CNWRA
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COPY 425

Project
NOTEBOOK NO. 20-01402-661
ISSUED TO Melissa Hill MA
ON 9/1/00
DEPARTMENT 20 CNWRA
RETURNED

—SCIENTIFIC NOTEBOOK CO.—
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INSTRUCTIONS

1. **The primary purpose of this notebook is to protect your and the Company's Patent-Rights by keeping records of all original work in a form acceptable as evidence if any legal conflict arises.**

2. • When starting a page, enter the title, project number, and book number.
   • Use ink for permanence -- avoid pencil.
   • Record your work as you progress, including any spur-of-the-moment ideas which may be developed later.
   • Avoid making notes on loose paper to be recopied.
   • Record your work in such a manner that a co-worker can continue from where you stop. You might be ill and to protect your priority it could be urgent that the work continue while you are absent.

3. • Give a complete account of your experiments and the results, both positive and negative, including your observations.
   • Record all diagrams, layouts, plans, procedures, new ideas, or anything pertinent to your work including the details of any discussions with suppliers, or other people outside the Company.
   • Do not try to erase any incorrect entries; draw lines deleting them, note the corrections, sign and date the changes. This extra care is worthwhile because of the necessity of original data to prove priority of new discoveries.

4. • After entering your data, sign and date the entries.
   • Explain your work to at least two witnesses who are not co-inventors, and have them sign and date the pages in the place provided.
   • Record the names of operators and witnesses present during any demonstration and have at least two witnesses sign the page. If no witnesses are present during an experiment of importance, repeat it in the presence of two witnesses.

5. Since computer programs can be patented these instructions apply to the development of computer software. In this case a description of the structure and operation of the program should be recorded in the notebook, together with a basic flow diagram which illustrates the essential features of the program. In the course of developing the code, the number of lines of code written each day should be recorded in the notebook, together with a statement of the portion of the flow diagram to which the section of code is directed.

6. This notebook and its contents are the exclusive property of the Company. It is confidential and the contents are not to be disclosed to anyone unless authorized by the Company. You must return it when completed, upon request, or upon termination of employment. It should be kept in a protected place. **If loss occurs, notify your supervisor immediately, and make a written report describing the circumstances of the loss.**

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9/1/00 This notebook is a continuation of notebook #220. It contains results of numerical simulations performed for the Thermal Effects on flow (TEF) KTI. Initial entry by Melissa Hill.

MH 9/1/00

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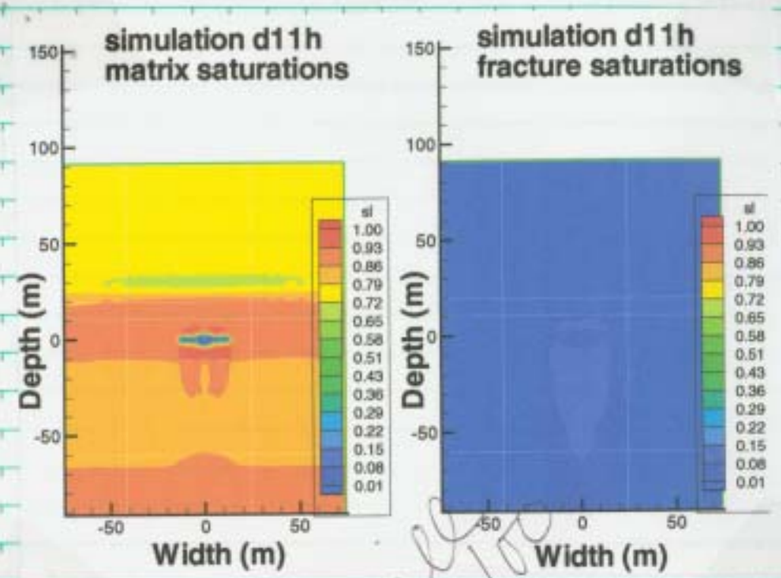
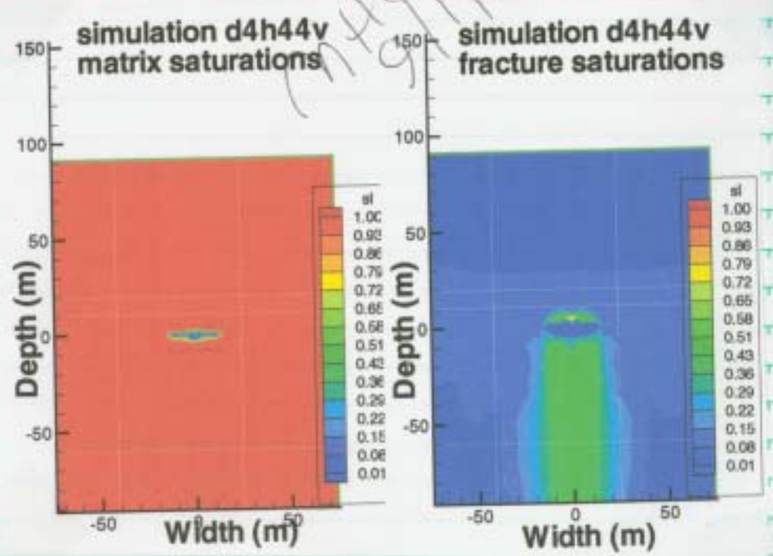
9/1/00 Continuation of plots for TEF August 2000 deliverable (see notebook #220 for additional plots p 301-304).





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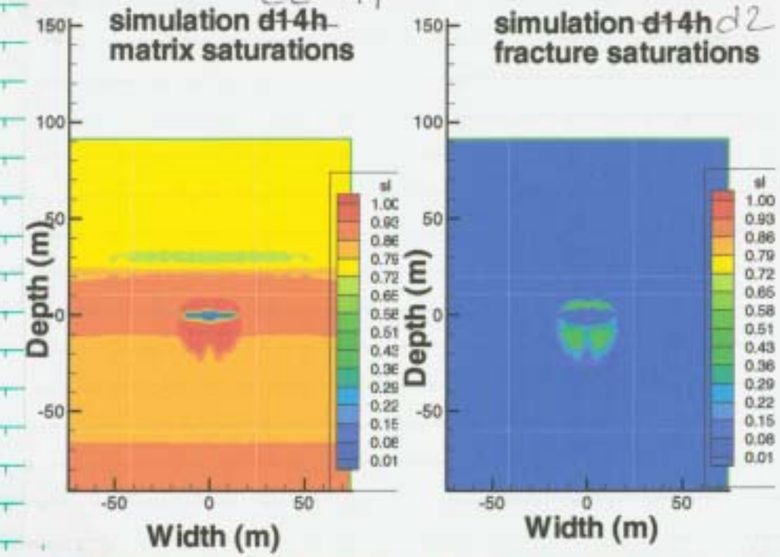

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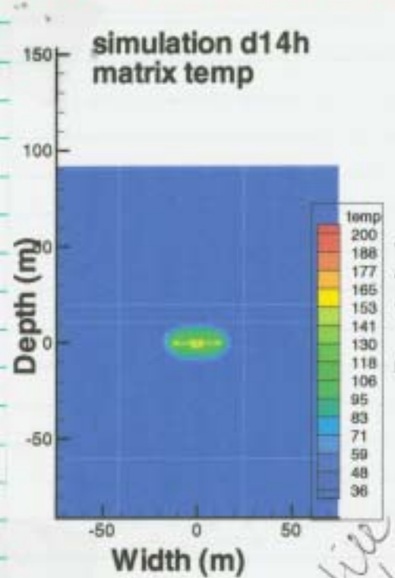
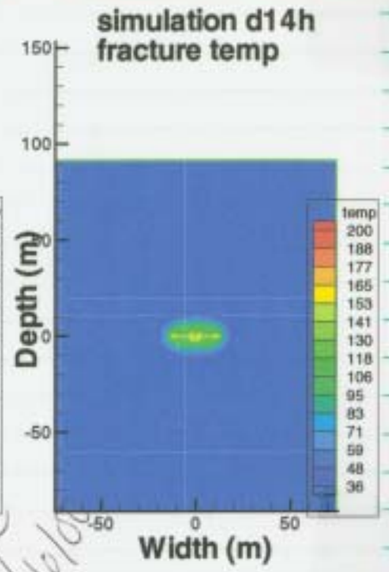
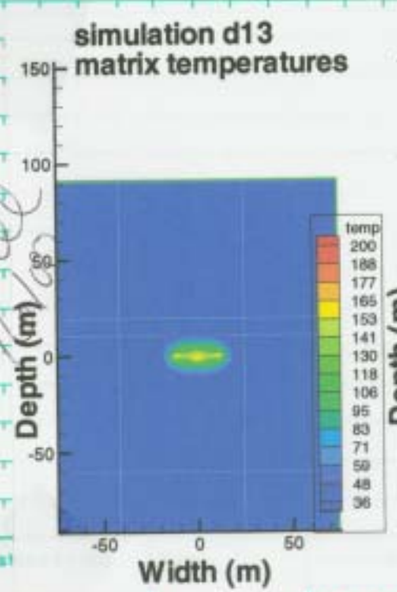
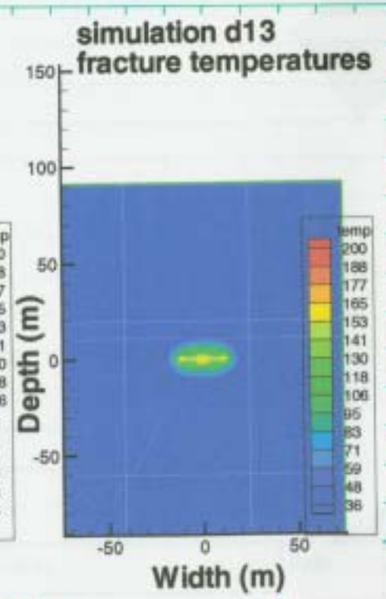
9/6/00 Continuation of plots for TEF August 2000 deliverable (See notebook # 330 for additional plots p 301-304).





M Hill 9/6/00





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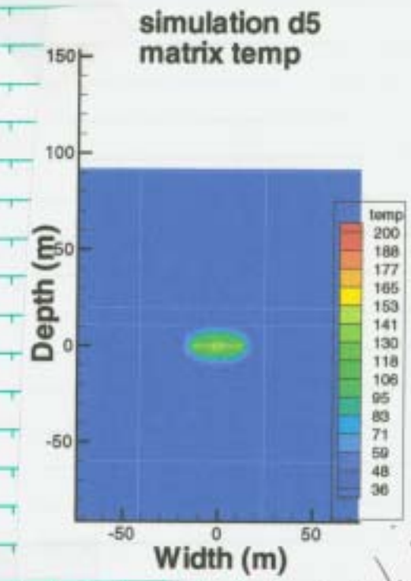

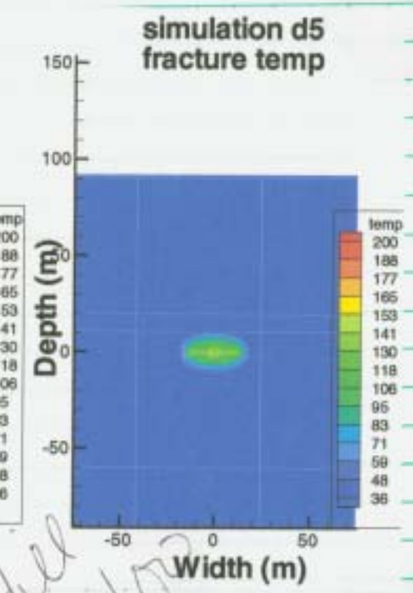

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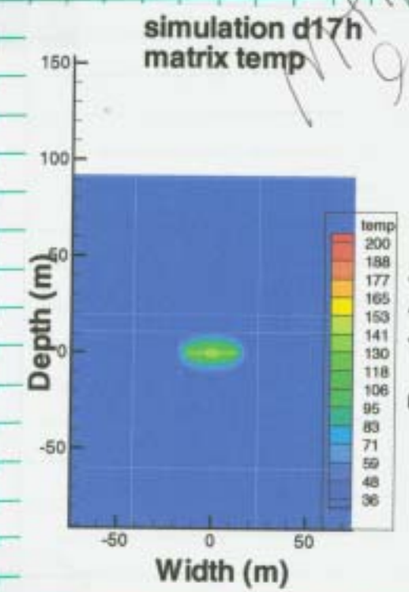

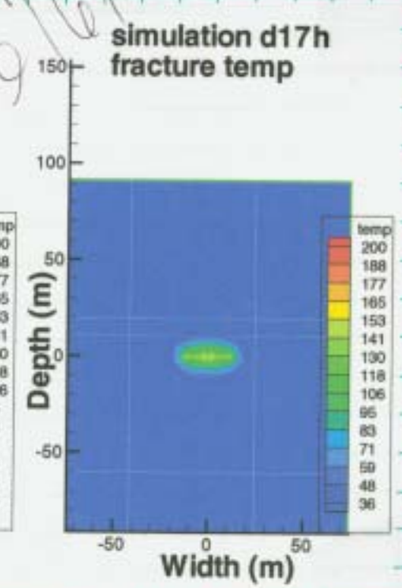

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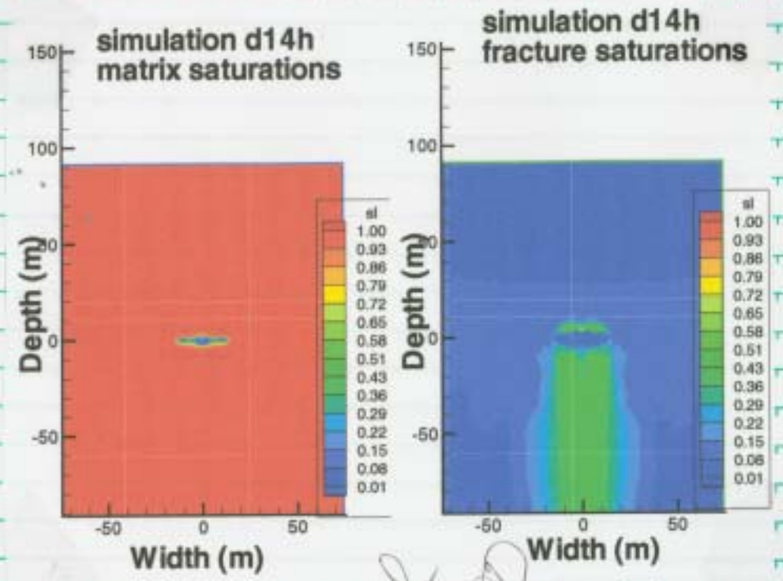

