

United States Government

See pocket #1 for encl.  
Department of Energy

## memorandum

DATE:

MAY 29 1987

REPLY TO RW-24  
ATTN OF:

SUBJECT: Minutes of April 22-23, 1987 QACG Meeting

TO: Sally Mann, RTTD  
John Anttonen, BWIP  
Don Vieth, WMPO  
Jeff Neff, SRPO

Attached is a draft of the minutes of the QACG meeting that was held in Germantown, Maryland on April 22-23, 1987. Please contact me if you have any questions or comments or if there are any corrections or additions that need to be made to these minutes.

The next QACG meeting is scheduled for July 22-23, 1987, in Denver, Colorado. The meeting on the 22nd is for the executive session; the 23rd is open to the NRC, States and Tribes. A separate meeting announcement and agenda will be issued when available.

*Carl Newton*  
Carl Newton, Chairman  
Quality Assurance Coordinating Group

cc w/attachment:  
see attached list

WM Record File

405

WM Project 1

Docket No. \_\_\_\_\_

PDR ☒

LPDR \_\_\_\_\_

Distribution:

*Kennedy**Delligatti JSL**Don Donnelly**Bilhorn Riddle jcg*

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PDR WASTE

WM-1

PDR

encl. to 5/29/87 Memo  
Minutes of 4/22-23, 1987  
QACG Mtg.

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SUMMARY OF THE QUALITY ASSURANCE COORDINATING GROUP  
EXECUTIVE SESSION HELD IN GERMANTOWN, MD.  
ON APRIL 22, 1987

I. Introduction

The Quality Assurance Coordinating Group (QACG) held it's Executive Session at the DOE offices in Germantown, Maryland on April 22, 1987. There were (20) attendees from DOE headquarters, DOE Project Offices, major contractors and technical support organizations that participated. The session attendance list is shown in Attachment A and the agenda in Attachment B.

II. Session Summary

A. Opening Remarks

1) Introduction of Attendees

The meeting was opened by C. Newton, the QACG Chairman, and introduction of attendees was made.

2) Interactions with NRC

C. Newton presented the OGR policy on NRC mini-audits of Project Office activities (Attachment C). Mr. C. Newton stated that DOE observers on the NRC mini-audits would be limited to OGR and applicable Project Office representatives. The NRC has not yet defined how it will report audits and any associated findings. Technical findings identified during the audit will not be tracked as part of the audit, but would be referred to the other program systems for resolving technical issues (i.e., DOE/NRC technical meetings, Appendix VII meetings, etc.).

C. Newton will draft the DOE letter of invitation to the NRC for the 1st NRC mini-audit of LANL and will send copies of the draft letter to the Project Offices for review and comment on letter format and content (Action Item #1).

B. DOE Policy on Interface with NRC on Project Office QA Program Submittal and Comment Resolution

C. Newton presented the OGR policy on interfaces with the NRC and OGR and Project Office QA program submittal and comment resolution. (Attachment D).

C. Update on OCRWM Overview Guidance

This agenda item was deferred due to G. Langston's absence from the meeting, due to a recent illness.

D. HQ-DOE Policy on Interface with ES&H

C. Newton presented the OGR policy on interface with ES&H (Attachment E). The discussion centered on the ES&H review and approval of Program QA plans and on their role and responsibilities on Program activities. A recommendation was made that in the near term, ES&H limit their review/overview to the OCRWM level and not get involved at the Project Office level until Licensing activities formally begin. C. Newton stated that a draft Memorandum of Understanding (MOU) is being developed between ES&H and OCRWM to address the above issues.

E. Role of Operation Office Management Appraisals in Satisfying OGR QA Plan Requirements

C. Newton presented the OGR policy on management appraisals (Attachment F). It was pointed out by one of the participants that there are varying definitions and differences in interpretation within the Program between management appraisals and management assessments. C. Newton stated that the correct term within the OCRWM Program is management assessments as required and referenced in NQA-1 and the OCRWM QAMPR document. C. Newton asked that "appraisal" be changed to "assessment" when referring to Attachment F.

- F. C. Williams provided an update on the status of NQA-3 - "QA Program Requirements for the Collection of Scientific and Technical Information for Site Characterization of High Level Nuclear Waste Repositories." C. Williams stated that the first draft of NQA-3 should be available by the end of May, 1987. The format and content of NQA-3 will be as follows:

NQA-3 Content

o Introduction

o Definitions

BR-2 - QA Program

BR-3 - Design Control

BR-8 - Identification and Control of Items

BR-11 - Test Control

BR-16 - Corrective Action

BR-17 - QA Records

BR-18 - Audits

- G. An agenda item was added to allow a presentation on the draft specification for "QA Requirements for High Level Waste Form Production" developed by the QAWG. J. Anderson made the presentation on the draft specification. The format and content of the draft specification is as follows:

1.0 General

2.0 Purpose

3.0 Scope

4.0 Definitions

5.0 Requirements

5.1 Basis Requirements

5.1.1 National Consensus Standards

5.1.2 DOE Orders & Guidance

5.1.3 Relationship to Other Requirements and Guidance

5.2 Supplemental Requirements

5.3 QA Program Description

5.4 Program Description Evaluation

P. Saget raised the question of the necessity to establish a new set of QA requirements in lieu of endorsing existing QA standards. J. Anderson stated that the QAWG decided it was both more productive and more expedient to develop a new QA standard rather than get existing QA standards modified to accommodate application to High Level Waste Form Production. A copy of the QA requirements package developed for High Level Waste Form Production was distributed for review and comment by HQ-OGR and the Project Offices. Comments are due back to B. Kehew by May 22, 1987 from BWIP and SRPO, and June 22, 1987 from WMPO and HQ-OGR. (Action Item #2). C. Newton will pursue either incorporating High Level Nuclear Waste Form Production within the scope of the draft memo of understanding between OCRWM and ES&H, or establish a new Memo of Understanding for High Level Waste Form Production (Action Item #3).

H. DOE Policy on Observer Participation in Program Audits

C. Newton lead a discussion on non-DOE observers in Program audits. A draft supplement for "Protocol for Support of Observers on DOE Quality Assurance Audits" prepared by BWIP (Attachment G) and a re-draft of the OGR QA Plan Supplement No. 12 "Protocol for Non-DOE Observers on DOE QA Audits" (Attachment H) were distributed for information. The majority of the participants thought a supplement to the OGR QA Plan was inappropriate, since it did not establish QA program requirements and should not be auditable within the scope of the QA program. Consensus was reached to issue the OGR policy on audit observers as Program guidance outside the scope of the QA program (Action Item #4).

A major issue addressed during the discussion was the number of observers per audit. The reasons cited for the need to limit the number of observers per audit were as follows:

1. The audit must get accurate information from the auditee's. If auditee's are intimidated by the number of observers, the auditee's performance and information accuracy will be negatively impacted.
2. The number of observers has a negative impact on on-going activities (time, spacing, etc.). Interference with on-going activities during audits must be kept to a minimum.
3. The number of observers negatively impacts audit schedule flexibility due to the necessity of rescheduling observer participation.
4. DOE cannot abdicate it's responsibility to perform effective and controlled audits. A limit to the number of observers is required to preclude negative impact on the audit's effectiveness.

C. Newton will pursue a DOE legal position on what the NWPA requires of DOE with respect to audit observers. (Action Item #5).

- I. Update on HQ-OGR QA Plan Supplement on "Stopwork Orders"  
P. Saget presented a summary of why an OGR QA Plan supplement on "Stopwork Orders" is not required. (Attachment I). The consensus of the QACG was that an OGR QA Plan Supplement on "Stopwork Orders" was not required. HQ-OGR requirements for interface and involvement in Project Office Stop Work Orders should be added to the OGR QA Plan. (Action Item #6).
- J. Update on HQ-OGR QA Plan Supplement on "Readiness Reviews"  
P. Saget distributed a draft HQ-OGR QA Plan supplement on "Readiness Reviews" (Attachment J) prepared by BWIP and requested comments to be submitted by June 22, 1987. (Action Item #7). SRPO and BWIP are to provide a copy of their Project Readiness Review procedure to WMFO for information (Action Item #8).
- K. Update on HQ-OGR QA Plan Supplement on "Auditing for Effectiveness"  
J. Reese distributed a draft HQ-OGR QA Plan Supplement on "Auditing for Effectiveness" (Attachment K). J. Reese suggested that requirements associated with "Auditing for Effectiveness" be issued as HQ-OGR guidance rather than as an OGR QA Plan Supplement. He also suggested that a presentation be given to HQ-OGR and the Project Office(s) on the objectives and elements involved in "Auditing for Effectiveness" before comments are made on the draft Supplement. P. Saget will coordinate with HQ-OGR and the Project Office(s) to set-up a meeting for a presentation on "Auditing for Effectiveness" (Action Item #9). If a meeting cannot be scheduled prior to the next QACG meeting, consideration should be given to holding a 3-day QACG meeting with (1) day dedicated to the subject presentation.
- HQ-OGR and the Project Office(s) will review and comment on the draft OGR QA Plan Supplement on "Auditing for Effectiveness" and submit comments to J. Reese (30) days after the subject presentation is completed.
- L. Update on HQ-OGR QA Plan Supplement on "Management Assessments"  
J. Blaylock distributed a draft HQ-OGR QA Plan Supplement on "Management Assessments" (Attachment L), prepared by WMFO. The question was raised whether the supplement should be reviewed prior to issuance of the OCRWM policy guidance on "Management Assessments." C. Newton will send the draft OGR QA Plan Supplement and the draft OCRWM policy guidance on "Management Assessments" to the Project Office(s) for review and comment, as soon as the latter becomes available. (Action Item #10).
- M. J. Blaylock presented a summary of NRC mini-audits (Attachment M) based on the DOE/NRC meeting held to discuss the first NRC mini-audit of LANL.
- N. Update on Consolidated/Common Training  
P. Saget discussed the establishment of a training work group; it's planned purpose, goals and accomplishments; suggested topics of core courses; and it's on-going activities (Attachment N). P. Saget also distributed "Proposed Changes to the OGR QA Plan Supplement on

"Indoctrination and Training" for review and comment by HQ-OGR and the Project Office(s) and requested that comments be submitted to Teresa Hennig (BWIP) by 5/22/87. (Action Item #11).

J. Reese took exception to mandating the "System Approach to Training" due to numerous acceptable ways of training and numerous cases where a "Systems Approach to Training" is not applicable. J. Reese recommended a meeting between collaborating parties and P. Saget agreed.

0. Update on Development of "Computer Software Control" Requirements  
H. Steinberg presented a "Proposal for Establishment of OCRWM Software Quality Assurance Programs" (Attachment O). It was generally agreed that the establishment of program computer software requirements was necessary. Concern was expressed that the proposed activities might duplicate activities currently in-progress to develop similar requirements as Supplement 2.7 to NQA-2. H. Steinberg stated that the draft Supplement 2.7 to NQA-2 would be used as a starting point to establish the OCRWM program requirements. A concern was also expressed with regard to the timing of the proposed activities vs. the current Program needs. H. Steinberg stated that he would review the proposed schedule and determine if the activities could be expedited.

### III. Required Actions

The following required actions resulted from the meeting:

1. C. Newton will draft the DOE letter of invitation to the NRC for the NRC mini-audit of LANL and will send copies of the draft letter to the Project Office(s) for review and comment.
2. B. Kehew requested that HQ-OGR and the Project Office(s) review and comment on the QA requirements package developed for High-Level Waste Form Production. Comments are due to B. Kehew by May 22, 1987, from BWIP and SRPO, and June 22, 1987 from WMPO and HQ-OGR.
3. C. Newton is to pursue either incorporating High-Level Waste Production within the scope of the draft Memo of Understanding (MOU) between OCRWM and ES&H or establish a new Memo of Understanding (MOU) between OCRWM and ES&H for High-Level Waste Production.
4. Consensus was reached by the QACG that an OGR QA Plan supplement for "non-DOE observers on DOE audits" was inappropriate since the draft supplement does not establish Program QA requirements. Consensus was to issue as Program guidance.
5. C. Newton will pursue a DOE legal position on what the NWPA requires DOE to do to accommodate observers on DOE audits.
6. Consensus of the QACG was that an OGR QA Plan supplement on "Stop Work Orders" was not required. HQ-OGR requirements for interface and involvement in Project Office Stop Work Orders should be added to the OGR QA Plan.

7. P. Saget requested that HQ-OGR and the Project Offices review and comment on the draft OGR QA Plan Supplement on "Readiness Reviews." Comments are to be submitted to P. Saget by June 22, 1987.
8. SRPO and BWIP are to provide a copy of their Project Readiness Review procedure to WMPO for information.
9. P. Saget will coordinate with HQ-OGR and the other Project Offices to set-up a meeting for a presentation on "Auditing for Effectiveness." If a meeting cannot be scheduled prior to the next QACG meeting, consideration should be given to holding a 3-day QACG meeting with 1 day dedicated to the subject presentation on "Auditing for Effectiveness."
10. C. Newton will send the draft OGR QA Plan Supplement on "Management Assessments" and the draft OCRWM Policy Guidance on "Management Assessments" to the Project Office(s) for review and comment, as soon as the latter becomes available.
11. HQ-OGR and the Project Office(s) will review and comment on the "Proposed Changes to the OGR QA Plan Supplement on Indoctrination and Training" prepared by BWIP and submit comments to Teresa Hennig (BWIP) by 5/22/87.

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SUMMARY OF THE QUALITY ASSURANCE COORDINATING  
GROUP GENERAL SESSION HELD IN GERMANTOWN,  
MD. ON APRIL 23, 1987

I. INTRODUCTION

The Quality Assurance Coordinating Group (QACG) held it's general session at the DOE offices in Germantown, Maryland. The session attendance is shown in Attachment A and the agenda in Attachment B.

II. SESSION SUMMARY

A. Introductory Remarks

- C. Newton, the QACG chairman, opened the meeting and announced that the meeting agenda had been revised to allow the participants to focus on the main agenda item: Participation of State and Tribal observers on DOE Quality Assurance audits.
- S. Zimmerman (State of Texas) and D. Provost (State of Washington) expressed their displeasure with the meeting location for the following reasons:
  1. Out-of-the-way location
  2. Lack of public transportation
  3. The need for an escort while in the DOE facilities.

They expressed a desire to hold future QACG meetings in more neutral, centrally located areas. C. Newton agreed that an effort would be made to hold future QACG meetings in more neutral, centrally located area(s).

B. State, Tribal and NRC Participation on DOE Audits

C. Newton opened the discussion and stated that a primary objective was to reach a consensus agreement on the major issues associated with this item. J. Knight (OGR Siting, Licensing and QA Division Director) made some introductory remarks centering on DOE's objective to get the job done well and efficiently, and to satisfy everyone's needs and responsibilities in the process.

The State and Tribal representatives felt they were entitled to individual representation on each DOE audit.

A major discussion was held and numerous positions and recommendations expressed by the meeting participants (reference Attachment C for position of the Confederated Tribes and Bands - Yakima Indian Nation). The discussion centered on the following topics:

1. The number of observers per audit and the potential impact the number of observers may have on audit efficiency and effectiveness.

2. Notification - This topic included the timing of DOE notification to affected States and Tribes of scheduled audits and the timing of State and Tribe notification to DOE of the audits they select to observe. Also addressed the potential for using computer mail systems for notifications.
3. Pre-audit, during audit and post audit information requirements of the parties involved.
4. Observer involvement in the technical areas being audited.
5. Observer assignment when audit team is divided into numerous sub-teams.
6. Observer participation in pre-audit, audit team caucus(s) and post-audit meetings.
7. Observation of DOE audits by other interested parties (i.e. State of Utah, EEI, etc).
8. The definition, role and responsibilities of observers.
9. Observer protocol during audit.

General agreements were reached by the State, Tribal, NRC AND HQ-OGR meeting participants on the topics discussed. C. Newton will draft a DOE policy guidance letter based on the agreements reached and will distribute the draft letter to the affected parties for review and comment. The following is a summary of the general agreements reached during the discussion:

1. The QA Manager of OGR will furnish to the State, Tribal and NRC representatives a schedule of audits planned by DOE-HQ (OGR) and by the DOE project offices. Because of frequent changes to the schedule, the schedule will be updated at approximately monthly intervals and copies furnished to the State, Tribal and NRC representatives.
2. OGR and the project offices will make every effort to send an audit notification at least 30 days prior to each QA audit. The audit notification will, whenever possible, include an audit plan and a description of the scope of the audit. Copies of OGR audit notifications will be furnished to NRC and to all State and Tribal representatives; copies of project audit notifications will be furnished to NRC and to the affected State and Tribal representatives.
3. State, Tribal and NRC representatives may request to participate in any audit. Requests need not be in writing. Telephone contacts to request participation are:

OGR - Carl Newton - (202) 586-5059  
 BWIP - Pierre Saget - (509) 942-7250  
 WMPO - Jim Blaylock - (702) 295-1125  
 SRPO - Jerry Reese - (614) 424-5916\*  
 \* After May 15, 1987 call (806) 374-2320

State, Tribal and NRC representatives who wish to participate will make every effort to contact the DOE representative at least two weeks prior to the audit so that arrangements for their participation can be made.

4. When a request to participate is received by DOE from a State, Tribal or NRC representative, it is DOE's policy to make every reasonable effort to honor the request. Generally participation will need to be limited. When small audit teams are used by DOE, and requests for many observers are received, it may be necessary for DOE to limit participation (but in no event to less than one observer per organizational entity, i.e., one from the affected State, one from each affected Tribe, and one from NRC), so that the auditing process will not be hampered by an excessive number of observers. In instances where the limit of one observer per affected party will still result in an excessive observer to auditor ratio, DOE will contact the affected parties and seek voluntary reductions. It is expected the parties will make every reasonable attempt to accommodate DOE's requests.
5. Observers on DOE audits will be under the authority of the audit team leader (or sub-team leader if the team is divided during the audit). Observers are encouraged to participate fully by furnishing their questions, observations and recommendations to the audit team leader (or sub-team leader). Direct interactions between observers and auditee personnel will generally be discouraged and it may be necessary to exempt observers from certain portions of an audit (such as procurement actions that are in-process, classified material, or sensitive personnel records). The DOE policy is that every effort is to be made to limit such exemptions and to include observers as full participants in all aspects of the audit possible.
6. The State, Tribal and NRC representatives who will be participating in a QA audit are to be furnished a copy of the audit checklist as soon as it is available. A target date of ten days prior to the audit will be attempted. The State, Tribal and NRC representatives who receive audit checklists are, of course, to keep their contents confidential and to not, under any circumstances, divulge its contents to representatives of the organization to be audited.
7. DOE encourages observers to receive formal QA auditor training and QA lead auditor training. Every effort to accommodate State, Tribal and NRC representatives in DOE sponsored training courses is to be made. There are, however, no DOE requirements for observers to have had such training.
8. DOE invites observers to express concerns and recommendations on the auditee's QA program to the audit team leader for his consideration in preparing the audit report. DOE also invites observations on the conduct of the audit and solicits recommendations on how we might improve our audit process. Observers will be afforded an opportunity to speak at exit meeting following each audit. Regular opportunities are to be provided to observers during the course of the audit and at the quarterly QACG meeting for State, Tribal and NRC representatives to discuss their comments and recommendations.



C. QACG Meeting Schedule

The following dates and locations were agreed upon for the next (5) QACG general session meetings:

<u>DATE</u>	<u>LOCATION</u>
July 23, 1987	Denver, Colorado
Oct. 22, 1987	Amarillo, Texas
Jan. 21, 1988	Las Vegas, Nevada
April 21, 1988	Albuquerque, New Mexico
July 21, 1988	Denver, Colorado

D. Comments From NRC

J. Kennedy (NRC) addressed the meeting and discussed the following topics:

- NRC-Mini Audits

The first NRC mini-audit is scheduled for June 8-12, 1987 of the MIN/PET activities of LANL on the WMPO project. The NRC audit team will consist of (8) people, which includes the technical support personnel.

The first NRC mini-audit of the SRPO & BWIP projects are tentatively scheduled for July/Aug., 1987 and Nov./Dec., 1987, respectively.

- NRC Generic Technical Positions

J. Kennedy asked the DOE/States/Tribes if they would like to receive copies of the final drafts of the GTP's for "Peer Review" and "Qualification Of Existing Data" and the NRC disposition of initial comments for re-review and re-comment or have a meeting to review and resolve the final GTP's and NRC comment dispositions. The consensus was to have a meeting. J. Kennedy tentatively established a meeting date of May 14, 1987 in Silver Springs, MA..

J. Kennedy stated that the NRC disposition of comments received on the GTP on "Items and Activities in the High-Level Geologic Repository Program Subject to 10 CFR 60 Quality Assurance Requirements" should be complete by June 30, 1987.

- NRC QA Review Plan

J. Kennedy stated that a revision to the NRC QA review plan was in-process and a draft should be issued for public comment by June 30, 1987.

**E. Project Office Progress Reports on QA Activities**

- Mr. Pierre Saget, BWIP Director-QS Division, presented and discussed the "BWIP QA Progress Report" (Attachment D)
- Mr. Jim Blaylock, WMPO QA Manager, presented and discussed the "WMPO QA Progress Report" (Attachment E)
- Mr. Jerry Reese, SRPO QA Manager, presented and discussed the "SRPO QA Progress Report". (Attachment F)

**F. Miscellaneous**

- The following items will be added to the agenda for the QACG general session meeting scheduled for July 23, 1987:
  - "Summary by C. Newton of QACG Executive Session Meeting"
  - "Update by C. Newton on HQ-OGR QA Program Status"
  - "Project Office(s) are to add "a summary of the key deficiencies identified during audits" To their Project QA progress reports".
- A recommendation was made to delete the Project Office "Status Reporting on QA Program Status & Training" as part of the Project QA progress reports.
- The following required changes to the "QACG meeting minutes" mailing list were identified:
  - Change "Nex Perce Tribal Executive Committee" to "Nez Perce Tribal Executive Committee".
  - Change Mr. Ron Halfmoon's title & address to:  
  
Ron Ti Halfmoon  
Nez Perce Nuclear Waste Program Manager  
Box 350, Main Street  
Lapwai, ID 83540
  - Add Mr. Abdul Alkezweeny as Follows:  
  
Abdul Alkezweeny  
Council of Energy Resource Tribes  
1933 Jadwin #135  
Richland, WA 99352  
(509) 943-5301
  - Change E.A. Patzer's mailing address to:  
  
E.A. Patzer  
Battelle Project Management Division  
7000 South Adams Street  
Willow Brook, Ill 60521

- Change "Mike Nicol - Rockwell International" to "Roger Johnson - Rockwell International"

Place DOE - GERMANTOWN, MA.Date 4-22-87

## ATTENDANCE LIST

NAME (Please Print)	Position Title	Organization Represented	Telephone (For Contact)
GARY L. FAUST	QA SECTION MGR.	R. F. WESTON	(202) 646-6759
CARL NEWTON	HQ-OGC QA MGR.	HQ-OGC	(202) 586-5059
A. M. SASTRY	QA MANAGER	MACTEC - BWIP SSC	(509)-376-8376
R. P. SAGET	Quality Systems Division Director	DOE - BWIP	FTS. 444-7250
J. B. SILVERWOOD	CONSULTANT	MAC	509-376-5231
R. T. JOHNSON	QA Manager	Rockwell-Hanford	(509) 376-8358
M. Flannigan	QA Manager	DOE - CH	FTS 972-2211
J. BLATLOCK	Project Quality Manager	DOE/NV	FTS 575-1125
I. J. Lefman	ONWI QA Manager	SRPO/BPMD	FTS 976-7280
JERRY REESE	QA MANAGER	SRPO	FTS 976-5916
Clarence Williams	Vice Pres. BPMD for Quality	BPMD	FTS 976-5332
J. B. SHULSE	QA SPECIALIST	DOE - SR	FTS 239-1087
W. J. Kehew	QA MANAGER	RTTD	FTS 972-2315
E. A. PATZER	QA MANAGER	BPMD/OWTD	312-655-8608
J. W. ANDERSON	MGR. PERF. ANALYSIS	MAXIMA/DNS-SAO	(615) 483-7010
J. R. TRINALDI	DIRECTOR QAD	DOE - NV	FTS 575-1001
E. W. SOLEK	CONSULTANT	WESTON	(215) 485-3527

QACG MEETING  
Las Vegas, Nv.

Place DOE - GERMAN TOWN, M A.

Date 4/22/87

## ATTENDANCE LIST

[illegible]

## QACG MEETING

ATTACHMENT A

Place DOE - GERMANTOWN, MA.Date 4/23/87

## ATTENDANCE LIST PAGE 1 OF 3

NAME (Please Print)	Position Title	Organization Represented	Telephone (For Contact)
C. NEWTON	HQ-OGC QA MGR	DOE	(202) 586-5059
G. FAUST	QA SECTION MGR	WESTON	(202) 646-6759
JERRY REESE	QA MANAGER	DOE / SRPO	FTS 476-5916 (614) 424-5916
R.P. SAGET	QUALITY SYSTEMS DIVISION DIRECTOR	DOE / BWIP	FTS-444-7250 (509) 376-7250
J. BLAYLOCK	PROJECT QUALITY MANAGER	DOE / NV	FTS 575-1125 (702) 295-1125
J. P. KNIGHT	DIR SL & QA DIV	DOE / HQ	202-586-9300
S. STUBBS	ASST. PROGRAM COORDINATOR	UNIV. of TX.	(512) 471-7721
SUSAN ZIMMERMAN	Geologist	State of TEXAS	512-463-2198
ARL JOHNSON	ADMINISTRATOR OF TECHNICAL PROGRAMS	NEVADA	702 885-3744
Harry Callkins	Technical Coordinator	CTUIR	(503) 276-2018
David Wolf, Jr.	Data Coordinator	CTUIR	503-276-3099
Toyd K. Kugzruk	Technical Coordinator	NEZ PERCE	208-843-2253
Jul Alkezweeny	Tribal on-site Rep.	CERT	(509) 943-5301
RON PROVOST	Deputy Assoc. Dir. of	State of Washington	206-459-6718
Stan Ehl	DOE - Attorney	GL	202 586-6947
G. SOMMER	HQ/OGC QA ENGR.	DOE	202-586-1639
R RINALDI	DIR - QAD	DOE-NV	FTS 575-1001 (702) 295-1001

Place DOE - GERMAN TOWN, MA.Date 4/23/87

## ATTENDANCE LIST PAGE 2 OF 3

NAME (Please Print)	Position Title	Organization Represented	Telephone (For Contact)
K.E. Marbaugh	Sec. Adm. - Prog. Dev. <del>For UNWMB</del> →	Consumers Power 1945 W. Parnall Rd Jackson MI 49201	517-788-7051
J.B. SHULKE	Quality Assurance Div.	DOE-SR	FB 239-1087 CM's 803/725-108
TOM COLANDREA	QA CONSULTANT	UNWMB & EET	(619) 487-7510
J.W. ANDERSON	NEPA PERFORMANCE ANAL. DIV.	THE MAXIMA COMP.	615/483-7010
Clarence Williams	Vice Pres. for Quality Battelle Proje. Mgt. Div	Battelle	614 424-5332
Jim Kennedy	Section Leader	US NRC	301-427-4786
Stephen Mette	Deputy Director for QA	Service Application Interchange App	(202) 295-0868 FIS-575-0858
Stephen S. Hart	Senior Engineer	Council of Energy Res. Tribes	(303) 832-6600 FIS-575-0854
Stan H. Klein	Director, QA	SAIC/NU	(702) 295-0854
I. J. Lefman	ONWI QA Manager	Battelle/ SRPO	FIS-976-7286 614-424-7280
E.A. PATZER	OWTD QA MANAGER	BATTELLE CHICAGO	312-655-8606
A.M. SASTRY	MACTEC - QA MANAGER	MACTEC - BWIP	509-376-3491
J.B. SILVERWOOD	CONSULTANT MAC	MAC	509-376-5234
R T JOHNSON	RHO - BWIP	ROCKWELL	509-376-8358
SONNIE BLAKE	QA REPRESENTATIVE	EWA, INC	612-332-0000
Michael Flannigan	QA Manager	DOE-CH	312 972 2219
W. J. Kepecs	QA Manager	DOE-RTTD	312 972 2315

Date 4/23/87

ATTENDANCE LIST *PAGE 30F3*

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ATTACHMENT B

Revised

AGENDA FOR QACG MEETING IN GERMANTOWN, MARYLAND  
ON April 23, 1987

Welcome and Introductory Remarks.....	J. Knight	8:30-8:45 a.m.
Develop Agenda for Working Session..... on Non-DOE Observation of DOE Audits	C. Newton	8:45-9:15 a.m.
Separate Meetings to Develop Procedures on Non-DOE Observation of DOE Audits (Session A - States, Session B - Tribes, Session C - NRC, Session D - DOE).....	All	9:15-TBD
LUNCH		
Joint Meeting to Discuss, Compare and Finalize.....	All	TBD
Procedure on Non-DOE Observation of DOE Audits		
Comments from NRC.....		TBD
Comments from States..... - Nevada - Texas - Washington		TBD
Comments from Tribes..... - Nez Perce - Umatilla - Yakima		TBD
Status Report on BWIP QA Activities.....	P. Saget	*
Status Report on WMPO QA Activities.....	J. Blaylock	*
Status Report on SRPO QA Activities.....	J. Reese	*
Overview of OGR QA Program and Schedule for QA Audits in 1987.....	C. Newton	*
Review of Draft DOE Disposition of Major State(s) Comments to OGR QA Plan.....	C. Newton	*

\* Presentations will be subject to time availability.

ESTABLISHED BY THE  
TREATY OF JUNE 9, 1855  
CENTENNIAL JUNE 9, 1955


## CONFEDERATED TRIBES AND BANDS

*Yakima Indian Nation*

POST OFFICE BOX 151  
TOPPENISH, WASHINGTON 98948

## MEMORANDUM

TO: Carl Newton,  
QA Coordinating Group Chairman

FROM: Jack Wittman,  
Technical Advisor   
Yakima Indian Nation

DATE: April 23, 1987

SUBJECT: YIN Position on the Role of Affected Parties in QA Audits

In response to the ongoing discussion of the proper role of the affected parties QA audits, the Yakima Indian Nation (YIN) would like to clarify its position on this important subject in accordance with its tribal policy. In this regard we would like to offer the following observations:

1. Without intensive involvement in the technical areas being audited, it is unlikely that an audit observer would identify significant issues beyond those in the audit report.
2. The integrity of the DOE QA program is very much in the interest of the YIN. We feel that the increased attention being paid to the QA process by the Department is appropriate and an important part of the site characterization. It also appears that the increased emphasis on an active participatory role in QA audits comes at the expense of the QA role identified in the NWPA for the affected parties; technical review and independent analysis. Accordingly, the YIN intends and will continue to focus its efforts on enhancing the process of technical interchange above and beyond that which may occur as a result of a QA audit.
3. In light of the above observations we recognize and accept the inevitable limitations to direct observing audits of the BWIP program created by the fact that there is more than one affected party at Hanford. In order to accomodate this situation the YIN is willing to accept the responsibility of distributing copies of trip reports to other affected parties produced as a result of QA audits.

4. Audit observers, however, need to have the same information as the auditors in order to be effective and useful to the affected parties and to gain public confidence in the DOE program. Participation without prior access to the results of the work being audited (technical reports, etc.) cannot lead to objective audit observation. Observers must be adequately prepared for the audit in advance; and consequently, official notification of upcoming audits should be provided in a timely fashion.

The YIN does not wish to see the current policy change with respect to the role of the affected parties in QA audits. In the interest of assuring a quality audit we feel that the currently DOE proposed audit-dimension-dependent limitations on the number of audit observers make sense and should merit support from the affected parties.

On the other hand, YIN reserves the right to suggest changes in this policy based on information obtained while observing audits, participating in the QACG, or while in the process of reviewing and analyzing the technical adequacy of the DOE repository program within the larger context of its technical and engineering activities. Furthermore, we believe that this coordinating group would be the appropriate forum to make these suggestions.

ATTACHMENT C

OGR POLICY ON NRC MINI-AUDITS

- o INVITATIONS TO NRC FOR MINI-AUDITS WILL BE MADE BY OGR; DETAILED ARRANGEMENTS WILL BE MADE BY THE PROJECT
- o INVITATIONS WILL INCLUDE:
  - RATIONALE AS TO WHY WE ARE READY
  - CLEAR LIMITATIONS ON SCOPE OF AUDIT (TECHNICAL AREAS, PROGRAMMATIC AREAS, PERSONNEL FOR INTERVIEW, DOCUMENTS TO BE EXAMINED, ETC.)
- o OGR AND PROJECT WILL BE REPRESENTED (AS OBSERVERS) ON ALL MINI-AUDITS
- o REPORT OF AUDIT BY NRC WILL BE MADE TO OGR (WITH COPIES TO PROJECT AND AUDITED CONTRACTOR)
- o PROJECT ANALYSIS AND COMMENT ON NRC AUDIT REPORT TO BE PROVIDED TO OGR (NOT TO NRC) WITHIN 30 DAYS
- o RESPONSE TO NRC AND ANY DOCUMENTATION OF FOLLOW UP WILL BE FROM OGR
- o FOLLOW UP WILL BE RESPONSIBILITY OF PROJECT WITH PERIODIC REPORTS TO OGR

ATTACHMENT D

OGR POLICY ON NRC INTERFACES

- o OGR AND PROJECT QA PLANS WILL BE FURNISHED TO NRC FOR REVIEW AND COMMENT BY OGR
- o ONLY OGR APPROVED PROJECT QA PLANS WILL BE FURNISHED TO NRC
- o NRC COMMENTS ARE TO BE TO OGR WITH COPY TO PROJECTS
- o RESPONSES TO NRC COMMENTS WILL BE FROM OGR (BASED ON INPUT FROM PROJECTS)
- o NRC REVIEW AND COMMENT ON CONTRACTOR QA PLANS IS NOT SOLICITED; NRC AND OGR TO BE FURNISHED INFO COPIES ONLY
- o PROJECT "REQUIREMENT DOCUMENTS" (SUCH AS NVO-196-17 AND BQARD) WILL BE HANDLED IN SAME MANNER AS PROJECT QA PLANS
- o DIRECT INFORMAL INTERACTIONS WITH NRC BY PROJECTS ENCOURAGED, BUT NOT WRITTEN RESPONSES TO COMMENTS

ATTACHMENT E

OGR POLICY ON EH INTERFACES

- o OGR, NOT PROJECTS, WILL FURNISH QA PLANS TO EH FOR REVIEW AND COMMENT
- o MOU DOCUMENTING POLICY IS IN FORMULATIVE STATE
  - OPTION IS TO REQUEST EH REVIEW PRIOR TO OGR APPROVAL
- o EH FORMAL APPROVAL OR CONCURRENCE WITH PROJECT QA PLANS IS NOT CURRENTLY ENVISIONED

ATTACHMENT F

OGR POLICY ON MANAGEMENT APPRAISALS

- o MANAGEMENT APPRAISALS ARE RESPONSIBILITY OF PROJECT
- o PROJECT MANAGER IS TO ARRANGE FOR THE APPRAISAL AND IT IS TO BE CONDUCTED FOR HIM AND AT HIS REQUEST
- o CONDUCT OF APPRAISAL IS "OUTSIDE" OF PROJECT QA ORGANIZATION
- o REPORTS OF MANAGEMENT APPRAISALS ARE TO BE MADE TO THE PROJECT MANAGER FOR HIS ACTION AND FOLLOW UP
- o PARTICIPATION BY OPERATIONS OFFICE QA IN PROJECT OFFICE MANAGEMENT ASSESSMENTS IS AT THE OPTION OF THE PROJECT MANAGER
- o MANAGEMENT ASSESSMENTS CONDUCTED BY THE OPERATIONS OFFICE, OR UNDER THE OPERATIONS OFFICE DIRECTOR, WILL NOT FULFILL THE PROJECT OFFICE MANAGER'S RESPONSIBILITY TO PERFORM MANAGEMENT ASSESSMENTS

AGENDA FOR QACG EXECUTIVE  
SESSION MEETING IN GERMANTOWN, MD  
ON APRIL 22, 1987  
(DOE REPRESENTATIVES ONLY)

April 22, 1987

- |     |  |                |             |
|-----|--|----------------|-------------|
| 1.  | Opening Remarks  | C. Newton      | 8:30-9:00   |
|     | <ul style="list-style-type: none"> <li>o Introduction of Attendees</li> <li>o Interaction with NRC</li> <li>- DOE/NRC Meeting held<br/>February 27, 1980 on<br/>"NRC mini-audit" Policy and<br/>Scope</li> </ul> |                |             |
| 2.  | HQ-DOE Policy on Interface with NRC on<br>Project Office QA Program Submittal and<br>Comment Resolution  | C. Newton      | 9:00-9:30   |
| 3.  | Update on OCRWM Overview Guidance  | M. E. Langston | 9:30-10:00  |
|     | BREAK  |                | 10:00-10:30 |
| 4.  | HQ-DOE Policy on Interface with ES&H   | C. Newton      | 10:30-11:00 |
|     | <ul style="list-style-type: none"> <li>- Submittal and approval of HQ-OGR<br/>and Project Office QA Programs</li> </ul>  |                |             |
| 5.  | Role of Operations Office Management<br>Appraisals and Audits in Satisfying<br>OGR QA Plan Requirements  | C. Newton      | 11:00-11:30 |
|     | LUNCH  |                | 11:30-1:00  |
| 6.  | Update on HQ-OGR QA Plan Supplement on<br>"Issuing Stop Work Orders"   | P. Saget       | 1:00-1:30   |
| 7.  | Update on HQ-OGR QA Plan Supplement on<br>"Readiness Review"   | P. Saget       | 1:30-2:00   |
| 8.  | Update on HQ-OGR QA Plan Supplement on<br>"Auditing for Effectiveness"   | J. Reese       | 2:00-2:30   |
| 9.  | Update on HQ-OGR QA Plan Supplement on<br>"Management Assessments"   | J. Blaylock    | 2:30-3:00   |
| 10. | Update on Consolidated/Common Training   | P. Saget       | 3:00-3:30   |
| 11. | Update on Development of "Computer<br>Software Control" Requirements   | H. Steinberg   | 3:30-4:00   |
| 12. | Discussion of DOE Policy on Observer<br>Participation in Program Audits  | C. Newton      | 4:00-5:00   |



ATTACHMENT D

# **BWIP QA PROGRESS REPORT**

AS OF QUARTER ENDING 3/31/87

## BWIP QA PLANS STATUS REPORT

AS OF QUARTER ENDING 3/31/87

MAJOR PARTICIPANT	DOCUMENT IDENTIFICATION	REV. NO.	STATUS*	APPROVAL DATE	REMARKS
RHO	RHO-QA-MA-3	3	5	2/18/87	
KE/PB	BWIP PROCEDURES MANUAL	8	5	2/87	
M-K	BWIP PROCEDURES MANUAL	2	5	1/87	
PNL	QA MANUAL FOR LICENSE RELATED PROGRAMS (PNL-MA-60)	2	5	9/5/86	
WHC	QA MANUAL MG-197	**	5	8/6/86	
DOE-RL	BOARD	2	5	11/86	
	DOE-RL QA PLAN	2	5	1/87	

**\*STATUS LEGEND:**

1 - PLANNED  
 2 - UNDER PREPARATION  
 3 - FOR COMMENT RESOLUTION

4 - FOR PROJECT APPROVAL  
 5 - ISSUED FOR IMPLEMENTATION

\*\* MANUAL HAS SEVERAL SECTIONS WITH INDIVIDUAL REVISION NUMBERS.

