mile pipeline to Milford, Pa.

Rerouting accepted. The New Hampshire alternate would be 107.7 miles long, 9.8 miles longer than Tapco's original proposed route. It would parallel a powerline right-of-way owned by Public Service Co. of New Hampshire which generally parallels the Tapco route. Use of the alternate would have less environmental impact, since it would be in an already impacted area.

Tapco accepted the alternate suggestion and has amended its application to reflect the change.

Alternate terminal sites. The FPC staff report said studies had shown that there are LNG sites and pipeline routes in the United States as desirable as those proposed in Canada. Additional studies and surveys are being made of such potential sites at Sears Island, Me., and Prudence Island, R.I. The studies will be completed prior to issuance of the final EIS.

The staff also suggested that further consideration be given by Tapco to the possibility of moving the gas part of the distance in the U.S. by displacement. This might offer significant reductions in pipeline facility requirements and environmental impact.

The report, in its safety analysis, found that risks associated with the project are acceptable. But it suggested that special care be taken in revegetation plans, in protecting wildlife habitat, and in causing the least disturbance to nesting sites of the bald eagle near Pocomoonshine Lake and Nehumkeag Island. The staff advised that, if the eagles are currently nesting, construction in the area should be delayed until after midsummer or the final line alignment be modified to avoid the nest sites.

Partner quits. In a related development, Lorneterm LNG Ltd., Tenneco's Montreal partner for construction and operation of the St. John terminal and vaporization facility, has pulled out of the joint venture. (OGJ, Dec. 27, 1976, p. 78).

Lorneterm cited unsatisfactory contract negotiations as its reason for quitting the partnership. Tenneco apparently now will assume responsibility for arranging construction of the terminal. Project start-up was scheduled for 1981.

ENI revives Mediterranean gas-line plan

REPRESENTATIVES of the Tunisian Government and Italy's Ente Nazionale Idrocarburi (ENI) signed an agreement in Tunis July 15 which will permit ENI to build a gas pipeline from Algeria through Tunisia and across the Mediterranean to Sicily.

ENI will build and pay for the line which is expected to carry 12 billion cu m/year (1.16 billion cfd) of gas to Italy.

When completed the Tunisian section of the line will become Tunisian property. Tunisia also will take a percentage of the gas from the line—likely 5.25%.

This is a major reversal of the decision taken at the end of December last year by ENI and Sonatrach to abort the trans-Mediterranean gas pipeline project which had been agreed on in 1973. In December last year SNAM, the gas arm of ENI, and Sonatrach struck a new deal which called for the delivery of 8.5 billion cu m/year of gas to Italy using liquefied-natural-gas tankers.

ENI engineering division, Snamprogetti, at that time stopped the expensive experimental program during which it laid pipeline across the Messina Strait in nearly 1,100 ft of water and in the Sicilian Channel in more than 1,800 ft of water.

With the Tunisian switch, SNAM and Sonatrach must now renegotiate the gas-supply deal of December last year. Until these negotiations have been completed, no further move will be made on construction of the line.

This is the second major breakthrough for Sonatrach in recent weeks. Earlier this month a Dutch-West German group signed a contract in Algiers under which Sonatrach will supply 8 billion cu m/year of gas as LNG to the European companies. Supply start-up date is 1984. The contract—with Germany's Ruhrgas, Essen, and Salzgitter Ferngas, Salzgitter, and Holland's N. V. Nederlandse Gasunie, Groningen, will run until 2004. Half the annual LNG supply will be delivered to Holland and half to West Germany.

Sonatrach will supply the LNG fob the Algerian coast. The two German participants in the deal will ship the LNG supplies to Wilhelmshaven. Gasunie will land its share at Rotterdam.

Gelsenberg AG and Ruhrgas have jointly formed a subsidiary company, Deutsche Fluessigerdgas - Terminal GMBH to handle the construction of a terminal at Wilhelmshaven.

Four LNG tankers, each with a capacity of 125,000 cu m, would be needed to move the gas. The Algerians will provide 50% of the sea transport capacity.