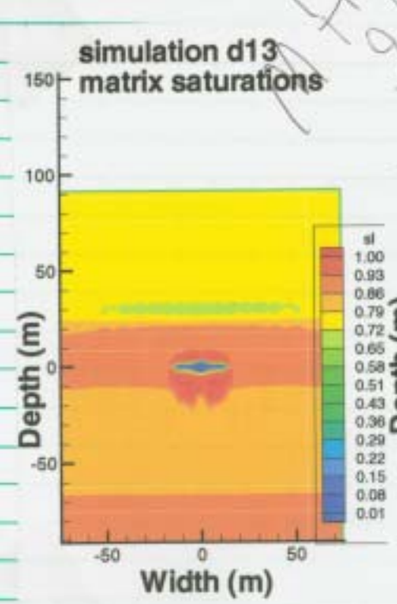

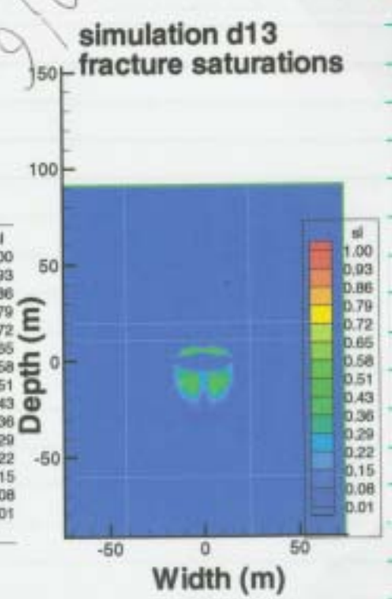

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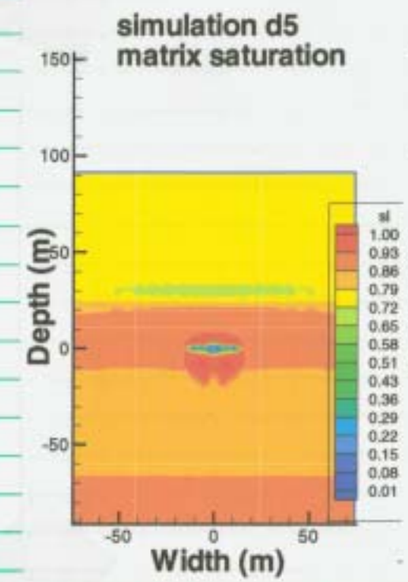

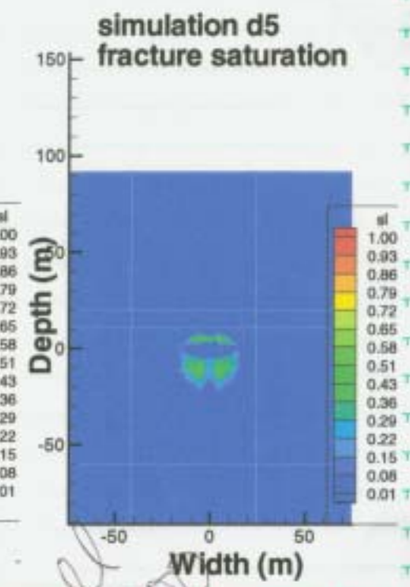

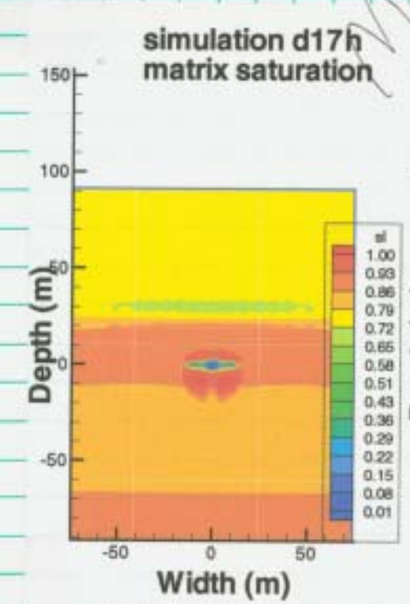

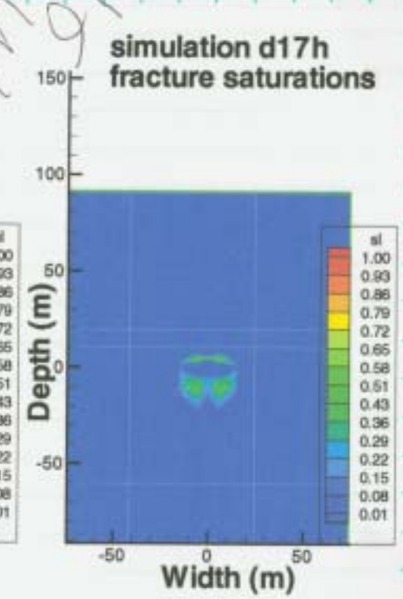

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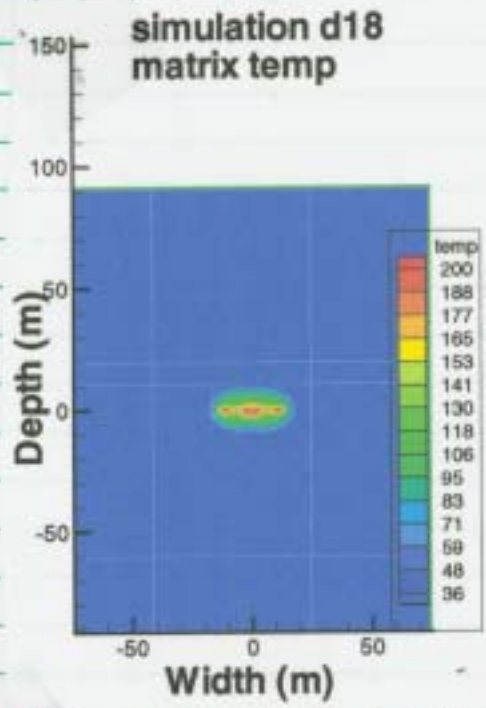
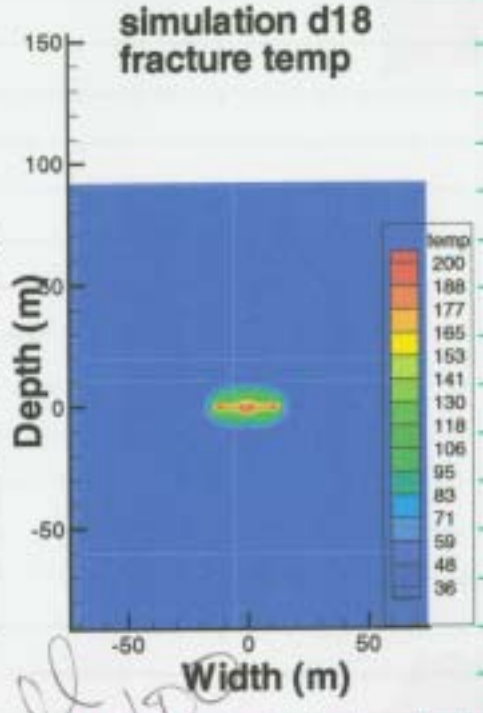
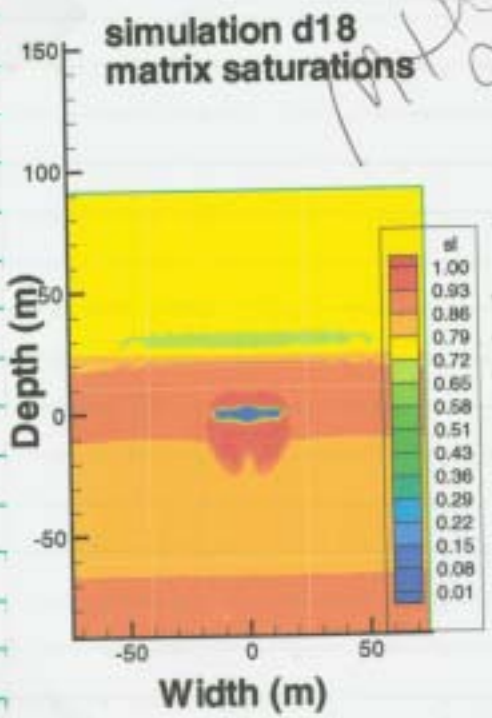
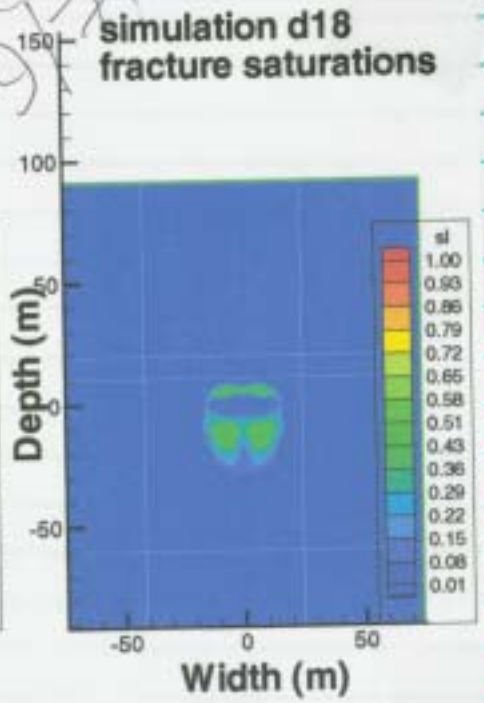
9/7/00 Continuation of plots for TEF August 2000 deliverable (see notebook # 220 for additional plots p301-304).









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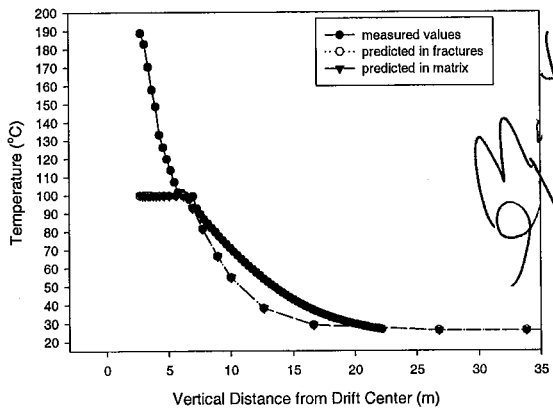

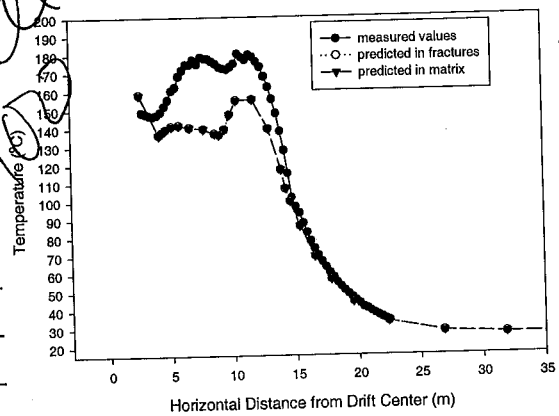

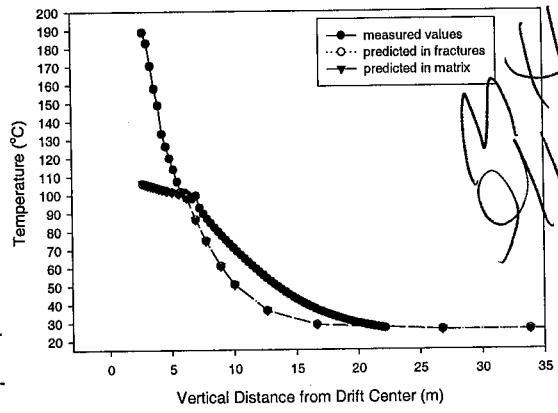

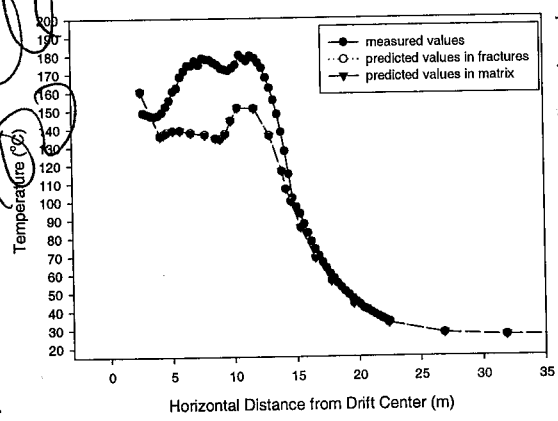

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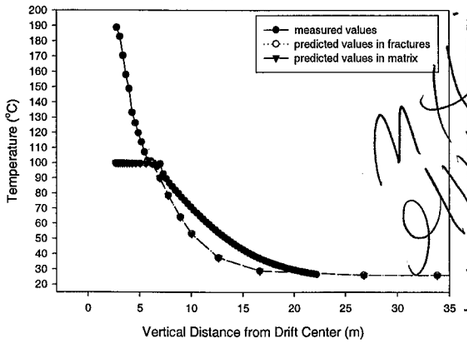
Temperature vs. Distance Borehole 158
simulation d11h 1yr
d11hfldf1.xyp & d11hfldm1.xyp
vulcan/home/mhill/ron
filename: d11h1581y.jnb



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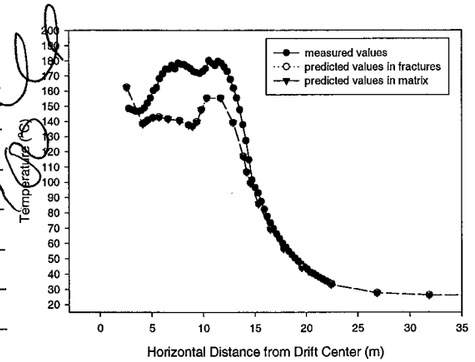

Temperature vs. Distance Borehole 158
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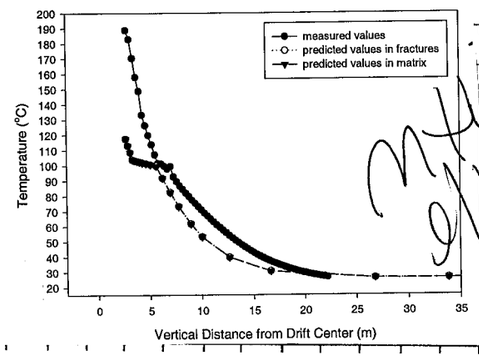

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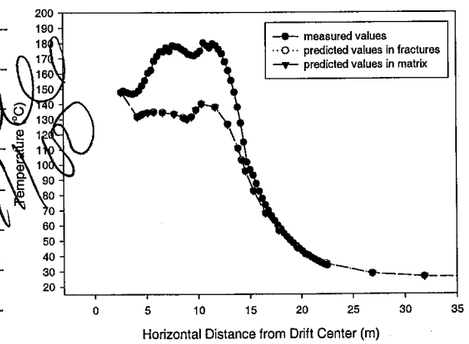

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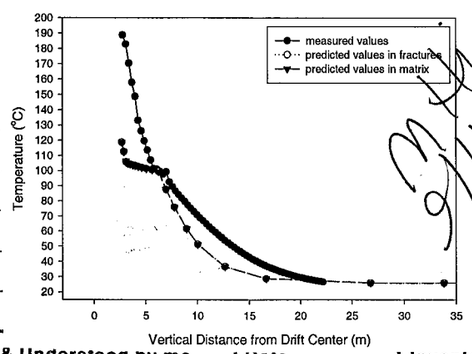

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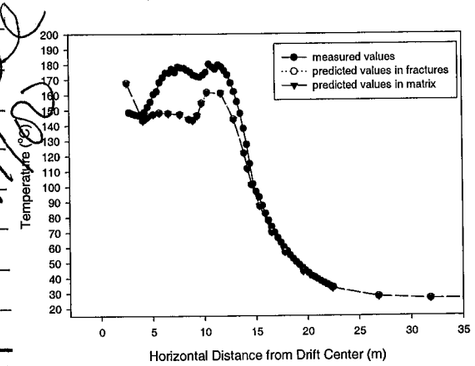