## QA PROCEDURES DEVELOPMENT SUMMARY

AS OF QUARTER ENDING 3/31/87

PROCEDURES STATUS	MAJOR PARTICIPANTS						REMARKS
	DOE-RL	RHO	KE/PB	M-K	PNL	WHC	
TOTAL REQUIRED	35	31*	50	27	80	68	*TO BE ISSUED AS QAAP'S IN RHO-BW-MA-17
ISSUED FOR IMPLEMEN- TATION	33*	30	48	21	80	68	* BEING REVISED TO ADDRESS NQA-1-86, OGR-B3 & REORG. CHANGES - 29 REVISED & REISSUED
APPROVED BY DOE-RL	33	30	47	21	NA*	NA*	* APPROVED BY RHO
UNDER REVIEW OR COMMENT	1	0	1	6	—	—	
UNDER PREPARATION	0	0	2	0	—	—	
NOT YET STARTED	1	1	—	—	—	—	

# BWIP FY 87 QA AUDIT STATUS REPORT

AS OF QUARTER ENDING 3/31/87

INITIATING ORGANIZA- TION	AUDITS			AUDIT FINDINGS					REMARKS
	FISCAL YTD PL	CO	QUARTER CO	FISCAL YTD IS	CL	OP	QUARTER IS	CL	
RHO	7	7	5	42	22	44	42	3	
KE/PB	2	1	1	5	0	5	5	0	
M-K	10	5	0	5	4	1	0	0	
PNL	8	4	0	4	4	0	0	0	
WHC	4	2	2	0	0	0	0	0	
DOE-RL	1	1	1	5	27	36	5	27	

**LEGEND:**

PL = PLANNED  
CO = COMPLETED

IS = ISSUED  
CL = CLOSED

OP = STILL OPEN

# BWIP FY 87 SURVEILLANCE STATUS REPORT

AS OF QUARTER ENDING 3/31/87

INITIATING ORGANIZATION	TOTAL SURVEILLANCES			UNSATISFACTORY SURVEILLANCES					REMARKS
	FISCAL YTD PL	CO	QUARTER CO	FISCAL YTD IS	CL	OP	QUARTER IS	CL	
RHO	88	127	93	56	36	20	45	25	
KE/PB	85	42	11	49	48	1	24	23	
M-K	0	0	0	0	0	0	0	0	NO ACTIVITIES TO SURVEIL
PNL	49	46	24	46	46	0	24	0	
WHC	12	6	4	5	5	0	2	2	
DOE-RL	10	14	7	2	0	2	2	0	

## LEGEND:

PL = PLANNED  
CO = COMPLETED

IS = ISSUED  
CL = CLOSED

OP = STILL OPEN

# BWIP FY 87 CAR AND NCR STATUS REPORT

AS OF QUARTER ENDING 3/31/87

INITIATING ORGANIZATION	CAR TOTALS					NCR TOTALS					REMARKS
	FISCAL YTD			QUARTER		FISCAL YTD			QUARTER		
	IS	CL	OP	IS	CL	IS	CL	OP	IS	CL	
RHO	1	3	3	1	0	3	0	8	3	0	
KE/PB	1	0	1	1	0	0	0	0	0	0	
M-K	2	1	1	0	0	1	0	1	0	0	
PNL	0	0	0	0	0	108	105	3	2	0	
WHC	5	5	0	2	2	0	0	0	0	0	
DOE-RL	0	0	1	0	0	0	0	0	0	0	

**LEGEND:**

PL - PLANNED  
IS - ISSUED

CO - COMPLETED  
OP - STILL OPEN

CL - CLOSED

## QA STAFFING STATUS REPORT

AS OF QUARTER ENDING 3/31/87

FUNCTIONAL ACTIVITY	MAJOR PARTICIPANTS												REMARKS
	DOE-RL		RHO		KE/PB		M-K		PNL		WHC		
	EX	REQ	EX	REQ	EX	REQ	EX	REQ	EX	REQ	EX	REQ	
ADMINISTRATION/ MANAGEMENT	1	1	13	13	2	2	3	3	1	1	1	1	
PROGRAM DEVELOPMENT	3	3	9	10	1	1	1	1	3	4.25	2	3	
PROGRAM VERIFICATION	2	2	38	38	0	0	0	2	4	6.5	1	1	
CONSULTANTS	19	19	0	0	0	0	0	0	1	4	0	0	
OTHERS	0	0	5	5	0	0	0	0	0	0	0	0	
TOTALS	25	25	65	66	3	3	4	6	9	15.75	4	5	

EX = EXISTING STAFF  
REQ = STAFFING REQUESTED FOR THE FY

## **DOE/RL BWI TRAINING PROGRAM**

<b>DOE/RL QUALIFICATION AND TRAINING PLAN</b>	<b>COMPLETE</b>	<b>3/10/87</b>
<b>TRAINING PROCEDURE REVISION</b>	<b>COMPLETE</b>	<b>3/24/87</b>
<b>TRAINING TO REVISION 1 OF QAP AND IMPLEMENTING PROCEDURES</b>	<b>COMPLETE</b>	<b>3/24/87</b>
<b>APPROVAL OF INTEGRATING CONTRACTOR'S Q&amp;T PROGRAM</b>	<b>SCHEDULED</b>	<b>4/17/87</b>
<b>INITIATION OF POSITION QUALIFICATION FORMS (INCLUDING MACTEC)</b>	<b>SCHEDULED</b>	<b>4/17/87</b>
<b>REVIEW OF TRAINING REQUIREMENTS THROUGH JOB FUNCTION ANALYSIS</b>	<b>SCHEDULED</b>	<b>4/30/87</b>
<b>INITIATION OF UPDATED TRAINING AND NEW PERSONNEL TRAINING</b>	<b>SCHEDULED</b>	<b>4/24/87</b>
<b>INITIATE UPDATED CLASSROOM TRAINING</b>	<b>SCHEDULED</b>	<b>5/10/87</b>



# **ROCKWELL HANFORD OPERATIONS BWIP QUALIFICATION & TRAINING ACCOMPLISHMENTS**

## **JOB ANALYSIS**

- 8% COMPLETE WITH VERIFIED TASK LISTS
- 90% OF ALL OTHER UNITS ARE CONDUCTING JOB ANALYSIS

## **TRAINING STAFF QUALIFIED**

- 43 PRESENTERS - TECHNICAL EXPERTS/INSTRUCTORS  
- 12 HOURS OF TRAINING
- 52 INSTRUCTORS - DEVELOPMENT SPECIALISTS/INSTRUCTORS  
- 40 HOURS OF TRAINING

## **TRAINING MATERIALS DEVELOPED**

- APPROVED: 1 JOB PROGRAM      10 COURSES  
53 LESSON PLANS      12 ON-THE-JOB TRAINING GUIDES
- UNDER DEVELOPMENT: 48 COURSES, LESSONS AND GUIDES

## **TRAINING CONDUCTED**

- 15 HOURS OF INDOCTRINATION FOR 800 EMPLOYEES
- 3700 TRAINEE-HOURS OF TECHNICAL/PROCEDURAL JOB REQUIREMENTS FOR 1200 TRAINEES

# **ROCKWELL HANFORD OPERATIONS BWIP QUALIFICATION & TRAINING PLANS FOR CY87**

## **JOB ANALYSIS**

- **COMPLETED, WITH VALIDATED TASK LISTS AND JOB DESCRIPTIONS BY JULY 31**

## **CONDUCT AND DEVELOPMENT**

- **FULL CORRELATION OF TRAINING MATERIALS, TASK LISTS AND PLANNED TRAINING**
  - **PROGRAM PLANS FOR ALL JOB DESCRIPTIONS**
  - **WELL DEFINED COURSES FOR ALL JOB DESCRIPTIONS**
- **TRANSFER EMPHASIS FROM INDOCTRINATION TO TECHNICAL TRAINING**
- **300-500 APPROVED LESSON PLANS AND OJT GUIDES**
- **150-200 TRAINED OJT EVALUATORS**

# **BWIP STOP WORK STATUS**

## **ACCOMPLISHMENTS**

- **BRIEFED DOE-HQ, NRC, STATES AND TRIBES ON PLANS AND STATUS OF PARTIALLY LIFTING STOP WORK ORDER (MARCH 17, 1987)**
- **COMPLETED APPROVAL OF RHO QA ADMINISTRATIVE PROCEDURES REQUIRED FOR RESTART**
- **INDEPENDENT MANAGEMENT REVIEW TEAM COMPLETED INTERVIEWS AND DRAFT REPORT**
- **COMPLETED REVIEW OF ESC FOR DESIGN OF BOREHOLES DC 23, 24, 25, 32 AND 33**

## **PLANNED ACTIONS - REQUIRED FOR PARTIAL LIFTING**

- **COMPLETE PREPARATION AND APPROVAL OF 11 PROJECT PLANS AND/OR GENERAL DOCUMENTS**
- **RHO COMPLETE PREPARATION OF 3 PROCEDURES**
- **RHO RESOLVE 27 READINESS APPRAISAL DISCREPANCIES**
- **RESOLVE 41 CONCERNS IDENTIFIED BY DOE-RL'S RESTART TEAM AND PERFORM RE-EVALUATIONS**
- **PARTIAL LIFT OF STOP WORK ORDER AND SECOND BRIEFING WITH DOE-HQ, NRC, STATES AND TRIBES PLANNED FOR MID-JUNE**

**ATTACHMENT E**

**NNWSI PROJECT QA STATUS REPORT**

**QACG MEETING - 4/23/87**

**NNWSI**

**QA PLANS STATUS REPORT**

Submitted By: WMPO

As Of: 4/17/87

Note: Participant QAPPs are presently under revision so as to meet the requirements of NVO-196-17, Rev. 5. The due date for submittal to WMPO for approval is June 8, 1987. The participant QAPPs (equivalent to the NRC term QA Administrative Procedures) are the documents which provide the instructions to implement and apply the Project QA requirements. The Project Office will approve participant QAPPs.

Major Participant	Document Identification	Rev. No.	*Status	Approval Date	Remarks
USGS	QAPP-01	3	5	10/86	A total of 22 documents make up the USGS QAPP.
Los Alamos	QAPP-01	1	4	4/87	
SNL	QAPP	0	5	12/86	
SAIC	QAPP-1	3	5	12/86	
LLNL	QAPP-NWMP	0	4-5	---	A total of 33 documents make up the LLNL QAPP. Thirty-one have been approved for implementation. Two are in process of comment resolution.
F&S	QAPP-001	1	5	2/86	The F&S QAPP (Rev. 2) has been retracted for rewrite.
H&N	QAPP	1	5	8/86	
REECo	568-DOE-115	4	5	12/86	

**\*Status Legend**

(1) Planned  
(2) Under Preparation

(3) For Comment Resolution  
(4) For Project Approval

(5) Issued for Implementation  
(6) For HQ/OGP Approval

**NNWSI**

**IMPLEMENTING PROCEDURES DEVELOPMENT SUMMARY**

Submitted By: WMPO

As Of: 4/17/87

Procedures Status	Project Office QMPs	Project Interface Procedure APs	Project Totals	Remarks
Total Required	22	20	42	
Approved and Issued by Project Office	12	9	21	All QMPs and APs are presently under revision for compliance to Rev. 5 of NVO-196-17.
Under Review/ Comment	3	0	3	
Under Preparation	3	10	13	
Not Yet Started	4	1	5	

QMP - Quality Management Procedure: An implementing procedure which identifies the control methods to meet Project QA requirements utilized by WMPO, WMPO matrix support, and QASC personnel.

AP - Administrative Procedure: An implementing procedure which identifies the interface control methods to meet QA requirements. The control methods are those which govern Project wide systems and are implemented by all Project participants.

## STOP WORK ORDER STATUS

## **USGS STOP WORK ORDER STATUS**

**ISSUED: APRIL 28, 1986, RESULT OF WMPO AUDIT 86-2 AND SURVEILLANCE 86-23**

### **CONDITIONS TO RESUME WORK:**

- o PROPOSED CORRECTIVE ACTIONS AND SCHEDULES FOR COMPLETION OF AUDIT FINDINGS APPROVED BY WMPO.
- o QAPP REVISED AND APPROVED BY WMPO.
- o INDOCTRINATION AND TRAINING COMPLETE.
- o PLAN TO PROVIDE ADEQUATE QA COVERAGE.
- o ASSIGNMENT OF QA LEVELS COMPLETED AND APPROVED BY WMPO.

### **STATUS:**

- o THE FIRST FOUR CONDITIONS IDENTIFIED ABOVE HAVE BEEN SATISFIED.
- o THE STOP WORK ORDER WILL BE LIFTED INCREMENTALLY WITH WMPO APPROVAL OF THE USGS SIPS AND ASSOCIATED QA LEVELS.
- o THREE (3) SIPS HAVE BEEN APPROVED BY WMPO. ONE (1) SIP IS IN THE FORMAL WMPO APPROVAL CYCLE. TWENTY SEVEN SIPS ARE IN PROCESS OF INFORMAL REVIEW. AWAITING SUBMITTAL OF FOUR (4) SIPS.



## **SAIC/LANL/LLNL STOP WORK ORDER STATUS**

**ISSUED: JUNE 10, 1986, AS A RESULT OF WMPO SURVEILLANCE 86-21, 86-24, AND 86-25.**

### **CONDITION TO RESUME WORK:**

- o **ASSIGNMENT OF QA LEVELS COMPLETE AND APPROVED BY WMPO.**

### **STATUS:**

#### **SAIC:**

- o **SAIC STOP WORK ORDER WAS RESCINDED MARCH 1987.**

#### **LOS ALAMOS:**

- o **LANL STOP WORK ORDER WAS RESCINDED NOVEMBER 1986.**

#### **LLNL:**

- o **FIVE (5) SIPs HAVE BEEN APPROVED BY WMPO. WORK IS AUTHORIZED TO PROCEED.**
- o **THERE ARE FIVE (5) SIPs REMAINING WHICH REQUIRE SUBMITTAL FOR WMPO APPROVAL.**

## **SNL STOP WORK ORDER STATUS**

**ISSUED: JUNE 10, 1986, AS A RESULT OF SURVEILLANCE 86-024.**

### **CONDITIONS TO RESUME WORK:**

- o WMPO APPROVAL OF THE SNL QAPP**
- o ASSIGNMENT OF QA LEVELS COMPLETE AND APPROVED BY WMPO**

### **STATUS:**

- o SNL STOP WORK ORDER WAS RESCINDED DECEMBER 1986.**

## **REECO STOP WORK ORDER STATUS**

**ISSUED: OCTOBER 31, 1986, AS A RESULT OF WMPO AUDIT 86-3.**

### **CONDITIONS TO RESUME WORK:**

- o WMPO APPROVAL OF PROPOSED AUDIT FINDING CORRECTIVE ACTIONS**
- o WMPO APPROVAL OF THE REECO QAPP**
- o COMPLETION OF INDOCTRINATION AND TRAINING OF REECO PERSONNEL**

### **STATUS:**

- o REECO STOP WORK ORDER WAS RESCINDED JANUARY 1987.**

## **AUDIT AND SURVEILLANCE STATUS REPORT**

**NNWSI PROJECT**  
**FY 86 QA AUDIT SCHEDULE AND SUMMARY**

INITIATING  
 ORGANIZATION WMPO

QUARTER  
 ENDING 3/31/86

ORGANIZATION	LOCATION	DATE		SCOPE	RESULTS SUMMARY
		SCH'D	ACTUAL		
LLNL 86-1	Livermore, CA	2/3/86	2/4-7/86	Requirements of NVO-196-17 Implementing QA Procedures	Seven findings of nonconformance were reported.
USGS/Denver 86-2a	Denver, CO	3/10/86	3/11-14/86	" "	Twenty-two findings of nonconformance were reported.
USGS/Menlo Park 86-2b	Menlo Park, CO	3/17/86	Cancelled	" "	N/A
REECo 86-3	Las Vegas & Mercury, NV	4/14/86	4/14-18/86	" "	Twenty-one findings of nonconformance were reported.
F&S 86-4	" "	6/16/86	6/16-18/86	" "	No findings were reported.
Los Alamos 86-5	Los Alamos, NM	7/14/86	Cancelled	" "	N/A
WMPO/NV 86-6	Las Vegas, NV	9/8/86	9/8-12/86	" "	Twenty-nine findings of nonconformance were reported.
H&N	Las Vegas & Mercury, NV	8/18/86	Cancelled	" "	N/A
SNL 86-8	Albuquerque, NM	9/15/86	Cancelled	" "	N/A
SAIC/T&MSS 86-9	Las Vegas, NV	5/26/86	Cancelled	" "	N/A

**NNWSI PROJECT**  
**FY 87 QA AUDIT SCHEDULE AND SUMMARY**

INITIATING  
 ORGANIZATION WMPO

QUARTER II  
 ENDING 3/31/87

ORGANIZATION	LOCATION	DATE		SCOPE	RESULTS SUMMARY
		* SCHED.	ACTUAL		
LOS ALAMOS	Los Alamos, NM	March	3/30/87	NVO-196-17 & Los Alamos QAPP	11 Standard Deficiency Reports and 10 Observations
H&N	Las Vegas & Mercury, NV	May		NVO-196-17, H&N QAPP	
LLNL	Livermore, CA	April		NVO-196-17, LLNL QAPP	
SAIC/T&MSS	Las Vegas, NV	May		NVO-196-17, SAIC QAPP	
SNL	Albuquerque, NM	June		NVO-196-17, SNL QAPP	
USGS	Denver, CO	June		NVO-196-17, USGS QAPP	
USGS	Menlo Park	June		NVO-196-17, USGS QAPP	
F&S	Tulsa, OK	July		NVO-196-17, F&S QAPP	
F&S	Las Vegas, NV	July		NVO-196-17, F&S QAPP	
REEC Co	Las Vegas & Mercury, NV	August		NVO-196-17, REEC Co QAPP	
WMPO	Las Vegas, NV	September		NVO-196-18	

\*Firm dates will be coordinated and issued in audit notification letter 30 days prior to audit.

**FY 86 CORRECTIVE ACTION REQUESTS (CAR)**

- o INADEQUATE CORE SAMPLE CONTROL
- o LACK OF PROCEDURE FOR INTERFACE CONTROL
- o INADEQUATE MAINTENANCE OF NCR LOG AND NCR FILES

**FY 87 CORRECTIVE ACTION REQUESTS (CAR)**

- o INADEQUATE TEST PROCEDURE

**NNWSI PROJECT  
CAR STATUS REPORT  
(CORRECTIVE ACTION REQUESTS)**

INITIATING  
ORGANIZATION WMPO

QUARTER  
ENDING 3/31/87

ORGANIZATION	FY 86				FY 87				REMARKS
	TOTAL			OTR. CL	TOTAL			OTR. CL	
	IS	CL	OP		IS	CL	OP		
WMPO	3	0	3	0					
SAIC					1	0	1	0	

LEGEND

CO - COMPLETED

CL - CLOSED

IS - ISSUED

OP - OPEN



**NNWSI PROJECT  
FY 86 QA AUDIT STATUS REPORT**

INITIATING  
ORGANIZATION WMPO

QUARTER  
ENDING 3/31/87

ORGANIZATION	AUDITS	AUDIT FINDINGS				REMARKS
		TOTAL			QTR.	
		IS	CL	OP	CL	
LLNL	1	7	3	4	0	o Violation of 4 procedures o 3 inadequate or lack of procedures
USGS/Denver	1	22	8	14	8	o Violation of 13 procedures o 9 inadequate or lack of procedures
REECe	1	21	17	4	15	o Violation of 17 procedures o 4 inadequate or lack of procedures
WMPO/NV	1	29	2	27	2	

**LEGEND**

CO - COMPLETED  
IS - ISSUED

CL - CLOSED  
OP - OPEN

**FY 86 CONSOLIDATED AUDIT FINDING**

- o LACK OF ADEQUATE MANPOWER STAFFING IN QA OPERATIONS ORGANIZATIONS.
- o LACK OF KNOWLEDGE/UNDERSTANDING OF QUALITY ASSURANCE AS A DISCIPLINE AND THE PURPOSE OF A QUALITY ASSURANCE PROGRAM AND ITS REQUIREMENTS BY MANY PEOPLE IN THE NNWSI PROGRAM PARTICULARLY IN THE SCIENTIFIC DISCIPLINES.
- o LACK OF TRAINING AND INDOCTRINATION OF PERSONNEL IN NNWSI QUALITY ASSURANCE REQUIREMENTS.
- o LACK OF AND INADEQUATE IMPLEMENTING PROCEDURES.
- o WORKING WITHOUT WMPO APPROVED QA LEVEL ASSIGNMENTS.
- o INADEQUATE PRACTICES FOR CALIBRATION OF MEASURING AND TEST EQUIPMENT (TRACEABILITY TO NBS).
- o MINIMUM OR LACK OF AUDITS AND SURVEILLANCES OF SUPPLIERS/CONTRACTORS AND INTERNAL ACTIVITIES.
- o ABSENCE OF IMPLEMENTATION OF CORRECTIVE ACTION PROGRAMS TO IDENTIFY NEED FOR CORRECTION OF REPETITIVE PROBLEMS.
- o INADEQUATE DOCUMENTATION (TRACEABILITY) OF TECHNICAL REVIEWS.

# **NNWSI PROJECT FY 87 QA AUDIT STATUS REPORT**

INITIATING  
ORGANIZATION WMPO

QUARTER  
ENDING 3/31/87

ORGANIZATION	AUDITS			AUDIT FINDINGS					REMARKS
	FISCAL YEAR		QTR.	FISCAL YEAR			QTR.		
	PL	CO	CO	IS	CL	OP	IS	CL	
Los Alamos	1	1	1	11	0	11	11	0	Issued as SDRs

LEGEND

PL - PLANNED

IS - ISSUED

CL - CLOSED

CO - COMPLETED

OP - OPEN

**FY 87 CONSOLIDATED AUDIT FINDINGS**

- o LACK OF AND INADEQUATE IMPLEMENTING PROCEDURES**
- o FAILURE TO IMPLEMENT APPROVED PROCEDURES**
- o INADEQUATE CALIBRATION OF MEASURING AND TEST EQUIPMENT**
- o FAILURE TO CORRECTLY SPECIFY QA REQUIREMENTS IN PROCUREMENT DOCUMENTS**

**NNWSI PROJECT**  
**FY 86 QA SURVEILLANCE STATUS REPORT**

INITIATING  
 ORGANIZATION WMPO

QUARTER  
 ENDING 3/31/87

ORGANIZATION	SURVEIL- LANCES	NONCONFORMANCE REPORTS				REMARKS
		TOTAL			QTR.	
		IS	CL	OP	CL	
REEC <sub>o</sub>	10	7	4	3	0	
USGS	19	12	0	12	0	
SNL	8	4	4	0	0	
SAIC	5	6	2	4	1	
LLNL	4	5	2	3	2	
H&N	4	0	0	0	0	
F&S	3	1	0	1	0	
Los Alamos	2	1	0	1	0	
WMPO	2	2	1	1	0	
WEC	1	0	0	0	0	

LEGEND

CO - COMPLETED  
 IS - ISSUED

CL - CLOSED  
 OP - OPEN

# NNWSI PROJECT FY 87 QA SURVEILLANCE STATUS REPORT

INITIATING  
ORGANIZATION WMPO

QUARTER  
ENDING 3/31/87

ORGANIZATION	SURVEILLANCES			NONCONFORMANCE REPORTS					REMARKS
	FISCAL YEAR		QTR.	FISCAL YEAR			QTR.		
	PL	CO	CO	IS	CL	OP	IS	CL	
REEC <sub>o</sub>	7	3	3	0					
USGS	13	3	3	4		4	4		
SNL	7	2	1	0					
SAIC	7	4	3	5					
LLNL	7	1	1	0					
H&N	9	0	0	0					
F&S	8	2	1	0					
Los Alamos	6	0	0	0					
WMPO	6	1	1	0					
NTS/G Tunnel	14	0	0	0					

LEGEND

PL - PLANNED

IS - ISSUED

CL - CLOSED

CO - COMPLETED

OP - OPEN

### FY 87 SURVEILLANCE AREAS

- o REVIEW OF ESF DESIGN ACTIVITIES
- o VERIFICATION OF CORRECTIVE ACTION FOR NCRS
- o VERIFICATION OF CORRECTIVE ACTION FOR AUDIT FINDINGS
- o VERIFICATION OF IMPLEMENTATION OF APPROVED QAPP AND IMPLEMENTING PROCEDURES
- o QA TRAINING
- o OBSERVE PREAWARD SURVEY CONDUCTED BY PARTICIPANT

**ATTACHMENT F**

**SRPO QA ACTIVITY  
STATUS REPORT**

**PRESENTED BY: T. J. REESE  
SRPO QA MANAGER  
QACG MEETING  
APRIL 22-23, 1987**



## SRPO QA PROGRAM STATUS APRIL 20, 1987

**QA PLAN** - THE REVISION OF THE SRPO QA PLAN WHICH WAS APPROVED BY THE PROJECT MANAGER (12/05/86), BUT WAS NOT ISSUED, HAS BEEN WITHDRAWN. RECENT SRPO ORGANIZATION CHANGES REQUIRED MAJOR CHANGES IN THE PROPOSED REVISION. ALSO, OGR COMMENTS AND RECOMMENDATIONS FROM A DOE-CH QA PROGRAM EVALUATION ARE BEING ADDRESSED IN THE REWRITTEN REVISION.

### QA PROCEDURES

- OGR HAS APPROVED TWENTY-FOUR (24) NEW OR REVISED SRPO QUALITY ASSURANCE ADMINISTRATIVE PROCEDURES FOR ISSUANCE AND USE.
- FOUR (4) NEW QAAP'S AND ONE REVISED QAAP ARE IN THE PREPARATION AND REVIEW CYCLE.

**TRAINING** - TRAINING ON THE QA PLAN AND ON ADMINISTRATIVE PROCEDURES IS REQUIRED WITHIN 30 DAYS AFTER THE DOCUMENTS HAVE BEEN ISSUED.

- ADMINISTRATIVE PROCEDURES - THE TRAINING FOR THE TWENTY-FOUR (24) NEW OR REVISED PROCEDURES HAS BEEN INITIATED OR COMPLETED.
- THREE SESSIONS OF THE SRP LEAD AUDITOR TRAINING COURSE HAVE BEEN PRESENTED SINCE OCTOBER, 1986.
- THE BEGINNING AUDITOR COURSE, "THE PRACTICE AND PROCESS OF AUDITING," HAS BEEN PRESENTED THREE TIMES.
- TRAINING FILES - REVIEWING LEGAL REQUIREMENTS ASSOCIATED WITH PERSONNEL TRAINING FILES AND DOE/CH SUPPORT CAPABILITIES REGARDING SRPO TRAINING INFORMATION.

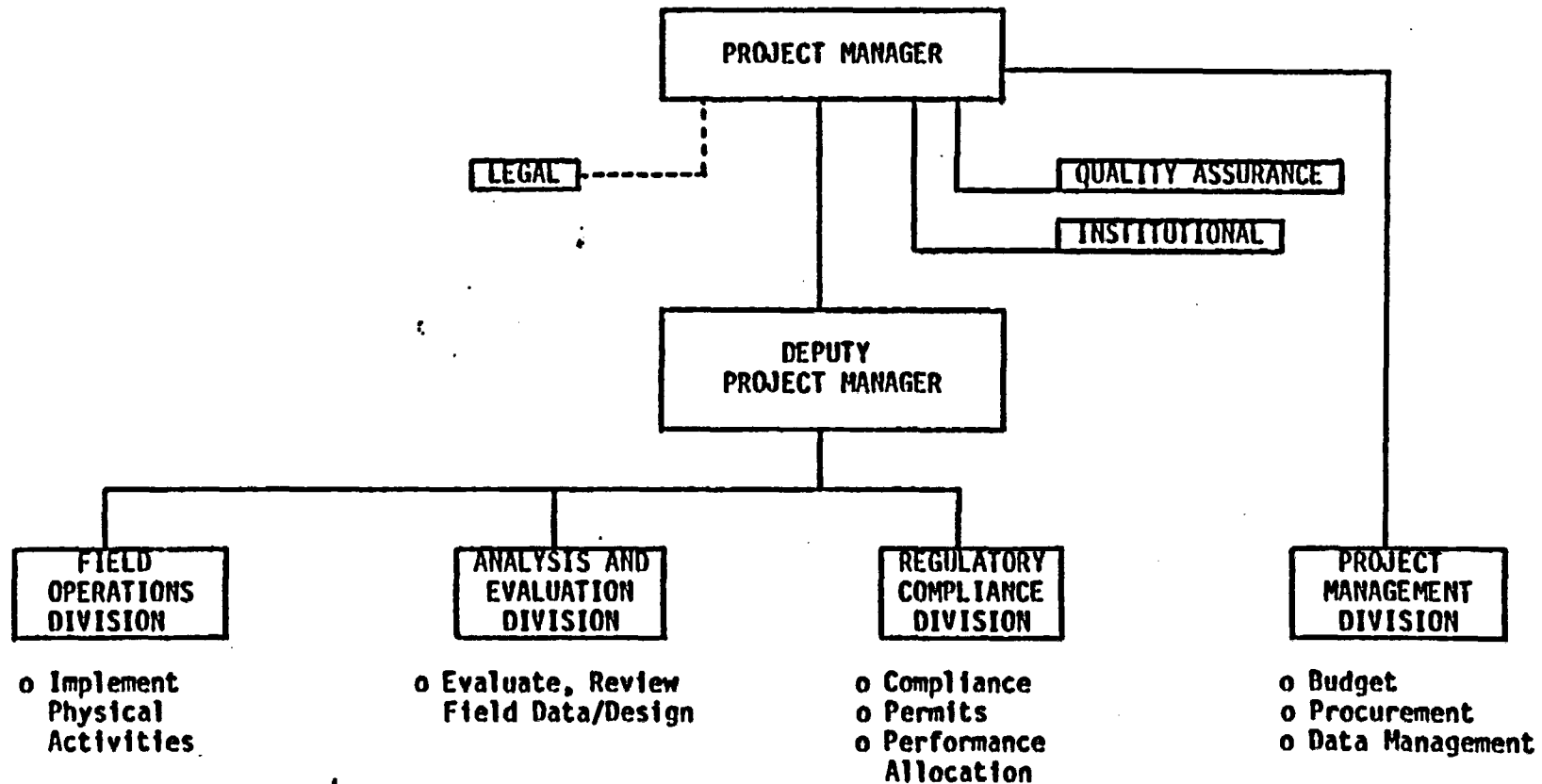
### STAFFING

- SRPO QA STAFF - DOE MANAGER, ONE (1) QA SPECIALIST AND FIVE (5) CONTRACTOR QA SPECIALISTS. RESUMES ARE BEING REVIEWED TO ADD FIVE (5) SRPO AND ONE (1) CONTRACTOR QA SPECIALISTS.

### READINESS FOR NRC AUDIT

- THE RELOCATION OF THE SRPO TO TEXAS HAS DELAYED THE DATE WHEN THE OFFICE WOULD BE READY FOR AN NRC AUDIT TO THE FOURTH QUARTER OF FY87. THIS TIMING IS DEPENDENT ON COMPLETION OF THE RELOCATION TO TEXAS, ADMINISTRATIVE PROCEDURES, TRAINING OF SRPO STAFF, INTERNAL SURVEILLANCES AND AUDITS BY THE SRPO QA ORGANIZATION, AND AN AUDIT BY DOE-HQ. IT IS PLANNED THAT SIXTY (60) DAYS AFTER COMPLETION OF THOSE ACTIVITIES DOE-HQ CAN BE NOTIFIED THAT THE SRPO IS PREPARED FOR AN NRC AUDIT.
- ORGANIZATIONS AND ACTIVITIES PROVIDED TO OGR AS BEING READY FOR AN NRC "MINI" AUDIT:
  - TBEG - SAMPLE STORAGE FACILITY
  - ONWI - TECHNICAL REVIEWS/QA DEPARTMENT
  - PB/PB-KBB - WHOLE PROGRAM
  - PNL - WASTE PACKAGE LABORATORY WORK
  - ANL - TECHNICAL AND PEER REVIEWS

**SALT REPOSITORY PROJECT OFFICE**  
**REPORTING STRUCTURE**



## **SALT REPOSITORY PROJECT OFFICE**

### **OFFICE OF THE PROJECT MANAGER**

- o Project Manager
- o Deputy Project Manager
- o Secretary
- o Legal Counsel
- o Senior Institutional
- o Staff Institutional

### **QUALITY ASSURANCE**

- o QA Manager
- o QA Staff
- o QA Staff
- o QA Staff

### **FIELD OPERATIONS DIVISION**

- o Acting Director
- o Secretary
- o Senior Field  
Environmental
- o Senior Geologist
- o Staff Geologist
- o Staff Geologist
- o Staff Geologist
- o Senior Engineer
- o Staff Engineer

### **ANALYSIS AND EVALUATION DIVISION**

- o Acting Director
- o Secretary
- o Senior Engineer
- o Staff Engineer
- o Staff Engineer
- o Staff Engineer
- o Senior Geologist
- o Staff Hydrogeologist
- o Staff Geologist
- o Senior Environmental/  
Socioeconomic
- o Staff Environmental

### **REGULATORY COMPLIANCE DIVISION**

- o Acting Director
- o Secretary
- o Senior Geologist
- o Staff Geologist
- o Senior Engineer
- o Staff Environmental

### **PROJECT MANAGEMENT DIVISION**

- o Acting Director
- o Senior Procurement
- o Staff Procurement
- o Staff Procurement
- o Senior Project Management
- o Information Management
- o Configuration Management
- o Budget

## **SRPO ACTIVITY STATUS**

**JANUARY - APRIL 1987**

**DESIGN REVIEW** - A 30% DESIGN REVIEW OF PB/PB-KBB'S ESF TITLE II DESIGN ACTIVITIES IS IN PROGRESS. ONWI IS CONDUCTING THIS REVIEW UNDER THE PROVISIONS OF THEIR PROCEDURES. IT IS ANTICIPATED THAT THE DESIGN REVIEW WILL BE COMPLETED BY THE END OF APRIL 1987. SRPO IS MONITORING THIS PROCESS THROUGH VISITS, REPORTS, AND PERIODIC SURVEILLANCES OF THE PROCESSES.

**SITE TRANSITION** - THE TRANSITION TO THE HEREFORD, TEXAS IS UNDERWAY. TEN (10) SRPO AND BATTELLE PERSONNEL HAVE ALREADY TRANSFERRED, AND THE SRPO QA PERSONNEL WILL COMPLETE TRANSFER BY THE END OF MAY 1987. BATTELLE QA PERSONNEL WILL START TRANSMITTING DURING THE MONTH OF MAY, 1987.

**ISSC AWARD** - NEGOTIATIONS WITH BATTELLE PROJECT MANAGEMENT DIVISION ARE STILL IN PROCESS.

**SCHEDULED AWARD DATE FOR TFSC CONTRACT** - TENTATIVE AWARD DATE JULY, 1987.

## **STATUS OF THE WRITING OF THE SALT PROJECT SCP**

SRPO LETTER OF MARCH 5, 1987 AUTHORIZED COMMENCEMENT OF WRITING SCP IN ACCORDANCE WITH THE APPROVED SCP AUTHOR COORDINATION FORMS.

SCP WRITING START DATE WAS SET FOR MARCH 9, 1987 THEREFORE, THE FOLLOWING IS UNDERWAY:

- PART A CHAPTERS 1-7
- PART B SECTIONS 8.0, 8.1, 8.4, 8.6 AND 8.7

HOWEVER, SECTIONS 8.2 "ISSUES AND INFORMATION", 8.3 "TESTS, ANALYSIS AND STUDIES", AND 8.5 "MILESTONES, DECISION POINTS AND SCHEDULES", ARE TO BE DEVELOPED AND REVIEWED BY SRPO PRIOR TO ACTUAL WRITING.

BPMD QA AND LICENSING DEPARTMENTS WILL PERFORM PRODUCTION ASSESSMENTS OF SCP ACTIVITIES; THE PURPOSE OF THE PRODUCTION ASSESSMENTS ARE:

- 1) MONITOR WRITING PROGRESS AND ENSURE THAT DRAFT MATERIAL IS CONSISTENT WITH THE WRITING GUIDELINES
- 2) ASSURE REQUIRED INTEGRATION OF THE VARIOUS CHAPTERS AND SECTIONS IS ACHIEVED
- 3) ASSURE CONFORMANCE TO APPLICABLE QA REQUIREMENTS

CHAPTER	PROPOSED END DATES FOR DRAFT SCP CHAPTER/SECTIONS DRAFT CHAPTER DUE
1	MAY 15, 1987
2	MAY 15, 1987
3	MAY 29, 1987
4	MAY 15, 1987
5	APRIL 24, 1987
6	MAY 29, 1987
7	MAY 29, 1987
8.0	MARCH 20, 1987
8.1	APRIL 3, 1987
8.4	APRIL 3, 1987
8.6	APRIL 30, 1987
8.7	APRIL 30, 1987
8.2, 8.3, 8.5	TBD

# STATUS OF DOE/SRPO LEAD AUDITOR TRAINING COURSE

LOCATION OF COURSE	DATE OF COURSE	NUMBER OF PARTICIPANTS	NUMBER OF PARTICIPANTS WHO PASSES THE EXAM	TYPE OF PARTICIPANTS
CINCINNATI, OH	OCT. 27-31, 1986	20	18	REPRESENTATIVES FROM: DOE-HQ ONWI STATE OF TEXAS SRPO CONTRACTORS
COLUMBUS, OH	DEC. 15-19, 1986	15	14	REPRESENTATIVES FROM: NATIONAL LABORATORIES BPMD CER SRPO CONTRACTORS
RICHLAND, WA	MARCH 23-27, 1987	20	*	REPRESENTATIVES FROM: DOE/RL STATE OF WASHINGTON BWIP CONTRACTORS NRC
ALBUQUERQUE, NM	JUNE 8-12, 1987	*	*	REPRESENTATIVES FROM: SRPO CONTRACTORS BPMD CONTRACTORS NATIONAL LABORATORIES
RICHLAND, WA	JULY 13-17, 1987	*	*	*

\* DATA NOT YET AVAILABLE.

# SRPO EXTERNAL AUDITS AND SURVEILLANCES

DATE	CONTRACTOR	ACTIVITY NO	RESULTS	OPEN/CLOSED
JANUARY 21-23, 1987	ONWI	ONWI-87-001-E	THREE AUDIT ACTION REPORTS WERE ISSUED. AREAS OF NONCOMPLIANCE WERE: <ul style="list-style-type: none"> <li>● QUALITY CATEGORY ASSIGNMENTS</li> <li>● QA REVIEW OF INTEGRATED CONTRACTS</li> <li>● DOCUMENTATION OF REVIEWER QUALIFICATION</li> </ul>	OPEN
FEBRUARY 18-20, 1987	GOLDER ASSOCIATES (SUB TO ONWI)	GOLDER-87-002-E	FIVE AUDIT ACTION REPORTS ISSUED. AREAS OF NONCOMPLIANCE WERE: <ul style="list-style-type: none"> <li>● STATUSING OF PROJECT PERFORMANCE</li> <li>● AUDIT PROGRAM</li> <li>● INEFFECTIVE TECHNICAL REVIEW PROCESS</li> <li>● INADEQUATE RECORD PROTECTION</li> <li>● LACK OF DOCUMENTED PERSONNEL QUALIFICATION</li> </ul>	OPEN
MARCH 17-20, 1987	ONWI	ONWI-87-003-E	TBD	OPEN
MARCH 24 & 25, 1987	PB/PB-KBB	S-PB/PB-KBB-87-003-E	SIX DEFICIENCY NOTICES WERE ISSUED. AREAS OF NONCOMPLIANCE WERE: <ul style="list-style-type: none"> <li>● QUALITY CATEGORY DETERMINATION</li> <li>● QUALITY CONTROL REVIEWS</li> <li>● SOFTWARE CONFIGURATION MANAGEMENT</li> <li>● PROCEDURAL INADEQUACY</li> <li>● INDEPENDENT REVIEWS</li> <li>● QUALIFICATION AND TRAINING SYSTEM</li> </ul>	OPEN



# SRPO EXTERNAL AUDITS AND SURVEILLANCES

DATE	CONTRACTOR	ACTIVITY NO	RESULTS	OPEN/CLOSED
APRIL 1-2, 1987	ONWI	S-ONWI-87-010-E	THREE DEFICIENCIES WERE NOTED. INFORMATION SHEET AREAS OF NONCONFORMANCE WERE: ● UNSATISFACTORY REFERENCES ● REFERENCES LISTED INCORRECTLY ● INCORRECT REFERENCES USED	OPEN
APRIL 14-15, 1987 APRIL 23-24, 1987	ONWI	S-ONWI-87-011-E	TBD	OPEN

# SRPO INTERNAL SURVEILLANCES

DATE	ACTIVITY	ACTIVITY NO	RESULTS	OPEN/CLOSED
MARCH 16-19, 1987	PROCUREMENT/ PACKAGE CHANGE CONTROL	S-SRPO-87-003-I	ONE DEFICIENCY WAS NOTED. AREA OF NONCOMPLIANCE WAS: ● REQUIRED REVIEWS NOT DOCUMENTED - 8 EXAMPLES	OPEN
APRIL 6-10, 1987	CONTROLLED DOCUMENT DISTRIBUTION	S-SRPO-87-005-I	SEVEN DEFICIENCIES WERE NOTED. AREAS OF NONCOMPLIANCE WERE: ● CONTRACTOR PROCEDURES NOT APPROVED ● DISTRIBUTION LIST UNAPPROVED ● MANUALS NOT RETURNED ● DISTRIBUTION LISTS NOT REVIEWED ● DE-CONTROLLED DOCUMENTS NOT VERIFIED ● DISTRIBUTION LIST REVIEW NOT REQUESTED ● PROCEDURES NOT CURRENT	OPEN

# SRPO CORE RECORDS SURVEILLANCE STATUS

DATE	CONTRACTOR	SURVEILLANCE NO	RESULTS	OPEN/CLOSED
Nov. 12-13, 1986	TEXAS BUREAU OF ECONOMIC GEOLOGY	S-TBEG-87-1-E	TWO DEFICIENCY NOTICES WERE ISSUED. AREAS OF NONCOMPLIANCE WERE: ● INADEQUATE SPECIFIC WORK INSTRUCTION. ● LACK OF DOCUMENTED PROCEDURES.	OPEN
Dec. 4, 1986	ARIZONA STATE UNIVERSITY	86-S-13	ONE DEFICIENCY NOTICE WAS ISSUED. THE AREA OF NONCOMPLIANCE WAS: ● LACK OF DOCUMENTED PROCEDURES.	CLOSED
Dec. 17-18, 1986	STONE & WEBSTER ENGINEERING CORPORATION	86-S-14	ONE DEFICIENCY NOTICE WAS ISSUED. THE AREA OF NONCOMPLIANCE WAS: ● LACK OF DOCUMENTED PROCEDURES.	OPEN
JAN. 21-22, 1987	UNITED NUCLEAR CORPORATION	S-UNC-87-2-E	ONE DEFICIENCY NOTICE WAS ISSUED. THE AREA OF NONCOMPLIANCE WAS: ● LACK OF DOCUMENTED PROCEDURES.	OPEN
MARCH 17-18, 1987	PACIFIC NORTHWEST LABORATORY	S-PNL-87-4-E	ONE DEFICIENCY NOTICE WAS ISSUED. THE AREA OF NONCOMPLIANCE WAS: ● INADEQUATE PROCEDURE REVISION.	OPEN
APRIL 6-7, 1987	RE/SPEC, Inc.	87-S-02	ONE DEFICIENCY NOTICE WAS ISSUED. THE AREA OF NONCOMPLIANCE WAS: ● INADEQUATE PROCEDURES REVISION.	OPEN
MAY OR JUNE, 1987	LLNL	S-LLNL-87-005-E	TO BE SCHEDULED	
MAY OR JUNE, 1987	USGS	S-USGS-87-007-E	TO BE SCHEDULED	

**QA PLAN OR MANUAL STATUS REPORT**  
**SALT REPOSITORY PROJECT OFFICE**

MAJOR PARTICIPANT	DOCUMENT IDENTIFICATION	REV. #	STATUS	APPROVAL DATE
FLUOR	N/A	1 DATED 1/19/87	4	5/1/87
PB/PB-KBB	ES 200-1	2 DATED 2/20/87	4	5/1/87
PARSONS-REDPATH	N/A	1 DATED 10/4/86	5	11/21/86
ONWI	N/A	REV. 8	5	CONDITIONALLY APPROVED 1/22/87
TBEG	N/A	REV. 6	3	N/A

**STATUS LEGEND**

(1) PLANNED; (2) UNDER PREPARATION; (3) FOR COMMENT RESOLUTION; (4) FOR PROJECT APPROVAL (5) ISSUED FOR IMPLEMENTATION; (6) FOR HQ-OGR APPROVAL.

**QA PROCEDURES DEVELOPMENT SUMMARY  
SALT REPOSITORY PROJECT OFFICE**

**MAJOR PARTICIPANTS**

<b>PROJECT PROCEDURES STATUS</b>	<b>OFFICE</b>	<b>BPMD</b>	<b>FLUOR</b>	<b>PB/PB-KBB</b>	<b>PARSONS-REDPATH</b>	<b>TBEG</b>
TOTAL REQUIRED (IDENTIFIED)	*****	87	10	22	42	20*****
ISSUED FOR IMPLEMENTATION		65	10	22	40	16
APPROVED BY PROJECT OFFICE		2	8**		40	2
UNDER REVIEW/ COMMENT		***			2	3
UNDER PREPARATION		17				12
NOT YET STARTED		5		*		3

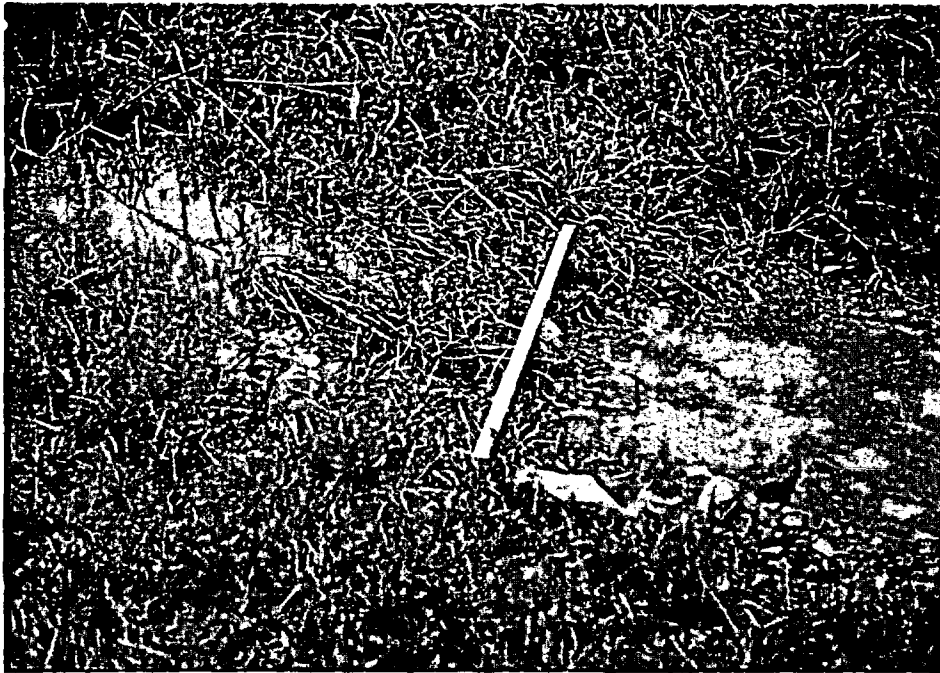
\* WAITING APPROVAL OF LATEST REVISION OF THE QA PLAN BEFORE ESTIMATING.

