

United States Department of Commerce
National Oceanic and Atmospheric Administration
National Ocean Service
National Geodetic Survey
Silver Spring, Maryland 20910-3282

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MEMORANDUM FOR: Distribution

FROM: Kendall L. Fancher
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SUBJECT: NGS Electronic Distances Measuring Instruments Calibration Base Line Policy

1. The National Geodetic Survey (NGS) conducts a cooperative program to provide the public with a means to detect and correct errors in Electronic Distances Measuring Instruments (EDMI). NGS has established more than 300 EDM I Calibration Base Lines (CBL) throughout the United States in cooperation with various government agencies, universities, professional societies, and others. These high-precision Base Lines provide a locally accessible standard for measuring length. For each state, NGS provides users with location descriptions and the adjusted results of CBL measurements. CBL location descriptions, adjusted results of CBL measurement information, CBL specification documents, CBL user guides, and further information about the program are available at the NGS EDM I CBL webpage: <http://www.ngs.noaa.gov/CBLINES/calibration.shtml>

2. The standard CBL configuration consists of four markers, or monuments, set in a straight line, with a total line length of approximately 1400 meters. For the conventional CBL, monuments are located at 150 meters, 400 to 430 meters, and 1000 to 1400 meters from the initial or "0-meter" monument. The standard CBL is established according to NGS specifications as stated in "Establishment of Calibration Base Lines," NOAA Technical Memorandum NOS NGS 8, Revised June 1982.

NGS-calibrated EDM I are check-calibrated on the NGS Instrumentation and Methodologies Branch Base Line located at Corbin, Virginia before and after each series of new CBL sites is measured and established. The calibration check serves as the National Institute of Standards and Technology connection to the national standard.

3. There are two options for interested parties to participate in this cooperative program:

Option 1 NGS State Geodetic Advisor Oversight:

For interested parties located in a state participating in NGS' State Geodetic Advisor program, the NGS CBL program manager will provide the CBL instruments and train the advisor in their use. The advisor will then oversee the use and care of the equipment and, in

turn, provide equipment and software training, as well as field-level quality control of the resulting CBL data, to the interested party. The NGS CBL program manager will conduct final quality control, perform adjustments of CBL data, and publish results on the NGS CBL webpage. To participate in this program, interested parties should contact their NGS state geodetic advisor or the NGS CBL program manager. The NGS State Geodetic Advisor webpage address is: <http://www.ngs.noaa.gov/ADVISORS/AdvisorsIndex.shtml> .

The exact number and the location of new CBL sites will be agreed upon by the requesting agency and the CBL program manager prior to the release of the equipment to the state advisor. The use of CBL instruments will be limited to 15 days, unless prior approval to keep the equipment longer has been granted by the NGS CBL program manager.

Validation of the CBL sites will be dependent upon the calibration checks performed by the NGS CBL program manager at the Corbin CBL. NGS provides the instruments and associated services at no charge to the user; however, CBL equipment shipping fees are the responsibility of the interested party. Repair or replacement costs for equipment damaged due to user negligence is at the expense of the responsible party.

Option 2 NGS CBL Program Manager Oversight:

For interested parties located within a state that does not participate in the NGS State Geodetic Advisor program, NGS will provide an instructor and the CBL instruments to the interested party under the following conditions:

- the participating agency provides help to assist with taking field measurements;
- NGS employee travel costs, such as lodging, airfare, and rental car fees, are paid for by the participating agency;
- and associated instrument shipping fees are paid for by the participating agency.

Repair or replacement costs for equipment damaged due to user negligence will be at the expense of the responsible party. Interested parties should contact the NGS CBL program manager to participate in the establishment of new CBLs or the re-measurement of existing CBLs.

The exact number and location of new CBL sites will be determined by the NGS CBL program manager prior to taking field measurements. Validation of the CBL sites will be dependent on the calibration checks performed by the NGS CBL program manager at the Corbin CBL.

4. NGS will not establish a new CBL within 75-highway miles of an existing CBL under normal conditions. However, under special circumstances—such as in metropolitan areas—CBL sites spaced less than 75-highway miles may be considered.

5. Participants are required to monument new CBLs at least four months prior to taking field measurements, and, where appropriate, one freeze/thaw cycle should be experienced before taking field measurements. If requested, NGS will provide participating agencies with surface disks.

NGS documents “Use of Calibration Base Lines,” NOAA Technical Memorandum NOS NGS-10, Reprinted with Corrections, 1980; and “Establishment of Calibration Base Lines,”

NOAA Technical Memorandum NOS/NGS 8, Revised June 1982, are available for download from the NGS CBL webpage:
<http://www.ngs.noaa.gov/CBLINES/calibration.shtml>

6. Two weeks prior to the shipment of equipment or the arrival of the NGS employee, participants will clear CBL sites of all interfering grass, shrubs, debris, etc., and perform third-order, double-run, differential leveling over the monuments. Additionally, participants must also have written local descriptions.

7. For NGS-measurement operations, only one NGS employee will visit the CBL site. Participants are required to provide two local experienced instrument personnel to assist NGS with the measurements.

In addition, participants are required to provide the NGS CBL program manager with a map or diagram of the layout and location of the CBL site.

8. Participants and future CBL users are responsible for obtaining whatever liability insurance coverage is required by the property owner.

9. The NGS CBL program manager is responsible for quality control and final computation and analysis of CBL measurements. The NGS CBL program manager will also maintain automated measurement records, including those submitted to NGS by local users, and analyze these data for CBL stability.

10. The NGS CBL program manager is responsible for the publication of CBL results and for maintaining automated publication records. The NGS CBL program manager will also maintain a list of active local CBL and contact personnel, including addresses and telephone numbers.

11. NGS will adjust and publish appropriate CBL measurements performed by others. The measurements must be made in accordance with NGS specifications and must be adjustable with satisfactory results. The observations must be submitted in the NGS-prescribed computer-readable format.

Further information regarding the NGS EDM Calibration Base Line program is available from Program Manager Steven Breidenbach:

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Adopted: NGS Executive Steering Committee
(Contact information updated September 2010)

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