Beta Versions of Log Archiver and Tran-Gen

Internal Software Utility Applications

USGS, Georgia District

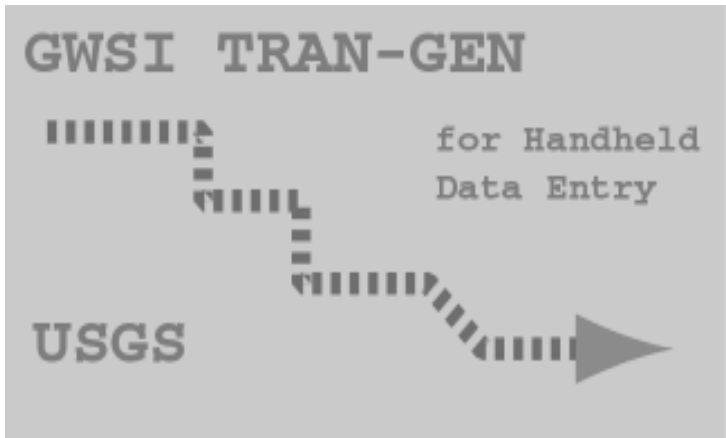
Lester J. Williams

Feb. 8, 2005

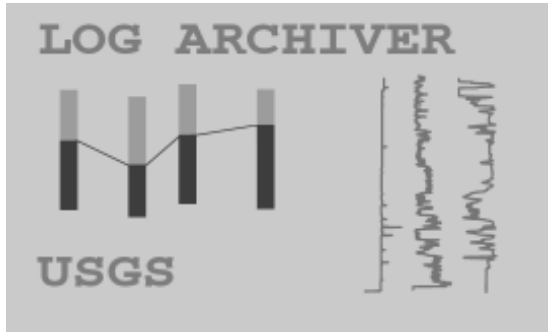
USGS

Overview of presentation

- Log Archiver – archiving geophysical logs
- Tran-Gen – generating transaction files from handheld applications



Log Archiver (beta)



- Needed a way to archive files without ‘cut and paste’ (time consuming/data entry problems/inaccurate).
- Solution: Log Archiver which automates this process in accordance with USGS standard protocols.

LAS Log File

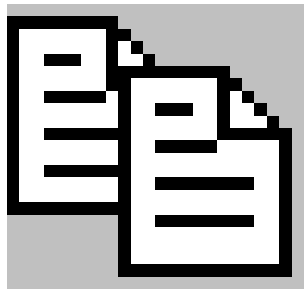
```
~Version Information
 VERS.              2.0:  CWLS LOG ASCII STANDARD -
VERSION 2.0
 WRAP.              NO:  ONE LINE PER DEPTH STEP
~WELL INFORMATION BLOCK
#MNEM.UNIT       DATA
DESCRIPTION OF MNEMONIC
#---------    -------------          ------------------------
 STRT.FT  241.800                     :START DEPTH
 STOP.FT  5.300                      :STOP DEPTH
 STEP.FT  -0.100                      :STEP
 NULL.    0                         :NULL VALUE
 COMP.                      USGS  :COMPANY
 WELL.                    13FF12  :WELL
 FLD .                   L'VILLE  :FIELD
 LOC .             None             :LOCATION
 CNTY.                  GWINNETT  :COUNTY
 STAT.               GA           :STATE
 SRVC.       Atlanta                :SERVICE COMPANY
 DATE.   09/22/98                   :LOG DATE
 UWI .                              :UNIQUE WELL ID
 LIC .                         :LICENSE NUMBER
```

```
~Curve Information Block
#MNEM.UNIT      API CODE     Curve Description
#---------    -------------  ------------------------
 DEPT     .FT               :  1  DEPTH
 CALIPER  .INCH             :  2          CALIPER
 TENSION  .POUNDS           :  3
TENSION
 TIME     .MINUTES          :  4             TIME
~Parameter Information Block
#MNEM.UNIT   Information     Description
#---------- ---------------  ------------------------
~Other Information
#MNEM.UNIT  Information      Description
#---------- ---------------  ------------------------
 FILE.      ORIGINAL          File Type
 FIID.      9065A           File Type Identifier
 VERS.       1.0            System Version
 SER .      1               System Serial Number
 TRUK.      0.2495           Truck Calibration
Number
```

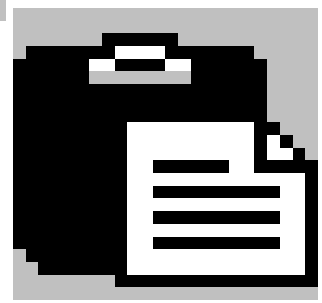
Log Data

```
MCRS.        0          Resistivity Mud Cake
MCTP.                   Temperature Mud Cake
FTYP.          0        Fluid Type
FD  .K/M3               Fluid Density
DFV .S                  Fluid Viscosity
FPH .                   Fuild PH
ELCO.        6000       Electron Cutoff
~A DEPTH  CALIPER TENSION  TIME
241.800   0.0      8.9  0.00000
241.700   0.0      6.7  0.00000
241.600   0.0      6.9  7.40000
241.500   2.0      6.9  0.66000
241.400   2.0      9.5  0.99000
241.300   2.0      8.6  2.20000
241.200   2.0      6.4  2.09000
241.100   2.0      7.4  2.08000
241.000   2.0      4.4  1.21000
240.900   2.0      1.8  0.99000
240.800   2.0      2.7  0.66000
```

copy



paste



USGS Log Header File

Site ID (C1): **304406081330505**
Station name (C12): **33D074**
Other ID (C190): **33D074**
Date of log: **19980923**
Start time of log: **15:18:**
Office/logging unit: **USGS**
Logging operator: **KBM**
Observer: **MJC**

Description of log-measuring point: **ls**
Height of log-measuring point above/below land-surface datum: **0 FT**
Altitude of log-measuring point: **8.8 FT NAVD88**
Log orientation:
Magnetic declination:
Logging direction: **DOWN**
Logging speed:
Depth error after logging: **FT**