\*\* THE QA PROCEDURES WERE APPROVED BY DOE LETTER ST#493-86 DATED 6/2/86, AS PART OF THE FLUOR QA MANUAL (REV. 2) APPROVAL. INDIVIDUAL PROCEDURES HAVE NOT YET BEEN APPROVED. PROCEDURES 5.1 AND 6.1 WERE ISSUED FOR USE AFTER THE 6/2/86 APPROVAL.

\*\*\* ALL PROCEDURES REVIEWED ANNUALLY.

\*\*\*\* DUE TO COMBINING AND RESTRUCTURING OF PROCEDURES.

\*\*\*\*\* SEE SRPO QA PROGRAM STATUS ATTACHMENT.

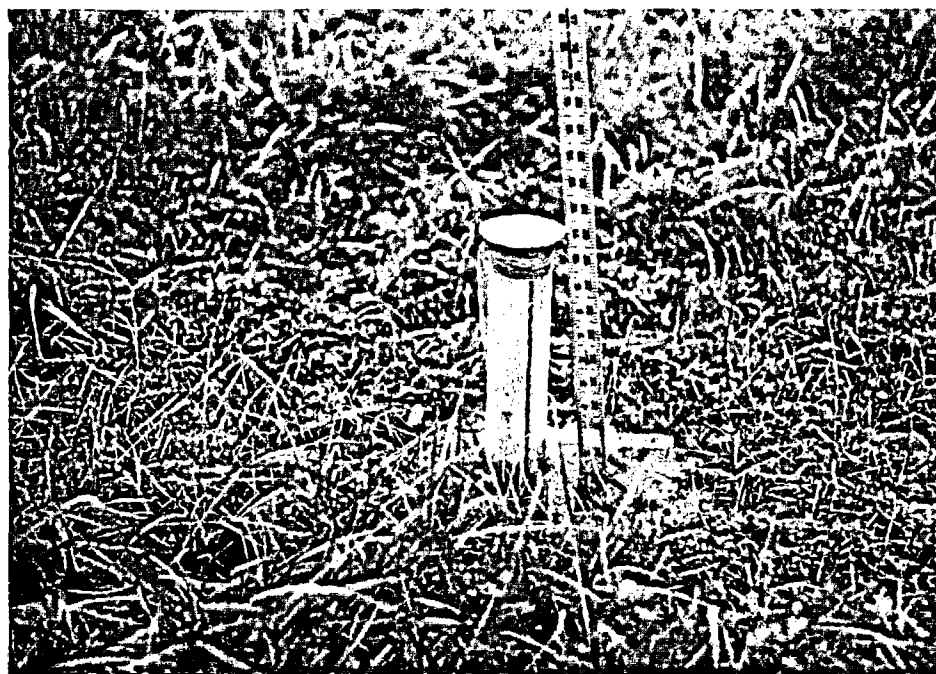


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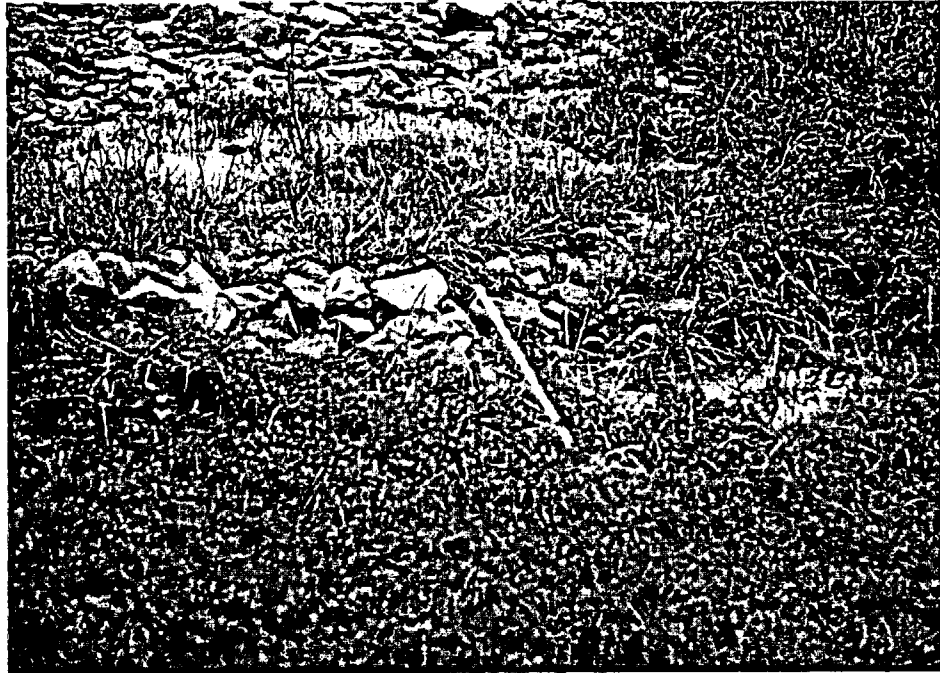




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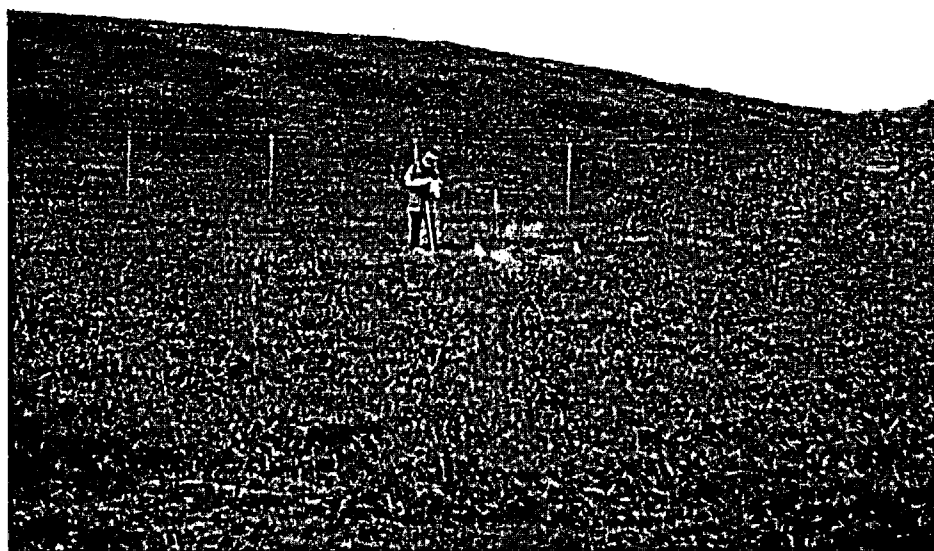
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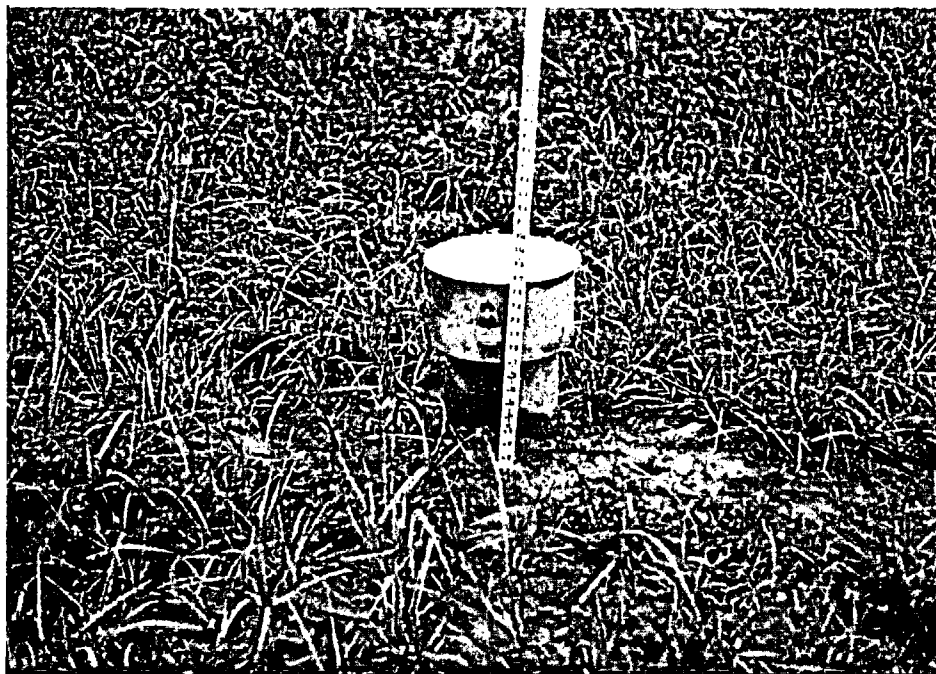


CAN 11/04/86 10 AZ 4.0





CAN 11/04/86 12 AZ 250



CAN 11/04/86 9 AZ 230  
MON WELL 413



CAN 11/04/86 11 AZ 125



CAN 11/04/86 15 AZ 210





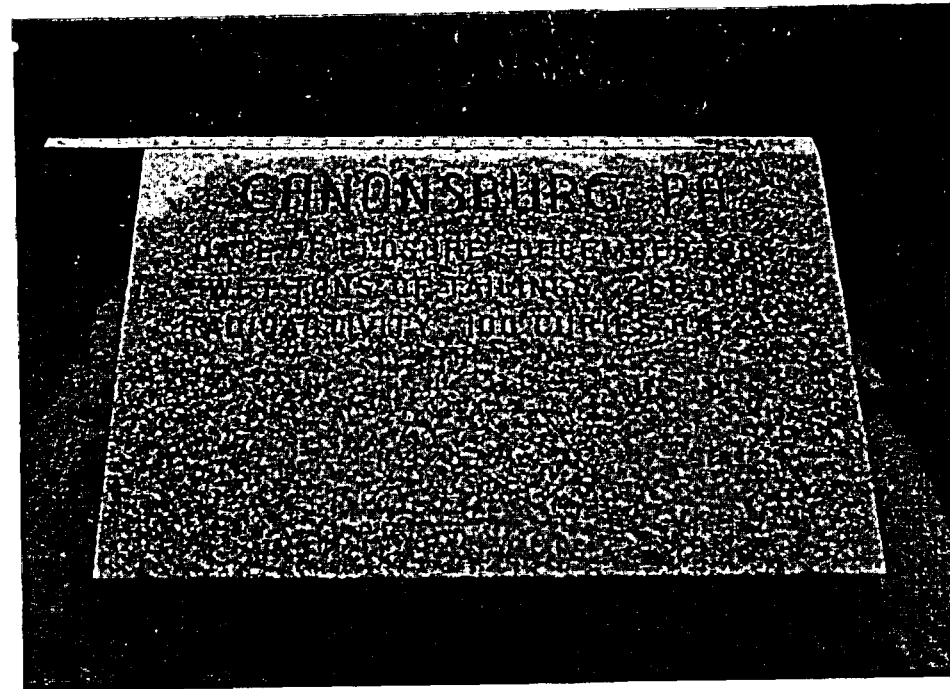
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CAN 11/04/86 13 AZ 25



CAN 11/04/86 14 AZ 280



CAN 11/04/86 19 AZ 295





CAN 11/04/86 20 AZ 270



CAN 11/04/86 17 AZ 5



CAN 11/4/86 18 AZ NA



CAN 11/04/86 23 AZ NA





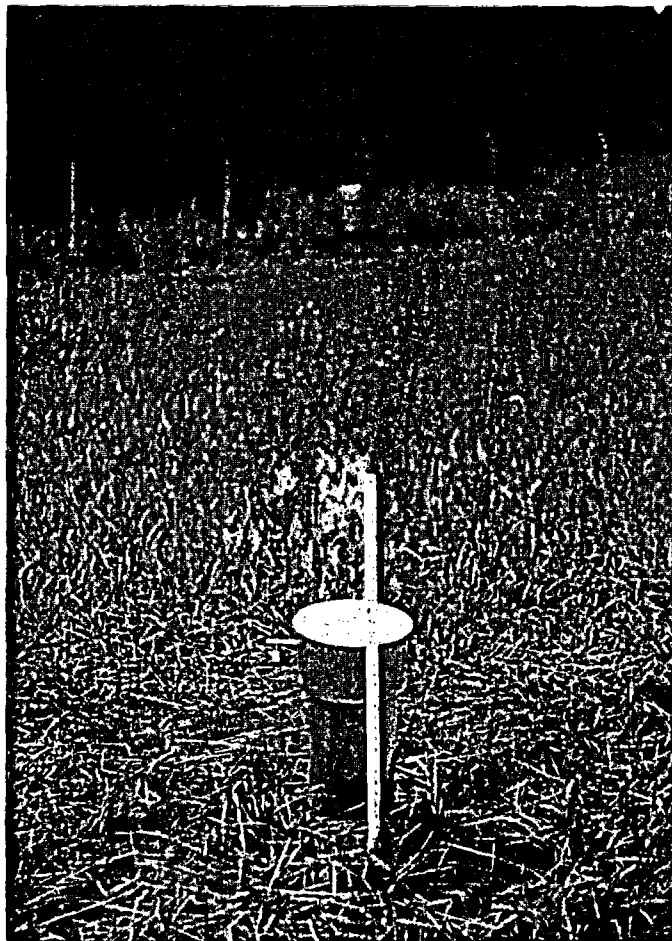
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MONWELL 412



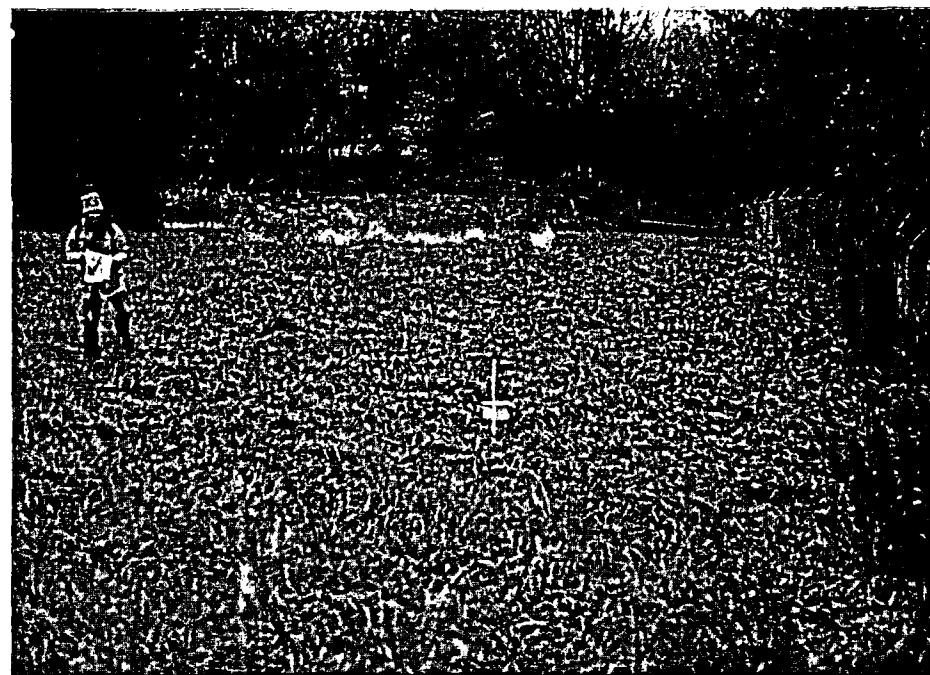


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CAN 11/04/86 27 AZ105

MON WELL 506



CAN 11/04/86 25 AZ 215



CAN 11/04/86 30 AZ 325

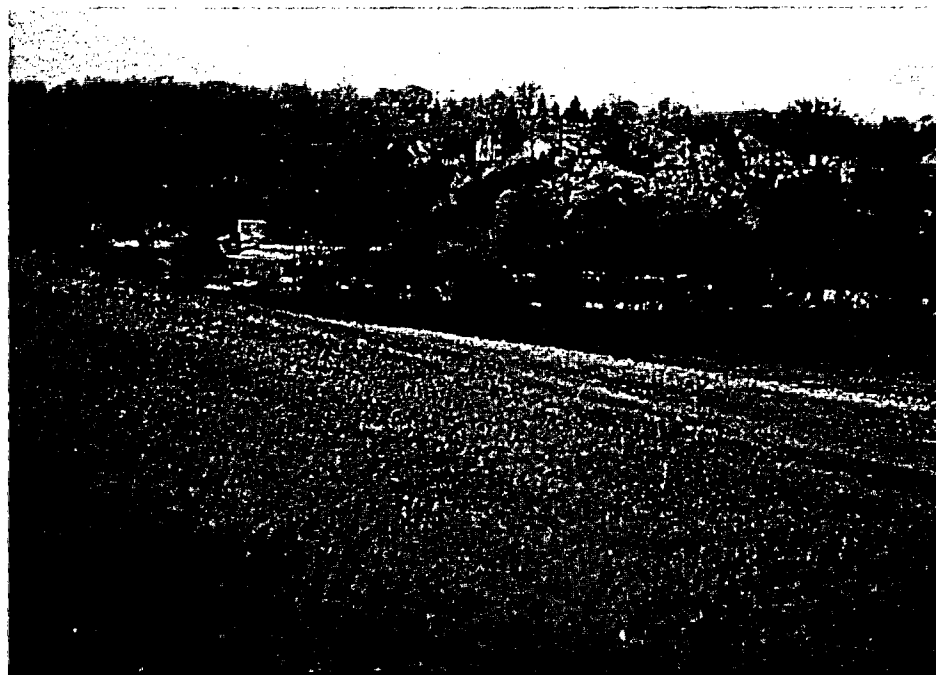




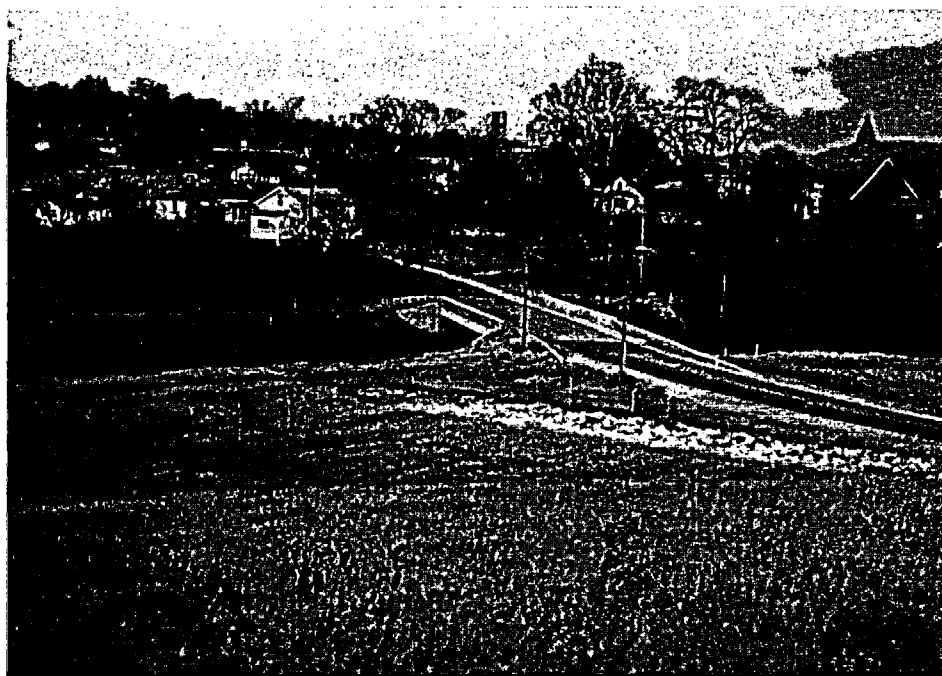
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CAN 11/04/86 31 AZ 170



CAN 11/04/86 34 AZ80





CAN 11/04/86 36 AZ 135



CAN 11/04/86 33 A250



CAN 11/04/86 35 AZ 115

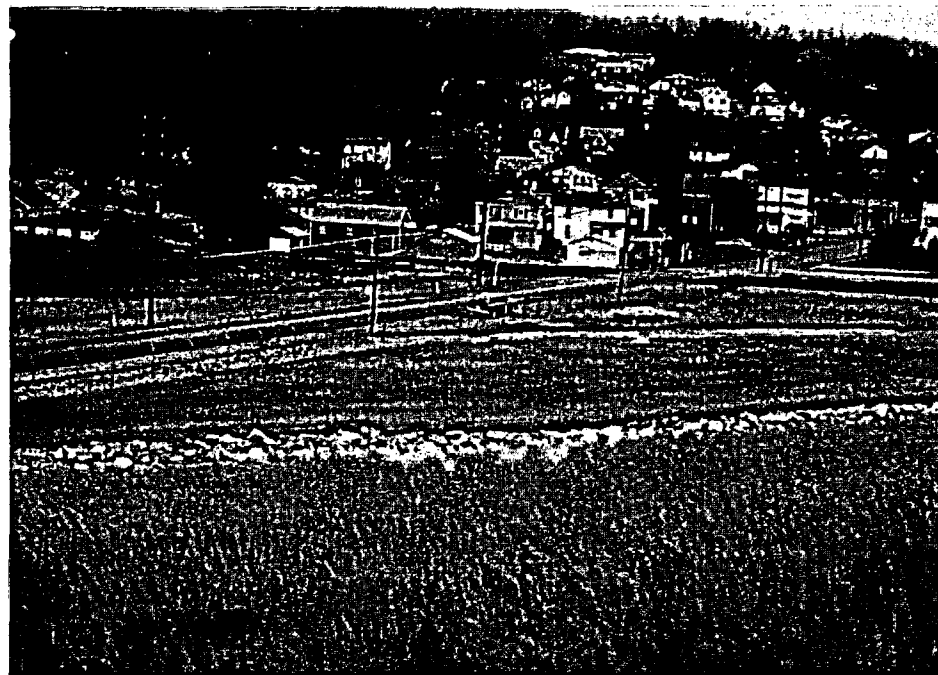


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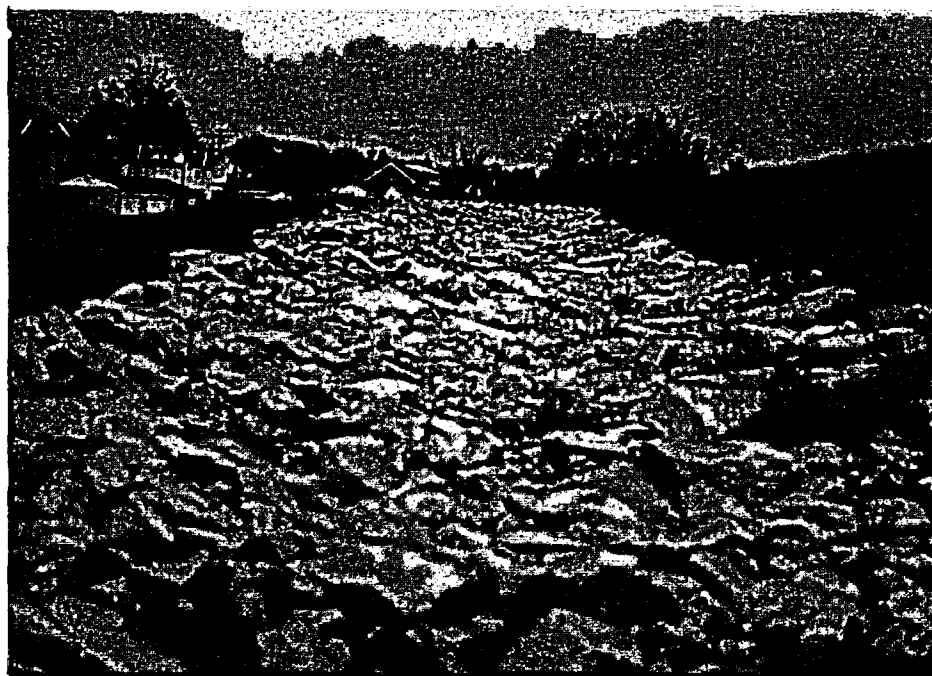




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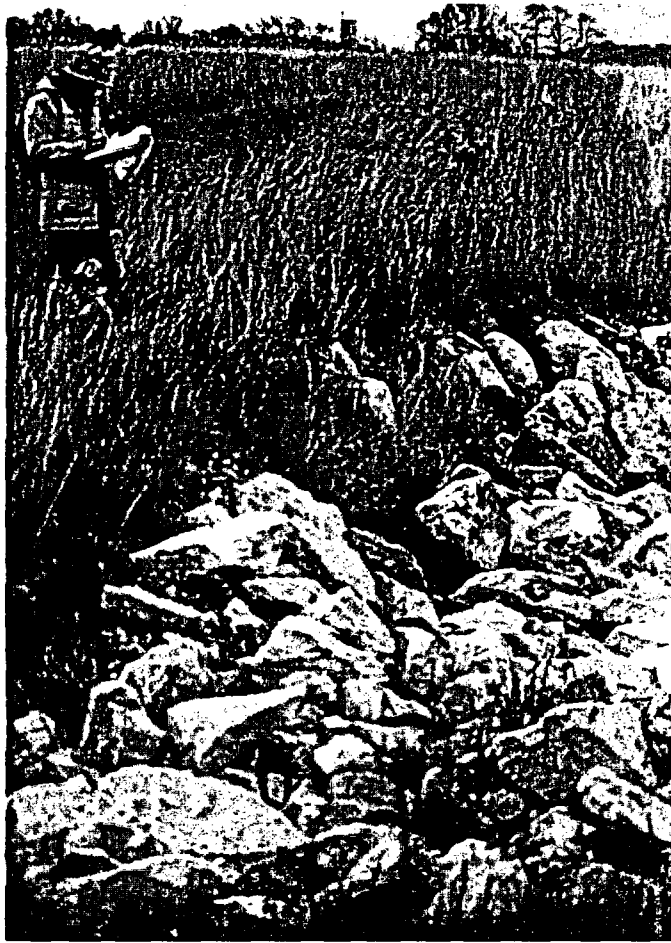
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CAN 11/04/86 39 AZ 230



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CAN 11/04/86 41 AZ 70



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# CANONSBURG PA

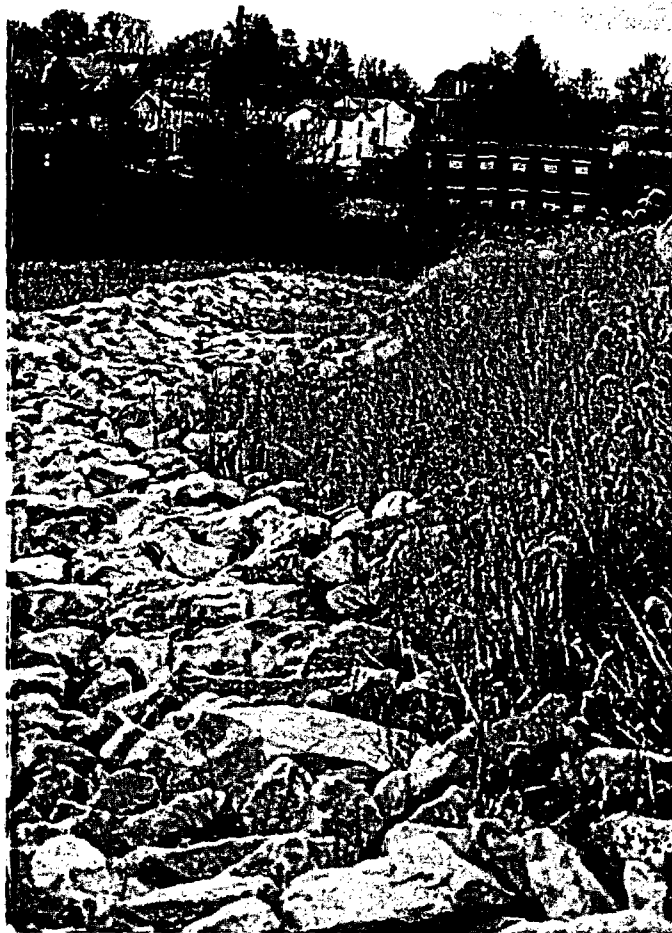
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WET TONS OF TAILINGS: 266,000

RADIOACTIVITY: 100 CURIES RA-226

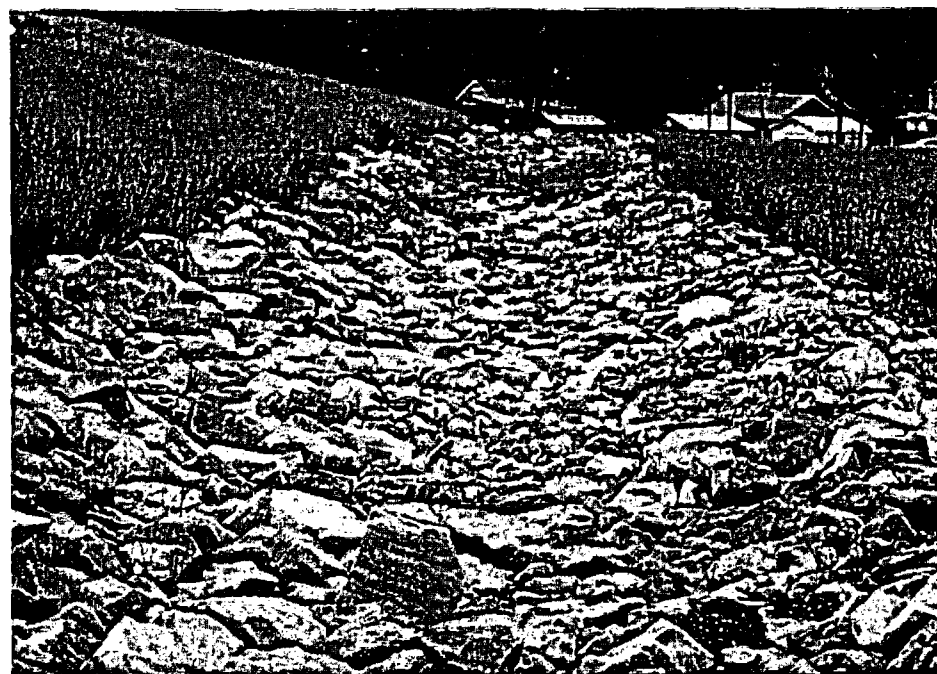


CAN 11/04/86<sup>^</sup>AZ 290  
46





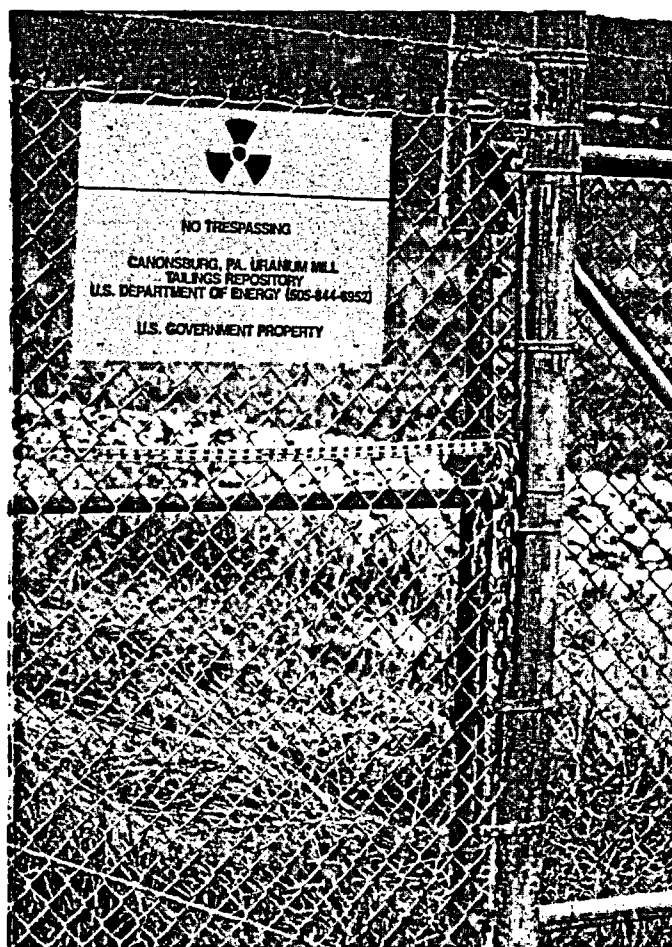
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CAN 11/04/86 45,125  
AZ

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CAN 11/04/86 50 AZ 315





CAN 11/04/86 52 AZ110



CAN 11/04/86 49 AZ



CAN 11/04/86 51 AZ 165

MON WELL 414

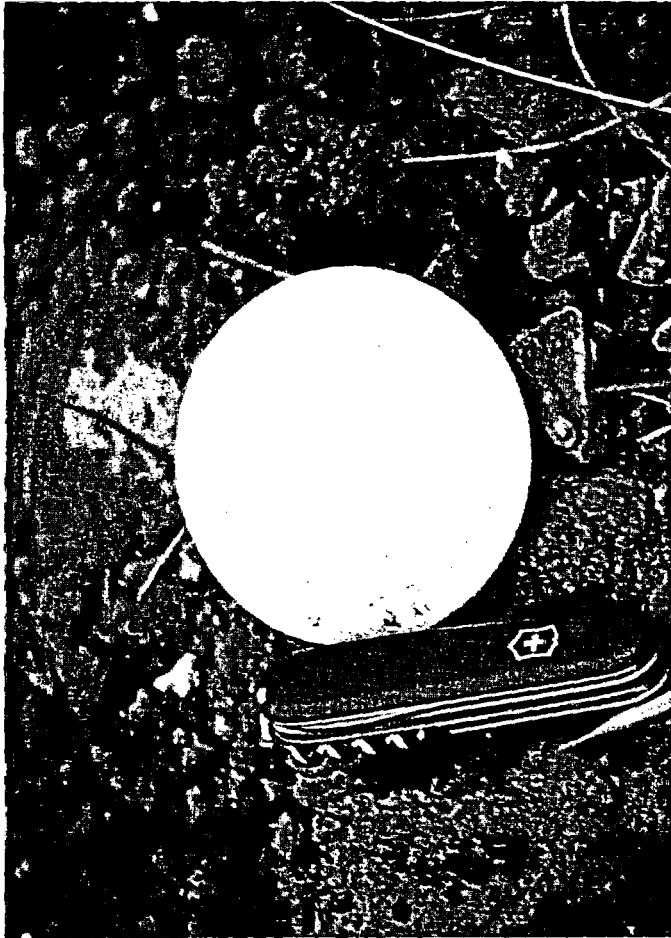


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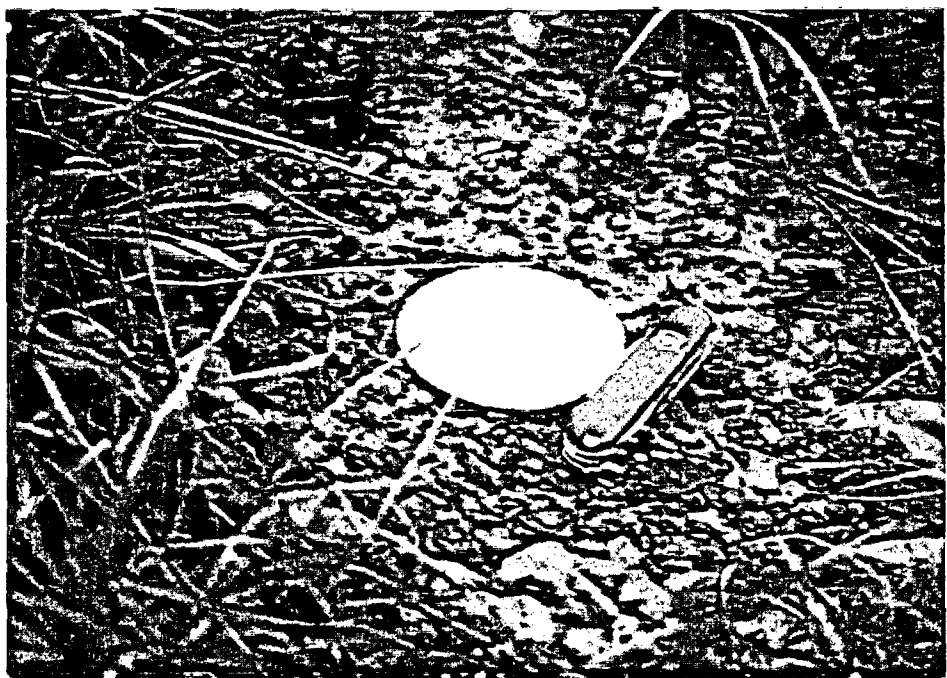




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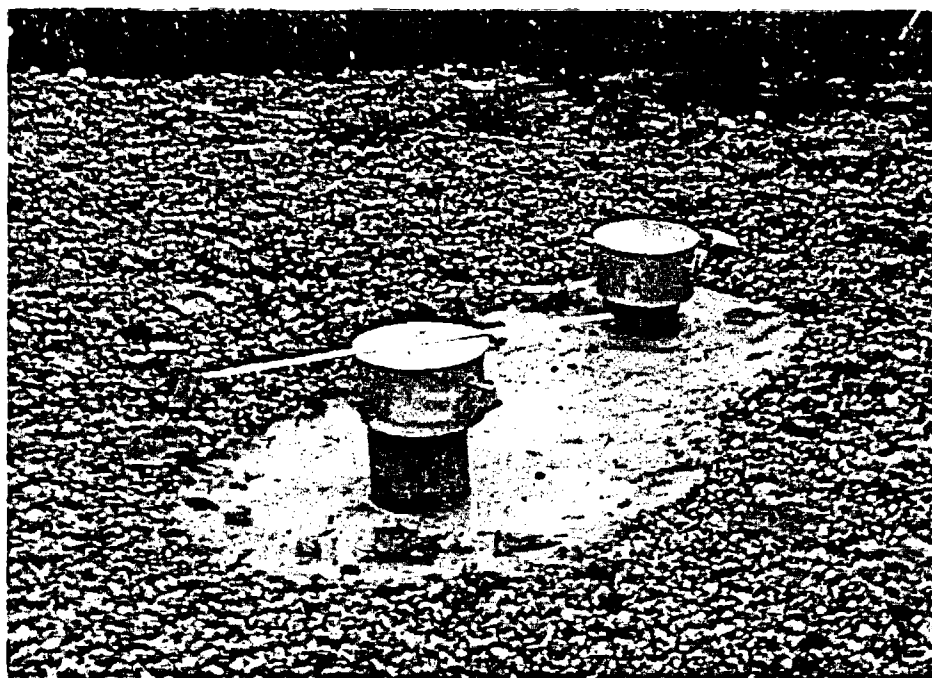
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CAN 11/04/96 58 AZ 315

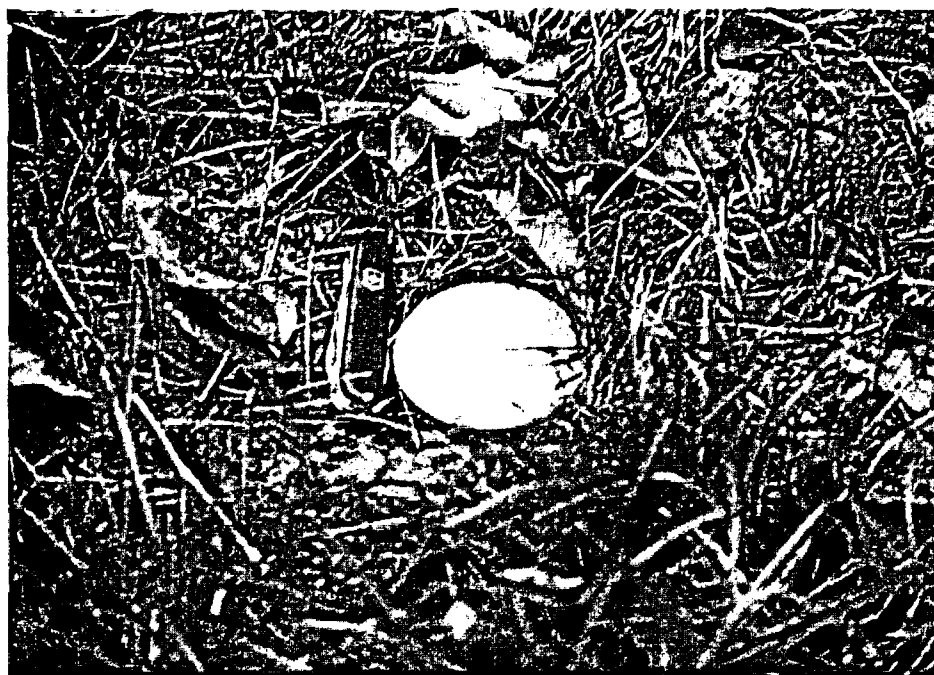




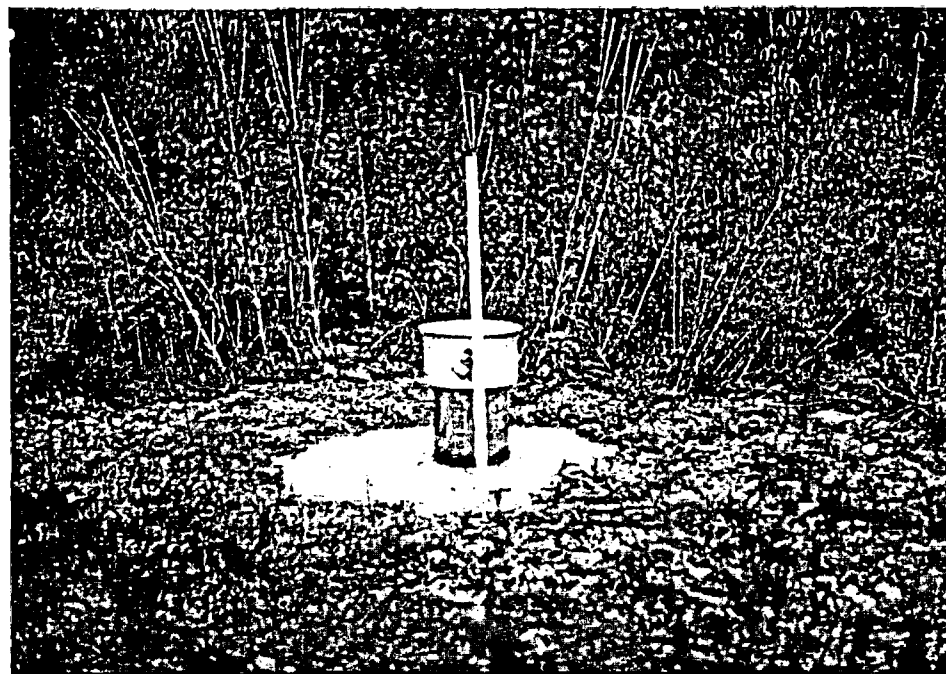
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MON WELLS 407 and 502



