

US GEOLOGICAL SURVEY, DENVER, COLORADO
RADIOCARBON DATES IV

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INTRODUCTION

This list contains the results of measurements of 167 groundwater samples made between September 1979 and December 1982. An additional 175 samples were measured, but these were submitted without detailed information, such as sampling depth, well location, etc; therefore, they were excluded from the following list.

^{14}C age calculations were based on the assumption that initial activity of the total dissolved inorganic carbon was 100% of modern ^{14}C activity. Although, this assumption generally is true for material of organic origin, it is not true for dissolved carbon in ground water. Estimation of initial activity of total dissolved carbon can be made from models. A review of the existing models and a new approach was made by Fontes and Garnier (1979). Interested readers may refer to these models for corrections of groundwater ages. ^{14}C half-life of 5568 ± 30 years was used in age calculations. Statistical errors quoted are 1σ counting errors, including sample, background, and standard error estimates. The age limit reported is calculated on the basis of 3σ activity. The $\delta^{13}\text{C}$ values in table 1 were measured in an isotope laboratory of the US Geological Survey in Reston, Virginia, and calculated relative to Craig's Peedee Belemnite (PDB) limestone standard (Craig, 1957). Total alkalinity as bicarbonate values reported in table 1 was determined using techniques described by Brown, Skougstad, and Fishman (1970). Unless otherwise stated, all samples were collected and submitted by personnel of the US Geological Survey. Sample preparation and counting technique remain as previously reported (Yang & Emerson, 1980; Yang, McAvoy, & Emerson, 1981).

GROUNDWATER SAMPLES

Alabama

DE-69. Well Burkville A-2 **11,300 \pm 450**

Sample coll Jan 14, 1981, from Montgomery Co ($32^{\circ} 18' 30''$ N, $86^{\circ} 31' 25''$ W) from depth 225.55m. Alt of well head, 70.1m above msl.

DE-70. Well A-5 W F Junkin **6300 \pm 130**

Sample coll Jan 15, 1981, from Pickens Co ($33^{\circ} 26' 49''$ N, $87^{\circ} 56' 29''$ W) from depth 67.67m. Hole drilled to 67.67m. Alt of well head, 109.42m above msl.

DE-71. Well D-17 Bobby Bain **2900 \pm 110**

Sample coll Jan 16, 1981, from Pickens Co ($33^{\circ} 28' 47''$ N, $88^{\circ} 12' 37''$ W) from depth 48.77m. Hole drilled to 48.77m. Alt of well head, 88.39m above msl.

- DE-72. Well 0-15 Hickman Farms** **18,900 ± 1010**
 Sample coll Jan 16, 1981, from Pickens Co (33° 16' 37" N, 88° 15' 44" W) from depth <60.96m. Hole drilled to 60.96m. Alt of well head, 82.3m above msl.
- DE-73. Well Burkville D-1** **21,900 ± 1800**
 Sample coll Apr 14, 1981, from Lowndes Co (32° 19' 51" N, 86° 31' 41" W) from depth 335.28m. Hole drilled to 408.43m. Alt of well head, 46.94m above msl.
- DE-74. Well Burkville B-2** **30,200 ± 600**
 Sample coll Apr 14, 1981, from Lowndes Co (32° 16' 12" N, 86° 31' 13" W) from depth 158.5m. Hole drilled to 158.5m. Alt of well head, 65.53m above msl.
- DE-75. Well CHO 1,Z 2 NR Melvin** **31,700 ± 1330**
 Sample coll Jan 27, 1981, from Choctaw Co (31° 55' 53" N, 88° 27' 30" W) from depth 542.54m. Alt of well head, 106.68m above msl.
- DE-76. Well H 14A Jerome McArthur** **4800 ± 680**
 Sample coll July 28, 1982, from Russell Co (32° 19' 45" N, 85° 10' 05" W) from depth 25.91m. Hole drilled to 25.91m. Alt of well head, 140.21m above msl.
- DE-77. Well L 12 City of Haneyville** **>40,000**
 Sample coll July 8, 1982, from Lowndes Co (32° 10' 58" N, 86° 34' 32" W) from depth 323.09m. Hole drilled to 323.39m. Alt of well head, 75.54m above msl.
- DE-78. Newtontown Well No. 2** **32,100 ± 2120**
 Sample coll July 13, 1982, from Dale Co (31° 19' 21" N, 85° 35' 33" W) from depth 189.89m. Hole drilled to 219.46m. Alt of well head, 106.68m above msl.
- DE-79. Well P-2** **19,400 ± 520**
 Sample coll July 28, 1982, from Barbour Co (31° 53' 08" N, 85° 35' 57" W) from depth 32m. Hole drilled to 55.17m. Alt of well head, 144.78m above msl.
- DE-80. Well Q Olympia Spa Golf Course** **15,400 ± 460**
 Sample coll July 12, 1982 from Houston Co (31° 07' 12" N, 85° 24' 24" W) from depth 85.34m. Hole drilled to 85.34m. Alt of well head, 82.3m above msl.
- DE-81. Well M Wycott Plantation** **>36,800**
 Sample coll July 14, 1982, from Barbour Co (31° 58' 14" N, 85° 19' 22" W) from depth 91.44m. Hole drilled to 91.44m. Alt of well head, 112.78m above msl.

DE-82. S-1 City Well 3 at Clayton 1300 ± 80

Sample coll July 14, 1982, from Barbour Co (31° 52' 08" N, 85° 24' 48" W) from depth 61.26m. Hole drilled to 59.44m. Alt of well head, 168.86m above msl.

DE-83. Well A-1 Ben Bowden 21,300 ± 1340

Sample coll July 15, 1982, from Barbour Co (32° 05' 19" N, 85° 12' 54" W) from depth 160.68m. Hole drilled to 60.96m. Alt of well head, 71.32m above msl.

DE-84. Well B-3 Barbour County Board of Education >30,700

Sample coll July 14, 1982, from Barbour Co (32° 04' 31" N, 85° 19' 32" W) from depth 367.76m. Hole drilled to 367.76m. Alt of well head, 110.34m above msl.

DE-85. Well B-11 Tom Smith 4100 ± 100

Sample coll July 29, 1982, from Russell Co (32° 27' 41" N, 85° 07' 41" W) from depth 42.67m. Hole drilled to 42.67m.