Logging probe manufacturer: **Century**
Logging probe model: **Electromagnetic Induction #9511A**
Logging probe serial number: **987**
Description of calibration/standardization:
Date of calibration/standardization:
Standard:
Response:
Standard:
Response:

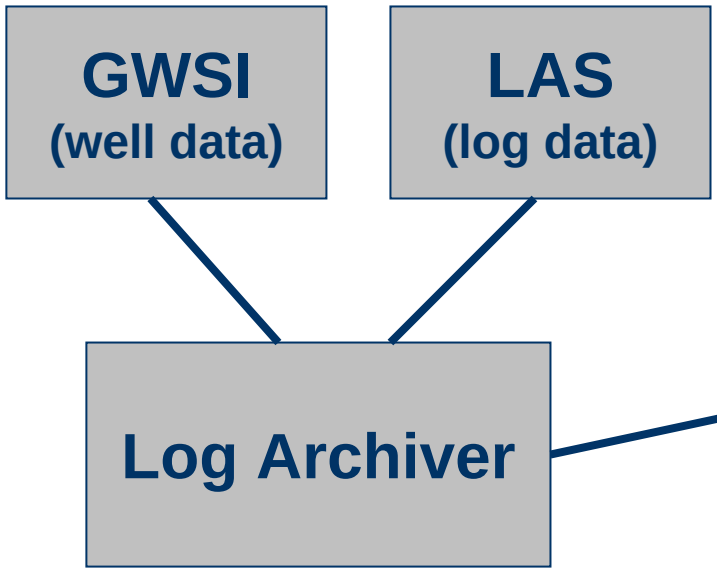
Borehole fluid type: **Water**
Depth of borehole fluid below log-measuring point:**12**
Borehole fluid resistivity/conductivity:
Borehole fluid temperature:
Hydrologic conditions: **flowing**
Software for non-ASCII logs:
Remarks: **example**
LinkingFile:
<----------PRE EXISTING LOG HEADER----------

