

Update on Handheld Computers

ITAC-Meeting
New Cumberland, PA
June 12, 2003

Charles F. Merk, Hydrologist
WRD Office of Information
Reston, VA





Famous Alumni

- **Greg Senko – New Cumberland, PA**
- **Jim Slack – Reston, VA**
- **Ed Doheny – Dover, DE**
- **Walt Aucott – Lawrence, KS**
- **Wink Smith (Retired) – Sacramento, CA**
- **Charlie Merk – Reston, VA**
- **Many more....**

Background

- **Field Computer work in 1990s sponsored by HIF, NWIS and Districts**
- **NWIS Field Computer User Group developed a set of requirements in 1998**
- **Field computer issue discussed at the WRD Senior Staff meeting in August 2000**
- **Charlie Merk assigned to investigate where we are on field computers and portable computing technology.**

Topics

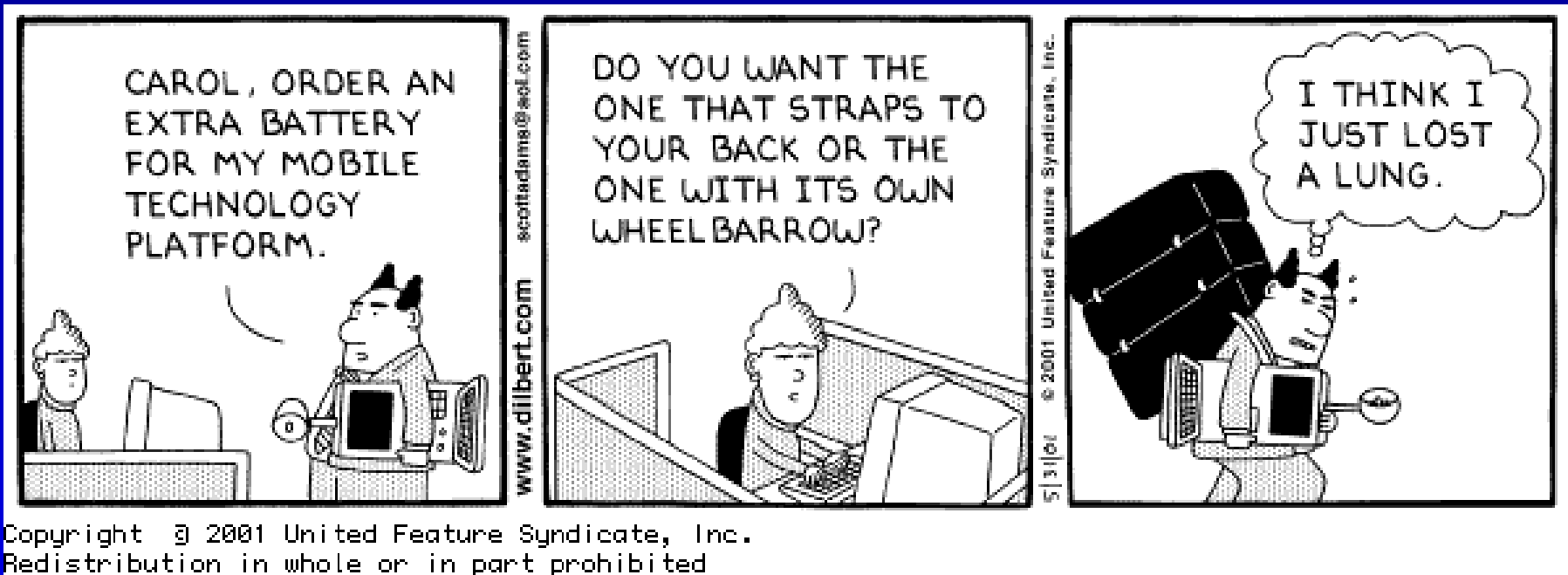
- **Vision**
- **FY03 Goals**
- **Discharge Measurement HW/SW Status**
- **Ground-Water Levels Forms**
- **Ground-Water Canvas Sheet**
- **FY04 Proposed Activities**

Vision

Vision is that every field technician and hydrologist have mobile technology to:

- improve data quality**
- improve work flow processes in the field**
- transfer field data to the NWIS data base and the web**

Dilbert on Mobile Technology



What is the FCIG?

