Department of Energy
Office of Civilian Radioactive Waste Management
Yucca Mountain Site Characterization Office
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SEP 13 1996

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ISSUANCE OF SURVEILLANCE RECORD YMP-SR-96-022 RESULTING FROM YUCCA MOUNTAIN QUALITY ASSURANCE DIVISION'S (YMQAD) SURVEILLANCE OF U.S. GEOLOGICAL SURVEY (USGS) SUPPORT OF THE YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT (YMP)

Enclosed is the record of Surveillance YMP-SR-96-022 conducted by the YMQAD at the USGS/YMP facilities in Las Vegas, Nevada, from July 31, 1996 through August 13, 1996.

The purpose of the surveillance was to verify whether controls for the use (injection) of SF_6 (Sulfur hexafluoride) are being implemented in the Exploratory Studies Facility Alcoves.

Two Deficiency Reports (DR) were issued as a result of this surveillance. Responses to the DRs, which were transmitted via separate letter, are due by the date indicated on Block 12 of the DRs.

This surveillance is considered completed and closed as of the date of this letter. A response to this surveillance record, and any documented recommendation, is not required; however, the open DRs will continue to be tracked until they are closed to the satisfaction of the quality assurance representative and the Director, Office of Quality Assurance.

If you have any questions, please contact either Mario R. Diaz at (702) 794-1489 or Daniel J. Tunney at (702) 794-1353.

R.C. Spence

Richard E. Spence, Director
Yucca Mountain Quality Assurance Division

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YMQAD:MRD-2593

Enclosure:
Surveillance Record YM-SR-96-022

WM-11
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Recip: NMSS/HLWR

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Surveillance No. YMP-SR-96-022

OFFICE OF
RADIOACTIVE WASTE MANAGEMENT
U.S. DEPARTMENT OF ENERGY
WASHINGTON, D.C.

QUALITY ASSURANCE SURVEILLANCE RECORD

SURVEILLANCE DATA

[1]ORGANIZATION/LOCATION:	[2]SUBJECT:	[3]DATE:
U.S. Geological Survey (USGS)/Yucca Mountain Site Characterization Project (YMP), Las Vegas, Nevada	Control of Sulfur hexafluoride (SF_6) tracer usage (injection) in the Exploratory Studies Facility (ESF) Alcoves	July 31, 1996 through August 13, 1996.

[4]SURVEILLANCE OBJECTIVE:
To verify whether controls for the use (injection) of SF_6 are being implemented in the ESF Alcoves.

[5]SURVEILLANCE SCOPE:
Verification of compliance with the applicable Test Planning Package (TPP), Job Package (JP), Determination of Importance Evaluation (DIE), and implementing procedures.

[6]SURVEILLANCE TEAM:
Team Leader:
Daniel J. Tunney

Additional Team Members:
N/A

[7]PREPARED BY:		[8]CONCURRENCE:	
Daniel J. Tunney	07/31/96	N/A	
Surveillance Team Leader	Date	QA Division Director	Date

SURVEILLANCE RESULTS

[9]BASIS OF EVALUATION/DESCRIPTION OF OBSERVATIONS:

Surveillance YMP-SR-96-022 was conducted at the YMP facilities in Las Vegas, Nevada, during the period of July 31, 1996, through August 13, 1996. The purpose of the surveillance was to verify that the USGS was controlling the injection of the tracer SF_6 in the ESF Alcoves. SF_6 was not injected as a tracer in the ESF Alcoves while the surveillance was ongoing. This precluded verification of work in progress.

(continued on page 2)

[10]SURVEILLANCE CONCLUSIONS:

The following deficiencies were identified during the course of the surveillance:

YM-96-D-091

Work is being performed in accordance with JPs YMP/JP 95-1 and YMP/JP 94-21, which direct that operations be conducted in accordance with a canceled Quality Assurance Grading Report (QAGR) G1233124. This deficiency was issued to the U.S. Department of Energy (DOE) Assistant Manager for Scientific Programs (AMSP).

