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PENNSYLVANIAN STRATIGRAPHY OF SAND MOUNTAIN, MARION COUNTY, TENNESSEE, AND DADE COUNTY, GEORGIA

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ABSTRACT

New borehole data on Sand Mountain in Marion County, Tennessee and Dade County, Georgia have enabled establishment of a workable Pennsylvanian stratigraphic framework.

INTRODUCTION

Recently obtained borehole data from Sand Mountain in Marion County, Tennessee and Dade County, Georgia has enabled reinterpretation of the Pennsylvanian stratigraphic sequence here. New boreholes located in Scratch Ankle Hollow and on top of Sand Mountain in Marion County as well as atop Sand Mountain between Ferndale Branch and Rattlesnake Creek, in Dade County are indicated on Figure 1. The remaining borehole data in Dade County has been taken from a map report by V. H. Johnson (1946).

R. L. Wilson (1975), the most recent worker on this problem, has presented an excellent review of previous workers who have subdivided these Pennsylvanian rocks in an attempt to establish a workable framework for correlation of stratigraphic units among the states of Tennessee, Georgia and Alabama.

Wilson's work was based entirely on outcrop study and covered a broad area which extended well into Jackson County, Alabama.

It is the purpose of this study to establish a common stratigraphic nomenclature, for Pennsylvanian rocks on Sand Mountain, across the border between Tennessee and Georgia.