DE-86. Well E-9 SH Robinson 10,900 ± 180

Sample coll July 13, 1982, from Henry Co (31° 37' 38" N, 85° 16' 30" W) from depth 103.94m.

DE-87. Well H-16 Lardonier-Crawford 18,700 ± 660

Sample coll July 27, 1982, from Russell Co (32° 22' 42" N, 85° 04' 48" W) from depth 114.91m. Hole drilled to 114.91m. Alt of well head, 80.77m above msl.

DE-88. Ozark City Well No. 2 38,600 ± 4150

Sample coll July 13, 1982, from Dale Co (31° 27' 23" N, 85° 38' 42" W) from depth 213.36m.

DE-89. H-12 Greenville City Well >37,800

Sample coll July 8, 1982, from Butler Co (31° 49' 47" N, 86° 36' 40" W) from depth 133.81m. Hole drilled to 175.87m. Alt of well head, 115.52m above msl.

DE-90. Well P-1 JB Neighbors <50

Sample coll July 7, 1982, from Macon Co (32° 28' 33" N, 86° 41' 03" W) from depth 54.86m. Alt of well head, 56.69m above msl.

DE-91. Well F-4 LB Bormeister 14,000 ± 380

Sample coll July 8, 1982, from Autauga Co (32° 36' 48" N, 86° 40' 16" W) from depth 36.58m. Hole drilled to 36.58m. Alt of well head, 89.92m above msl.

*Colorado***DE-92. Well TH 75-15A (C3-97-30 ACCI) 21,500 ± 230**

Sample coll Oct 5, 1982, Rio Blanco Co (39° 45' 40" N, 108° 19' 12" W) from depth 199.64m.

DE-93. Well TH-75-13B (C2-98-24 CBB3) >37,700

Sample coll Oct 6, 1982 from Rio Blanco Co (39° 51' 36" N, 108° 21' 00" W) from depth 329.18m.

DE-94. Well TH 75-1A (B1-97-CAD1) 20,700 ± 200

Sample coll Oct 13, 1982, from Rio Blanco Co (40° 02' 18" N, 108° 17' 06" W) from depth 323.08m.

DE-95. Spring Yellow Creek No. 1 23,100 ± 260
(SC00109802aab)

Sample coll Oct 14, 1982, from Rio Blanco Co (40° 00' 19" N, 108° 21' 10" W) from depth 213.36m.

Florida

DE-96. Well Fla For Srv Cmp Hndrsn >33,900

Sample coll Feb 20, 1980, from Santa Rosa Co (30° 59' 40" N, 86° 58' 06" W) from depth 248.41m. Alt of well head, 85.34m above msl.

DE-97. USGS Test Well No. 1 >37,600

Sample coll Jan 23, 1980, from Santa Rosa Co (30° 32' 41" N, 86° 54' 04" W) from depth 457.2m. Alt of well head, 38.21m above msl.

DE-98. USGS Test Well No. 2 >41,600

Sample coll Jan 8, 1980, from Santa Rosa Co (30° 42' 52" N, 87° 00' 22" W) from depth 393.19m. Alt of well head, 38.12m above msl.

DE-99. Well North Monitor >36,300

Sample coll Jan 22, 1980, from Escambia Co (30° 36' 57" N, 87° 15' 43" W) from depth 464.21m. Alt of well head, 2.39m above msl.

DE-100. Well Deep Monitor North Am Cy >41,600

Sample coll Jan 7, 1980, from Santa Rosa Co (30° 35' 14" N, 87° 05' 48" W) from depth 509.02m. Alt of well head, 37.17m above msl.

DE-101. Well D-0349 J-0414 9800 ± 150

Sample coll June 19, 1981, from Duval Co (30° 24' 16" N, 81° 52' 26" W) from depth 211.83m. Hole drilled to 679.7m. Alt of well head, 24.38m above msl.

DE-102. Well D-0349 J-0414 6100 ± 140

Sample coll June 25, 1980, from Duval Co (30° 24' 16" N, 81° 52' 26" W) from depth 679.7m. Alt of well head, 24.38m above msl.

DE-103. Well 29S/38E-10 >2000

Sample coll July 28, 1980, from Brevard Co (27° 58' 58" N, 80° 31' 18" W) from depth 100.28m. Alt of well head, 0.3m above msl.

DE-104. Well 30S/31E-1 >37,400

Sample coll July 29, 1980, from Brevard Co (27° 52' 08" N, 80° 27' 17" W) from depth 74.68m.

- DE-105. Yates Well** **25,500 ± 950**
 Sample coll July 31, 1980, from Indian River Co (27° 48' 57" N, 80° 49' 34" W) from depth 71.02m. Alt of well head, 8.53m above msl.
- DE-106. Well OS-273 NR Kenansville** **30,000 ± 2000**
 Sample coll July 31, 1980, from Hillsborough Co (27° 59' 57" N, 82° 52' 31" W) from depth 83.52m. Hole drilled to 10.97m.
- DE-107. Well 30S/37E-35** **28,800 ± 2900**
 Sample coll July 29, 1980 from Brevard Co (27° 49' 25" N, 80° 36' 17" W) from depth 150.27m. Alt of well head, 7.73m above msl.
- DE-108. Well 50S/35E-03g** **13,900 ± 680**
 Sample coll Oct 18, 1980, from Broward Co (26° 10' 16" N, 80° 49' 26" W) from depth 284.68m. Hole drilled to 856.79m. Alt of well head, 4.71m above msl.
- DE-109. Well 50S/35E-03g** **>24,500**
 Sample coll Mar 9, 1981, from Broward Co (26° 10' 16" N, 80° 49' 26" W) from depth 308.46m.
- DE-110. Well 50S/35E-03g** **22,900 ± 1060**
 Sample coll Mar 8, 1981, from Broward Co (26° 10' 16" N, 80° 49' 26" W) from depth 326.9m.
- DE-111. Well 50S/35E-03g** **24,500 ± 1150**
 Sample coll Mar 7, 1981, from Broward Co (26° 10' 16" N, 80° 49' 26" W) from depth 466.34m.
- DE-112. Well 50S/35E-03g** **9600 ± 480**
 Sample coll Mar 3, 1981, from Broward Co (26° 10' 16" N, 80° 49' 26" W) from depth 746.76m.
- DE-113. Tide Water Well 1** **6300 ± 130**
 Sample coll Sept 7, 1981, from Marion Co (29° 07' 43" N, 82° 34' 15" W) from depth 238.96m. Alt of well head, 22.51m above msl.
- DE-114. Well 50S/35E-03g** **>37,800**
 Sample coll Oct 19, 1981, from Broward Co (26° 10' 16" N, 80° 49' 26" W) from depth 248.41m. Hole drilled to 856.79m. Alt of well head, 4.71m above msl.
- DE-115. Well 50S/35E-03g** **>20,700**
 Sample coll Oct 19, 1981, from Broward Co (26° 10' 16" N, 80° 49' 26" W) from depth 762m. Hole drilled to 856.79m. Alt of well head, 4.71m above msl.
- DE-116. Well 56S/40E-21** **7100 ± 190**
 Sample coll Oct 22, 1981, from Hendry Co (26° 32' 55" N, 80° 19' 57" W) from depth 819.61m. Hole drilled to 825.09m. Alt of well head, 3.05m above msl.

