



Department of Energy

Washington, DC 20585

QA: L

SEP 23 1997

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ISSUANCE OF SURVEILLANCE RECORD USGS-SR-97-051 RESULTING FROM THE OFFICE OF QUALITY ASSURANCE (OQA) SURVEILLANCE OF U.S. GEOLOGICAL SURVEY (USGS)

Enclosed is the record of Surveillance USGS-SR-97-051, conducted by the OQA of USGS facility in Denver, Colorado, July 8 - August 8, 1997.

The purpose of the surveillance was to determine adequacy of methods for development of hydrologic models and preparation of reports.

There were no Corrective Action Requests, Deficiency Reports, or Performance Reports issued as a result of the surveillance.

The results of the surveillance were that implementation of the Quality Assurance Requirements and Description document and the pertinent procedures is satisfactory and effectively implements the applicable elements of the Office of Civilian Radioactive Waste Management Quality Assurance program.

If you have any questions, please contact either James Blaylock at (702) 794-1420 or Donna J. Sinks at (303) 236-5050.

Handwritten signature: R.W. Craig
for Donald G. Horton, Director
Office of Quality Assurance

OQA:JB-2318

Enclosure:
Surveillance Record USGS-SR-97-051

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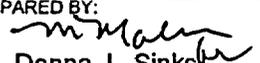
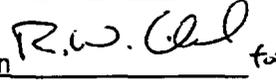
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Susan Dudley, Esmeralda County, Goldfield, NV
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OFFICE OF CIVILIAN
RADIOACTIVE WASTE MANAGEMENT
U.S. DEPARTMENT OF ENERGY
WASHINGTON, D.C.

Surveillance No. USGS -SR-97-051

QUALITY ASSURANCE SURVEILLANCE RECORD

SURVEILLANCE DATA

1. ORGANIZATION/LOCATION: United States Geological Survey (USGS), Denver, Colorado	2. SUBJECT: Deliverables: Regional and Site Saturated Zone Synthesis Reports	3. DATE: July 8 - August 8, 1997
4. SURVEILLANCE OBJECTIVE: Determine adequacy of methods for development of hydrologic models and preparation of reports.		
5. SURVEILLANCE SCOPE: Surveillance personnel will examine the Scientific Notebooks (SN) used to document development of the hydrologic model deliverable (SPH35RM4), review the software controls for the simulation codes (software model), and examine the methods used to identify source data for the report deliverables (SP23NM3 and SP230M3).		6. SURVEILLANCE TEAM: Team Leader: Donna J. Sinks Additional Team Members N/A
7. PREPARED BY:  Donna J. Sinks Surveillance Team Leader	Date: <u>7/3/97</u>	8. CONCURRENCE:  Donald G. Horton Director, OQA
Date: <u>7/8/97</u>		Date: <u>7/8/97</u>

SURVEILLANCE RESULTS

9. BASIS OF EVALUATION/DESCRIPTION OF OBSERVATIONS:

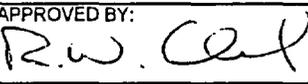
This surveillance is a follow-up to an audit on the regional and site saturated-zone modeling to determine effectiveness of the three areas which had limited implementation at the time of the audit. Audit USGS-95037-IA was conducted 6/26-30/95, with satisfactory results. However, because there had been limited activity in two areas at the time of the audit, effectiveness could not be adequately determined for software (YMP-USGS-QMP-3.03) and source data for report deliverables (YMP-USGS-QMP-3.04). Additionally, surveillance personnel also examined the SNs (YMP-USGS-QMP-5.05) because of the progress on model development and the associated documentation in the SNs.

See Pages 2-5...

10. SURVEILLANCE CONCLUSIONS:

Based on discussions with personnel, inspection of SNs, and examination of the list of applicable software, it was determined that all personnel involved with milestone preparation are familiar with the program requirements. Management has taken an active role not only in the final products, but also with the developmental aspects of the models, as shown by frequent reviews (averaging every 6 months) of the SNs. The technical personnel have been actively involved in ensuring that applicable software is evaluated and documented according to requirements and in a timely manner. Additionally, the Quality Assurance (QA) Implementation Specialist has a key role in assuring that the milestones meet the Project and USGS requirements, prior to submittal of the milestones.

It was determined that implementation of the Quality Assurance Requirements and Description document and the pertinent procedures is satisfactory and effectively implements the applicable elements of the Office of Civilian Radioactive Waste Management QA Program. A solution to the issue regarding the listing of source data (i.e., models) for report deliverables and the approval of models and associated reports by the USGS Director has been reached (noting on the TDIF that the model cannot be released until USGS Director's approval is obtained).