Log Data

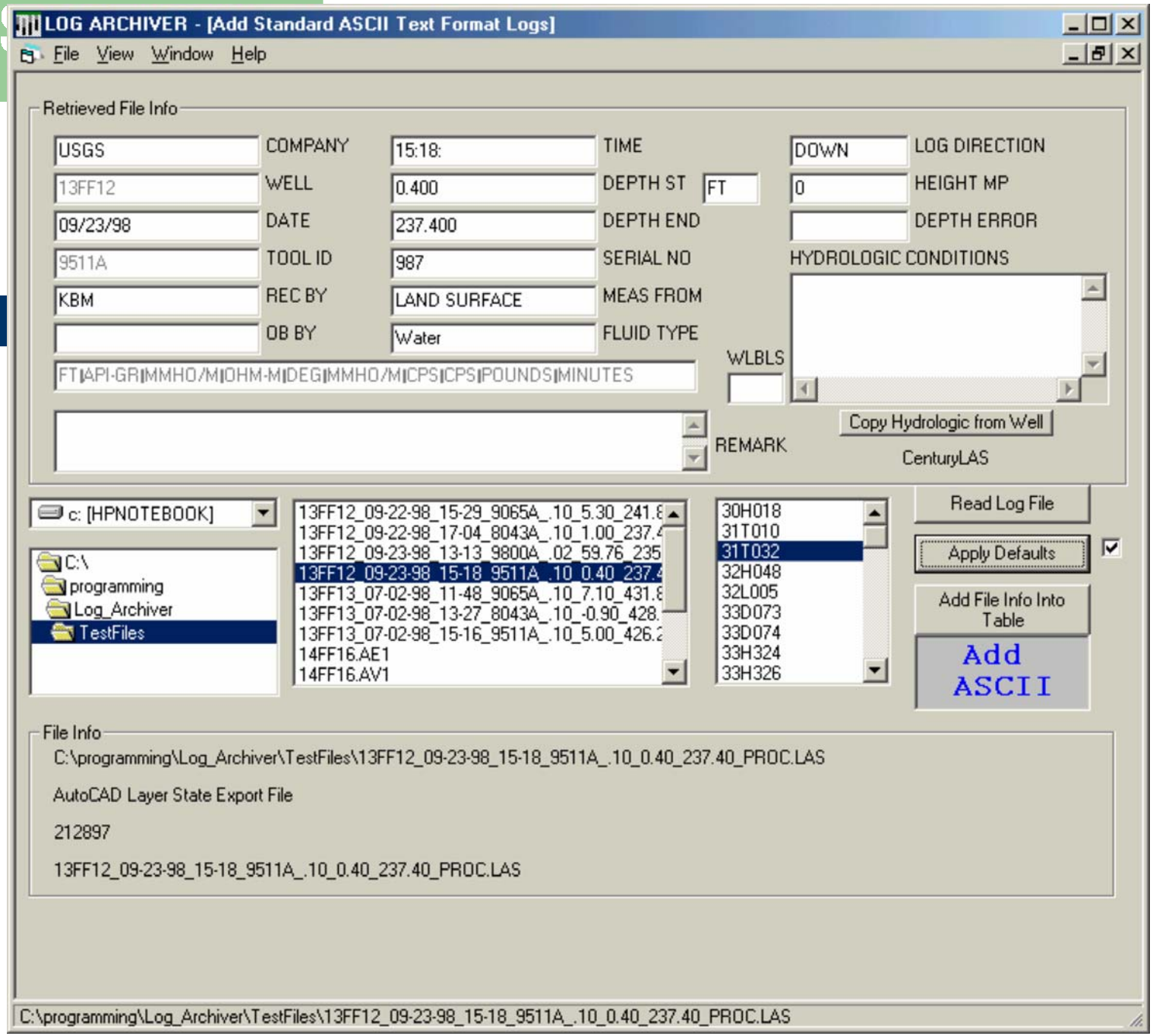
<----------LOG DATA----------

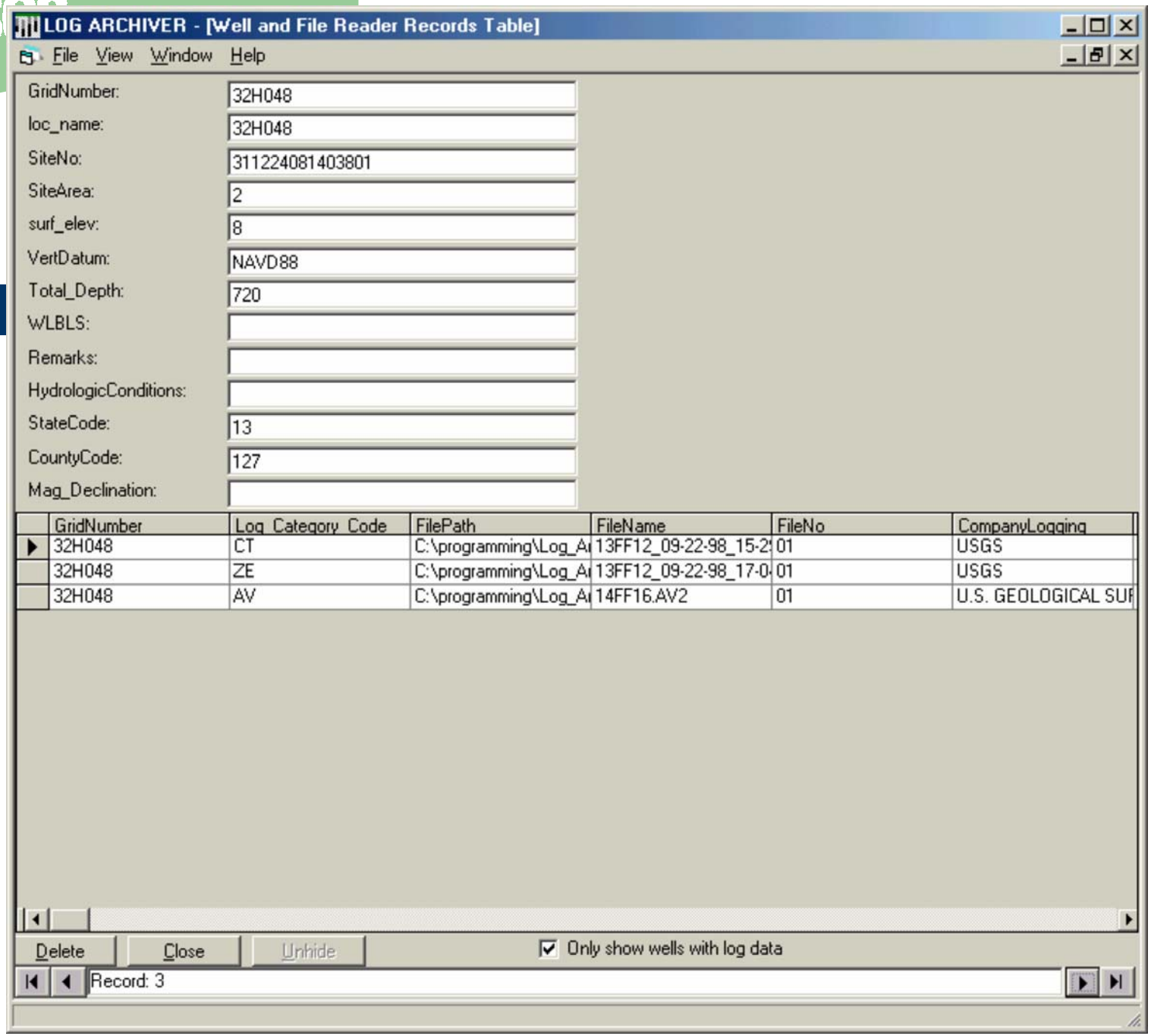
DEPTH	GAM(NAT)	COND	RES	TEMP	AP-COND	TEMP	AP-COND	TENSION	TIME
FT	API-GR	MMHO/M	OHM-M	DEG	MMHO/M	CPS	CPS	POUNDS	MINUTES
0.400	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.2	0.00000
0.500	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.0	0.00000
0.600	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.1	5.84000
0.700	27.6	0.0	0.0	0.0	0.0	0.0	0.0	6.8	1.78000
0.800	34.9	0.0	0.0	0.0	0.0	0.0	0.0	5.3	0.77000
0.900	17.0	0.0	0.0	0.0	0.0	0.0	0.0	5.3	0.66000