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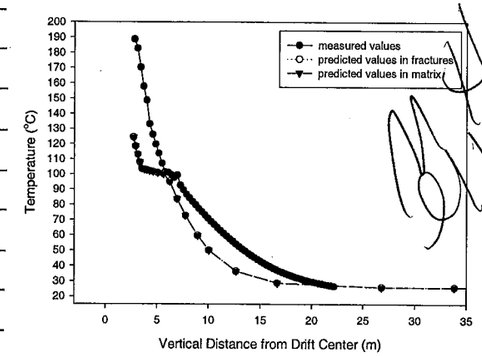

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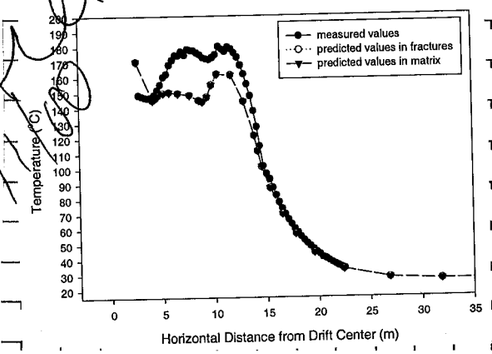

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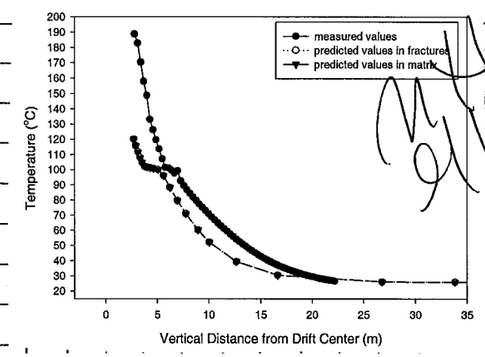

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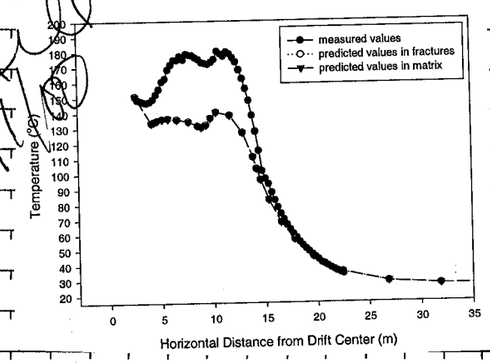

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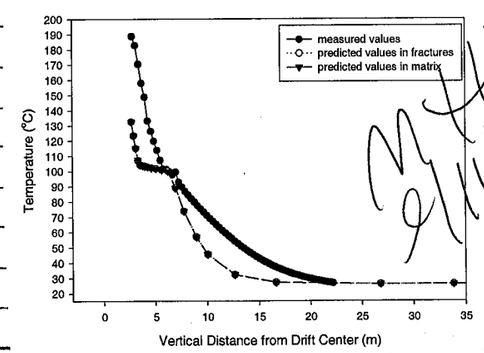

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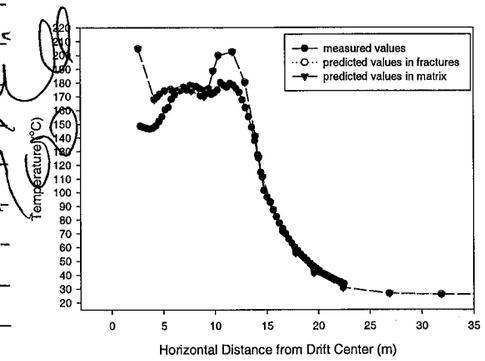

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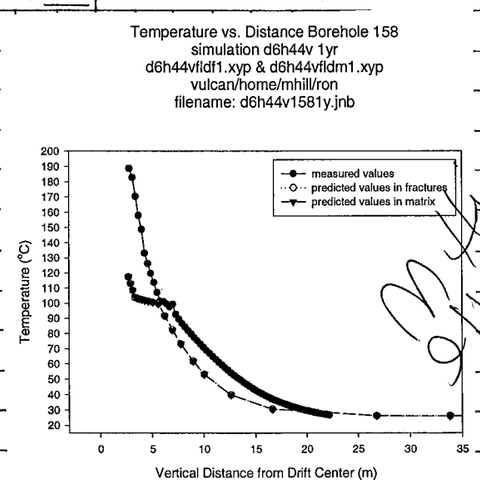

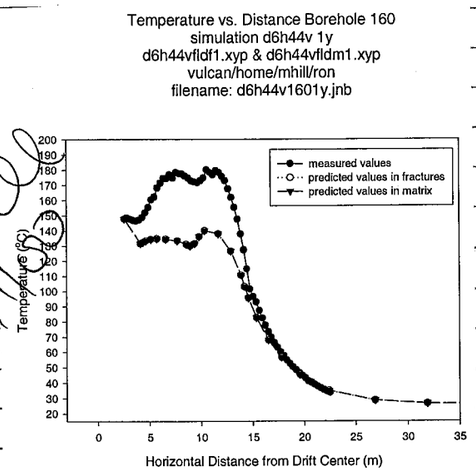

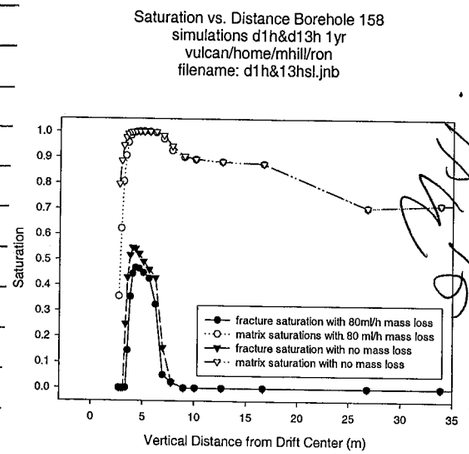

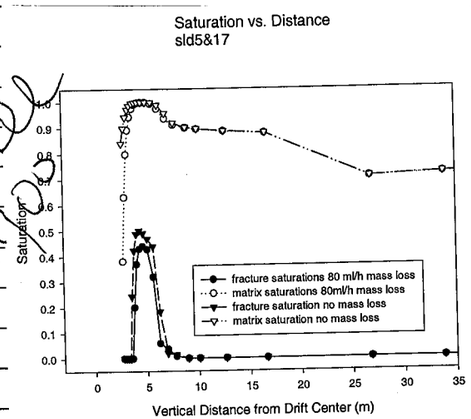

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Directions for processing data for dsht model results

TEF August 2000 deliverable

For vertical/horizontal profiles

<u>In one directory: (copy from vulcan/home/mhill/ron)</u>

Step 1: write contents of col158.dat to profile.pts
Step 2: type Plotf — program written in Fortran by D. Hughson MH. 9/11/00
Step 3: type filename
Step 4: save plotf.dat file under different name
Step 5: type vertprof — program written in Fortran by D. Hughson MH 9/11/00
Step 6: type plotf.dat
Step 7: save vertprof.dat file under different name
Step 8: copy renamed vertprof.dat file to own directory
Step 9: cut and paste column B from fnfldf.xyp (z-coordinates) to a new excel spreadsheet
Step 10: cut and paste column B from fnfldm.xyp (z-coordinates) to the excel worksheet opened in step 9
Step 11: sort data in B column in ascending order
Step 12: open file 158-1year file which contains measured values and sort column B in ascending order
Step 13: cut from file 160-1.9y original and corrected (+2.5m) distances and paste to file discussed in step 12
Step 14: cut predicted values from models processed in steps 10&11 and paste to file discussed in step 13 and save file as .xls worksheet
Step 15: open .xls file in Sigmaflop and plot up results
Step 16: write contents of col160.dat to profile.pts and repeat steps 2-16. Note: in steps 9&10 cut and paste column A and in step 11 sort column A. In step 12, open file 160-1year which contains measured values and sort column B in ascending order

For contour plots

<u>In a separate directory: (copy from vulcan/home/mhill/80)</u>

Step 1: type Plotf
Step 2: type filename
Step 3: save plotf.dat file under different name
Step 4: type cat tecplot.head renamed plotf.dat file from step 4 > new filename
Step 5: type preplot new filename created in step 5
Step 6: type tecplot8
Step 7: load data file preplotted in step 6
Step 8: play macro (m2.mcr)
Step 9: to adjust legend go to field/contour legend/format (integers/temp, float/saturation)
Step 10: to adjust contour levels go to field/contour levels
Step 11: to adjust contour variable go to field/contour variable
Step 12: print setup/format (postscript, check color)
Step 13: print file (change .cps to .eps)
Step 14: open .eps file in adobe irritator
Step 15: go to document setup (check deskjet 895)
Step 16: print file

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		Recorded by	

MHill 9/11/00

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9/18/00

Summary of parameter values assigned to thermal-hydrological simulations of the Drift-Scale Heater Test & simulations for TEF August 2000 deliverable.
Simulation MH 9/18/00

Permeability (m^2)	Infiltration Rate (mm/yr)	Bulkhead Mass Loss (mL/hr)	Thermal Conductivity (W/m-°C)
Basecase values dst45b	0.036	None	Basecase values
Basecase values d11h	0.036	80	Basecase values
10^{-2} reduction d4h44v or 3.6 d5h44v	0.036	None	Basecase values
10^{-2} reduction d14h or 3.6 d7h44v	0.036	80	Basecase values
10^{-2} reduction d1h44v or 0.036 d2h44v	0.036	None	Basecase values
10^{-2} reduction d13h	0.036	80	Basecase values
10^{-2} reduction d5 or 6h44v	0.036	None	one-third increase in κ_r
10^{-2} reduction d17h	0.036	80	one-third increase in κ_r
10^{-2} reduction d18h	0.036	80	one-third decrease in κ_r

MH 9/18/00

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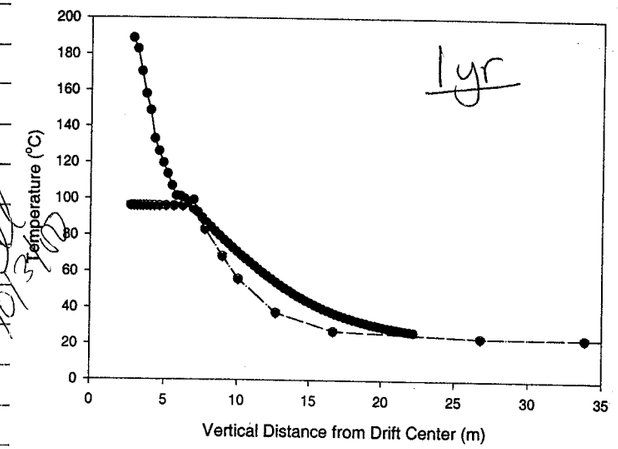
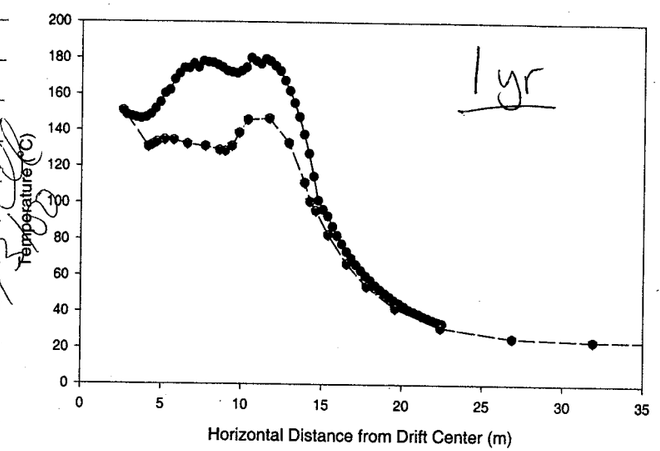
From Page No.
10/3/00 Provided the following files by R. Green
- rdt11afldm1.xyp
- rdt11afldf1.xyp



MHill 10/3/00



MHill 10/3/00

MHill 10/3/00

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10/6/00 Given files by R.T. Green:

Infiltration mm/y	filename	Area	Modf	Block size
3.6	rd+16.dat	1.0	5.0e-4	0.25
	rd+17.dat			0.5
	rd+18.dat			1.0
	rd+19.dat			2.0
	rd+20.dat			3.0
	rd+21.dat			4.0
	rd+22.dat			5.0
	rd+23.dat			7.2 (file crashed)
	rd+24.dat			10
3.6	rd+25.dat	1.0	5.0e-4	20

Amended files as recorded in chart above.

Set up a second set of runs as follows:

Infiltration (mm/y)	filename	Area	Modf	Block size
0.072	rd+16b.dat	1.0	MH 10/6/00 ~~1.0~~ 5.0e-4	0.25
	rd+17b.dat			0.5
	rd+18b.dat			1.0 (file crashed)
	rd+19b.dat			2.0
	rd+20b.dat			3.0
	rd+21b.dat			4.0
	rd+22b.dat			5.0
	rd+23b.dat			7.2
	rd+24b.dat		MH 10/6/00	10
0.072	rd+25b.dat	1.0	~~1.0~~ 5.0e-4	20

All of the above files are located on net/vulcan/home/mhill/barewolf/

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Set up a third set of runs as follows:

Infiltration (mm/y)	filename	Area	Modf	Block size
3.6	rd+16c.dat	1.0	1.0	0.25
	rd+17c.dat			0.5
	rd+18c.dat			1.0
	rd+19c.dat			2.0
	rd+20c.dat			3.0
	rd+21c.dat			4.0
	rd+22c.dat			5.0
	rd+23c.dat			7.2
	rd+24c.dat			10
3.6	rd+25c.dat	1.0	1.0	20

MHill 10/6/00

10/9/00

Set up a fourth set of runs as follows:

Infiltration (mm/y)	filename	Area	Modf	Block size
0.072	rd+16d.dat	1.0	1.0	0.25
	rd+17d.dat			0.5
	rd+18d.dat			1.0
	rd+19d.dat			2.0
	rd+20d.dat			3.0
	rd+21d.dat			4.0
	rd+22d.dat			5.0
	rd+23d.dat			7.2
	rd+24d.dat			10
0.072	rd+25d.dat	1.0	1.0	20

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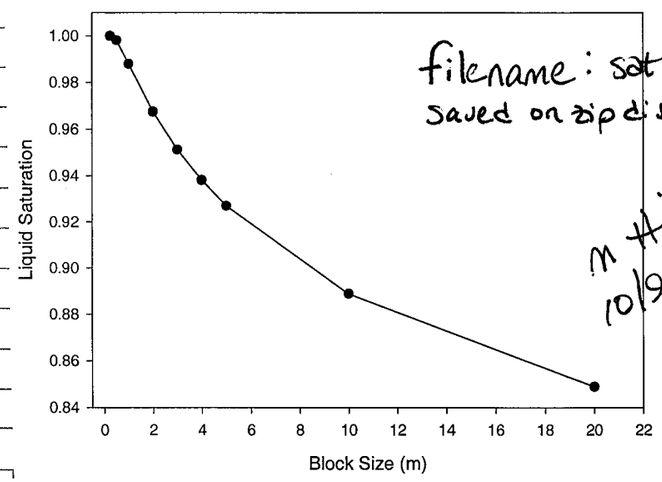
Filename	sg at element 1101
rdt16_out	7.6030e-5
rdt17_out	1.8920e-3
rdt18_out	1.2076e-2
rdt19_out	3.2501e-2
rdt20_out	4.8798e-2
rdt21_out	6.1970e-2
rdt22_out	7.3064e-2
rdt23_out	CRASHED
rdt24_out	1.1114e-1
rdt25_out	1.5109e-1

