed rock column studies	31 Aug 82	1
TWS-ESS-DP-03,R2	Nevada Test Site core petrography procedure	24 Nov 82	1
TWS-ESS-DP-07,R2	Microprobe operating procedure	5 Sep 86	2
TWS-ESS-DP-16,R2	Siemens x-ray diffraction procedure	19 May 86	1
TWS-ESS-DP-25,R1	Clay-mineral separation and preparation for x-ray diffraction analysis	3 Apr 86	1
TWS-ESS-DP-28,R0	Nevada Test Site fracture filling studies procedure	9 Sep 85	2
TWS-ESS-DP-111,R0	X-ray fluorescence procedure	TBD	1
TWS-INC-DP-26,R0	Preparation of aqueous standards for analysis of water samples	1 June 83	1
TWS-INC-DP-27,R0	Trace element determination for analysis of water samples	1 June 83	1

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\* Technical Procedures are identified as in Chapter 8 of the SCP.

\*\* Priority 1 - immediate need  
 Priority 2 - need within 6 months

# Technical Procedure

Number	Title	Date	Priority
TWS-INC-DP-35,R0 CR-006	pH measurements	28 May 85 and 26 Aug 86	1
TWS-INC-DP-45,R0	Analysis of strong acid anions by ion chromatography	25 May 85	1
TWS-INC-DP-62,R0	Nevada Test Site bulk water samples	30 Jan 87	1
TWS-INC-DP-63,R0	Preparation of Nevada Test Site core samples for crushed rock experiments	20 Mar 87	1
TWS-MSTQA-QP-14,R1	Research and development (experimental) procedures	19 May 86	1
TWS-MSTQA-QP-15,R0	Nevada Nuclear Waste Storage Investigations calibration	1 Aug 86	1
NWM-USGS-DP-04,R4	Thin-section preparation	8 Jul 86	1
NWM-USGS-DP-06,R2	Carbon coating of samples with DV-502 vacuum	5 Feb 86	1
NWM-USGS-DP-07, R2	Microprobe operating procedure	8 Jul 86	2
NWM-USGS-DP-11,R0	Procedure for x-ray fluorescence analysis	14 Jan 88	1
NWM-USGS-DP-16,R2	Siemens x-ray diffractometer procedure	2 Feb 86	1
NWM-USGS-DP-20,R1	Preparation of fused-glass beads from rock powder	24 Nov 82	1
NWM-USGS-DP-24,R0	Alignment of Siemens diffractometer	24 Nov 82	1

Technical Procedure

Number	Title	Date	Priority
NWM-USGS-DP-25,R1	Clay-mineral separation and preparation for x-ray diffraction	5 Feb 86	1
NWM-USGS-DP-50,R0	Sputter coating with gold	3 Apr 86	1
NWM-USGS-DP-51,R0	Mettler H80 samples-weighing procedure	5 Feb 86	1
NWM-USGS-DP-52,R0	Making fused discs with Junior orbit shaker	5 Feb 86	1
NWM-USGS-DP-53,R0	Pulverizing with Spex 8500 Shatterbox	5 Feb 86	1
NWM-USGS-DP-55,R0	Rock-splitting with 50-ton hydraulic press	5 Feb 86	2
NWM-USGS-DP-56,R0	Brinkman automated grinding procedure	5 Feb 86	1
NWM-USGS-DP-101,R0	Sample identification and control for mineralogy and petrology studies	17 Apr 87	1
NWM-USGS-DP-112,R0	Operating instruction for International Scientific Instrument Model DS-130 scanning electron microscope and TRACOR northern series II x-ray analyzer	27 Jun 88	1
NWM-USGS-DP-113,R0	Temperature determination from fluid inclusion studies	27 Jan 88	2
NWM-USGS-GCP-02,R1	Labeling, identification and control of samples for geochemistry and isotope geology	20 Jun 87	1



### Technical Procedure

Number	Title	Date	Priority
NWM-USGS-GCP-07,R1	Mineral separation for geochemistry and isotopic analysis	27 May 88	1
NWM-USGS-GCP-14,R0	Extraction and recovery of water from calcite- hosted inclusion fluids	29 Apr 88	2
NWM-USGS-GP-01,R0	Geologic Mapping	1 Mar 83	1
NWM-USGS-GP-14,R0	Measurement of dry bulk- rock densities from paleomagnetic samples	25 Apr 86	1
NWM-USGS-GP-27,R1	Trench wall and natural outcrop sampling for coordinated studies	7 Jun 88	1
NWM-USGS-HP-91,R0	Collection and field analysis of surface- water samples	7 Oct 87	1
NWM-USGS-QP-04,R2	Handling, storage, and shipping of samples	2 Apr 85	1
NWM-USGS-QP-14,R0	One-time research and development work	TBD	1