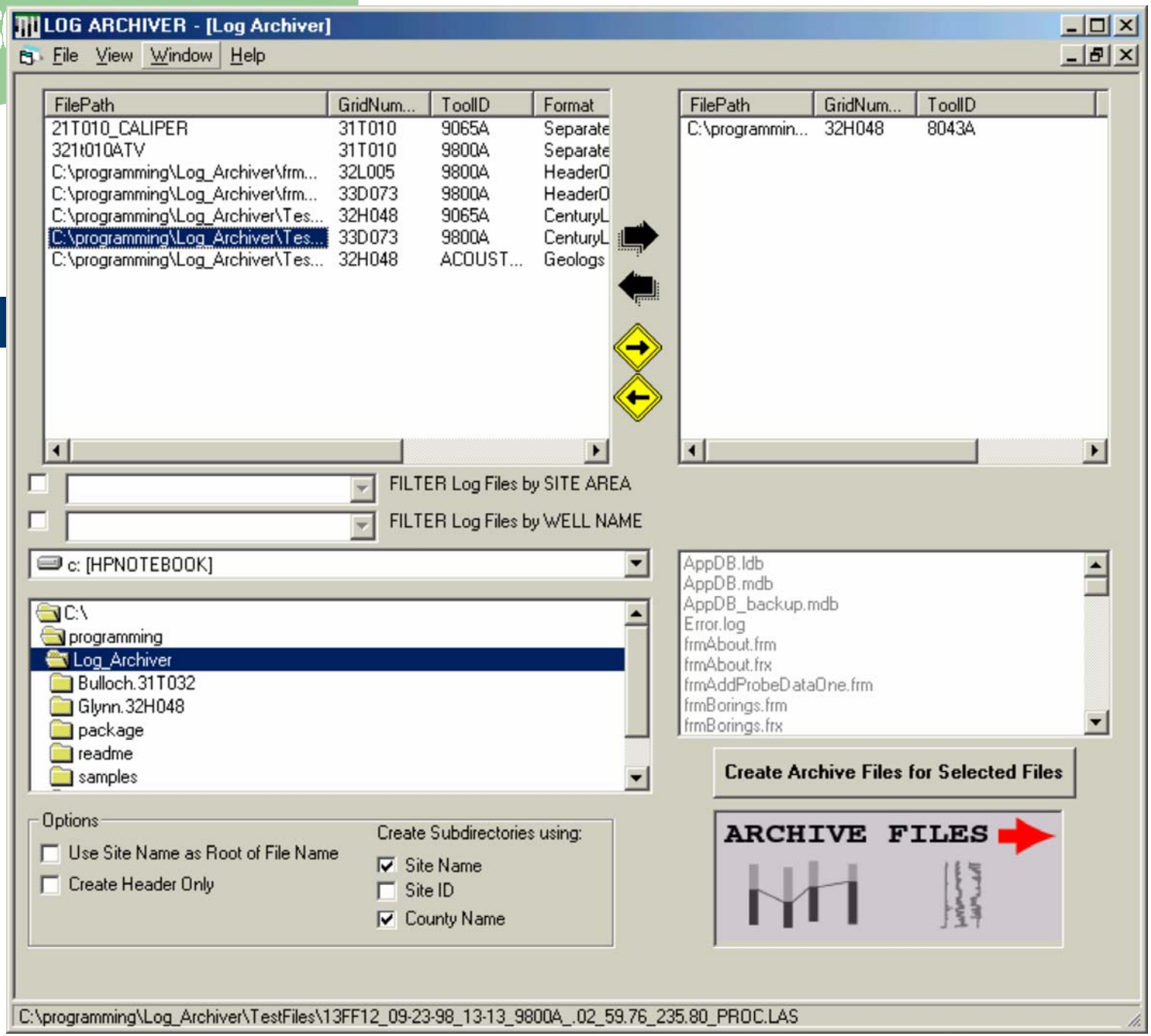
Log Archiver Model



Official Log Archive
..gw\log_archive\...
Gwinnett.13FF20
335744084011601.20010724.CT01
335744084011601.20010724.ZE01
335744084011601.20010724.ZE02
335744084011601.20010724.ZI01

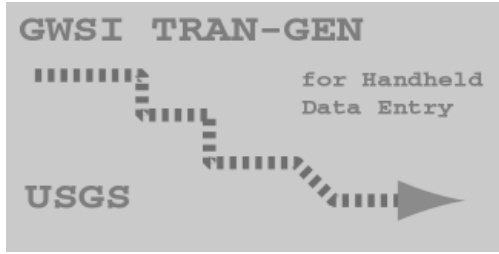

LOG ARCHIVER - [Add Standard ASCII Text Format Logs]
File View Window Help
Retrieved File Info
USGS
COMPANY
15:18:
TIME
DOWN
LOG DIRECTION
13FF12
WELL
0.400
DEPTH ST
FT
0
HEIGHT MP
09/23/98
DATE
237.400
DEPTH END
DEPTH ERROR
9511A
TOOL ID
987
SERIAL NO
HYDROLOGIC CONDITIONS
KBM
REC BY
LAND SURFACE
MEAS FROM
OB BY
Water
FLUID TYPE
FT|API-GR|MMHO/M|OHM-M|DEG|MMHO/M|CPS|CPS|POUNDS|MINUTES
WLBLS
Copy Hydrologic from Well
REMARK
CenturyLAS
c: [HPNOTEBOOK]
C:\
programming
Log_Archiver
TestFiles
13FF12_09-22-98_15-29_9065A_.10_5.30_241.8
13FF12_09-22-98_17-04_8043A_.10_1.00_237.4
13FF12_09-23-98_13-13_9800A_.02_59.76_235
13FF12_09-23-98_15-18_9511A_.10_0.40_237.4
13FF13_07-02-98_11-48_9065A_.10_7.10_431.8
13FF13_07-02-98_13-27_8043A_.10_-0.90_428.
13FF13_07-02-98_15-16_9511A_.10_5.00_426.2
14FF16.AE1
14FF16.AV1
30H018
31T010
31T032
32H048
32L005
33D073
33D074
33H324
33H326
Read Log File
Apply Defaults
Add File Info Into Table
Add ASCII
File Info
C:\programming\Log_Archiver\TestFiles\13FF12_09-23-98_15-18_9511A_.10_0.40_237.40_PROC.LAS
AutoCAD Layer State Export File
212897
13FF12_09-23-98_15-18_9511A_.10_0.40_237.40_PROC.LAS
C:\programming\Log_Archiver\TestFiles\13FF12_09-23-98_15-18_9511A_.10_0.40_237.40_PROC.LAS


LOG ARCHIVER - [Well and File Reader Records Table]
File View Window Help
GridNumber: 32H048
loc_name: 32H048
SiteNo: 311224081403801
SiteArea: 2
surf_elev: 8
VertDatum: NAVD88
Total_Depth: 720
WLBLS:
Remarks:
HydrologicConditions:
StateCode: 13
CountyCode: 127
Mag_Declination:
GridNumber | Log_Category_Code | FilePath | FileName | FileNo | CompanyLogging
32H048 | CT | C:\programming\Log_A | 13FF12_09-22-98_15-2 | 01 | USGS
32H048 | ZE | C:\programming\Log_A | 13FF12_09-22-98_17-0 | 01 | USGS
32H048 | AV | C:\programming\Log_A | 14FF16.AV2 | 01 | U.S. GEOLOGICAL SU
Delete
Close
Unhide
Only show wells with log data
Record: 3


