



WM DOCKET CONTROL CENTER

'84 DEC -3 AM 1:30

Department of Energy

Nevada Operations Office
P. O. Box 14100
Las Vegas, NV 89114-4100

WM Record File

102.2

WM Project 11

Docket No.

PDR

LPDR

Distribution:

Kennedy	BILBORN
COPLAN	STARLEIN
(Return to WM, 623-SS)	Delligatti
	H-FM L3

James E. Kennedy
Nuclear Regulatory Commission
Division of Waste Management
7915 Eastern Avenue
Silver Springs, MD 20910

NOV 30 1984

NNWSI DOE-NRC MEETING, DECEMBER 13-14, 1984

Enclosed for your information are the documents that will be discussed at the subject meeting.

DOE Documents

- NVO-196-17 Nevada Nuclear Waste Storage Investigation Quality Assurance Plan
- NNWSI-SOP-03-01 Engineering, Construction, and Support Services at the NTS
- NNWSI-SOP-15-01 NNWSI, Nonconformance Control System
- NVO-196-18 Waste Management Project Office Quality Assurance Program Plan
- QMP-01-01 WMPO Organization
- QMP-02-01 Indoctrination and Training
- QMP-02-02 Qualification and Certification of Auditors
- QMP-03-01 Peer Review
- QMP-06-01 QMP Format and Preparation
- QMP-06-02 Document Control
- QMP-06-03 Document Review and Approval
- QMP-07-01 Surveillance
- QMP-15-01 Nonconformance Control
- QMP-16-01 Corrective Action Control System
- QMP-16-02 Trend Analysis
- QMP-18-01 Audits

8502210018 841130
PDR WASTE
WM-11 PDR

James E. Kennedy

-2-

NOV 30 1984

USGS Documents

NWM-USGS-QAPP

Quality Assurance Program Plan for Nevada Nuclear Waste Storage Investigations

NWM-USGS-QP-01

Document Control

NWM-USGS-QP-02

Control of Quality Assurance Records

NWM-USGS-QP-03

Control of Nonconforming Materials, Components, and Processes

NWM-USGS-QP-04

Control for Corrective Action

NWM-USGS-QP-05

Auditing

NWM-USGS-QP-06

Instrument Calibration

NWM-USGS-QP-07

Procurement

NWM-USGS-QP-09

Surveillance

NWM-USGS-GP-02

Subsurface Investigations

NWM-USGS-GPP-06

Rock and Paleomagnetism Investigations

NWM-USGS-HP-13

Collection and Field Analysis of Unsaturated Zone Ground Water Samples

NWM-USGS-HP-26

Method for Calibrating Water Level Measurement

NWM-USGS-HP-37

Equipment Using the Reference Steel Tape

Preliminary Procedure for Drilling and Coring of Wet and Dry Lake Sediments

WMPO:JB -379

Enclosures:

As stated

cc w/o encl.:

James Blaylock, QAD, DOE/NV

M. P. Kunich, WMPO, DOE/NV

J. S. Szymanski, WMPO, DOE/NV

S. H. Klein, SAIC/LV

M. A. Glora, SAIC/LV

D. C. Newton, RW-25, DOE/HQ

W. W. Dudley, Jr., USGS, CO

J. R. Willmon, USGS, CO

Paul Prestholt, NRC, LV


Donald L. Vieth, Director
Waste Management Project Office

**Nevada
Nuclear
Waste
Storage
Investigations**



A U.S. DOE PROJECT

UNCONTROLLED

**NEVADA NUCLEAR WASTE STORAGE
INVESTIGATIONS
QUALITY ASSURANCE PLAN**

**UNITED STATES DEPARTMENT OF ENERGY
NEVADA OPERATIONS OFFICE
LAS VEGAS, NEVADA**

DISCLAIMER

THIS REPORT WAS PREPARED AS AN ACCOUNT OF WORK SPONSORED BY THE UNITED STATES GOVERNMENT. NEITHER THE UNITED STATES NOR THE UNITED STATES DEPARTMENT OF ENERGY, NOR ANY OF THEIR EMPLOYEES, MAKES ANY WARRANTY, EXPRESS OR IMPLIED, OR ASSUMES ANY LEGAL LIABILITY OR RESPONSIBILITY FOR THE ACCURACY, COMPLETENESS, OR USEFULNESS OF ANY INFORMATION, APPARATUS, PRODUCT, OR PROCESS DISCLOSED, OR REPRESENTS THAT ITS USE WOULD NOT INFRINGE PRIVATELY OWNED RIGHTS. REFERENCE HEREIN TO ANY SPECIFIC COMMERCIAL PRODUCT, PROCESS, OR SERVICE BY TRADE NAME, MARK, MANUFACTURER, OR OTHERWISE, DOES NOT NECESSARILY CONSTITUTE OR IMPLY ITS ENDORSEMENT, RECOMMENDATION, OR FAVORING BY THE UNITED STATES GOVERNMENT OR ANY AGENCY THEREOF. THE VIEWS AND OPINIONS OF AUTHORS EXPRESSED HEREIN DO NOT NECESSARILY STATE OR REFLECT THOSE OF THE UNITED STATES GOVERNMENT OR ANY AGENCY THEREOF.



NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS

NNWSI-SOP-03-01

Revision 0

UNCONTROLLED

**ENGINEERING, CONSTRUCTION, AND SUPPORT
SERVICE AT THE NTS**

**UNITED STATES DEPARTMENT OF ENERGY
NEVADA OPERATIONS OFFICE**



NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS

UNCONTROLLED
NNWSI-SOP-15

Revision 0

NNWSI NONCONFORMANCE CONTROL SYSTEM

UNITED STATES DEPARTMENT OF ENERGY
NEVADA OPERATIONS OFFICE

**Nevada
Nuclear
Waste
Storage
Investigations**



A U.S. DOE PROJECT

UNCONTROLLED

**WASTE MANAGEMENT
PROJECT OFFICE**

**QUALITY ASSURANCE
PROGRAM PLAN**

**UNITED STATES DEPARTMENT OF ENERGY
NEVADA OPERATIONS OFFICE
LAS VEGAS, NEVADA**

DISCLAIMER

THIS REPORT WAS PREPARED AS AN ACCOUNT OF WORK SPONSORED BY THE UNITED STATES GOVERNMENT. NEITHER THE UNITED STATES NOR THE UNITED STATES DEPARTMENT OF ENERGY, NOR ANY OF THEIR EMPLOYEES, MAKES ANY WARRANTY, EXPRESS OR IMPLIED, OR ASSUMES ANY LEGAL LIABILITY OR RESPONSIBILITY FOR THE ACCURACY, COMPLETENESS, OR USEFULNESS OF ANY INFORMATION, APPARATUS, PRODUCT, OR PROCESS DISCLOSED, OR REPRESENTS THAT ITS USE WOULD NOT INFRINGE PRIVATELY OWNED RIGHTS. REFERENCE HEREIN TO ANY SPECIFIC COMMERCIAL PRODUCT, PROCESS, OR SERVICE BY TRADE NAME, MARK, MANUFACTURER, OR OTHERWISE, DOES NOT NECESSARILY CONSTITUTE OR IMPLY ITS ENDORSEMENT, RECOMMENDATION, OR FAVORING BY THE UNITED STATES GOVERNMENT OR ANY AGENCY THEREOF. THE VIEWS AND OPINIONS OF AUTHORS EXPRESSED HEREIN DO NOT NECESSARILY STATE OR REFLECT THOSE OF THE UNITED STATES GOVERNMENT OR ANY AGENCY THEREOF.



NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS

QMP-01-01

Revision 0

WMPO ORGANIZATION

UNCONTROLLED

**UNITED STATES DEPARTMENT OF ENERGY
NEVADA OPERATIONS OFFICE**



NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS

QMP-02-01

Revision 0

INDOCTRINATION AND TRAINING

UNCONTROLLED

**UNITED STATES DEPARTMENT OF ENERGY
NEVADA OPERATIONS OFFICE**



NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS

QMP-02-02

Revision 0

**QUALIFICATION AND CERTIFICATION
OF AUDITORS**

UNCONTROLLED

**UNITED STATES DEPARTMENT OF ENERGY
NEVADA OPERATIONS OFFICE**



NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS

QMP-03-01

Revision 0

PEER REVIEW

UNCONTROLLED

**UNITED STATES DEPARTMENT OF ENERGY
NEVADA OPERATIONS OFFICE**



NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS

QMP-06-01

Revision 0

FORMAT AID PREPARATION

UNCONTROLLED

**UNITED STATES DEPARTMENT OF ENERGY
NEVADA OPERATIONS OFFICE**



NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS

QMP-06-02

Revision 0

DOCUMENT CONTROL

UNCONTROLLED

**UNITED STATES DEPARTMENT OF ENERGY
NEVADA OPERATIONS OFFICE**



NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS

QMP-06-03

Revision 0

DOCUMENT REVIEW/APPROVAL

UNCONTROLLED

**UNITED STATES DEPARTMENT OF ENERGY
NEVADA OPERATIONS OFFICE**



NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS

QMP-07-01

Revision 0

SURVEILLANCE

UNCONTROLLED

**UNITED STATES DEPARTMENT OF ENERGY
NEVADA OPERATIONS OFFICE**



NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS

QMP-15-01

Revision 0

NONCONFORMANCE CONTROL

UNCONTROLLED

**UNITED STATES DEPARTMENT OF ENERGY
NEVADA OPERATIONS OFFICE**



NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS

QMP-16-01

Revision 0

CORRECTIVE ACTION

UNCONTROLLED

**UNITED STATES DEPARTMENT OF ENERGY
NEVADA OPERATIONS OFFICE**



NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS

QMP-16-02

Revision 0

TREND ANALYSIS

UNCONTROLLED

**UNITED STATES DEPARTMENT OF ENERGY
NEVADA OPERATIONS OFFICE**



NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS

QMP-18-01

Revision 0

AUDITS

UNCONTROLLED

**UNITED STATES DEPARTMENT OF ENERGY
NEVADA OPERATIONS OFFICE**

QUALITY ASSURANCE PROGRAM PLAN
FOR
NUCLEAR WASTE STORAGE INVESTIGATIONS

U.S. GEOLOGICAL SURVEY

Effective Date July 15, 1983

UNCONTROLLED

J. Ryle Keethers
REVISED BY

6/8/83
DATE

Alvin H. Davis
REVIEWED BY

6/8/83
DATE

Peter L. Bussolini
QUALITY ASSURANCE MANAGER

6/9/83
DATE

[Signature]
ASSISTANT DIRECTOR APPROVAL

6/24/83
DATE

DOCUMENT CONTROL

QUALITY ASSURANCE DETAILED PROCEDURE QP-01
NUCLEAR WASTE MANAGEMENT PROJECT QUALITY ASSURANCE PROGRAM
U.S. GEOLOGICAL SURVEY

