IADC DDR and computers: A powerful combination

IADC DAILY DRILLING REPORT forms have long been a drilling industry standard.

As advanced computers and communication technology continue to make drilling data more accessible—and more useful—to more users, integrating these technologies with the Daily Drilling Report (DDR) can improve drilling efficiency.

Three companies with rig data recording systems are currently licensed to use the IADC DDR in electronic form to standardize the computer presentation of drilling data. The three companies are **M/D Totco, Pason Systems Inc and Pentastic Systems Inc**.

The data systems in which the three firms are licensed to use the IADC DDR format differ in approach. But these types of systems typically have several benefits:

• Reports are consistent and legible;

• Less time is spent on repetitive data entry;

• Stored data can be used for report summaries and analyses and for use in other programs;

• Data can be quickly distributed;

• Information can be used to measure performance.

MD/TOTCO

The RIMDrill drilling database system offered by MD Totco is an example of how the power of a drilling information system can be combined with the utility of a computer-generated IADC Daily Drilling Report.

The system, developed as an extension of MD Totco's RIMBase application, is designed to generate the IADC DDR from a rig-based drilling information system.

A broad range of drilling data, including tour data for the IADC report is entered into the database at the well site. At the end of the drilling day, a Daily Drilling Report can be printed using the officially approved IADC format.

A secure version of each report is also saved to a file. A communications module provides secure transfer of all entered data to databases in office locations.

A selection of reports and graphs provides office users with tools to improve operational awareness and help in engineering analyses.

SYSTEM FEATURES

The MD Totco system generates proof and official IADC Daily Drilling Report copies in an approved IADC format. Use of look up lists and carry forwards make data entry efficient. Report data are used to populate the RIMDrill database.

The system is built on the Microsoft Access database environment and integrates with other Microsoft Office tools. RIMDrill is scalable for all types of installations from single user rig site systems to networked office environments. There are automated communication routines for bi-directional data transfer between offices and rig sites.

Data entry items for the system include well and rig information, mud and bit data, BHA and survey data, and casing and cementing information.

System utilities include hydraulics calculations, casing tally, miscellaneous drilling calculations, and data browsers.

The RIMDrill system can generate a number of summary reports and graphs, including:

• Daily rig summary;

• Operations activity time analysis;

• Well cost summary;

• Vendor cost report;

• Time vs depth and cost vs depth curves;

• Operational time analysis graph;

• Borehole and BHA schematics;

• Hole directional plots.

PASON SYSTEMS INC

The Pason Systems Inc. Electronic Drill Recorder has proven that electronic systems can be installed on the rig floor and operate effectively.

Pason's system was developed in Canada, where Pason first produced an electronic daily drilling report that resembled the CAODC paper form. Then Pason developed an approved electronic DDR that looks exactly like the IADC paper form.

Input is by keyboard or the touch-screen terminal in the doghouse. Many fields have pull-down menus to minimize repetitive input. Other functions such as totaling operating hours are automated. Sign-off by rig crews, pushers and company representatives is by PIN number.

The forms can be printed at the rig and e-mailed to the office to be printed.

Some of the benefits of electronic DDRs are immediately obvious. They are legible because all entries are typed. If changes are necessary, the driller's PIN number can be used to change a floor hand's payroll entry, the tool pusher's PIN number can be used to change an entry made by the driller.

After the company representative signs off with his PIN number, only he can make further changes. All changes—and the person who authorized them—are saved in the background to provide an audit trail, if needed.

Reports can be received in the drilling contractor's office in a very timely fashion via e-mail.

Reports can also be distributed quickly and painlessly to all interested parties electronically.

Most of the information that flows from a land rig each day in the form of morning reports to contractor and operator offices is derived from either the drilling recorder or the DDR.

When both the recorder and the DDR are electronic, it becomes very easy to automatically extract specific information and produce reports that can then printed or e-mailed.

Reports that are available include a morning report, bit record, payroll report, and the complete tour sheet or DDR. Customized reports can also be created.

The information contained in both the Pason Electronic Tour Sheet and the Electronic Drill Recorder is stored in a database and can be queried by customized utilities.

It can be exported in a flat ASCII file for import into other applications such as payroll software.

DATA HUB

An important feature of any electronic information gathering/handling system is the ease of storage and retrieval of the information.

Pason maintains a secure site on the Internet called the Pason DataHub where data is available to those authorized to use it. Various levels of access can be granted with user names and secure passwords.

The Pason Penless Drill Recorder reports twice daily to the DataHub via satellite phone. The tour sheet is transmitted manually when the pusher and company representative are ready.

When the tour sheet along with the drilling data have been posted to the DataHub, everyone who is authorized to access them can view or print copies using a web browser. Both current and historical data are available.