- **Field Computer Interest Group**
 - http://wwwnwis.er.usgs.gov/cm/fcig_index.html
 - **Not an NWIS User Group**
 - **Very broad in vision**
 - **Broad representation**
 - **NWIS User Groups (GW, SW, QW), OSW, OGW, OWQ, Technical Committees, All four Regions HIF**

Mobile Applications

- Data Logger Connectivity
- Field Forms

WATER-LEVEL FORMS

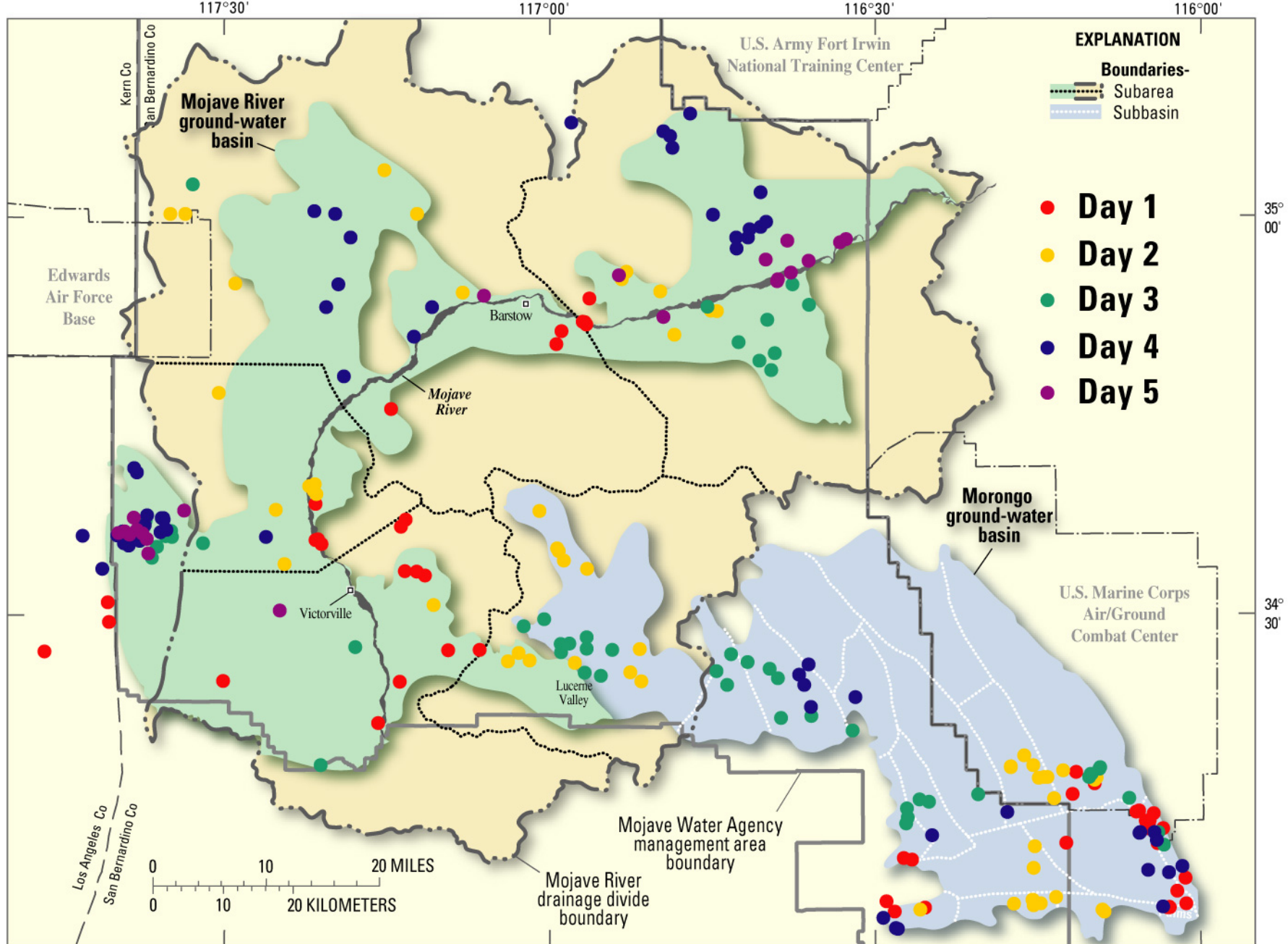


Paper



Electronic





Nightly GW Level updates to NWIS from the field

FY02 Activity: Water Levels Forms



- **Multi-Optional Network Key Entry System**
- **Project Chief: Greg Smith, San Diego**
- **CA Project Personnel: Steve Predmore, Julia Huff**
- **LA Programmers: Burl Goree, Ron Seanor**
- **HQ Personnel: Linda Geiger, Charlie Merk**
- **Cooperator: Mojave Water Agency**
- **One week “field trip”; About 500 wells**
- **Seven field trip teams**
- **WRI Report 00-4090**



MONKES1:

Water Levels Forms



- **Populate NWIS “Field Trip” Sites to Handheld**
- **Locate Well Using GPS – Validate Lat/Long**
- **Measure Water Level – Validate via Historic Data tables and hydrographs**
- **Field Forms Entry**
- **Connect to Field Printer**
- **Connect via Hotel Modem**
- **Upload water-levels NWIS/GWSI**
- **Display Sites on Web Page**



MONKES2:

Well Inventory Forms



- **Field Forms Entry**
- **Use GPS as input for Lat/Long**
- **General, well, pump, locator, description information , etc.**
- **Connect to Field Printer**
- **Connect via Hotel Modem**
- **Upload sites to NWIS/GWSI**