Steady-State Liquid Saturation in Matrix 3.6mm/yr
Areamodf 1.0/5.0e-4
files: rdt16-25.dat



MH 5/22/01
filename: satblk.jnb
saved on zip disk: ~~Decovalex III~~
M Hill 10/9/00

Filename	sg at element 1101
rdt16b_out	8.2764e-2
rdt17b_out	8.2803e-2
rdt18b_out	CRASHED
rdt19b_out	8.2640e-2
rdt20b_out	8.2832e-2

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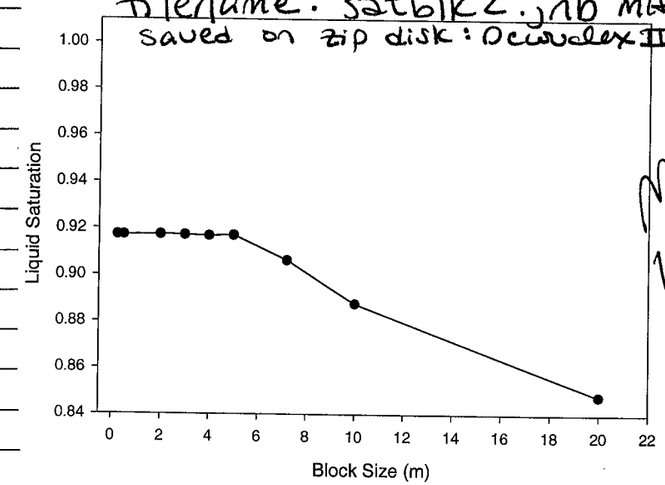
rdt21b_out	8.3121e-2
rdt22b_out	8.3000e-2
rdt23b_out	8.3622e-2
rdt24b_out	1.1221e-1
rdt25b_out	1.5199e-1

Steady State Liquid Saturation in Matrix vs. Block Size 0.072mm/y
Areamodf 1.0/5.0e-4
files rdt16b-25b_out

filename: satblk2.jnb MH 3/22/01
saved on zip disk: Decovalex III



M Hill 10/9/00

M Hill 10/9/00

10/11/00

Filename	sg at element 1101
rdt16c_out	7.3264e-5
rdt17c_out	7.6504e-5
rdt18c_out	5.6852e-5
rdt19c_out	5.9538e-5
rdt20c_out	2.1509e-4
rdt21c_out	1.1573e-3
rdt22c_out	2.7374e-3

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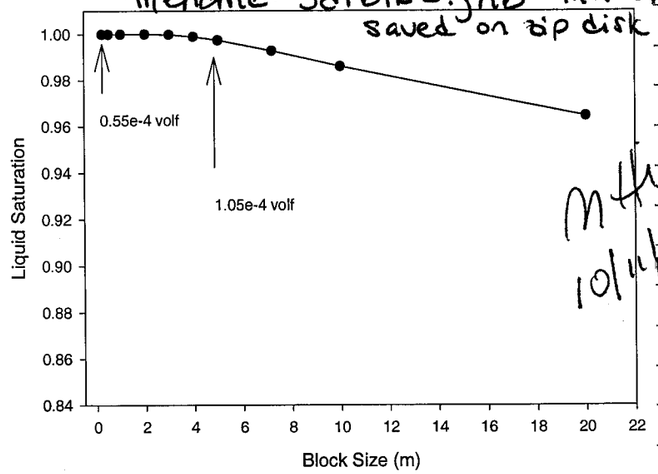
rdt23c_out	7.3690e-3
rdt24c_out	1.4040e-2
rdt25c_out	3.5540e-2

Steady-State Liquid Saturation in Matrix 3.6mm/y
Areamodf 1.0/1.0
files: rdt16c-25c.dat
volf 0.55e-4 for elem1 and elemn

filename: satblk3.jnb MH 3/22/01
saved on zip disk: Decovalex III



MH 10/11/00

Reran input files rdt16c.dat & rdt17c.dat after changing volf from 0.55e-4 to 1.05e-4. New files saved as rdt16c2.dat & rdt17c2.dat

Filename	sg at element 1101
~~rdt162c-out~~ rdt16c2_out	5.3398e-5
rdt17c2_out	5.4784e-5

MH 10/11/00

plot on p 22 of this notebook

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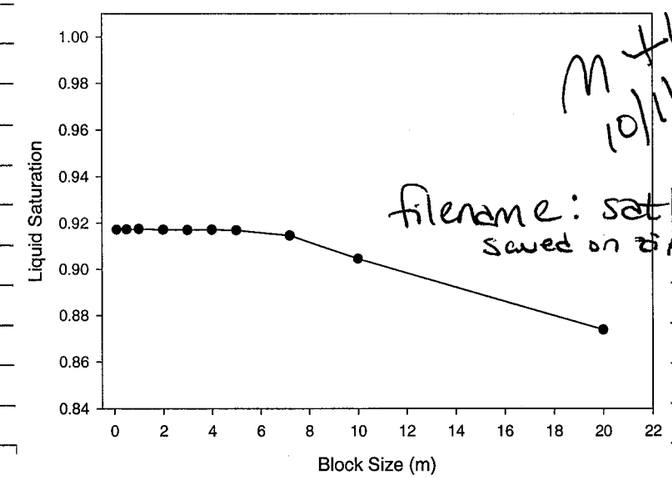
Steady State Liquid Saturation in Matrix 0.072 mm/y
Areamodf 1.0/1.0
files: rdt16d2 and rdt17d2_out
volf 1.05e-4 for elem1 and elemn



MH 10/11/00

filename: satblk4-2.jnb MH 3/22/01
saved on zip disk: ~~Decovalex III~~

Filename	sg at element 1101	
rdt16d_out	1.1106e-1	
rdt17d_out	1.1104e-1	
rdt18d_out	8.2554e-2	
rdt19d_out	8.2779e-2	
rdt20d_out	8.2937e-2	
rdt21d_out	8.2910e-2	
rdt22d_out	8.3141e-2	
rdt23d_out	8.5415e-2	
rdt24d_out	9.5497e-2	plot on p 22
rdt25d_out	1.2614e-1	of this notebook

~~Top of this page~~
~~(plot on A next page; 22 of this notebook)~~ MH 10/11/00

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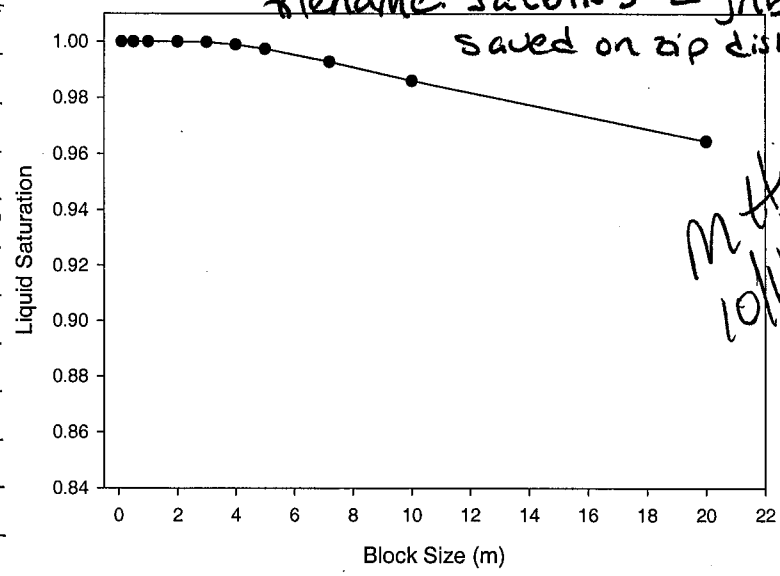
Steady State Liquid Saturation in Matrix 3.6 mm/y
Areamodf 1.0/1.0
files: rdt16c2 & rdt17c2_out
volf 1.05e-4 for elem1 and elemn

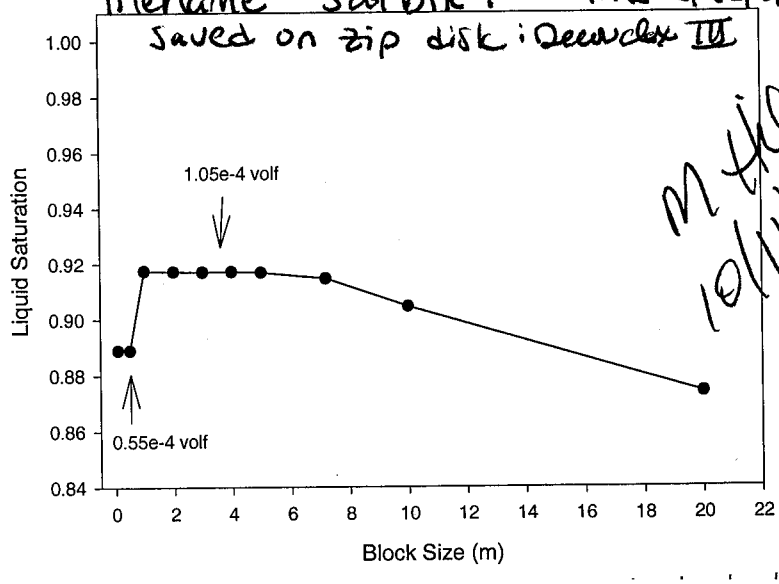
filename: satblk3-2.jnb MH 3/22/01
saved on zip disk: Decovalex III



M Hill 10/11/00

Steady State Liquid Saturation in Matrix 0.072mm/yr
Areamodf 1.0/1.0
files: rdt16d-25d_out
volf 0.55e-4 for elem1 and elemn

filename: satblk4 MH 3/22/01
saved on zip disk: Decovalex III



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Filename	so at element 1101	
rd+16d2_out	8.2819e-2	plot on p21
rd+17d2_out	8.2691e-2	of this notebook

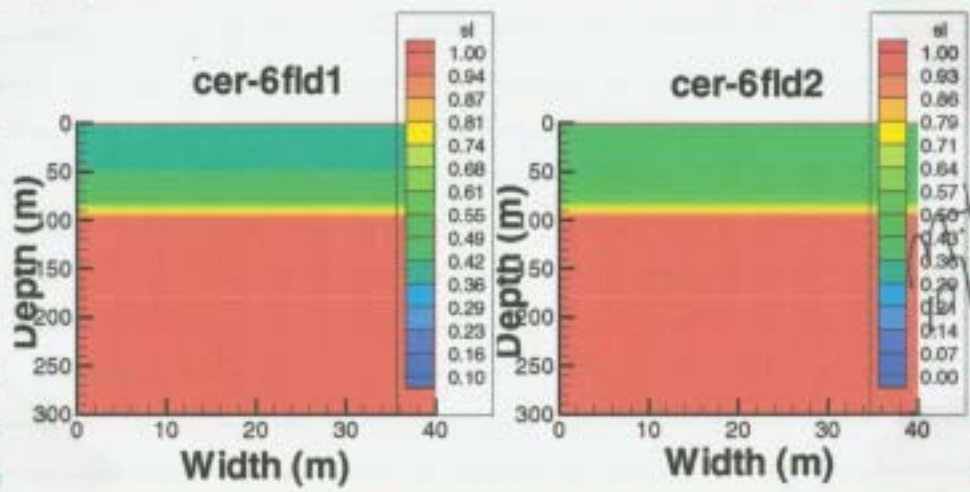
The plots represented on p 20-22 of this notebook demonstrate the sensitivity of vol f on simulation results at ~~higher~~ lower infiltration rates (i.e. ~~13.6mm/yr)~~ 0.072 mm/y) MH 10/11/00 MH 10/11/00

M Hill 10/11/00

10/18/00 Given 2 more files by R. Green

- cer-6fld1.xyp
- cer-6fld2.xyp

files located on vulcan/home/mhill/chuck



M Hill 10/18/00

M Hill 10/18/00

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11/16/00

MH 11/16/00

Provided input file: ~~afm15fld~~ afm15.dat by R. Green. Modified input file as follows:

MH 11/16/00

- xlm (block size) = ~~5.0~~ 2.0
- infiltration = 0.5 mm/y
- areamodF = 5e-4
- K_t = thermal conductivity of basecase

ran to steady state file named afm17.dat From file: afm17_out element 1101 liquid saturation at 0.95.

turned on heat saved as file afm17h.dat

160

```
plotf afm17fldfl.xyp
plotf.dat => af17.dat
vertprof plotf.dat
vertprof.dat => afmf17.dat

plotf afm17fldml.xyp
plotf.dat => am17.dat
vertprof plotf.dat
vertprof.dat => afmm17.dat
```

158

```
plotf afm17fldfl.xyp
plotf.dat => af172.dat
vertprof plotf.dat
vertprof.dat => afmf172.dat

plotf afm17fldml.xyp
plotf.dat => ~~am172.dat~~ 1.dat
vertprof plotf.dat
```

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MH 11/16/00

```
vertprof.dat => ~~afmm172.dat~~ 111.dat
```

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```
plotf afm17hfldfl.xyp
plotf.dat => 2.dat
vertprof plotf.dat
vertprof.dat => 22.dat

plotf afm17hfldml.xyp
plotf.dat => 3.dat
vertprof plotf.dat
vertprof.dat => 33.dat
```

160

```
plotf afm17hfldfl.xyp
plotf.dat => 4.dat
vertprof plotf.dat
vertprof.dat => 44.dat