CAN 11/04/86 57 AZ 330



CAN 11/04/86 59 AZ 30



CAN 11/05/86 62 AZ 135

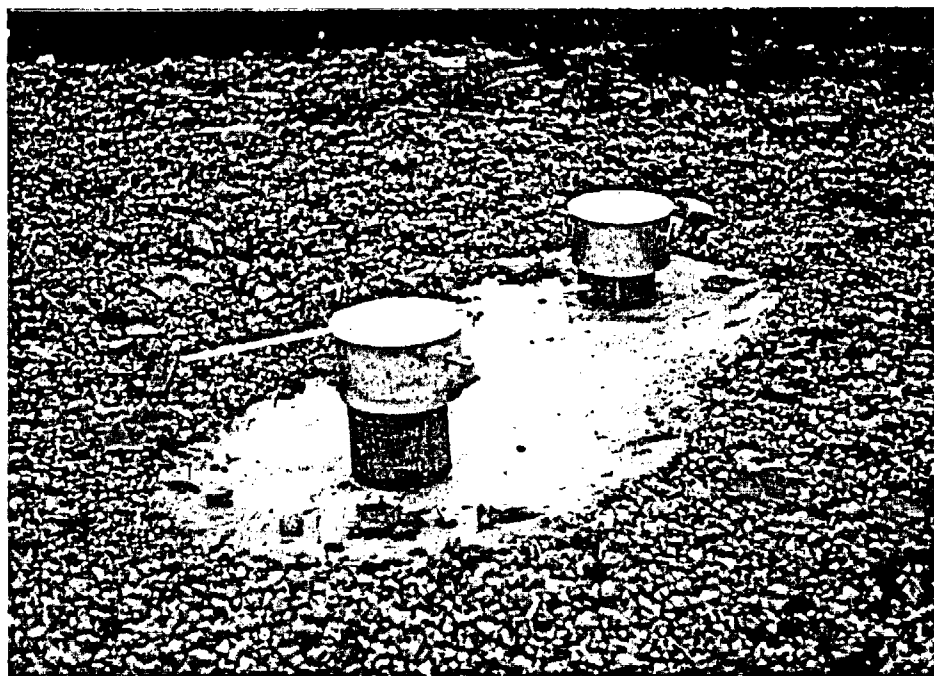
MON WELL 408



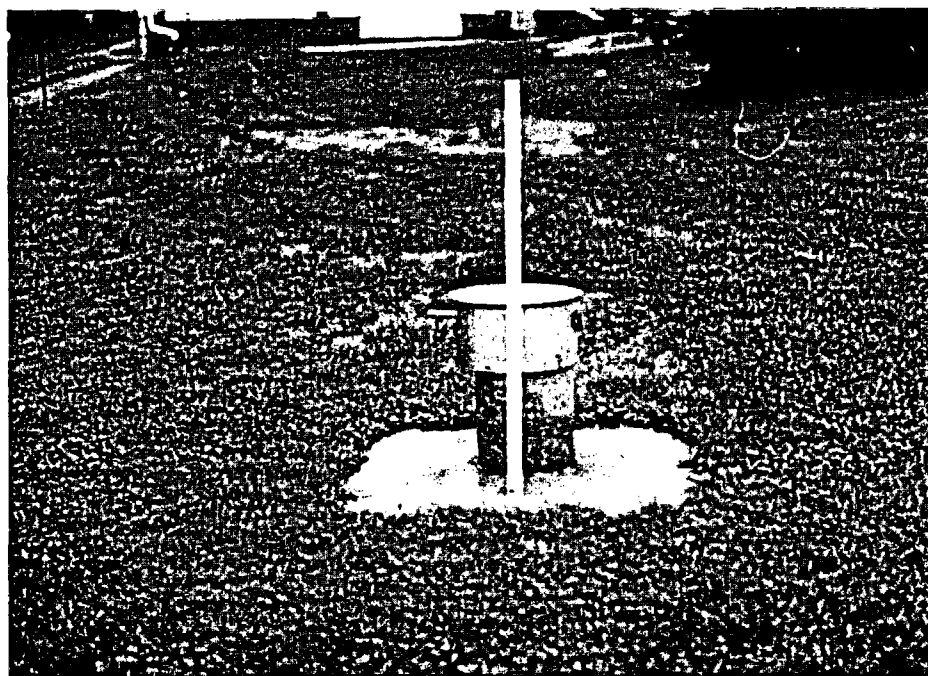


CAN 11/05/86 64 AZ 112

MON WELLS 410 and 505



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MON WELLS 407 and 502

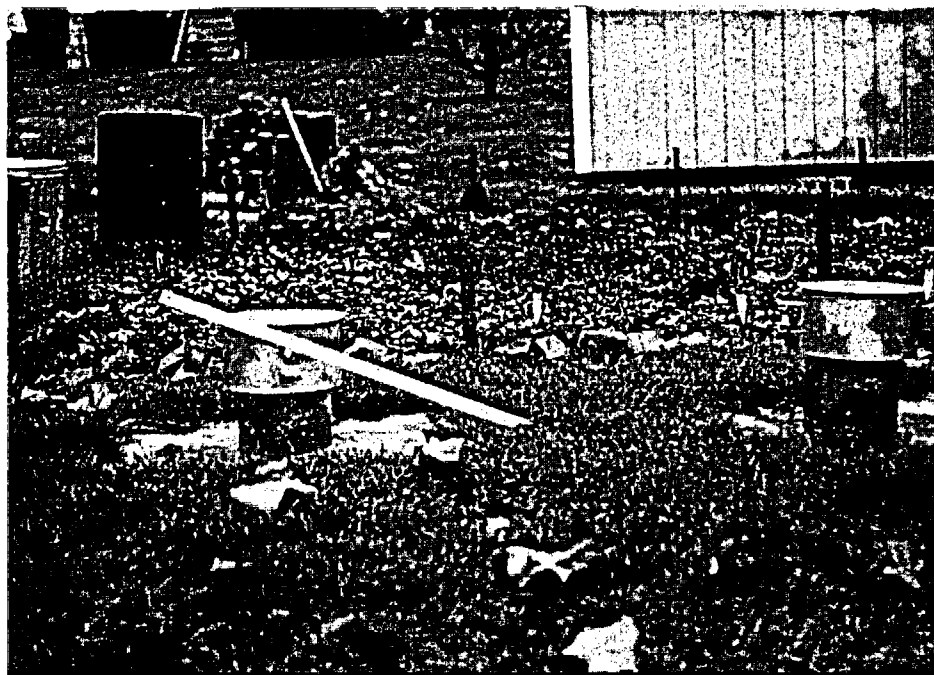


CAN 11/05/86 63 AZ183  
MON WELL 401



CAN 11/05/86 66 AZ 85

MON WELL 405





CAN 11/05/86 65 AZ 174

MON WELLS 503 and 409

APPENDIX C  
HYDROLOGY

Presently, three sets of ground-water samples have been collected at the Canonsburg tailings site. The water-quality analyses from the first two sample sets are included as Table C.1. The field forms, also included herein, document the results of the sampling procedures for each sample and corresponding monitor well, static water levels for the sampled (primary network) and non-sampled (secondary network) monitor wells, and two sets of slug test data from the primary monitor well network.

Table C.1 Ground water-quality data for the Canonsburg tailings site (8/6/86 to 11/6/86)

FORMATION OF COMPLETION: ALLUVIUM  
HYDRAULIC FLOW RELATIONSHIP: UP GRADIENT

PARAMETER	UNIT OF MEASURE	LOCATION ID - SAMPLE ID AND LOG DATE					
		401-01 08/07/86	410-01 08/07/86	410-01 11/05/86	S04-01 08/06/86	S04-01 11/04/86	
		PARAMETER VALUE+/-UNCERTAINTY	PARAMETER VALUE+/-UNCERTAINTY	PARAMETER VALUE+/-UNCERTAINTY	PARAMETER VALUE+/-UNCERTAINTY	PARAMETER VALUE+/-UNCERTAINTY	
ALKALINITY	MG/L CaCO3	120.0	87.	120.	215.	622.	
ALUMINUM	MG/L	0.2	0.3	0.4	0.2	0.4	
AMMONIUM	MG/L	( 0.4	( 0.4	( 0.4	( 0.4	( 0.4	
ANTIMONY	MG/L	( 0.003	( 0.003	( 0.003	( 0.003	( 0.003	
ARSENIC	MG/L	( 0.04	( 0.04	( 0.004	( 0.04	( 0.004	
BARIUM	MG/L	0.3	0.3	0.4	0.4	0.4	
BORON	MG/L	( 0.4	( 0.4	( 0.4	( 0.4	( 0.4	
CADMIUM	MG/L	( 0.004	( 0.004	( 0.004	( 0.004	( 0.004	
CALCIUM	MG/L	21.9	52.4	56.5	175.	165.	
CHLORIDE	MG/L	33.	44.	37.	150.	59.	
CHROMIUM	MG/L	0.02	0.02	0.05	0.05	0.05	
COBALT	MG/L	( 0.05	( 0.05	( 0.05	( 0.05	( 0.05	
CONDUCTANCE	UMHO/CM	320.	440.	420.	800.	800.	
COPPER	MG/L	( 0.02	0.02	( 0.02	( 0.02	( 0.02	
CYANIDE	MG/L	( 0.04	-	( 0.004	( 0.04	( 0.004	
FLUORIDE	MG/L	0.2	0.2	0.2	0.2	0.3	
IRON	MG/L	0.40	8.68	14.5	4.25	0.45	
LEAD	MG/L	( 0.04	( 0.04	( 0.007	( 0.04	( 0.004	
MAGNESIUM	MG/L	14.5	13.8	16.6	18.4	19.8	
MANGANESE	MG/L	0.47	3.32	2.90	0.83	0.69	
MERCURY	MG/L	( 0.0002	( 0.0002	( 0.0002	( 0.0002	( 0.0002	
MOLYBDENUM	MG/L	0.27	0.20	( 0.1	0.13	( 0.1	
NICKEL	MG/L	( 0.04	0.05	( 0.04	0.04	( 0.04	
NITRATE	MG/L	( 4.	( 4.	13.0	( 4.	1.3	
NITRITE	MG/L	( 0.4	( 0.4	( 0.4	( 0.4	( 0.4	
ORG. CARBON	MG/L	47.	-	21.5	63.	46.1	
PB-240	PCI/L	0.0	-	4.4	2.6	0.0	1.4
PH	SU	5.64	5.74	5.60	6.94	6.74	
PHOSPHATE	MG/L	( 0.4	( 0.4	( 0.04	( 0.4	( 0.04	
PO-240	PCI/L	4.5	-	0.4	4.5	0.4	0.3
POTASSIUM	MG/L	4.54	4.72	4.58	2.17	4.59	
RA-226	PCI/L	0.4	-	2.4	0.0	0.6	0.4
RA-228	PCI/L	0.0	-	0.2	0.0	0.4	1.6
SELENIUM	MG/L	( 0.005	( 0.005	( 0.002	( 0.005	( 0.002	
SILICA	MG/L	7.	6.	6.8	6.	6.3	
SILVER	MG/L	( 0.04	( 0.04	( 0.04	( 0.04	( 0.04	
SODIUM	MG/L	69.5	42.9	38.7	54.5	40.7	
STRONTIUM	MG/L	0.2	0.4	( 0.4	0.4	0.3	
SULFATE	MG/L	97.9	144.	138.	187.	182.	
SULFIDE	MG/L	( 0.4	-	( 0.4	( 0.4	( 0.4	
TEMPERATURE	C - DEGREE	17.5	17.	14.	13.	14.	
TH-230	PCI/L	2.9	-	0.0	0.4	0.4	0.6
TIN	MG/L	( 0.005	0.044	( 0.005	( 0.005	( 0.005	
TOTAL SOLIDS	MG/L	358.	380.	494.	749.	802.	
URANIUM	MG/L	( 0.0003	( 0.0003	( 0.0003	0.0044	0.0047	
VANADIUM	MG/L	0.20	0.30	( 0.2	0.20	( 0.2	
ZINC	MG/L	0.032	0.447	0.079	0.023	0.040	

Table C.1 Ground water-quality data for the Canonsburg tailings site (8/6/86 to 11/6/86)  
(Continued)

FORMATION OF COMPLETION: ALLUVIUM  
HYDRAULIC FLOW RELATIONSHIP: ON-SITE

		LOCATION ID - SAMPLE ID AND LOG DATE									
		412-01 08/06/86		412-02 08/06/86		412-03 08/06/86		412-04 08/06/86		412-05 08/06/86	
PARAMETER	UNIT OF MEASURE	PARAMETER VALUE+/-UNCERTAINTY		PARAMETER VALUE+/-UNCERTAINTY		PARAMETER VALUE+/-UNCERTAINTY		PARAMETER VALUE+/-UNCERTAINTY		PARAMETER VALUE+/-UNCERTAINTY	
ALKALINITY	MG/L CaCO3	314.		314.		314.		314.		314.	
ALUMINUM	MG/L	0.2		0.2		0.2		0.2		0.2	
AMMONIUM	MG/L	( 0.1		( 0.1		( 0.1		( 0.1		( 0.1	
ANTIMONY	MG/L	( 0.003		( 0.003		( 0.003		( 0.003		( 0.003	
ARSENIC	MG/L	( 0.01		( 0.01		( 0.01		( 0.01		( 0.01	
BARIUM	MG/L	0.2		0.2		0.2		0.2		0.2	
BORON	MG/L	( 0.1		( 0.1		( 0.1		( 0.1		( 0.1	
CADMIUM	MG/L	( 0.001		( 0.001		( 0.001		( 0.001		( 0.001	
CALCIUM	MG/L	230.		230.		230.		230.		230.	
CHLORIDE	MG/L	84.		84.		84.		84.		84.	
CHROMIUM	MG/L	0.03		0.03		0.03		0.03		0.03	
COBALT	MG/L	( 0.05		( 0.05		( 0.05		( 0.05		( 0.05	
CONDUCTANCE	UMHO/CM	1200.		1200.		1200.		1200.		1200.	
COPPER	MG/L	0.03		0.02		0.02		0.02		0.02	
CYANIDE	MG/L	( 0.01		( 0.01		( 0.01		( 0.01		( 0.01	
FLUORIDE	MG/L	0.2		0.2		0.2		0.2		0.2	
IRON	MG/L	0.10		0.10		0.10		0.10		0.10	
LEAD	MG/L	( 0.01		( 0.01		( 0.01		( 0.01		( 0.01	
MAGNESIUM	MG/L	43.9		43.9		43.9		43.9		43.9	
MANGANESE	MG/L	9.40		9.41		9.41		9.40		9.40	
MERCURY	MG/L	( 0.0002		( 0.0002		( 0.0002		( 0.0002		( 0.0002	
MOLYBDENUM	MG/L	0.20		0.19		0.19		0.19		0.19	
NICKEL	MG/L	0.06		0.06		0.06		0.06		0.06	
NITRATE	MG/L	( 1.		( 1.		( 1.		( 1.		( 1.	
NITRITE	MG/L	( 0.1		( 0.1		( 0.1		( 0.1		( 0.1	
ORG. CARBON	MG/L	112.		112.		116.		115.		112.	
PB-210	PCI/L	0.0	1.7	0.0	1.4	0.0	1.0	1.2	1.1	0.0	1.2
PH	SU	6.34		6.34		6.34		6.34		6.34	
PHOSPHATE	MG/L	( 0.1		( 0.1		( 0.1		( 0.1		( 0.1	
PO-210	PCI/L	0.0	0.7	0.0	0.6	0.0	0.6	0.0	0.6	0.0	0.6
POTASSIUM	MG/L	7.44		7.45		7.44		7.44		7.44	
RA-226	PCI/L	0.3	0.2	0.3	0.2	0.2	0.2	0.3	0.2	0.2	0.2
RA-228	PCI/L	0.0	1.0	0.6	1.2	0.0	0.8	0.0	0.9	0.0	1.0
SELENIUM	MG/L	( 0.005		( 0.005		( 0.005		( 0.005		( 0.005	
SILICA	MG/L	2.		2.		2.		2.		2.	
SILVER	MG/L	( 0.01		( 0.01		( 0.01		( 0.01		( 0.01	
SODIUM	MG/L	147.		147.		147.		147.		147.	
STRONTIUM	MG/L	0.7		0.7		0.7		0.7		0.7	
SULFATE	MG/L	622.		622.		621.		626.		608.	
SULFIDE	MG/L	( 0.1		( 0.1		( 0.1		( 0.1		( 0.1	
TEMPERATURE	C - DEGREE	14.		14.		14.		14.		14.	
TH-230	PCI/L	0.0	0.1	1.7	0.7	0.0	0.1	2.6	0.9	0.0	0.1
TIN	MG/L	( 0.005		( 0.005		( 0.005		( 0.005		( 0.005	
TOTAL SOLIDS	MG/L	1310.		1300.		1300.		1300.		1300.	
URANIUM	MG/L	0.0176		0.0222		0.0223		0.0223		0.0221	
VANADIUM	MG/L	0.22		0.20		0.20		0.20		0.20	
ZINC	MG/L	0.021		0.021		0.019		0.021		0.020	

Table C.1 Ground water-quality data for the Canonsburg tailings site (8/6/86 to 11/6/86)  
(Continued)

FORMATION OF COMPLETION: ALLUVIUM  
HYDRAULIC FLOW RELATIONSHIP: ON-SITE

		LOCATION ID - SAMPLE ID AND LOR DATE					
		412-01 11/06/86		413-01 08/07/86		413-01 11/04/86	
PARAMETER	UNIT OF MEASURE	PARAMETER VALUE+/-UNCERTAINTY		PARAMETER VALUE+/-UNCERTAINTY		PARAMETER VALUE+/-UNCERTAINTY	
ALKALINITY	MG/L CaCO3	289.		394.		440.	
ALUMINUM	MG/L	0.4		0.2		0.4	
AMMONIUM	MG/L	( 0.4		0.4		4.3	
ANTIMONY	MG/L	( 0.003		( 0.003		( 0.003	
ARSENIC	MG/L	( 0.008		( 0.01		0.002	
BARIUM	MG/L	( 0.1		0.3		0.1	
BORON	MG/L	( 0.3		( 0.1		( 0.1	
CADMIUM	MG/L	( 0.001		( 0.001		( 0.001	
CALCIUM	MG/L	203.		184.		174.	
CHLORIDE	MG/L	59.		120.		74.	
CHROMIUM	MG/L	( 0.05		0.04		( 0.05	
COBALT	MG/L	( 0.05		( 0.05		( 0.05	
CONDUCTANCE	UMHO/CM	4200.		4150.		4100.	
COPPER	MG/L	( 0.02		( 0.02		( 0.02	
CYANIDE	MG/L	( 0.001		( 0.01		( 0.001	
FLUORIDE	MG/L	0.1		0.3		0.1	
IRON	MG/L	0.09		14.7		12.7	
LEAD	MG/L	0.001		( 0.01		0.002	
MAGNESIUM	MG/L	44.7		28.4		29.2	
MANGANESE	MG/L	4.05		7.47		6.03	
MERURY	MG/L	( 0.0002		( 0.0002		( 0.0002	
MOLYBDENUM	MG/L	( 0.1		0.19		( 0.1	
NICKEL	MG/L	( 0.04		0.06		( 0.04	
NITRATE	MG/L	12.0		( 1.		1.8	
NITRITE	MG/L	( 0.1		( 0.1		( 0.1	
ORG. CARBON	MG/L	24.5		442.		74.2	
PH-240	PCI/L	6.4	1.2	0.0	1.4	2.0	1.2
PH	SU	6.37		6.58		6.59	
PHOSPHATE	MG/L	( 0.04		( 0.1		( 0.04	
PU-240	PCI/L	0.8	0.5	0.0	0.6	0.2	0.4
POTASSIUM	MG/L	2.25		4.03		3.43	
RA-226	PCI/L	0.8	0.3	0.2	0.2	0.5	0.3
RA-228	PCI/L	0.0	0.9	0.2	1.1	0.0	1.0
SELENIUM	MG/L	( 0.002		( 0.005		( 0.002	
SILICA	MG/L	4.2		4.		4.2	
SILVER	MG/L	( 0.01		( 0.01		( 0.01	
SODIUM	MG/L	98.		155.		98.	
STRONTIUM	MG/L	0.6		0.6		0.4	
SULFATE	MG/L	596.		356.		343.	
SULFIDE	MG/L	( 0.1		( 0.1		( 0.1	
TEMPERATURE	C - DEGREE	14.		17.5		14.	
TH-230	PCI/L	0.2	0.5	1.9	0.8	0.4	0.6
TIN	MG/L	( 0.005		( 0.005		( 0.005	
TOTAL SOLIDS	MG/L	4300.		1010.		1030.	
URANIUM	MG/L	0.0206		0.0492		0.0450	
VANADIUM	MG/L	( 0.2		0.20		( 0.2	
ZINC	MG/L	0.010		0.023		0.018	

Table C.1 Ground water-quality data for the Canonsburg tailings site (8/6/86 to 11/6/86)  
(Continued)

FORMATION OF COMPLETION: ALLUVIUM  
HYDRAULIC FLOW RELATIONSHIP: CROSS GRADIENT

		LOCATION ID - SAMPLE ID AND LOG DATE				
		444-04 08/05/86		444-04 11/05/86		
PARAMETER	UNIT OF MEASURE	PARAMETER VALUE+/-UNCERTAINTY		PARAMETER VALUE+/-UNCERTAINTY		PARAMETER VALUE+/-UNCERTAINTY
ALKALINITY	MG/L $\text{CaCO}_3$	202.		242.		
ALUMINUM	MG/L	0.3		0.4		
AMMONIUM	MG/L	1.3		2.6		
ANTIMONY	MG/L	( 0.003		( 0.003		
ARSENIC	MG/L	( 0.04		( 0.004		
BARIUM	MG/L	0.2		0.4		
BARIUM	MG/L	( 0.4		0.3		
CADMIUM	MG/L	( 0.004		( 0.004		
CALCIUM	MG/L	95.7		92.6		
CHLORIDE	MG/L	25.		14.		
CHROMIUM	MG/L	0.03		( 0.05		
COBALT	MG/L	( 0.05		( 0.05		
CONDUCTANCE	UMHO/CM	470.		475.		
COPPER	MG/L	0.02		( 0.02		
CYANIDE	MG/L	( 0.04		( 0.004		
FLUORIDE	MG/L	0.3		0.2		
IRON	MG/L	1.04		1.42		
LEAD	MG/L	( 0.04		0.002		
MAGNESIUM	MG/L	14.0		13.2		
MANGANESE	MG/L	10.9		11.5		
MERCURY	MG/L	( 0.0002		( 0.0002		
MOLYBDENUM	MG/L	0.48		( 0.4		
NICKEL	MG/L	( 0.04		( 0.04		
NITRATE	MG/L	( 1.		0.4		
NITRITE	MG/L	( 0.4		( 0.4		
ORG. CARBON	MG/L	63.		52.2		
PB-210	PCI/L	0.0	1.0	5.0	1.2	
PH	SU	6.72		6.70		
PHOSPHATE	MG/L	( 0.4		( 0.04		
PD-210	PCI/L	0.0	0.6	0.4	0.4	
POTASSIUM	MG/L	2.57		2.34		
RA-226	PCI/L	0.4	0.3	0.4	0.3	
RA-228	PCI/L	0.0	0.8	0.0	1.0	
SELENIUM	MG/L	( 0.005		( 0.002		
SILICA	MG/L	5.		3.9		
SILVER	MG/L	( 0.04		( 0.04		
SODIUM	MG/L	24.0		24.3		
STRONTIUM	MG/L	0.3		0.2		
SULFATE	MG/L	110.		104.		
SULFIDE	MG/L	( 0.4		( 0.4		
TEMPERATURE	C - DEGREE	15.		14.		
TH-230	PCI/L	0.4	0.2	0.0	0.3	
TIN	MG/L	( 0.005		( 0.005		
TOTAL SOLIDS	MG/L	440.		445.		
URANIUM	MG/L	0.0224		0.0206		
VANADIUM	MG/L	0.30		( 0.2		
ZINC	MG/L	0.045		0.007		

Table C.1 Ground water-quality data for the Canonsburg tailings site (8/5/86 to 11/3/86)  
(Continued)

FORMATION OF COMPLETION: LIMESTONE  
HYDRAULIC FLOW RELATIONSHIP: ON-SITE

PARAMETER	UNIT OF MEASURE	LOCATION ID - SAMPLE ID AND LOG DATE									
		505-01 08/05/86		505-01 11/03/86		505-02 11/03/86		505-03 11/03/86		505-04 11/03/86	
		PARAMETER VALUE+/-UNCERTAINTY		PARAMETER VALUE+/-UNCERTAINTY		PARAMETER VALUE+/-UNCERTAINTY		PARAMETER VALUE+/-UNCERTAINTY		PARAMETER VALUE+/-UNCERTAINTY	
ALKALINITY	MG/L CaCO <sub>3</sub>	495.		518.		518.		518.		518.	
ALUMINUM	MG/L	0.5		0.1		0.1		0.1		0.1	
AMMONIUM	MG/L	0.4		0.6		0.6		0.7		0.6	
ANTIMONY	MG/L	( 0.003		( 0.003		( 0.003		( 0.003		( 0.003	
ARSENIC	MG/L	( 0.01		( 0.004		( 0.004		( 0.004		( 0.004	
BARIUM	MG/L	0.2		0.1		0.2		0.1		0.1	
BORON	MG/L	( 0.1		0.1		( 0.1		0.1		0.1	
CADIUM	MG/L	( 0.004		0.004		( 0.004		0.004		0.004	
CALCIUM	MG/L	5.17		11.0		7.00		6.96		6.98	
CHLORIDE	MG/L	440.		250.		250.		240.		260.	
CHROMIUM	MG/L	0.01		( 0.05		( 0.05		( 0.05		( 0.05	
COBALT	MG/L	( 0.05		( 0.05		( 0.05		( 0.05		( 0.05	
CONDUCTANCE	UMHO/CM	1650.		1325.		1325.		1325.		1325.	
COPPER	MG/L	( 0.02		( 0.02		( 0.02		( 0.02		( 0.02	
CYANIDE	MG/L	( 0.01		( 0.004		( 0.004		( 0.004		( 0.004	
FLUORIDE	MG/L	2.7		0.4		2.2		2.1		1.9	
IRON	MG/L	0.06		0.06		0.05		0.06		0.06	
LEAD	MG/L	( 0.01		( 0.004		( 0.004		( 0.004		( 0.004	
MAGNESIUM	MG/L	1.30		2.21		1.69		1.70		1.64	
MANGANESE	MG/L	0.02		0.01		0.01		0.11		0.01	
MERCURY	MG/L	( 0.0002		( 0.0002		( 0.0002		( 0.0002		( 0.0002	
MOLYBDENUM	MG/L	0.12		( 0.1		( 0.1		( 0.1		( 0.1	
NICKEL	MG/L	( 0.04		( 0.04		( 0.04		( 0.04		( 0.04	
NITRATE	MG/L	( 1.		( 0.1		( 0.1		( 0.1		( 0.1	
NITRITE	MG/L	( 0.1		( 0.1		( 0.1		( 0.1		( 0.1	
ORG. CARBON	MG/L	121.		110.		50.1		50.9		53.2	
PH-210	PCI/L	0.0	1.5	0.0	1.6	1.3	1.3	0.6	1.0	0.2	1.1
PH	SU	8.20		8.01		8.01		8.01		8.01	
PHOSPHATE	MG/L	( 0.1		( 0.01		( 0.01		( 0.01		( 0.01	
PO-210	PCI/L	0.0	0.5	0.5	0.4	0.1	0.4	0.4	0.4	0.6	0.5
POTASSIUM	MG/L	1.47		1.20		1.19		1.29		1.14	
RA-226	PCI/L	0.7	0.3	2.7	0.6	1.7	1.0	0.4	0.2	0.3	0.3
RA-228	PCI/L	0.0	0.8	0.0	1.6	0.1	1.0	0.0	1.1	0.0	1.2
SELENIUM	MG/L	( 0.005		( 0.002		( 0.002		( 0.002		( 0.002	
SILICA	MG/L	5.		5.2		5.		5.		5.0	
SILVER	MG/L	( 0.01		( 0.01		( 0.01		( 0.01		( 0.01	
SODIUM	MG/L	575.		435.		429.		432.		435.	
STRONTIUM	MG/L	0.3		0.3		0.3		0.3		0.3	
SULFATE	MG/L	150.		128.		131.		126.		123.	
SULFIDE	MG/L	( 0.1		( 0.1		( 0.1		( 0.1		( 0.1	
TEMPERATURE	C - DEGREE	14.		13.		13.		13.		13.	
TH-230	PCI/L	0.3	0.3	0.2	0.5	0.0	0.3	0.0	0.4	0.3	0.5
TIN	MG/L	( 0.005		( 0.005		( 0.005		( 0.005		( 0.005	
TOTAL SOLIDS	MG/L	1330.		1210.		1210.		1220.		1200.	
URANIUM	MG/L	( 0.0003		0.0003		0.0004		0.0003		0.0005	
VANADIUM	MG/L	0.30		0.2		0.2		0.2		0.2	
ZINC	MG/L	0.012		0.005		0.007		0.005		0.004	



Table C.1 Ground water-quality data for the Canonsburg tailings site (8/5/86 to 11/3/86)  
(Continued)

FORMATION OF COMPLETION: LIMESTONE  
HYDRAULIC FLOW RELATIONSHIP: ON-SITE

		----- LOCATION ID - SAMPLE ID AND LOG DATE -----				
		505-05 44/03/86				
PARAMETER	UNIT OF MEASURE	PARAMETER VALUE+/-UNCERTAINTY	PARAMETER VALUE+/-UNCERTAINTY	PARAMETER VALUE+/-UNCERTAINTY	PARAMETER VALUE+/-UNCERTAINTY	PARAMETER VALUE+/-UNCERTAINTY
ALKALINITY	MG/L CaCO3	548.				
ALUMINUM	MG/L	0.4				
AMMONIUM	MG/L	0.6				
ANTIMONY	MG/L	( 0.003				
ARSENIC	MG/L	0.003				
BARIUM	MG/L	( 0.4				
BORON	MG/L	( 0.4				
CADMIUM	MG/L	( 0.004				
CALCIUM	MG/L	6.95				
CHLORIDE	MG/L	260.				
CHROMIUM	MG/L	( 0.05				
COBALT	MG/L	( 0.05				
CONDUCTANCE	UMHO/CM	1325.				
COPPER	MG/L	( 0.02				
CYANIDE	MG/L	( 0.004				
FLUORIDE	MG/L	4.8				
IRON	MG/L	0.04				
LEAD	MG/L	( 0.004				
MAGNESIUM	MG/L	4.60				
MANGANESE	MG/L	0.04				
MERCURY	MG/L	( 0.0002				
MOLYBDENUM	MG/L	( 0.4				
NICKEL	MG/L	( 0.04				
NITRATE	MG/L	( 0.4				
NITRITE	MG/L	( 0.4				
ORG. CARBON	MG/L	52.5				
PB-240	PCI/L	0.4	4.2			
PH	SU	8.04				
PHOSPHATE	MG/L	( 0.04				
PO-240	PCI/L	0.6	0.5			
POTASSIUM	MG/L	4.08				
RA-226	PCI/L	4.6	0.5			
RA-228	PCI/L	0.0	4.4			
SELENIUM	MG/L	( 0.002				
SILICA	MG/L	5.4				
SILVER	MG/L	( 0.04				
SODIUM	MG/L	434.				
STRONTIUM	MG/L	0.3				
SULFATE	MG/L	430.				
SULFIDE	MG/L	( 0.4				
TEMPERATURE	C - DEGREE	43.				
TH-230	PCI/L	0.0	0.3			
TIN	MG/L	( 0.005				
TOTAL SOLIDS	MG/L	4490.				
URANIUM	MG/L	0.0003				
VANADIUM	MG/L	( 0.2				
ZINC	MG/L	0.006				

Table C.1 Ground water-quality data for the Canonsburg tailings site (8/6/86 to 11/6/86)  
(Continued)

FORMATION OF COMPLETION: SHALE  
HYDRAULIC FLOW RELATIONSHIP: ON-SITE

PARAMETER	UNIT OF MEASURE	LOCATION ID - SAMPLE ID AND LOG DATE					
		506-01 08/06/86	506-01 11/06/86	506-01 08/06/86	506-01 11/06/86	506-01 08/06/86	506-01 11/06/86
PARAMETER	UNIT OF MEASURE	PARAMETER VALUE+/-UNCERTAINTY	PARAMETER VALUE+/-UNCERTAINTY	PARAMETER VALUE+/-UNCERTAINTY	PARAMETER VALUE+/-UNCERTAINTY	PARAMETER VALUE+/-UNCERTAINTY	PARAMETER VALUE+/-UNCERTAINTY
ALKALINITY	MG/L CAC03	404.	432.				
ALUMINUM	MG/L	0.5	0.1				
AMMONIUM	MG/L	0.1	0.1				
ANTIMONY	MG/L	0.003	0.003				
ARSENIC	MG/L	0.01	0.001				
BARIUM	MG/L	0.2	0.1				
BORON	MG/L	0.1	0.1				
CAESIUM	MG/L	0.001	0.004				
CALCIUM	MG/L	258.	263.				
CHLORIDE	MG/L	140.	70.				
CHROMIUM	MG/L	0.02	0.05				
COBALT	MG/L	0.05	0.05				
CONDUCTANCE	UMHO/CM	2750.	2850.				
COPPER	MG/L	0.02	0.02				
CYANIDE	MG/L	0.01	0.001				
FLUORIDE	MG/L	0.3	0.3				
IRON	MG/L	0.04	0.03				
LEAD	MG/L	0.01	0.001				
MAGNESIUM	MG/L	51.2	60.4				
MANGANESE	MG/L	0.04	0.04				
MERCURY	MG/L	0.0002	0.0002				
MOLYBDENUM	MG/L	0.18	0.1				
NICKEL	MG/L	0.05	0.04				
NITRATE	MG/L	1.	0.1				
NITRITE	MG/L	0.1	0.1				
ORG. CARBON	MG/L	131.	69.0				
PH-210	PCI/L	1.4	0.1	1.5	1.6		
PH	SU	6.85	6.99				
PHOSPHATE	MG/L	0.1	0.01				
PO-210	PCI/L	0.0	1.0	0.6	0.5		
POTASSIUM	MG/L	2.74	2.80				
RA-226	PCI/L	0.3	0.4	0.2	0.3		
RA-228	PCI/L	0.0	0.0	0.9	1.3		
SELENIUM	MG/L	0.005	0.002				
SILICA	MG/L	6.	6.5				
SILVER	MG/L	0.01	0.01				
SODIUM	MG/L	632.	595.				
STRONTIUM	MG/L	0.4	0.4				
SULFATE	MG/L	1570.	1600.				
SULFIDE	MG/L	0.1	0.1				
TEMPERATURE	C - DEGREE	13.	14.				
TH-230	PCI/L	0.0	0.3	0.1	0.5		
TIN	MG/L	0.005	0.005				
TOTAL SOLIDS	MG/L	2820.	2970.				
URANIUM	MG/L	0.927	0.865				
VANADIUM	MG/L	0.35	0.2				
ZINC	MG/L	0.063	0.019				

Table C.1 Ground water-quality data for the Canonsburg tailings site  
(Concluded)

MONITORING WELL INFORMATION											
SITE: CANONSBURG											
LOCATION ID	NORTH COORDINATE (FT.)	EAST COORDINATE (FT.)	ELEVATION (FT. MSL)	BOREHOLE DEPTH (FT.)	DIAMETER (IN.)	ELEVATION (FT. MSL)	WELL CASING DEPTH (FT.)	DIAMETER (IN.)	SCREENED DEPTH (FT.)	INTERVAL LENGTH (FT.)	FLOW RELATIONSHIP
FORMATION OF COMPLETION: ALLUVIUM											
404	999999.9	999999.9	9999.99	12.50	6.000	9999.99	12.30	4.000	7.50	4.7	UP GRADIENT
410	999999.9	999999.9	9999.99	17.00	6.000	9999.99	16.00	4.000	11.40	4.6	UP GRADIENT
412	999999.9	999999.9	9999.99	20.40	10.000	9999.99	21.30	4.000	14.30	5.0	ON-SITE
413	999999.9	999999.9	9999.99	12.20	10.000	9999.99	13.00	4.000	7.00	5.0	ON-SITE
414	999999.9	999999.9	9999.99	15.55	10.000	9999.99	15.45	4.000	4.45	10.0	CROSS GRADIENT
504	999999.9	999999.9	9999.99	26.50	4.500	9999.99	26.90	2.000	19.90	5.0	UP GRADIENT
FORMATION OF COMPLETION: LIMESTONE											
505	999999.9	999999.9	9999.99	95.00	6.000	9999.99	37.40	2.000	25.40	10.0	ON-SITE
FORMATION OF COMPLETION: SHALE											
506	999999.9	999999.9	9999.99	90.00	6.000	9999.99	27.95	2.000	20.95	5.0	ON-SITE

FIELDS DISPLAYED AS NINES INDICATE DATA IS UNAVAILABLE

**SLUG TEST DATA**

SITE ID: Can-phi LOCATION ID: 410

STATIC WATER LEVEL:

DATE: 1/30/87 TIME: 9:45 A.M.

SLUG VOLUME (ft.<sup>3</sup>): .217

DEPTH (ft.): 7.69

INITIAL WATER LEVEL (AT t<sub>0</sub>):

OPEN INTERVAL (ft.) ? to ?

DATE: 1/30/87

TOTAL DEPTH OF WELL (ft.): 17.9

TIME: 9:45 AM

WELL DIAM. (ft.): .333

DEPTH (ft FROM TOC): 9.69

FIELD REP: Fritts / Althouse

ELAPSED TIME (MIN. from to)	GROUNDWATER (ft. from TOC)	RESIDUAL DDN (ft.)	1/t <sub>m</sub>	H/H <sub>0</sub> or $\frac{H-h}{H-H_0}$
0.0	9.69			
.5	7.42			
1.0	7.42			
.5	7.42			
2.0	7.42			
.5	7.42			
3.0	7.42			
5.0	7.42			
10.0	7.48			
15.0	7.53			
20.0	7.56			
30.0	7.68			
40.0	7.75			
50.0	7.83			
60.0	7.91			
Stop	—			

COMMENTS: Injection



## SLUG TEST DATA

SITE ID: Can-41 LOCATION ID: 412

**STATIC WATER LEVEL:**

DATE: 1/30/97 TIME: 8:45 A.M.

SLUG VOLUME (H.3): 217

DEPTH (ft): 1225

**INITIAL WATER LEVEL (AT  $t_0$ ):**

OPEN INTERVAL (ft.) 14.3 to 19.3

DATE: 1/30/97

**TOTAL DEPTH OF WELL (ft):** 21.3

TIME: 8:45 AM

WELL DIAM. (11): .333

DEPTH (ft FROM TOC): 12.25

FIELD REP: Fritts/Athouse

[illegible]

COMMENTS: Injection!

**SLUG TEST DATA**

SITE ID: C-1-01 LOCATION ID: 413 STATIC WATER LEVEL:  
DATE: 1/29/87 TIME: 2:12 p.m.  
SLUG VOLUME (H<sub>2</sub>O): .217 DEPTH (ft.): 5.99  
INITIAL WATER LEVEL (AT 10): 7.0 to 12.0  
DATE: 1/29/87 TOTAL DEPTH OF WELL (ft.): 13.0  
TIME: 2:12 p.m. WELL DIAM. (in): .333  
DEPTH (ft FROM TOC): 5.99 FIELD REP: Fr. H<sub>2</sub>O / A Hhouse

ELAPSED TIME (MIN. from to)	GROUNDWATER (ft. from TOC)	RESIDUAL DDN (ft.)	1/l <sub>m</sub>	H/H <sub>0</sub> or $\frac{H-h}{H-H_0}$
0.00	5.99			
.5	4.09			
1.0	4.37			
.5	4.64			
2.0	4.86			
.5	4.96			
3.0	5.04			
.5	5.14			
4.0	5.19			
.5	5.23			
5.0	5.28			
6.0	5.35			
8.0	5.48			
10.0	5.54			
14.0	5.63			
18.0	5.69			
28.0	5.73			
38.0	5.76			
48.0	5.80			
<del>78.0</del>	5.94			

COMMENTS: Injection

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



JACOBS ENGINEERING GROUP INC.  
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

### SLUG TEST DATA

SITE ID: CA-1-01 LOCATION ID: 414

STATIC WATER LEVEL:

DATE: 1/29/87 TIME: 3:40 p.m.

SLUG VOLUME (H<sub>2</sub>O): .217

DEPTH (ft.): 3.94

INITIAL WATER LEVEL (AT 10):

OPEN INTERVAL (ft.) 4.45 to 14.45

DATE: 1/29/87

TOTAL DEPTH OF WELL (ft.): 15.45

TIME: 3:40 p.m.

WELL DIAM. (ft.): .333

DEPTH (ft FROM TOC): 3.94

FIELD REP: Fritter/A House

ELAPSED TIME (MIN. from to)	GROUNDWATER (ft. from TOC)	RESIDUAL DDN (ft.)	1/m	H/H <sub>0</sub> or $\frac{H-h}{H-H_0}$
:00	3.94			
.5	2.22			
1.0	2.76			
.5	2.99			
2.0	3.16			
.5	3.26			
3.0	3.32			
.5	3.40			
4.0	3.46			
.5	3.47			
5.0	3.49			
6.0	3.55			
8.0	3.66			
10.0	3.62			
14.0	3.74			
18.0	3.79			
22.0	3.85			
26.0	3.85			
36.0	3.88			
46.0	3.93			

Stop  
COMMENTS: Injection

**SLUG TEST DATA**

SITE ID: Can-01 LOCATION ID: 504  
SLUG VOLUME (ft.<sup>3</sup>): .054  
INITIAL WATER LEVEL (AT 1<sub>0</sub>):  
DATE: 1/30/87  
TIME: # 9:19 A.M.  
DEPTH (ft. FROM TOC): 11.75

STATIC WATER LEVEL:  
DATE: 1/30/87 TIME: 9:19 A.M.  
DEPTH (ft.): 11.75  
OPEN INTERVAL (ft.) 17.9 to 24.9  
TOTAL DEPTH OF WELL (ft.): 26.9  
WELL DIAM. (ft.): 0.167  
FIELD REP: Fr.H. / Althouse

ELAPSED TIME (MIN. from t <sub>0</sub> )	GROUNDWATER (ft. from TOC)	RESIDUAL DDN (ft.)	1/l <sub>m</sub>	H/H <sub>0</sub> or $\frac{H-h}{H-H_0}$
0.0	11.75			
.5	11.21			
1.0	11.34			
.5	11.42			
2.0	11.48			
.5	11.53			
3.0	11.56			
.5	11.57			
4.0	11.57			
5.0	11.60			
6.0	11.62			
8.0	11.65			
10.0	11.68			
15.0	11.74			
20.0	11.74			
Stop	—			

COMMENTS: Ligation





JACOBS ENGINEERING GROUP INC.  
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

SLUG TEST DATA

SITE ID: San-phi LOCATION ID: 505 STATIC WATER LEVEL:  
DATE: 1/21/87 TIME: 1:41 pm.  
SLUG VOLUME (H.3): .054 DEPTH (ft.): 7.09  
INITIAL WATER LEVEL (AT t<sub>0</sub>): OPEN INTERVAL (ft.) 25.4 to 35.4  
DATE: 1/21/87 TOTAL DEPTH OF WELL (ft.): 37.4  
TIME: 1:41 pm WELL DIAM. (ft.): .167  
DEPTH (ft FROM TOC): 7.09 FIELD REP: Frills / Althouse

ELAPSED TIME (MIN. from t <sub>0</sub> )	GROUNDWATER (ft. from TOC)	RESIDUAL DDN (ft.)	1/m	H/H <sub>0</sub> or $\frac{H-h}{H-H_0}$
0.00	7.09			
.5	5.19			
1.0	5.69			
.5	6.14			
2.0	6.41			
.5	6.56			
3.0	6.69			
.5	6.78			
4.0	6.85			
.5	6.93			
5.0	6.95			
6.0	6.98			
7.0	7.00			
8.0	7.02			
10.0	7.05			
12.0	7.07			
14.0	7.07			
16.0	7.07			
— Stop	—			

COMMENTS: Tragitation!