- DE-117. Well 50S/42E-14bi** >26,900
Sample coll Oct 21, 1981, from Broward Co (26° 05' 55" N, 80° 00' 73" W) from depth 782.73m.
- DE-118. Well 50S/35E-03g** 17,100 ± 700
Sample coll Oct 19, 1981, from Broward Co (26° 10' 16" N, 80° 49' 26" W) from depth 274.32m. Hole drilled to 856.79m. Alt of well head, 4.71m above msl.
- DE-119. Well 50S/42E-14bi** 27,900 ± 1000
Sample coll Oct 21, 1981, from Broward Co (26° 05' 55" N, 80° 00' 73" W) from depth 311.2m.
- DE-120. Well 56S/40E-21** 21,600 ± 260
Sample coll Oct 22, 1981, from Palm Beach Co (26° 32' 55" N, 80° 19' 57" W) from depth 307.85m. Hole drilled to 825.09m. Alt of well head, 3.05m above msl.
- DE-121. Firetower Well nr Codys Corner** 8300 ± 140
Sample coll Feb 17, 1982, from Flagler Co (29° 18' 18" N, 81° 19' 05" W) from depth 42.67m. Alt of well head, 7.62m above msl.
- DE-122. 12S/29E-33 Harper Well** >26,800
Sample coll Feb 18, 1982, from Flagler Co (29° 25' 21" N, 81° 22' 23" W) from depth 91.44m. Alt of well head, 2.13m above msl.
- DE-123. Newbold Irrigation Well at Crescent City** 10,600 ± 340
Sample coll Feb 16, 1982, from Putnam Co (29° 27' 41" N, 81° 30' 58" W) from depth 24.38m. Alt of well head, 1.52m above msl.
- DE-124. Well Yarborough Home** 7100 ± 150
Sample coll Mar 3, 1982, from Seminole Co (28° 44' 11" N, 81° 26' 58" W) from depth 45.72m. Alt of well head, 10.73m above msl.
- DE-125. Well 13S/30E-06** 27,800 ± 2190
Sample coll Feb 18, 1982, from Flagler Co (29° 23' 42" N, 81° 18' 37" W) from depth 86.86m. Alt of well head, 4.32m above msl.
- DE-126. Well Seminole Pkwy at Sesame Blvd** 13,300 ± 260
Sample coll Feb 22, 1982, from Flagler Co (29° 25' 59" N, 81° 11' 11" W) from depth 89.92m. Alt of well head, 8.53m above msl.
- DE-127. Stock Well at St. Johns Park** >22,300
Sample coll Feb 22, 1982, from Flagler Co (29° 25' 28" N, 81° 25' 53" W) from depth 91.44m. Alt of well head, 2.13m above msl.
- DE-128. Palm Coast Well SW-92** 11,200 ± 130
Sample coll Mar 1, 1982, from Flagler Co (29° 36' 36" N, 81° 18' 09" W) from depth 26.82m. Alt of well head, 9.14m above msl.

DE-129. Palm Coast Well SW-91 13,400 ± 280

Sample coll Mar 1, 1982, from Flagler Co (29° 34' 06" N, 81° 17' 46" W) from depth 24.99m. Alt of well head, 9.73m above msl.

*Georgia***DE-130. Well USGS TW 1 25,200 ± 1200**

Sample coll June 9, 1981, from Ware Co (31° 07' 06" N, 82° 15' 51" W) from depth 565.71m. Alt of well head, 45.7m above msl.

DE-131. Well J P Stevens 4 8800 ± 140

Sample coll Aug 22, 1981, from Jefferson Co (33° 00' 14" N, 82° 27' 39" W) from depth 129.24m. Alt of well head, 85.34m above msl.

DE-132. Well Wrens, GA;3 2000 ± 130

Sample coll Sept 3, 1981, from Jefferson Co (33° 11' 57" N, 82° 23' 25" W) from depth 42.98m. Alt of well head, 128.93 above msl.

DE-133. Well Thiele Co, Reedy CR 1 1500 ± 270

Sample coll Sept 4, 1981, from Jefferson Co (33° 10' 49" N, 82° 27' 11" W) from depth 45.79m. Alt of well head, 138.44m above msl.

DE-134. Well J M Huber Co., 2 3700 ± 240

Sample coll Sept 3, 1981, from Jefferson Co (33° 16' 52" N, 82° 24' 34" W) from depth 95.1m. Alt of well head, 131.06m above msl.

DE-135. Well Gibson, GA 3 <50

Sample coll Sept 4, 1981, from Glascock Co (33° 13' 59" N, 82° 35' 56" W) from depth 61.87m. Alt of well head, 132.56m above msl.

DE-136. Well King Finishing No. 1 32,900 ± 2700

Sample coll Aug 19, 1981, from Screven Co (32° 36' 14" N, 81° 44' 21" W) from depth 404.17m. Alt of well head, 48.77m above msl.

DE-137. Chalker Well <50

Sample coll Aug 21, 1981, from Warren Co (33° 20' 00" N, 82° 38' 08" W) from depth 6.09m.