In addition to legibility and efficiency, there are other reasons for using digital data reporting systems, according to Pason, including:

• Data are stored digitally in multiple locations and can be retrieved with a few keystrokes;

• Once data are in digital format, customized utilities can pull together historical information for designing drilling programs;

• Modern bits and other downhole tools require more precise control that can only come from digital monitoring devices;

• Systems which place graphic representations of drilling parameters alongside high and low alarms can reduce fishing trips due to washed out pipe and other unexpected occurrences.
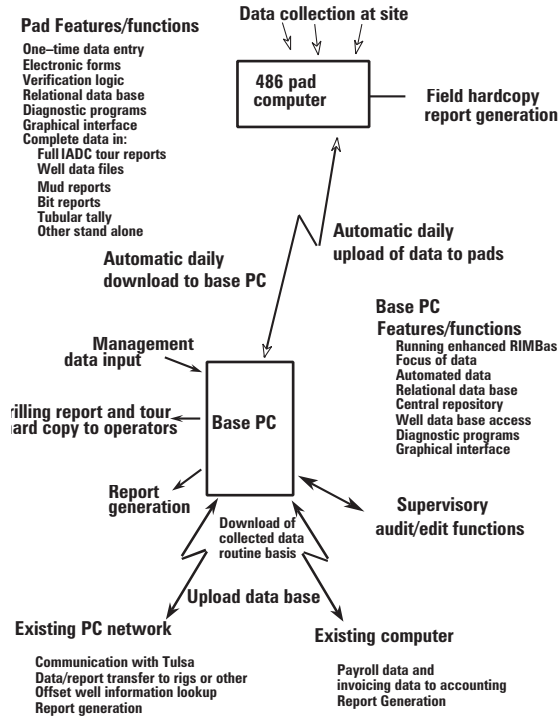
PENTASTIC SYSTEMS INC

Pentastic Systems Inc. (PSI), Modesto, Calif, specializes in the development and integration of software that captures field data. Many of these applications employ pen computer technology for the one-time field input of data at the point of origin.

For the drilling industry, PSI developed e-Tour™, the first IADC-licensed electronic Daily Drilling Report.

Pentastic's e-Tour combines the best attributes of recording information on paper forms with the best features of today's computer technology.

Using a pen or pencil to record information the familiar way—but writing on a computer rather than a sheet of paper—makes recording information efficient and cost effective.

Figure 1: e-tour system and network

Pad Features/functions
One–time data entry
Electronic forms
Verification logic
Relational data base
Diagnostic programs
Graphical interface
Complete data in:
    Full IADC tour reports
    Well data files
    Mud reports
    Bit reports
    Tubular tally
    Other stand alone

Data collection at site

486 pad computer

Field hardcopy report generation

Automatic daily upload of data to pads

Automatic daily download to base PC

Management data input

Base PC Features/functions
Running enhanced RIMBas
Focus of data
Automated data
Relational data base
Central repository
Well data base access
Diagnostic programs
Graphical interface

Drilling report and tour hard copy to operators

Base PC

Report generation

Download of collected data routine basis

Supervisory audit/edit functions

Upload data base

Existing PC network
Communication with Tulsa
Data/report transfer to rigs or other
Offset well information lookup
Report generation

Existing computer
Payroll data and invoicing data to accounting
Report Generation

PSI has created e-Tour to have the same look and feel of the paper daily drilling report form so that roughnecks, drillers, toolpushers and others see it as simply a paperless tour report.

With e-Tour, data are input at the source and only once. All subsequent transfer of information is by computer-to-computer links.

The e-Tour system is made up of a central PC base system running a drilling information engine and a data input subsystem running on pen-based computers (Figure 1).

The central base PC system is the hub for all the subsystems. Daily updates are made to and from the Base PC. Applications running on the Base PC allow supervisory review of the data and accounting functions to be performed.

A single Base PC can accommodate as many pen-based computers as needed.

The Data Input System runs on a pen-based personal computer under the Windows environment; the Base System is a Windows based, well site reporting and database application.

USING THE SYSTEM

Handwriting is the primary input method for the program. The user uses a stylus to enter the numbers or letters into the appropriate fields. A virtual keyboard can also be used to enter letters and numbers.

The system uses a number of icons to simplify data input. For example, one icon takes the user to the screen where data for a particular section of the report can be entered; another displays a list that allows the user to view several days worth of data.

Clicking on the signature icon enables the user to input a signature. A number of buttons on the keypad are used to simplify editing of input and navigation among the different parts of the report.

The display screens are in the same relative position as on the traditional paper IADC DDR forms. When the data are limited to known possibilities, a pull-down menu is available. Color-coding indicates the tour during which data were recorded.

When the driller clicks on the signature icon to close the tour, the system checks for any missing data and then prompts the user to sign the document so that security and accuracy are insured.

The computer can also serve as a reference library in the doghouse by tracking equipment data such as sizes, ODs, lengths and serial numbers for drilling assembly items. Bit and mud companies' catalogs can be input.

From any display screen the user can navigate to an input screen to enter the data found in the specific display section.

At the end of the day after information is verified, selecting the "end of day" button provides a signature ensuring security and accuracy of the electronic report.

After all required data is input and signatures added to the form, by temporarily exiting the e-Tour displays the user can transfer the data to other computers or print out morning reports, the IADC DDR or other reports. ■