Use of Electronic Handheld Devices for Collection of Savannah River Site Environmental Data – 13329

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ABSTRACT

Savannah River Nuclear Solutions has begun using Xplore Tablet PC's to collect data in the field for soil samples, groundwater samples, air samples and round sheets at the Savannah River Site (SRS).

EPA guidelines for groundwater sampling are incorporated into the application to ensure the sample technician follows the proper protocol. The sample technician is guided through the process for sampling and round sheet data collection by a series of menus and input boxes. Field measurements and well stabilization information are entered into the tablet for uploading into Environmental Restoration Data Management System (ERDMS). The process helps to eliminate input errors and provides data integrity. A soil sample technician has the ability to collect information about location of sample, field parameter, describe the soil sample, print bottle labels, and print chain of custody for the sample that they have collected. An air sample technician has the ability to provide flow, pressure, hours of operation, print bottle labels and chain of custody for samples they collect. Round sheets are collected using the information provided in the various procedures. The data are collected and uploaded into ERDMS.

The equipment used is weather proof and hardened for the field use. Global Positioning System (GPS) capabilities are integrated into the applications to provide the location where samples were collected and to help sample technicians locate wells that are not visited often.

INTRODUCTION

SRS has historically utilized log books and log sheets to gather field parameters and well information in the collection of Resource Conservation and Recovery Act (RCRA) and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) samples. Information collected in the field was manually transferred from the paper system to spread sheets and later to a database. During this process information was occasionally lost and transcription errors occurred while entering data into spread sheets or word documents. In addition not all of

the information collected in the process was entered into the spread sheets or word documents but was available in the log books and log sheets. Historical information was not available to assist sample technicians in determining if anomalies had occurred during the collection of field parameters. The project teams did not have access to the data until the log books or log sheets were distributed or entered into spread sheets.

DESCRIPTION

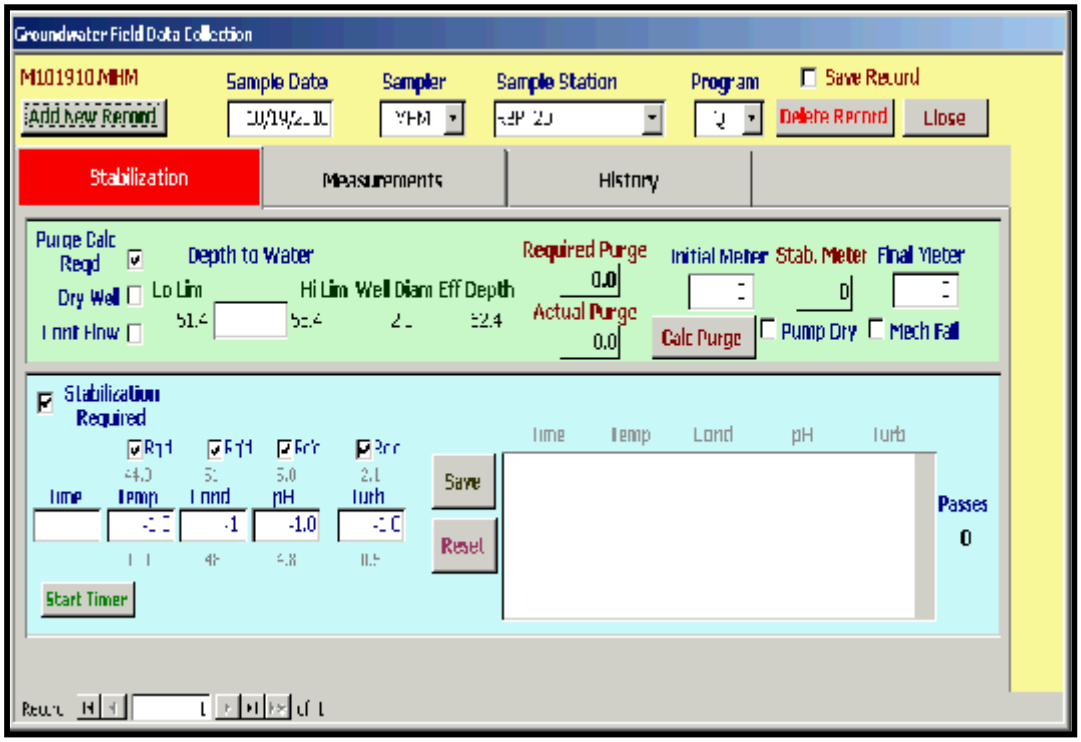

Figure 1. Example of Data Entry Screen for Groundwater Field Data Collection Application

The use of hand held devices has allowed SRS to electronically implement the sampling processes (Figure 1). The sample technician has the ability to print bottle labels and chains of custody in the field. The sample technicians were provided historical information for them to compare current field parameters to field parameters collected previously. Set points were provided from the previous samples to help the sample technicians determine if the sample being taken is out of line with the previous sample collected. The sample technicians were able to provide feedback to the technical team and to respond to unexpected conditions in the field. The information collected is directly transferred to a temporary Oracle table for review by supervision. The data is then transferred to ERDMS for dissemination to the project team.