SITE ID: GA-61 LOCATION ID: 506  
SLUG VOLUME (H.9): .054  
INITIAL WATER LEVEL (AT 10):  
DATE: 1/30/87  
TIME: 8:57 AM  
DEPTH (H) FROM TOC: 16.91

STATIC WATER LEVEL:  
DATE: 1/30/87 TIME: 8:57 AM  
DEPTH (H): 16.91  
OPEN INTERVAL (H) 20.95 to 25.95  
TOTAL DEPTH OF WELL (H): 22.95  
WELL DIAM. (H): 367  
FIELD REP: Fr. H. Attmore

[illegible]

COMMENTS: Injection



JACOBS ENGINEERING GROUP INC.  
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

# GROUND WATER SAMPLING RECORD

Page 1 of 3

SITE ID: Can - 61

FINAL FIELD VALUES:

LOCATION ID: 410

SAMPLE ID: 61 11.61

pH (S.U.):

5.60

SURFACE  
DOWN-HOLE

N/A

STATIC WATER LEVEL (FT) 7.9

Ec (umhos/cm)

420

N/A

SAMPLE DEPTH (FT) 14.0'

Eh (millivolts)

N/A

N/A

SAMPLING DATE 11/4/86

TEMP. (°C):

14

N/A

SAMPLING TIME:

ALKALINITY (mg/l CaCO<sub>3</sub>): 120 24.50

START 8:30A.M.

LOCATION DESCRIPTION

COMPLETE 11/5/86 9:45A.M.

CONTAINER SIZE NONACIDIFIED (no.) ACIDIFIED (no.) VOL. ACID (ml)

NUMBER OF  
CONTAINERS  
COLLECTED:

ONE-LITER

150 ml

50 ml

See Attachment F

SPECIFY OTHERS:

COMMENTS: Titrate 1.6 N H<sub>2</sub>SO<sub>4</sub> Lot # 5133  
1 Gelman Filter used

FIELD REP (S): Fritts / Althaus

DATE	TIME	TOTAL VOLUME WITHDRAWN		pH	Ec (umhos/cm)	TEMP. (°C)	COMMENTS
		(Gals)	(Bore Volumes)				
11/4	9:10	0.0	0.0	-	-	-	START PUMPING
11/4	9:15	0.5	0.185	5.37	390	14	
11/4	9:20	2.0	0.74	5.60	410	14	
11/4	9:25	3.0	1.11	5.72	410	14	
11/4	9:30	3.5	1.3	5.60	420	14	Bailed dry - will return
11/5	8:30	-	-	-	-	-	returned to sample
11/5	9:15	-	-	-	-	-	Stop sampling Filter used
11/5	9:30	-	-	-	-	-	Stop sampling non-filtered

# WATER QUALITY SAMPLING RECORD

**BORE VOL CALCULATION**  
 $(d/2)^2 \pi (h_1 - h_2)$

Can -  $\phi 1$   
410

**SAMPLING INFORMATION**

DEPTH TO WATER ( $h_2$ ) (FT.) 11.61  
DEPTH OF WELL ( $h_1$ ) (FT.) 15.78  
WELL DIA (FT.) .33  
BORE VOL. (FT.)<sup>3</sup> .36  
DEPTH TO SCREEN (FT.) \_\_\_\_\_

WITHDRAWAL METHOD Johnson submersible  
SAMPLING METHOD Filtered  
FILTER SIZE .45u  
THERMOMETER ID 12853  
EC METER ID 12853  
PH METER ID 384560  
PUMP ID 62

## CALIBRATION INFORMATION

DATE/TIME OF LAST EC CALIBRATION 10/24/86  
TIME OF PH CALIBRATION 9:35 A.M.  
PH AFTER MEASUREMENT 7.05 FOR STANDARD PH 7.00  
PH AFTER MEASUREMENT 4.02 FOR STANDARD SOLUTION PH 4.00  
EC OF CALIBRATING SOLUTION N/A  
EC READING IN CALIBRATING SOLN. AFTER MEASUREMENT N/A  
TEMP. OF CALIBRATION SOLN. (°C) N/A

## SHIPPING INFORMATION

LAB(S) SHIPPED TO: EOA  
DATE(S) SHIPPED: 1/15/86  
METHOD OF SHIPMENT: American Airlines

## NOTES:

$$\left(\frac{.33}{2}\right)^2 \times (15.78 - 11.61) = .36 \times 7.5 = 2.67 \text{ gal/B.O.}$$

$$3BU = 8.0 \text{ gal}$$

$$1 \text{ gal} = .378 \text{ U}$$



JACOBS ENGINEERING GROUP INC.  
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

### ALKALINITY TITRATION GRAPH

SITE ID: Can-01

LOCATION ID: 410

DATE: 11/4/86

ERROR AT 4.50:  $\left| \frac{X1 - X2}{XS} \right| \times 100 = \underline{\hspace{1cm}}\%$

1st 3.4 %

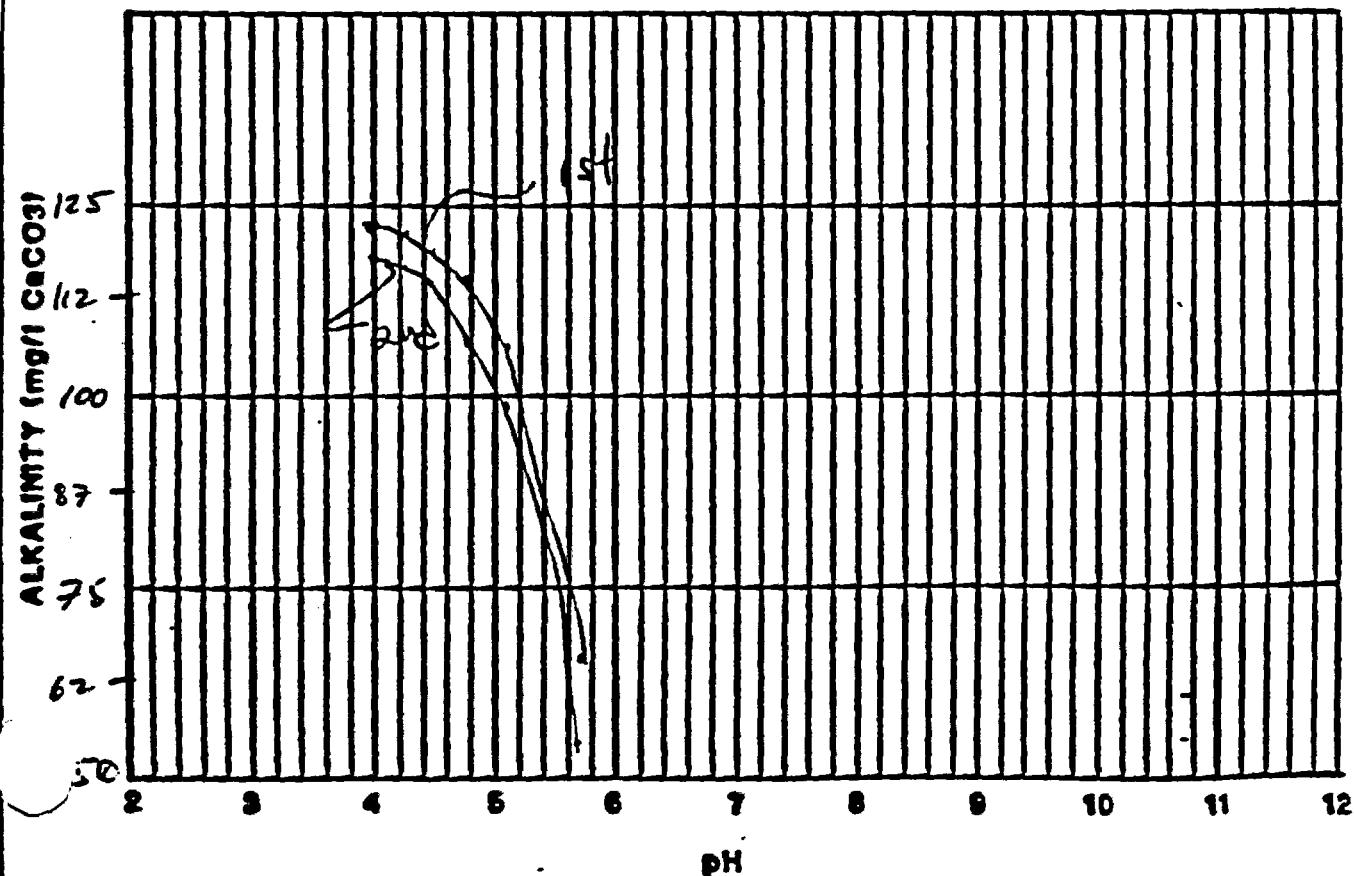
2nd      %

PH CHECK AFTER TITRATION

7.00 = 6.98

4.00 = 3.97

pH	ALKALINITY (mg/l CaCO <sub>3</sub> )		
	1st	2nd	3rd
8.90	—	—	
8.60	—	—	
8.30	—	—	
8.05	—	—	
7.80	—	—	
7.50	—	—	
6.50	—	—	
5.70	66	56	
5.10	106	99	
4.80	114	108	
4.50	120	116	
4.25	122	117	
4.00	123	118	



**ATTACHMENT F**

**CONTRACT NO. ASD-34-6703-S-85-0026**

**ACKNOWLEDGEMENT OF RECEIPT OF SAMPLES FOR DELIVERY ORDER NO. AD 45**

**SITE ID:** Car-61 **LOCATION ID:** 410 **SAMPLE ID:** 01

**SAMPLE SHIPMENT LIST**

**Lot #** 1

<u>Bottle ID</u>	<u>Amount</u>	<u>Rec'd</u>	<u>Bottle ID</u>	<u>Amount</u>	<u>Rec'd</u>
A1	<u>2L</u>	<u>( )</u>	Th 230	<u>1L</u>	<u>( )</u>
A1-A	<u>      </u>	<u>( )</u>	G 18	<u>      </u>	<u>( )</u>
M1	<u>      </u>	<u>( )</u>	N1	<u>1L</u>	<u>( )</u>
M1-A	<u>      </u>	<u>( )</u>	N2	<u>      </u>	<u>( )</u>
M2	<u>1L</u>	<u>( )</u>	CN	<u>1L</u>	<u>( )</u>
M2-A	<u>      </u>	<u>( )</u>	S	<u>1L</u>	<u>( )</u>
Pb 210	<u>1L</u>	<u>( )</u>	TOC	<u>1.5L</u>	<u>( )</u>
Po 210	<u>1L</u>	<u>( )</u>	TOX	<u>      </u>	<u>( )</u>
Ra 226	<u>2L</u>	<u>( )</u>	S102	<u>      </u>	<u>( )</u>
Ra 228	<u>2L</u>	<u>( )</u>	Alkalinity	<u>1L</u>	<u>( )</u>

**DATE SHIPPED:** 11/5/86 **METHOD OF SHIPMENT:** American Airlines

**COMMENTS:** \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

I hereby acknowledge receipt of the following on \_\_\_\_\_  
 (date)

( ) Delivery Order No. AD \_\_\_\_ (Work Order Plan) dated \_\_\_\_\_.

**Subcontractor:** \_\_\_\_\_  
**Name:** \_\_\_\_\_  
**Title:** \_\_\_\_\_  
**Date:** \_\_\_\_\_

**Partial Analysis Due:** \_\_\_\_\_ **Complete Analysis Due:** \_\_\_\_\_

**COMMENTS:** \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Delivery of Analysis in accordance with Exhibits B and C of the Subcontract is due no later than: Preliminary to JEG by: \_\_\_\_\_

Complete to JEG by: \_\_\_\_\_  
 Date



JACOBS ENGINEERING GROUP INC.  
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

# GROUND WATER SAMPLING RECORD

Page 1 of 3

SITE ID: Can-01

FINAL FIELD VALUES:

LOCATION ID: 412

SAMPLE ID: 01

pH (S.U.):

STATIC WATER LEVEL (FT) 13.29

Ec (umhos/cm)

SAMPLE DEPTH (FT) 20.0'

Eh (millivolts)

SAMPLING DATE 11/6/86

TEMP. (°C):

SAMPLING TIME:

ALKALINITY (mg/l CaCO<sub>3</sub>): 289 at 4.50

START 12:00

LOCATION DESCRIPTION

COMPLETE 2:15 p.m.

CONTAINER SIZE NONACIDIFIED (no.) ACIDIFIED (no.) VOL. ACID (ml)

NUMBER OF  
CONTAINERS  
COLLECTED:

ONE-LITER

150 ml

50 ml

See Attachment F

SPECIFY OTHERS:

COMMENTS: Titrate 1.6 N H<sub>2</sub>SO<sub>4</sub> Lot #503

Galman Filter used

Quality Assurance by Jim Craft

FIELD REP (S): Fritts / Althouse

DATE	TIME	TOTAL VOLUME WITHDRAWN		pH	Ec (umhos/cm)	TEMP. (°C)	COMMENTS
		(Gals)	(Bore Volumes)				
11/6	12:47	0.0	0.0	-	-	-	START PUMPING
	12:50	3.0	.57	6.46	1200	13.5	
	12:55	8.0	1.52	6.33	1200	14	Adjust pH meter
	1:01	14.0	2.66	6.36	1200	14	
	1:08	21.0	3.99	6.37	1200	14	check pH meter
	1:20	-	-	-	-	-	Stop sampling non Filtered
	1:30	-	-	-	-	-	Stop sampling Filtered

# WATER QUALITY SAMPLING RECORD

## BORE VOL CALCULATION

$$(d/2)^2 \pi (h_1 - h_2)$$

Can- $\phi$ 1  
412

## SAMPLING INFORMATION

DEPTH TO WATER ( $h_2$ ) (FT.) 13.29

DEPTH OF WELL ( $h_1$ ) (FT.) 21.66

WELL DIA (FT.) .33

BORE VOL. (FT.)<sup>3</sup> .72

DEPTH TO SCREEN (FT.) 14.30

WITHDRAWAL METHOD Johnson submersible

SAMPLING METHOD Filtered

FILTER SIZE .45  $\mu$

THERMOMETER ID 12853

Ec METER ID 12853

pH METER ID 384560

PUMP ID 62

## CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION 10/24/86

TIME OF pH CALIBRATION 1:07 p.m.

Ec AFTER MEASUREMENT 4.01 FOR STANDARD pH 4.00

pH AFTER MEASUREMENT 7.01 FOR STANDARD SOLUTION pH 7.00

Ec OF CALIBRATING SOLUTION N/A

Ec READING IN CALIBRATING SOLN. AFTER MEASUREMENT N/A

TEMP. OF CALIBRATION SOLN. (°C) N/A

## SHIPPING INFORMATION

LAB(S) SHIPPED TO: EOA

DATE(S) SHIPPED: 11/6/86

METHOD OF SHIPMENT: American Airlines

## NOTES:

$$\left(\frac{.33}{2}\right)^2 \pi (21.66 - 13.29) = .72 \times 7.5 = 5.37 \text{ gal/BV}$$

$$3 \text{ BV} = 16.11 \text{ gal}$$

$$4 \text{ gal} = .19 \text{ BV}$$



**ALKALINITY TITRATION GRAPH**

SITE ID: Can-01

LOCATION ID: 412

DATE: 11/6/86

ERROR AT 4.50:  $\left| \frac{X1 - X2}{X5} \right| \times 100 = \underline{\hspace{1cm}}\%$

1st = 1.4 %

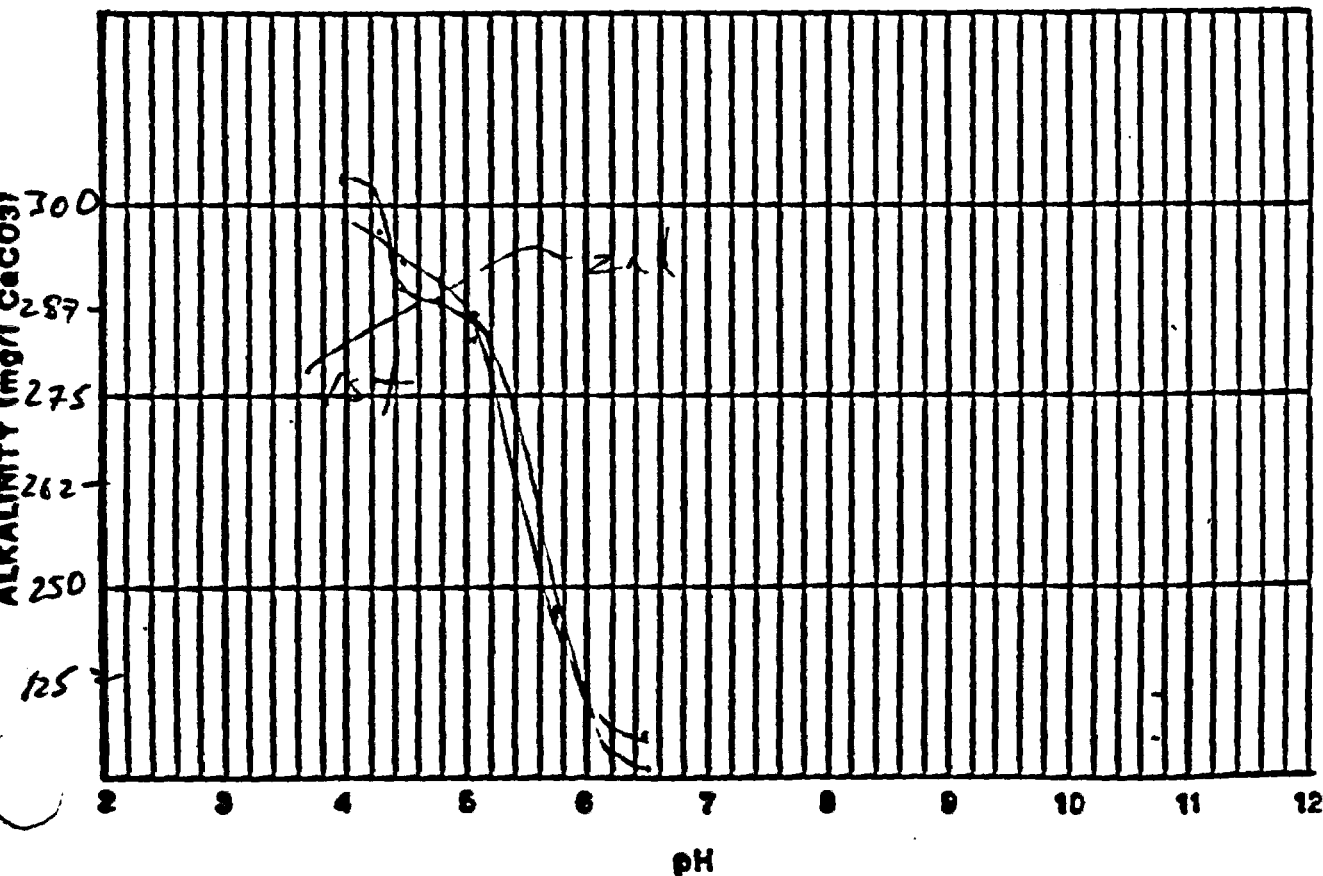
2nd =      %

PH CHECK AFTER TITRATION

7.00 = 6.98

4.00 = 4.01

pH	ALKALINITY (mg/l CaCO3)		
	1st	2nd	3rd
8.90	-		
8.60	-		
8.30	-		
8.05	-		
7.80	-		
7.50	-		
6.50	16	80	
5.70	241	240	
5.10	267	283	
4.80	288	288	
4.50	289	293	
4.25	302	294	
4.00	303	298	



**ATTACHMENT F**

**CONTRACT NO. ASD-34-6703-S-8-0027**

**ACKNOWLEDGEMENT OF RECEIPT OF SAMPLES FOR DELIVERY ORDER NO. AD 45**

**SITE ID:** Car-01

**LOCATION ID:** 412

**SAMPLE ID:** 01

**SAMPLE SHIPMENT LIST**

**Lot #** 1

<b>Bottle ID</b>	<b>Amount</b>	<b>Rec'd</b>	<b>Bottle ID</b>	<b>Amount</b>	<b>Rec'd</b>
A1	<u>2L</u>	( )	Th 230	<u>1L</u>	( )
A1-A	<u>      </u>	( )	G 1B	<u>      </u>	( )
M1	<u>      </u>	( )	N1	<u>1L</u>	( )
M1-A	<u>      </u>	( )	N2	<u>      </u>	( )
M2	<u>1L</u>	( )	CH	<u>1L</u>	( )
M2-A	<u>      </u>	( )	S	<u>1L</u>	( )
Pb 210	<u>1L</u>	( )	TOC	<u>1L</u>	( )
Po 210	<u>1L</u>	( )	TOX	<u>      </u>	( )
Ra 226	<u>2L</u>	( )	SiO2	<u>      </u>	( )
Ra 228	<u>2L</u>	( )	Alkalinity	<u>1L</u>	( )

**DATE SHIPPED:** 11/6/86

**METHOD OF SHIPMENT:** American Airlines

**COMMENTS:**

I hereby acknowledge receipt of the following on \_\_\_\_\_ (date)

( ) Delivery Order No. AD \_\_\_\_\_ (Work Order Plan) dated \_\_\_\_\_.

**Subcontractor:**

**Name:**

**Title:**

**Date:**

**Partial Analysis Due:** \_\_\_\_\_

**Complete Analysis Due:** \_\_\_\_\_

**COMMENTS:**

Delivery of Analysis in accordance with Exhibits B and C of the Subcontract is due no later than: Preliminary to JEG by: \_\_\_\_\_

**Date**

Complete to JEG by: \_\_\_\_\_

**Date**

**GROUND WATER SAMPLING RECORD**

Page 1 of 3

SITE ID: Can-01 FINAL FIELD VALUES: SURFACE DOWN-HOLE  
LOCATION ID: 413  
SAMPLE ID: 01 pH (S.U.): 6.59 N/A  
STATIC WATER LEVEL (FT) 7.03 Ec (umhos/cm) 1100 N/A  
SAMPLE DEPTH (FT) 10.0 Eh (millivolts) N/A N/A  
SAMPLING DATE 11/4/86 TEMP. (°C): 14 N/A  
SAMPLING TIME: ALKALINITY (mg/l CaCO<sub>3</sub>): 440 44.50  
START 12:15 p.m. LOCATION DESCRIPTION \_\_\_\_\_  
COMPLETE 3:15 p.m. \_\_\_\_\_

CONTAINER SIZE NONACIDIFIED (no.) ACIDIFIED (no.) VOL. ACID (ml)  
NUMBER OF ONE-LITER \_\_\_\_\_  
CONTAINERS COLLECTED: 150 ml See Attachment F  
50 ml \_\_\_\_\_

SPECIFY OTHERS: \_\_\_\_\_  
\_\_\_\_\_

COMMENTS: Titrate 1.6 N H<sub>2</sub>SO<sub>4</sub> Lot # 5127  
Belman Filter used

FIELD REP (S): Fritts / Althouse

DATE	TIME	TOTAL VOLUME WITHDRAWN		pH	Ec (umhos/cm)	TEMP. (°C)	COMMENTS
		(Gals)	(Bore Volumes)				
11/4	12:54	0.0	0.0	-	-	-	START PUMPING
	12:56	2.0	.5	6.64	1100	14	
	12:58	4.0	1.0	6.59	1100	14	pumped dry.
	1:50	-	-	-	-	-	Stop sampling nonfiltered
	2:50	-	-	-	-	-	Stop sampling filtered
							Well pumping dry while sampling.

# WATER QUALITY SAMPLING RECORD

## BORE VOL CALCULATION

$$(d/2)^2 \pi (h_1 - h_2)$$

Can -  $\phi 1$   
413

## SAMPLING INFORMATION

DEPTH TO WATER ( $h_2$ ) (FT.) 7.03  
DEPTH OF WELL ( $h_1$ ) (FT.) 13.21  
WELL DIA (FT.) .333  
BORE VOL. (FT.)<sup>3</sup> .53  
DEPTH TO SCREEN (FT.) 7'

WITHDRAWAL METHOD Thermon submersible  
SAMPLING METHOD Filtered  
FILTER SIZE 1.45  $\mu$   
THERMOMETER ID 12853  
EC METER ID 12853  
PH METER ID 389560  
PUMP ID 62

## CALIBRATION INFORMATION

DATE/TIME OF LAST EC CALIBRATION 10/24/86  
TIME OF PH CALIBRATION 1:00 pm  
PH AFTER MEASUREMENT 7.03 FOR STANDARD PH 7.00  
H AFTER MEASUREMENT 4.02 FOR STANDARD SOLUTION PH 4.05  
PH OF CALIBRATING SOLUTION N/A  
EH READING IN CALIBRATING SOLN. AFTER MEASUREMENT N/A  
TEMP. OF CALIBRATION SOLN. (°C) N/A

## SHIPPING INFORMATION

LAB(S) SHIPPED TO: EPA  
DATE(S) SHIPPED: 11/4/86  
METHOD OF SHIPMENT: American Airlines

## NOTES:

$$\left(\frac{.33}{2}\right)^2 \pi (13.21 - 7.03) = .53 \times 7.5 = 3.96 \text{ gal/bv}$$
$$3 \text{ BV} = 11.89 \text{ gal}$$
$$1 \text{ gal} = .258 \text{ BV}$$



JACOBS ENGINEERING GROUP INC.  
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

### ALKALINITY TITRATION GRAPH

SAMPLE ID: Ca1-01

LOCATION ID: 413

DATE: 11/4/86

ERROR AT 4.50:  $\left| \frac{X1 - X2}{X5} \right| \times 100 = \underline{\hspace{1cm}} \%$

1st = 6 %

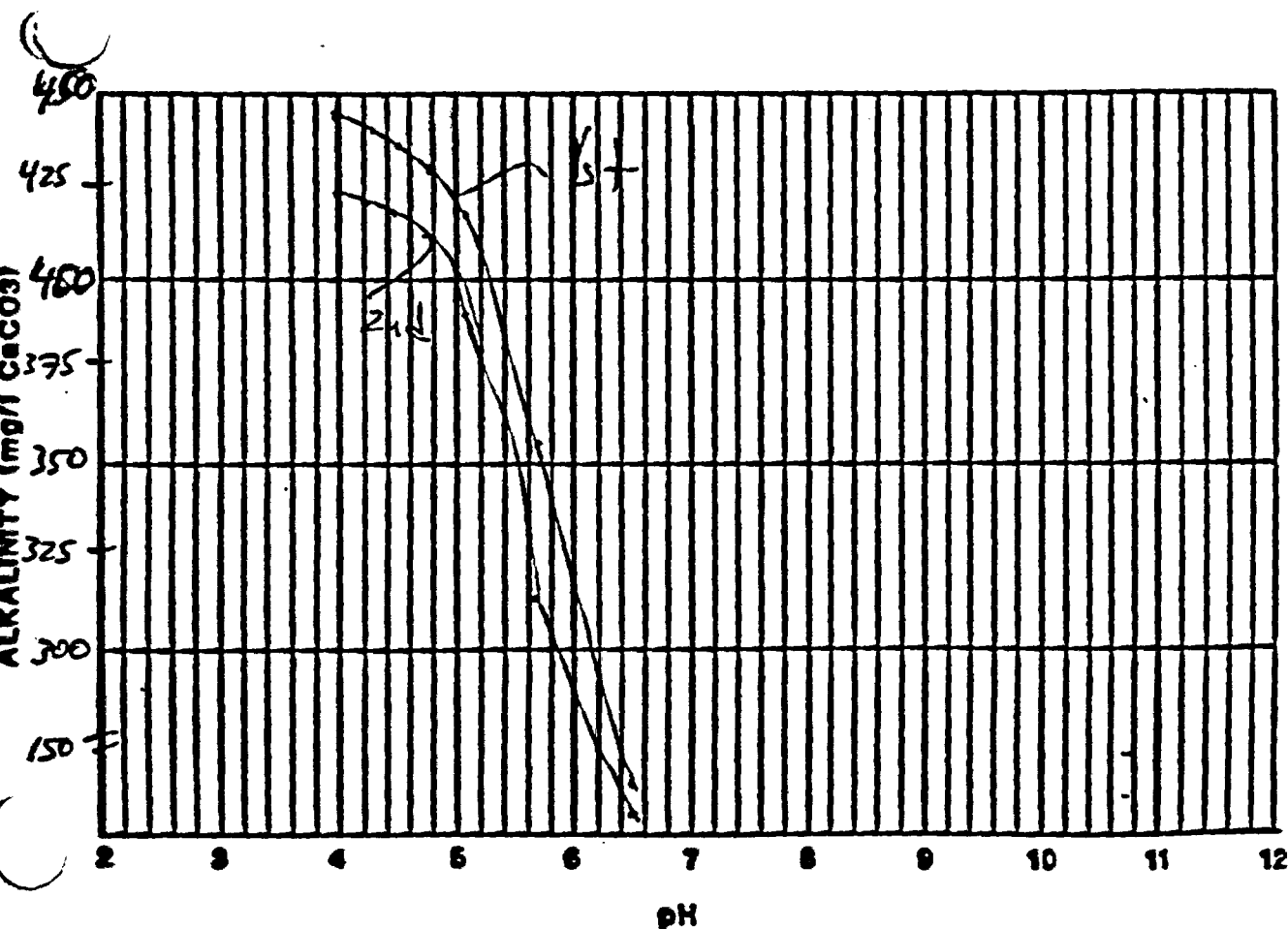
2nd =      %

pH CHECK AFTER TITRATION

7.00 = 7.03

4.00 = 4.02

pH	ALKALINITY (mg/l CaCO3)		
	1st	2nd	3rd
8.90			
8.60			
8.30			
8.05			
7.80			
7.50			
6.50	123	91	
5.70	355	312	
5.10	420	390	
4.80	435	410	
4.50	440	418	
4.25	444	418	
4.00	447	416	





**JACOBS ENGINEERING GROUP INC.**  
**ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS**

Page \_\_\_\_\_ of \_\_\_\_\_

**ATTACHMENT F**

**CONTRACT NO. ASD-34-6703-S-85-0027**

**ACKNOWLEDGEMENT OF RECEIPT OF SAMPLES FOR DELIVERY ORDER NO. AO 45**

**SITE ID:** Can-01

**LOCATION ID:** 413

**SAMPLE ID:** 01

**SAMPLE SHIPMENT LIST**

**Lot #** 1

<u>Bottle ID</u>	<u>Amount</u>	<u>Rec'd</u>	<u>Bottle ID</u>	<u>Amount</u>	<u>Rec'd</u>
Al	<u>2L</u>	<u>( )</u>	Th 230	<u>1L</u>	<u>( )</u>
Al-A	<u>      </u>	<u>( )</u>	G 18	<u>      </u>	<u>( )</u>
M1	<u>      </u>	<u>( )</u>	H1	<u>1L</u>	<u>( )</u>
M1-A	<u>      </u>	<u>( )</u>	H2	<u>      </u>	<u>( )</u>
M2	<u>1L</u>	<u>( )</u>	CN	<u>1L</u>	<u>( )</u>
M2-A	<u>      </u>	<u>( )</u>	S	<u>1L</u>	<u>( )</u>
Pb 210	<u>1L</u>	<u>( )</u>	TOC	<u>2.5L</u>	<u>( )</u>
Po 210	<u>1L</u>	<u>( )</u>	TOX	<u>      </u>	<u>( )</u>
Ra 226	<u>2L</u>	<u>( )</u>	S102	<u>      </u>	<u>( )</u>
Ra 228	<u>2L</u>	<u>( )</u>	Alkalinity	<u>1L</u>	<u>( )</u>

**DATE SHIPPED:** 11/4/86

**METHOD OF SHIPMENT:** American Airlines

**COMMENTS:** \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

I hereby acknowledge receipt of the following on \_\_\_\_\_  
(date)

( ) Delivery Order No. AO \_\_\_\_\_ (Work Order Plan) dated \_\_\_\_\_

**Subcontractor:** \_\_\_\_\_

**Name:** \_\_\_\_\_

**Title:** \_\_\_\_\_

**Date:** \_\_\_\_\_

**Partial Analysis Due:** \_\_\_\_\_

**Complete Analysis Due:** \_\_\_\_\_

**COMMENTS:** \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Delivery of Analysis in accordance with Exhibits B and C of the Subcontract is due no later than: Preliminary to JEG by: \_\_\_\_\_  
Date

Complete to JEG by: \_\_\_\_\_  
Date



**JACOBS ENGINEERING GROUP INC.**  
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

**GROUND WATER SAMPLING RECORD**

Page 1 of 3

SITE ID: Can-01 FINAL FIELD VALUES: 

	SURFACE	DOWN-HOLE
PH (S.U.):	<u>6.70</u>	<u>N/A</u>
Ec (umhos/cm)	<u>475</u>	<u>N/A</u>
Eh (millivolts)	<u>N/A</u>	<u>N/A</u>
TEMP. (°C):	<u>14</u>	<u>N/A</u>
ALKALINITY (mg/l CaCO <sub>3</sub> ):	<u>242</u>	<u>4.50</u>

LOCATION ID: 414

SAMPLE ID: \* 01

STATIC WATER LEVEL (FT) 6.98

SAMPLE DEPTH (FT) 13.0'

SAMPLING DATE 11/5/86

SAMPLING TIME: 10:00 A.M.

START 10:00 A.M.

COMPLETE 12:30 P.M.

LOCATION DESCRIPTION \_\_\_\_\_

CONTAINER SIZE NONACIDIFIED (no.) ACIDIFIED (no.) VOL. ACID (ml)

NUMBER OF  
CONTAINERS  
COLLECTED:

ONE-LITER

150 ml

50 ml

See Attachment F

SPECIFY OTHERS: \_\_\_\_\_

COMMENTS: Titrate 1.6 N H<sub>2</sub>SO<sub>4</sub> Lot #5133  
/ Gelman Filter used

FIELD REP (S): Fritts / Althouse

DATE	TIME	TOTAL VOLUME WITHDRAWN		PH	Ec (umhos/cm)	TEMP. (°C)	COMMENTS
		(Gals)	(Bore Volumes)				
11/5	10:32	0.0	0.0	-	-	-	START PUMPING
	10:34	2.0	<del>4.0</del> 3.6	6.48	400	13	
	10:37	5.0	.90	6.48	395	14	Adjust p/te for
	10:39	7.0	1.26	6.55	450	14	pump dry
	10:52	8.0	1.44	6.71	460	14	Restart at 10:51
	10:54	10.0	1.80	6.65	470	14	
	10:55	11.0	1.98	6.63	470	14	Pumped dry
	11:11	12.0	2.16	6.75	475	14	restart at 11:10
	11:12	13.0	2.34	6.70	475	14	pumped dry.
	11:30	-	-	-	-	-	Stop sampling nonfiltered
✓	11:50	-	-	-	-	-	Stop sampling filtered

## WATER QUALITY SAMPLING RECORD

**BORE VOL CALCULATION**  
 $(d/2)^2 \pi (h_1 - h_2)$

Can-Ø 1  
414

### SAMPLING INFORMATION

DEPTH TO WATER ( $h_2$ ) (FT.) 6.98  
DEPTH OF WELL ( $h_1$ ) (FT.) 15.45  
WELL DIA (FT.) .33  
BORE VOL. (FT.)<sup>3</sup> .72  
DEPTH TO SCREEN (FT.) 4.45

WITHDRAWAL METHOD Johnson submergible  
SAMPLING METHOD Filtered  
FILTER SIZE 45µ  
THERMOMETER ID 12853  
EC METER ID 12858  
PH METER ID 384560  
PUMP ID 62

### CALIBRATION INFORMATION

DATE/TIME OF LAST EC CALIBRATION 10/24/86  
TIME OF PH CALIBRATION 11:15 A.M.  
PH AFTER MEASUREMENT 3.98 FOR STANDARD PH 4.00  
H AFTER MEASUREMENT 7.01 FOR STANDARD SOLUTION PH 7.00  
EH OF CALIBRATING SOLUTION N/A  
EH READING IN CALIBRATING SOLN. AFTER MEASUREMENT N/A  
TEMP. OF CALIBRATION SOLN. (°C) N/A

### SHIPPING INFORMATION

LAB(S) SHIPPED TO: EDA  
DATE(S) SHIPPED: 11/5/86  
METHOD OF SHIPMENT: American Airlines

NOTES:  $\left(\frac{.33}{2}\right)^2 \pi (15.45 - 6.98) = .72 \times 7.5 = 5.43 \text{ gal/BU}$   
 $38 \text{ BU} = 16.3 \text{ gal}$   
 $1 \text{ gal} = .11 \text{ BU}$





JACOBS ENGINEERING GROUP INC.  
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

### ALKALINITY TITRATION GRAPH

SITE ID: 604-01

LOCATION ID: 414

DATE: 11/5/86

ERROR AT 4.50:  $\left| \frac{X1 - X2}{XS} \right| \times 100 = \underline{\hspace{1cm}}\%$

1st = 1.02%

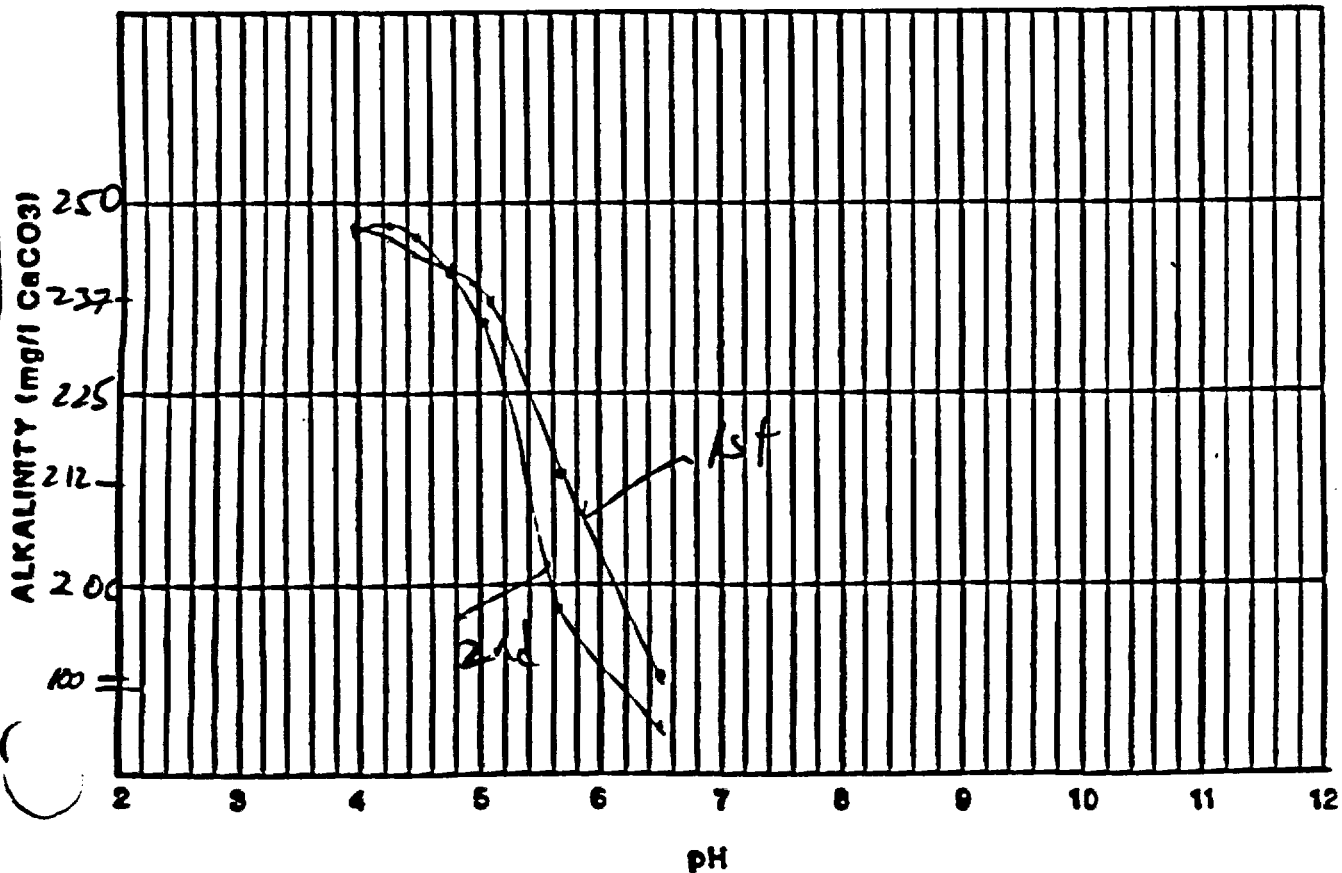
2nd =     %

pH CHECK AFTER TITRATION

7.00 = 6.99

4.00 = 4.00

pH	ALKALINITY (mg/l CaCO <sub>3</sub> )		
	1st	2nd	3rd
8.90			
8.60	—	—	
8.30	—	—	
8.05	—	—	
7.80	—	—	
7.50	—	—	
6.50	104	69	
5.70	213	195	
5.10	236	235	
4.80	240	240	
4.50	242	245	
4.25	245	246	
4.00	247	247	





ATTACHMENT F

CONTRACT NO. ASD-34-6703-S-850027

ACKNOWLEDGEMENT OF RECEIPT OF SAMPLES FOR DELIVERY ORDER NO. AD 45

SITE ID: Car-01

LOCATION ID: 414

SAMPLE ID: 01

SAMPLE SHIPMENT LIST

Lot # 1

Bottle ID	Amount	Rec'd	Bottle ID	Amount	Rec'd
A1	<u>2L</u>	( )	Th 230	<u>1L</u>	( )
A1-A	<u>      </u>	( )	G 1B	<u>      </u>	( )
M1	<u>      </u>	( )	N1	<u>1L</u>	( )
M1-A	<u>      </u>	( )	N2	<u>      </u>	( )
M2	<u>1L</u>	( )	CN	<u>1L</u>	( )
M2-A	<u>      </u>	( )	S	<u>1L</u>	( )
Pb 210	<u>1L</u>	( )	TOC	<u>0.5L</u>	( )
Po 210	<u>1L</u>	( )	TOX	<u>      </u>	( )
Ra 226	<u>2L</u>	( )	SiO2	<u>      </u>	( )
Ra 228	<u>2L</u>	( )	Alkalinity	<u>1L</u>	( )

DATE SHIPPED: 11/5/86

METHOD OF SHIPMENT: American Airlines

COMMENTS: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

I hereby acknowledge receipt of the following on \_\_\_\_\_ (date)

( ) Delivery Order No. AD \_\_\_\_\_ (Work Order Plan) dated \_\_\_\_\_.

