FIELD PRODUCTION DATA CAPTURE-DIGITAL AND OTHER METHODS

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ABSTRACT
This paper will report the results of a survey of the field methods that oil and gas operators are using to capture and transmit daily field production. The objective of the survey was to : (1) accumulate information on the techniques/methods operators in the Permian Basin were using to collect, record and transmit daily production (oil, gas, water) and other associated operational data; and (2) determine if the methods employed correlated with size of the operator and/or location (remote or centralized). The survey was conducted by interviewing office and field personnel, and other contact methods. The results show that there is a "mix" of methods being used by the operators surveyed. The method tends to be a result of the needs or the philosophies of the operators, the status of mergers, and buy-outs (who is the surviving entity) with new systems being tried, and communications between field and office personnel.

INTRODUCTION
"What are pumpers in the Permian Basin doing with regards to using hand-helds or laptops to capture their field data, or are they still relying on hand-prepared reports?" This straightforward inquiry led to a survey, primarily of Permian Basin operators. Operators ranged from very small independents to large independents to majors. Visits were with company owners, pumpers, production engineers, field foremen and office accounting managers.

This article focuses on the field perspective and production accounting, while acknowledging that financial accounting exerts significant influence on the systems selected.

Consider this an interim report with more visits planned since technology is improving and more oil and gas operators are initiating pilot programs using hand-helds and laptop computers for data gathering and transmission. There are many different perspectives represented in the results so far. If asked to state just one conclusion, the title of this article expresses it well.

The first objective involved visiting operators both in their production offices and field offices. Also a significant amount of information was gathered by telephone. This has been time consuming but rewarding. Table 1 is a list of the companies contacted, followed by a list of companies where some information was gathered. Overall, I talked with 18 different operators, making 25 visits.

REGARDING OPERATOR SIZE AND LOCATION, THE SURVEY REVEALS: NO DIRECT CORRELATIONS COULD BE MADE WITH THE METHOD EMPLOYED. WHY?
Practices are in rapid flux, being strongly influenced by continued disruptions from mergers and buy-outs. The two factors that exert the strongest influence on what companies are doing are (1) owner/upper management philosophy and (2) clout of the accounting department, which is stronger in this post Sarbanes-Oxley world. Notice that I did not mention company size. From all the discussions I have had with operators so far, Company Size and Location of Production (remote or centralized) does not have a major impact. In fact, in several smaller companies, good communication between the pumpers/field operators and the office management/production accounting personnel are enabling them to navigate the digital world quite well. Deployment depends upon operators using the information highway to learn what technology is available.

SUMMARY OF METHODS AND TECHNIQUES
There is a "mix" of methods of collecting production data and transmitting it to a data base (data path) by the operators surveyed (Figure 1). The method tends to be a result of the needs or the philosophies of the operators, the status of mergers and buy-outs (who is the surviving entity) with new systems being tried, and communications between field and office. There was a genuine interest in the operators to learn what others are doing, and this is fueled by the very recent improvement in the technology of digital data gathering. More companies are initiating pilot projects as a result of the improvement in the technology. The new technology provides more interfacing between the data gathering devices and accounting software, which in the eyes of a lot of operators is a "must." It is quite apparent that accounting is becoming a bigger player. Also the

technology can now provide more regulatory reporting than before. The recent developments also provide better user-friendly data displays and the pumpers/lease operators are less fearful of learning the digital world.

- Hand-Held Computers: Field Direct-Production Explorer; Merrick-Pro Count
- Laptops: Used as an alternative to Field Direct and Merrick Hand-held computers (choice of pumper/lease operator), or utilizing individual software components. Data are gathered and either electronically transmitted via a modem or paper faxed. Laptop software used includes: Local- developed Excel spread sheets; TOW; LOWIS; WINTANK; ACCESS database internally-developed; TOTAL ROD
- SCADA Systems
- Pencil: Hand-prepared Saddle Blanket and Grease Sheets (Old methods)
- Combination of ALL!!!

FIELD DATA GATHERING AND TRANSMISSION MUST SATISFY MANY “USERS”

When going digital, one must understand the role or perspective of the "users." Perspectives that must be considered include:

- The Pumper or Lease Operator
- The Production Supervisor (Foreman/Superintendent)
- The Production Accounting Administrator/Clerk
- The Financial Accounting Department

Please see Figure 2.

The Pumper/Lease Operator Perspective

The pumpers favor methods that offer simplicity and reduce their workload, whether it is digital or hand-prepared. For digital, some like hand-helds while others prefer laptops because either their fingers fit the keyboard better, or they like a larger screen display. Others like the old-fashioned hand-entered grease sheet or blanket sheet. Some are using the Field Direct or Merrick System, while others are using locally-developed software in their laptops. Almost all record their tank gages by hand and then transfer the data into the hand-held unit or the laptop. This is good from a safety issue, since it is not wise to carry anything unnecessary up the tank ladder when gauging the tank, especially in an H_2S environment.

Some pumpers fear losing their data with digital recording, so they would still enter their data into a paper document for backup. The new hand-held units provide for data backup, so pumpers are beginning to lose their fear over data loss. In a related vein, one contract pumper stated that the new hand-held unit he has been using is superior to the previous one. He claims he could "crash the old one" but he can't the new one.