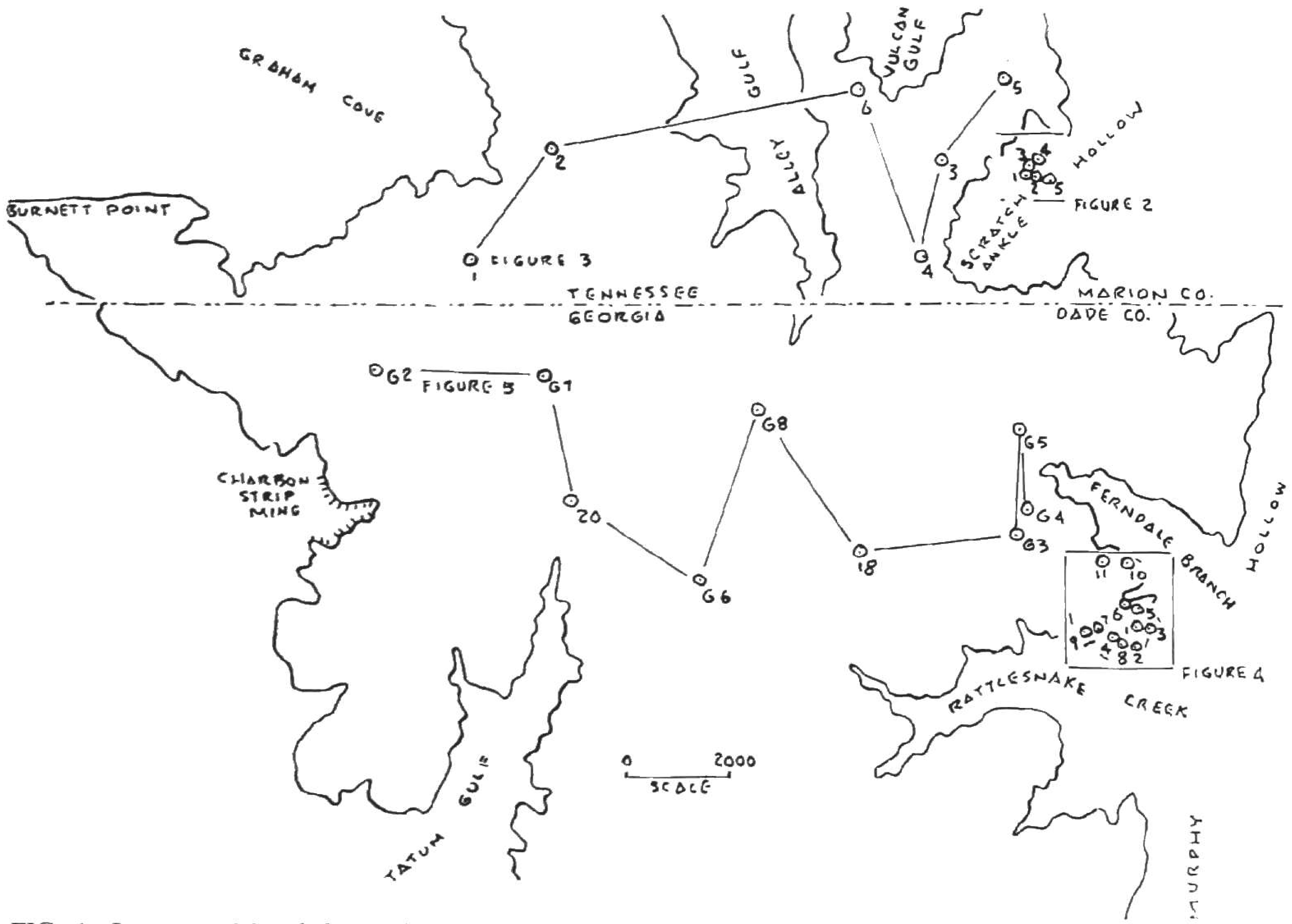

FIG. 1. *Location of boreholes on Sand Mountain in Tennessee and Georgia.*

STRATIGRAPHY

C. W. Wilson and others (1956) presented the following stratigraphic subdivision of Pennsylvanian rocks in southern Tennessee:

Crab Orchard Mountains Group	Rockcastle Conglomerate
	Vandever Upper Shale
	Vandever Needleseye Conglomerate
	Vandever Lower Shale
	Newton Sandstone
	Whitwell Shale
	Sewanee Conglomerate
Gizzard Group	Signal Point Shale
	Warren Point Sandstone
	Raccoon Mountain Formation

Structure

Sand Mountain has form of a shallow, asymmetrical syncline with a northeast-southwest axial trend. The northwest-dipping east limb of the Sand Mountain syncline is the steepest and the southeast-dipping west limb rises to the northwest at a low angle.

Scratch Ankle Hollow, Marion County, Tennessee

Figure 2 is a panel diagram indicating correlation of 5 coreholes in Scratch Ankle Hollow, Marion County, Tennessee.

Corehole 2 began drilling in the uppermost sandstone in the Raccoon Mountain Formation and bottomed in the upper part of the Mississippian Pennington Formation.

Two hundred and thirty five feet of Raccoon Mountain Formation is present in Corehole 2. Here, the Raccoon Mountain consists of 5 sand bodies that range in thickness from 15'-75'; three shale units that range from 5'-20' thick; and six coal seams that range from 2"-20" thick.

Milici, in Ferm, Milici, Eason and others (1972, p.7) has shown that, in a regional sense, the Raccoon Mountain Formation has a wide range in thickness and lithology. That is, there is a large lateral variation in the number and thickness of coal seams, as well as sand and shale units, in the Raccoon Mountain Formation in southeastern Tennessee.

The New Home topographic quadrangle shows abandoned strip mines in the area cored (Fig. 2) and it is likely that the coals exposed in the strip mine are the 6" and 2" seams, in corehole 2, situated in the upper part of the Raccoon Mountain Formation.

The coals of major mining interest in this area are the Aetna and Dade seams, and they occur in the Upper Raccoon Mountain Formation just below the Warren Point Sandstone.

On Top of Sand Mountain, Marion County, Tennessee

Corehole 1, on Figure 3, penetrated the entire 150 feet of the Warren Point Sandstone.

The Raccoon Mountain Formation ranges from 115' (corehole 1) to 210' (corehole 5) thick. Lensing sandstone thicknesses range from 10' to 50'. The Aetna seam (in upper Raccoon Mountain Formation below Warren Point Sandstone) ranges from 2" to 27" thick. The Dade seam (below Aetna) ranges from 1"-10".

There are as many as 10 coal horizons in the Raccoon Mountain Formation.