The tablets use standard applications such as MicroSoft Access and MicroSoft .Net to organize the

collection of the field information and provide interfaces directly to the environmental database. This process allows for better data integrity and reduced duplication of effort. The sample technicians are able to better utilize their time in the field.

DISCUSSION

When SRS decided to upgrade the process we looked at various hand held devices. The determining factor was to select equipment that would be able to withstand the day to day field use in a harsh environment.

Figure 2. Xplore Tablet PC

SRS selected the Xplore C5 Dual Mode Tablet PC (Figure 2). The tablet was selected based upon the following performance factors:

- 10.5” sunlight readable display.
- Rugged design (can withstand being dropped from heights of over 4’)
- Waterproof (can be taken into water to a depth of 100’)
- Extended life battery (for up to 6 hours of continuous field use).
- Windows 7 Operating System
- GPS

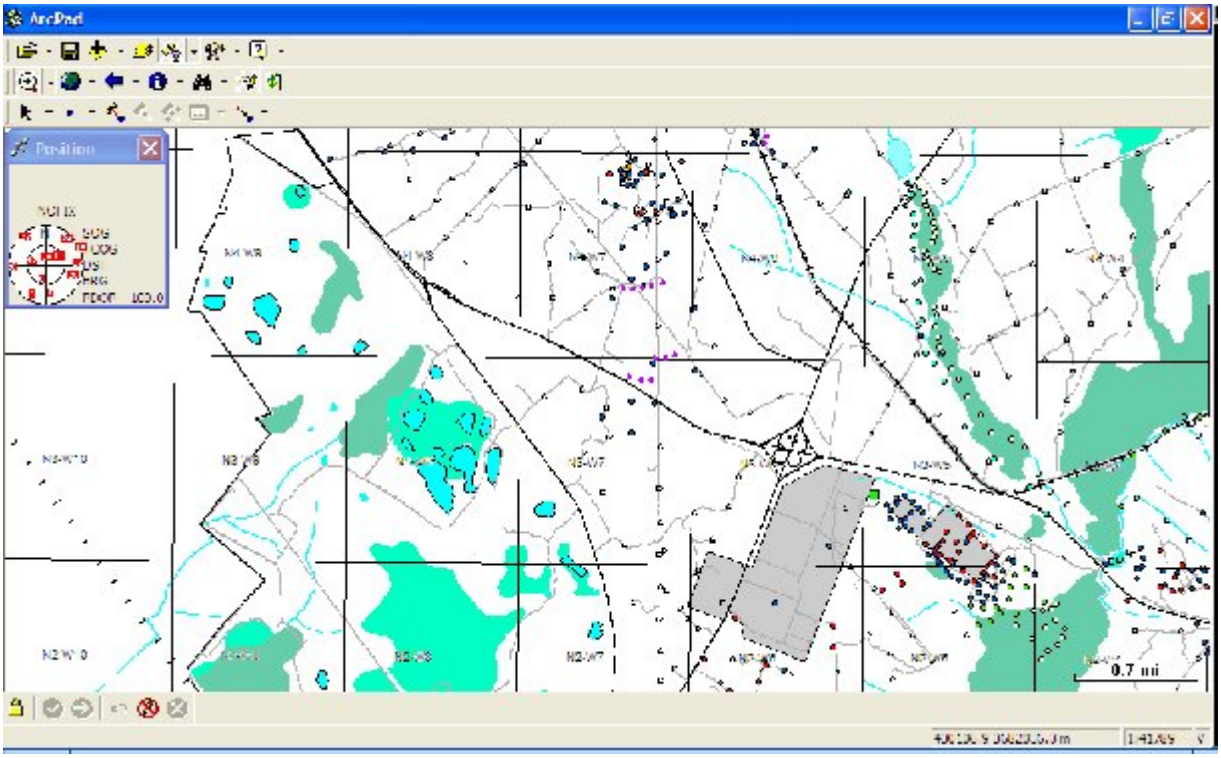

Figure 3. Example of Map Utilizing the GPS Receiver

The tablets are equipped with 2 types of GPS receivers. One GPS receiver is used for soil sampling and has sub-meter accuracy for locating where soil samples were taken (Figure 3). Another GPS receiver is used by groundwater sample technicians, stream sample technicians, air sample technicians and for round sheet data collection which has a 2-meter accuracy. SRS sample technicians only needed to locate existing sampling locations and therefore do not currently utilize the sub-meter accuracy to find existing sample locations.

The tablets use the current Window 7 operating system which allows tablets to use any software package that can run on a desktop PC. This allowed more flexibility to develop applications in support of the different sampling requirements.

CONCLUSION

Implementation of the hand held devices has provided more efficient sampling and data collection. Sample Technicians participate in more than 50 sampling events each quarter and have collected over 1.5 million records each year using the hand held devices. SRS has become more proficient in loading data collected, improved data source integrity and minimized duplication of efforts. This has led to improved communication between the sample technicians and the technical team. The

technical team and sample technician have been able to respond more quickly to unexpected conditions in the field.