plotf afm17hfldml.xyp
plotf.dat => 5.dat
vertprof plotf.dat
vertprof.dat => 55.dat
```

MNiell 11/16/00

11/17/00 Modified input file afm17.dat as follows:

- xlm = 5.0
- infiltration = 1.5 mm/yr

ran to steady state after saving under new filename afm20.dat. File crashed prior to completion.

Set up another input file as follows:

- xlm = 5.0
- infiltration = 2.0 mm/yr

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saved as file afm21.dat & ran to steady state.

Turned on heat & ran simulation for one time step (1yr) after saving under new file name: afm21h.dat.

MH 11/17/00

~~158~~ File (afm21h.dat) crashed with heat turned on.

Set up 2 new input files as follows:

afm22.dat
- x/m = 5.0
- infiltration = 1.0 mm/y

afm23.dat
- x/m = 5.0
- infiltration = 0.5 mm/y

afm22.dat reached steady state. Turned on heat & ran simulation after renaming as file afm22h.dat. afm22h.dat crashed.

afm23.dat crashed prior to reaching steady state.

MH 11/17/00 ~~Sep~~ Set up new file as follows:

afm24.dat
- x/m = 5.0
- infiltration = 2.5 mm/y

File (afm24.dat) ran to steady state. Cut & pasted steady state conditions,

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turned on heat & ran simulation after renaming as file afm24.dat. afm24h.dat crashed.

Set up new file as follows:

afm26.dat
- x/m = 5.0
- infiltration = 3.0 mm/y

afm27.dat
- x/m = 5.0
- infiltration = 3.5 mm/y

M Hill 11/17/00

11/27/00 Set up new file afm29.dat changed x/m to 10.0 ran to steady state.

Cut & pasted initial conditions. Ambient saturation at element 1101 is 88%. Turned on heat after saving as new file afm29h.dat.

M Hill 11/27/00

11/28/00

	Filename	Amb Saturation	frac perm	x/m	infiltration (mm/y)
crashed	afm 29h	.888	$\sqrt{1000}$	10	3.6
	afm 30	.888	$\sqrt{1000}$	10	.218
	afm 31	.877	$\sqrt{1000}$	12	

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afm 32 .882 √1000 11 .218

crashed afm 33 – √1000 8 .218

crashed afm 34 – √1000 6 .218

afm 35 .888 √1000 10 1.0

afm 36 .888 √1000 10 2.0

afm 37 .888 √1000 10 2.5

afm 38 .88 √1000 10 3.0

afm 39 .849 √1000 20 .218

crashed afm 40 – √1000 5 .218

M Hill 11/23/00

11/29/00

crashed afm 41 – √1000 (.) 5 .218

crashed afm 42 (modified fracture permeability, ran with heat on) – originally afm02.dat 10 3.6

afm 43 .88 (duplicate of afm42, but with heat off)

crashed afm 44 – √1000 (inserted steady state) 10 3.6

afm 45 .849 √1000 20 3.6

.926 afm 46 .926 √1000 5 3.6

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afm 47 .967 √1000 2 3.6

afm 48 .966 √1000 2 .218

M Hill 11/29/00

11/30/00

afm 49 .926 √1000 5 3.0

afm 50 .926 √1000 5 2.0

afm 51 .926 √1000 5 0.5

crashed afm 52 – √1000 5 .218

crashed afm 51h √1000 5 0.5 with heat

in3-6.bc = 1.08724e-03 ✓

inf0.5.bc = 2.17448e-04
inf1.0.bc = 4.34896e-04
inf1.5.bc = 6.52344e-04
} Incorrect MH 12/4/00

inf1.8.bc = 5.4362e-04 ✓

inf2.0.bc = 8.69792e-04
inf2.5.bc = 1.08724e-03
inf2.8.bc = 6.5836e-05?
inf3.0.bc = 1.30469e-03
inf3.5.bc = 1.52214e-03
} Incorrect MH 12/4/00

M Hill 11/30/00

12/1/00 ivplwr

afm 53 0 √1000 5 0.5 (heat on)

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ivplwr

afm54 0 √1000 5 0.5
(running to steady state)

crashed afm55 0 √1000 5 0.5
(heat on)

ok afm58 1 √1000 5 0.5
(steady state)

crashed afm59 1 √1000 5 0.5
(heat on)

Ran files afm58 & afm59 to see if they crashed again with ivplwr set at 1 when heat on. Asked Steffen Mayer to look at files. Afm58 completes (steady state conditions, but afm59 crashes (heat on) afm59_errs gives messages, "water density derivatives bad, errors in water/steam properties."

M Dell 12/1/00

12/4/00

Cut ½ period steady state conditions for file: afm35.dat turned on heat after saving file under new name: afm35h.dat

Observed that some of the infiltration rates used were incorrect (p 29 of this notebook).

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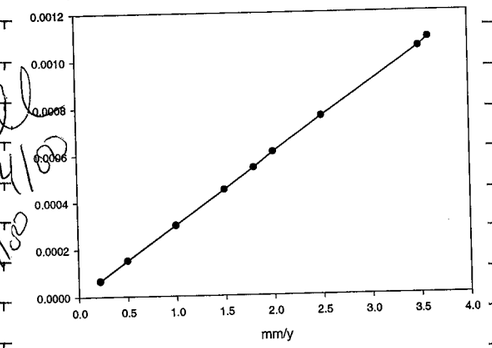
Made plot using values @ 0, 1.8 & 3.6 mm/yr. Picked points that yielded linear increase in infiltration to use for corrected points

0.218	6.58E-05
0.5	1.52E-04
1	3.00E-04
1.5	4.50E-04
1.8	5.44E-04
2	6.10E-04
2.5	7.60E-04
3.5	1.05E-03
3.6	1.09E-03

MD 12/4/00

MD 12/4/00



crashed afm60 √1000 to 5 0.5r
MD 12/4/00 (run to steady state)
used corrected infiltration

M Dell 12/4/00

12/5/00

crashed afm61 √1000 5 0.5r
(but reversed order)

Killed afm62 √1000 5 0.5r
let run overnight (commented out 1st line with value of
never reached 1624 in frac. permeabilities)
steady state
.93 afm63 assumed error in 1st data 5 0.5r
point (# abnormally ↑ compared to
rest 51.36) assumed 15.36 √1000 = 486 which
is more reasonable # so subsituted 486 into
data set

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changed measured data in plots (used data from file: dstout_0133.pdat located on vulcan/home/rgreen/dst_scans/decovalex/afm

Borehole 158
X=0, y=23

z	temp (°C)	
0	157.50	skip
1	161.22	
2	154.26	
3	132.61	start here
4	108.13	
5	92.64	
6	81.56	
7	72.39	
8	64.18	
9	56.35	
10	49.38	
11	43.58	
12	38.66	
13	34.62	
14	31.61	
15	29.27	
16	27.50	
17	26.16	
18	25.29	
19	24.51	
20	24.03	
21	23.69	
22	23.61	
23	22.78	

Borehole 160
z=0 y=23

x	temp (°C)	
0	157.50	skip
1	154.53	
2	146.34	
3	144.30	start here
4	142.57	
5	156.81	
6	165.57	
7	167.53	
8	173.37	
9	175.51	
10	175.69	
11	175.31	
12	170.02	
13	158.31	
14	126.30	
15	95.85	
16	87.29	
17	71.64	
18	60.35	
19	51.35	
20	44.84	
21	40.17	
22	34.56	
23	36.66	

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.91 afm 64 √1000/486 5 0.5r
~~Killed~~ MH 12/5/00 (turned on heat without substituting steady state)

crashed afm 65 √1000/486 5 0.5r
(heat on, steady state conditions)

.93 afm66 √1000/486 5 0.5r
changed sg under init from 9.7e-1 to 9.9e-1

.91 afm67 √1000/486 5 0.5r
changed sg under init from 9.7e-1 to 9.9e-1 turned on heat (without steady state conditions)

M Dell 12/5/00

12/6/00

crashed afm68 √1000/486 5 0.5r

amended file 63.int as follows:
changed value for sg from 9.9999e-01 to 9.7000e-01 & saved as 63r.int
Used 63r.int in afm68.dat

original afm02.dat runs with heat but has cap. pressure values of 0
4th column for 8 & 9 fracture permeabilities under pckr

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crashed afm69 $\sqrt{1000}$/486 5 3.6
(heat on) not prev run to steady state

crashed afm70 MH 12/6/00 ~~$\sqrt{200}$~~ $\sqrt{1000}$/486 5 .218
(heat on)

.93 afm71 $\sqrt{1000}$/486 5 .218
(ran to ss)

crashed afm72 $\sqrt{1000}$/486 5 .218
(inserted ss conditions turned on heat)

.93 afm73 $\sqrt{1000}$/2 5 .218
2 divided by 2 (heat off)
not previously run to ss with updated cap press

crashed afm74 $\frac{\sqrt{1000}}{2}$ 5 .218
(heat on)
not previously run to ss with updated cap press

crashed afm75 $\frac{\sqrt{1000}}{2}$ 5 0.5

crashed afm76 0 5 0.5 (heat on)
did not run to ss

.93 afm77 0 5 0.5 (ran to ss)

crashed afm78 0 5 0.5
cut & pasted ss conditions heat on

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crashed afm79 0 5 0.5
(ss conditions pasted heat on)

MWill 12/6/00

12/13/00 158
plot f heat2cfldfl.xyp
plotf.dat => o2.dat
vertprof plotf.dat
vertprof.dat => o2f.dat

plotf heat2cfldml.xyp
plotf.dat => p2.dat
vertprof plotf.dat
vertprof.dat => p2m.dat

160
plotf heat2cfldfl.xyp
plotf.dat => n2.dat
vertprof plotf.dat
vertprof.dat => n2f.dat

plotf heat2cfldml.xyp
plotf.dat => y2.dat
vertprof plotf.dat
vertprof.dat => y2m.dat

160
plotf heat2afldfl.xyp
plotf.dat => la.dat
vertprof plotf.dat
vertprof.dat => la2.dat

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```
plotf heet2afldml.xyp
plotf.dat => ta.dat
vertprof plotf.dat
vertprof.dat => ta2.dat

158
plotf heet2afldfl.xyp
plotf.dat => ha.dat
vertprof plotf.dat
vertprof.dat => ha2.dat

plotf heet2afldml.xyp
plotf.dat => ua.dat
vertprof plotf.dat
vertprof.dat => ua2.dat

158
plotf rdt13fldfl.xyp
plotf.dat => pi.dat
vertprof plotf.dat
vertprof.dat => pi2.dat

plotf rdt13fldml.xyp
plotf.dat => omega.dat
vertprof plotf.dat
vertprof.dat => omega2.dat

160
plotf rdt13fldfl.xyp
plotf.dat => omicron.dat
vertprof plotf.dat
vertprof.dat => omicron2.dat
```