DE-138. Well Pincushion TW-3 19,700 ± 370

Sample coll Jan 28, 1982, from Laurens Co (32° 30' 30" N, 83° 03' 00" W) from depth 377.92m. Hole drilled to 513.59m. Alt of well head, 85.95m above msl.

DE-139. Well Ellaville GA 5 8300 ± 290

Sample coll Aug 3, 1982, from Schley Co (32° 14' 08" N, 84° 18' 20" W) from depth 195.07m. Hole drilled to 198.12m. Alt of well head, 173.13m above msl.

DE-140. Well Breeland, Lee 600 ± 570

Sample coll Aug 5, 1982, from Schley Co (32° 17' 47" N, 84° 17' 24" W) from depth 39.01m. Hole drilled to 39.01m. Alt of well head, 146.91m above msl.

- DE-141. Well Albany TW-10** **27,900 ± 840**
Sample coll July 20, 1982, from Dougherty Co (31° 35' 30" N, 84° 10' 30" W) from depth 256.03m.
- DE-142. Crouch Well H-5** **1150 ± 70**
Sample coll July 28, 1982, from Chattahoochee Co (32° 23' 22" N, 85° 07' 13" W) from depth 32m.
- DE-143. Well Kolomoki State Park No. 2** **10,200 ± 300**
Sample coll July 20, 1982, from Early Co (31° 28' 05" N, 84° 55' 40" W) from depth 44.2m.
- DE-144. Well Albany TW-1** **>40,000**
Sample coll July 19, 1982, from Dougherty Co (31° 31' 05" N, 84° 06' 43" W) from depth 449.28m.
- DE-145. Well Fort Gains, GA-3** **>36,500**
Sample coll July 21, 1982, from Clay Co (31° 36' 38" N, 85° 03' 21" W) from depth 109.73m. Hole drilled to 112.78m. Alt of well head, 45.42m above msl.
- DE-146. Well Wainwright-House** **1300 ± 210**
Sample coll July 22, 1982, from Taylor Co (32° 40' 12" N, 84° 11' 04" W) from depth 21.34m. Hole drilled to 21.34m. Alt of well head, 165.51m above msl.
- DE-147. Well Georgetown No. 1** **>38,400**
Sample coll July 21, 1982, from Quitman Co (31° 53' 10" N, 85° 05' 57" W) from depth 416.05m.
- DE-148. Well Georgetown No. 2** **24,300 ± 750**
Sample coll July 21, 1982, from Quitman Co (31° 52' 21" N, 85° 04' 51" W) from depth 536.45m.
- DE-149. Omaha School Well** **15,900 ± 180**
Sample coll Aug 4, 1982, from Stewart Co (32° 08' 32" N, 85° 00' 04" W) from depth 96.32m.
- DE-150. Well Omaha, GA-1** **>31,000**
Sample coll Aug 4, 1982, from Stewart Co (32° 08' 59" N, 85° 00' 37" W) from depth 295.05m. Hole drilled to 312.42m. Alt of well head, 91.74m above msl.
- DE-151. Well BIBB Plant Laurel 2** **2000 ± 160**
Sample coll July 22, 1982, from Taylor Co (32° 30' 58" N, 84° 07' 19" W) from depth 58.83m. Hole drilled to 58.83m. Alt of well head, 129.54m above msl.
- DE-152. Well Singletary Bancroft** **25,800 ± 960**
Sample coll July 20, 1982, from Early Co (31° 24' 45" N, 84° 49' 41" W) from depth 234.7m. Alt of well head, 233.78m above msl.

DE-153. Well Wainwright 2 **6200 ± 780**

Sample coll July 22, 1982, from Taylor Co (32° 33' 04" N, 84° 10' 11" W) from depth 185.01m. Hole drilled to 185.01m. Alt of well head, 192.63m above msl.

DE-154. Well Weston GA (Old 1) **10,500 ± 170**

Sample coll Aug 4, 1982, from Webster Co (31° 58' 41" N, 84° 36' 55" W) from depth 81.69m. Hole drilled to 81.69m. Alt of well head, 159.11m above msl.

*Idaho***DE-155. Well 04S/01E-34bad1** **21,500 ± 600**

Sample coll Jan 27, 1982, from Owyhee Co (43° 02' 36" N, 116° 19' 26" W) from depth 408.30m. Alt of well head, 783.34m above msl.

DE-156. Well 05S/03E-26bcb1 **24,600 ± 1850**

Sample coll Jan 26, 1982 from Owyhee Co (42° 57' 50" N, 116° 04' 32" W) from depth 905.26m. Alt of well head, 757.43m above msl.

DE-157. Well 08S/14E-30acd2 **25,800 ± 1570**

Sample coll Jan 18, 1982, from Jerome Co (42° 42' 14" N, 114° 51' 21" W) from depth 128.02m. Alt of well head, 882.09m above msl.

*Iowa***DE-158. Well Webster 6** **>37,400**

Sample coll Feb 24, 1982, from Hamilton Co (42° 28' 55" N, 93° 48' 15" W) from depth 609.6m.

DE-159. Ode Bolt 2 Town Well **33,800 ± 1700**

Sample coll Feb 23, 1982, from Carroll Co (42° 18' 31" N, 95° 15' 21" W) from depth 650.75m.

DE-160. Well 07-227W-10cdca **29,400 ± 930**

Sample coll Feb 23, 1982, from Monroe Co (41° 02' 35" N, 93° 56' 49" W) from depth 949.15m. Alt of well head, 371.86m above msl.

DE-161. Well 08-007W-25bdb **24,600 ± 510**

Sample coll Feb 24, 1982, from Linn Co (41° 42' 35" N, 91° 36' 41" W) from depth 524.25m. Alt of well head, 247.5m above msl.

DE-162. Well 08-307W-01badc **26,400 ± 920**

Sample coll Feb 24, 1982, from Monroe Co (42° 02' 00" N, 91° 36' 30" W) from depth 477.01m. Alt of well head, 243.84m above msl.

DE-163. Well 07-623W-31dadd **25,500 ± 290**

Sample coll Feb 22, 1982, from Warren Co (41° 20' 25" N, 93° 32' 22" W) from depth 742.18m. Alt of well head, 258.78m above msl.