Effective Date April 1, 1984

UNCONTROLLED

T. Kyle Kerstner
PREPARED BY

9 January 1984
DATE

William H. Davis
REVIEWED BY

1/13/84
DATE

J R Rollo
USGS DIRECTOR'S OFFICE APPROVAL

8 Feb 84
DATE

Peter L. Bussolini
QUALITY ASSURANCE APPROVAL

March 20, 1984
DATE

CONTROL OF QUALITY ASSURANCE RECORDS

QUALITY ASSURANCE PROCEDURE QP-02
NUCLEAR WASTE MANAGEMENT QUALITY ASSURANCE PROGRAM
U.S. Geological Survey

Effective Date April 30, 1984

T. Hyle Kerstians
PREPARED BY

9 January 1984
DATE

Alvin K. Davis
REVIEWED BY

1/24/84
DATE

J R Rollo
USGS DIRECTOR'S OFFICE APPROVAL

24 April 84
DATE

Peter L. Bussolini
QUALITY ASSURANCE APPROVAL

April 30, 1984
DATE

CONTROL OF NONCONFORMING MATERIALS, COMPONENTS, & PROCESSES

QUALITY ASSURANCE DETAILED PROCEDURE QP-03
NUCLEAR WASTE MANAGEMENT QUALITY ASSURANCE PROGRAM
U.S. GEOLOGICAL SURVEY

Effective Date April 1, 1984

UNCONTROLLED

Y. Hyde Kestner
PREPARED BY

9 January 1984
DATE

Alvin K. Davis
REVIEWED BY

1/24/84
DATE

J R Rallo
USGS DIRECTOR'S OFFICE APPROVAL

8 Feb 84
DATE

Peter L. Bussoini
QUALITY ASSURANCE APPROVAL

March 20, 1984
DATE

CONTROL FOR CORRECTIVE ACTION

QUALITY ASSURANCE DETAILED PROCEDURE QP-04
NUCLEAR WASTE MANAGEMENT QUALITY ASSURANCE PROGRAM

U.S. GEOLOGICAL SURVEY

Effective Date April 1, 1984

J. Doyle Kerthens
PREPARED BY

9 January 1984
DATE

Alvin H. Davis
REVIEWED BY

1/24/84
DATE

J R Rollo
USGS DIRECTOR'S OFFICE APPROVAL

8 Feb 84
DATE

Peter L. Bussolini
QUALITY ASSURANCE APPROVAL

March 20 1984
DATE

AUDITING

QUALITY ASSURANCE PROCEDURE QP-05
NUCLEAR WASTE MANAGEMENT PROJECT QUALITY ASSURANCE PROGRAM
U.S. Geological Survey

Effective Date June 15, 1984

UNCONTROLLED

J. Kyle Kerstien
REVISED BY

9 January 1984
DATE

Alvin H. Davis
REVIEWED BY

1/24/84
DATE

J R Rollo
USGS DIRECTOR'S OFFICE APPROVAL

24 April 84
DATE

Peter L. Bussolini
QUALITY ASSURANCE APPROVAL

April 30, 1984
DATE

INSTRUMENT CALIBRATION

QUALITY ASSURANCE DETAILED PROCEDURE QP-06
NUCLEAR WASTE MANAGEMENT PROJECT QUALITY ASSURANCE PROGRAM
U.S. GEOLOGICAL SURVEY

Effective Date April 1, 1984

J. Hyle Kertine
PREPARED BY

9 January 1984
DATE

Alvin H. Davis
REVIEWED BY

1/24/84
DATE

J. R. Rallo
USGS DIRECTOR'S OFFICE APPROVAL

8 Feb 84
DATE

Peter L. Bussolini
QUALITY ASSURANCE APPROVAL

March 20 1984
DATE

PROCUREMENT

QUALITY ASSURANCE DETAILED PROCEDURE QP-07
NUCLEAR WASTE MANAGEMENT QUALITY ASSURANCE PROGRAM
U. S. GEOLOGICAL SURVEY

Effective Date June 15, 1984

Thyle Kestras
PREPARED BY

4-9-84
DATE

Joe Pattillo
REVIEWED BY

4/9/84
DATE

J R Rollo
USGS DIRECTOR'S OFFICE APPROVAL

24 April 84
DATE

Peter L. Bussalini
QUALITY ASSURANCE APPROVAL

April 30, 1984
DATE

SURVEILLANCE

QUALITY ASSURANCE DETAILED PROCEDURE QP-09
NWSI PROJECT QUALITY ASSURANCE PROGRAM
U. S. GEOLOGICAL SURVEY

Effective Date November 25, 1983

UNCONTROLLED

Bob Michels
PREPARED BY

10/18/83
DATE

R. Ronald Griffin
QUALITY ASSURANCE REVIEWER

October 21, 1983
DATE

W.W. Dudley, Jr.
NWSI PROJECT COORDINATOR APPROVAL

November 16, 1983
DATE

Peter L. Bussolini
QUALITY ASSURANCE MANAGER APPROVAL

November 22, 1983
DATE

Rock and Paleomagnetic Investigations

Technical Detailed Procedure GPP-06

NNWSI Project Quality Assurance Program

U.S. Geological Survey

Effective Date: November 1, 1984

UNCONTROLLED

Joseph H. Rosenbaum
Prepared by: Joseph Rosenbaum

Sept. 25, 1984
Date

Richard L. Reynolds
Technical Reviewer: Richard Reynolds

Sept. 25, 1984
Date

Adel F. Zohdy
Branch Chief: Adel Zohdy

Oct. 1, 1984
Date

W. Dudley
for NNWSI Project Coordinator: W. Dudley

Oct. 17, 1984
Date

Peter L. Bussolini
Quality Assurance: P. L. Bussolini

October 24, 1984
Date

corresponds to a change of one flux quantum. Since it is possible to detect a change of $10^{-3} \phi_0$, a field of 7×10^{-13} T can be detected by the sensor.

In principle the weak link sensor can be used directly for magnetic field measurements but it is advantageous on several counts, particularly for NRM measurements, to detect the field initially by means of a superconducting pick-up coil. This is linked by superconducting leads to a field coil tightly coupled to the SQUID detector. This system acts as a form of zero-frequency field transformer, based on the condition that the flux linkages within the circuit must remain constant. Thus, for a given field more flux is linked with the sensor because of the large pick-up coil area relative to the effective SQUID area, and substantial field amplification by a factor of 20-50 can be obtained. The use of pick-up coils is also a much more satisfactory (electromagnetically) and convenient way of detecting the field of a rock sample than placing it near the sensor.