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```
plotf rdt13fldml.xyp
plotf.dat => luke.dat
vertprof plotf.dat
vertprof.dat => luke2.dat
```

M Lee 12/13/00

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M Hill Decovalex runs

Vulcan/home/mhill/agu

	Ambient saturation	Phik	CONN	Xlm	AMF
✓ heat2a.dat	0.072	multi	multi	AFM 1.0	5e-4
h2as.dat	.93	"	"	"	" 1.0
✓ h2a.dat	"	"	"	" heat on	
✓ heat2c.dat	0.072	multi	multi	AFM .25	5e-4
h2cs.dat	.93	"	"		1.0
✓ h2c.dat	"	"	"	heat on	
✓ heat2e.dat	0.072	muk-3	multi	NoAFM .25	5e-4
h2es.dat	.92	"	"		1.0
h2e.dat	"	"	"	heat on	
✓ rdt13b.dat	0.072	murdt	multi	NoAFM .25	1.0
r13bs.dat	.93	"	"	"	5e-4
✓ r13b.dat	"	"	"	" heat on	

M Hill 12/28/00

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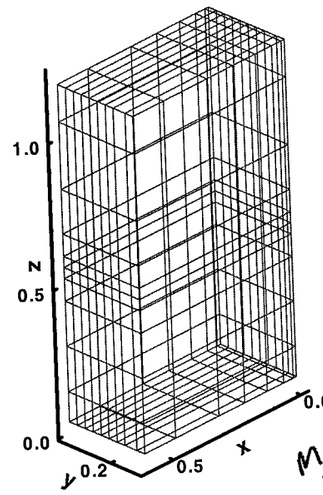
Mesh grid for file dcm-sm98fldml.xyp
Plotted using Tecplot 8 saved as wordperfect
meta file & inserted file into wordperfect.



M Hill 12/28/00

M Hill 12/28/00

12/29/00
158
plotf h2afldfl.xyp
plotf.dat => a1.dat
vertprof plotf.dat
vertprof.dat => a2.dat

plotf h2afldml.xyp
plotf.dat => a3.dat
vertprof plotf.dat
vertprof.dat => a4.dat

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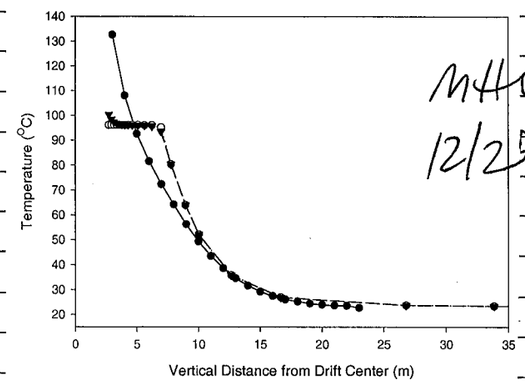
160
plotf h2afldfl.xyp
plotf.dat => a5.dat
vertprof plotf.dat
vertprof.dat => a6.dat

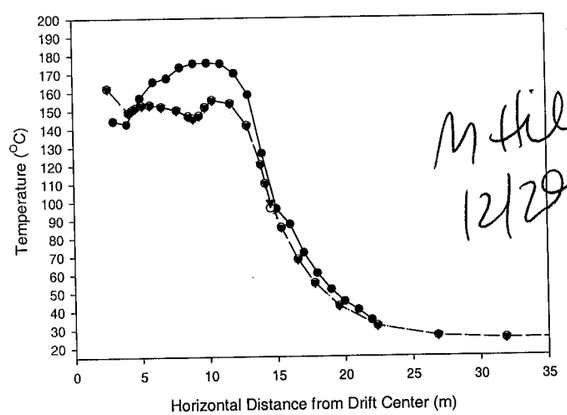
plotf h2afldml.xyp
plotf.dat => a7.dat
vertprof plotf.dat
vertprof.dat => a8.dat

h2a158



MHill
12/29/00

h2a160



MHill
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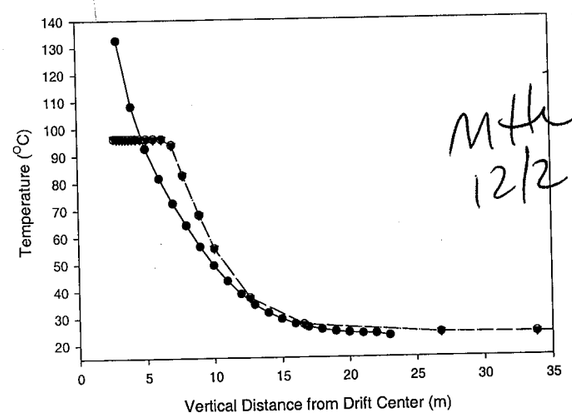
160
plotf h2cfldfl.xyp
plotf.dat => a9.dat
vertprof plotf.dat
vertprof.dat => a10.dat

plotf h2cfldml.xyp
plotf.dat => a11.dat
vertprof plotf.dat
vertprof.dat => a12.dat

158
plotf h2cfldfl.xyp
plotf.dat => a13.dat
vertprof plotf.dat
vertprof.dat => a14.dat

plotf h2cfldml.xyp
plotf.dat => a15.dat
vertprof plotf.dat
vertprof.dat => a16.dat

h2c158



MHill
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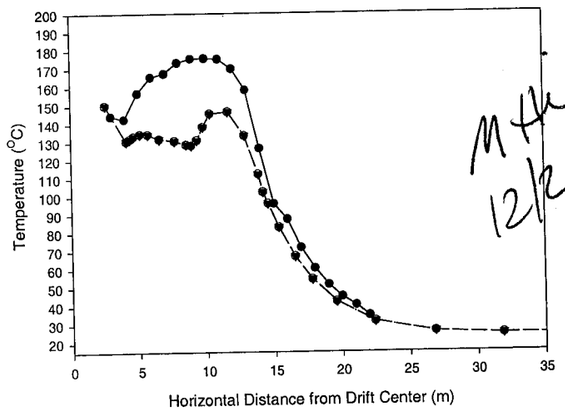
h2c160



MHull
12/29/00

158
plotf r13bfldfl.xyp
plotf.dat => a17.dat
MH 12/29/00 vertprof ~~dat~~ plotf.dat
vertprof.dat => a18.dat

plotf r13bfldml.xyp
plotf.dat => a19.dat
vertprof plotf.dat
vertprof.dat => a20.dat

160
plotf r13bfldfl.xyp
plotf.dat => a21.dat
vertprof plotf.dat
vertprof.dat => a22.dat

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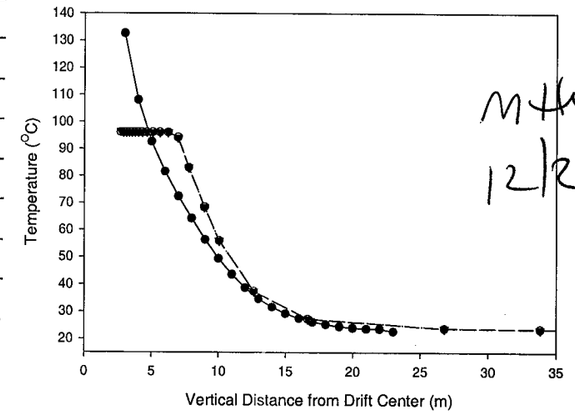
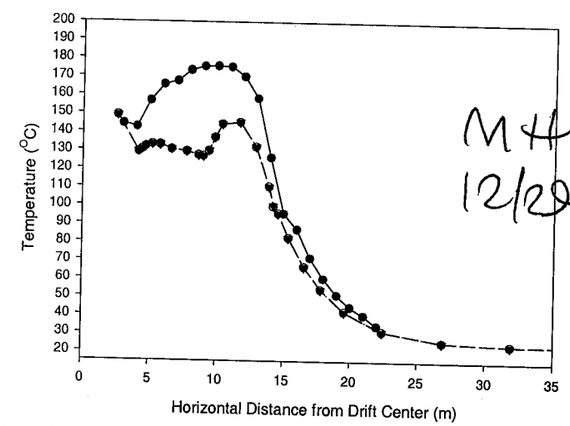
plotf r13bfldml.xyp
plotf.dat => a23.dat
vertprof plotf.dat
vertprof.dat => a24.dat

r13b158



MHull
12/29/00

r13b160



MHull
12/29/00

Note: plots on pgs 40-43 the symbols represent the following:

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• closed circles (measured values)
○ open circles (predicted values in fractures)
▼ closed upside down triangles (predicted values in matrix)

M Hill 12/29/00

1/4/01

Filename	Amb.	saturation	infil.	Phik	xlm	aremodf
afm58d.dat			0.5	multi	5	1.0
58ds.dat	.93	corrected	0.5		"	"
Killed 58d.dat			"		heat on	
h2ds.dat	.92		0.072	mk3afm.phk (e-12)	.25	1.0
CRASHED h2d.dat			"		heat on	
h3ds.dat	.92		"	mk4afm (e-11)		
CRASHED h3d.dat			"		heat on	
h2fs.dat	.92		0.072	mk3afm	.25	5e-4
CRASHED h2f.dat			"		heat on	
h3fs.dat	.92		"	mk4afm		
✓ h3f.dat			"		heat on	
h4ds.dat	.92		"	mk1afm	.25	1.0
✓ h4d.dat			"		heat on	
h4fs.dat	~~.95~~ ~~.92~~ .92 MH 1/8/01		0.072	mk1afm (e-10)	.25	5e-4
✓ h4f.dat			"		heat on	

M Hill 1/4/01

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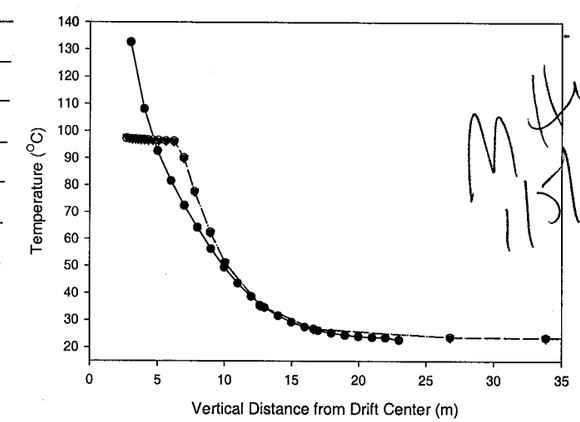
1/5/01 160 h4dfldfl.xyp
plot f ~~h4dfldfl.xyp~~ MH 1/5/01
plotf.dat => a25.dat
vertprof plotf.dat
vertprof.dat => a26.dat

plot f h4dfldml.xyp
plotf.dat => a27.dat
vertprof plotf.dat
vertprof.dat => a28.dat

158
plotf h4dfldfl.xyp
plotf.dat => a29.dat
vertprof plotf.dat
vertprof.dat => a30.dat

plotf h4dfldml.xyp
plotf.dat => a31.dat
vertprof plotf.dat
vertprof.dat => a32.dat



M Hill 1/5/01

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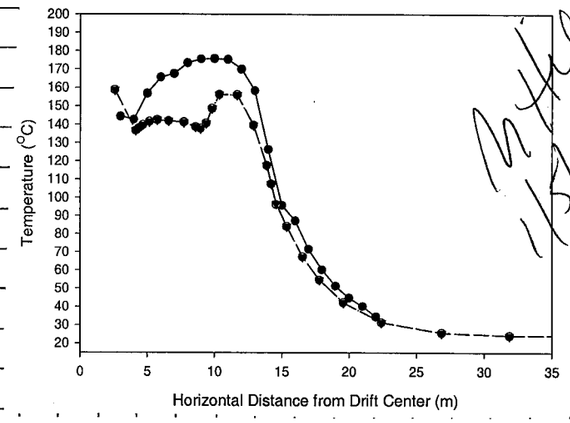
h4d160



M Hill 1/5/01

M Hill 1/5/01

1/8/01

158

plotf h4ffldfl.xyp
plotf.dat => a33.dat
vertprof plotf.dat
vertprof.dat => a34.dat

plotf h4ffldml.xyp
plotf.dat => a35.dat
vertprof plotf.dat
vertprof.dat => a36.dat

160

plotf h4ffldfl.xyp
plotf.dat => a37.dat
vertprof plotf.dat
vertprof.dat => a38.dat

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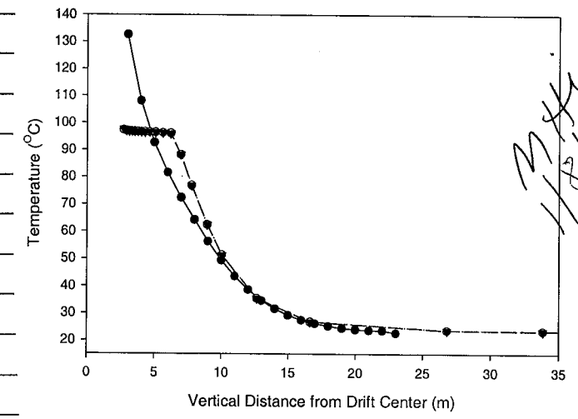
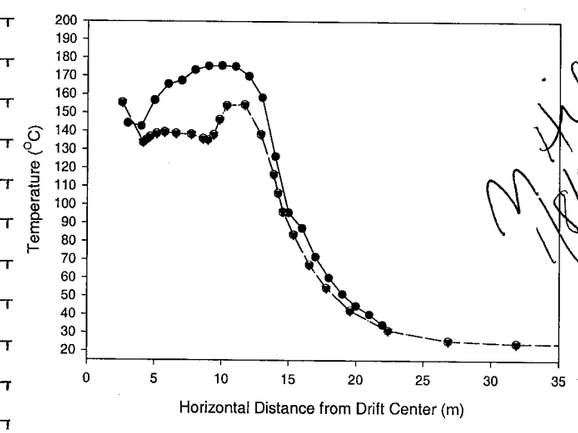
plotf h4ffldml.xyp
plotf.dat => a39.dat
vertprof plotf.dat
vertprof.dat => a40.dat

h4f158



M Hill 1/8/01

h4f160



M Hill 1/8/01

See pg 43-44 of this notebook for a description of symbols for plots on pgs

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45 - 47.

160
plotf h3ffldfl.xyp
plotf.dat => a41.dat
Vertprof plotf.dat
vertprof.dat => a42.dat

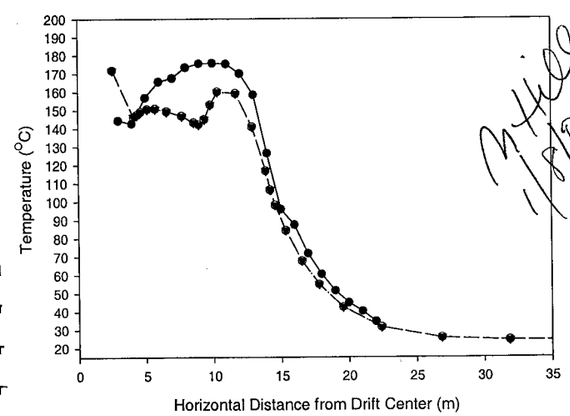
plotf h3ffldml.xyp
plotf.dat => a43.dat
vertprof plotf.dat
vertprof.dat => a44.dat