ERDA encounters only shows in Project Halo wells

GAS AND oil were indicated, but no commercial production found in four Greenwood County, Kan., wells drilled as part of the Energy Research and Development Administration's Project Halo.

The Bartlesville, Okla., Energy Research Center is conducting the project to test a low-cost exploration method to locate shallow oil and gas deposits (OGJ, May 30, p. 77).

ERDA scientists will be analyzing cuttings from the four wells for about 6 months before the project is completed, said Thomas C. Wesson, Project Halo leader.

Soil-gas sampling surveys to a depth of 9 ft were used by ERDA to pinpoint the Greenwood County drill sties, all in 23s-12e near Sutherland field production.

The survey indicated the presence of hydrocarbon - molecule concentrations or "halos" from 1-2 miles in diameter at the locations.

Drilling results. All the wells, drilled by Berentz Drilling Co., Eureka, Kan., under a $93,040 contract, had oil shows in the Viola between 2,210-2,300 ft. Gas also was indicated from a higher Mississippian sand.

Drilling began with the 1 Bock, 15-23s-12e, 2 miles west of Hilltop, Kan. Other locations were 1 Lockard, 9-23s-12e, 2 miles northwest of Hilltop, and 1 Stauffer, 20-23s-12e, 4 miles southwest of Hilltop.

An originally unscheduled fourth well, 1 Bonczkowski, 17-23s-12e, recently bottomed at 2,348 ft about 1 mile southwest of the 1 Lockard.

Drill stem tests for all four wells were negative, but cuttings and well logs revealed the hydrocarbon shows.

Laboratory work. The rest of Project Halo will be conducted in the laboratory at the Bartlesville research center.

Hydrocarbon gases will be extracted from cutting samples drawn at 10-ft intervals in each well, Wesson said.

"We'll try to relate the gases we extract to the hydrocarbon indications we found as we drilled the holes," he said. "We will see how they relate to the mud-log gas indications, and also look at the fracture-identification log to try and get a handle on where the gases we saw on the surface are coming from."

ERDA will publish the results of the study.

Report on Conodont Content In
Sub-Chattanooga Carbonate Rocks
From ERDA Cores in Greenwood County, Kansas

by

Edwin D. Goebel
1978

Introduction. Carbonate rocks beneath the Chattanooga Shale in Greenwood and Coffey counties, Kansas, on a lithographic basis, have been assigned by various geologists to different stratigraphic units ranging from the Arbuckle and Viola (Ordovician) through the Hunton (Silurian-Devonian, undifferentiated). The general paucity of mega-fossils makes biostratigraphic determination difficult. Goebel, 1968, and Hilpman, 1969, recovered conodonts as part of the residue from sub-Chattanooga carbonate rocks in Kansas. These conodonts were found to be useful in their biostratigraphic correlation of rocks outside the Greenwood and Coffey county area.

Four closely spaced cores were recently taken by ERDA in the sub-Chattanooga rocks in Greenwood County, Kansas, south of the customarily mapped extent of the Hunton rocks. These cores held promise of a conodont micro-fauna which could help to resolve the subsurface stratigraphic correlation problem of sub-Chattanooga carbonate rocks. Accordingly, after visual examination of the cores during the summer of 1978, the ERDA No. 1 Bock (15-23-12E) core was selected for laboratory dissolution by standard insoluble residue techniques. Table 1, provides a general lithologic description, footages of the core, a count of identifiable specimens of conodonts recovered and a preliminary identification to genus.

Spot sampling from the ~~ERDA~~ UTE No. 1 Strahm (22-22-13 E) core yielded no conodonts. With low magnification, Upper Devonian conodonts are visible on the weathered surface of the Chattanooga Shale in the Bock core and in the sandstone, next beneath the Chattanooga Shale in the Bonzkowski (17-23-12E) core at 2322 feet depth. Spot samples deeper in the Bonzkowski were barren of conodonts.