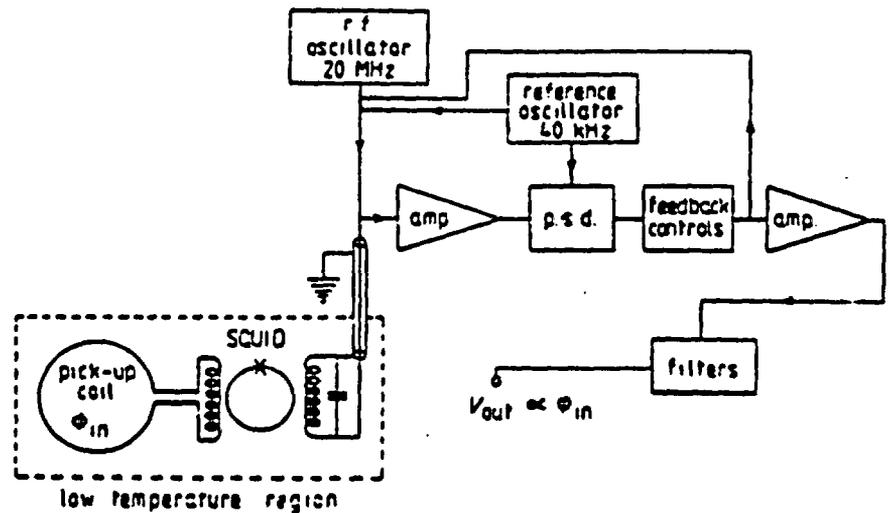


Fig. 9.23 Block diagram of CCL cryogenic magnetometer. (Courtesy of Cryogenic Consultants Ltd. London)

The output obtained from the SQUID is non-linear with the applied field and it is usual to apply feedback to the sensor via a coil, the current or voltage in which is then proportional to the applied field. A block diagram of a cryogenic magnetometer is shown in Fig. 9.23.

9.4.2 The SCT and CCL cryogenic magnetometers

At the time of writing there are two commercially built SQUID rock magnetometers on the market. The Superconducting Technology instrument

Method for Calibrating Water-Level
Measurement Equipment Using the
Reference Steel Tape

By F. Eugene Rush and Leonard E. Wollitz

Technical Detailed Procedure HP- 26
NNWSI Project Quality Assurance Program

U.S. Geological Survey
Effective Date _____

UNCONTROLLED

Leonard E. Wollitz
Technical Reviewer

1-16-84
Date

F. Eugene Rush
NHP QA Coordinator

1-21-84
Date

William E. Nixon
NHP Chief

1-21-84
Date

Peter L. Bussolini
QA Approval

8-14-94
Date

W. Dudley J. Jew
Project Coordinator

2/1/84
Date

Preliminary Procedure for Drilling and Coring of Wet- and Dry-Lake Sediments

By Larry Benson

Technical Detailed Procedure HP-37
KNWSI Project Quality Assurance Program

U.S. Geological Survey
Effective Date 8-14-84

F. Eugene Rush
Technical Reviewer

6-7-84
Date

F. Eugene Rush
NHP QA Coordinator

6-2-84
Date

William E. Hein
NHP Chief

6-7-84
Date

Peter L. Bussolini
QA Approval

July 25, 1984
Date

7/25 *L. W. Dudley, Jr.*
Project Coordinator

7/31/84
Date

UNCONTROLLED

SUBSURFACE INVESTIGATIONS

Technical Detailed Procedure: GP-02
HMWSI Project Quality Assurance Program
U.S. Geological Survey

Effective Date March 1, 1983

Howard S. Simpson
PREPARED BY

12-06-82
DATE

UNCONTROLLED

Florian Maltona
TECHNICAL REVIEWER

10/21/82
DATE

C. C. Wier
ASST. BRANCH CHIEF
ENGINEERING GEOLOGY

11/30/82
DATE

Peter L. Bussalini
QUALITY ASSURANCE APPROVAL

2/17/83
DATE

W. W. Dudley Jr.
HMWSI PROJECT COORDINATOR

2/16/83
DATE

Collection and Field Analysis of
Unsaturated Zone Ground Water Samples

Technical Detailed Procedure HP-13

NHWSI Project Quality Assurance Program
U. S. Geological Survey

Effective Date 8-29-83

UNCONTROLLED

Lorenz H. Huber
PREPARED BY

JULY 20 1983
DATE

[Signature]
TECHNICAL REVIEWER

80 JUL 83
DATE

[Signature]
BRANCH CHIEF
A. C. Kirby

7/20/83
DATE

Peter L. Russolini
QUALITY ASSURANCE APPROVAL

8-15-83
DATE

[Signature]
NHWSI PROJECT COORDINATOR APPROVAL

7/21/83
DATE