Mississippi

- DE-164. Well C040 H Miller** **19,700 ± 1110**
Sample coll Jan 19, 1981, from Noxubee Co (33° 13' 08" N, 88° 36' 51" W) from depth 493.78m. Alt of well head, 78.64m above msl.
- DE-165. Well B013 Hoffman** **22,100 ± 300**
Sample coll Jan 10, 1981, from Noxubee Co (33° 15' 28" N, 88° 37' 07" W) from depth 231.65m. Alt of well head, 88.39m above msl.
- DE-166. Brooksville Town Well** **21,600 ± 450**
Sample coll Jan 12, 1981, from Noxubee Co (33° 13' 57" N, 88° 34' 52" W) from depth 287.12m.
- DE-167. Well D018 Holcut Cairo WA** **4200 ± 110**
Sample coll Jan 9, 1981, from Jackson Co (34° 44' 55" N, 88° 21' 40" W) from depth 92.96m. Alt of well head, 179.83m above msl.
- DE-168. Well H010 Ashland** **14,400 ± 420**
Sample coll Jan 7, 1981, from Amite Co (34° 51' 00" N, 89° 10' 48" W) from depth 280.42m. Alt of well head, 186.84m above msl.
- DE-169. Well B011 Walnut** **28,800 ± 2900**
Sample coll Jan 6, 1981, from Alcorn Co (34° 57' 24" N, 88° 54' 00" W) from depth 292.91m. Alt of well head, 161.54m above msl.
- DE-170. Well C018 Black Belt Exp Sta** **7700 ± 900**
Sample coll Jan 12, 1981, from Noxubee Co (33° 15' 31" N, 88° 33' 41" W) from depth 393.19m. Alt of well head, 85.95m above msl.
- DE-171. Well B007 Walnut** **10,900 ± 170**
Sample coll Jan 8, 1981, from Tippah Co (34° 56' 57" N, 88° 53' 49" W) from depth 44.81m. Alt of well head, 143.26m above msl.
- DE-172. Well B002 Abrams** **13,300 ± 200**
Sample coll Jan 10, 1981, from Noxubee Co (33° 11' 45" N, 88° 37' 04" W) from depth 264.57m. Alt of well head, 85.65m above msl.
- DE-173. Well E003 Mathis** **1200 ± 370**
Sample coll Jan 8, 1981, from Alcorn Co (34° 56' 00" N, 88° 48' 26" W) from depth 38.1m. Alt of well head, 155.45m above msl.
- DE-174. Well L006 Mashulaville** **33,500 ± 1550**
Sample coll Jan 11, 1981, from Noxubee Co (33° 05' 28" N, 88° 44' 30" W) from depth 557.78m. Alt of well head, 80.77m above msl.
- DE-175. Well D005 Byhalia** **29,800 ± 900**
Sample coll Jan 7, 1981, from Harrison Co (34° 52' 20" N, 89° 46' 23" W) from depth 499.87m. Alt of well head, 109.73m above msl.

DE-176. Well A010 Columbus AFB No. 2 16,200 ± 500

Sample coll Jan 9, 1981, from Lowndes Co (33° 37' 32" N, 88° 26' 36" W) from depth 134.72m. Alt of well head, 61.87m above msl.

DE-177. Well C020 Butler 31,300 ± 900

Sample coll Jan 11, 1981, from Noxubee Co (33° 13' 57" N, 88° 34' 08" W) from depth 215.8m. Alt of well head, 79.25m above msl.

*Nevada***DE-178. Well 210/S13/E63-23dd 20,700 ± 230**

Sample coll Dec 23, 1980, from Clark Co (36° 47' 44" N, 114° 53' 32" W) from depth 203.91m. Alt of well head, 664.46m above msl.

DE-179. Well 179/N12/E63-12bdabI 9600 ± 110

Sample coll Jan 19, 1981, from White Pine Co (38° 55' 16" N, 114° 50' 21" W) from depth 288.95m.

DE-180. Well 210/S13/E63-23dd 20,800 ± 240

Sample coll July 22, 1981, from Clark Co (36° 47' 44" N, 114° 53' 32" W) from depth 203.91m. Alt of well head, 664.46m above msl.

DE-181. Well VE 29A-2-H 3800 ± 120

Sample coll Jan 8, 1982, from Nye Co (36° 56' 29" N, 116° 22' 26" W) from depth 335.7m.

DE-182. Well VE 29A-2-H 4100 ± 120

Sample coll Jan 15, 1982, from Nye Co (36° 56' 29" N, 116° 22' 26" W) from depth 150.12m.

DE-183. USW-H 6 14,600 ± 100

Sample coll Oct 16, 1982, from Nye Co (36° 50' 49" N, 116° 28' 55" W) from depth 557.75m.

*New Mexico***DE-184. Oscura Range Camp Well 15,700 ± 330**

Sample coll July 29, 1982, from Lincoln Co (33° 29' 54" N, 106° 10' 22" W) from depth 41.76m.

*North Carolina***DE-185. Carolina Welding Well 300 ± 140**

Sample coll Aug 12, 1981, from Scotland Co (34° 44' 18" N, 79° 27' 13" W) from depth 7.62m.

DE-186. Rowland, RB-39 9000 ± 220

Sample coll Aug 12, 1981, from Robeson Co (34° 32' 21" N, 79° 17' 02" W) from depth 128.32m.

DE-187. Rowland, RB-41 6500 ± 250

Sample coll Aug 12, 1981 from Robeson Co (34° 32' 38" N, 79° 17' 43" W) from depth 76.2m.

DE-188. Laurinburg, SC-18 **2700 ± 280**

Sample coll Aug 12, 1981, from Scotland Co (34° 47' 02" N, 79° 26' 30" W) from depth 42.67m.

Oregon

DE-189. Wood **28,300 ± 880**

Wood sample coll Oct 1979, from Douglas Co (43° 27' 16" N, 124° 16' 24" W) from depth 49.07m.

DE-190. Shell **7500 ± 190**

Shell sample coll Oct 1979, from Douglas Co (43° 27' 16" N, 124° 16' 24" W) from depth 33.53m.