Bonczkowski

Results and Conclusion. Palmatolepis is a key index conodont fossil to Upper Devonian rocks. The genus is present in the black shale of the Bock core and the sandstone beneath the black shale in the Bonzkowski core. It affixes the age of the Chattanooga Shale and the upper part of the underlying sandstone at these locations in these cores in Greenwood County, Kansas.

All the conodonts recovered from acidic acid residues from carbonate rocks of the Bock core (See Table 1) are simple cones, of the type grouped by Ellison (1946) within the family Distacodidae. None of the specimens recovered exhibit any physical-wear evidence of having been reworked into younger rocks.

Cone-shaped conodonts are differentiated from each other by the shape and depth of the basal cavity as well as the transverse cross-section shape of the cones. Simple cones are used by some conodont-workers as guides to lower Ordovician rocks. The cone-shaped conodonts are abundant and widespread in middle and upper Ordovician rocks, but are less useful as guide fossil in these rocks than in lower Ordovician rocks. Because the simple cone-shaped

conodonts extend through Niagaran time and because locally they dominate the conodont fauna in Silurian rocks, it is difficult to distinguish Silurian rocks from Ordovician rocks where distinction depends solely on cone-shaped conodonts. Simple cones dominate the collections in the upper part of the Silurian Bainbridge Formation at Lithium, Missouri (Rexroad and Craig 1971). In collections of conodonts from lower Ordovician rocks of Missouri and Oklahoma, cone-shaped forms are characteristically the only conodonts present.

The range of Acodus, Distacodus and Paltodus is through the Niagaran, while Oistodus and Drepanodus are limited to the pre-Silurian (Ellison, 1946). In the Bock core, one specimen of Oistodus?, a pre-Silurian form (2180-81), was recovered from an otherwise barren sandy dolomite. An appreciable sized fauna (185 specimens) of five cone-shaped conodonts, Drepanodus, Oistodus, Acodus, Distacodus and Paltodus was recovered from 2192-2198 from the core. A meager fauna of cones was recovered to the bottom of the core at 2222 feet.

Without the presence of conodonts more diagnostic than the simple cones, biostratigraphic determination using the specimens from the carbonate portions of the Bock core is hazardous and would have to be largely judgmental. It would be feasible to assign the carbonate rocks in question to either the Silurian portion of the Hunton or the Lower Ordovician portion of the Arbuckle. Previous unpublished work in Greenwood and adjacent Coffey counties sheds some light on the correlation problem but does not resolve the problem.

In sec. 8 of T. 24 S. R 14 E, in the Brunsen-Spines No. 1 Thomsen, a six foot carbonate core from 2040-2045 feet depth yielded specimens of Icriodus, an index fossil to the Middle and Upper Devonian. The base of the "Kinderhook" Shale (Chattanooga) is picked here at 1970 feet depth. In sec. 34, T. 22 S., R. 13 E., one foot of carbonate core (from Clark Roach) in the Hart No. 17 Hessler from 2241-2242 feet depth yielded Icriodus, Palmatolepis, and Polygnathellus, which are biostratigraphically significant Devonian forms. The top of the "Kinderhook" is at 2164 feet depth. In sec. 22, T. 22 S., R. 13 E. a carbonate rock core from 2289 to 2307 yielded specimens of Icriodus, and a specimen of Palmatolepis in the Hart-McClure and N & B No. 1 Shaffer. The top of the "Kinderhook" is picked at 2219 feet depth. The Schaffer, Hessler and Thomsen cores (as are the ERDA cores), are located to the south, beyond the extent of mapped subsurface Hunton rocks in Kansas.

Acknowledgement. This project was suggested, supported and supervised by Dr. Wm. J. Ebanks, Jr., Chief, Subsurface Geology Section, Kansas Geological Survey. Some of the cores were made available by Virgil Cole of Wichita, Kansas.

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15 - 23s - 12E

Table 1

NO. 1 BOCK CORE, GREENWOOD COUNTY, KANSAS
(DISSOLVED IN ACETIC ACID AND PICKED FOR CONODONTS, 1978) E. D. GOEBEL

Footage

2171-72 - Black siliceous shale, conodonts visible at surface include several specimens of Palmatolepis, rocks notacidized. (N.A.)

