"Rite in the Rain®"
ALL-WEATHER WRITING PAPER

CNWRA

CONTROLLED COPY 240 4/29/03 589

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Project 20.01402.861
Unsat & Saturated
Zone Under Isothermal
Conditions

Reissued as S/N No. 240
5/3/2000

"Rite in the Rain" - a unique all-weather writing surface created to shed water and to enhance the written image. Makes it possible to write sharp, legible field data in any kind of weather.

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10/1/97 JP

Site Decommissioning Management Plan (SDMP) - Task 04

20-8801-004 - Modeling Leach Processes

Initial entry 10/1/97 by

James D. Pryl JP

This notebook chronicles the field work conducted for Task 04 of the SDMP.

JP
4/29/03

Final Entry!

This notebook, However brief (!) appears to comply with QAP-001.

E. C. Percy

2/4/2000

This notebook was been reissued to Walter Tillman as No. 240 on 5/3/2000

E. C. Percy

JP 4/29/03

4/29/03 JP

Radionuclide Transport (RT)

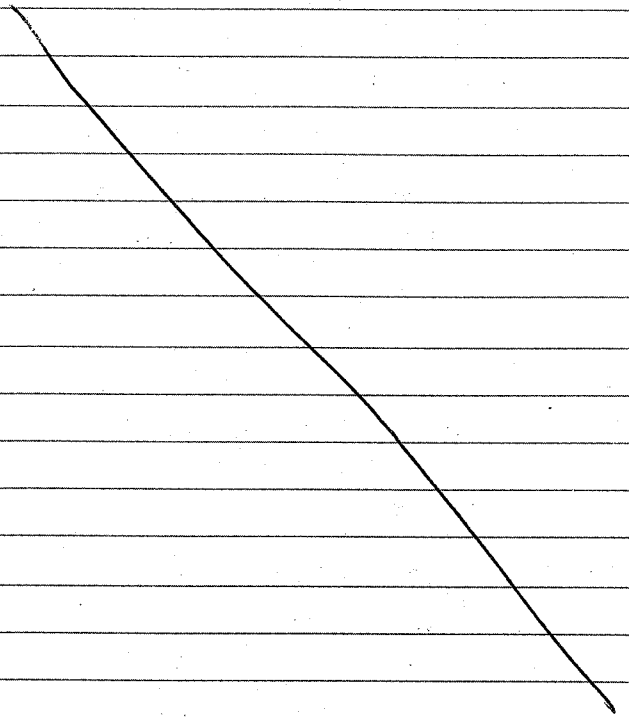
20.06002.01.141

Initial entry 4/29/03 by

James D. Prikryl JP

This notebook chronicles field work conducted for the RT KTI.

5/2/03 Preparations for field trip to Wopal to conduct water sampling. The following page has a list of all the equipment, materials & supplies taken to Wopal I for water sampling & field chemical analyses.



Nopal I – Water sampling, field chemical analysis, and miscellaneous equipment, materials, and supplies

Water sampling for cation, anion, and isotopic analyses.

1L HDPE bottles
250 ml amber glass bottles
Hand pump
Millipore filter housings
Flow totalizer
Masterflex Portable Sample Pump with pump head
AC and DC adapters for Masterflex pump
Mn impregnated filters and housings
Tubing and fittings
In line filters – Gelman Aquaprep 600 capsules

If possible the following sample types and amounts from each well sampled will be brought back for chemical analysis

2L	Filtered and acidified (add 3 ml of 1+1 HNO3)
1L	Filtered and unacidified
1L	Unfiltered and unacidified
250 ml	Filtered and acidified (add 1 ml of 1+1 HNO3)
250 ml	Unfiltered and unacidifed

Field chemical analysis

pH-temp	Hach Model 50200 Combination pH electrode with temperature Hach Model EC20 pH/ISE meter Hach Singlet pH 4.01 Buffer Solution Packs – lot # A2039 Hach Singlet pH 7.00 Buffer Solution Packs – lot # A2053 Hach Singlet pH 10.01 Buffer Solution Packs – lot # A2298 Fisher Buffer Solution pH 4.00 – lot # 011780-24 Fisher Buffer Solution pH 7.00 – lot # 013451-24 Fisher Buffer Solution pH 10.00 – lot # 013656-24
Conductivity	Hach Model 50161 Conductivity Probe Hach Model CO150 Conductivity Meter Hach Singlet Conductivity Standard Solution Packs (180 us/cm) – lot # A1292 Hach Singlet Conductivity Standard Solution Packs (1990 us/cm) – lot # 9344 Fisher Traceable Conductivity Calibration Standard (101.5 uohm/cm) – analysis # 2766 Fisher Traceable Conductivity Calibration Standard (1430 uohm/cm) – analysis # 2815
Redox	Orion 290A meter Corning redox combination electrode ORP Standard (424 mV at 20C; 420 mV at 25C) Saturated KCl fill solution – lot # 2141
Dis. Oxygen	WTW Oxi330I meter WTW CellOx 325 probe
Alkalinity	Hach AquaChek 5 in 1 Water Quality Test Strips Hach Digital Titrator Hach Digital Titrator Cartridges 1.6N sulfuric acid – lot # A2011 Hach Digital Titrator Cartridges 0.16N sulfuric acid – lot # A2018 Delivery tubes