158
plotf h3ffldfl.xyp
plotf.dat => a45.dat
Vertprof plotf.dat
vertprof.dat => a46.dat

plotf h3ffldml.xyp
Plotf.dat => a47.dat
Vertprof Plotf.dat
Vertprof.dat => a48.dat

MH 1/8/01

h3f160



MHW 1/8/01

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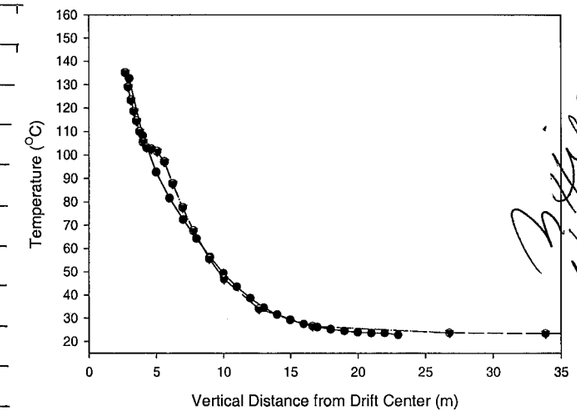
h3f158



MHW 1/8/01

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Description of properties for Decovalex Simulations

Filename	Infil	Phik		xlm	AreaModF
rdt13	~0.072	muk-3 (e^{-12})	NoAFM	.25	1
afm58b	~~0.5~~	multi (e^{-9})	AFM	5	5e-4
afm58d	~~0.5~~	multi	AFM	5	1
heat2a	0.072 .93	multi	AFM	1	5e-4
heat2c	0.072 .93	multi	AFM	.25	5e-4
~~heat2e~~	~~0.072 .92~~	~~muk-3~~ RH 3/9/01	~~NoAFM~~	~~.25~~	~~5e-4~~
rdt13b	0.072 .93	~~multi~~ murdt	NoAFM	.25	1.0
h3f	0.072 .92	mk4afm (e^{-11})	AFM	.25	5e-4
h4d	0.072 .92	mk1afm (e^{-10})	AFM	.25	1.0
h4f	0.072 .92	mk1AFM (e^{-10})	AFM	.25	5e-4
h2a	0.072 .93	multi	AFM	1	1
h2c	0.072 .93	multi	AFM	.25	1
	ambient saturations @ element 1101				

MH 1/18/01

MH 1/15/01

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Description of properties for Decovalex Simulations (con't)

~~h2e~~	~~0.072~~	~~.92~~	~~muk-3~~	~~NoAFM~~	~~.25~~	~~1~~
r13b	0.072	.93	murdt (e^{-9})	NoAFM	.25	5e-4
rdt15	0.072	.93	muk-3	NoAFM	.8kt .25	1
r9kt	0.072	.93	murdt	NoAFM	.8kt .25	1
~~h2dkt~~	~~0.072~~		~~mk3afm~~	~~AFM~~	~~.8kt .25~~	~~1~~

MH 1/18/01

Steady state ran / heat crashed

Filename	Infil	Phik	AFM	xlm	AreaModF
58ds	0.5 .93	multi	AFM	5	1
58d	Killed (too many using Vulcan)				
h2ds	0.072 .92	mk3afm (e^{-12})	AFM	.25	1
h2d	CRASHED				
h3ds	0.072 .92	mk4afm (e^{-11})	AFM	.25	1
h3d	CRASHED				
h2fs	0.072 .92	mk3afm	AFM	.25	5e-4
h2f	CRASHED				

MH 1/15/01

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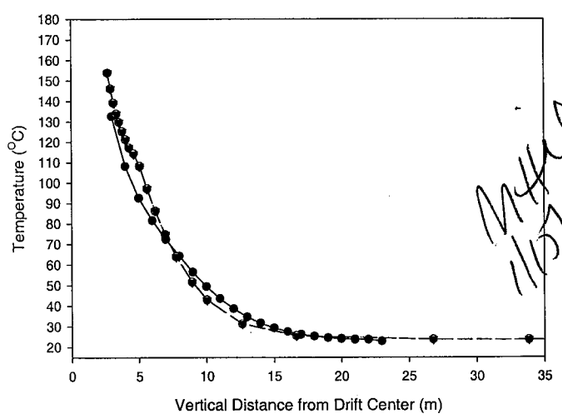
plotf rdt15fldfl.xyp
plotf.dat => a49.dat
vertprof plotf.dat
vertprof.dat => a50.dat

plotf rdt15fldml.xyp
plotf.dat => a51.dat
vertprof plotf.dat
vertprof.dat => a52.dat

160
plotf rdt15fldfl.xyp
plotf.dat => a53.dat
vertprof plotf.dat
vertprof.dat => a54.dat

plotf rdt15fldml.xyp
plotf.dat => a55.dat
vertprof plotf.dat
vertprof.dat => a56.dat

rdt15158



MHill 1/15/01

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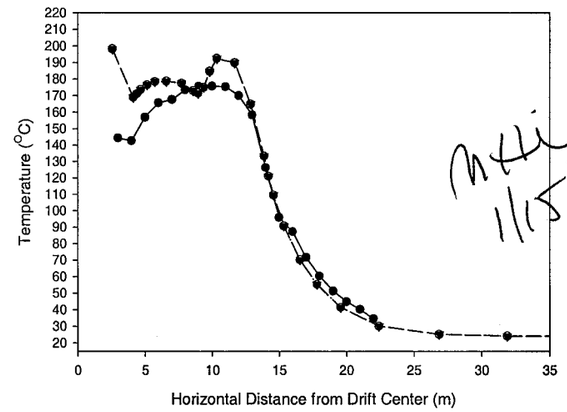
rdt15160



MHill 1/15/01

M Hill 1/15/01

1/17/01 160
plotf r9ktfldfl.xyp
plotf.dat => a57.dat
vertprof plotf.dat
vertprof.dat => a58.dat

plotf r9ktfldml.xyp
plotf.dat => a59.dat
vertprof plotf.dat
vertprof.dat => a60.dat

158
plotf r9ktfldfl.xyp
plotf.dat => a61.dat
vertprof plotf.dat
vertprof.dat => a62.dat

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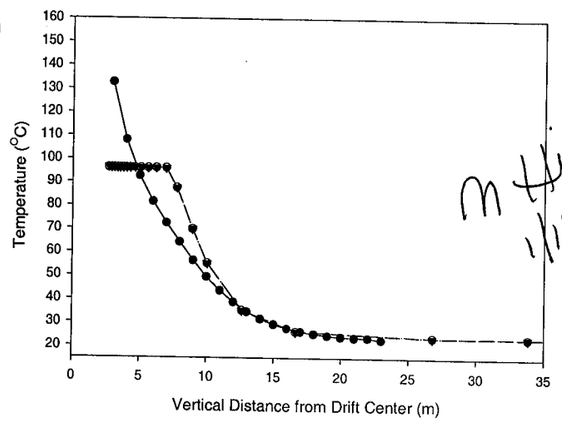
plotf r9kt fldm1.xyp
plotf.dat => ab3.dat
vertprof plotf.dat
vertprof.dat => ab4.dat

M Hill 1/17/01

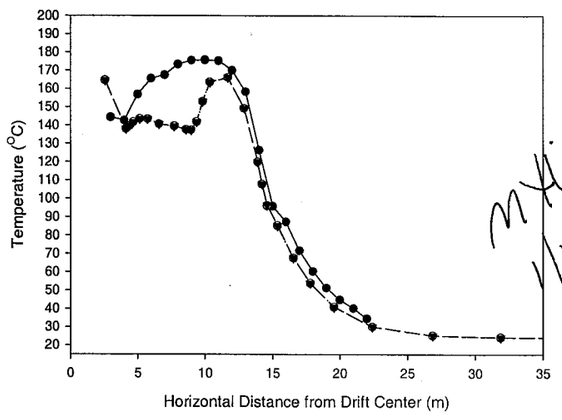
M Hill 1/18/01

r9kt158



M Hill 1/18/01

r9kt160



M Hill 1/18/01

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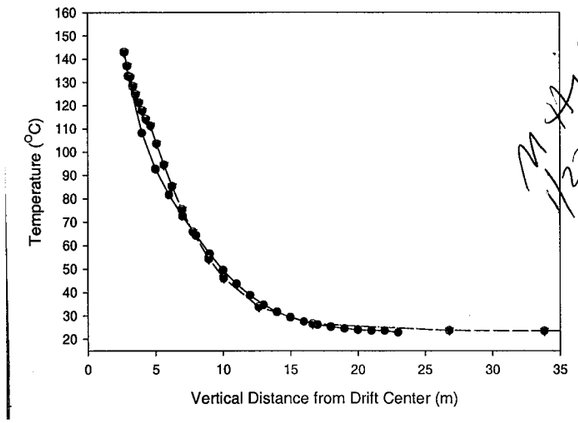
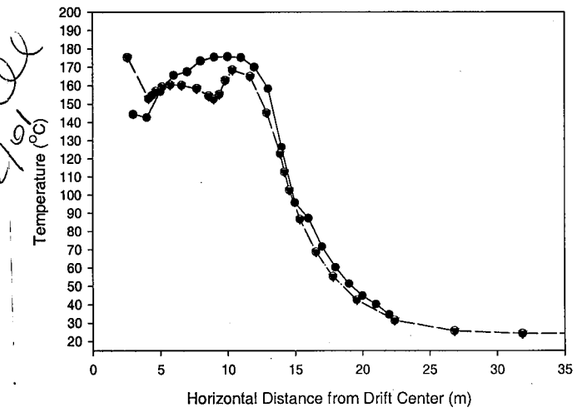
rdt13158



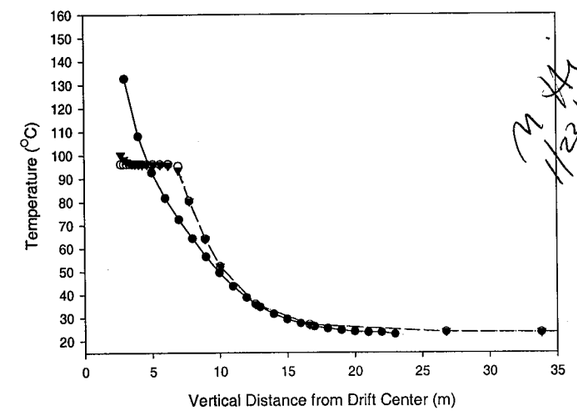
M Hill 1/22/01

Temperature vs. Distance Borehole 158
heat2a

rdt13160

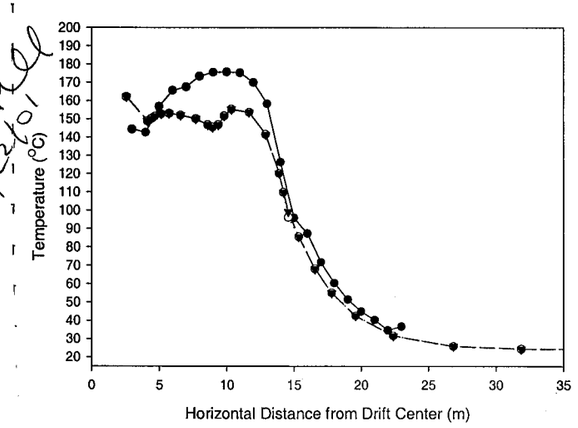


Temperature vs. Distance Borehole 160
heat2a

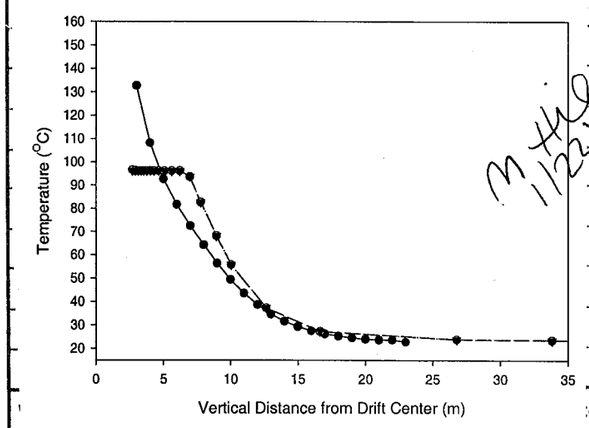


M Hill 1/22/01

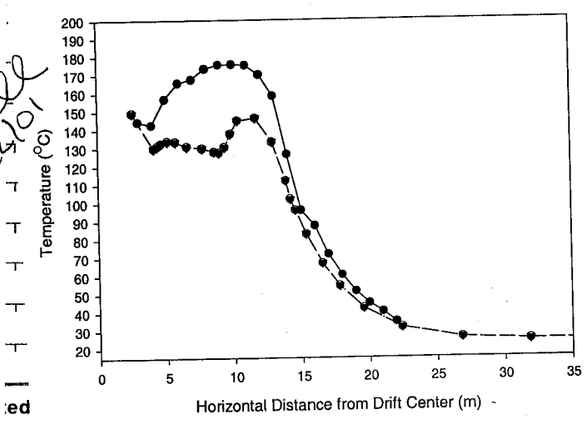
heat2c158



heat2C160



M Hill 1/22/01



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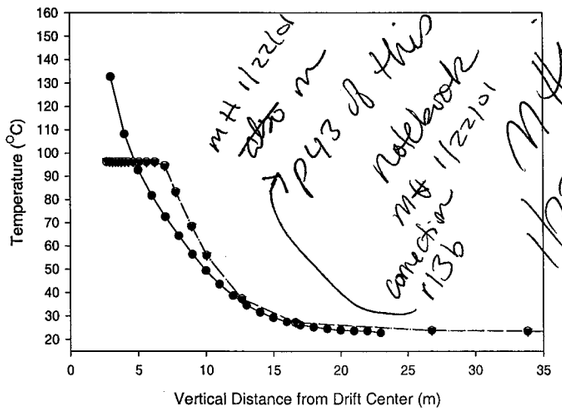
rdt13b158



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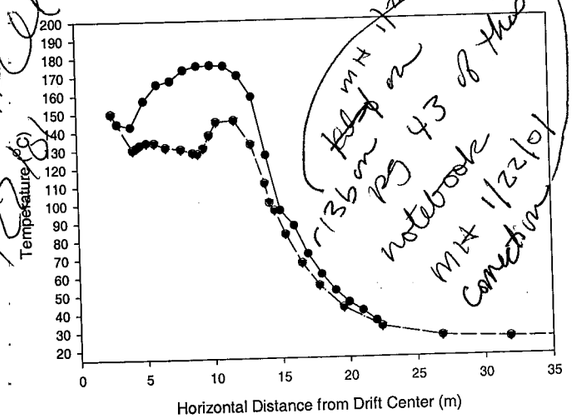
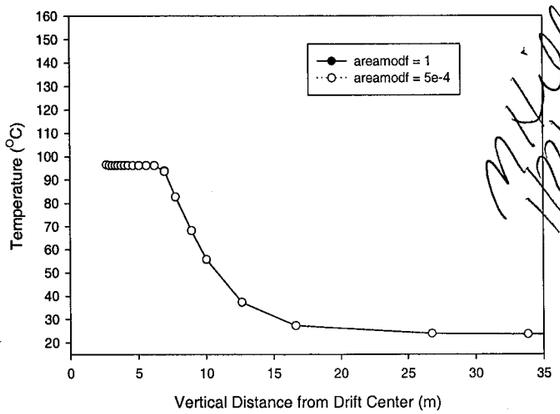
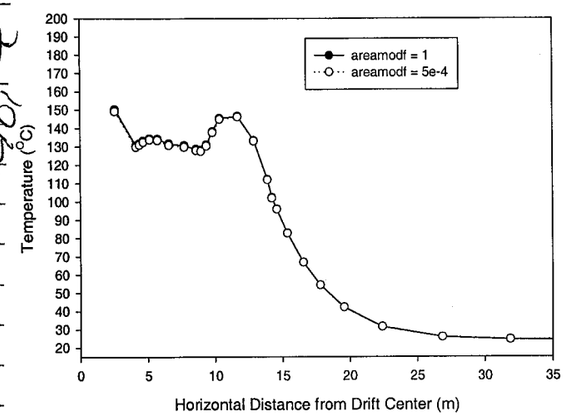


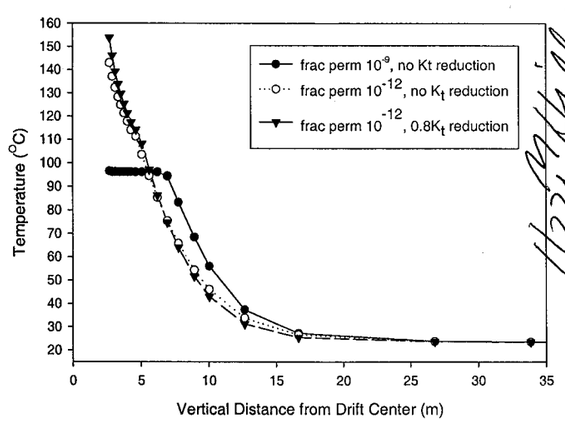
h2c & heat2c



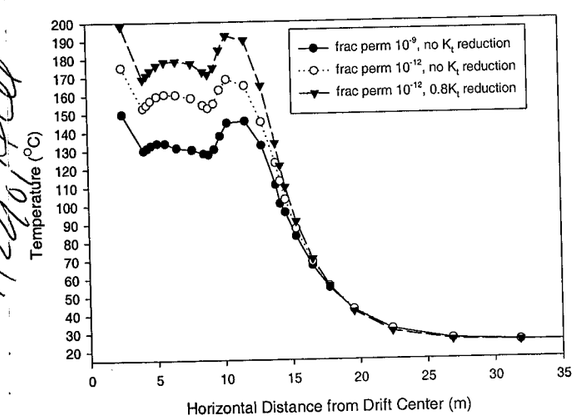
h2c vs heat2c



matrix temperatures vs. distance rdt13b, rdt13, rdt15



matrix temperatures vs. distance rdt13b, rdt13, rdt15



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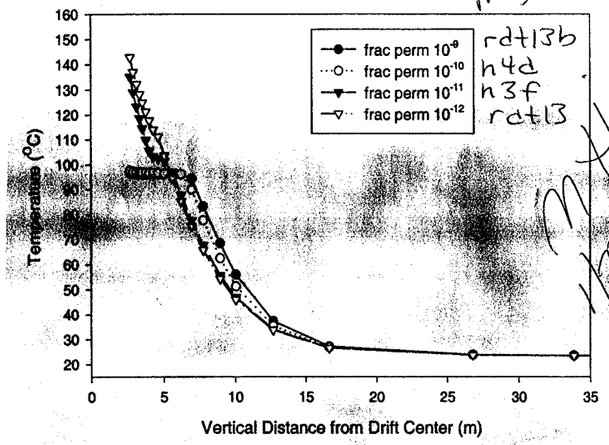
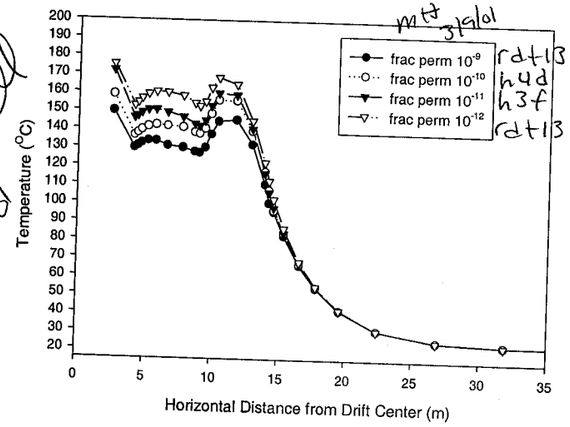
matrix tempertures vs. distance



matrix temperatures vs. distance



See pgs 43-44 of this notebook for a description of symbols for plots on pgs 48-49, 52, 53, 54-56 that do not already have a legend.

Plots saved on zip disks titled: Dewvalex plots I, II, III + IV. Zip disks stored in fire-proof cabinet in bldg 51.

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Fracture permeability data used in DOE DST analyses. Fracture permeabilities are believed to be expressed as bulk permeability.

TSPA-VA TBD near-Field/Altered-Zone Models Report UCRL-ID-129179

Tptpul vert perm 2.63e-11 hort perm 8.91e-13 porosity 1.05e-4

Tptpmn vert perm 6.76e-12 hort perm 4.27e-13 porosity 1.24e-4

Tptpll vert perm 3.80e-12 hort perm 9.12e-13 porosity 3.29e-4

This gives intrinsic permeabilities of:

Tptpul vert perm 2.50e-7 and hort perm 8.49e-9

Tptpul vert perm 5.45e-8 and hort perm 3.44e-9

Tptpul vert perm 1.15e-8 and hort perm 2.77e-9