2172-75 - Black shale (N.A.)

2175-76 - Black shale in contact above dolomitic sandstone; pyrite in shale; calcite filled veins; bryozoa clasts in sandstone and shale clasts in lower 2 inches. (N.A.)

2176-78 - Sandstone and dolomitic sandstone with pyrite. (N.A.)

2178-79 - Sandstone and dolomitic sandstone with pyrite. (N.A.)
plus coarsely crystalline calcite rhombs in lower part - barren.

2179-80 - Sandy dolomite plus crystalline calcite.

2180-81 - Sandy dolomite plus crystalline calcite, Oistodus (1 spec.)

2181-84 - Sandy dolomite plus crystalline calcite.

2184-87 - Siltstone, green shale laminae.

2187-90 - Sandstone with oolitic chert breccia in lower part.

2191-97 - Dolomite, gray, fine-grained with fossil molds.

- 2192, Acodus, Drepanodus + other conodonts (45 spec.)
- 92-93, Acodus, Distocodus, Drepanodus (23 spec.)
- 93-94, Paltodus, Drepanodus, (5 spec.)
- 94-95, Paltodus, Drepanodus, Acodus, (13 spec.)
- 95-96, Paltodus, Drepanodus, Acodus, Oistodus (17 spec.)
- 96-97, Paltodus, Drepanodus, Acodus, Oistodus (47 spec.)

2199-2200 - Gray, fine-grained dolomite, with fractured, blue, fine-grained dolomite; some fossil molds, brecciated blue dolomite.

- 97-98, Paltodus, Drepanodus, Acodus, Oistodus (35 spec.)
- 98-2200 - Barren

2200-02 - Dolomite, fine-grained with white, gray chert and blue-gray dense dolomite.

2202-04 - Dolomite, gray, dense plus oolitic chert.

Table 1 (continued)

2204-08 - Dolomite, dense, gray, plus oolitic chert and "flat pebble conglomerate?" at base.

2206-07 - Three cones (conodonts).

2209-10 - Dolomite, gray.

2210-11 - Dolomite, gray, stylolites - white chert.

2211-13 - Dolomite, fine-grained, - a mudstone?

2213-19 - Dolomite, fine-grained, gray, with chert lenses and some fossil - cast porosity.

2219-22 - Dolomite, gray, fine-grained, with some lenses of oolites? - fossil - cast porosity and some oolitic chert.

- 2219 - Drepanodus (1 spec.)

ERDA
Boroczkowski
Greenwood Co.
~~given first 3 boxes~~
have cored interval 2321'-2348'

2321'-22.5'

black shale
pyrite present
uncarbonatic w/ unit below (pyrite at contact)

base 55?

2322.5'-2328' Dolomite w/ thin interbeds of green silty shale, silty w/ rhombic dolomite xl's in large vugs, sharp contact w/ unit below + shale above
oil staining in places
- Spar calcite at top of unit - lt. brown
siltstone & fine grained sandstone
2328'-2342' fine-green shale stringers throughout
one blue-green shale interval ± 20 cm thick (at ±2330') >> ref back page.
minor amount of pyrite throughout
chert pebbles in bottom 1/3
disturbated
oil staining in places
sharp contact w/ unit below + above

2342'-2348'

fractured dolomite
lt brown & med gray, silty in places
chert (white)
vugs (small vugs)
some vugs filled w/ yellow calcite xl's
at 2343' is an intrusive 18 cm. thick of argillaceous sandstone like that of the unit above, the lower 1" is sharp upper contact w/ the dolomite