Subcontractor:

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

Partial Analysis Due: \_\_\_\_\_

Complete Analysis Due: \_\_\_\_\_

COMMENTS: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Delivery of Analysis in accordance with Exhibits B and C of the Subcontract is due no later than: Preliminary to JEG by: \_\_\_\_\_

Date

Complete to JEG by: \_\_\_\_\_

Date



## Page 1 of 3

**FINAL FIELD VALUES:**

**SURFACE**

## DOWN-HOLE

**pH (S.U.):**

674

11/4

**Ec (μmhos/cm)**

800

N/A

**Eh (millivolts)**

11/5

11/4

**TEMP. (°C):**

14

N/A

**ALKALINITY (mg/l CaCO<sub>3</sub>):**

67.

455

### LOCATION DESCRIPTION

---

100

---

\_\_\_\_\_

CONTAINER SIZE	NONACIDIFIED (no.)	ACIDIFIED (no.)	VOL. ACID (ml)
100 ml	1	1	10
250 ml	1	1	25
500 ml	1	1	50
1000 ml	1	1	100
2000 ml	1	1	200
5000 ml	1	1	500
10000 ml	1	1	1000

**NUMBER OF  
CONTAINERS  
COLLECTED:**

## ONE-LITER

150 ml

60 ml

See Attachment F

**SPECIFY OTHERS:**

COMMENTS: Titrate 1.6 N  $H_2SO_4$ , Lot # 5153

Used / Gelman Filter.

FIELD REP (S): Fritts / Althouse

[illegible]

# WATER QUALITY SAMPLING RECORD

**BORE VOL CALCULATION**  
 $(d/2)^2 \pi (h_1 - h_2)$

Can-phi  
504

**SAMPLING INFORMATION**

DEPTH TO WATER ( $h_2$ ) (FT.) 13.03  
DEPTH OF WELL ( $h_1$ ) (FT.) 26.90  
WELL DIA (FT.) .167  
BORE VOL. (FT.)<sup>3</sup> .30  
DEPTH TO SCREEN (FT.) 19.90

WITHDRAWAL METHOD Johnson submersible  
SAMPLING METHOD Filtered  
FILTER SIZE 45u  
THERMOMETER ID 12853  
EC METER ID 384560/12853  
PH METER ID 384560  
PUMP ID 62

## CALIBRATION INFORMATION

DATE/TIME OF LAST EC CALIBRATION 10/24/86  
TIME OF PH CALIBRATION 9:45 AM  
PH AFTER MEASUREMENT 7.05 FOR STANDARD PH 7.00  
PH AFTER MEASUREMENT 4.02 FOR STANDARD SOLUTION PH 4.00  
EC OF CALIBRATING SOLUTION N/A  
EC READING IN CALIBRATING SOLN. AFTER MEASUREMENT N/A  
TEMP. OF CALIBRATION SOLN. (°C) N/A

## SHIPPING INFORMATION

LAB(S) SHIPPED TO: EOA  
DATE(S) SHIPPED: 11/17/86  
METHOD OF SHIPMENT: American Airlines

## NOTES:

$$\left(\frac{.167}{2}\right)^2 \pi (26.90 - 13.03) = .30 \times 7.5 = 2.25 \text{ gal/PU}$$
$$3 \text{ BU} = 6.84 \text{ gal}$$
$$1 \text{ gal} = .44 \text{ BU}$$



JACOBS ENGINEERING GROUP INC.  
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

### ALKALINITY TITRATION GRAPH

SITE ID: Can-phi

LOCATION ID: 504

DATE: 11/4/86

ERROR AT 4.50:  $\left| \frac{X1 - X2}{X5} \right| \times 100 = \underline{\quad\quad\quad} \%$

1st = 34 %

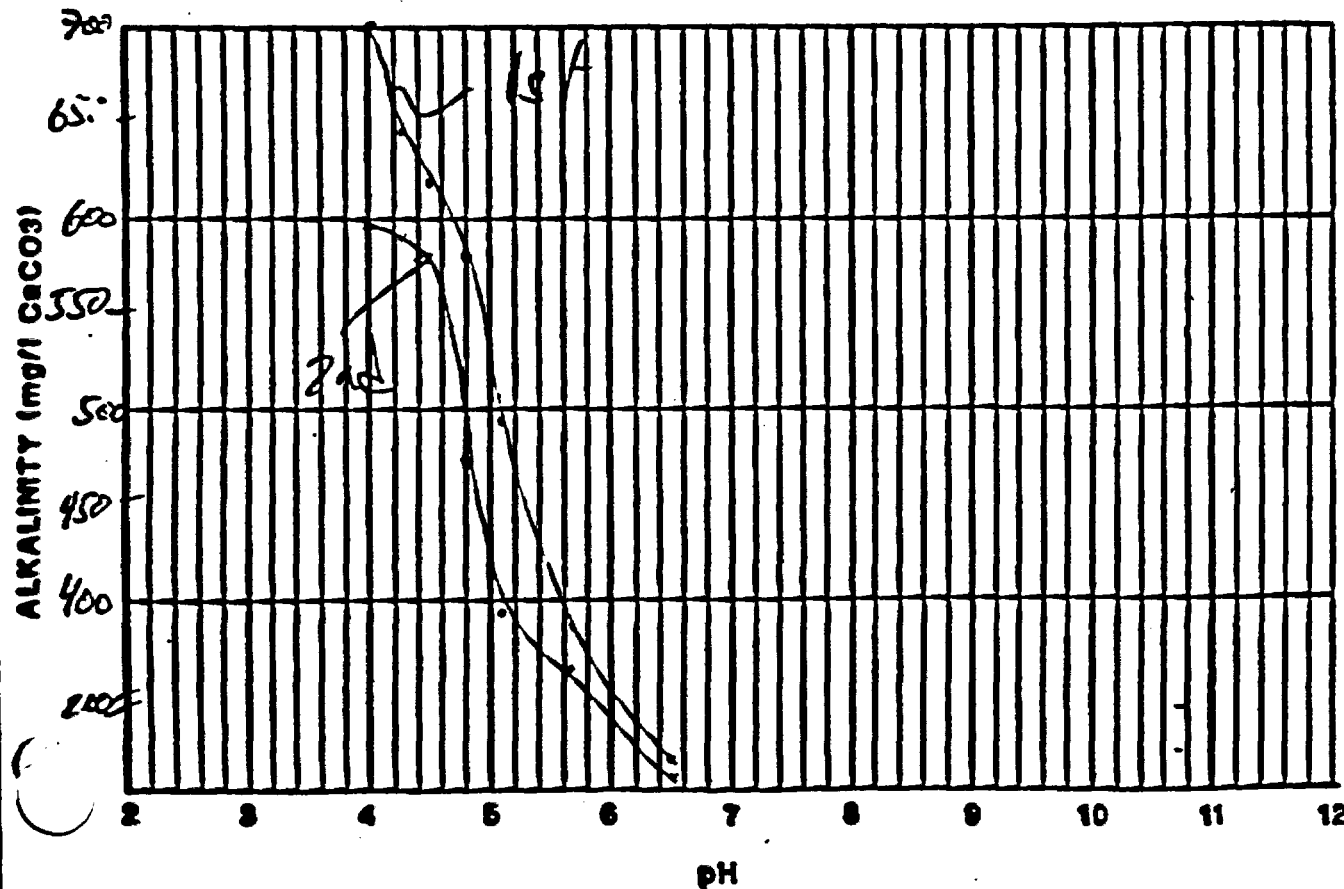
2nd = 9 %

pH CHECK AFTER TITRATION

7.00 = 7.03

4.00 = 4.00

pH	ALKALINITY (mg/l CaCO <sub>3</sub> )		
	1st	2nd	3rd
8.90	—	✓	✓
8.60	—	—	—
8.30	—	—	—
8.05	—	—	—
7.80	—	—	—
7.50	—	—	—
6.50	62	89	62
5.70	265	349	300
5.10	367	494	391
4.80	410	577	460
4.50	465	622	570
4.25	495	650	580
4.00	510	700	593





# JACOBS ENGINEERING GROUP INC.

ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

Page \_\_\_\_\_ of \_\_\_\_\_

## ATTACHMENT F

CONTRACT NO. ASD-34-6703-S-85-0027

ACKNOWLEDGEMENT OF RECEIPT OF SAMPLES FOR DELIVERY ORDER NO. AD 45

SITE ID: Caq-01

LOCATION ID: 504

SAMPLE ID: 01

### SAMPLE SHIPMENT LIST

Lot # 1

Bottle ID	Amount	Rec'd	Bottle ID	Amount	Rec'd
A1	<u>2L</u>	<u>( )</u>	Th 230	<u>1L</u>	<u>( )</u>
A1-A	<u>      </u>	<u>( )</u>	G 18	<u>      </u>	<u>( )</u>
M1	<u>      </u>	<u>( )</u>	N1	<u>1L</u>	<u>( )</u>
M1-A	<u>      </u>	<u>( )</u>	N2	<u>      </u>	<u>( )</u>
M2	<u>1L</u>	<u>( )</u>	CN	<u>1L</u>	<u>( )</u>
M2-A	<u>      </u>	<u>( )</u>	S	<u>1L</u>	<u>( )</u>
Pb 210	<u>1L</u>	<u>( )</u>	TOC	<u>.5L</u>	<u>( )</u>
Po 210	<u>1L</u>	<u>( )</u>	TOX	<u>      </u>	<u>( )</u>
Ra 226	<u>2L</u>	<u>( )</u>	SiO2	<u>      </u>	<u>( )</u>
Ra 228	<u>2L</u>	<u>( )</u>	Alkalinity	<u>.1L</u>	<u>      </u>

DATE SHIPPED: 11/4/86

METHOD OF SHIPMENT: American Airlines

COMMENTS: \_\_\_\_\_

I hereby acknowledge receipt of the following on \_\_\_\_\_ (date)

( ) Delivery Order No. AD \_\_\_\_\_ (Work Order Plan) dated \_\_\_\_\_.

Subcontractor:

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

Partial Analysis Due: \_\_\_\_\_

Complete Analysis Due: \_\_\_\_\_

COMMENTS: \_\_\_\_\_

Delivery of Analysis in accordance with Exhibits B and C of the Subcontract is due no later than: Preliminary to JEG by: \_\_\_\_\_

Date

Complete to JEG by: \_\_\_\_\_

Date

## Page 1 of 3

SURFACE	DOWN-HOLE
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10
11	11
12	12
13	13
14	14
15	15
16	16
17	17
18	18
19	19
20	20
21	21
22	22
23	23
24	24
25	25
26	26
27	27
28	28
29	29
30	30
31	31
32	32
33	33
34	34
35	35
36	36
37	37
38	38
39	39
40	40
41	41
42	42
43	43
44	44
45	45
46	46
47	47
48	48
49	49
50	50
51	51
52	52
53	53
54	54
55	55
56	56
57	57
58	58
59	59
60	60
61	61
62	62
63	63
64	64
65	65
66	66
67	67
68	68
69	69
70	70
71	71
72	72
73	73
74	74
75	75
76	76
77	77
78	78
79	79
80	80
81	81
82	82
83	83
84	84
85	85
86	86
87	87
88	88
89	89
90	90
91	91
92	92
93	93
94	94
95	95
96	96
97	97
98	98
99	99
100	100

**pH (S.U.):**

**Ec (umhos/cm)**

**Eh (millivolts)**

TEMP. (°C):

ALKALINITY (mg/l  $\text{CaCO}_3$ ): 578 at 4.50

### LOCATION DESCRIPTION

COMPLETE 2:00 a.m.

CONTAINER SIZE	NONACIDIFIED (no.)	ACIDIFIED (no.)	VOL. ACID (ml)
100 ml	1	1	10
250 ml	1	1	25
500 ml	1	1	50
1000 ml	1	1	100
2000 ml	1	1	200
5000 ml	1	1	500
10000 ml	1	1	1000

## ONE-LITER

**150 ml**

SEE ATTACHMENT F

50 ml

**SPECIFY OTHERS:**

COMMENTS: TITRATE 1.6N LOT 5133

2 Gelman Filters used	Collected split labeled
Note: pump rate 1 gal/min.	416, 417, 418, 419

FIELD REP (S): Fritts/Althouse

JEG-AL-ENG-12 (2/85)

# WATER QUALITY SAMPLING RECORD

## BORE VOL CALCULATION

$$(d/2)^2 \pi (h_1 - h_2)$$

CAN #1  
505

## SAMPLING INFORMATION

DEPTH TO WATER ( $h_2$ ) (FT.) 7.98  
 DEPTH OF WELL ( $h_1$ ) (FT.) 37.51  
 WELL DIA (FT.) .167  
 BORE VOL. (FT.)<sup>3</sup> .65  
 DEPTH TO SCREEN (FT.) 25.40

WITHDRAWAL METHOD THOMSON SURVEILLANCE  
 SAMPLING METHOD FILTERED  
 FILTER SIZE .45μ  
 THERMOMETER ID YST  
 EC METER ID 12853  
 PH METER ID 384560  
 PUMP ID 62

## CALIBRATION INFORMATION

DATE/TIME OF LAST EC CALIBRATION 86/24/10  
 TIME OF PH CALIBRATION 12:11  
 PH AFTER MEASUREMENT 7.01 FOR STANDARD PH 7.00  
 PH AFTER MEASUREMENT 10.00 FOR STANDARD SOLUTION PH 10.00  
 EH OF CALIBRATING SOLUTION N/A  
 EH READING IN CALIBRATING SOLN. AFTER MEASUREMENT N/A  
 TEMP. OF CALIBRATION SOLN. (°C) N/A

## SHIPPING INFORMATION

LAB(S) SHIPPED TO: EDA  
 DATE(S) SHIPPED: 11/2/86  
 METHOD OF SHIPMENT: American Airlines

NOTES:  $\left(\frac{.167}{2}\right)^2 \pi (37.51 - 7.98) = .65 \times 7.5 = 4.85 \text{ gal/BU}$   
 $38 \text{ BU} = 14.6 \text{ gal}$   
 $1 \text{ gal} = .21 \text{ BU}$





JACOBS ENGINEERING GROUP INC.  
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

### ALKALINITY TITRATION GRAPH

SITE ID: CAN 01

LOCATION ID: 505

DATE: 86/3/11

ERROR AT 4.50:  $\left| \frac{X1 - X2}{X5} \right| \times 100 = \underline{\hspace{1cm}} \%$

1st 3.8 %

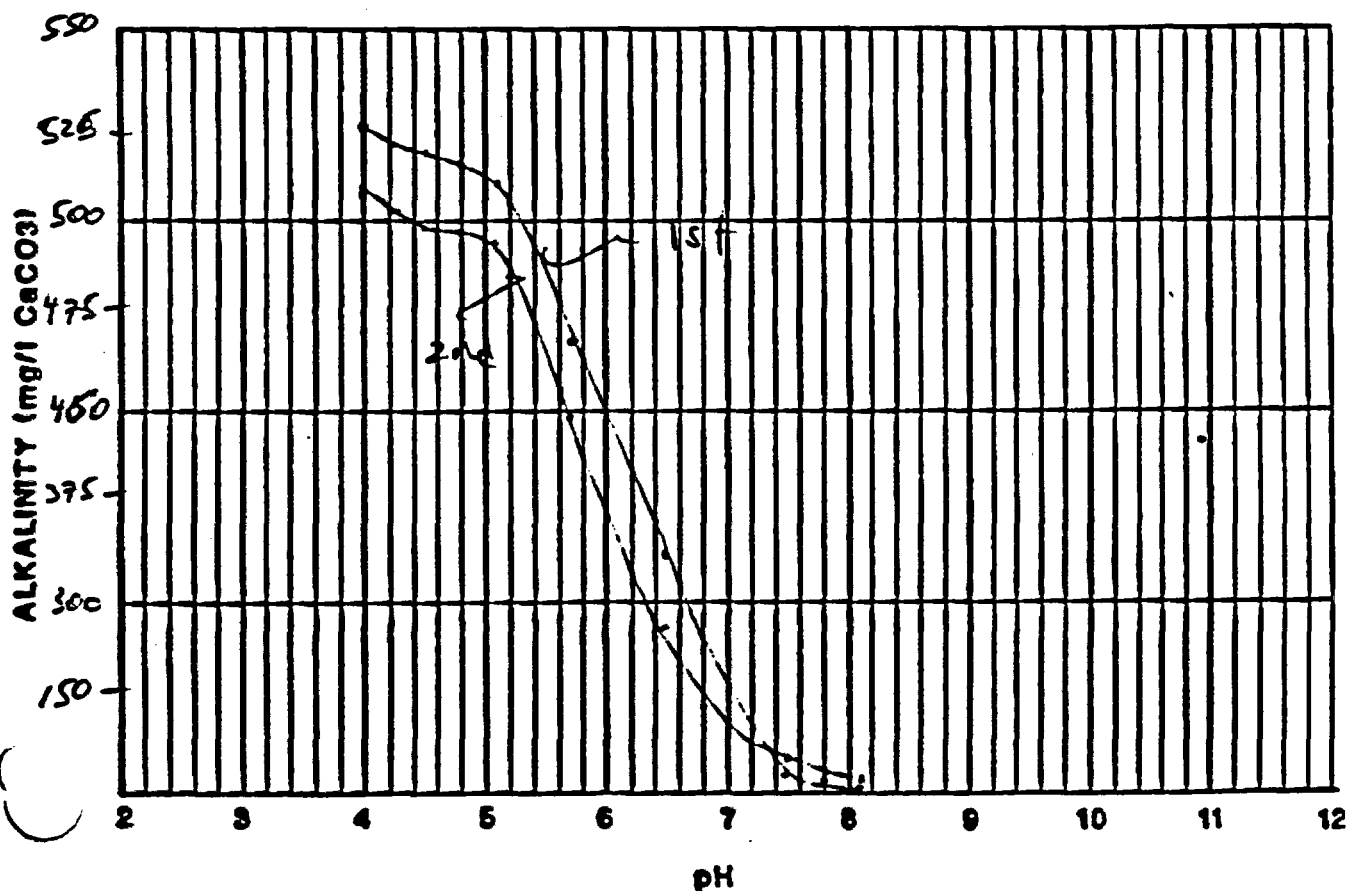
2nd =      %

pH CHECK AFTER TITRATION

7.00 = 7.05

4.00 = 4.05

pH	ALKALINITY (mg/l CaCO <sub>3</sub> )		
	1st	2nd	3rd
8.90			
8.60			
8.30			
8.05	12	13	
7.80	15	23	
7.50	30	37	
6.50	335	275	
5.70	468	449	
5.10	506	492	
4.80	511	498	
4.50	518	499	
4.25	522	504	
4.00	527	509	





**JACOBS ENGINEERING GROUP INC.** Page \_\_\_\_\_ of \_\_\_\_\_  
**ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS**

**ATTACHMENT F**

**CONTRACT NO. ASD-34-6703-S-85-0026**

**ACKNOWLEDGEMENT OF RECEIPT OF SAMPLES FOR DELIVERY ORDER NO. AD 45**

**SITE ID:** Can-01

**LOCATION ID:** SDS

**SAMPLE ID:** 01

**SAMPLE SHIPMENT LIST**

**Lot #** 1

<b>Bottle ID</b>	<b>Amount</b>	<b>Rec'd</b>	<b>Bottle ID</b>	<b>Amount</b>	<b>Rec'd</b>
A1	<u>2L</u>	( )	Th 230	<u>1L</u>	( )
A1-A	<u>      </u>	( )	G 18	<u>      </u>	( )
M1	<u>      </u>	( )	N1	<u>1L</u>	( )
M1-A	<u>      </u>	( )	N2	<u>      </u>	( )
M2	<u>1L</u>	( )	CN	<u>1L</u>	( )
M2-A	<u>      </u>	( )	S	<u>1L</u>	( )
Pb 210	<u>1L</u>	( )	TOC	<u>.5L</u>	( )
Po 210	<u>1L</u>	( )	TOX	<u>      </u>	( )
Ra 226	<u>2L</u>	( )	S102	<u>      </u>	( )
Ra 228	<u>2L</u>	( )	Alkalinity	<u>1L</u>	( )

**DATE SHIPPED:** 11/3/86

**METHOD OF SHIPMENT:** American Airtel

**COMMENTS:**

Also collected split labeled  
416, 417, 418, 419

I hereby acknowledge receipt of the following on \_\_\_\_\_  
(date)

( ) Delivery Order No. AD \_\_\_\_ (Work Order Plan) dated \_\_\_\_\_.

**Subcontractor:**

**Name:** \_\_\_\_\_

**Title:** \_\_\_\_\_

**Date:** \_\_\_\_\_

**Partial Analysis Due:** \_\_\_\_\_

**Complete Analysis Due:** \_\_\_\_\_

**COMMENTS:**

Delivery of Analysis in accordance with Exhibits B and C of the Subcontract is due no later than: Preliminary to JEG by: \_\_\_\_\_

**Date**

**Complete to JEG by:** \_\_\_\_\_

**Date**

# GROUND WATER SAMPLING RECORD

Page 1 of 3

SITE ID: <u>Can - 01</u>		FINAL FIELD VALUES:	
LOCATION ID: <u>506</u>		<u>SURFACE</u>	<u>DOWN-HOLE</u>
SAMPLE ID: <u>01</u>	pH (S.U.):	<u>6.99</u>	<u>N/A</u>
STATIC WATER LEVEL (FT) <u>13.71</u>	Ec (umhos/cm)	<u>2850</u>	<u>N/A</u>
SAMPLE DEPTH (FT) <u>25.0'</u>	Eh (millivolts)	<u>N/A</u>	<u>N/A</u>
SAMPLING DATE <u>11/6/86</u>	TEMP. (°C):	<u>14</u>	<u>N/A</u>
SAMPLING TIME:	ALKALINITY (mg/l CaCO <sub>3</sub> ):	<u>432</u>	<u>at 4.50</u>
START <u>8:40 A.M.</u>	LOCATION DESCRIPTION		
COMPLETE <u>11:30 A.M.</u>			

CONTAINER SIZE	NONACIDIFIED (no.)	ACIDIFIED (no.)	VOL. ACID (ml)
100 ml	1	1	10
250 ml	1	1	25
500 ml	1	1	50
1000 ml	1	1	100
2000 ml	1	1	200
5000 ml	1	1	500
10000 ml	1	1	1000

**NUMBER OF  
CONTAINERS  
COLLECTED:**

## ONE-LITER

150 ml

60 ml

See Attachment F

**SPECIFY OTHERS:**

COMMENTS: Titrate 1.6 N  $H_2SO_4$   
1 Gelman Filter used  
- Quality Analysis by Tim Graff  
FIELD REP (S): Fritts/Althouse

FIELD REP(S): Fritts / Althouse

[illegible]

## WATER QUALITY SAMPLING RECORD

**BORE VOL CALCULATION**  
 $(d/2)^2 \pi (h_1 - h_2)$

Can -  $\phi 1$   
506

**SAMPLING INFORMATION**

DEPTH TO WATER ( $h_2$ ) (FT.) 17.71  
DEPTH OF WELL ( $h_1$ ) (FT.) 26.96  
WELL DIA (FT.) .167  
BORE VOL. (FT.)<sup>3</sup> .20  
DEPTH TO SCREEN (FT.) 20.95

WITHDRAWAL METHOD Johanson submersible  
SAMPLING METHOD Filtered  
FILTER SIZE .45u  
THERMOMETER ID 12 P53  
EC METER ID 12 P53  
PH METER ID 384560  
PUMP ID 62

### CALIBRATION INFORMATION

DATE/TIME OF LAST EC CALIBRATION 10/24/86  
TIME OF PH CALIBRATION 10:20 A.M.  
PH AFTER MEASUREMENT 4.00 FOR STANDARD PH 4.00  
PH AFTER MEASUREMENT 7.00 FOR STANDARD SOLUTION PH 7.00  
EH OF CALIBRATING SOLUTION N/A  
EH READING IN CALIBRATING SOLN. AFTER MEASUREMENT N/A  
TEMP. OF CALIBRATION SOLN. (°C) N/A

### SHIPPING INFORMATION

LAB(S) SHIPPED TO: EPA  
DATE(S) SHIPPED: 1/16/86  
METHOD OF SHIPMENT: American Airlines

### NOTES:

$$\left(\frac{.167}{2}\right)^2 \pi (26.96 - 17.71) = .20 \times 7.5 = 1.52 \text{ gal/BV}$$
$$3 \text{ BV} = 4.56$$
$$1 \text{ gal} = .66 \text{ BV}$$



JACOBS ENGINEERING GROUP INC.  
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

### ALKALINITY TITRATION GRAPH

TEST ID: Can-01

LOCATION ID: 506

DATE: 11/6/86

ERROR AT 4.50:  $\left| \frac{X1 - X2}{X5} \right| \times 100 = \underline{\hspace{1cm}} \%$

1st N/A %

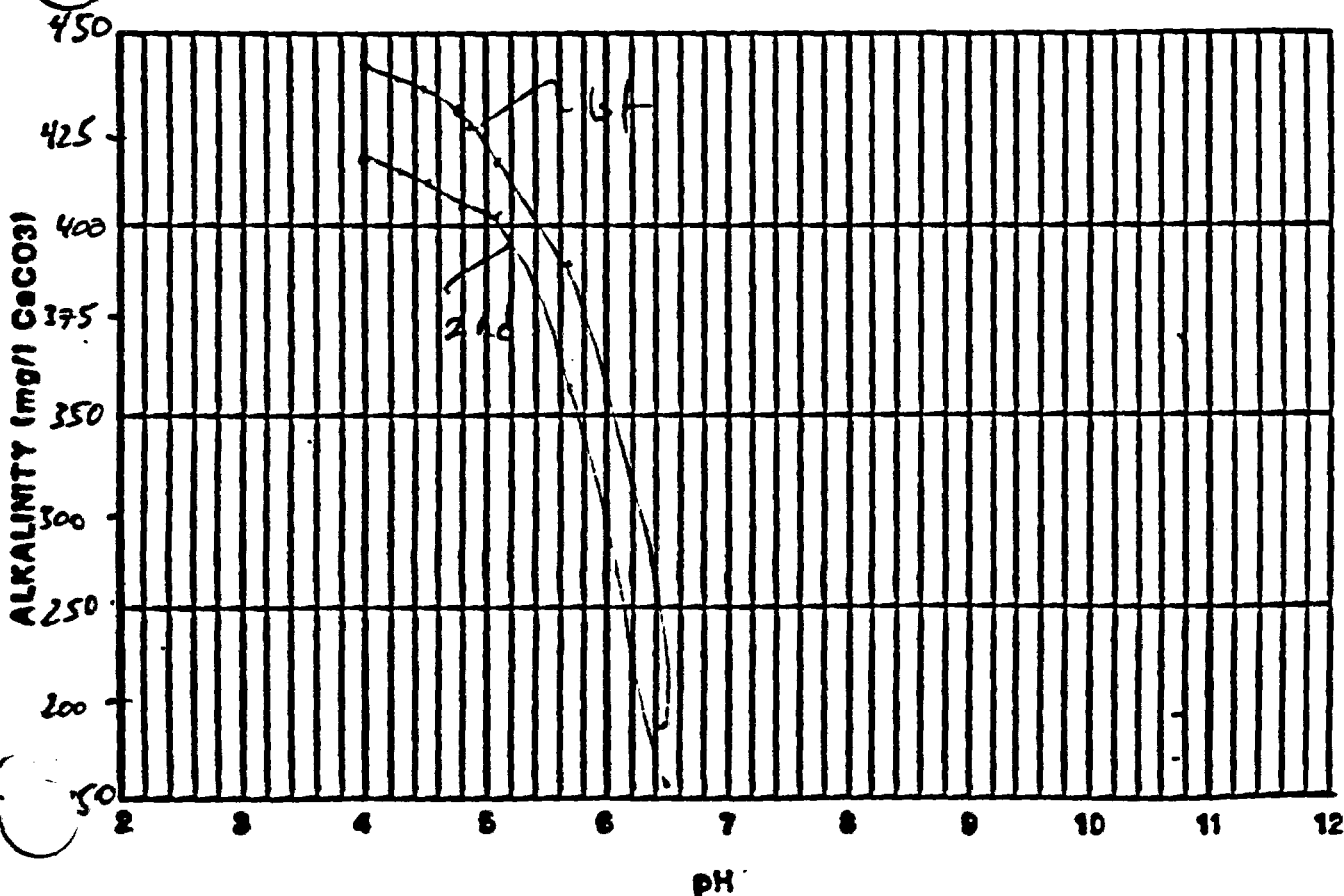
2nd 5.4 %

PH CHECK AFTER TITRATION

7.00 = 7.05

4.00 = 4.03

pH	ALKALINITY (mg/l CaCO3)		
	1st	2nd	3rd
8.80	—	—	—
8.60	—	—	—
8.30	—	—	—
8.05	—	—	—
7.80	—	—	—
7.60	—	—	—
6.50	196	178	159
5.70	386	342	356
5.10	419	379	401
4.80	428	402	402
4.50	432	—	410
4.25	433	—	411
4.00	437	411	412





JACOBS ENGINEERING GROUP INC. Page \_\_\_\_\_ of \_\_\_\_\_  
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

ATTACHMENT F

CONTRACT NO. ASD-34-6703-S-85-0027

ACKNOWLEDGEMENT OF RECEIPT OF SAMPLES FOR DELIVERY ORDER NO. AD 45

SITE ID: Can-01 LOCATION ID: 506 SAMPLE ID: 01

SAMPLE SHIPMENT LIST

Lot # 1

Bottle ID	Amount	Rec'd	Bottle ID	Amount	Rec'd
A1	<u>2L</u>	<u>( )</u>	Th 230	<u>1L</u>	<u>( )</u>
A1-A	<u>      </u>	<u>( )</u>	G 1B	<u>      </u>	<u>( )</u>
M1	<u>      </u>	<u>( )</u>	N1	<u>1L</u>	<u>( )</u>
M1-A	<u>      </u>	<u>( )</u>	N2	<u>      </u>	<u>( )</u>
M2	<u>1L</u>	<u>( )</u>	CN	<u>1L</u>	<u>( )</u>
M2-A	<u>      </u>	<u>( )</u>	S	<u>1L</u>	<u>( )</u>
Pb 210	<u>1L</u>	<u>( )</u>	TOC	<u>.5L</u>	<u>( )</u>
Po 210	<u>1L</u>	<u>( )</u>	TOX	<u>      </u>	<u>( )</u>
Ra 226	<u>2L</u>	<u>( )</u>	S102	<u>      </u>	<u>( )</u>
Ra 228	<u>2L</u>	<u>( )</u>	Alkalinity	<u>.1L</u>	<u>( )</u>

DATE SHIPPED: 11/6/86 METHOD OF SHIPMENT: American Airlines

COMMENTS: \_\_\_\_\_

I hereby acknowledge receipt of the following on \_\_\_\_\_ (date)

( ) Delivery Order No. AD \_\_\_\_\_ (Work Order Plan) dated \_\_\_\_\_

Subcontractor: \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

Partial Analysis Due: \_\_\_\_\_ Complete Analysis Due: \_\_\_\_\_

COMMENTS: \_\_\_\_\_

Delivery of Analysis in accordance with Exhibits B and C of the Subcontract is due no later than: Preliminary to JEG by: \_\_\_\_\_

Date

Complete to JEG by: \_\_\_\_\_

Date



JACOBS ENGINEERING GROUP INC.  
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

# GROUND WATER SAMPLING RECORD

Page 1 of 3

SITE ID: Can-p1

FINAL FIELD VALUES:

LOCATION ID: 410

SAMPLE ID: 01

STATIC WATER LEVEL (FT) 9.44

SAMPLE DEPTH (FT) 14.0

SAMPLING DATE 11/28/82

SAMPLING TIME:

START 9:30 A.M.

COMPLETE 3:20 P.M.

pH (S.U.):

Ec (umhos/cm)

Sh (millivolts)

TEMP. (°C):

ALKALINITY (mg/l CaCO<sub>3</sub>): 82 at 4.50

LOCATION DESCRIPTION

SURFACE DOWN-HOLE

6.22 N/A

380

N/A

9 11

CONTAINER SIZE NONACIDIFIED (no.) ACIDIFIED (no.) VOL. ACID (ml)

NUMBER OF CONTAINERS COLLECTED:

ONE-LITER

150 ml

50 ml

See Attachment F

SPECIFY OTHERS:

COMMENTS: Titrate 1.6 N H<sub>2</sub>SO<sub>4</sub> Lot #5133

1 Gelman Filter used

FIELD REP (S): Fritts / Althouse

DATE	TIME	TOTAL VOLUME WITHDRAWN		pH	Ec (umhos/cm)	TEMP. (°C)	COMMENTS
		(Gals)	(Bore Volumes)				
<u>11/28</u>	<u>9:45</u>	<u>0.0</u>	<u>0.0</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>START PUMPING</u>
	<u>10:00</u>	<u>1.0</u>	<u>.24</u>	<u>6.30</u>	<u>350</u>	<u>9</u>	
	<u>10:10</u>	<u>3.0</u>	<u>.72</u>	<u>6.22</u>	<u>380</u>	<u>9</u>	<u>check pH meter</u>
	<u>10:20</u>	<u>5.0</u>	<u>1.20</u>	<u>6.22</u>	<u>380</u>	<u>9</u>	<u>bailed dry</u>
	<u>2:45</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>return to sample</u>
							<u>static at 11.86</u>
	<u>3:05</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>Stop sampling nonfiltered</u>
	<u>3:15</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>Stop sampling filtered</u>

# WATER QUALITY SAMPLING RECORD

**BORE VOL CALCULATION**  
 $(d/2)^2 \pi (h_1 - h_2)$

Can- $\phi$ 1  
 410

**SAMPLING INFORMATION**

DEPTH TO WATER ( $h_2$ ) (FT.) 9.44  
 DEPTH OF WELL ( $h_1$ ) (FT.) 15.78  
 WELL DIA (FT.) .33  
 BORE VOL. (FT.)<sup>3</sup> .55  
 DEPTH TO SCREEN (FT.) 15' 2"

WITHDRAWAL METHOD bailer  
 SAMPLING METHOD Filtered  
 FILTER SIZE .45u  
 THERMOMETER ID 12237  
 EC METER ID 12237  
 PH METER ID Worlon ID# RFW-01329  
 PUMP ID bailer

## CALIBRATION INFORMATION

DATE/TIME OF LAST EC CALIBRATION 1/20/87  
 TIME OF PH CALIBRATION 10:21 A.M.  
 PH AFTER MEASUREMENT 7.03 FOR STANDARD PH 4.00  
 PH AFTER MEASUREMENT 4.04 FOR STANDARD SOLUTION PH 7.00  
 pH OF CALIBRATING SOLUTION N/A  
 Eh READING IN CALIBRATING SOLN. AFTER MEASUREMENT ↓  
 TEMP. OF CALIBRATION SOLN. (°C) ↓

## SHIPPING INFORMATION

LAB(S) SHIPPED TO: EPA  
 DATE(S) SHIPPED: 1/20/87  
 METHOD OF SHIPMENT: American Airmail

## NOTES:

$$\left(\frac{.33}{2}\right)^2 \pi (15.78 - 9.44) = .55 \times 7.5 = 4.14 \text{ gal/bu}$$

$$3 \text{ BU} = 12.42 \text{ gal}$$

$$1 \text{ gal} = .24 \text{ BU}$$





JACOBI ENGINEERING GROUP INC.  
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

### ALKALINITY TITRATION GRAPH

SITE ID: Can-01

LOCATION ID: 410

DATE: 1/26/87

MMWH AT 6.00:  $\left| \frac{A - B}{K_8} \right| \times 100 = \underline{\quad\quad\quad} \%$

1st = 3.8 %

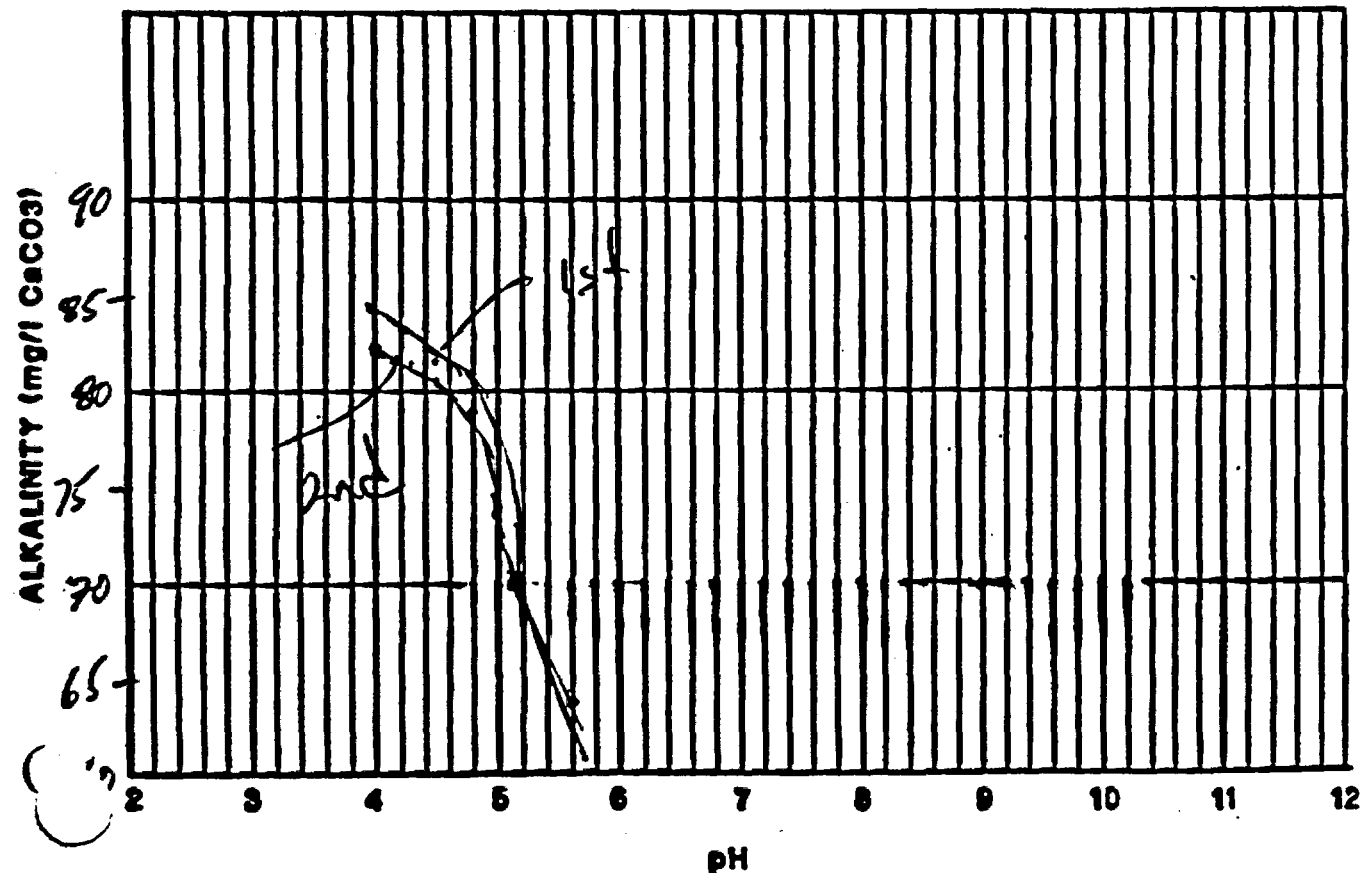
2nd =      %

pH CHECK AFTER TITRATION

7.00 = 7.04

4.00 = 4.04

pH	ALKALINITY (mg/l CaCO <sub>3</sub> )		
	1st	2nd	3rd
8.00			
8.05			
8.10			
8.20			
8.30			
8.40			
8.50			
8.60			
8.70			
8.80			
8.90			
9.00			
9.10			
9.20			
9.30			
9.40			
9.50			
9.60			
9.70			
9.80			
9.90			
10.00			
10.10			
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10.70			
10.80			
10.90			
11.00			
11.10			
11.20			
11.30			
11.40			
11.50			
11.60			
11.70			
11.80			
11.90			
12.00			





**JACOBS ENGINEERING GROUP INC.** Page \_\_\_\_\_ of \_\_\_\_\_  
**ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS**

**ATTACHMENT F**

**CONTRACT NO. ASD-34-6703-S-850027**

**ACKNOWLEDGEMENT OF RECEIPT OF SAMPLES FOR DELIVERY ORDER NO. AO 49**

**SITE ID:** Can-p1

**LOCATION ID:** 410

**SAMPLE ID:** 01

**SAMPLE SHIPMENT LIST**

Lot 1

<u>Bottle ID</u>	<u>Amount</u>	<u>Rec'd.</u>	<u>Bottle ID</u>	<u>Amount</u>	<u>Rec'd</u>
A1	<u>2L</u>	<u>( )</u>	Th 230		<u>( )</u>
A1-A	<u>      </u>	<u>( )</u>	G 1B	<u>0.5L</u>	<u>( )</u>
M1	<u>      </u>	<u>( )</u>	N1	<u>1L</u>	<u>( )</u>
M1-A	<u>      </u>	<u>( )</u>	N2	<u>      </u>	<u>( )</u>
M2	<u>1L</u>	<u>( )</u>	CN	<u>      </u>	<u>( )</u>
M2-A	<u>      </u>	<u>( )</u>	S	<u>      </u>	<u>( )</u>
Pb 210	<u>      </u>	<u>( )</u>	TOC	<u>0.5L</u>	<u>( )</u>
Po 210	<u>      </u>	<u>( )</u>	TOX	<u>      </u>	<u>( )</u>
Ra 226	<u>2L</u>	<u>( )</u>	S102	<u>      </u>	<u>( )</u>
Ra 228	<u>2L</u>	<u>( )</u>	Alkalinity	<u>0.1L</u>	

**DATE SHIPPED:** 1/21/87

**METHOD OF SHIPMENT:** American Airlines

**COMMENTS:**

I hereby acknowledge receipt of the following on \_\_\_\_\_ (date)

( ) Delivery Order No. AO \_\_\_\_\_ (Work Order Plan) dated \_\_\_\_\_.