South Carolina

DE-191. Well BFT-457 **28,600 ± 520**

Sample coll Sept 10, 1981, from Beaufort Co (32° 19' 39" N, 80° 27' 42" W) from depth 832.1m. Hole drilled to 953.11m. Alt of well head, 2.13m above msl.

DE-192. Well Isle of Palms **28,400 ± 510**

Sample coll Aug 7, 1981, from Charleston Co (32° 47' 15" N, 79° 49' 17" W) from depth 609.6m.

DE-193. Well BFT-454 **30,100 ± 620**

Sample coll Sept 10, 1981, from Beaufort Co (32° 14' 46" N, 80° 44' 40" W) from depth 923.54m. Hole drilled to 924.76m. Alt of well head, 2.05m above msl.

DE-194. Well MRN-42 Marion TWN No. 3 **10,600 ± 150**

Sample coll Aug 13, 1981, from Marion Co (34° 10' 26" N, 79° 23' 47" W) from depth 173.74m. Alt of well head, 21.34m above msl.

DE-195. Well MRN-38 Marion TWN No. 2 **28,600 ± 1290**

Sample coll Aug 13, 1981, from Marion Co (34° 11' 01" N, 79° 23' 47" W) from depth 60.96m. Hole drilled to 60.96m. Alt of well head, 21.95m above msl.

DE-196. Well Brookgreen No. 1 **5100 ± 120**

Sample coll Aug 5, 1981, from Horry Co (33° 31' 13" N, 79° 05' 35" W) from depth 33.52m.

DE-197. Well Brookgreen No. 2 **26,700 ± 420**

Sample coll Aug 5, 1981, from Horry Co (33° 30' 59" N, 79° 05' 32" W) from depth 205.74m.

DE-198. Well H0-299 **>41,600**

Sample coll Aug 5, 1981, from Horry Co (33° 53' 33" N, 78° 35' 20" W) from depth 381m.

- DE-199. Well CHN-64-CHN** **33,100 ± 930**
Sample coll Aug 7, 1981, from Charleston Co (32° 47' 08" N, 79° 55' 55" W) from depth 408.43m. Hole drilled to 406.91m. Alt of well head, 4.88m above msl.
- DE-200. Well Conway W-2** **32,600 ± 870**
Sample coll Aug 6, 1981, from Horry Co (33° 51' 01" N, 79° 04' 08" W) from depth 204.06m.
- DE-201. Well BFT-11** **36,200 ± 2920**
Sample coll Sept 11, 1981, from Beaufort Co (32° 21' 10" N, 80° 41' 22" W) from depth 850.39m. Hole drilled 849.17m. Alt of well head, 3.66m above msl.
- DE-202. Well BFT-10** **32,800 ± 890**
Sample coll Sept 11, 1981, from Beaufort Co (32° 19' 46" N, 80° 42' 26" W) from depth 905.26m. Hole drilled to 1045.46m. Alt of well head, 3.66m above msl.
- DE-203. Well GEO-88** **>41,800**
Sample coll Aug 25, 1981, from Georgetown Co (33° 15' 08" N, 79° 16' 24" W) from depth 563.88m. Hole drilled to 394.72m. Alt of well head, 1.83m above msl.
- DE-204. Hodge Well** **31,300 ± 800**
Sample coll Aug 24, 1981, from Charleston Co (32° 55' 35" N, 79° 44' 16" W) from depth 129.54m.
- DE-205. Well BRK-9** **26,800 ± 470**
Sample coll Aug 24, 1981, from Charleston Co (33° 11' 50" N, 80° 00' 40" W) from depth 45.72m. Hole drilled to 45.72m. Alt of well head, 15.24m above msl.
- DE-206. Well N Myrtle Beach-3** **6700 ± 130**
Sample coll Aug 6, 1981, from Horry Co (33° 49' 19" N, 78° 40' 27" W) from depth 32m.
- DE-207. MRN-78, Test Well No. 2** **24,500 ± 340**
Sample coll Apr 1, 1982, from Horry Co (33° 51' 43" N, 79° 19' 50" W) from depth 347.47m.
- DE-208. MRN-78, Test Well No. 2** **22,600 ± 250**
Sample coll Apr 9, 1982, from Horry Co (33° 51' 43" N, 79° 19' 50" W) from depth 313.94m.
- DE-209. MRN-78, Test Well No. 2** **29,900 ± 580**
Sample coll Apr 19, 1982, from Horry Co (33° 51' 43" N, 79° 19' 50" W) from depth 253.29m.

DE-210. MRN-78, Test Well No. 2 **29,600 ± 970**

Sample coll Apr 24, 1982, from Horry Co (33° 51' 43" N, 79° 19' 50" W) from depth 234.09m.

DE-211. MRN-78, Test Well No. 2 **28,400 ± 500**

Sample coll Apr 30, 1982, from Horry Co (33° 51' 43" N, 79° 19' 50" W) from depth 163.68m.

DE-212. MRN-78, Test Well No. 2 **>38,100**

Sample coll May 2, 1982, from Horry Co (33° 51' 43" N, 79° 19' 50" W) from depth 108.2m.

South Dakota

DE-213. Well 93N/55W-04bbc **28,300 ± 580**

Sample coll May 7, 1980, from Yankton Co (42° 54' 40" N, 97° 21' 25" W) from depth 117.65m. Hole drilled to 124.05m. Alt of well head, 365.76m above msl.

DE-214. Well 96N/63W-08ceda **33,200 ± 1570**

Sample coll May 8, 1980, from Charles Mix Co (43° 08' 26" N, 98° 19' 06" W) from depth 201.63m. Hole drilled to 204.83m. Alt of well head, 433.73m above msl.

DE-215. Well 91N/49W-19bccca **22,000 ± 320**

Sample coll May 6, 1980, from Union Co (42° 41' 13" N, 96° 41' 13" W) from depth 99.06m. Hole drilled to 99.06m.

DE-216. Well 116N/70W-07ada **31,600 ± 780**

Sample coll May 13, 1980, from Hand Co (44° 52' 36" N, 99° 17' 38" W) from depth 581.66m. Hole drilled to 587.96m. Alt of well head, 582.17m above msl.

DE-217. Well 109N/70W-04babd **33,700 ± 1140**

Sample coll May 14, 1980, from Hand Co (44° 16' 53" N, 99° 15' 33" W) from depth 573.94m. Hole drilled to 592.84m. Alt of well head, 570.59m above msl.