(continued on page 4)

[11]COMPLETED BY:		[12]APPROVED BY:	
Daniel J. Tunney	9/11/96		9/11/96
Surveillance Team Leader	Date	QA Division Director	Date

Block 9 BASIS FOR EVALUATION/DESCRIPTION OF OBSERVATION: (continued from page 1)

The TPPs, JPs, and DIEs discussed in this report establish the technical and Quality Assurance (QA) requirements for field activities. TPPs provide the overall objectives and planning elements for the conduct of radial borehole tests and study of hydrological properties of major faults in the ESF. JPs are the mechanism for assigning responsibilities, authorizing and directing site work, and reporting results. DIEs are conducted to determine whether field activities at the Yucca Mountain (YM) Site could adversely impact site characterization data, the waste isolation capabilities of a potential geologic repository in the YM Site, or other Q-List items that have been installed. They also establish appropriate QA controls, if necessary, to prevent or minimize such potential impacts. Relevant requirements from these documents were verified during the surveillance.

USGS has used SF_6 as a tracer in borehole tests conducted in ESF Alcoves #1, #2, and #3. These tests and tracers are controlled and documented using scientific notebooks (SN). Calibrated measuring equipment is used to control the concentration of SF_6. Records of SF_6 concentrations and volumes are generated and reported. Compliance with procedures which control scientific investigation, equipment calibration, and reporting of Tracers, Fluids and Materials (TFM) was verified.

Control of SF_6 tracer injection was in compliance with the appropriate TPPs, JPs, and procedures, with the exception of the deficiencies noted in the conclusion section of this report.

Activities were verified for compliance with applicable sections (shown in parentheses) of requirements documents. The results are as follows:

TPP YMP/TPP T93-8, Revision 0, "Hydrologic Properties of Major Faults Encountered in the Exploratory Studies Facility" and TPP YMP/TPP 92-13, Revision 2, "Radial Borehole Tests in the Exploratory Studies Facility" (both TPPs are part of Work Breakdown Structure Number 1.2.3.3.1.2.4)

- No specific requirements pertaining to the control of SF_6 are provided in the TPPs. However, these TPPs reference canceled QAGR G1233124. Deficiency Report (DR) number YM-96-D-091 further describes this deficiency. (YMP/TPP T93-8, 8.2 and YMP/TPP 92-13, 8.2)

YMP/JP 94-21, March 1995, "Hydrologic Properties of Major Faults Encountered in the Exploratory Studies Facility"

- The use of SF_6 in ESF Alcove #2 including concentrations and volumes is documented on TFM Reports ESF-96-08-06-.02 (in process) and ESF-96-07-03-.01. (B.1.c)

- Concentrations of SF_6 used in ESF Alcove #2 exceeded the 20 ppm (parts per million) limitation. This deficiency was identified by USGS as DR number USGS-96-D005. (B.2.e.9)

- The JP directs that operations be conducted in accordance with canceled QAGR G1233124. As a result, DR YM-96-D-091 has been issued to document this condition. (A.1.b)

YMP/JP 95-1, Revision 2, "Hydrochemistry and Radial Borehole Tests in the Exploratory Studies Facility"

- The use of SF_6 in ESF Alcoves #1, #2, and #3 including concentrations and volumes is documented on TFM Reports ESF-96-08-06-.01 through .03 (in process). (B.1.c)

- The concentrations of SF_6 used as reported on ESF-96-08-06-.01 through .03 fall within the specified 20 ppm limit. However, in a related requirement, the limits specified in YMP/JP 95-1 for the use of tetrafluoroethane (SUVA-COLD MP) conflict with the limits specified in DIE BAB000000-01717-2200-00146. DR YM-96-D-092 provides the details of this conflict. (B.2.e.9)

- The JP directs that operations be conducted in accordance with canceled QAGR G1233124. This is identified as a part of DR YM-96-D-091. (A.1.b)