These are the basecase for CNWRA simulations

mtiell 1/22/01

Tsang, Y.W. and J.T. Birkholzer. 1999. Predictions and observations of the thermal-hydrological conditions in the Single Heater Test. *Journal of Contaminant Hydrology*. 38:385-425.

Tptpmn

Low perm background 5.85e-14 m^2 intrinsic perm=2.41e-10

High perm background 5.2e-12 m^2 intrinsic perm=2.14e-8

porosity 0.000243

Birkholzer, J.T. and YW. Tsang. 2000. Modeling the thermal-hydrologic processes in a large-scale underground heater test in partially saturated fractured tuff. *Water Resources Research* 36(6):1431-1447.

The following values are taken: Birkholzer, J.T. and Y.W. Tsang. 1997. Pretest analysis of the thermal-hydrological conditions of the ESF drift scale test. Level 4 Milestone SP9322M4. Berkeley: CA: Lawrence Berkeley National Laboratory. Data calibrated to infiltration of 0.36 mm/yr.

Tptpul perm 0.635e-12 m^2 porosity 0.000171 intrinsic perm=3.71e-9

Tptpmn perm 0.100e-12 m^2 porosity 0.000263 intrinsic perm=3.80e-10

Tptpll perm 0.187e-11 m^2 porosity 0.000329 intrinsic perm=5.68e-9

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mtiell 3/20/01

Processed files h4d-1nofldml.xyp & h3f-2nofldml.xyp for plotting as follows:

MA 3/20/01

153 MA 3/20/01

plotf h4d-1nofldml.xyp
plotf.dat => h4d-1.dat
vertprof plotf.dat MA 3/20/01 MA 3/20/01
vertprof.dat => ~~h4d-1no.dat~~ h4d-1no.dat

plotf h3f-nofldml.xyp
plotf.dat => h3f-2.dat
vertprof plotf.dat
vertprof.dat => h3f-2no.dat

160

plotf h4d-nofldml.xyp
plotf.dat => h4dd-no.dat
vertprof plotf.dat MA 3/20/01
vertprof.dat => h4de-no.dat

plotf h3f-nofldml.xyp
plotf.dat => h4de.dat
vertprof plotf.dat
vertprof.dat => h4df.dat

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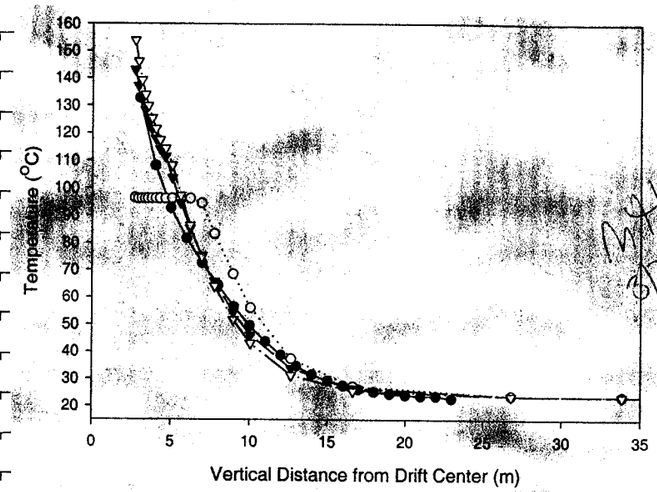
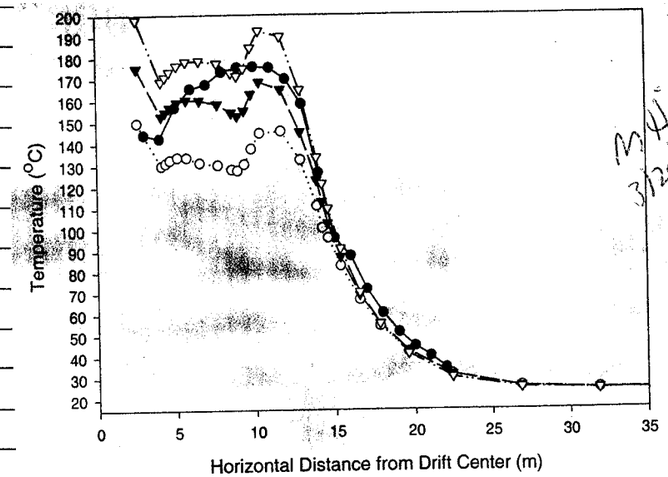


filename: 3m1582.jnb

MHall 3/20/01



filename: 3m1602.jnb

MHall 3/20/01

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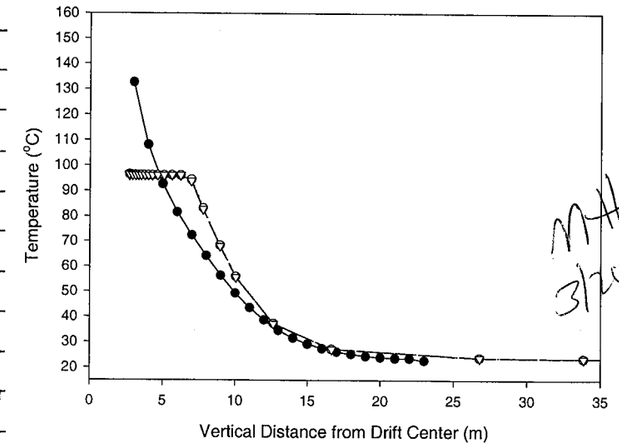
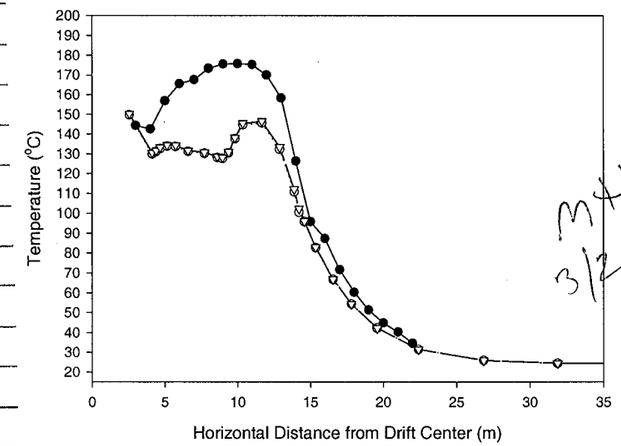
fd158



MHall 3/20/01

fd160



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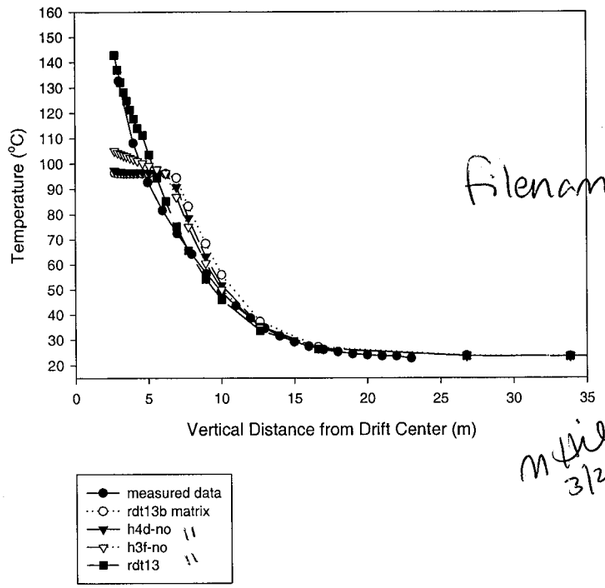
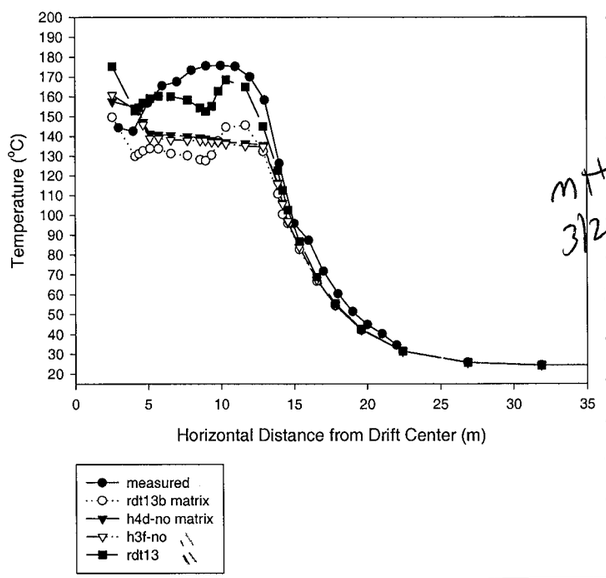


filename: 4frac.jnb

mtt 3/20/01

4frac160



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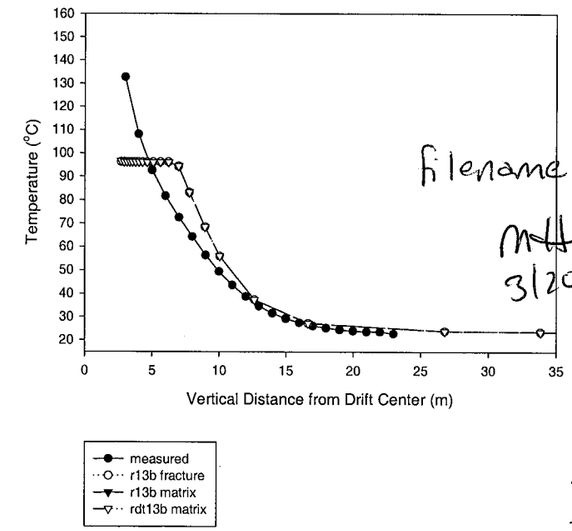
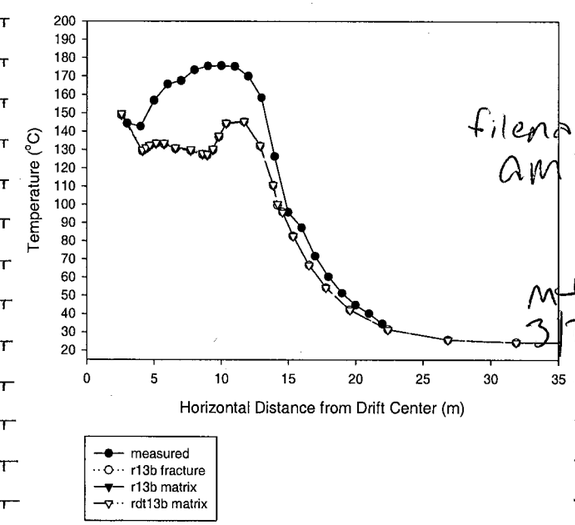
measured, r13bfrac,r13bmat,rdt13bmatrix



filename: am.jnb

mtt 3/20/01

measured, r13bfrac, r13bmat, rdt13bmat



filename: am160.jnb

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Note: files on p. 60-63 of this notebook saved on zip disk labeled: Decnudex I-IV. Zip disks are stored in fire-proof cabinet in bldg 51.

MH 3/20/01

5/23/01 Provided the following files by R. Green:

MH 5/23/01
- rdt22f1dfl.~~plt~~ xyp
- ~~rdt22m~~ MH 5/23/01
- rdt22f1dml.~~plt~~ xyp 5/23/01

160
plotf rdt22f1dfl.xyp
plotf.dat => r22f.xyp
vertprof plotf.dat
~~vertprof plotf.dat~~ MH 5/23/01
vertprof.dat => r22fv.dat

158
plotf rdt22f1dml.xyp
plotf.dat => r22m.xyp
vertprof plotf.dat
vertprof.dat => r22mv.dat

158
plotf rdt22f1dfl.xyp
plotf.dat => r22ff.dat
vertprof plotf.dat
vertprof.dat => r22ffv.dat

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160
plotf rdt22f1dml.xyp
plotf.dat => r22mm.xyp
vertprof plotf.dat
vertprof.dat => r22mmv.dat

M. MH 5/23/01

7/5/01

Provided the following files by R. Green:

letter "l" not #1 →
- 1blk2f1dfl.xyp
- 1blk2f1dml.xyp
- ~~1blk~~ MH 7/5/01

MH 7/5/01
~~158~~ 160
Plotf 1blk2f1dfl.xyp
Plotf.dat => pblk2.dat
vertprof plotf.dat
vertprof.dat => vblk2.dat

158
Plotf 1blk2f1dfl.xyp
Plotf.dat => pfblk2dat
vertprof plotf.dat
vertprof.dat => v2blk2.dat

158
Plotf 1blk2f1dml.xyp
Plotf.dat => pmblk2.dat
vertprof plotf.dat
vertprof.dat => mmblk2.dat

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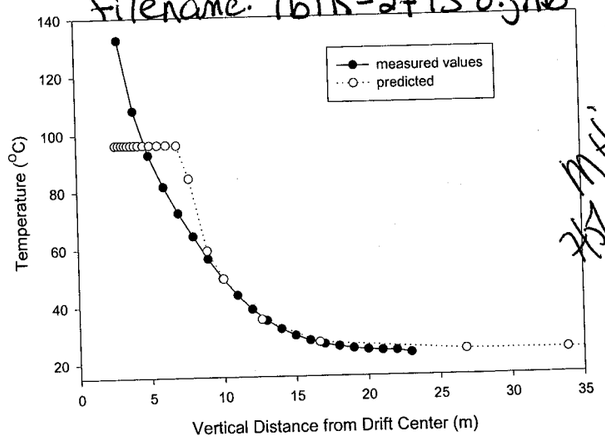
160

Plotf lblk-2fldm1.xyp
plotf.dat => pm2blk2.dat
vertprof plotf.dat
vertprof.dat => mblk2.dat

158 lbk-2fldf1.xyp
v2blk2.dat

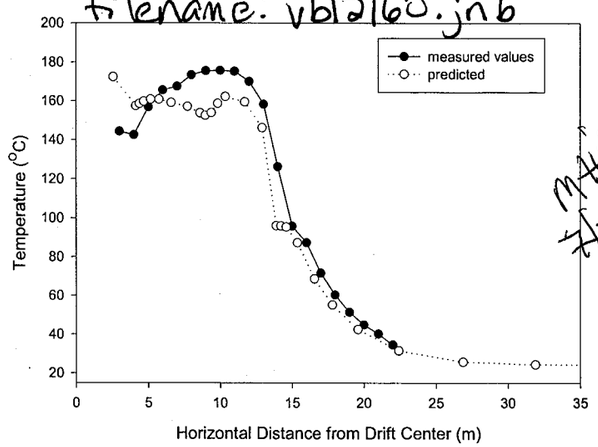
filename: lblk-2f158.jnb



MHill 7/5/01

160 lblk-2fldf1.xyp
vblk2.dat

filename: vblk2160.jnb



MHill 7/5/01

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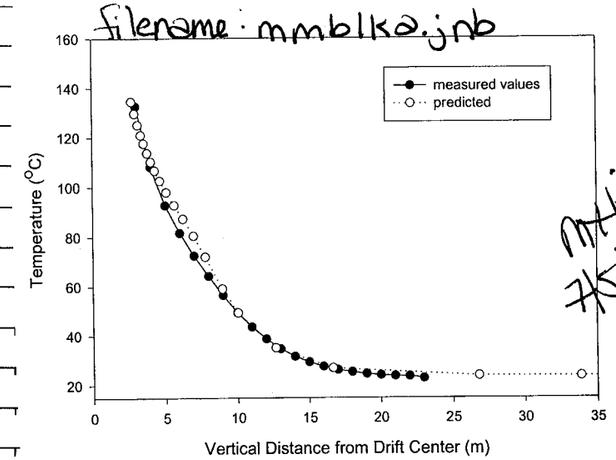
158 lblk-2fldm1.xyp
mmblk2.dat

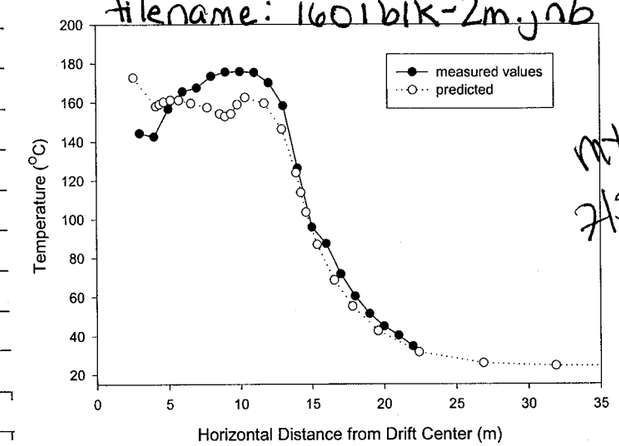
filename: mmblk2.jnb



MHill 7/5/01

160 lblk-2fldm1.xyp
mblk2.dat

filename: 160lblk-2m.jnb



MHill 7/5/01

Plots on pages 66-67 of this notebook are saved on zip disk: agu II which is stored in the fire-proof cabinet in bldg 51.

MHill 7/5/01

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FINAL ENTRY:

I have reviewed this scientific notebook and find it in agreement with QAP-001. There is sufficient information regarding methods used for conducting tests, acquiring and analyzing data so that another qualified individual could repeat the activity.

E.C. Pen 4/2/2002

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