Another contract pumper, who pumps for several operators, said that the hand-held unit he was using for one company on 15 wells reduced his work one hour per day on those 15 wells.

Five company pumpers who are using a sophisticated database on laptops complained about the maintenance of the database. When an update or change was needed, the laptops had to be physically retrieved and worked on, which meant a day or two of operating without the use of the laptop.

The Office "Production Accounting" Perspective

Production accounting here is defined as the software and procedures that are used to take daily production (oil and gas) accounting, and could include water injection and disposal volumes, to properly allocate lease data. Engineers like information, such as well tests, injection pressures, and wellhead pressures, which can now be captured by digital means. Although data are used by engineers, the crux of data gathering techniques are more governed by production accounting, with input from financial accounting in many cases. During this survey, more time was spent with the office production accounting personnel than with engineering.

The survey discovered that previous hand-held computer and laptop programs for field data capture did not interface easily with production accounting software. Many times this dictated that data be transmitted to a database where the data were integrated into a format that would interface with the production accounting software before being forwarded. This inefficiency still occurs, but there have been major improvements and now hand-held and laptop software can interface with a lot of the production accounting systems.

SELECTED COMMENTS FROM COMPANIES INTERVIEWED

The following excerpts from selected company interviews convey key insights gathered during the survey. In some cases, I have added comments in "italics" addressing their comments. As you will note, the logic of capturing field data digitally to enable more accurate and timely data availability sometimes gets lost in the shuffle of the processes used.

Company 1 (Medium size, privately-owned independent)—Prefers hand-prepared reports.

- Better accuracy (*Errors may be more likely the more times data are transferred*.)
- More personal ownership with hand documentation
- Costs—do not like fixed costs (*Need to look at cost of paper and time for paper trail*)
- Doubt it would reduce the number of pumpers. (*The primary reason is to give pumpers more profitable time*)
- Would have to switch to a new accounting system. (*Most new digital programs interface with accounting systems and, if not, the programming can be done*)
- Concerned about implementation time and training costs associated with new system

Company 2 (Small-medium size, privately-owned independent, 700 wells in Permian Basin, 700 wells in Oklahoma)—Prefers hand-held computers.

- Using Field Direct (*Considered user friendly*), happy with 15 contract pumpers using.
- Piloted for 4 months; has been used Company-wide for over one year
- Only problem encountered is with a few unreliable phone lines in remote areas

Company 3 (Small-medium size, publically-owned independent operating in Mississippi)—Prefers hand-held computers.

- Using the Merrick system since Nov 2002
- Waiting on new pocket units that can expand to include environmental reporting and other functions
- Tried TOW (Landmark oracle production accounting data base, now owned by Halliburton)—did not like the slow response to company requests
- Looking at switching to SAP accounting system

Company 4 (Large publically-owned independent)—Uses Laptops to enter data into a company network.

- Pumpers use laptops to enter their daily production data into TOW
- Pumpers capture data by hand then enter the data into the laptop workstations toward the end of the day.
- Pumpers not happy with system. To change or upgrade the system each laptop has to be retrieved and worked on. Causes delays. Office personnel verified that they were not happy with the TOW support, that it took too long for them to honor requests.
- Company is trying a pilot with hand-helds in the Hugoton Field.

Company 5 (Small-medium size, privately-owned independent)—Uses laptops with software package.

- Uses WINTANK 2.01 software on laptops
- Pumpers mail a computer printout into the office on a weekly basis, unless it is an important new development well or lease and then the pumper calls in the data daily. (*If they have a laptop, why not transfer the data electronically daily. Using a modem is cheaper than faxing or mailing*.)
- Some pumpers still using hand-prepared reports
- Concerned about fixed costs of one hand-held system. (*Need to really look at the costs they are already incurring with the paper system plus the time*)

Company 6 (Medium size, publically-owned operating company, 900 wells)—Faxing production data.

- Previously used Field View on a laptop computer system. Only had one computer for 8 pumpers so waiting time became a problem.

- Now they are entering their data by hand-prepared sheets that are faxed to a field production clerk who has to re-enter all the data into a Lowis system for their production accounting. (*This is extremely time consuming for the field Production Clerk, as well as the pumper's time. Faxing is slower*)
- Also their field supervisors still require a separate excel spreadsheet for their use that the production clerk has to prepare.
- They are considering a pilot with hand-helds.

Company 7 (Small privately-owned independent)—Uses hand-held computers and laptops for data collecting.

- Use Field Direct by pumpers for daily production, well tests, downtime, fluids
- Use 4 palm pilot units and 8 laptops
- Office says it cuts the pumpers time by 50%
- Their working interest owners and CEO use Field Direct to monitor daily operators on a "read only" basis.

Company 8 Small privately-owned independent)—Uses both hand-held and laptops (pumper preference).

- Use Merrick's latest version (eVin)
- Totally pleased—like the 30 day graphs and 7 day averages
- Much faster to enter than Field View
- Does interface with Excalibur and Aries software
- Negative figures can be displayed in red to alert you to a problem

Company 9 (Very large, publically-owned independent)—Uses a combination of methods due to mergers.

