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Yucca Mountain Climate Technical Support Representative

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Nevada System of Higher Education
DOCUMENT CHANGE NOTICE
(DCN)

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DCN No. 1 dated [see latest approval date below]

to Document No. SIP-DRI-031, **Revision** 0, **Effective Date:** 2/20/2004.

Document Title: Yucca Mountain Climate Technical Support Representative

Identify applicable affected page, section, paragraph, attachment, exhibit, table, figure, or other:

Replace the following:

Page 5 of 8, first full paragraph, second to last sentence: delete "and Precipitation Sites 401, 405, and 415"

Page 6 of 8, under Software and Models heading, last sentence of paragraph: delete "The Western Climate Data System (WCDS v9.04) program and"

Page 7 of 8, under Data Recording, Reduction, and Reporting heading,

First paragraph, second sentence: change "WCDS v9.04" to "WCDS v. 9.05"

First paragraph, third sentence: remove "and 3 precipitation stations"

Second paragraph, second sentence: replace "It is not expected that this program will contain unqualified data but if so, it", with "If this project contains unqualified data, the data"

Approved by:

PI: _____ Date: 4/14/06
(Signature)

Print name: Saxon Sharpe _____

QA Manager: _____ Date: 4-19-06
(Signature)

Print name: Amy Smiecinski _____

QA Manager evaluated acceptability that it does not violate quality requirements, and for impacts to other procedures; signature above documents this evaluation as successfully completed.

Attach this DCN as first page of hard copies of document, if any.



**University and Community College System of Nevada (UCCSN)
Scientific Investigation Plan (SIP)**


Task Title: TASK ORD-FY04-012, Yucca Mountain Climate Technical Support Representative


Document Number: SIP-DRI-031

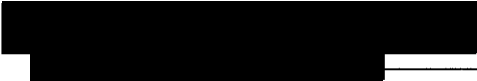
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Date

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REVISION HISTORY

<u>Revision</u> <u>Number</u>	<u>Effective</u> <u>Date</u>	<u>Description and Reason for Change</u>
Rev. 0	02/20/2004	Initial Issue

INTRODUCTION

The principal investigator (PI), Saxon Sharpe, for Task ORD-FY04-012, DOE Cooperative Agreement DE-FC28-04RW12232, will serve as Yucca Mountain Climate Technical Support Representative for the Department of Energy (DOE) in a series of activities related to past, present, and future climate for the Yucca Mountain Project (YMP) climate program.

As stated in the Viability Assessment of a Repository at Yucca Mountain: “Climate and its changes over time directly affect system performance at Yucca Mountain.” Currently, information from climate studies is used in models that support the Total System Performance Assessment and Licensing Application. It is a model component of all key attributes in the repository safety strategy (limited water contacting waste package, long waste package lifetime, low rate of release of radionuclides from breached waste packages, and radionuclide concentration reduction during transport from the waste packages). Elements of the climate program are also directly related to the Nuclear Regulatory Commission’s (NRC) Key Technical Issue of Unsaturated and Saturated Zone Flow Under Isothermal Conditions and, in addition, address other NRC Key Technical Issues.

SCOPE AND OBJECTIVES

The objective of Task ORD-FY04-012, Yucca Mountain Climate Technical Support Representative, is to provide the Office of Civilian Radioactive Waste Management (OCRWM), DOE, with expertise on past, present, and future climate scenarios and to support the technical elements of the climate program. The Climate Technical Support Representative will explain, defend, and interpret the YMP climate program to the various audiences during Site Recommendation and Licensing Application. This technical support representative will support DOE management in the preparation and review of documents, participation in comment response for the Final Environmental Impact Statement, the Site Recommendation Hearings, the NRC Sufficiency Comments, and other forums as designated by DOE management. This work is subject to the requirements of the UCCSN Quality Assurance Program.

Tasks will be performed as needed throughout the following years related to past, present, and future climate states in the Yucca Mountain region. These include but are not limited to representing the Department of Energy (DOE) at meetings and hearings, and reviewing and commenting on climate-related reports, documents, and activities. Subtasks associated with this contract include: providing expertise during technical and public comment response processes; acting as DOE representative at Nuclear Waste Technical Review Board meetings and other external review group meetings; preparing presentation materials as required; supporting Licensing Application activities that pertain to technical elements of the climate program; and working with Lawrence Berkeley National Laboratory, Los Alamos National Laboratory, U.S. Geological Survey, Sandia National Laboratory, and the Bechtel SAIC Company as needed.