LOG ARCHIVER - [Log Archiver]
File View Window Help
FilePath GridNum... ToolID Format
21T010_CALIPER 31T010 9065A Separate
321t010ATV 31T010 9800A Separate
C:\programming\Log_Archiver\frm... 32L005 9800A HeaderO
C:\programming\Log_Archiver\frm... 33D073 9800A HeaderO
C:\programming\Log_Archiver\Tes... 32H048 9065A CenturyL
C:\programming\Log_Archiver\Tes... 33D073 9800A CenturyL
C:\programming\Log_Archiver\Tes... 32H048 ACOUST... Geologs
FilePath GridNum... ToolID
C:\programmin... 32H048 8043A
FILTER Log Files by SITE AREA
FILTER Log Files by WELL NAME
c: [HPNOTEBOOK]
C:\
programming
Log_Archiver
Bulloch.31T032
Glynn.32H048
package
readme
samples
AppDB.ldb
AppDB.mdb
AppDB_backup.mdb
Error.log
frmAbout.frm
frmAbout.frx
frmAddProbeDataOne.frm
frmBorings.frm
frmBorings.frx
Create Archive Files for Selected Files
Options
Use Site Name as Root of File Name
Create Header Only
Create Subdirectories using:
Site Name
Site ID
County Name
ARCHIVE FILES
C:\programming\Log_Archiver\TestFiles\13FF12_09-23-98_13-13_9800A_.02_59.76_235.80_PROC.LAS

Log Archiver Feature Summary

- Imports GWSI well data and FIPS county data.
- Reads standard LAS format log files and builds header data.
- Builds other types of header files (for binary files).
- Automatically assigns files names using standard conventions (3225410814712O2.19980922.CT01).
- Writes ASCII text log files to the target archive directory.



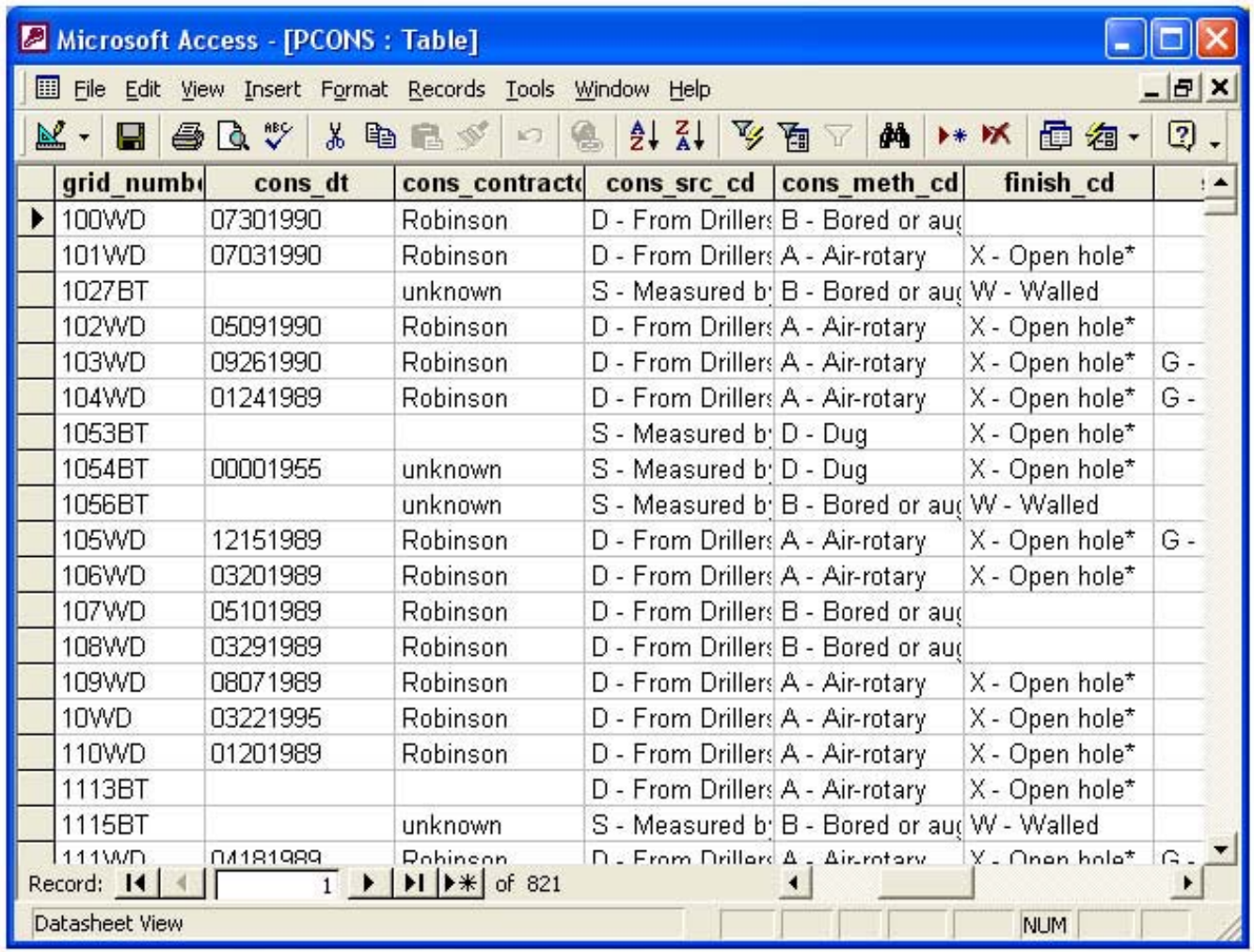
Transaction File Generator (beta)

- Needed a way to organize county-scale well inventories (several 1,000's of wells).
- Various sources of data (health dept, drillers records, geocoded addresses, GIS).
- Wanted handheld capability and flexibility.
- To avoid doing data entry twice, needed to generate the GWSI transaction files directly from this data source.