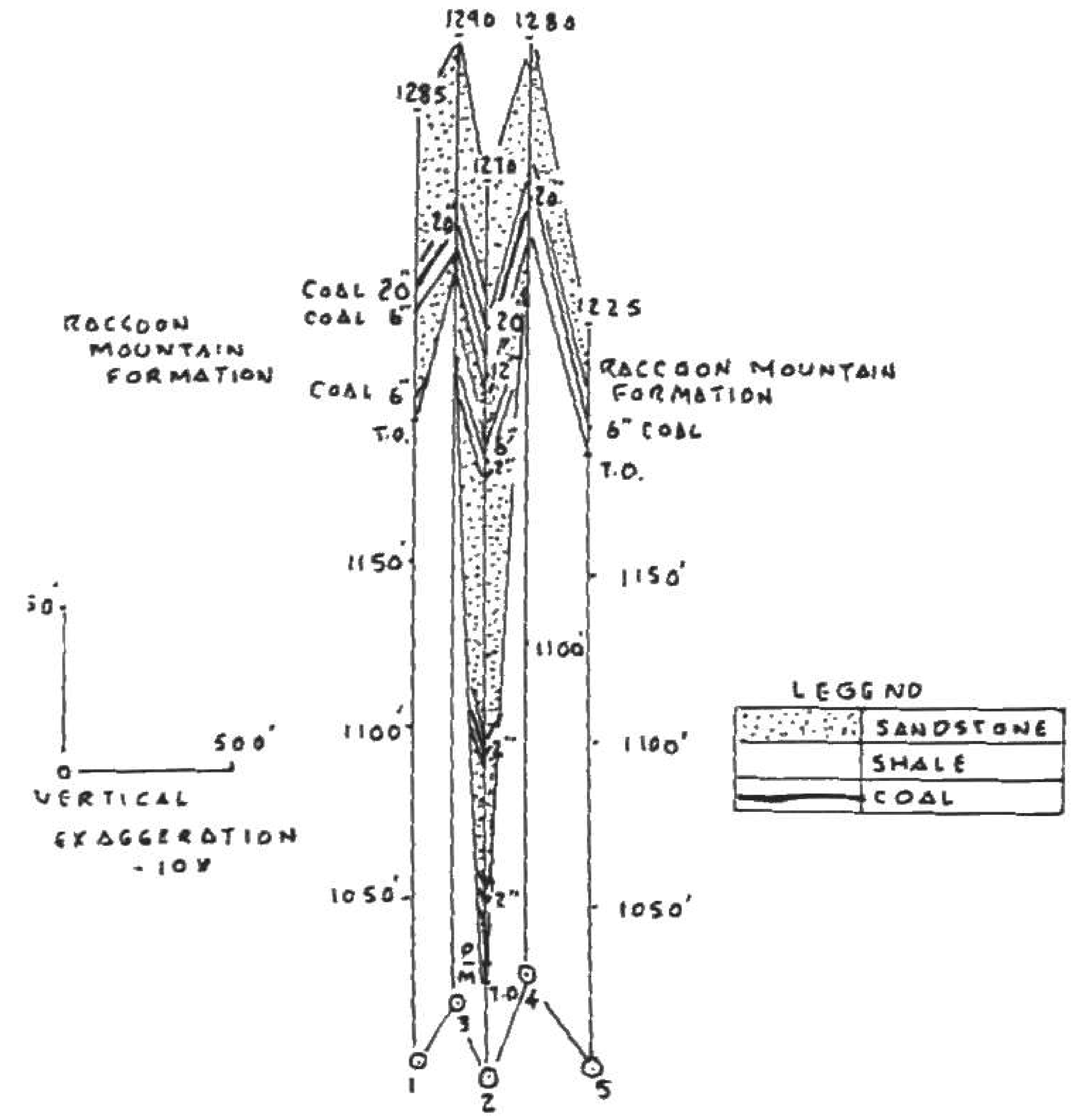

FIG. 2. *Panel diagram utilizing data from five coreholes in Scratch Ankle Hollow, Marion County, Tennessee.*