DIE BAB000000-01717-2200-00146, Revision 01, "Determination of Importance Evaluation for Hydrochemistry and Radial Borehole Tests in the ESF" and DIE BA000000-01717-2200-00005, Revision 05, "Determination of Importance Evaluation for Subsurface Exploratory Studies Facility"

- As stated previously, the limits discussed for the use of tetrafluoroethane in hydrochemistry and radial borehole tests conflict with the limits specified in YMP/JP 95-1. See DR number YM-96-D-092 for further details. (BA000000-01717-2200-00146, Section entitled "Evaluation," fourth paragraph, sixth sentence)

- The DIE for hydrochemistry and radial borehole tests conclude that the QA controls in the subsurface ESF DIE are applicable and that no additional DIE-generated QA controls are required. (BAB000000-01717-2200-00146, Conclusion)

- Yucca Mountain Site Characterization Project Administrative Procedure (YAP)-2.8Q, Revision 1, "Tracers, Fluids, and Materials Data Reporting and Management," is the procedure used for developing a QA record of TFMs consumed within the Topopah Spring Loop and associated operation and test support areas. (BA000000-01717-2200-00005, Section 13.2, Requirement 10)

Procedure YMP-USGS-Quality Management Procedure (QMP)-5.05, Revision 4, Modification 2, "Scientific Notebook"

- The testing performed by USGS, including tracer injection, is controlled and documented by SN-0096, "Scientific Notebook for Air-k (permeability) testing in the ESF Major Faults Testing" and SN-0063, "Radial Borehole Air-k Testing-ESF." (5.1)

- The notebooks document the unique identifiers of equipment used to control the tracers (e.g., mass flow controllers AKMC359 and AKMC378). Documentation associated notebook SN-0096 included a record of the volumes and concentrations of SF_6. (5.6)

Procedure YMP-USGS-QMP-12.01, Revision 6, Modification 3, "Instrument Calibration"

- Calibration records are available indicating that mass flow controllers AKMC359 and AKMC378 were calibrated by John C. Stennis, Space Center on March 20, 1996, with a calibration due date of September 20, 1997. This supplier is listed on the Office of Civilian Radioactive Waste Management Qualified Suppliers List as G. B Tech, Inc., Lockheed Stennis Operations. (5.2.2)

Procedure YAP-2.8Q, Revision 1, "Tracers, Fluids, and Materials Data Reporting and Management"

- Use of SF_6 in the ESF Alcoves is documented on TFM Reports ESF-96-07-03-.01 and ESF-96-08-06-.01 through .03 (in process) using Form YMP-221-R1. (5.3.1)

- Data from Report ESF-96-07-03-.01 have been entered into the TFM Technical Data Base (TDB). Data from Report ESF-96-08-06-.01 through .03 have not reached this stage of processing. (5.3.3)

The following personnel were contacted during the surveillance:

N. E. Bartley, DIE Analyst, Civilian Radioactive Waste Management System Management and Operating Contractor (CRWMS M&O)
S. J. Bodnar, Technical Data Management, CRWMS M&O
A. G. Burningham, QA Liaison, Los Alamos National Laboratory (LANL)
L. L. Cuba, Senior Assurance Engineer, CRWMS M&O
D. L. Edwards, ESF and Surface-Based Testing Test Coordinator, USGS
P. S. Hastings, Mined Geologic Disposal System (MGDS) Safety Assurance Manager, CRWMS M&O
E. W. McCann, Environmental Programs Department Manager, CRWMS M&O
M. McLane, Hydrologist/Scientist, USGS
A. J. Mitchell, Test Planning Specialist and Project Engineer, LANL
A. J. Randall, Environmental Scientist, CRWMS M&O

Block 10 SURVEILLANCE CONCLUSIONS: (continued from page 1)

YM-96-D-092

The limits on the use of tetrafluoroethane specified in JP YMP/JP 95-1 (target value of 15 ppm, with no more than 30 ppm) conflict with those discussed in DIE BAB000000-01717-2200-00146 (30 ppm +/- 10 ppm). This deficiency was issued to the CRWMS M&O.