**Subcontractor:**

**Name:**

**Title:**

**Date:**

**Partial Analysis Due:** \_\_\_\_\_

**Complete Analysis Due:** \_\_\_\_\_

**COMMENTS:**

Delivery of Analysis in accordance with Exhibits B and C of the Subcontract is due no later than: Preliminary to JEG by: \_\_\_\_\_

**Date**

**Complete to JEG by:** \_\_\_\_\_

**Date**

**GROUND WATER SAMPLING RECORD**

Page 1 of 3

SITE ID: Ean-01 FINAL FIELD VALUES: SURFACE DOWN-HOLE  
LOCATION ID: 412  
SAMPLE ID: \* 01 pH (S.U.): 6.22 N/A  
STATIC WATER LEVEL (FT) 12.50 Ec (umhos/cm) 1150 ↓  
SAMPLE DEPTH (FT) 20.0 Eh (millivolts) N/A ↓  
SAMPLING DATE 1/29/87 TEMP. (°C): 12.5 ↓  
SAMPLING TIME: ALKALINITY (mg/l CaCO<sub>3</sub>): 362 at 4.50  
START 8:15 A.M. LOCATION DESCRIPTION \_\_\_\_\_  
COMPLETE 10:20 A.M. \_\_\_\_\_

CONTAINER SIZE NONACIDIFIED (no.) ACIDIFIED (no.) VOL. ACID (ml)  
NUMBER OF CONTAINERS COLLECTED: ONE-LITER \_\_\_\_\_  
150 ml \_\_\_\_\_  
50 ml See Attachment F  
SPECIFY OTHERS: \_\_\_\_\_  
COMMENTS: Titrate 1.6 N H<sub>2</sub>SO<sub>4</sub> Lot #5133  
1 Gelman Filter used  
- Carried equipment to well.  
FIELD REP (S): Fritts/Althouse

DATE	TIME	TOTAL VOLUME WITHDRAWN		pH	Ec (umhos/cm)	TEMP. (°C)	COMMENTS
		(Gals)	(Bore Volumes)				
1/29	9:35	0.0	0.0	-	-	-	START PUMPING
	9:41	3.0	.87	5.99	1100	12	
	9:44	6.0	1.74	6.10	1150	12.5	Adjust gH meter
	9:47	9.0	2.61	6.22	1150	12.5	
	9:50	12.0	3.48	6.22	1150	12.5	
	10:05	-	-	-	-	-	Stop sampling nonfiltered
	10:15	-	-	-	-	-	Stop sampling filtered

# WATER QUALITY SAMPLING RECORD

**BORE VOL CALCULATION**  
 $(d/2)^2 \pi (h_1 - h_2)$

Can- $\phi$ 1  
 412

**SAMPLING INFORMATION**

DEPTH TO WATER ( $h_2$ ) (FT.) 12.50  
 DEPTH OF WELL ( $h_1$ ) (FT.) 21.30  
 WELL DIA (FT.) 3.33  
 BORE VOL. (FT.)<sup>3</sup> .77  
 DEPTH TO SCREEN (FT.) 14.30

WITHDRAWAL METHOD submersible  
 SAMPLING METHOD Filtered  
 FILTER SIZE 45u  
 THERMOMETER ID 12237  
 EC METER ID 12237  
 PH METER ID WaterTO<sup>TM</sup> RTW-01329  
 PUMP ID #86

## CALIBRATION INFORMATION

DATE/TIME OF LAST EC CALIBRATION 1/20/87  
 TIME OF PH CALIBRATION 9:51  
 PH AFTER MEASUREMENT 7.02 FOR STANDARD PH 7.00  
 PH AFTER MEASUREMENT 4.04 FOR STANDARD SOLUTION PH 4.00  
 EH OF CALIBRATING SOLUTION N/A  
 EH READING IN CALIBRATING SOLN. AFTER MEASUREMENT ↓  
 TEMP. OF CALIBRATION SOLN. (°C) ↓

## SHIPPING INFORMATION

LAB(S) SHIPPED TO: EDA  
 DATE(S) SHIPPED: 1/21/87  
 METHOD OF SHIPMENT: American Airlines

## NOTES:

$$\left(\frac{0.333}{2}\right)^2 \pi (21.30 - 12.50) = .77 \times 4.5 = 3.45 \text{ gal} / \text{ft}^3$$

3 BV = 10.35 gal  
 1 gal = .29 BV



JACOBS ENGINEERING GROUP INC.  
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

### ALKALINITY TITRATION GRAPH

SITE ID: Can-pl

LOCATION ID: 412

DATE: 1/29/87

ERROR AT 4.50:  $\left| \frac{X1 - X2}{XS} \right| \times 100 = \underline{\hspace{1cm}} \%$

1st - 2 %

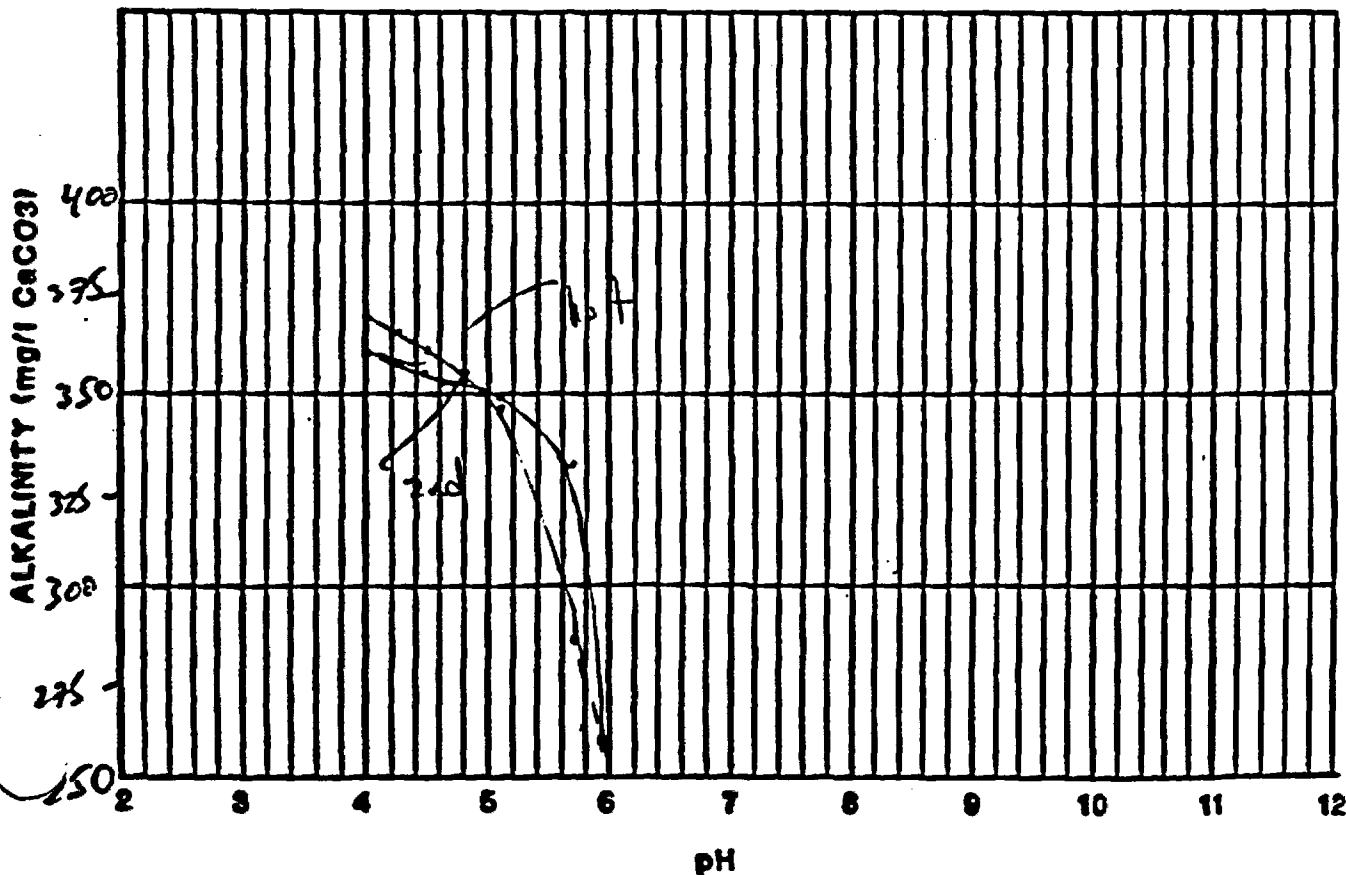
2nd -      %

PH CHECK AFTER TITRATION

7.00 - 6.95

4.00 - 4.01

PH	ALKALINITY (mg/l CaCO3)		
	1st	2nd	3rd
8.90	—	—	
8.60	—	—	
8.30	—	—	
8.05	—	—	
7.80	—	—	
7.50	—	—	
6.50	—	—	
5.70	287	260	
5.10	348	335	
4.80	354	347	
4.50	362	355	
4.25	366	359	
4.00	372	363	





**JACOBS ENGINEERING GROUP INC.** Page \_\_\_\_\_ of \_\_\_\_\_  
**ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS**

**ATTACHMENT F**

**CONTRACT NO. ASD-34-6703-S-850027**

**ACKNOWLEDGEMENT OF RECEIPT OF SAMPLES FOR DELIVERY ORDER NO. AD 49**

**SITE ID:** Car-01

**LOCATION ID:** 412

**SAMPLE ID:** 01

**SAMPLE SHIPMENT LIST**

**Lot #** 1

<b>Bottle ID</b>	<b>Amount</b>	<b>Rec'd</b>	<b>Bottle ID</b>	<b>Amount</b>	<b>Rec'd</b>
A1	<u>2L</u>	( )	Th 230		( )
A1-A		( )	G 18	<u>0.5L</u>	( )
M1		( )	N1	<u>1L</u>	( )
M1-A		( )	N2		( )
M2	<u>1L</u>	( )	CH		( )
M2-A		( )	S		( )
Pb 210		( )	TOC	<u>0.5L</u>	( )
Po 210		( )	TOX		( )
Ra 226	<u>2L</u>	( )	S102		( )
Ra 228	<u>2L</u>	( )	<i>Atk</i>	<u>0.5L</u>	

**DATE SHIPPED:** 1/29/87

**METHOD OF SHIPMENT:** American Air

**COMMENTS:**

I hereby acknowledge receipt of the following on \_\_\_\_\_ (date)

( ) Delivery Order No. AD\_\_\_\_ (Work Order Plan) dated \_\_\_\_\_.

**Subcontractor:**

**Name:**

**Title:**

**Date:**

**Partial Analysis Due:** \_\_\_\_\_

**Complete Analysis Due:** \_\_\_\_\_

**COMMENTS:**

Delivery of Analysis in accordance with Exhibits B and C of the Subcontract is due no later than: Preliminary to JEG by: \_\_\_\_\_

**Date**

**Complete to JEG by:** \_\_\_\_\_

**Date**

**GROUND WATER SAMPLING RECORD**

Page 1 of 3

SITE ID: Can-01  
LOCATION ID: 413  
SAMPLE ID: \* 01  
STATIC WATER LEVEL (FT) 5.67  
SAMPLE DEPTH (FT) 12.0  
SAMPLING DATE 1/27/87  
SAMPLING TIME:  
START 11:00 AM.  
COMPLETE 3:15 P.M.

FINAL FIELD VALUES:  
SURFACE DOWN-HOLE  
pH (S.U.): 6.70 N/A  
Ec (umhos/cm) 980 ↓  
Eh (millivolts) N/A ↓  
TEMP. (°C): 10 ↓  
ALKALINITY (mg/l CaCO<sub>3</sub>): 403 4.50  
LOCATION DESCRIPTION \_\_\_\_\_

CONTAINER SIZE NONACIDIFIED (no.) ACIDIFIED (no.) VOL. ACID (ml)

NUMBER OF CONTAINERS COLLECTED: ONE-LITER  
150 ml  
50 ml

See Attachment F

SPECIFY OTHERS:

- Also collected split labeled 416, 417, 418, 419

COMMENTS: Titrate 1.6 N H<sub>2</sub>SO<sub>4</sub> lot #5133

4 Gelmann Filters used

- slow recharge, ∴ sampled after 1.26 B.U.

FIELD REP (S): Fritts Althouse

DATE	TIME	TOTAL VOLUME WITHDRAWN		pH	Ec (umhos/cm)	TEMP. (°C)	COMMENTS
		(Gals)	(Bore Volumes)				
1/27	11:37	0.0	0.0	-	-	-	START PUMPING
	11:40	3.0	.63	6.60	950	10	
	11:44	4.0	.84	6.62	960	10	pumped dry/check meter
	12:07	6.0	1.26	6.70	980	10	restart at 12:05/pumped dry
	12:30	-	-	-	-	-	Sampled 413
	1:00	-	-	-	-	-	Sampled 416
	1:30	-	-	-	-	-	Sampled 417
	2:00	-	-	-	-	-	Sampled 418
	2:30	-	-	-	-	-	Sampled 419
							- Slow recharge

# WATER QUALITY SAMPLING RECORD

**BORE VOL CALCULATION**  
 $(d/2)^2 \pi (h_1 - h_2)$

Can -  $\phi 1$   
413

**SAMPLING INFORMATION**

DEPTH TO WATER ( $h_2$ ) (FT.) 5.67  
DEPTH OF WELL ( $h_1$ ) (FT.) 13.0  
WELL DIA (FT.) .333  
BORE VOL. (FT.)<sup>3</sup> .064  
DEPTH TO SCREEN (FT.) 7.0

WITHDRAWAL METHOD Submersible  
SAMPLING METHOD Filtered  
FILTER SIZE .45  $\mu$   
THERMOMETER ID 12237  
EC METER ID 12237  
PH METER ID 384560  
PUMP ID #86

## CALIBRATION INFORMATION

DATE/TIME OF LAST EC CALIBRATION 1/20/87  
TIME OF PH CALIBRATION 12:08 p.m.  
PH AFTER MEASUREMENT 4.02 FOR STANDARD PH 4.00  
H AFTER MEASUREMENT 7.02 FOR STANDARD SOLUTION PH 7.00  
EH OF CALIBRATING SOLUTION N/A  
EH READING IN CALIBRATING SOLN. AFTER MEASUREMENT ↓  
TEMP. OF CALIBRATION SOLN. (°C) ↓

## SHIPPING INFORMATION

LAB(S) SHIPPED TO: EDA  
DATE(S) SHIPPED: 1/28/87  
METHOD OF SHIPMENT: American Airlines

## NOTES:

$$\left(\frac{.333}{2}\right)^2 \pi (13.0 - 5.67) = .064 \times 7.5 = 4.77 \text{ gal/bv}$$
$$3 \text{ BV} = 14.36 \text{ gal}$$
$$1 \text{ gal} = .21 \text{ BV}$$





JACOBS ENGINEERING GROUP INC.  
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

### ALKALINITY TITRATION GRAPH

SITE ID: Can-01

LOCATION ID: 413

DATE: 1/27/87

ERROR AT 4.50:  $\left| \frac{X_1 - X_2}{X_5} \right| \times 100 = \underline{\hspace{1cm}} \%$

1st = 8 %

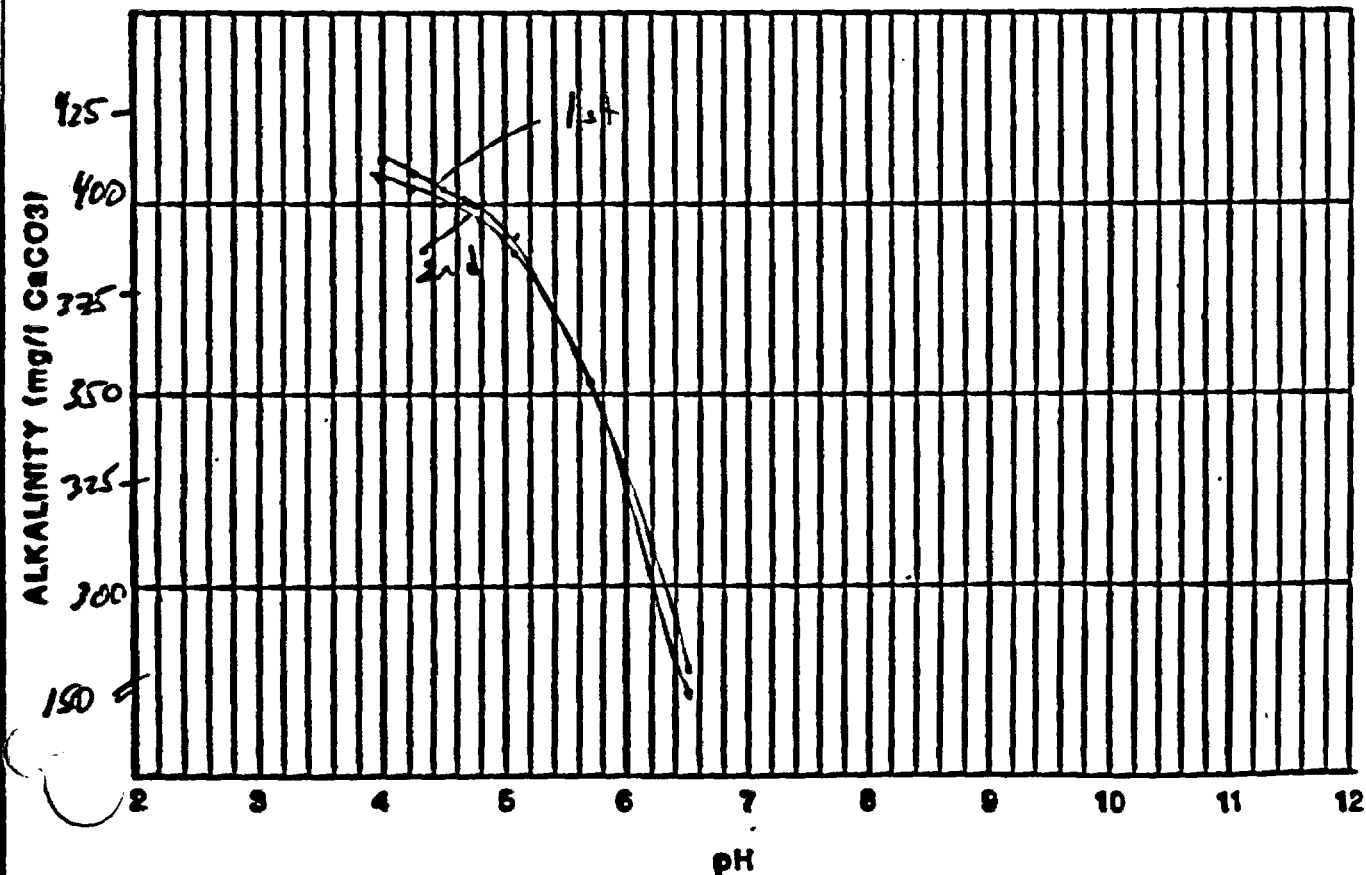
2nd =      %

PH CHECK AFTER TITRATION

7.00 = 7.04

4.00 = 4.03

pH	ALKALINITY (mg/l CaCO <sub>3</sub> )		
	1st	2nd	3rd
8.90	—	—	
8.60	—	—	
8.30	—	—	
8.05	—	—	
7.80	—	—	
7.50	—	—	
6.50	150	165	
5.70	252	352	
5.10	393	387	
4.80	400	397	
4.50	403	400	
4.25	406	404	
4.00	410	407	





JACOBS ENGINEERING GROUP INC. Page \_\_\_\_\_ of \_\_\_\_\_  
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

ATTACHMENT F

CONTRACT NO. ASD-34-6703-S-850027

ACKNOWLEDGEMENT OF RECEIPT OF SAMPLES FOR DELIVERY ORDER NO. AD 49

SITE ID: Can-01

LOCATION ID: 413

SAMPLE ID: 01

SAMPLE SHIPMENT LIST

Lot # 1

Bottle ID	Amount	Rec'd	Bottle ID	Amount	Rec'd
A1	<u>2L</u>	( )	Th 230		( )
A1-A		( )	G 1B	<u>.5L</u>	( )
M1		( )	M1	<u>1L</u>	( )
M1-A		( )	M2		( )
M2	<u>1L</u>	( )	CN		( )
M2-A		( )	S		( )
Pb 210		( )	TOC	<u>.5L</u>	( )
Po 210		( )	TOX		( )
Ra 226	<u>2L</u>	( )	S102		( )
Ra 228	<u>2L</u>	( )	Alkalinity	<u>.1L</u>	

DATE SHIPPED: 1/29/87

METHOD OF SHIPMENT: American Airlines

COMMENTS: Also collected split labeled 416, 417, 418, 419

I hereby acknowledge receipt of the following on \_\_\_\_\_ (date)

( ) Delivery Order No. AD \_\_\_\_\_ (Work Order Plan) dated \_\_\_\_\_

Subcontractor:

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

Partial Analysis Due: \_\_\_\_\_

Complete Analysis Due: \_\_\_\_\_

COMMENTS: \_\_\_\_\_

Delivery of Analysis in accordance with Exhibits B and C of the Subcontract is due no later than: Preliminary to JEG by: \_\_\_\_\_

Date

Complete to JEG by: \_\_\_\_\_

Date

**JE JACOBS ENGINEERING GROUP INC.**  
 ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS  
**GROUND WATER SAMPLING RECORD**

Page 1 of 3

SITE ID: Can - #1  
 LOCATION ID: 414  
 SAMPLE ID: #1  
 STATIC WATER LEVEL (FT) 3.66  
 SAMPLE DEPTH (FT) 14.0  
 SAMPLING DATE 1/28/87  
 SAMPLING TIME:  
 START 11:00 AM  
 COMPLETE 1:00 PM

**FINAL FIELD VALUES:**

	SURFACE	DOWN-HOLE
pH (S.U.):	<u>6.15</u>	<u>N/A</u>
Ec (umhos/cm)	<u>345</u>	<u>↓</u>
Eh (millivolt)	<u>N/A</u>	<u>↓</u>
TEMP. (°C):	<u>9</u>	<u>↓</u>
ALKALINITY (mg/l CaCO <sub>3</sub> ):	<u>178</u>	<u>at 4.50</u>

LOCATION DESCRIPTION \_\_\_\_\_

CONTAINER SIZE    NONACIDIFIED (no.)    ACIDIFIED (no.)    VOL. ACID (ml)

NUMBER OF  
CONTAINERS  
COLLECTED:

ONE-LITER  
150 ml  
50 ml

See Attachment F

SPECIFY OTHERS: \_\_\_\_\_

COMMENTS: Titrate 1.6 N H<sub>2</sub>SO<sub>4</sub> Lot # 5133

1 Gelman Filter used

Cap frozen on well

FIELD REP (S): Frills / Althouse

DATE	TIME	TOTAL VOLUME WITHDRAWN		pH	Ec (umhos/cm)	TEMP. (°C)	COMMENTS
		(Gals)	(Bore Volumes)				
1/28	11:27	0.0	0.0	-	-	-	START PUMPING
	11:30	3.0	.39	5.75	270	8.5	
	11:33	6.0	.78	5.80	250	8.5	Adjust pH meter
	11:36	9.0	1.17	5.90	315	8.5	
	11:39	12.0	1.56	6.10	345	9	Pumped dry
	11:59	15.0	1.95	6.15	345	9	(restarted at 11:50) Adjust pH meter
	12:02	18.0	2.34	6.15	345	9	
	12:03	19.0	2.47	6.15	345	9	pumped dry
	12:15	-	-	-	-	-	Stop sampling not filtered
	12:30	-	-	-	-	-	Stop sampling filtered

## WATER QUALITY SAMPLING RECORD

**BORE VOL CALCULATION**  
 $(d/2)^2 \pi (h_1 - h_2)$

Can -  $\phi 1$   
414

**SAMPLING INFORMATION**

DEPTH TO WATER ( $h_2$ ) (FT.) 3.66  
DEPTH OF WELL ( $h_1$ ) (FT.) 15.45  
WELL DIA (FT.) 3.33  
BORE VOL. (FT.)<sup>3</sup> 1.03  
DEPTH TO SCREEN (FT.) 4.45

WITHDRAWAL METHOD submersible  
SAMPLING METHOD Filtered  
FILTER SIZE 0.45u  
THERMOMETER ID 12237  
EC METER ID 12237  
PH METER ID Waters ID# RFW-01329  
PUMP ID # 86

### CALIBRATION INFORMATION

DATE/TIME OF LAST EC CALIBRATION 1/20/87  
TIME OF PH CALIBRATION 12:04  
4 AFTER MEASUREMENT 3.98 FOR STANDARD PH 4.00  
1 AFTER MEASUREMENT 6.98 FOR STANDARD SOLUTION PH 7.00  
EN OF CALIBRATING SOLUTION N/A  
EN READING IN CALIBRATING SOLN. AFTER MEASUREMENT ↓  
TEMP. OF CALIBRATION SOLN. (°C) \_\_\_\_\_

### SHIPPING INFORMATION

LAB(S) SHIPPED TO: EPA  
DATE(S) SHIPPED: 1/26/87  
METHOD OF SHIPMENT: American Airlines

### NOTES:

$$\left(\frac{3.33}{2}\right)^2 \pi (15.45 - 3.66) = 1.03 \times 7.5 = 7.70 \text{ gal/bu}$$
$$3 \text{ BU} = 23.10 \text{ gal}$$
$$1 \text{ gal} = .13 \text{ BU}$$



# JACOBS ENGINEERING GROUP INC.

ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

Page \_\_\_\_\_ of \_\_\_\_\_

## ATTACHMENT F

CONTRACT NO. ASD-34-6703-S-85 00027

ACKNOWLEDGEMENT OF RECEIPT OF SAMPLES FOR DELIVERY ORDER NO. AD 49

SITE ID: Car-01

LOCATION ID: 414

SAMPLE ID: 01

### SAMPLE SHIPMENT LIST

Lot # 1

Bottle ID	Amount	Rec'd	Bottle ID	Amount	Rec'd
A1	<u>2L</u>	( )	Th 230		( )
A1-A		( )	G 1B	<u>.5L</u>	( )
M1		( )	N1	<u>1L</u>	( )
M1-A		( )	N2		( )
M2	<u>1L</u>	( )	CN		( )
M2-A		( )	S		( )
Pb 210		( )	TOC	<u>.5L</u>	( )
Po 210		( )	TOX		( )
Ra 226	<u>2L</u>	( )	S102		( )
Ra 228	<u>2L</u>	( )	Alkalinity	<u>.1L</u>	

DATE SHIPPED: 1/28/87

METHOD OF SHIPMENT: American Airlines

COMMENTS:

I hereby acknowledge receipt of the following on \_\_\_\_\_ (date)

( ) Delivery Order No. AD \_\_\_\_\_ (Work Order Plan) dated \_\_\_\_\_

Subcontractor:

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

Partial Analysis Due: \_\_\_\_\_

Complete Analysis Due: \_\_\_\_\_

COMMENTS:

Delivery of Analysis in accordance with Exhibits B and C of the Subcontract is due no later than: Preliminary to JEG by: \_\_\_\_\_

Date

Complete to JEG by: \_\_\_\_\_

Date

**ALKALINITY TITRATION GRAPH**

SITE ID: Can - 61

LOCATION ID: 4/4

DATE: 1/28/87

ERROR AT 4.50:  $\left| \frac{X1 - X2}{XS} \right| \times 100 = \underline{\hspace{1cm}}\%$

1st = 3.9%

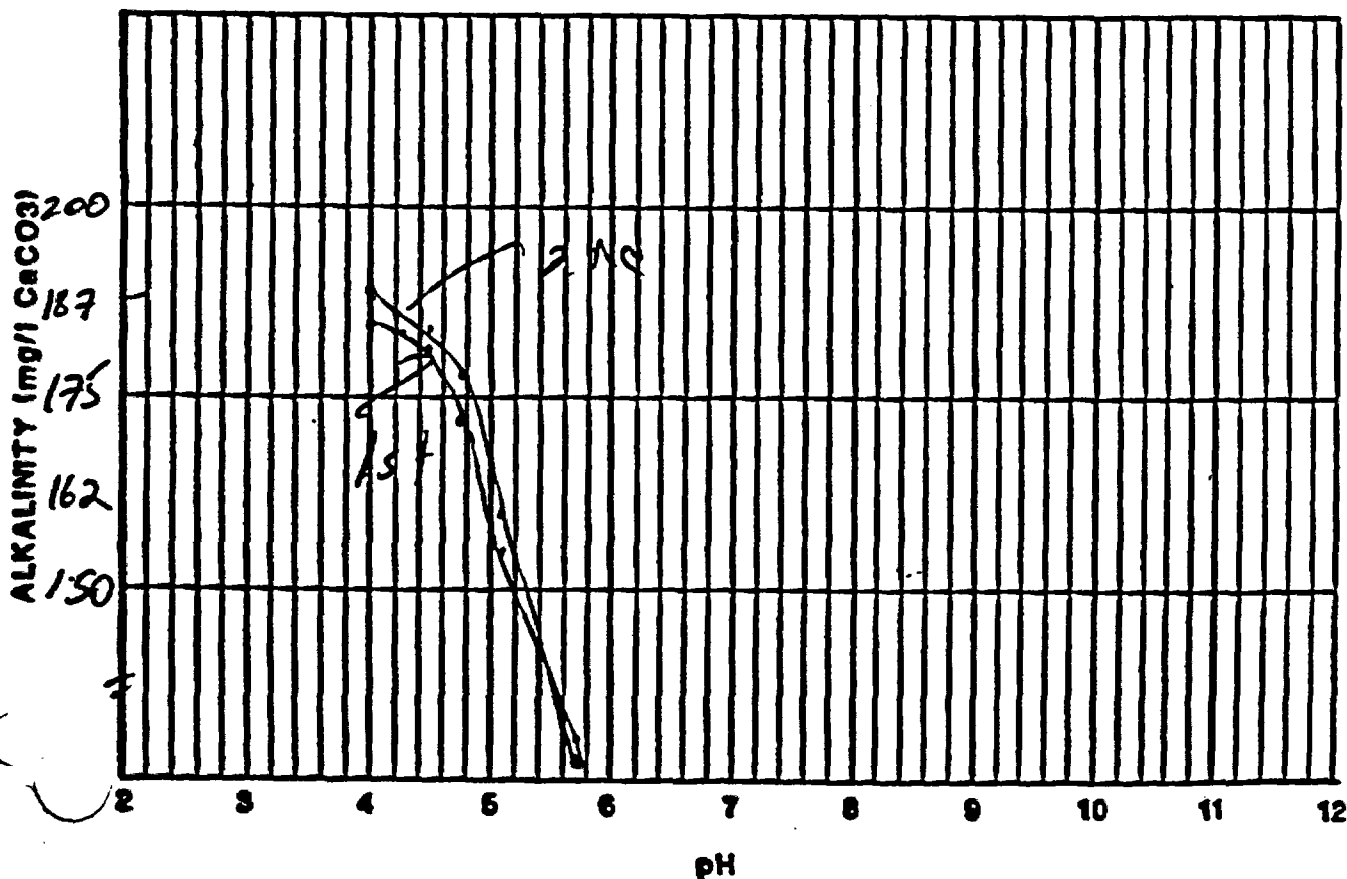
2nd =     %

**PH CHECK AFTER TITRATION**

7.00 = 6.95

4.00 = 4.00

pH	ALKALINITY (mg/l CaCO <sub>3</sub> )		
	1st	2nd	3rd
8.90	—	—	
8.60	—	—	
8.30	—	—	
8.05	—	—	
7.80	—	—	
7.50	—	—	
6.50	—	—	
5.70	69	79	
5.10	157	161	
4.80	167	190	
4.50	178	155	
4.25	179	157	
4.00	180	139	



SITE ID: Can- (7)

LOCATION ID: 504'

SAMPLE ID: 01

STATIC WATER LEVEL (FT) 12.05

SAMPLE DEPTH (FT) 24.0

SAMPLING DATE 1/28/87

**SAMPLING TIME:** 4 1/2

START 8:15 A.M.

COMPLETE 10:25 A.M.

**FINAL FIELD VALUES:**

**pH (S.U.):**

**Ec (umhos/cm)**

Eb (millivolts)

TEMP. (°C):

ALKALINITY (mg/l  $\text{CaCO}_3$ ): 212 at 450

**LOCATION DESCRIPTION** \_\_\_\_\_

CONTAINER SIZE	NONACIDIFIED (no.)	ACIDIFIED (no.)	VOL. ACID (ml)
100 ml	1	1	10
250 ml	1	1	25
500 ml	1	1	50
1000 ml	1	1	100
2000 ml	1	1	200
5000 ml	1	1	500
10000 ml	1	1	1000

**NUMBER OF  
CONTAINERS  
COLLECTED:**

## ONE-LITER

**160 ml**

60 ml

See Attachment F

**SPECIFY OTHERS:**

Titrate 1.6 N  $H_2SO_4$  Lot # 5133

**COMMENTS:**

1 Graham F. ... 1950

FIELD REP (S): Edith Althaus

[illegible]

# WATER QUALITY SAMPLING RECORD

**BORE VOL CALCULATION**  
 $(d/2)^2 \pi (h_1 - h_2)$

Can -  $\phi$  1  
504

**SAMPLING INFORMATION**

DEPTH TO WATER ( $h_2$ ) (FT.) 12.05  
DEPTH OF WELL ( $h_1$ ) (FT.) 26.9  
WELL DIA (FT.) .167  
BORE VOL. (FT.)<sup>3</sup> .33  
DEPTH TO SCREEN (FT.) 17.9

WITHDRAWAL METHOD Submersible  
SAMPLING METHOD Filtered  
FILTER SIZE 45  $\mu$   
THERMOMETER ID 12237  
Ec METER ID 12237  
pH METER ID 384560 / Fisher \*  
PUMP ID # 86  
\* Weston # RFW-C1329

## CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION 1/20/87  
TIME OF pH CALIBRATION 9:27  
pH AFTER MEASUREMENT 7.05 FOR STANDARD pH 7.00  
AFTER MEASUREMENT 3.95 FOR STANDARD SOLUTION pH 4.00  
OF CALIBRATING SOLUTION N/A  
EH READING IN CALIBRATING SOLN. AFTER MEASUREMENT J  
TEMP. OF CALIBRATION SOLN. (°C) J

## SHIPPING INFORMATION

LAB(S) SHIPPED TO: EOA  
DATE(S) SHIPPED: American Airlines  
METHOD OF SHIPMENT: 1/28/87

NOTES:  $\left(\frac{.167}{2}\right)^2 \pi (26.9 - 12.05) = .33 \times 7.5 = 2.44 \text{ gal / BU}$   
 $3 \text{ BU} = 7.32 \text{ gal}$   
 $1 \text{ gal} = .41 \text{ BU}$





JACOBS ENGINEERING GROUP INC.  
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

### ALKALINITY TITRATION GRAPH

SITE ID: Car-01

LOCATION ID: 504

DATE: 1/28/87

ERROR AT 4.50:  $\left| \frac{X1 - X2}{X5} \right| \times 100 = \underline{\hspace{2cm}}\%$

1st = 3.4%

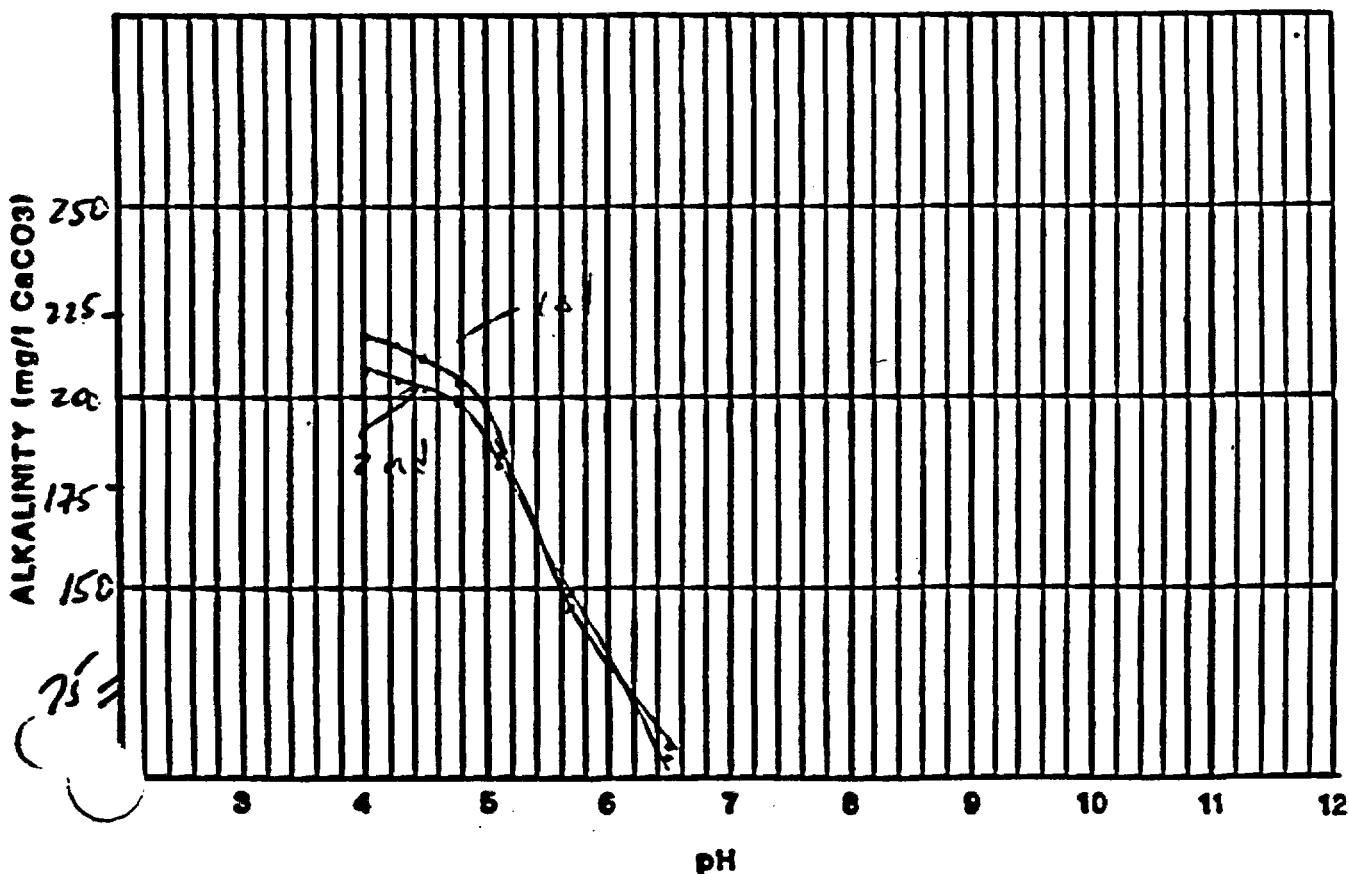
2nd =     %

pH CHECK AFTER TITRATION

7.00 = 7.05

4.00 = 3.98

pH	ALKALINITY (mg/l CaCO <sub>3</sub> )		
	1st	2nd	3rd
8.90	—	—	
8.60	—	—	
8.30	—	—	
8.05	—	—	
7.80	—	—	
7.50	—	—	
6.50	35	28	
5.70	140	145	
5.10	183	180	
4.80	202	200	
4.50	212	205	
4.25	216	203	
4.00	220	212	





# JACOBS ENGINEERING GROUP INC.

ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

Page \_\_\_\_\_ of \_\_\_\_\_

## ATTACHMENT F

CONTRACT NO. ASD-34-6703-S-85-0027

ACKNOWLEDGEMENT OF RECEIPT OF SAMPLES FOR DELIVERY ORDER NO. AD 49

SITE ID: Can-01

LOCATION ID: 504

SAMPLE ID: 01

### SAMPLE SHIPMENT LIST

(RI) 1

Bottle ID	Amount	Rec'd.	Bottle ID	Amount	Rec'd.
A1	<u>2L</u>	( )	Th 230		( )
A1-A		( )	G 18	<u>.5L</u>	( )
M1		( )	N1	<u>1L</u>	( )
M1-A		( )	N2		( )
M2	<u>1L</u>	( )	CN		( )
M2-A		( )	S		( )
Pb 210		( )	TOC	<u>.5L</u>	( )
Po 210		( )	TOX		( )
Ra 226	<u>2L</u>	( )	SiO2		( )
Ra 228	<u>2L</u>	( )	Alkalinity	<u>.1L</u>	

DATE SHIPPED: 1/28/87

METHOD OF SHIPMENT: American Airlines

COMMENTS:

I hereby acknowledge receipt of the following on \_\_\_\_\_ (date)

( ) Delivery Order No. AD \_\_\_\_ (Work Order Plan) dated \_\_\_\_\_.

Subcontractor:

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

Partial Analysis Due: \_\_\_\_\_

Complete Analysis Due: \_\_\_\_\_

COMMENTS:

Delivery of Analysis in accordance with Exhibits B and C of the Subcontract is due no later than: Preliminary to JEG by: \_\_\_\_\_

Date

Complete to JEG by: \_\_\_\_\_

Date



JACOBS ENGINEERING GROUP INC.  
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

# GROUND WATER SAMPLING RECORD

Page 1 of 3

SITE ID: Can-01  
LOCATION ID: 505  
SAMPLE ID: \* 01  
STATIC WATER LEVEL (FT) 6.68  
SAMPLE DEPTH (FT) 30.0  
SAMPLING DATE 1/27/87  
SAMPLING TIME:  
START 8:15 A.M.  
COMPLETE 10:45 A.M.