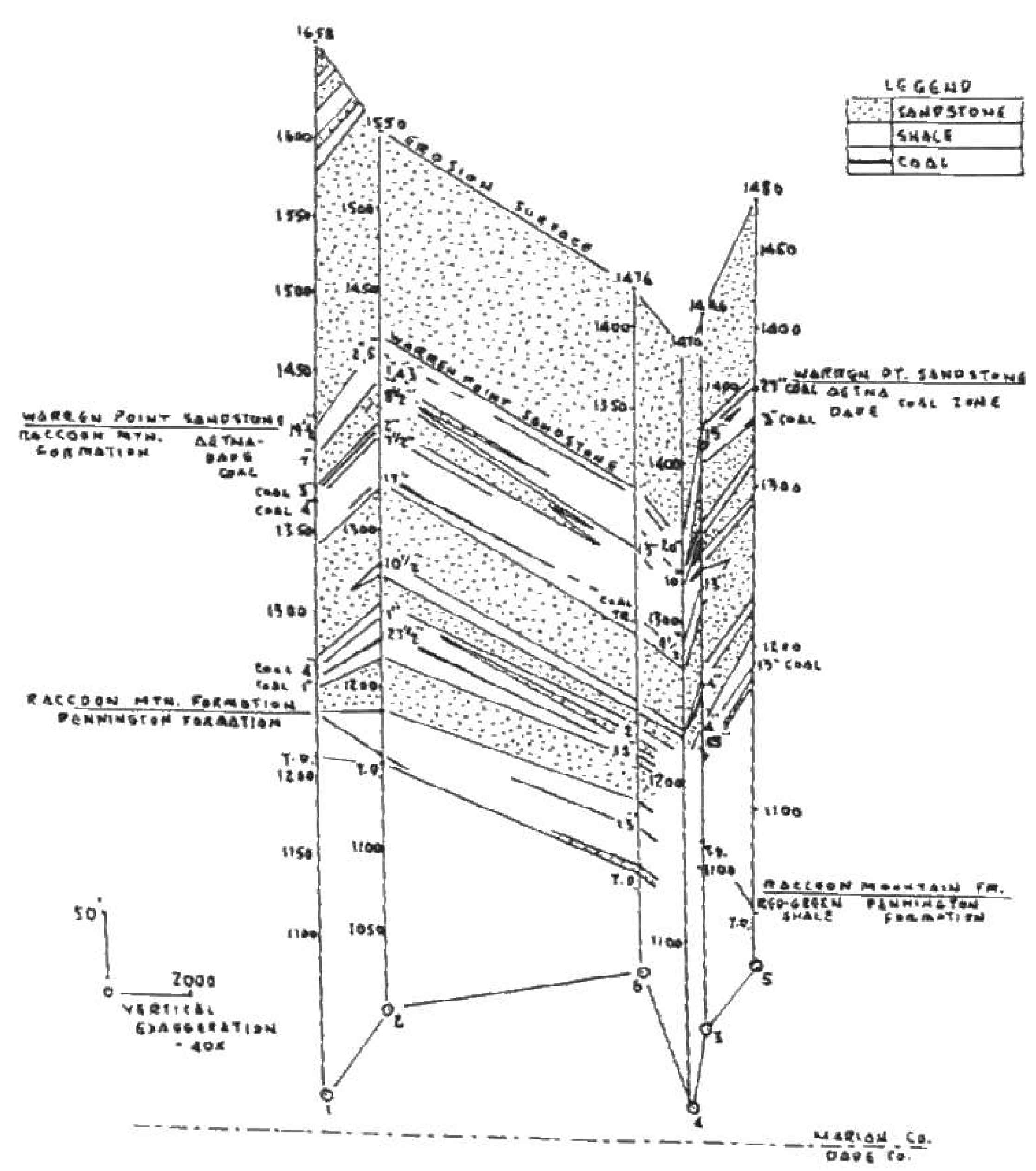

FIG. 3: *Panel diagram based on corehole data in Marion County, TN.*

Eastern Erosional Edge of Sand Mountain, Dade County, Georgia

Figure 4 is based on air rotary borehole data and is located near the eastern erosional edge of Sand Mountain in Dade County, Georgia (Fig. 1). Further, it shows that the Warren Point Sandstone caps Sand Mountain and is, in turn, underlain by the Raccoon Mountain Formation. Four localized, lensing coal seams are present in the upper Raccoon Mountain formation. The Aetna seam (uppermost) ranges from 0" to 60 inches thick. The Dade seam (below Aetna) ranges from 3" to 56 inches thick.

On Top of Sand Mountain, Dade County, Georgia

Figure 5, based on core data from Johnson (1946), indicates that the Warren Point Sandstone forms an erosion surface on Sand Mountain.

Sandstone layers range over 70 feet thick.

There are four coal horizons in the upper Raccoon Mountain Formation. The uppermost coal (Aetna seam) ranges from 2" to 33 inches thick. The Dade seam (below Aetna) ranges from 0"-29 inches thick.