Solution: Tran-Gen

- Pendragon Forms front-end
- ‘Template Based’
- Templates consist of one or more MS Access tables
- User can customize the template

Need to go from this…



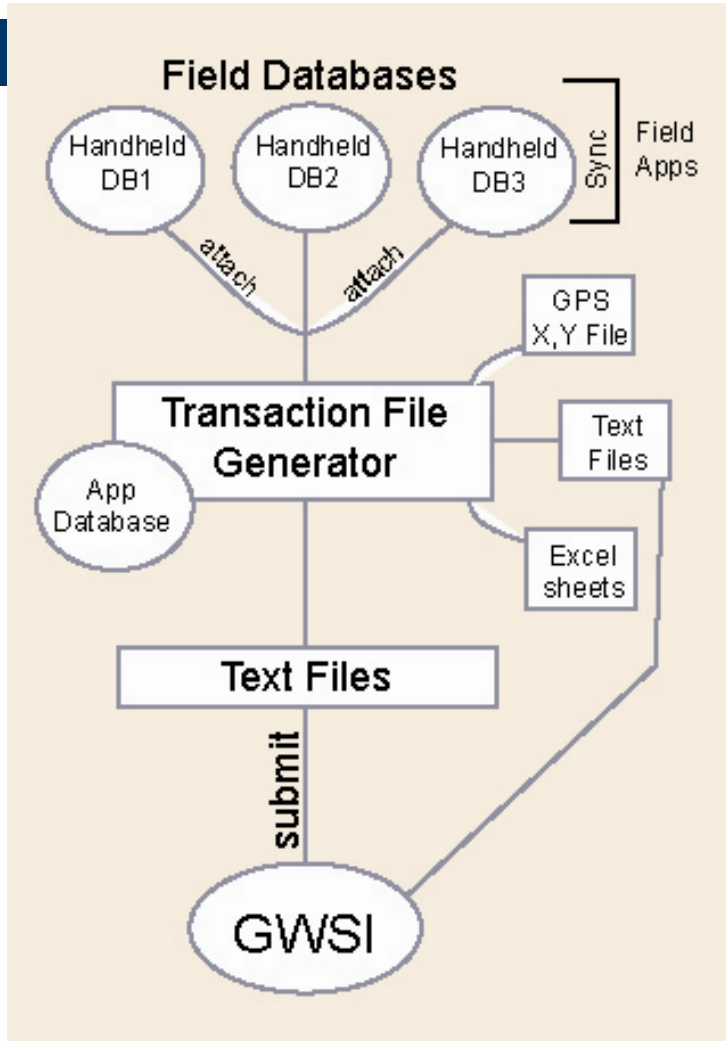
grid_numb	cons_dt	cons_contract	cons_src_cd	cons_meth_cd	finish_cd	
100WD	07301990	Robinson	D - From Drillers	B - Bored or au		
101WD	07031990	Robinson	D - From Drillers	A - Air-rotary	X - Open hole*	
1027BT		unknown	S - Measured b	B - Bored or au	W - Walled	
102WD	05091990	Robinson	D - From Drillers	A - Air-rotary	X - Open hole*	
103WD	09261990	Robinson	D - From Drillers	A - Air-rotary	X - Open hole*	G -
104WD	01241989	Robinson	D - From Drillers	A - Air-rotary	X - Open hole*	G -
1053BT			S - Measured b	D - Dug	X - Open hole*	
1054BT	00001955	unknown	S - Measured b	D - Dug	X - Open hole*	
1056BT		unknown	S - Measured b	B - Bored or au	W - Walled	
105WD	12151989	Robinson	D - From Drillers	A - Air-rotary	X - Open hole*	G -
106WD	03201989	Robinson	D - From Drillers	A - Air-rotary	X - Open hole*	
107WD	05101989	Robinson	D - From Drillers	B - Bored or au		
108WD	03291989	Robinson	D - From Drillers	B - Bored or au		
109WD	08071989	Robinson	D - From Drillers	A - Air-rotary	X - Open hole*	
10WD	03221995	Robinson	D - From Drillers	A - Air-rotary	X - Open hole*	
110WD	01201989	Robinson	D - From Drillers	A - Air-rotary	X - Open hole*	
1113BT			D - From Drillers	A - Air-rotary	X - Open hole*	
1115BT		unknown	S - Measured b	B - Bored or au	W - Walled	
111WD	04181989	Robinson	D - From Drillers	A - Air-rotary	X - Open hole*	G -