Phenolphthalein Indicator Powder Pillows – lot # A2039
Bromcresol Green Methyl Red Indicator Powder Pillows – lot # A1327
250 ml Erlenmeyer flask
100 ml Volumetric cylinder

Other supplies needed

Plastic bottles – 30 ml; 60 ml
Sample beakers -- various sizes
Stir bars
Magnetic stick
Scienceware magnetic stirrer
Kimwipes
Hach pH Buffer Powder Pillows 4.01 – lot # 1355
Hach pH Buffer Powder Pillows 7.00 – lot # A1243
Hach pH Buffer Powder Pillows 10.01 – lot # A1299
Parafilm

Batteries (9V and AA and D)
Sharpies and pens

Ultrapure water
Squirt bottle
Acid (1+1 HNO3; lot # - 012229)
Oxford 5 ml pipet
5 ml plastic pipet tips

Tape measure
Gamma meter
Radiation badges
Rock hammer
Sample bags

Camera
Cell phone
Scientific notebook
Site maps

Tape
Scissors
Tools

5/16/03 JP

Water sampling at Napal I.

Arrived at site at about 1330 hrs. A bailer will be used to retrieve water in boreholes drilled at the site. The boreholes were drilled to the water table ~200 m deep. 2 boreholes have been completed. These are named PB2 + PB3. A third borehole is still being drilled. This borehole is named PB1. PB1 is being drilled thru the orebody + a core is also being collected for this borehole. PB2 is 50m upgradient (in term of groundwater flow) on the Level +10. PB3 is 50m downgradient.

5/6/03 JP
PB2 water sampling + Field chemical analyses.

PH - 11.28
Temp - 26.7°C

ORP - 524.4 mV

Conductivity
Temp. std - 31.2°C
S-2 20.0°C

2.02 mS 26.1°C

Dissolved Oxygen
4.63 mg/L

Alkalinity
Phenolphthalein endpoint 251
Bromcresol endpoint 340

5/6/03 JP
Notes - PB2 sampling

The bailer was lost on the first retrival of water from PB2. Apparently the string attached to the bailer broke due to the weight of the bailer + water.

A second smaller bailer (~1L) was used to remove water from the borehole.

The water removed from PB2 was very turbid and contained significant suspended solids.

Results of field analyses of pH, Temp, ORP, conductivity, Dissolved Oxygen + alkalinity are shown on previous page.

5/6/03 gp

Notes (cont)
Water sample from PB2 were also collected for subsequent cation, anion, & isotope analyses.
Preserving + preparation of these samples were done by D. Pickett. (See Scientific Notebook #121)
1L of water was filtered and acidified for cation analysis
1L of water was filtered but not acidified for anion analysis.
2 250ml samples were filtered + acidified + placed in amber glass bottles

For the field chemical analyses the equipment, standards, + chemicals listed on p 5-6 were used to conduct the analyses.

5/7/03 gp

Water sampling at PB3 on Level +00

Arrived at site about 1300hr.
A bailer was used to retrieve water from the borehole

Field chemical analyses

pH =
Temp =

Conductivity
Temp std 30.7°C
S-2 20.0°C

ORP- could not cal meter -
std read 472.5 mV

Did not collect any water.
Bailer lowered to bottom of hole + stirred up mud.

5/7/03 JP

Water sampling at PB4

Arrived at borehole at ~1545 hrs

Field chemical analysis

pH 9.89
Temp 29.9°C

Conductivity
Temp std 30.7°C
S-2 20°C
Sample - 182.3 µS

ORP - could not cal meter
std read at 472.5 mV
sample - 138.9 mV

Dissolved O_2 - 2.02 mg/L

Alkalinity
Phenolphthalein - 48
Bromcresol - 69

5/7/03 JP

Water sampling at Pecos well

pH - 7.15
Temp - 30.8°C

Alkalinity
Phenolphthalein - 0
Bromcresol - 159

5/7/03 gp

Notes on second day of sampling at Nopal I - PB3, PB4, & Pocos well

Water was not collected at PB3. The bailer was lowered to the bottom of the hole and stirred up a large amount of mud. Sample brought up were sandy mud & not appropriate for water chemistry. Steve Goldstein of LANL was able to collect about 1L of water before stirring up the mud.