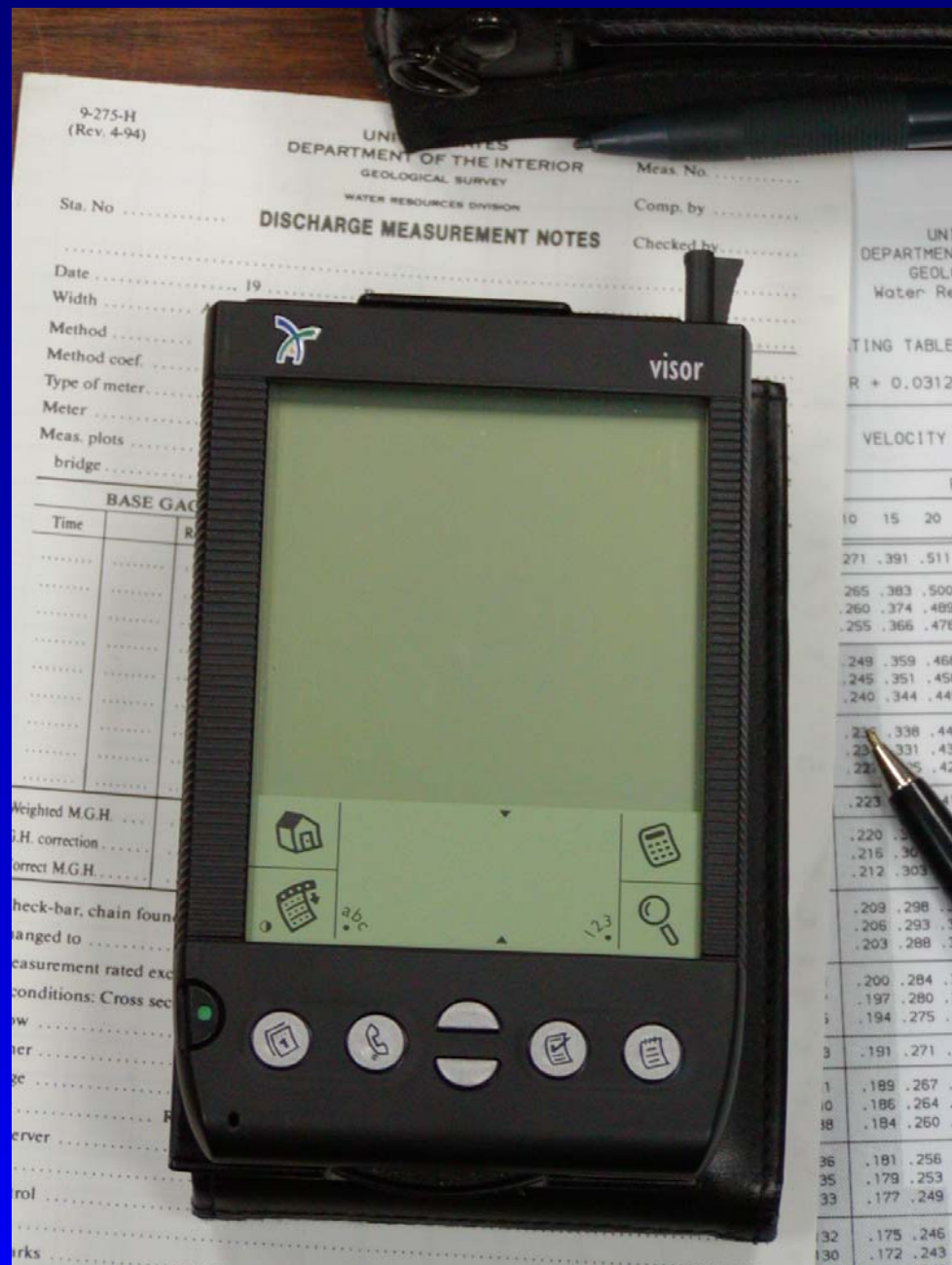
FY03 Activity: MONKES1 and 2



- **Software development**
 - State codes, county codes, aquifer codes, etc.
- **User Manuals**
- **Help Desk Support**
- **Programmer Support: Jerry Feese, KS**



Automating Discharge Measurement Computations and Notes



FY02 Activity:

Discharge Measurement System

- Project Initiation Aug '01
 - **Merk, Hayes, Ross, Walker**
- Hardware Requirements Dec '01
 - **Merk, Ross**
- Software Requirements Apr '02
 - **Merk, Ross, Walker, Frigon, Goree, Knapp, Midtlyng, Halper**
- Software Design Jun, Jul '02
 - **Merk, Walker, Frigon, Goree, Knapp, Midtlyng, Babcock**

FY02 - 03 Activities:

Discharge Measurement System

- Integration Tests, rUston, LA Sep 17, '02
 - Merk, Ross, Walker, Frigon, Goree, Knapp, Midtlyng, McEwen
 - Merk, Ross, Walker, Goree Nov 13, '02
- OSW Staff Briefing/Cyber Seminar April, '03
 - Walker
- Field Tests, Altamonte Springs, FL May 17, '03
 - Merk, Ross, Walker, Jones, Goree, Midtlyng, Nielsen, Christman, Shelton, Hayes
- Additional Field Tests in CA and TX Summer, '03

Mobile Equipment

- **Palm Pilot**
- **Current Meter**
- **Current Meter
Signal Processor**
- **Pocket PC**



Mobile Equipment

- **Current Meter Signal Processor**
 - Outputs velocity and no. of counts
 - Developed by HIF
 - Can be used independent of forms s/w
 - 10 test units – 3Q FY03