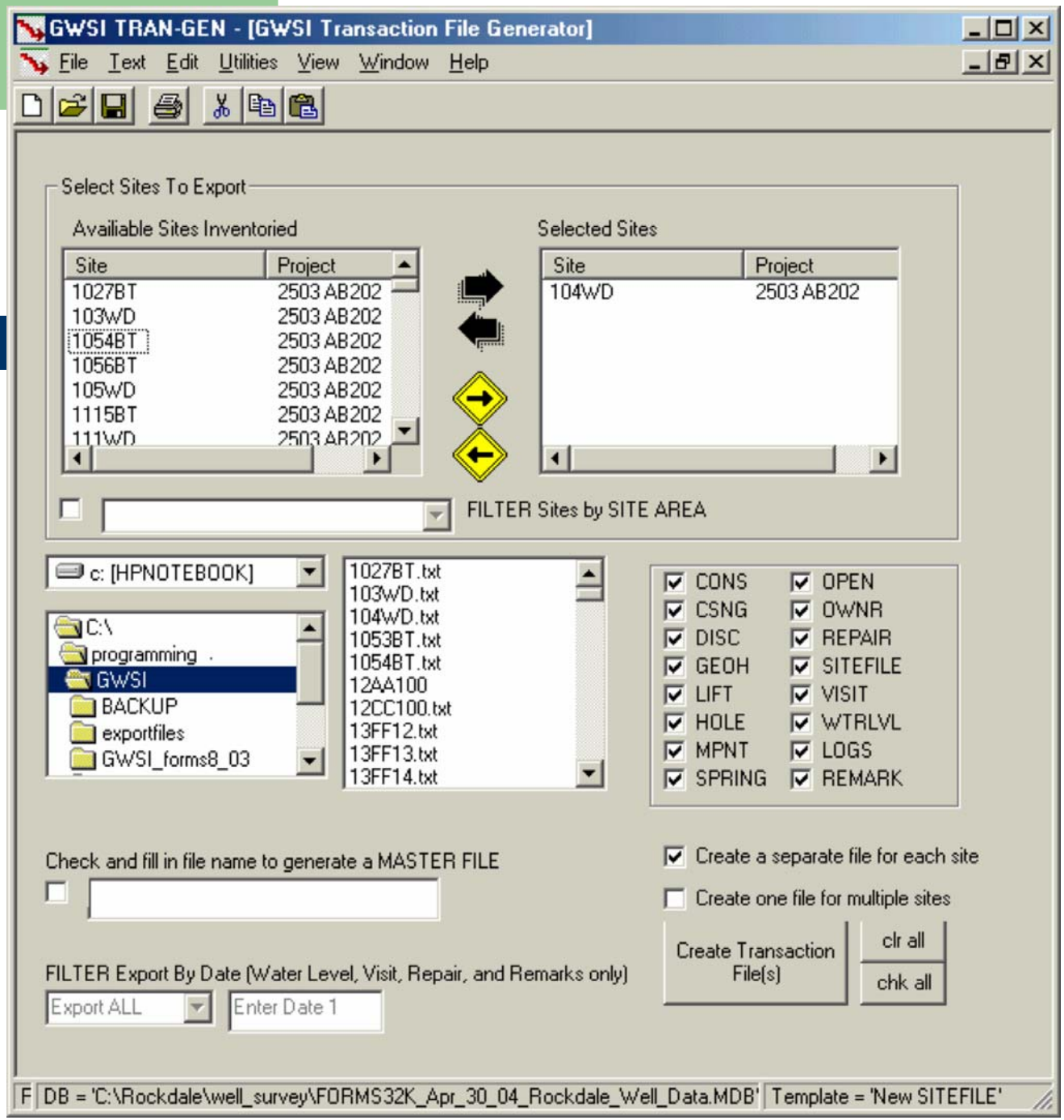
To this…

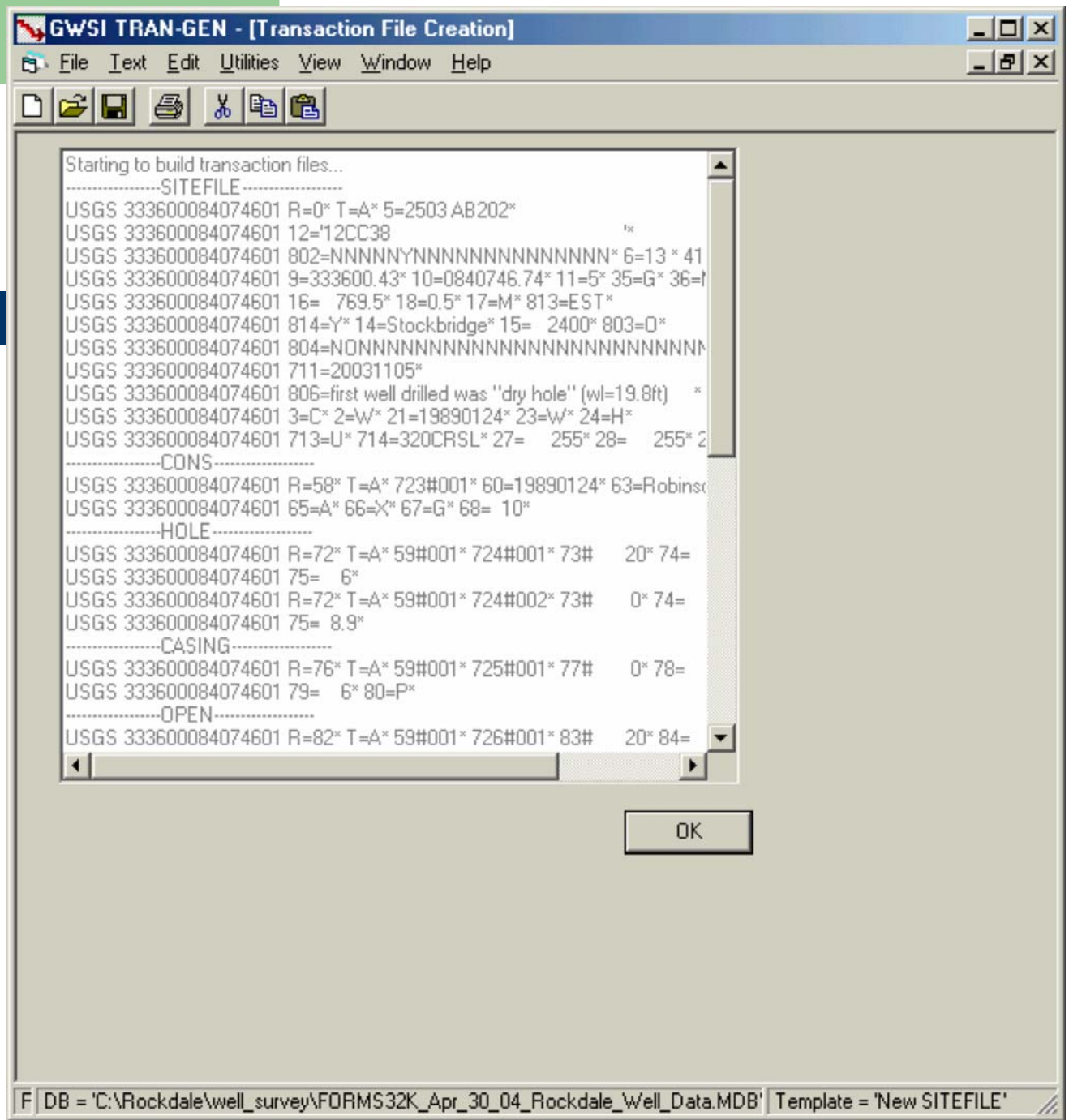
```
XXXXX
USGS 334342084021701 R=0* T=A* 5=2503 AB202*
USGS 334342084021701 12='13DD98                                          '*
USGS 334342084021701 802=NNNNNYNNNNNNNNNNNNNN* 6=13 * 41=US* 7=13* 8=247*
USGS 334342084021701 9=334342.17* 10=0840217.45* 11=5* 35=G* 36=NAD83*
USGS 334342084021701 16=     790* 18=0.5* 17=M* 813=EST*
USGS 334342084021701 814=Y* 14=Conyers* 15=   2400* 803=O*
USGS 334342084021701 804=NONNNNNNNNNNNNNNNNNNNNNNNNNNN* 39=DO*
USGS 334342084021701 711=20030224*
USGS 334342084021701 806=send report, this well replaced older bored well  *
USGS 334342084021701 3=C* 2=W* 21=19900926* 23=U* 24=H*
USGS 334342084021701 713=U* 714=320CRSL* 27=     605* 28=     605* 29=D*
USGS 334342084021701 R=58* T=A* 723#001* 60=19900926* 63=Robinson* 64=D*
USGS 334342084021701 65=A* 66=X* 67=G* 68=  10*
USGS 334342084021701 R=72* T=A* 59#001* 724#001* 73#       0* 74=      25*
USGS 334342084021701 75=  8.9*
USGS 334342084021701 R=72* T=A* 59#001* 724#002* 73#      25* 74=     605*
USGS 334342084021701 75=    6*
USGS 334342084021701 R=76* T=A* 59#001* 725#001* 77#       0* 78=      25*
```