5/7/03 gp

Water at PB4 was collected at depth of ~90m. This well had been sampled in a previous trip to Nopal, Water sampled this trip was fairly turbid and had an unexpected high pH.

Water at Pocos well was visual clear - not a lot of suspended solids. Only pH, temp, & alkalinity were measured in the field.

5/7/03 gp

Correction of water from p10. At PB2 the samples collected for return for cats, anions, + isotope analysis were actually:

2L of water filtered + acidified - in 2 1L plastic bottles

5/7/03 gp 250ml ~~1L~~ of water unfiltered and unacidified in 250 ml amber bottle.

250ml of water filtered and unacidified in 250 ml amber bottle.

The same suite of samples were collected at PB4 and the Pocos well.

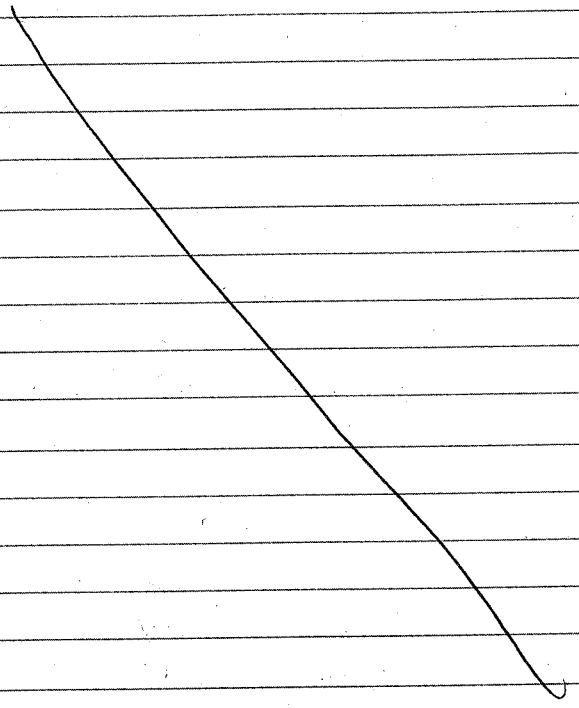
5/8/03 gp

Listed below are the sample IDs of waters collected from PB2, PB4, + the Pocos wells.

Well PB2		
PB2-503-1a	1L	filtered + acidified
PB2-503-1b	1L	filtered + acidified
PB2-503-1c	250ml	unfiltered + unacidified
PB2-503-1d	250ml	filtered + unacidified
Well PB4	~~1L~~ gp 5/8/03	
PB4-503-1a	1L gp 5/8/03	filtered + acidified
PB4-503-1b	~~2~~ 1L	filtered + acidified
PB4-503-1c	250ml	unfiltered + unacidified
PB4-503-1d	250ml	filtered + unacidified
Pocos well		
POCOS-503-1a	1L	filtered + acidified
POCOS-503-1b	1L	filtered + acidified
POCOS-503-1c	250ml	unfiltered + unacidified
POCOS-503-1d	250ml	filtered + unacidified

5/8/03 JP

Additional information on the water samples collected at PB2, PB4 + the Pecos wells can be found in scanner notebook #121.



GEOSCIENCES AND ENGINEERING DIVISION

SCIENTIFIC NOTEBOOK REVIEW CHECKLIST RECORD

Scientific Notebook No. 589 Project Numbers: 20.06002.01 141

Accomplished

- [✓] 1. Initial entries per QAP-001
- [✓] 2. Dating of entries
- [ ] 3. Corrections (crossed out, one line through w/initials/date)
- [ ] 4. No White out used
- [✓] 5. Page number visible on copy or original notebook
- [✓] 6. In process entries per QAP-001
- [✓] 7. Figure information present
- [✓] 8. Text readable
- [NA] 9. Copyrighted material is identified
- [✓] 10. Permanent ink or type only
- [✓] 11. Signing of entries (not required on each page)
- [N/A] 12. Electronic media in the scientific notebook properly labeled
- [✓] 13. NRC Supplementary Scientific Notebook Questions are addressed.
- [✓] 14. The independent, two person verification required by AP-019, Section 5.2.1.2(b) is complete

Any discrepancies must be resolved before notebook closeout.

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I have reviewed this scientific notebook and find it in agreement with QAP-001.

E. C. [illegible] — Manager's Signature

10/17/2007 — Date

Attach this completed form to the last page of the notebook.