Reboxed in boxes numbered 2355 - 2361

55 -

56 -

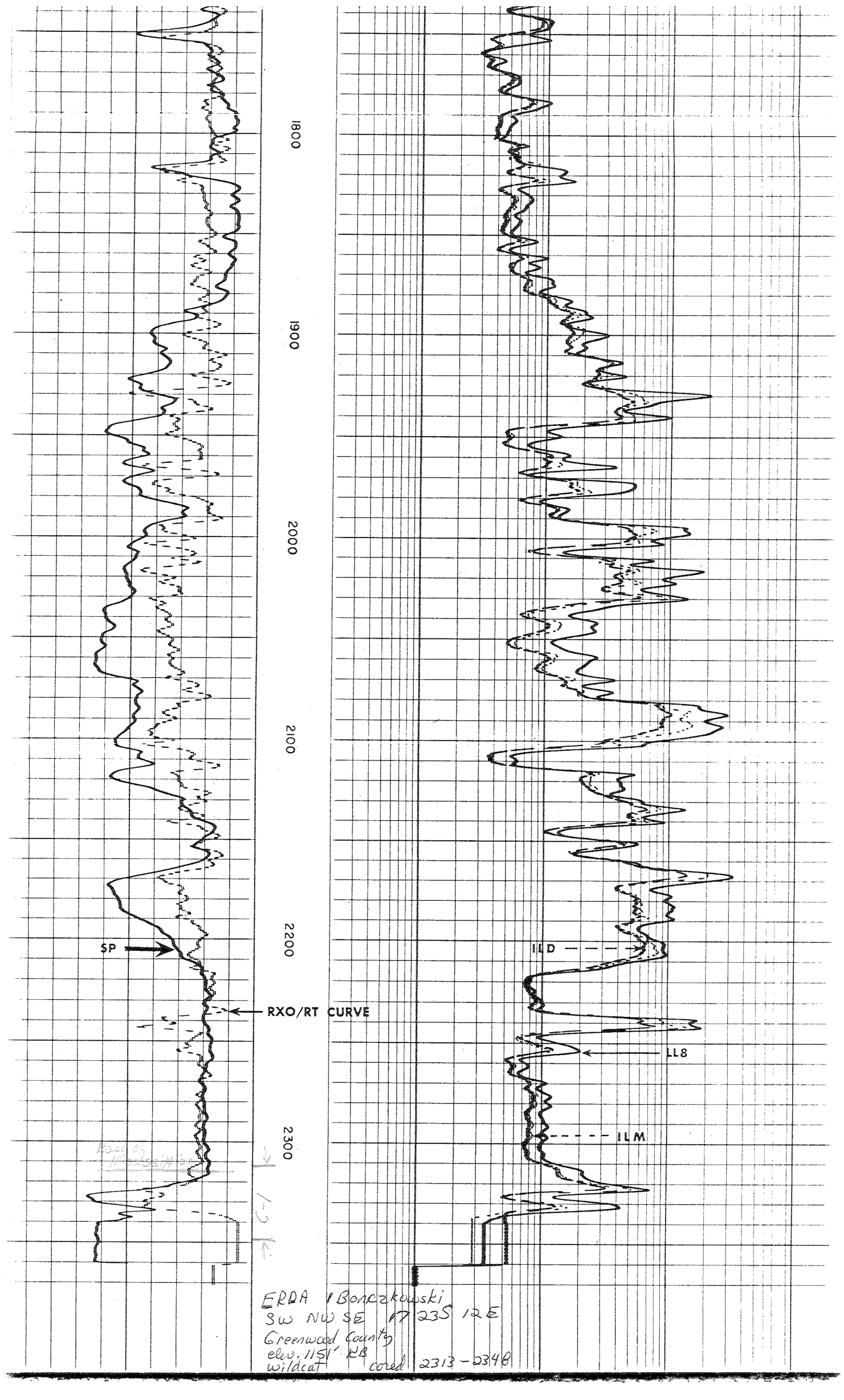
57 - 2321 - 26

58 - 26 - 31

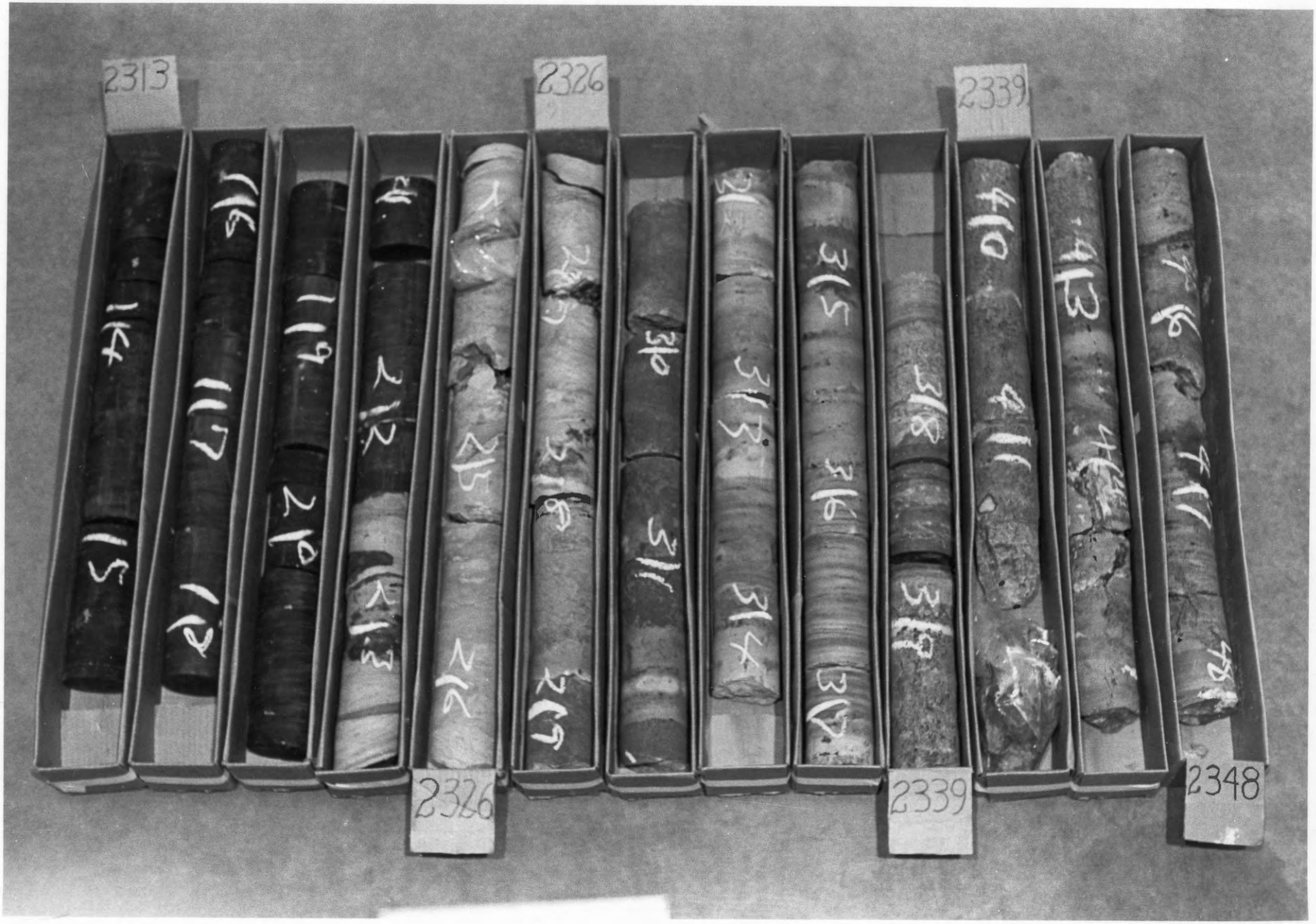
59 - 31 - 37

60 - 37 - 42

61 - 42 - 48


1800
1900
2000
2100
2200
2300
SP
RXO/RT CURVE
ILD
LL8
ILM
ERDA 1 Bonczkowski
SW NW SE 17 23S 12E
Greenwood County
elev. 1151' KB
wildcat
cored 2313 - 2340