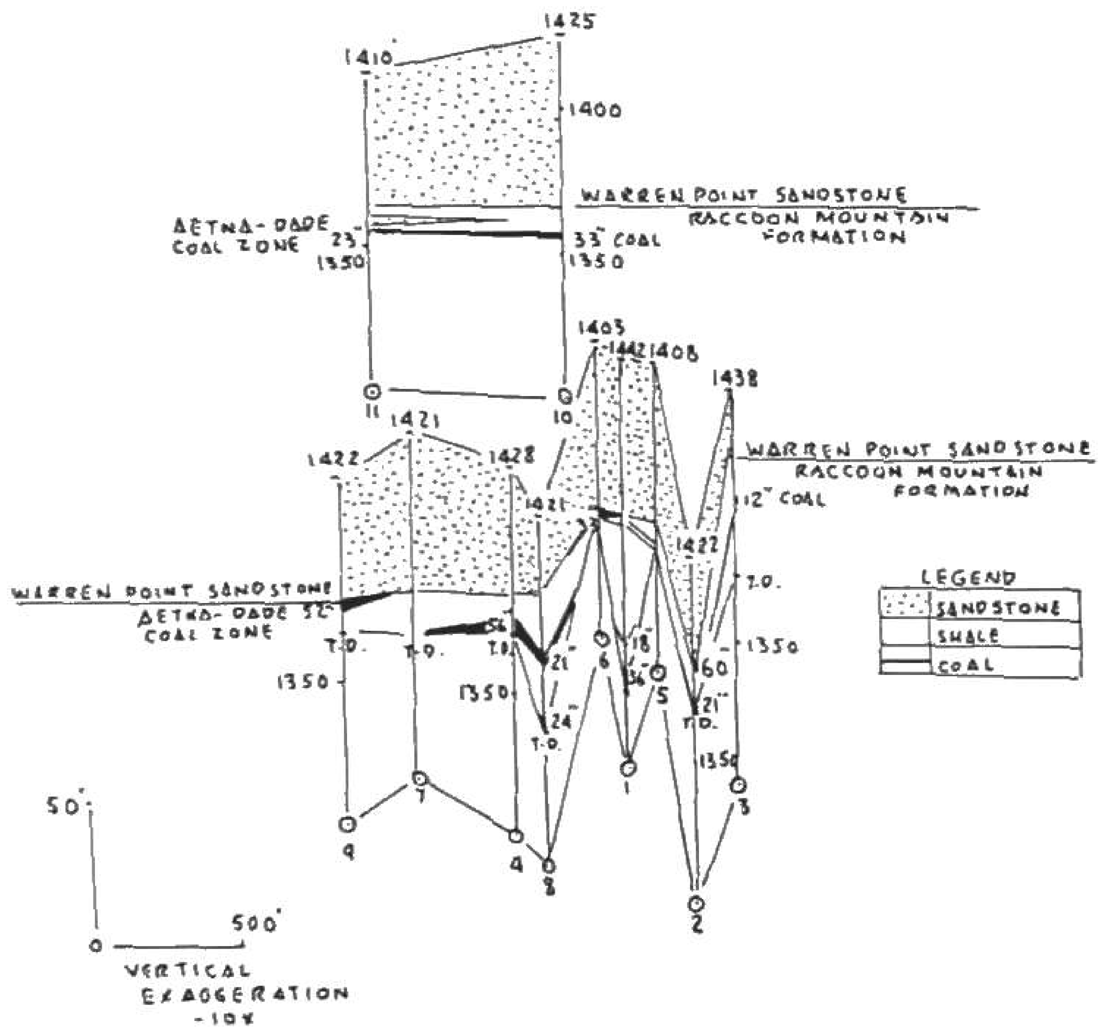

FIG. 4: *Panel diagram based on air rotary boreholes in Dade County, Georgia.*

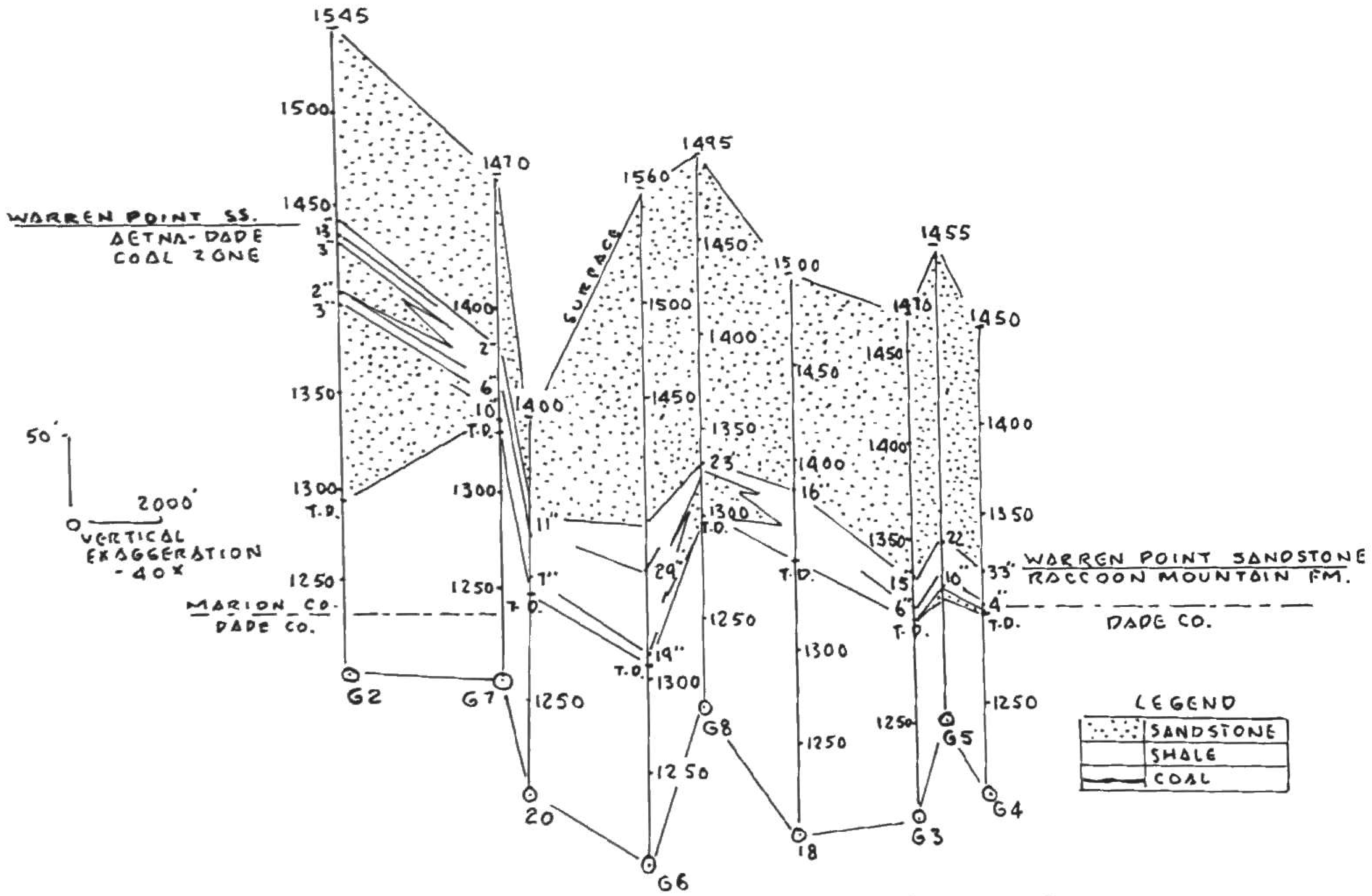

FIG. 5: *Panel diagram based on corehole data from Johnson (1946), Dade County, Georgia.*

SUMMARY

A geologic cross-section of Sand Mountain is shown on Figure 6.

Sand Mountain has the structure of a shallow, asymmetrical syncline with the shortest, steepest limb on the east. The axis trends northeast-southwest.

The Warren Point Sandstone forms a resistant caprock on Sand Mountain, and is underlain by the lowermost Pennsylvanian stratigraphic unit, the Raccoon Mountain Formation which shows marked lateral variation in thickness as well as lensing sandstone, shale and coal units. There may be as many as 10 coal horizons in the Raccoon Mountain Formation, but the Aetna-Dade coal zone is situated at the top of the Raccoon Mountain where discontinuous, locally thick accumulations represent mineable coal deposits.