DE-218. Well 113N/66W-25dada2 **29,400 ± 1110**

Sample coll May 12, 1980, from Hand Co (44° 34' 01" N, 98° 42' 26" W) from depth 352.04m.

DE-219. Well 107N/65W-5bbba **23,500 ± 540**

Sample coll May 15, 1980, from Jerauld Co (44° 06' 34" N, 98° 40' 03" W) from depth 429.16m. Hole drilled to 432.82m. Alt of well head, 576.07m above msl.

DE-220. Well 104N/61W-36ddaa **30,268 ± 793**

Sample coll May 19, 1980, from Davison Co (43° 45' 55" N, 98° 05' 12" W) from depth 103.63m. Hole drilled to 103.63m. Alt of well head, 394.72m above msl.

- DE-221. Well 105N/58W-31bacc** **26,400 ± 520**
 Sample coll May 20, 1980, from Miner Co (43° 51' 42" N, 97° 50' 39" W) from depth 192.02m. Hole drilled to 192.02m. Alt of well head, 398.68m above msl.
- DE-222. Well 128N/66W-08abbc** **32,000 ± 1330**
 Sample coll May 22, 1980, from McPherson Co (45° 55' 27" N, 98° 49' 03" W) from depth 547.73m. Hole drilled to 581.25m.
- DE-223. Well 2N/8E-17cdd** **5000 ± 130**
 Sample coll June 19, 1980, from Pennington Co (44° 07' 35" N, 103° 10' 56" W) from depth 528.82m. Hole drilled to 528.82m.
- DE-224. Well 106N/76W-3b** **>25,300**
 Sample coll June 26, 1980, from Buffalo Co (44° 00' 50" N, 99° 56' 06" W) from depth 431.6m. Hole drilled to 437.99m.
- DE-225. Well 9N/26E-12add** **>35,300**
 Sample coll June 30, 1980, from Potter Co (44° 45' 16" N, 100° 53' 37" W) from depth 514.05m. Hole drilled to 548.6m.
- DE-226. Well 02S/31E-35cacc** **>42,200**
 Sample coll July 1, 1980, from Jones Co (43° 49' 31" N, 100° 22' 53" W) from depth 503.38m. Hole drilled to 539.5m.
- DE-227. Well 112N/74W-4dc** **>42,200**
 Sample coll July 2, 1980, from Hughes Co (44° 31' 42" N, 99° 43' 54" W) from depth 429.01m. Hole drilled to 445.01m.

Tennessee

- DE-228. Well SH:Q-40** **3800 ± 70**
 Sample coll Mar 31, 1982, from Shelby Co (35° 11' 09" N, 89° 51' 29" W) from depth 134.42m.
- DE-229. Well SH:0-231 Mallory ML6N** **3500 ± 60**
 Sample coll Mar 31, 1982, from Shelby Co (35° 09' 17" N, 90° 01' 20" W) from depth 157.89m. Hole drilled to 157.89m.
- DE-230. Well SH:T-16 Shelby Forest Campground** **7300 ± 70**
 Sample coll June 3, 1982, from Shelby Co (35° 20' 45" N, 90° 02' 49" W) from depth 178m. Hole drilled to 178m.

Utah

- DE-231. Well DOE No. 6** **>37,600**
 Sample coll Jan 8, 1980, from Grand Co (38° 50' 33" N, 109° 44' 21" W) from depth 148.13m.
- DE-232. Well DOE No. 4** **41,400 ± 2700**
 Sample coll Jan 31, 1980, from Grand Co (38° 50' 24" N, 109° 44' 08" W) from depth 149.68m.

DE-233. Well DOE No. 8 **16,700 ± 200**

Sample coll Feb 20, 1980, from Grand Co (38° 50' 34" N, 109° 44' 18" W) from depth 159.72m.

DE-234. Well DOE No. 9 **25,600 ± 700**

Sample coll Feb 26, 1980, from Grand Co (38° 50' 34" N, 109° 44' 18" W) from depth 136.25m.

DE-235. Well DOE No. 5 **32,000 ± 800**

Sample coll Mar 12, 1980, from Grand Co (38° 50' 31" N, 109° 44' 05" W) from depth 125.27m.

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TABLE I
Summary of $\delta^{13}\text{C}$ and alkalinity for water sources

Sample no.	Colln date	$\delta^{13}\text{C}$ (‰ PDB)	Total alkalinity as bicarbonate (mg/L)	Water source by state
DE-69	1/14/81	-16.7	45	Alabama
-70	1/15/81	-18.6	46	"
-71	1/16/81	-18.9	66	"
-72	1/16/81	-19.1	94	"
-73	4/14/81	-19.1	48	"
-74	4/14/81	-10.3	630	"
-75	1/27/81	-12.6	450	"
-76	7/28/82	-21.0	5	"
-77	7/8/82	-15.6	130	"
-78	7/13/82	-9.5	180	"
-79	7/28/82	-13.2	160	"
-80	7/12/82	-14.6	130	"
-81	7/14/82	-10.7	200	"
-82	7/14/82	-20.0	36	"
-83	7/15/82	-8.5	52	"
-84	7/14/82	-17.8	78	"
-85	7/29/82	-22.5	40	"
-86	7/13/82	-11.8	230	"
-87	7/27/82	-19.3	69	"
-88	7/13/82	-6.5	—	"
-89	7/8/82	-8.8	250	"
-90	7/7/82	-23.2	17	"
-91	7/8/82	-24.2	16	"
-92	10/5/82	-4.6	—	Colorado
-93	10/6/82	-9.5	—	"
-94	10/13/82	-8.7	—	"
-95	10/14/82	-8.2	—	"
-96	2/20/80	-3.8	170	Florida
-97	1/23/80	-3.5	391	"
-98	1/8/80	-2.9	378	"
-99	1/22/80	-4.9	320	"
-100	1/7/80	-3.2	435	"
-101	6/19/80	-9.8	—	"
-102	6/25/80	-6.6	—	"
-103	7/28/80	-5.7	170	"
-104	7/29/80	-4.4	200	"
-105	7/31/80	-7.7	150	"
-106	7/31/80	-7.4	180	"
-107	7/29/80	-7.4	170	"
-108	10/18/80	-3.1	97	"
-109	3/9/81	-2.4	—	"
-110	3/8/81	-2.6	—	"
-111	3/7/81	-1.6	—	"
-112	3/3/81	-3.8	—	"
-113	9/7/81	-9.2	—	"
-114	10/19/81	-1.8	—	"
-115	10/19/81	-7.3	—	"
-116	10/22/82	-5.3	—	"
-117	10/21/81	—	—	"
-118	10/19/81	-1.2	—	"
-119	10/21/81	—	—	"
-120	10/22/81	-3.9	—	"
-121	2/17/82	-11.1	—	"
-122	2/18/82	-9.0	—	"
-123	2/16/82	-6.9	—	"
-124	3/3/82	-9.3	—	"
-125	2/18/82	-8.8	—	"