 - Plans to take orders for 1Q FY04
 - About \$150 per unit
 - Contact Jerry Ross

Handheld Field Computer Discharge Measurement

Nov. 13, 2002



Jerry Ross, HIF
Burl Goree, LA
John Walker, WI



Little Corney Bayou nr Lillie, LA

Mobile Equipment Test

- **Current Meter
Signal Processor**
- **Conductivity
23,500 $\mu\text{S}/\text{cm}$**
- **02247598 Tomoka
River nr Ormond Beach,**
- **May 21, 2003**



Mobile Equipment Test

- **Current Meter
Signal Processor**
- **Conductivity
53,500 $\mu\text{S}/\text{cm}$**
- **Daytona Beach, FL**
- **May 21, 2003**



Electronic ASR



Electronic ASR Upload

Select file for transmission:

```
ArrayLen(aFields) = 3  
aFields[1] = SMCOD  
aFields[2] = BU_ID  
aFields[3] = Abundance  
ArrayLen(aFields) = 3  
aFields[1] = MISE0896IRM0005A  
aFields[2] = Naididae  
aFields[3] = 35  
ArrayLen(aFields) = 3  
aFields[1] = MISE0896IRM0005A  
aFields[2] = Ancyronyx variegata (Germar)  
aFields[3] = 12  
ArrayLen(aFields) = 3  
aFields[1] = MISE0896IRM0005A
```

- **HTML Format**
- **Browser**
- **Upload Function**
- **District Partners**
- **Bar Code**
 - **Jeremy Fee, NWQL**

Handheld applications are driven by your imagination

- **GPS**
- **Convergence of Telephone and PDA USA coverage**
- **Web Access: Update and Retrieval**
- **Reports for Weather, Traffic, etc.**
- **Voice Recognition, Voice Input to Forms applications**

What can you do?