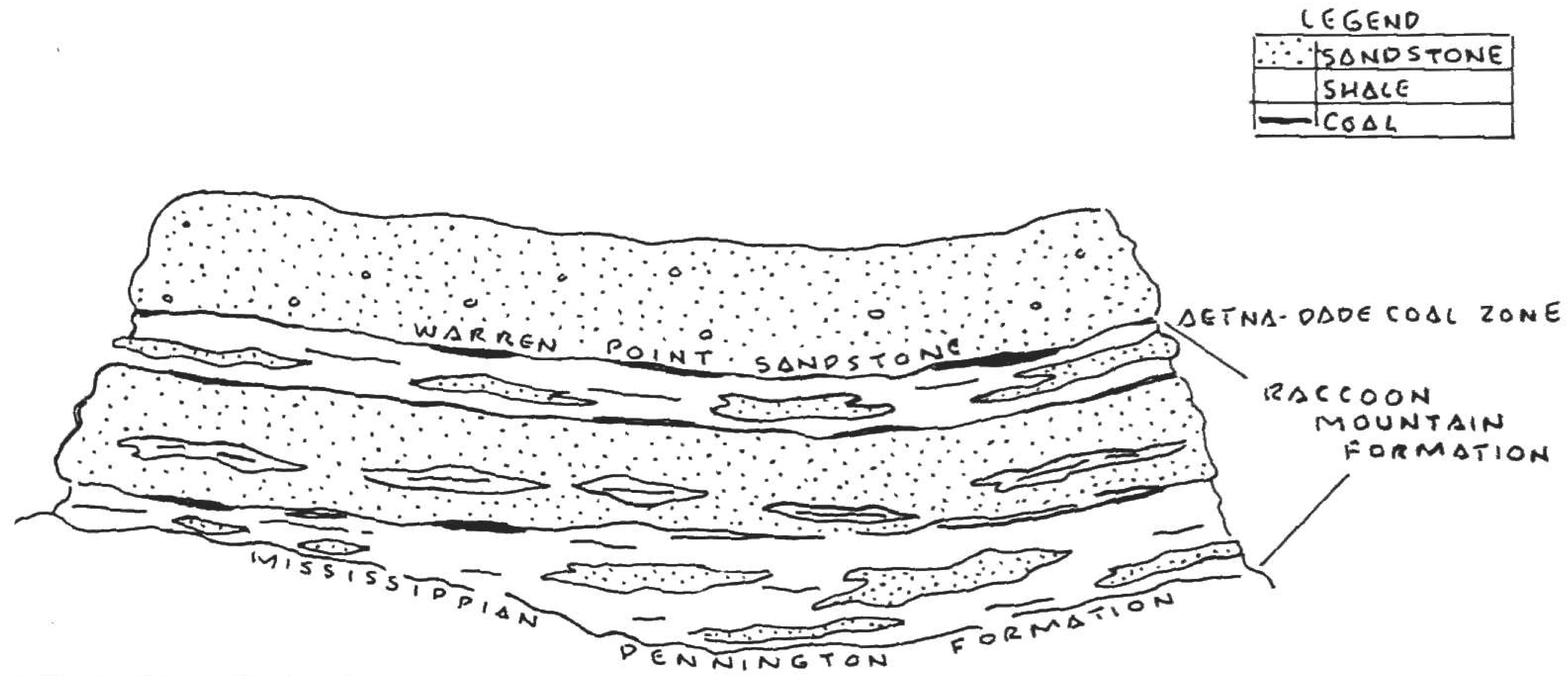

FIG. 6: *Generalized geologic cross-section of Sand Mountain.*

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ASSAY OF TRITIUM IN WHITE OAK CREEK, OAK RIDGE, TENNESSEE

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ABSTRACT

Grab samples of the water in white Oak Creek were taken in 1975 on May 29 and June 17, and in White Oak Lake on July 24. Tritium activities were assayed by liquid scintillation counting. The highest concentration of radioactivity observed was 0.685 nCi/ml at White Oak Dam on May 29. An approximate tenfold dilution of tritium activity was found on traversing the 0.6 mile stretch of White Oak Creek from the dam to the confluence with the Clinch River on June 17.

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INTRODUCTION

White Oak Lake, located within the controlled area of the Oak Ridge Reservation, was formed in 1943 to serve as a final control in the water stream from Oak Ridge National Laboratory to the Clinch River. Low-level radioactive wastes from the Laboratory are discharged to White Oak Creek upstream from White Oak Lake. Drainage from the lake is into the final stretch of White Oak Creek which discharges into the Clinch River 0.6 miles below White Oak Dam (Fig. 1). The lake serves as a final settling basin for wastes from the Laboratory and provides dilution and temporary holdup for decay of short-lived radionuclides before release to the