

# State Surveys *of the* Great Depression



Pennsylvania  
was one of two states  
that designed its own bronze  
disk during the State Surveys.  
(Image courtesy of Dave Doyle).

**T**he Great Depression of the 1930s, largely triggered by the stock market crash of 1929, affected virtually every occupation including land surveying and civil engineering. Engineering companies that thrived in the roaring 1920s found themselves searching for any work. By the fall of 1933, the Federal Emergency Relief Administration contacted the United States Coast & Geodetic Survey (C&GS), the predecessor to the National Geodetic Survey (NGS), to administer a relief measure with the primary objective of creating employment for needy surveyors and engineers.

The initial goal was to employ up to 15,000 workers with the project to begin immediately upon approval. C&GS accepted the worthy assignment from an altruistic motive, but not without some serious reservations. The key concern was that insufficient personnel with their own workloads would not be able to provide adequate supervision. C&GS also knew that instruments of the type needed for precise survey work would be hard to obtain on such short notice. Providing the vehicles needed for the work was an almost insurmountable task since funding for the project was to be primarily used for wages with strict limitations placed on the purchase of equipment and materials. The final concern was that work was to begin during the harsh winter months—the least productive season for survey work.

>> By Jerry Penry, LS

On November 27, 1933, formal approval was established and the project became part of the Civil Works Administration (CWA) with work immediately beginning in all states with no delay. A serious drawback was the fact that federal funding was available only until February 15, 1934, giving the project less than three months; however, there was every indication that Congress would approve further funding when that time arrived.

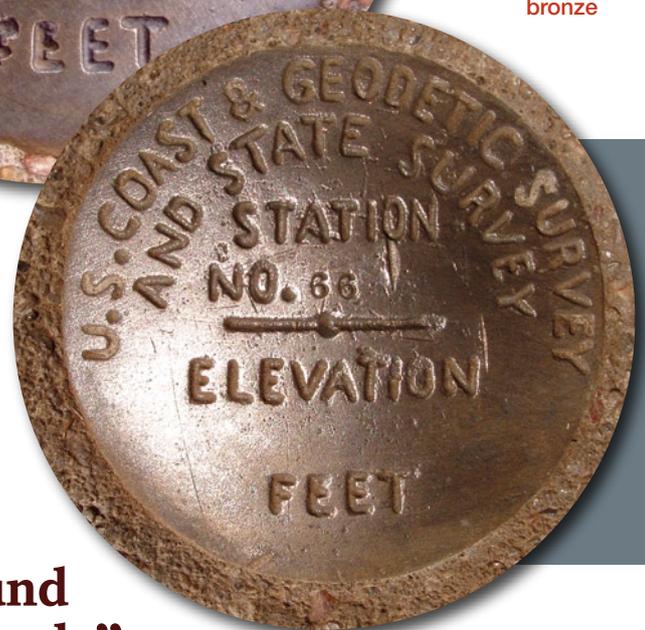
By January 19, 1934, the CWA issued orders to cease hiring new employees for the project. This greatly hampered operations since some states were still in the initial hiring process and were not even close to the quota of workers they had hoped to employ. Congress did provide more funding as the February deadline arrived, but prohibited the direct participation of any Federal Bureau after that date. With 10,000 employees in the project, each state was given the option to continue if they could be represented locally. C&GS personnel were relegated to an advisory capacity where they did their best to insure that the work was meeting acceptable standards. All but four states decided to continue the project with local representation. In the state of Nebraska, for instance, Willard J. Turnbull who was the professor in the Mechanics Arts Building at the University in Lincoln, assumed the role. Turnbull was well suited for the job since he had been a former officer with C&GS. Other states were less fortunate and relied upon the best available person who would agree to assume the responsibilities. Generally the state representatives did the work with no pay and continued working at

that some of the most skilled surveyors and engineers involved in the projects could no longer participate since they were finding fragments of other work to keep their struggling businesses open. Some exceptions were made to keep instrument operators on the crews where their expertise was needed most.



The majority of the states participating in the State Surveys used a standard bronze

The state projects were often water-related, such as establishing horizontal and vertical control for rivers, canals, or dams. In many instances



## “Engineering companies that thrived in the roaring 1920s found themselves searching for any work.”

their other jobs in addition to the work devoted to the State Survey projects.

On March 31, 1934, the CWA program ended with certain relief measures provided which would now be under the State Emergency Relief Administration. New rules stated that workers remaining in the projects had to work without any outside financial compensation. This naturally meant

these projects would not have been considered had there been no need to create employment. Workers were generally assigned to projects in their own areas to eliminate the need for travel, food, and lodging expenses. To provide instruments, an appeal was made to railroads, state highway departments, construction companies, and municipalities to borrow unused

equipment. C&GS agreed to assume the responsibility for their care and calibration upon return. The appeal was well-received, but the equipment was a mixture of various types of instruments of differing precision and certainly not what the C&GS was used to operating. Traverse closures were set at a minimum of 1:10,000, but

some work was accepted at 1:5,000. Level loops were set at 0.05' per the square root of the number of miles run. Connections in the surveys were usually started and stopped at known C&GS monuments if possible. Horizontal control was adjusted to the North American Datum of 1927 (NAD27), and published in state plane coordinates. Elevations were adjusted to the Mean Sea Level Datum of 1929 (MSL29), which was renamed the National Geodetic Vertical Datum of 1929 (NGVD29) by NGS in 1973. Transportation needs were met mainly by having workers use their own vehicles, with C&GS agreeing to maintenance when needed unless caused by negligence.

Statistics up to June 30, 1934, just seven months after the beginning of the project, showed the completion of 14,000 miles of traverse, 20,000 miles of levels, and 1,200 miles of triangulation. The permanent monuments resemble the familiar bronze disks set in concrete used by C&GS, but were

lettered with the additional words "State Survey". The states of North Carolina and Pennsylvania decided to have disks cast with legends peculiar to their representative states. Due to the abrupt termination of the project, many monuments that were set in the projects ahead of the traverse and leveling crews were never used. Parts of the project struggled on until 1939, but the work continued less than a year in many states.

The project had both positive and negative aspects. Certainly the most positive was the employment of thousands of surveyors and engineers. This not only provided financially for the workers and their families, but also helped them to better understand how geodetic surveying was performed. One initial negative aspect of the project was the poor planning on the part of the federal government, who basically threw the project into the lap of C&GS with little warning. Only the final positions and elevations were submitted to C&GS, while the majority

of the actual field work was never seen by them. With the development of the North American Datum of 1983 (NAD83) and the North American Vertical Datum of 1988 (NAVD88), NGS has taken the position that they will not publish any information unless they have the original observations. This leaves thousands of the CWA monuments with precision uncertainty since the actual field work cannot be verified. Although some of these monuments were later used by NGS during their own work and therefore published, many are hard to find since they are not available in the NGS datasheets. 

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**Jerry Penry** is employed by Lancaster County Engineering in Lincoln, Nebraska. He has been a licensed surveyor since 1994 specializing in section corner monumentation and GPS surveying. He has written numerous articles for *TAS* and other surveying newsletters and magazines.

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