11. COMPLETED BY:  DONNA J. Sinks Surveillance Team Leader	Date: <u>9/4/97</u>	12. APPROVED BY:  Director, OQA	Date: <u>9/22/97</u>
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9. BASIS OF EVALUATION/DESCRIPTION OF OBSERVATIONS: (Cont'd)

The progress of preparation of the following three milestones (with Data Tracking Numbers [DTN]) was determined during the surveillance:

<u>Milestone</u>	<u>DTN #</u>	<u>Title</u>
FY97 SPH35RM4	GS970708312333.001	Model: Preliminary Site Saturated-zone Hydrogeologic Framework Model, Version 2.0 (primary author: C. Faunt)
FY97 SP23OM3	GS970708312144.003	Report: Simulated Effects of Climate Change on the Death Valley Regional Ground-water Flow System, Nevada and California (primary author: F. D'Agnese)
FY97 SP23NM3	GS970808312333.002	Report: Site Saturated-zone Synthesis Report (primary author: J. Czarnecki)

Each of these milestones is discussed in the sections below.

The FY96 and FY97 USGS model milestones (models only) discussed in this report were schedule-driven by performance assessment (PA). The USGS had intended to submit milestones that included the model, as well as a discussion (report) of the model. The final deliverables were divided into model deliverables and report deliverables. However, because of USGS policy [not limited to the USGS Yucca Mountain Project (YMP) Branch], the model-only milestones (with limited discussion) cannot receive USGS Director's approval until an adequate discussion (i.e., report) accompanies the model. Therefore, to meet the milestones, the models are being submitted to the Technical Data Base (TDB) with comments on the Technical Data Information Form (TDIF) indicating that the model can only be used by the Project and cannot be released to the public until it has received USGS Director's approval. This approach allows the USGS to meet its milestones.

Source Data

FY97 milestone SPH35RM4, "Preliminary Site Saturated-zone Hydrogeologic Framework Model, Version 2.0," was submitted to the TDB 8/1/97. The model was reviewed by E. Ervin-Blankenheim (contractor) and F. D'Agnese (USGS). This milestone is an update to FY96 model milestone 3GWM601M to ensure consistency with the FY97 report milestone (SP23NM3, discussed below). FY96 milestone 3GWM601M, entitled "Site Hydrologic Framework Model" (preliminary model) resides in the Las Vegas modeling warehouse at technical data management,

but has not been submitted to the TDB. Since an associated report was not part of this FY96 milestone, the model has not yet been approved by the USGS Director. A DTN has not yet been assigned because there is no associated milestone report scheduled for completion. The following two comments appear on the TDIF for the FY97 milestone SPH35RM4: 1) "Version 2.0 (milestone SPH35RM4) updates a preliminary submittal of the model to the YMP modeling warehouse, in 1996, under milestone 3GWM601M"; and 2) "This model has not received USGS Director's approval. For internal YMP use only". Additional source data were cross section data (DTN GS950508312333.001) and borehole data (GS950508312333.002).

FY97 report milestone SP23OM3, entitled "Simulated Effects of Climate Change on the Death Valley Regional Ground-water Flow System, Nevada and California," was submitted to the TDB July 30, 1997. The milestone was reviewed by Z. Peterman and R. Luckey (USGS). This model used the FY96 regional milestone 3GRM600M (model and associated report) as source data and modified it to create two new scenarios (past and future). The two new scenarios included the documentation of numerical simulations of groundwater flow in the Death Valley ground-water basin with the previously "calibrated" groundwater flow model (FY96 milestone 3GWM601M). New input data were used; however, the software remained the same. The term "model calibration" is used throughout the technical modeling community. In this instance, the model calculates what water levels should be at the monitoring wells and compares them to the observed water levels; the differences between the observed and calculated values are then determined. Nine additional source data were also cited (two data packages [recharge model and paleoclimate data] and seven reports).