TABLE 1 (continued)

Sample no.	Colln date	$\delta^{13}\text{C}$ (‰ PDB)	Total alkalinity as bicarbonate (mg/L)	Water source by state
DE-126	2/22/82	-7.3	—	Florida
-127	2/22/82	-9.0	—	"
-128	3/1/82	-11.5	—	"
-129	3/1/82	-10.6	—	"
-130	6/9/81	-12.1	140	Georgia
-131	8/22/81	-19.1	46	"
-132	9/3/81	-22.9	7	"
-133	9/4/81	-19.1	28	"
-134	9/3/81	-25.7	2	"
-135	9/4/81	-25.4	1	"
-136	8/19/81	-16.4	110	"
-137	8/21/81	-21.8	—	"
-138	1/28/82	-20.6	46	"
-139	8/3/82	-22.3	25	"
-140	8/5/82	-20.4	2	"
-141	7/20/82	-4.8	—	"
-142	7/28/82	-21.4	—	"
-143	7/20/82	-12.2	—	"
-144	7/19/82	-2.0	—	"
-145	7/21/82	-4.2	210	"
-146	7/22/82	-22.4	1	"
-147	7/21/82	-10.4	—	"
-148	7/21/82	-17.2	—	"
-149	8/4/82	-13.4	—	"
-150	8/4/82	-16.2	88	"
-151	7/22/82	-23.2	2	"
-152	7/20/82	-6.3	160	"
-153	7/22/82	-20.9	2	"
-154	8/4/82	-9.1	180	"
-155	1/27/82	-11.5	—	Idaho
-156	1/26/82	-14.0	—	"
-157	1/18/82	-7.0	—	"
-158	2/24/82	—	—	Iowa
-159	2/23/82	—	—	"
-160	2/23/82	—	—	"
-161	2/24/82	—	—	"
-162	2/24/82	—	—	"
-163	2/22/82	—	—	"
-164	1/19/81	-16.3	90	Mississippi
-165	1/10/81	-5.2	400	"
-166	1/12/81	-17.4	—	"
-167	1/9/81	-18.7	71	"
-168	1/7/81	-13.2	190	"
-169	1/6/81	-16.3	150	"
-170	1/12/81	-19.6	80	"
-171	1/8/81	-12.4	210	"
-172	1/10/81	-9.6	180	"
-173	1/8/81	-19.3	6	"
-174	1/11/81	-15.9	200	"
-175	1/7/81	-12.1	480	"
-176	1/9/81	-18.3	71	"
-177	1/11/81	-8.2	470	"
-178	12/23/80	-10.6	—	Nevada
-179	1/19/81	-14.6	—	"
-180	7/22/81	-14.4	—	"
-181	1/8/82	—	—	"
-182	1/15/82	—	—	"
-183	10/16/82	-7.5	—	"
-184	7/29/82	-3.5	—	New Mexico

TABLE 1 (continued)

Sample no.	Colln date	$\delta^{18}\text{C}$ (‰ PDB)	Total alkalinity as bicarbonate (mg/L)	Water source by state
DE-185	8/12/81	-21.5	—	North Carolina
-186	8/12/81	-18.3	48	"
-187	8/12/81	-13.4	69	"
-188	8/12/81	-22.7	—	"
-189	10/79	—	—	Oregon
-190	10/79	—	—	"
-191	9/10/81	-6.8	1430	South Carolina
-192	8/7/81	-6.6	1050	"
-193	9/10/81	-6.8	1100	"
-194	8/13/81	-19.3	92	"
-195	8/13/81	-16.8	110	"
-196	8/5/81	-11.1	190	"
-197	8/5/81	-5.2	600	"
-198	8/5/81	-9.0	460	"
-199	8/7/81	-6.6	860	"
-200	8/6/81	-8.9	—	"
-201	9/11/81	-5.6	1080	"
-202	9/11/81	-6.0	1250	"
-203	8/25/81	-6.8	1240	"
-204	8/24/81	-4.6	—	"
-205	8/24/81	-7.7	260	"
-206	8/6/81	-9.6	590	"
-207	4/1/82	-13.6	—	"
-208	4/9/82	-12.9	—	"
-209	4/19/82	-12.2	—	"
-210	4/24/82	-10.3	—	"
-211	4/30/82	—	—	"
-212	5/2/82	—	—	"
-213	5/7/80	-6.1	—	South Dakota
-214	5/8/80	-9.1	—	"
-215	5/6/80	-7.5	—	"
-216	5/13/80	-3.9	—	"
-217	5/14/80	-3.4	—	"
-218	5/12/80	-5.0	—	"
-219	5/15/80	-5.1	—	"
-220	5/19/80	-4.6	—	"
-221	5/20/80	-5.5	—	"
-222	5/22/80	-4.8	—	"
-223	6/19/80	-10.0	254	"
-224	6/26/80	-9.0	170	"
-225	6/30/80	-5.4	234	"
-226	7/1/80	-19.6	1320	"
-227	7/2/80	-20.2	560	"
-228	3/31/82	-21.5	—	Tennessee
-229	3/31/82	-20.5	84	"
-230	6/3/82	-14.8	181	"
-231	1/8/80	-19.2	—	Utah
-232	1/31/80	—	228	"
-233	2/20/80	-8.6	351	"
-234	2/26/80	-8.6	135	"
-235	3/12/80	-9.4	220	"