Majority of fields are automated. Data is retrieved thru SCADA systems. SCADA systems bring in LACT reading but not test data. Some sites are pencil and paper; hand-helds and laptops are not used for data collection and entry. There is the capability to enter data into the SCADA systems from vehicles. Laptops are used some for data monitoring only. Originally some palm pilots were used to enter data into various meters but they had problems with the data entry. These were a low $ unit, the batteries would die, and they were poorly designed, not allowing for fat fingers. Actually the test of the palm units was doomed in the beginning because the instruments were cheap in quality. This company has just finished a major study on what methods they will be trying in the future.

CONCLUSIONS: MOVING BEYOND DATA CAPTURE TO CONTROL

Hand held, Laptop digital data collection by pumpers is cost effective but still requires that they visit the well site, typically every day, unless the data is transmitted by an automation system. With costs for basic automation systems dropping every day, a degree of automation or control becomes more viable. Early morning lists of "normally operating" and "exception" wells/leases allow pumpers/field staff to focus their efforts where it will have the most impact. All wells/leases still need visits, but those operating normally don't need visiting every day. As with the overall subject of field data capture, owner/management philosophy exerts a strong influence on the extent that operators employ automation. The financial accounting perspective may also see benefits from the additional data gathered with automation.

Future Game Plan

As noted, technologies are changing rapidly and many companies are now in the middle of pilot tests of new (for them) systems. PTTC's intent is to become an objective resource of "what's happening" in this field. PTTC plans future workshops, so watch the calendar (www.pttc.org/events.htm).

Table 1
Companies Visited and Data Gathered

Companies Visited		Other Companies—Some Info
Henry Petroleum	Pure Resources	Devon
Cowboy Resources	Key Energy	Endeavor
Concho Resources	Pogo Producing Co.	Apache
Great Western Drilling	Burlington Resources	BTA Operating
Pioneer Natural Resources	Denbury Resources	Cortez Oil and Gas
Discovery Operations	EOG	Chi Energy
Oxy Permian	Basin Financial Resources	Griffin Petroleum
Schlumberger IPM		Saga Petroleum
ConocoPhillips		Forest Energy
Permian Resources		Burlington Resources
Finley Resources		Clayton Williams

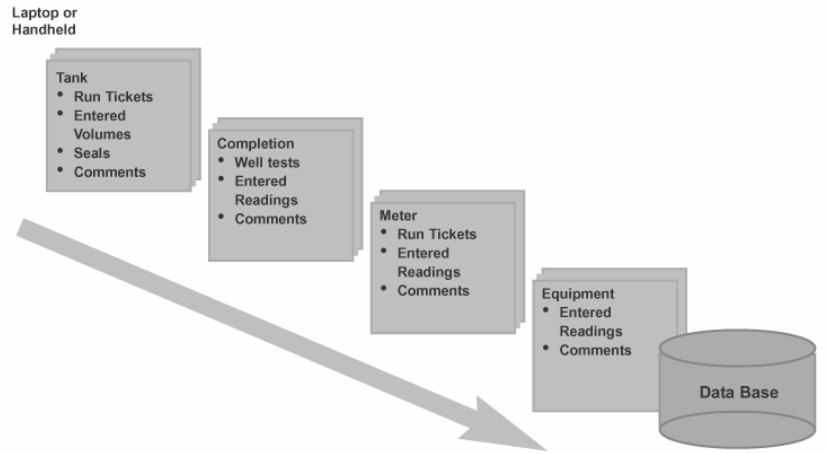

Figure 1 – Data Path

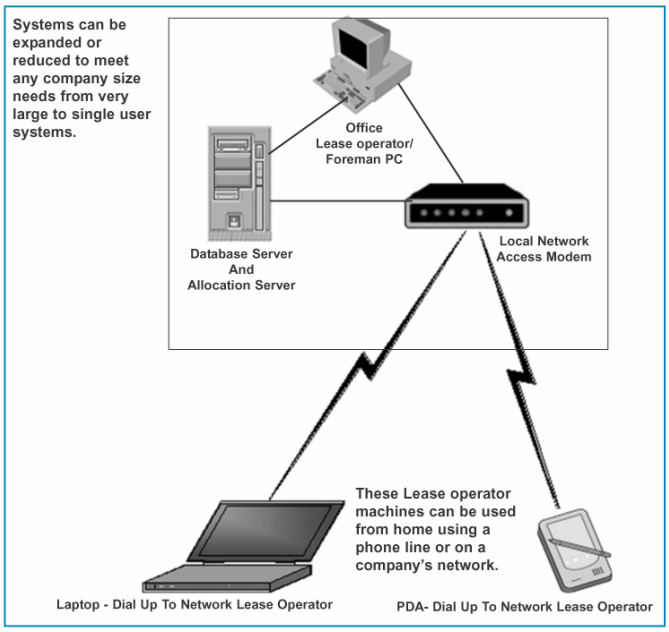

Figure 2 – Systems Available