Responsibilities include, but are not limited to, the following:

- Maintain expertise in the technical elements of the climate program to support the preparation and review of documents.
- Provide expertise during technical and public comment response processes.
- Act as DOE representative at Nuclear Waste Technical Review Board meetings and other external review group meetings. Prepare presentation materials as required.
- Author, co-author, review or revise documents as needed.
- Support Licensing Application activities that pertain to technical elements of the climate program by providing technical expertise on past and future climate scenarios.
- Work with Lawrence Berkeley National Laboratory, Sandia National Laboratories, U.S. Geological Survey, the Bechtel SAIC Company, and other contractors as requested.

Results from the previous contract (Task 21) include the following reports, papers, and presentations:

- ◆ *Future Climate Analysis-10,000 to 1,000,000 Years After Present Rev 00.*
- ◆ *Future Climate Analysis-10,000 to 1,000,000 Years After Present Rev 01.*
- ◆ *Reconstructing Past and Forecasting Future Climate at Yucca Mountain, Nevada* at the 9th International High-Level Radioactive Waste Management Conference in Las Vegas, NV.
- ◆ *Performance Assessment-Natural System Future Climate Analysis- 10,000 to 1,000,000 Years after Present* to Nuclear Waste Technical Review Board, Arlington, Virginia, meeting.
- ◆ *Estimating Climate and Unsaturated Zone Moisture Flux For the Past 24,000 Years at the Nevada Test Site* for Climate Variability of the Eastern North Pacific and Western North America Conference.
- ◆ *Glacial and Interglacial Patterns in the Devils Hole, Nevada, Record: Are We Currently in Marine Isotope Stage 3?* for Climate Variability of the Eastern North Pacific and Western North America Conference.

This work is subject to University and Community College System of Nevada (UCCSN) Quality Assurance (QA) Program requirements. This Scientific Investigation Plan presents an independent confirmatory study supporting previously gathered information.

APPROACH

The PI uses data from peer-reviewed articles on past climate and paleoenvironments to determine the magnitude, duration, and timing of past climate states and projects those into the future. The PI also directs and coordinates compilation of modern climate summaries from regional climate stations in the Yucca Mountain area. The sequence of work will be to respond in a timely manner to requests from DOE to perform tasks listed above. Work is documented in

written reports. There are no observations, measurements, or field work associated with the project. No special controls, environmental conditions, processes, and/or skills are required.

The Modern Climate Summaries task summarizes data from regional stations, Yucca Mountain stations, and Nevada Test Site stations (which all record on different time scales and measure different climate elements) so that users can create tables and graphs for different climate parameters through an interactive web user interface. Regional stations may include: Austin, Amargosa Farms, Garey, Battle Mountain, Beatty, Beatty 8N, Caliente, Desert National Wildlife Refuge, Elko Municipal Airport, Ely, Yelland Field, Indian Springs, Mercury Desert Rock Airport, Las Vegas McCarran International Airport, Pahrnagat Wildlife Refuge, Pioche, Ruby Lake, Snowball Ranch, Tonopah, Tonopah Airport, Winnemucca Municipal Airport, 4JA, and Area 12 Mesa. Yucca Mountain Sites include Sites 1 through 9 and ~~Precipitation Sites 401, 405, and 415~~. Nevada Test Site Stations include about 25 stations.

See DCN #1

Deliverables associated with completing this task follow:

- ◆ Create data summaries¹ from available data from the beginning of period of record for each station through 2002 (or 2003 if available).
- ◆ Develop station history files from 1985-2002 (or 2003 if available) for YM stations from available data.
- ◆ Obtain Nevada Test Site Network (different from Yucca Mountain network) historical digital 15-minute data and reformat into internal Western Regional Climate Center (WRCC) format.
- ◆ Complete web interface for access to the above data. Develop web page and links modeled after existing special purpose pages at Western Regional Climate Center.

If a subtask is later evaluated as non-quality affecting, the DOE Technical Task Representative will be notified in writing and a revised SIP will be written and sent to the QA Manager.

SCHEDULE

Task 2004	Completion Date
Respond to DOE requests	ongoing
Quarterly reports	ongoing
Download NTS station data through 2002 (or 2003, if available)	6/1/04
Develop station history files	7/1/04
Develop website summary products	8/1/04
QA for modern climate summaries through 2002	ongoing
Summarize data through 2002	9/1/04
Final Report	9/30/08

¹ Includes temperature (extreme maximum, mean maximum, mean, mean minimum, extreme minimum); snowfall (maximum daily, monthly maximum, daily maximum); precipitation (mean, monthly maximum, mean minimum, extreme maximum, maximum 1, 6, and 24-hour totals); number of days with precipitation of 0.01 inch or more; temperature (32 °C and above, 0 °C and below); mean barometric pressure; mean relative humidity at different hours; wind speed (mean, fastest 1 minute, direction, peak 3-second gusts).