The following deficiency was identified by USGS prior to the surveillance:

USGS-96-D005

SF_6 concentrations measured in the pumping interval Alcove #2 exceeded the requirements stated in JP 94-21.

The deficiencies described are against the TPPs, JPs, and a DIE. No procedural deficiencies were identified. Based on the deficiencies, examination of objective evidence and discussions with personnel, it is determined that the USGS implementation of its QA program, as it applies to control of SF_6 tracer in the ESF Alcoves, is marginally effective.

The following recommendations are provided for the consideration of the organizations with responsibility for reporting or assimilating TFM information.

Recommendation Number 1

SF_6 use is reported in ppm concentrations and volume of cm^3 (cubic centimeters) or liters. The number of significant figures presented for concentrations and volumes varies. For example, concentrations may be reported as 2 ppm or 2.0 ppm and volumes may be reported as 22.5 liters or 45,028.8 cm^3.

Use of gas in a single location may be reported as the sum of volumes of individual uses with the concentration reported as the maximum measured. Data reported in this manner provides a conservative estimate of the minimum use.

Volumes and concentrations are not required to be reported with measured temperatures and pressures. At a given volume and concentration, it may not be possible to determine the amount of tracer, unless the temperature and pressure are also provided.

The method for reporting use of tracer gases should be standardized, including identification of the method for calculating use, variables to be reported, standard units of measurement, and reporting measurement uncertainties. This is specifically recommended for gases which may have a critical impact on waste isolation or test interference.

Recommendation Number 2

Definition 3.10 of YAP-2.8Q, states that a TDB is the YMP database that stores regional and site-specific technical data expected to be needed for mined geologic disposal system design and for site suitability and licensing evaluations. The requirements of Supplement V of DOE/RW-0333P, Revision 5, "Office of Civilian Radioactive Waste Management Quality Assurance Requirements and Description Document," apply to the electronic management of data used as the controlled source for information used in design analysis, process control, or scientific investigation. Currently there is no procedure which addresses the requirements of Supplement V of DOE/RW-0333P for the TFM TDB. It is recommended that development of this procedure be expedited, and that YAP-2.8Q be revised to incorporate the following:

a. Provide a step after 5.4c to check the data input and changes for accuracy and completeness. Develop some sort of objective evidence that this check has been completed. For example, add a data input checked by signature and date on the TFM form.

b. Add a subsection which describes how to retrieve data and how to check that the query language satisfies the user's requirements.

c. Describe how the security of the data is maintained or reference procedure to be used for security.

Recommendation Number 3

YAP-2.8Q should define how to develop reporting formats for various types of TFM. Existing reporting formats should be available to responsible managers for determining the minimum information to be submitted.

Recommendation Number 4

YAP-2.8Q, item 5.4c indicates that the TFM Database Administrator enters data from the TFM reports into the TFM database within ten working days. It is recommended that this be revised to clarify what information on TFM reports is considered data and required to be input into the database. Also, this should clarify which event triggers the start of the ten working days.

Recommendation Number 5

YAP-2.8Q, Exhibit YAP-2.8Q.1, Block 7 instructions indicate that U.S. traditional should be used (where practical) as the unit of measurement for quantities. Block 11 instructions and examples indicate that locations should be reported in metric units. It is unclear why quantities are reported in U.S. traditional units and locations are reported in metric units. To allow for ease in unit conversions and for consistency, it is recommended that quantities and locations both be required to be reported in metric units. Also, Block 11 should clarify by example whether it is acceptable to report the location of ESF Alcove boreholes by name and alcove, or should location be specified with a coordinate.

The surveillance team thanks the individuals contacted for their cooperation during the surveillance.