

# STOCKPILE INVENTORY SERVICES

Electric utilities and other energy intensive industries maintain large inventories of coal. For business planning, financial reporting, regulatory and other reasons, it is often necessary to determine with relative accuracy the quantity of coal in inventory. As with other bulk commodities, coal quantity is expressed in weight; however, the vast amount of coal in stockpiles makes the weighing of the coal impractical and cost prohibitive.

## DETERMINING THE COAL QUANTITY

The accepted method for determination of coal quantity is to determine the density of the coal and the volume of the stockpile. Then the total weight can be calculated.

## DENSITY DETERMINATION

The method employed by SGS, representing the latest state-of-the-art technology, utilizes a nuclear depth density gauge. The probe source is a radioactive material that emits gamma radiation at a constant average rate.

The gamma rays interact in various processes at the atomic level with the surrounding medium. The number of interactions, or scattering events, per unit time is a function of the density of the medium. The variation in chemical composition of coal in storage and the different coal sources represented in most stockpiles requires calibration of the nuclear depth gauge to a representative sample of coal in each stockpile.

Once the nuclear gauge has been calibrated to the coal, the borings can proceed for the density determination task. After boring, the access tubing is inserted into the bore hole.

The nuclear probe is then lowered into the access tubing and readings are taken at pre-determined depth intervals. The nuclear counts are returned to the surface of the stockpile and are recorded for calculation of density.

## DETERMINING THE VOLUME OF THE STOCKPILE

Data acquisition at ground level or by photogrammetry is normally conducted in a fashion to satisfy the requirements of a TIN (Triangular Irregular Network) creating software package. Mass points and break lines are collected that describe the surface to be mapped. To insure that the volume result includes all the coal in storage and only the coal in storage, the elevation of the soil on which the coal is stored must be known. The information that describes the changing elevation of soil within the storage yard may be referred to as the "base" datum or the soil elevation datum. This datum provides the surface above which coal volume will be calculated.

The prismatic method uses a data point file to create a TIN of the coal surface within the storage area. The volume of coal within the TIN is then computed by electronically filling the volume of the TIN above the soil elevation datum with prisms or polyhedrons of known volume. The software then totals the number of polyhedrons required to fill the volume of the TIN.

## TONNAGE COMPUTATION

Once the density in pounds per cubic feet and the volume in cubic feet are known, total tons of coal in the stockpile are readily determined, using the following calculations: Wet tons = volume (ft<sup>3</sup>) x density (pcf) / 2,000

## SUMMARY

While the discussion and procedures outlined herein refer to coal stockpiles, the same basic premises and methods can be equally applied for conducting quantity determinations of any material stored in bulk, whether it is chemicals, minerals, or ores. SGS has the expertise, equipment and personnel to provide prompt, accurate inventory control services, regardless of requirements or commodity. We welcome your inquiry.



## CONTACT INFORMATION

Email us at [minerals@sgs.com](mailto:minerals@sgs.com)  
[www.sgs.com/mining](http://www.sgs.com/mining)