Quarterly administrative reports will be submitted to the appropriate UCCSN coordinator. These reports will describe progress, plans, and problems in the effort on the project.

INTERFACE CONTROLS

Internal Interfaces: Saxon Sharpe, DRI

External Interfaces: Eric Smistad, DOE/YMSCO

Information will be transferred across interfaces by electronic methods.

STANDARDS

There are no special standards and criteria for this task. No specific job skills are required beyond those stated in the position descriptions filed with the HRC.

IMPLEMENTING PROCEDURES/SCIENTIFIC NOTEBOOKS

One routine process for this work is described in proposed implementing procedures IPR-022 and IPR-023. These IP's relate to the compilation of modern meteorology data. Two scientific notebooks will be kept: one for GIS-related procedures and one for reduction of climate data.

SAMPLES

No samples will be collected.

EQUIPMENT

No field or laboratory equipment will be used.

SOFTWARE AND MODELS

Programs such as Excel, Powerpoint, and Word are used to create reports, presentations and documents. Reduction of hourly and sub-hourly downloaded data is accomplished by internally written software by Western Regional Climate staff. Climate data will be displayed using ArcView 3.3. ~~The Western Climate Data System (WCDS v9.04) program and~~ Arc View 3.3 will be qualified and used in accordance with QAP-3.2. No models will be developed.

PROCUREMENTS AND SUBCONTRACTS

No procurements or subcontracts are necessary.

HOLD POINTS/DECISION POINTS

There are no hold points/decision points as defined in the UCCSN QA Program for this work.

QUALITY CONTROL

Error associated with data reduction performed by task personnel will be minimized by verifying the accuracy of the reduced data to the raw data and that the reduction processes are accurate. Verification will be performed by someone other than the originator. These reviews will be documented in the scientific notebooks for this task and in conjunction with the technical report review. There is no objective or evaluation for precision.

Electronic data will be controlled by limited access to the computers that will contain those data. Each computer will be password protected. Data will be backed up on a regular basis. Access lists will be established for authorized users and these lists and the types of access will be listed in the applicable scientific notebooks. The accuracy of downloaded data is ensured with periodic checks as specified in IPR-022 and IPR-023 and documented with records submitted to the RPC. Accuracy and precision of developed data (modern meteorological variables) are controlled by procedures in IPR-022 and IPR-023.

DATA RECORDING, REDUCTION, AND REPORTING

Data will be developed or used and controlled electronically in accordance with QAP-3.1, "Control of Electronic Data," to prevent tampering. Climate summary data will be reduced using the Western Climate Data System (WCDS v9.0⁵) program. The historical climate summaries for regional stations, Yucca Mountain stations #1-9 and 3 precipitation stations, and Nevada Test Site stations were accepted data in the previous QA program. Currently, their appropriateness for use for QA work is undetermined. We are planning on using these data, however, if their status changes, and if deemed unacceptable, we will not use them for QA purposes. Data will be recorded in electronic form, backed up to prevent loss, and verified when converted, transferred or input manually.

See DCN #1

Data considered to be established fact by the scientific community need not undergo qualification. ~~It is not expected that this project will contain unqualified data but if so, it~~ ^{If this project contains unqualified data, the data} may be used in scientific investigations for corroboration purposes only. Unqualified data will be clearly labeled "unqualified" and traceability to their origin will be maintained.

See DCN #1

Data that are used, reduced, or produced in this work will be submitted to the Technical Data Archive (TDA) and/or the BSC-maintained Technical Data Management System (TDMS) in

accordance with QAP-3.6, "Submittal of Data to the Technical Data Management System." QA records produced as a result of the UCCSN QAP's are controlled in accordance with QAP-17.0, "Quality Assurance Records". Quarterly report deliverables are submitted to the cooperative agreement administrator in accordance with the Cooperative Agreement. QA records may include reports, other documents produced, hard copies of data used if available, and copies of literature cited.

REVIEWS AND VERIFICATIONS

Scientific notebooks started under this task will be reviewed at the end of the subtask, or earlier as needed. Reports developed under this task will be technically reviewed according to QAP-3.4 prior to submission. Technical and planned QA reviews will be conducted when reports are completed.

RECORDS AND DELIVERABLES

QAP-17.0, "Quality Assurance Records", will be used for the protection and transmittal of QA records. Data will be transmitted as QA records. Documents or items that will be produced and submitted to DOE will be produced in accordance with QAP-3.4, "Technical Reports".