

LONG TERM PAVEMENT PERFORMANCE PROGRAM DIRECTIVE



For The Technical Direction Of The LTPP Program



Program Area: Monitoring

Directive Number: AWS-9

Date: November 17, 1997

Supersedes: parts of AWS-1

Subject: Remote Collection of AWS Data

Background

Effective immediately, RCOCs shall pursue one of two options for remote collection of AWS data at SPS-1, -2 and -8 projects. Those options, in priority order, are:

1. Access through direct telephone line from AWS site,
2. Use of cellular phone installed at AWS site.

Equipment installation, responsibilities, estimated costs, and other miscellaneous issues are discussed next for each of these options. Implementation of remote data collection procedures at existing AWS sites shall be completed during the next scheduled visit to those sites and it shall be included as part of the installation of all new automated weather stations.

In case neither of these two options are feasible (no direct telephone line nor cellular phone carrier in the area), RCOCs shall pursue the following AWS data collection options:

3. Upload of AWS data stored in datalogger during site visits by highway agency personnel,
4. Upload of AWS data stored in datalogger during site visits by RCOC personnel.

The frequency of these visits shall be carried-out in accordance with the specifications provided in LTPP Directive AWS-1: Installation, Data Collection and Maintenance of Automated Weather Stations at SPS-1, -2 and -8 Projects.

Access to Direct Telephone Line

Working with highway agency, RCOCs shall pursue installation of a direct telephone line and modem at those AWS locations where there is access to a telephone line. Three options for paying associated equipment installation costs and monthly charges should be explored by the

RCOCs. They are, in order of preference:

1. Highway agency pays for installation costs and monthly charges,
2. Highway agency pays for installation costs and RCOC for monthly charges, or
3. RCOC pays for installation costs and monthly charges.

Installation costs are estimated to be approximately \$50, while monthly charges are estimated to vary between \$7 and \$10.

Besides arrangements for the telephone line, RCOCs are also responsible for purchase and installation of the Campbell Scientific (CS) COM200 telephone modem required for transmittal of data from the AWS site to the office (or other desired location). Cost of the CS COM200 telephone modem is approximately \$372 (government price) to \$395 (list price). RCOCs are required to coordinate the purchase of all required COM200 units with FHWA to take advantage of Campbell Scientific's multi-quantity discount option.

Installation of the COM200 modem shall be done in accordance with the manufacturer's instructions which are included with the hardware. These instructions shall be supplemented by Brandt Henderson and Dilan Singaraja's technical memorandum on the pilot installation of a direct telephone line and modem at the Delaware SPS-1 project; a copy of that memorandum is included with this directive -- "AWS Remote Access - Direct Line Hook-Up", by Brandt Henderson and Dilan Singaraja, October 6, 1997.

Notes: (1) ***When installing a direct phone line, please make sure that it is a standard analog line and not a digital one; the COM200 unit will not work with a digital line.***

In addition to hardware, the AWS datalogger software must be modified to enable upload of weather data from the AWS site. Included with this directive is a diskette containing relevant software changes for remote access of AWS data using the Campbell Scientific CR10 datalogger (PC208) software and Weather program/files. Again, please refer to Brandt Henderson and Dilan Singaraja's technical memorandum for detailed instructions on the installation and implementation of this software.

Use of Cellular Telephone

For those locations where telephone line access is not available, but cellular service is available, RCOCs shall install a cellular telephone and modem package for remote collection of AWS data. Under this option, installation costs and monthly charges will be borne by the RCOCs. The cellular phone activation cost will vary depending on location and/or carrier, but should typically range from \$0 (no cost) to \$50. Monthly charges associated with this option are estimated to vary between \$10 and \$40.

Equipment needed for installation of the cellular telephone and modem package will be provided by the FHWA upon notification by the RCOCs; please contact Aramis Lopez at the FHWA

LTPP Division office (703-285-2013). This equipment includes the CS COM100 cellular phone package and the CS COM200 telephone modem. Installation of this equipment shall be done in accordance with the manufacturer's instructions which are included with the hardware. These instructions shall be supplemented by Hank Usher's on the pilot installation of a cellular telephone and modem at the New Mexico SPS-8 project; a copy of that report is included with this directive -- "Automated Weather Station Telemetry Pilot", by Hank Usher, June 23, 1997.

Again, do not forget that the AWS datalogger software must be modified to turn the cellular phone on at specified time intervals and to enable upload of weather data from the AWS site; please refer to Hank Usher's report for detailed instructions on the required software changes.

General Notes

AWS Remote Communication

The AWS datalogger shall be programmed to turn on and off a maximum of two times per 24-hour period. The first turn on/off time should be within three hours after midnight for data upload purposes only. The second turn on/off time should be scheduled to coincide with regular office hours so that RCOCs can review and check the data collected during the previous night and ensure that there are no problems at the AWS site. Please refer to the technical memorandum prepared by Brandt Henderson and Dilan Singaraja and the report prepared by Hank Usher for detailed instructions on required changes to the AWS datalogger software.

AWS Maintenance and Calibration

Installation of remote data collection capabilities at AWS sites eliminates the need for site visits by either RCOC or highway personnel for purposes of retrieving data from the AWS datalogger; however, it does not relieve the RCOCs of equipment maintenance and calibration responsibilities (refer to LTPP Directive AWS-1: Installation, Data Collection and Maintenance of Automated Weather Stations at SPS-1, -2 and -8 Projects and AWS-4: Check-Out Procedure and Calibration of AWS Sensors). Indeed, implementation of this directive could potentially result in more frequent maintenance and calibration of the AWS equipment since data for any given site can be viewed daily and problems more quickly identified.

Frequency of AWS Data Collection

Directive AWS-1 states that "retrieval of weather data shall be performed at routine intervals, but shall never exceed six (6) months." However, implementation of this directive allows for increased frequency in the collection of AWS data. Accordingly, that part of Directive AWS-1 shall be replaced by "RCOCs shall retrieve AWS data at intervals not to exceed one (1) month and shall review those data using the AWSScan program within one (1) week of retrieval for quality control and problem identification purposes." Furthermore, RCOCs shall process those data on a monthly basis using the latest version of the AWSCheck program. The resulting file from this processing shall be appended to an existing EDT file for that site or it will be used to start a new EDT file if one does not already exist. Upload of AWS data to the LTPP IMS shall be

done in accordance with dates scheduled by FHWA; please refer to the IMS upload schedule for those dates.

Problems

As always, problems encountered by the RCOCs regarding the remote collection of AWS data shall be reported in accordance with LTPP Directive AWS-3: AWS Problem Report (AWSPR) Form.

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