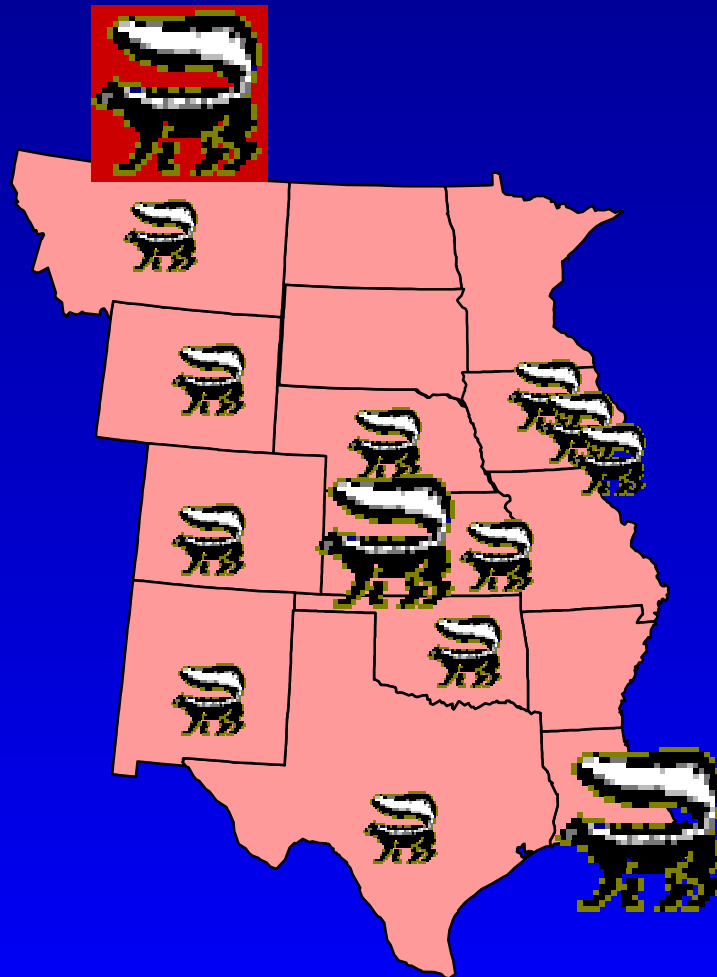
District Activity:

Become an advocate in your District

- **2 Districts equip all field personnel with handhelds – 2Q FY03**
 - **Iowa – HP iPaq – 15 units**
 - **Caribbean – Dell Axim – 30 units**

What can you do?

District Activity: Share Software and Documentation



What can you do?

District Activity:

Lead a Handheld Workshop



Advances in handheld field computing

- **Data into NWIS before the technician gets back to the office**
- **No double entry of data**
- **QA checks**
- **Direct integration of GPS**
 - **Use DB lat/long to find site**
 - **Upload NWIS lat/long from GPS**

FY04 Proposed Activities

- **Ground-Water Forms**
 - XML
 - Help desk / user support
- **Surface-Water Forms**
 - Port to Pocket PC 2002 OS
 - XML for loading measurements to NWIS
 - Shifts to the Web in near-real time
- **Testing**
 - GW
 - SW
- **More \$, More innovations**

FY04/05 Proposed Activities

- add to the handheld application the ability for the field hydrographer to send processing instructions to the database along with the data. For example, I envision a hydrographer making a measurement, reviewing how the measurement compares with the existing rating curve as well as any existing shift diagram, and then submitting instructions to add or change a shift - all on the handheld.

Joe Nielsen email dated 05/30/2003

FY04/05 Proposed Activities

- “I think that getting software on the NWIS side to pick up and process the instructions is very possible as it is a not very complicated extension of the work already being done to support the Hydstra CTA as well as the site-visit loader with Illex. ”

Joe Nielsen email dated 05/30/2003

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