FY97 report milestone SP23NM3 (Site Saturated-zone Synthesis Report), due to the TDB 8/29/97, is a discussion of FY97 model milestone SP23CBM3 and its status. There are two data sources for this report milestone. The first, the FY97 model milestone SP23CBM3 (simulation codes for data input and software output part of model) was reviewed by C. Faunt (USGS) and W. Arnold (Sandia National Laboratories [SNL]) and was submitted to the TDB on 6/12/97. This model also resides in the Las Vegas modeling warehouse and has not been submitted to the TDB. This report milestone is considered preliminary because the source data (FY97 model milestone SP23CBM3) is considered preliminary and has not yet been released. The report milestone was reviewed by M. Hill (USGS) and B. Travis (Los Alamos National Laboratory [LANL]). Discussions with USGS Data Management personnel indicated that a single DTN (GS970808312333.002) was assigned to the model (FY97 milestone SP23CBM3) and the report (FY97 milestone SP23NM3) and that both will be submitted to the USGS Director for approval and, therefore, will meet YMP-USGS-QMP-3.04 requirements. An additional model (FY97 hydrogeologic framework model milestone SPH35RM4) is also source data for this milestone. Thirty-three other source data packages (primarily reports, and some data) were also cited on the TDIF. The model and report will be used by LANL to develop a transport model, which in turn will be utilized by SNL for a Performance Assessment (PA) model.

Preliminary models that have been provided to the PA group and to others have been designated as "preliminary" via e-mail, in accordance with YAP-SIII.3Q. For example, an e-mail dated 7/16/97 from J. Czarnecki, USGS, to Bruce Robinson, LANL, was examined.

Scientific Notebook

SN-0072, Part B: 3-D Site Saturated Zone Hydrologic Framework, is used to document model development. The initial entry dated 2/1/95 refers to SN-0072, Part A. The initial review was performed by P. Tucci on 2/1/95. Since the initial entry, seven management reviews have been performed. Resolution of the comments was determined by the reviewer to be prompt and satisfactory.

SN-0070, entitled: Regional 3-D Ground-water Flow Model, was initiated 11/29/94 and reviewed by P. Tucci 12/15/94. Seven additional periodic management reviews were conducted, with satisfactory follow-up to the review comments.

SN-0072, Part A: 3-D Saturated-Zone Site Model, was initiated 10/6/94 and reviewed by P. Tucci 10/24/94. A total of eight periodic management reviews were conducted. Several areas of concern were identified, and resolution was reached after a series of explanations and solutions were agreed upon by both parties.

Software

At the time of the surveillance, 18 computer programs were on the July 15, 1997, YMP-USGS Software Configuration Management System list for programs used by the saturated-zone modeling group. The 18 are classified as follows:

<u>Classification</u>	<u>Program</u>
Acquired	BEALEP (ESP0013.01), MLAEM, FEHMN, PEST, MODPATH/MODPATH-PLOT, RESANP (ESP0011.01)
Scientific and Engineering Software	MODFLOW, MODFLOWP (NHP0082.04)
Limited Requirements	YCINT, CORPSCON, ZONEBUDGET, SURFER
Distributed	RESANP (ESP0011.02), YCINT, BEALEP (ESP0013.02), MODFLOWP (NHP0082.05)
Exempt	Stratamodel, boundflx2

With the exception of FEHMN, which was in review at the time of the surveillance, all software has been documented according to YMP-USGS-QMP-3.03 requirements. In addition, summaries of the description of software programs and the use of them within the modeling group were prepared for 33 additional distributed software (gridding, modular GIS environment, GIS/CAD, database, graphics, video engine utilities, and plotting utilities) for submittal by July 31, 1997, to the USGS Software Overview Board for evaluation.

Personnel Contacted:

<u>Personnel</u>	<u>Organization</u>	<u>Role</u>
Robert Craig	USGS	USGS TPO
John Czarnecki	USGS	Hydrologist
Frank D'Agnese	USGS	Hydrologist
Claudia Faunt	USGS	Hydrologist
Kate Larsen	Pacific Western Tech.	Tech. Data Management
Pat McKinley	USGS	Hydrologist (data management)
Cynthia Miller-Corbett	USGS	Hydrologist (software specialist)
Martha Mustard	USGS	Hydrologist (Engineering Assurance)
Michele O'Brien	USGS	QA Implementation Specialist
Patrick Tucci	USGS	Hydrologist

Referenced Documents:

DOE/RW-0333P, R7, "U.S. DOE OCRWM Quality Assurance Requirements and Description for the CRWM Program", Supplement III, Sect. 2.6 (model development)

YAP-SIII.3Q, R1, "Processing of Technical Data on the Yucca Mountain Site Characterization Project"

YMP-USGS-QMP-3.03, R7, "Software"

YMP-USGS-QMP-3.04, R9, "Review and Approval of YMP-USGS Data, Interpretations of Data, and Manuscripts"

YMP-USGS-QMP-5.05, R4-M2&3, "Scientific Notebook"

YMP-USGS Software Configuration Management System List, July 15, 1997