BONCZKOWSKI ERDA 1 17-23-12E



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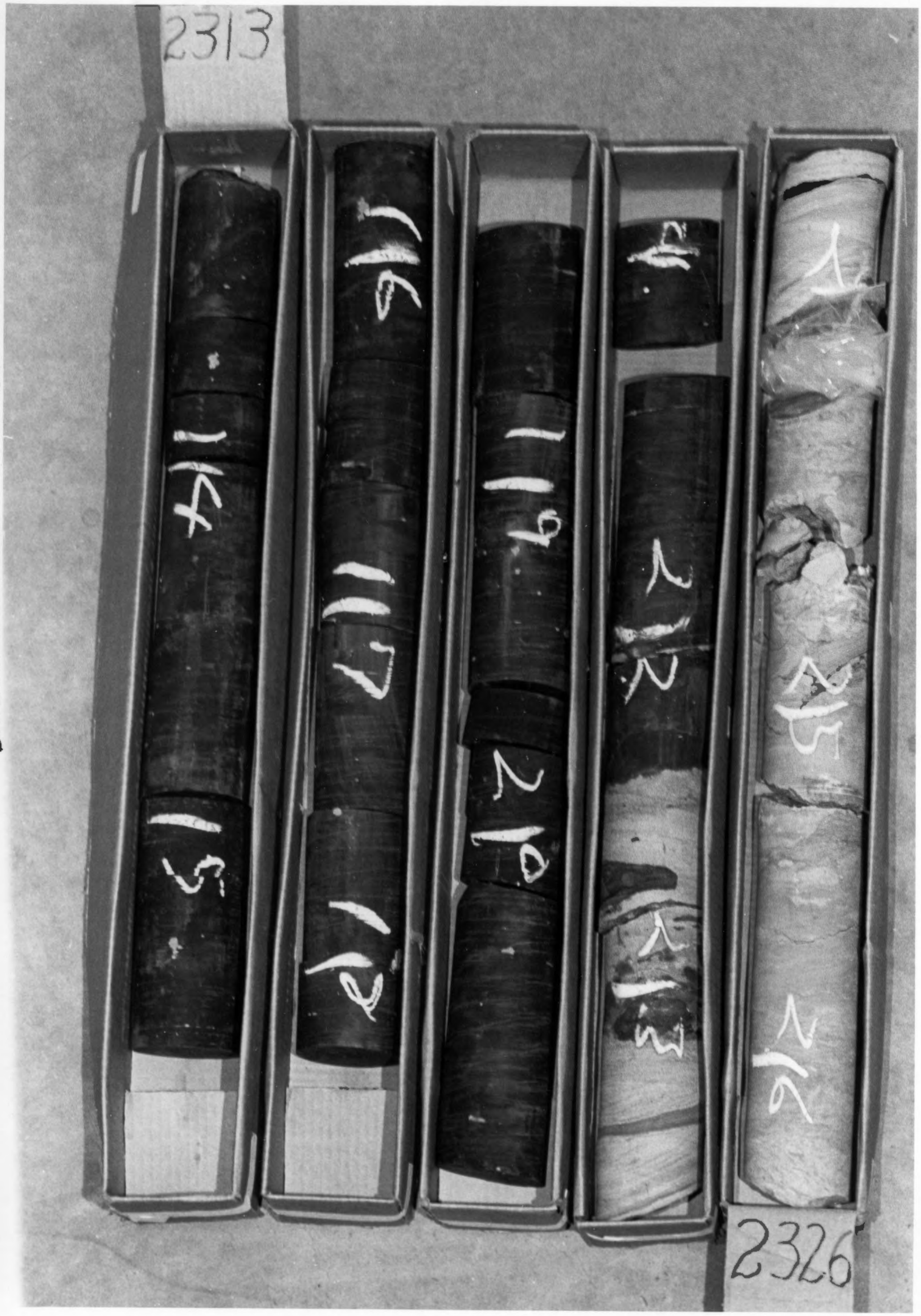

BONCZKOWSKI ERDA 1 17-23-12E

BONCZKOWSKI ERDA 1 17-23-12E