Transaction File Generator Model

- Use available commercial software for handhelds (Pendragon Forms)
- Use MS Access to store lookups, procedures, views, and commands.
- Generate transaction files and error checking.




GWSI TRAN-GEN - [GWSI Transaction File Generator]
File Text Edit Utilities View Window Help
Select Sites To Export
Availiable Sites Inventoried
Site Project
1027BT 2503 AB202
103WD 2503 AB202
1054BT 2503 AB202
1056BT 2503 AB202
105WD 2503 AB202
1115BT 2503 AB202
Selected Sites
Site Project
104WD 2503 AB202
FILTER Sites by SITE AREA
c: [HPNOTEBOOK]
C:\
programming .
GWSI
BACKUP
exportfiles
GWSI_forms8_03
1027BT.txt
103WD.txt
104WD.txt
1053BT.txt
1054BT.txt
12AA100
12CC100.txt
13FF12.txt
13FF13.txt
13FF14.txt
CONS OPEN
CSNG OWNR
DISC REPAIR
GEOH SITEFILE
LIFT VISIT
HOLE WTRLVL
MPNT LOGS
SPRING REMARK
Check and fill in file name to generate a MASTER FILE
Create a separate file for each site
Create one file for multiple sites
Create Transaction File(s)
clr all
chk all
FILTER Export By Date (Water Level, Visit, Repair, and Remarks only)
Export ALL
Enter Date 1
F DB = 'C:\Rockdale\well_survey\FORMS32K_Apr_30_04_Rockdale_Well_Data.MDB' Template = 'New SITEFILE'


GWSI TRAN-GEN - [Transaction File Creation]
File Text Edit Utilities View Window Help
Starting to build transaction files...
----------SITEFILE----------
USGS 333600084074601 R=0* T=A* 5=2503 AB202*
USGS 333600084074601 12='12CC38 '*
USGS 333600084074601 802=NNNNNYNNNNNNNNNNNNN* 6=13 * 41
USGS 333600084074601 9=333600.43* 10=0840746.74* 11=5* 35=G* 36=
USGS 333600084074601 16= 769.5* 18=0.5* 17=M* 813=EST*
USGS 333600084074601 814=Y* 14=Stockbridge* 15= 2400* 803=0*
USGS 333600084074601 804=NONNNNNNNNNNNNNNNNNNNNNNNN
USGS 333600084074601 711=20031105*
USGS 333600084074601 806=first well drilled was "dry hole" (wl=19.8ft) *
USGS 333600084074601 3=C* 2=W* 21=19890124* 23=W* 24=H*
USGS 333600084074601 713=U* 714=320CRSL* 27= 255* 28= 255* 2
----------CONS----------
USGS 333600084074601 R=58* T=A* 723#001* 60=19890124* 63=Robins
USGS 333600084074601 65=A* 66=X* 67=G* 68= 10*
----------HOLE----------
USGS 333600084074601 R=72* T=A* 59#001* 724#001* 73# 20* 74=
USGS 333600084074601 75= 6*
USGS 333600084074601 R=72* T=A* 59#001* 724#002* 73# 0* 74=
USGS 333600084074601 75= 8.9*
----------CASING----------
USGS 333600084074601 R=76* T=A* 59#001* 725#001* 77# 0* 78=
USGS 333600084074601 79= 6* 80=P*
----------OPEN----------
USGS 333600084074601 R=82* T=A* 59#001* 726#001* 83# 20* 84=
OK
F DB = 'C:\Rockdale\well_survey\FORMS32K_Apr_30_04_Rockdale_Well_Data.MDB' Template = 'New SITEFILE'

Tran-Gen Feature Summary

- Provides an MS Access ‘Base Template’ for loading data from Handheld applications or Excel.
- Allows handheld application to be customized around the ‘Base Template’.
- Provides tools for managing lookups, updating data, data entry, importing x,y data.
- Generates GWSI Transaction Files.

Interesting possibilities…

- Stand-alone windows application that can be run from you PC, laptop, handhelds.
- Soil Logger*, Air Rotary Logger, Core Log
- Excel Spreadsheet could be distributed for data entry (no installations!).
- MS Access is great for developing reports.
- Easily integrated into Arc View projects.

Summary

- Increase productivity and accuracy.
- Integration of various existing software solutions: MS Access, Excel, Handheld applications (open and flexible architecture)
- If interested, we probably need to team up with other programmers, IT support.
- Need someone to analyze code, memory leaks, optimization, better way??