## FINAL FIELD VALUES:

	SURFACE	DOWN-HOLE
pH (S.U.):	7.91	N/A
Ec (umhos/cm)	1450	
Eh (millivolts)	N/A	
TEMP. (°C):	13	
ALKALINITY (mg/l CaCO <sub>3</sub> ):	499	24.50

## LOCATION DESCRIPTION

CONTAINER SIZE NONACIDIFIED (no.) ACIDIFIED (no.) VOL. ACID (ml)

NUMBER OF  
CONTAINERS  
COLLECTED:

ONE-LITER

150 ml

50 ml

See Attached

F

SPECIFY OTHERS:

COMMENTS: Titrate 1.6 N H<sub>2</sub>SO<sub>4</sub> lot #5133  
1 Gelman Filter used

FIELD REP (S): FiHs / Altheure

DATE	TIME	TOTAL VOLUME WITHDRAWN		pH	Ec (umhos/cm)	TEMP. (°C)	COMMENTS
		(Gals)	(Bore Volumes)				
1/27	9:39	0.0	0.0	-	-	-	START PUMPING
	9:41	2.0	.40	8.05	1400	13	
	9:43	4.0	.80	8.08	1400	13	
	9:45	6.0	1.20	8.03	1420	13	Adjust pH meter
	9:48	9.0	1.80	8.00	1420	13	
	9:51	12.0	2.40	7.98	1430	13	
	9:54	15.0	3.60	7.78	1420	13	
	9:57	18.0	3.60	7.57	1450	13	Adjust pH meter
	10:00	21.0	4.20	7.91	1450	13	
	10:30	-	-	-	-	-	Stop sampling, not filtered
	10:30	-	-	-	-	-	Stop sampling, filtered

## WATER QUALITY SAMPLING RECORD

**BORE VOL CALCULATION**  
 $(d/2)^2 \pi (h_1 - h_2)$

Can- $\phi$ 1  
505

**SAMPLING INFORMATION**

DEPTH TO WATER ( $h_2$ ) (FT.) 6.68  
DEPTH OF WELL ( $h_1$ ) (FT.) 37.40  
WELL DIA (FT.) .167  
BORE VOL. (FT.)<sup>3</sup> .67  
DEPTH TO SCREEN (FT.) 25.4

WITHDRAWAL METHOD submersible  
SAMPLING METHOD Filtered  
FILTER SIZE .45  $\mu$   
THERMOMETER ID 12237  
EC METER ID 12237  
PH METER ID 384560  
PUMP ID # 36

### CALIBRATION INFORMATION

DATE/TIME OF LAST EC CALIBRATION 1/22/87  
TIME OF PH CALIBRATION 10:00 A.M.  
-4 AFTER MEASUREMENT 7.00 FOR STANDARD PH 7.00  
-9 AFTER MEASUREMENT 9.98 FOR STANDARD SOLUTION PH 10.00  
EC OF CALIBRATING SOLUTION N/A  
EC READING IN CALIBRATING SOLN. AFTER MEASUREMENT J  
TEMP. OF CALIBRATION SOLN. (°C) J

### SHIPPING INFORMATION

LAB(S) SHIPPED TO: EDA  
DATE(S) SHIPPED: 1/28/87  
METHOD OF SHIPMENT: American Airlines

### NOTES:

$$\left(\frac{.167}{2}\right)^2 \pi (37.40 - 6.68) = .67 \times 7.5 = 5.05 \text{ gal/bv}$$

$$3 \text{ BV} = 15.14 \text{ gal}$$

$$1 \text{ gal} = .20 \text{ BV}$$



JACOBS ENGINEERING GROUP INC.  
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

### ALKALINITY TITRATION GRAPH

SITE ID: Can-01

LOCATION ID: 505

DATE: 1/27/87

ERROR AT 4.50:  $\left| \frac{X1 - X2}{XS} \right| \times 100 = \underline{\hspace{2cm}}\%$

1st = 1 %

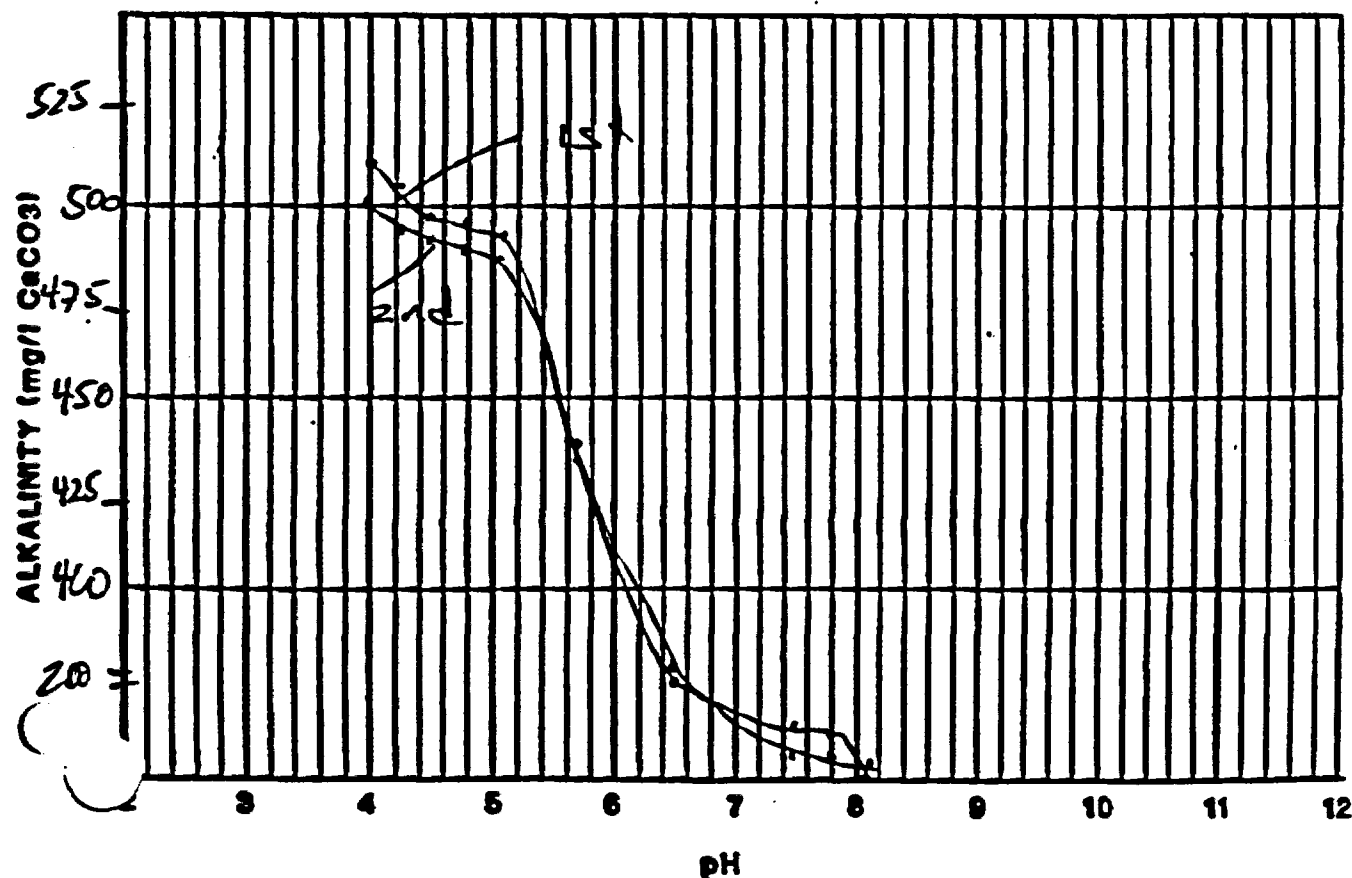
2nd =     %

pH CHECK AFTER TITRATION

7.00 = 7.05

4.00 = 4.05

pH	ALKALINITY (mg/l CaCO <sub>3</sub> )		
	1st	2nd	3rd
8.90	—	—	
8.60	—	—	
8.30	—	—	
8.05	1	5	
7.80	80	9	
7.50	84	17	
6.50	210	215	
5.70	435	439	
5.10	489	495	
4.80	495	492	
4.50	499	494	
4.25	505	498	
4.00	509	502	





**JACOBS ENGINEERING GROUP INC.** Page \_\_\_\_\_ of \_\_\_\_\_  
**ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS**

**ATTACHMENT F**

CONTRACT NO. ASD-34-6703-S-85-0027

ACKNOWLEDGEMENT OF RECEIPT OF SAMPLES FOR DELIVERY ORDER NO. AO 49

SITE ID: Can-01

LOCATION ID: 505

SAMPLE ID: 01

**SAMPLE SHIPMENT LIST**

Lot # 1

Bottle ID	Amount	Rec'd	Bottle ID	Amount	Rec'd
A1	<u>2L</u>	( )	Th 230		( )
A1-A		( )	G 18	<u>.5L</u>	( )
M1		( )	N1	<u>1L</u>	( )
M1-A		( )	N2		( )
M2	<u>1L</u>	( )	CN		( )
M2-A		( )	S		( )
Pb 210		( )	TOC	<u>.5L</u>	( )
Po 210		( )	TOX		( )
Ra 226	<u>2L</u>	( )	S102		( )
Ra 228	<u>2L</u>	( )	Alkalinity	<u>.1L</u>	

DATE SHIPPED: 1/4/87

METHOD OF SHIPMENT: American Airlines

COMMENTS:

I hereby acknowledge receipt of the following on \_\_\_\_\_ (date)

( ) Delivery Order No. AO \_\_\_\_\_ (Work Order Plan) dated \_\_\_\_\_.

Subcontractor:

Name:

Title:

Date:

Partial Analysis Due: \_\_\_\_\_

Complete Analysis Due: \_\_\_\_\_

COMMENTS:

Copy of Analysis in accordance with Exhibits B and C of the Subcontract is no later than: Preliminary to JEG by: \_\_\_\_\_

Date

Complete to JEG by: \_\_\_\_\_

Date



## WATER QUALITY SAMPLING RECORD

**BORE VOL CALCULATION**  
 $(d/2)^2 \pi (h_1 - h_2)$

Can- $\phi$ 1  
506

**SAMPLING INFORMATION**

DEPTH TO WATER ( $h_2$ ) (FT.) 17.33  
DEPTH OF WELL ( $h_1$ ) (FT.) 27.95  
WELL DIA (FT.) 0.167  
BORE VOL. (FT.)<sup>3</sup> .23  
DEPTH TO SCREEN (FT.) 20.95

WITHDRAWAL METHOD submersible  
SAMPLING METHOD Filtered  
FILTER SIZE .45u  
THERMOMETER ID 12237  
EC METER ID 12237  
PH METER ID Wate-RFW 01329  
PUMP ID #86

### CALIBRATION INFORMATION

DATE/TIME OF LAST EC CALIBRATION 1/20/87  
TIME OF PH CALIBRATION 10:47 Am.  
-4 AFTER MEASUREMENT 7.00 FOR STANDARD PH 7.00  
AFTER MEASUREMENT 4.05 FOR STANDARD SOLUTION PH 4.00  
EH OF CALIBRATING SOLUTION N/A  
EH READING IN CALIBRATING SOLN. AFTER MEASUREMENT ↓  
TEMP. OF CALIBRATION SOLN. (°C) ↓

### SHIPPING INFORMATION

LAB(S) SHIPPED TO: EPA  
DATE(S) SHIPPED: 1/29/87  
METHOD OF SHIPMENT: American Airlines

### NOTES:

$$\left(\frac{0.167}{2}\right)^2 \pi (27.95 - 17.33) = .23 \times 7.5 = 1.74 \text{ gal/BV}$$
$$3 \text{ BV} = 5.23 \text{ gal}$$
$$1 \text{ gal} = .57 \text{ BV}$$





JACOBS ENGINEERING GROUP INC.  
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

### ALKALINITY TITRATION GRAPH

SITE ID: Can-01

LOCATION ID: 506

DATE: 1/29/87

ERROR AT 4.50:  $\left| \frac{X1 - X2}{X5} \right| \times 100 = \underline{\hspace{1cm}} \%$

1st = 46 %

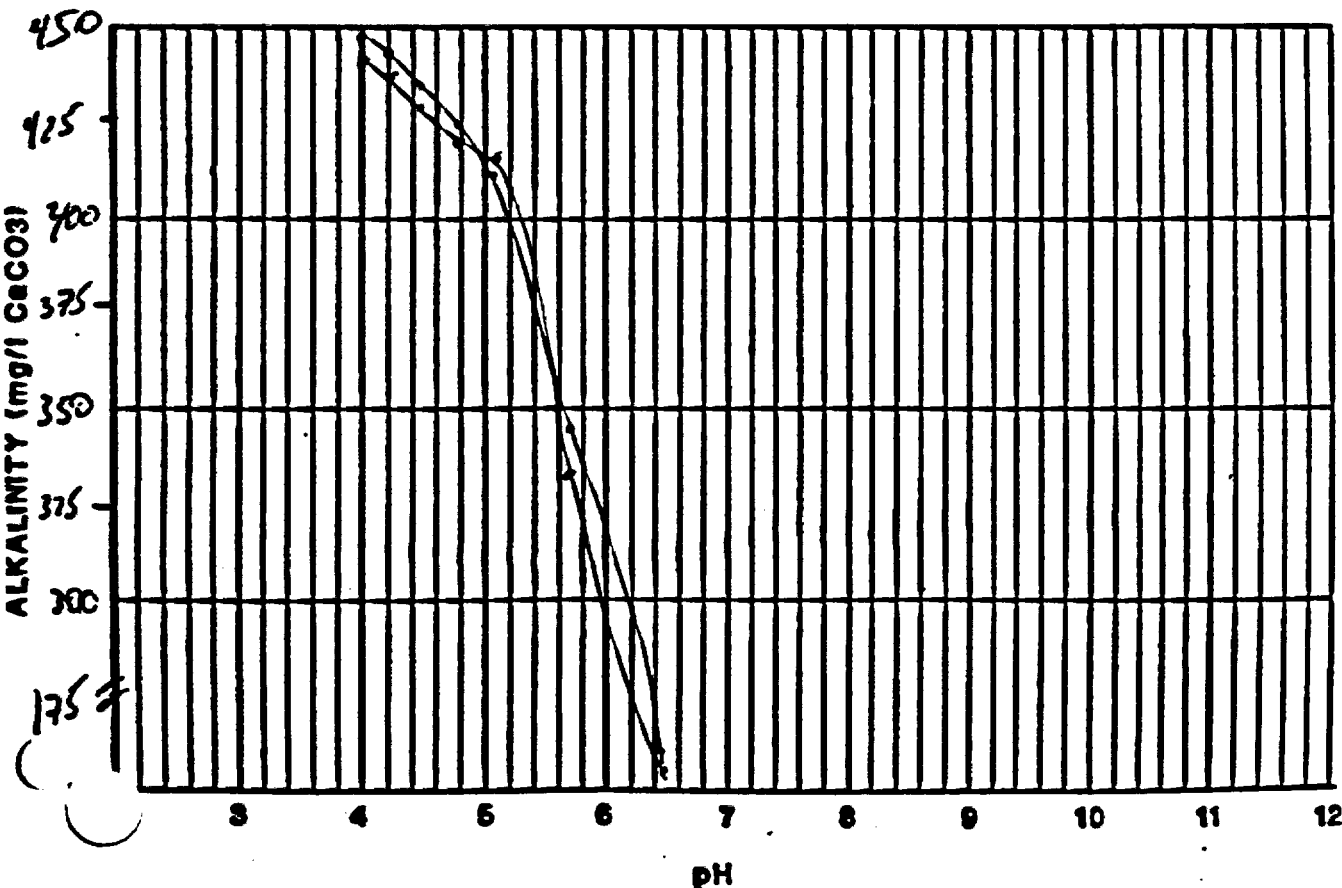
2nd =      %

pH CHECK AFTER TITRATION

7.00 = 7.01

4.00 = 4.01

pH	ALKALINITY (mg/l CaCO <sub>3</sub> )		
	1st	2nd	3rd
8.90	—	—	
8.60	—	—	
8.30	—	—	
8.05	—	—	
7.80	—	—	
7.50	—	—	
6.50	65	72	
5.70	333	340	
5.10	415	413	
4.80	420	425	
4.50	429	432	
4.25	432	437	
4.00	436	440	





**JACOBS ENGINEERING GROUP INC.** Page \_\_\_\_\_ of \_\_\_\_\_  
**ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS**

**ATTACHMENT F**

**CONTRACT NO. ASD-34-6703-S-84-0027**

**ACKNOWLEDGEMENT OF RECEIPT OF SAMPLES FOR DELIVERY ORDER NO. AD 49**

**SITE ID:** Can-01

**LOCATION ID:** 506

**SAMPLE ID:** 01

**SAMPLE SHIPMENT LIST**

**Lot #** 1

<b>Bottle ID</b>	<b>Amount</b>	<b>Rec'd</b>	<b>Bottle ID</b>	<b>Amount</b>	<b>Rec'd</b>
A1	<u>2L</u>	( )	Th 230		( )
A1-A		( )	G 18	<u>0.5L</u>	( )
M1		( )	N1	<u>1L</u>	( )
M1-A		( )	N2		( )
M2	<u>1L</u>	( )	CN		( )
M2-A		( )	S		( )
Pb 210		( )	TOC	<u>0.5L</u>	( )
Po 210		( )	TOX		( )
Ra 226	<u>2L</u>	( )	S102		( )
Ra 228	<u>2L</u>	( )	Alkalinity	<u>0.1L</u>	

**DATE SHIPPED:** 1/29/87

**METHOD OF SHIPMENT:** American Airlines

**COMMENTS:**

I hereby acknowledge receipt of the following on \_\_\_\_\_ (date)

( ) Delivery Order No. AD \_\_\_\_ (Work Order Plan) dated \_\_\_\_\_.

**Subcontractor:**

**Name:**

**Title:**

**Date:**

**Partial Analysis Due:** \_\_\_\_\_

**Complete Analysis Due:** \_\_\_\_\_

**COMMENTS:**

Very of Analysis in accordance with Exhibits B and C of the Subcontract is due no later than: Preliminary to JEG by: \_\_\_\_\_

**Date**

**Complete to JEG by:** \_\_\_\_\_

**Date**

THIS AIRBILL IS A CONTRACT GOVERNED BY LAW AND BY THE PROVISIONS ON THE REVERSE SIDE. SUCH PROVISIONS, AMONG OTHER THINGS, EXCLUDE OR LIMIT THE CARRIER'S LIABILITY FOR LOSS, DAMAGE OR DELAY IN CERTAIN INSTANCES.

[illegible]

**THIS AIRBILL IS A CONTRACT GOVERNED BY LAW AND BY THE PROVISIONS ON THE REVERSE SIDE. SUCH PROVISIONS, AMONG OTHER THINGS, EXCLUDE OR LIMIT THE CARRIER'S LIABILITY FOR LOSS, DAMAGE OR DELAY IN CERTAIN INSTANCES.**

AC134L

SITE ID: Can #1

**FINAL FIELD VALUES:**

SURFACE	DOWN-HOLE
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10
11	11
12	12
13	13
14	14
15	15
16	16
17	17
18	18
19	19
20	20
21	21
22	22
23	23
24	24
25	25
26	26
27	27
28	28
29	29
30	30
31	31
32	32
33	33
34	34
35	35
36	36
37	37
38	38
39	39
40	40
41	41
42	42
43	43
44	44
45	45
46	46
47	47
48	48
49	49
50	50
51	51
52	52
53	53
54	54
55	55
56	56
57	57
58	58
59	59
60	60
61	61
62	62
63	63
64	64
65	65
66	66
67	67
68	68
69	69
70	70
71	71
72	72
73	73
74	74
75	75
76	76
77	77
78	78
79	79
80	80
81	81
82	82
83	83
84	84
85	85
86	86
87	87
88	88
89	89
90	90
91	91
92	92
93	93
94	94
95	95
96	96
97	97
98	98
99	99
100	100

LOCATION ID: 401

SAMPLE ID: \* 01

**pH (S.U.):**

5.64 N/A

STATIC WATER LEVEL (FT) 12.74

**Ec (μmhos/cm)**

320 1

SAMPLE DEPTH (FT) 11

**Eh (millivolts)**

N/A

SAMPLING DATE 8/18/7

**TEMP. (°C):**

17.5

**SAMPLING TIME:**

ALKALINITY (mg/l CaCO<sub>3</sub>): 120 at 4.50

START 2:30 pm

**LOCATION DESCRIPTION** \_\_\_\_\_

COMPLETE 4.15.21

CONTAINER SIZE	NONACIDIFIED (no.)	ACIDIFIED (no.)	VOL. ACID (ml)
100 ml	1	1	10
250 ml	1	1	25
500 ml	1	1	50
1000 ml	1	1	100
2000 ml	1	1	200
5000 ml	1	1	500
10000 ml	1	1	1000

**NUMBER OF  
CONTAINERS  
COLLECTED:**

## ONE-LITER

**150 ml**

60 ml

**SPECIFY OTHERS:**

COMMENTS: titrd. 1.6 N btd 5133

Ex 1 filters used (German)

FIELD REP (S): D. Miller / R. Altmaier

[illegible]

# WATER QUALITY SAMPLING RECORD

## BORE VOL CALCULATION

$$(\frac{d}{2})^2 \pi (h_1 - h_2)$$

Can #1  
401

## SAMPLING INFORMATION

DEPTH TO WATER ( $h_2$ ) (FT.) 8.82

DEPTH OF WELL ( $h_1$ ) (FT.) 12.74

WELL DIA (FT.) .333

BORE VOL. (FT.)<sup>3</sup> .34

DEPTH TO SCREEN (FT.) \_\_\_\_\_

WITHDRAWAL METHOD Johnson - lect

SAMPLING METHOD Filtered

FILTER SIZE .45

THERMOMETER ID YST

EC METER ID 12779

pH METER ID 114

PUMP ID Johnson

## CALIBRATION INFORMATION

DATE/TIME OF LAST EC CALIBRATION 8/6/81

TIME OF pH CALIBRATION 3:30

pH AFTER MEASUREMENT 7.01 FOR STANDARD pH 7.01

pH AFTER MEASUREMENT 4.03 FOR STANDARD SOLUTION pH 4.00

EH OF CALIBRATING SOLUTION N/A

EH READING IN CALIBRATING SOLN. AFTER MEASUREMENT N/A

TEMP. OF CALIBRATION SOLN. (°C) N/A

## SHIPPING INFORMATION

LAB(S) SHIPPED TO: E.D.A.

DATE(S) SHIPPED: 8/6/81

METHOD OF SHIPMENT: American Airlines

## NOTES:

$$(\frac{.333}{2})^2 \pi (12.74 - 8.82) = .34 \times 7.5 = 2.56 \text{ gal.}$$

$$3 \text{ BV} = 7.68 \text{ gal.}$$

$$1 \text{ gal} = .39 \text{ BV.}$$



JACOBS ENGINEERING GROUP INC.  
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

### ALKALINITY TITRATION GRAPH

SITE ID: Canphi

LOCATION ID: 401

DATE: 8/6/87

ERROR AT 4.50:  $\left| \frac{X1 - X2}{XS} \right| \times 100 = \underline{\hspace{1cm}}\%$

1st = 7 %

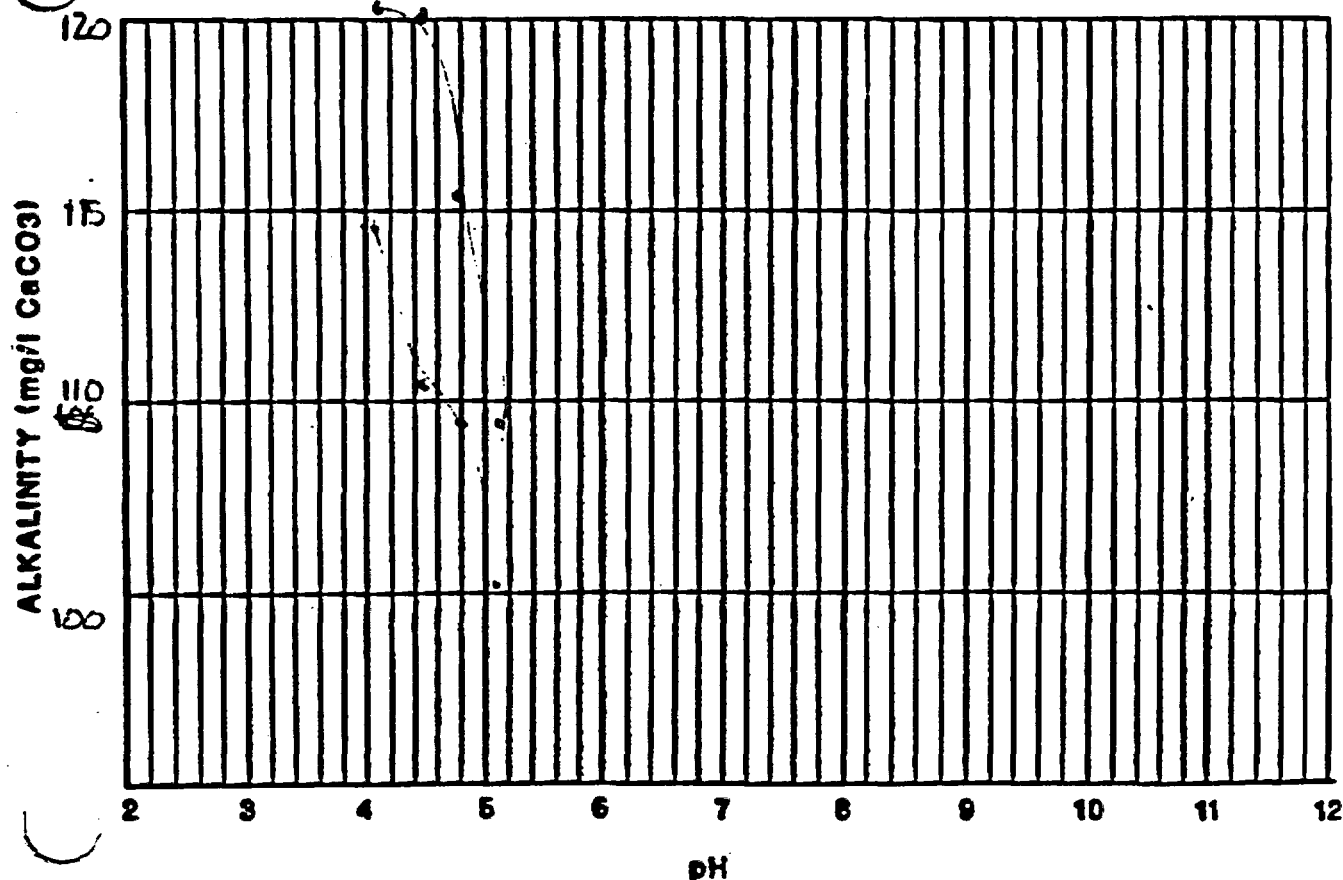
2nd =      %

pH CHECK AFTER TITRATION

7.00 =           

4.00 = 4.05

pH	ALKALINITY (mg/l CaCO <sub>3</sub> )		
	1st	2nd	3rd
8.90	—		
8.60	—		
8.30	—		
8.05	—		
7.80	—		
7.50	—		
6.50	—		
5.70	109		
5.10	109	102	
4.80	116	108	
4.50	120	112	
4.25	121	114	
4.00	122	116	





## ATTACHMENT F

CONTRACT NO. ASD-34-6703-S-85-0026ACKNOWLEDGEMENT OF RECEIPT OF SAMPLES FOR DELIVERY ORDER NO. AD 32SITE ID: Can 01LOCATION ID: 401SAMPLE ID: 01SAMPLE SHIPMENT LISTLot # 1

Bottle ID	Amount	Rec'd	Bottle ID	Amount	Rec'd
A1	<u>22</u>	( )	Th 230	<u>12</u>	( )
A1-A	<u>      </u>	( )	G 18	<u>      </u>	( )
M1	<u>      </u>	( )	N1	<u>12</u>	( )
M1-A	<u>      </u>	( )	N2	<u>      </u>	( )
M2	<u>12</u>	( )	CN	<u>12</u>	( )
M2-A	<u>      </u>	( )	S	<u>12</u>	( )
Pb 210	<u>12</u>	( )	TOC	<u>500ml</u>	( )
Po 210	<u>12</u>	( )	TOX	<u>      </u>	( )
Ra 226	<u>22</u>	( )	SiO2	<u>      </u>	( )
Ra 228	<u>22</u>	( )	Alkalinity	<u>100ml</u>	( )

DATE SHIPPED: 8/18/7METHOD OF SHIPMENT: American AirlinesCOMMENTS: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_I hereby acknowledge receipt of the following on \_\_\_\_\_  
(date)

( ) Delivery Order No. AD \_\_\_\_\_ (Work Order Plan) dated \_\_\_\_\_.

Subcontractor: \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

Partial Analysis Due: \_\_\_\_\_

Complete Analysis Due: \_\_\_\_\_

COMMENTS: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_Delivery of Analysis in accordance with Exhibits B and C of the Subcontract is  
due no later than: Preliminary to JEG by: \_\_\_\_\_

Date

Complete to JEG by: \_\_\_\_\_

Date



SITE ID: <u>CAN Ø 1</u>	FINAL FIELD VALUES:	<u>SURFACE</u>	<u>DOWN-HOLE</u>
LOCATION ID: <u>410</u>			
SAMPLE ID: * <u>1</u>	pH (S.U.):	<u>5.74</u>	<u>N/A</u>
STATIC WATER LEVEL (FT) <u>10.42</u>	Ec (umhos/cm)	<u>410</u>	<u>1</u>
SAMPLE DEPTH (FT) _____	EH (millivolts)	<u>N/A - 19°m</u>	<u>1</u>
SAMPLING DATE <u>8/6/8/6</u>	TEMP. (°C):	<u>17°</u>	
SAMPLING TIME:	ALKALINITY (mg/l CaCO <sub>3</sub> ):	<u>87 at</u>	<u>4.50</u>
START <u>1:15 pm.</u>	LOCATION DESCRIPTION	_____	
COMPLETE <u>9:10 am 8/6/8/7</u>			

CONTAINER SIZE	NONACIDIFIED (no.)	ACIDIFIED (no.)	VOL. ACID (ml)
100 ml	1	1	10
250 ml	1	1	25
500 ml	1	1	50
1000 ml	1	1	100
2000 ml	1	1	200
5000 ml	1	1	500
10000 ml	1	1	1000

**NUMBER OF  
CONTAINERS  
COLLECTED:**

## ONE-LITER

150 ml

50 ml

**SPECIFY OTHERS:**

COMMENTS: TITRATE 1.6 N  $H_2SO_4$  LOT 5133

1 Gelman filter used

FIELD REP (S): D. MILLER / R. ALTHOUSE

[illegible]

# WATER QUALITY SAMPLING RECORD

## BORE VOL CALCULATION

$$(d/2)^2 \pi (h_1 - h_2)$$

Can #1  
-410

## SAMPLING INFORMATION

DEPTH TO WATER ( $h_2$ ) (FT.) 10.42

DEPTH OF WELL ( $h_1$ ) (FT.) 15.78

WELL DIA (FT.) .333

BORE VOL. (FT.)<sup>3</sup> .467

DEPTH TO SCREEN (FT.) \_\_\_\_\_

WITHDRAWAL METHOD THROUGHT

SAMPLING METHOD FILTERED

FILTER SIZE .45  $\mu$

THERMOMETER ID YST

Ec METER ID 12779

pH METER ID 114

PUMP ID 30 HVSU SUBVERSIBLE

## CALIBRATION INFORMATION

DATE/TIME OF LAST Ec CALIBRATION 8/6/81

TIME OF pH CALIBRATION 8:30 AM

pH AFTER MEASUREMENT 7.00 FOR STANDARD pH 7.00

pH AFTER MEASUREMENT 4.01 FOR STANDARD SOLUTION pH 4.01

EN OF CALIBRATING SOLUTION NA

EN READING IN CALIBRATING SOLN. AFTER MEASUREMENT NA

TEMP. OF CALIBRATION SOLN. (°C) NA

## SHIPPING INFORMATION

LAB(S) SHIPPED TO: E.D.A

DATE(S) SHIPPED: 8/6/81

METHOD OF SHIPMENT: Airline Express

## NOTES:

$$\frac{.333}{2} 2\pi (15.78 - 10.42) = .467 \times 7.5 = 3.50$$

$$3BV = 10.50 \text{ gal.}$$

$$1 \text{ gal.} = .29$$



JACOBS ENGINEERING GROUP INC.  
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

### ALKALINITY TITRATION GRAPH

SITE ID: CAN #1

LOCATION ID: 410

DATE: 86/8/6

ERROR AT 4.50:  $\left| \frac{X1 - X2}{XS} \right| \times 100 = \underline{\hspace{1cm}} \%$

1st = 1.1 %

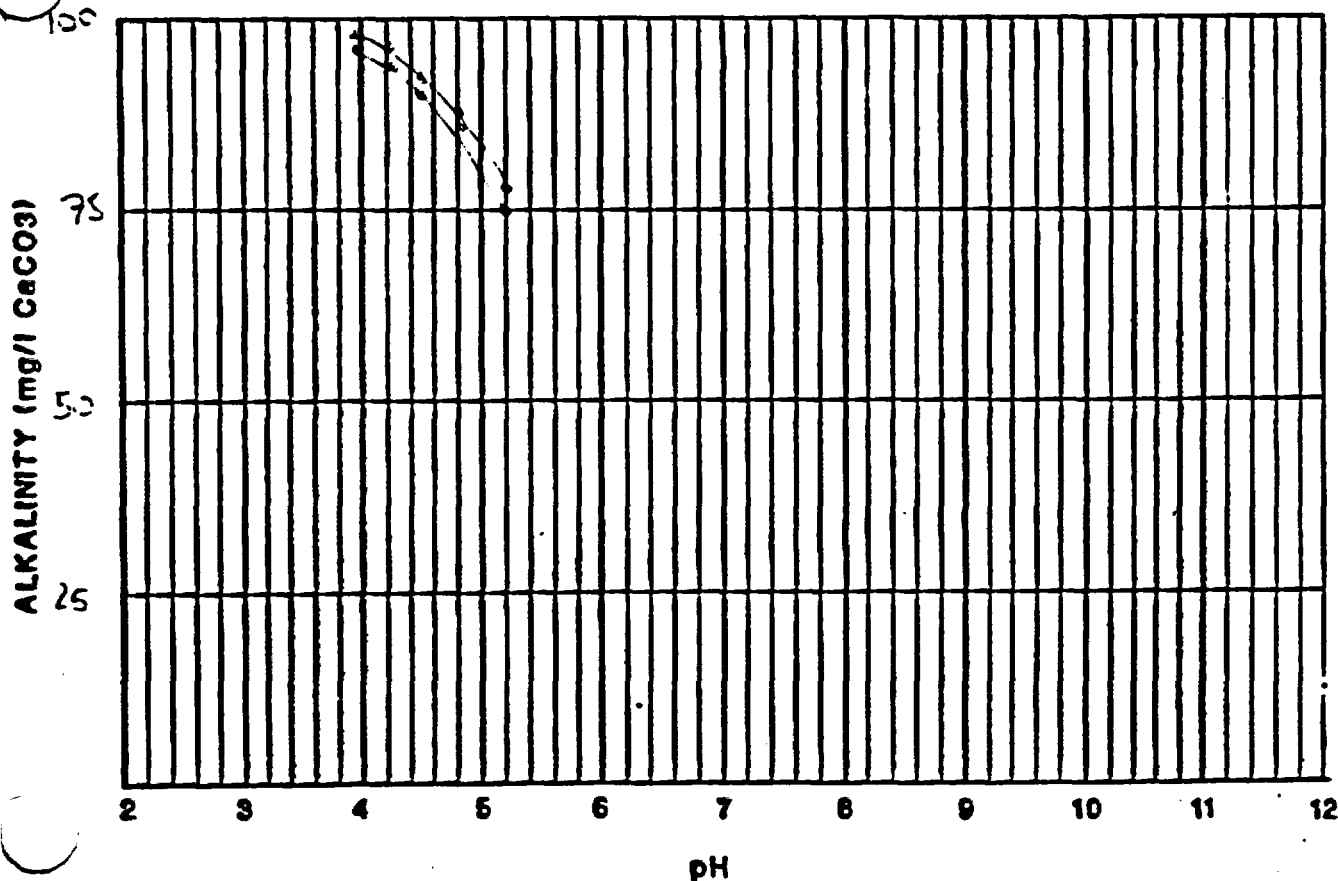
2nd =      %

#### pH CHECK AFTER TITRATION

7.00 = 6.99

4.00 = 4.02

pH	ALKALINITY (mg/l CaCO <sub>3</sub> )		
	1st	2nd	3rd
8.90	—	—	
8.60	—	—	
8.30	—	—	
8.05	—	—	
7.80	—	—	
7.50	—	—	
6.50	—	—	
5.70	—	—	
5.10	77	75	
4.80	83	82	
4.50	87	88	
4.25	90	90	
4.00	91	91	





ATTACHMENT F

CONTRACT NO. ASD-34-6703-S-85-0026

ACKNOWLEDGEMENT OF RECEIPT OF SAMPLES FOR DELIVERY ORDER NO. AD 32

SITE ID: Can #1

LOCATION ID: 410

SAMPLE ID: #1

SAMPLE SHIPMENT LIST

Lot # 1

Bottle ID	Amount	Rec'd	Bottle ID	Amount	Rec'd
A1	<u>2 Q</u>	( )	Th 230		( )
A1-A		( )	G 1B		( )
M1		( )	N1	<u>1.0</u>	( )
M1-A		( )	N2		( )
M2	<u>1.0</u>	( )	CN		( )
M2-A		( )	S		( )
Pb 210		( )	TOC		( )
Po 210		( )	TOX		( )
Ra 226		( )	S102		( )
Ra 228		( )	Alkalinity	<u>100 ml</u>	

DATE SHIPPED: 8/6/86

METHOD OF SHIPMENT: American Airlines Express

COMMENTS: well did not have enough recharge to collect radionuclides, TOC, CN, S

... note: All liter samples collected in 500 ml poly containers due to bottle situation

I hereby acknowledge receipt of the following on \_\_\_\_\_ (date)

( ) Delivery Order No. AD \_\_\_\_\_ (Work Order Plan) dated \_\_\_\_\_

Subcontractor:

Name: \_\_\_\_\_  
Title: \_\_\_\_\_  
Date: \_\_\_\_\_

Partial Analysis Due: \_\_\_\_\_

Complete Analysis Due: \_\_\_\_\_

COMMENTS: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Delivery of Analysis in accordance with Exhibits B and C of the Subcontract is no later than: Preliminary to JEG by: \_\_\_\_\_

Date

Complete to JEG by: \_\_\_\_\_

Date

21-66



JACOBS ENGINEERING GROUP INC.  
ADVANCED SYSTEMS DIVISION, ALBUQUERQUE OPERATIONS

# GROUND WATER SAMPLING RECORD

Page 1 of 3

SITE ID: Can #1 FINAL FIELD VALUES: SURFACE DOWN-HOLE

LOCATION ID: 412

SAMPLE ID: \* #1 pH (S.U.): 6.34 N/A

STATIC WATER LEVEL (FT) 13.78 Ec (umhos/cm) 1200 1

SAMPLE DEPTH (FT)            Eh (millivolts) N/A 1

SAMPLING DATE 8/18/16 TEMP. (°C): 14.0 N/A

SAMPLING TIME: ALKALINITY (mg/l CaCO<sub>3</sub>): 314 at 450

START 10:25 LOCATION DESCRIPTION           

COMPLETE 12:05

CONTAINER SIZE NONACIDIFIED (no.) ACIDIFIED (no.) VOL. ACID (ml)

NUMBER OF  
CONTAINERS  
COLLECTED:

ONE-LITER

150 ml

50 ml

See attachment F

SPECIFY OTHERS:

COMMENTS: titrate 1.6 N H<sub>2</sub>SO<sub>4</sub> lot # 5133  
collected SPITS 416, 417, 418, 419

7 filters used GeotekFIELD REP (S): D. Miller / R. Atchase

DATE	TIME	TOTAL VOLUME WITHDRAWN		pH	Ec (umhos/cm)	TEMP. (°C)	COMMENTS
		(Gals)	(Bore Volumes)				
8/18/16	10:56	0.0	0.0	-	-	-	START PUMPING
	10:52	2.0	0.38	6.71	1300	16	EC max umhos
	10:54	4.0	0.76	6.72	1250	15	
	10:56	6.0	1.14	6.72	1250	14.5	
	10:58	8.0	1.52	6.71	1250	14.5	
	10:59	9.0	1.71	6.73	1225	14.0	pH meter adjusted
	11:04	14.0	2.66	6.28	1200	14.0	
	11:08	18.0	3.42	6.32	1200	14.0	
	11:11	21.1	3.99	6.34	1200	14.0	

*Draft*

Supplement No. 12

Page 1 of 4

4/14/87

SUPPLEMENTAL QUALITY ASSURANCE REQUIREMENTSPROTOCOL FOR SUPPORT OF OBSERVERS  
ON DOE QUALITY ASSURANCE AUDITS

## 1.0 GENERAL

*for external  
or internal  
observers?*

This supplement provides guidance for the support of observers of DOE QA audits during pre-licensing OCRWM activities and establishes the basis for determining the appropriate number of observers for planned audits. It supplements the requirements of the OGR QA plan. The guidance in this supplement is to be used in conjunction with requirements embodied or referenced in the governing QA Plans and Procedures.

## 2.0 PURPOSE

The purpose of this Supplement is to describe the role of observers on DOE audits and the support that is to be provided to such observers in order to promote maximum mutual benefit from the observation process.

## 3.0 SCOPE

This Supplement applies to all audits performed by HQ-OGR, Project Offices, and Project Office contractors.

## 4.0 DEFINITIONS

4.1 Observer

An individual who accompanies an audit team on an audit, but has no responsibility for audit preparation, examination and evaluation of audit evidence, or preparation of the audit report, and who is not under the direction of the audit team leader.

*all persons must be  
under the direction of  
the audit team leader*4.2 Audit Subteam

A subdivision of the audit team, designated to conduct a particular part of the audit. The subteam will ordinarily include one or more QA auditors and, as appropriate, a technical specialist, but may consist only of the technical specialist(s) who should also have audit training.

## 5.0 RESPONSIBILITIES

### 5.1 Requesting Organization

recommend  
60 days  
in advance

The organization requesting to observe a particular audit should submit its request in writing at the earliest practicable time, recognizing that the number of observers that can be accommodated is limited by such factors as auditee work space and audit team size.

The number of observers will normally be restricted to one observer for every four auditors with a maximum of three observers per audit.

### 5.2 HQ-OGR QA Manager

*QA after consultation with organization conducting audit*  
The HQ-OGR Manager shall be responsible for approving requests from organizations desiring to have observers at DOE audits.

### 5.3 QA Manager of Auditing Organization

The QA manager of the auditing organization shall be responsible for determining, in consultation with the audit team leader, the maximum number of observers that can be accommodated on each audit. Ordinarily, up to one observer for each audit subteam should be acceptable; however, logistics may dictate a smaller number.

may be difficult  
at time of release  
of audit schedule  
to determine full  
scope & hence the  
no. of observers

The QA manager of the auditing organization shall inform the HQ-OGR QA manager of the number of observers that can be accommodated on the audit. The information should be supplied ~~and/or updated~~ for each audit on the published audit schedule, updated each time the audit schedule is updated. If ~~changed~~ circumstances result in a change in the number of observers that can be accommodated, the responsible QA manager should notify the HQ-OGR QA manager as early as possible.

### 5.4 Audit Team Leader

The audit team leader shall be responsible for pre-audit support of authorized observers. Support should include the following, as a minimum:

observer must  
attend audit  
team briefing-  
a late pre-  
audit observer  
briefing

- (a) Copy of preliminary audit plan, identifying intended audit scope, the dates of audit performance, and the time and place of the pre-audit observer briefing. This information should be transmitted as an attachment to, or as part of, the formal audit notification.
- (b) As requested by individual observers, copies of procedures relevant to the activities of interest to the observer.

observers  
receive  
same  
material  
as audit  
team

[2/6/87]

MAC:JHR [QA14B7.R5]

use only one audit plan

is corrective  
action history  
the last audit

- (c) Copy of final audit plan, including corrective action history from previous audits of the audited activities, audit checklist, audit team list, and planned schedule of audit activities. The final audit plan may be transmitted to observers upon approval or, if the observer prefers, at the pre-audit observer briefing.

delete  
all words  
after  
approval

- (d) Direct communication with observers during audit preparation, to the extent necessary to enable observers to achieve observation objectives and remain consistent with DOE audit objectives.

### 5.5 Observer

The observer should be expected to inform the audit team leader of any special information needs as they are recognized, so that support can be provided in a timely and responsive manner.

You are  
opening the  
door for  
special  
request.

## 6.0 REQUIREMENTS

### 6.1 Pre-Audit Briefing

a separate briefing should  
not be held for observers

A pre-audit briefing shall be provided for audit observers. The briefing should be scheduled in such a manner as to minimize impact on observer travel schedules. Where feasible, it is recommended that the briefing be presented the same day as the audit entrance meeting.

The briefing should address at least the following agenda:

should  
not be  
mandatory  
but a  
shopping  
list

- (a) Introduction of audit team members and observers
- (b) The auditee's role in the project
- (c) How work and requirements are specified for the auditee
- (d) How the auditee expresses specified QA requirements internally
- (e) How the auditee manages and coordinates project related work
- (f) How audit preparation was conducted
- (g) The auditee's corrective action history (i.e., previous audits, CARs, etc.)
- (h) Audit scope (i.e., activities to be audited and QA program elements to be addressed)
- (i) Review of planned schedule of audit events
- (j) Security and escort arrangements, if applicable.



## 6.2 Audit Protocol

The audit team leader should endeavor to place each observer with the subteam that will be auditing activities of particular interest to the observer. The placement process should be kept as flexible as possible during the audit to maximize the observers' opportunities to cover the areas that concern them.

be expected to

During audit performance, observers will normally attend the opening and exit meetings, will accompany audit subteams during the audit process, should be encouraged to attend any audit team meetings or caucuses, and to join the team during final evaluation of audit results and preparation for the exit meeting.

delete "be encouraged to"

During the performance of the audit, the observers should communicate any questions, comments or concerns to members of the appropriate audit subteam and/or to the audit team leader. The audit team should ensure that any such communications receive prompt, effective attention. Questions of the audited organization by the observers are not permitted.

The audit <sup>report</sup> package shall document the portions of the audit that were observed, and by whom.