(200)

R290

NO. 76-756

USGS- OFR
76-756

United States Department of the Interior
Geological Survey

A NEW HEAT-FLOW CONTOUR MAP OF THE CONTERMINOUS UNITED STATES

by

J. H. Sass, W. H. Diment, A. H. Lachenbruch, B. V. Marshall,

R. J. Munroe, T. H. Moses, Jr., and T. C. Urban

Open-File Report 76-756

1976

This report is preliminary and has not been edited or reviewed
for conformity with Geological Survey standards and nomenclature.

MASTER 271510

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency Thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

DISCLAIMER

Portions of this document may be illegible in electronic image products. Images are produced from the best available original document.

This report presents a series of maps depicting our interpretation of the heat flow within the conterminous United States based on all the data available to the U.S. Geological Survey (USGS) as of August 1976. Sources include all published data and about a hundred new USGS values currently being readied for publication.

Figure 1 shows the distribution of points. The dots are USGS values, and the circles, those published by other institutions. For completeness, points in northern Mexico, southern Canada, and the Pacific coastal waters are included. A few points were left off the map. These included sites where the temperature profile showed curvature not related to changes in thermal conductivity and sites within a 3-km radius of hot springs or other currently active hydrothermal manifestations. Because of problems associated with the scale of the map, we have occasionally generalized one value from a number within a small area. In other instances where a sharp transition occurs over a short distance, one point is offset to show clearly the control for the transition.

In Figure 2, observed heat-flow data (q) are shown as coded symbols with state boundaries and latitudes and longitudes as points of reference.

Figure 3 shows our interpretation of the heat-flow field as a contour map. Our aim was to produce a map that was as objective as possible, and in general, we were guided by the heat flow alone without reference to other geological or geophysical quantities; however in

drawing the contours in areas of spotty control, we were guided by thermal criteria such as the presence or absence of hot springs.

Figure 3a shows the contours for the entire continental United States, and Figure 3b, for the western part of the country where most of the thermal structure is found.

Figure 4 shows the reduced heat flow (q_r) plotted on a base adapted from the physiographic map of Fenneman (1946). The reduced heat flow (see e.g., Roy and others, 1972) is defined by $q_r = q - DA_0$ where q = surface heat flux, A_0 , the observed radioactivity, and D , an empirically determined constant for a given heat-flow province. For the United States west of the Great Plains, D is 10 km and for eastern United States, D was taken as 7.5 km (cf. Roy and others, 1968a; Birch and others, 1968). Figures 2 and 4 represent an updating and revision of Figures 9 and 10 of Diment and others (1975). The sources of individual points (with the exception of the unpublished USGS data which are now being readied for publication) may be obtained from Table 1 which lists published data by state, physiographic province, and geographic location.

TABLE 1. Locations, heat flow (q, HFU) and heat production (A, HGU) for published values plotted on Figures 1 through 4

		q	A
U.S.A. -- ALABAMA			
AL AP TD1 TALLADEGA	RO 68 33-16 86-01	0.95	
U.S.A. -- ARIZONA			
AZ BR SRM SANTA RITA MTS. A719	RO 68 31-50 110-45	2.06	
AZ BR HV1 MELVETIA A729	RO 68 31-52 110-48	1.78	3.8
AZ BR CNT CONTINENTAL A972	RO 68 31-53 111-00	2.47	
AZ BR TB2 TWIN BUTTES A940	US 71 31-53 111-02	1.56	
AZ BR TB3 TWIN BUTTES A616	US 71 31-53 111-02	1.88	5.30
AZ BR SR1 SIERRITA MTS.	RO 68 31-53 111-08	2.0	7.7
AZ BR TB4 TWIN BUTTES A911	US 71 31-54 111-02	1.98	
AZ BR TB5 TWIN BUTTES A644	US 71 31-54 111-03	2.10	5.3
AZ BR MP1 HELMET PEAK A545	US 71 31-58 111-04	2.14	
AZ BR MN1 MISSION 106	RO 68 31-59 111-04	2.98	
AZ BR DR1 DRAGOON UCSD 4	WA 69 32-02 110-04	1.58	3.1
AZ BR DR1 DRAGOON UCSD 4	WA 69 32-02 110-04	1.58	3.1
AZ BR AJ1 AJCO	RO 68 32-06 112-45	2.4	6.0
AZ BR KCL TUCSON KCL-7	US 71 32-11 111-07	2.56	
AZ BR SB1 SILVER BELL D151	RO 68 32-25 111-32	2.36	
AZ BR RR1 RED ROCK D-9-7	US 71 32-36 111-36	0.85	
AZ BR SM2 SAN MANUEL	LO 48 32-37 110-39	1.2	
AZ BR OR1 ORACLE UCSD-3	WA 69 32-37 110-48	1.85	5.7
AZ BR SM1 SAN MANUEL	US 71 32-40 110-42	1.54	6.00
AZ BR YU2 YUMA LCRP-13	US 71 32-41 114-37	2.10	
AZ BR YU3 YUMA LCRP-26	US 71 32-44 114-37	1.92	
AZ BR EL1 ELOY D-7-8	US 71 32-47 111-29	1.30	
AZ BR CH1 CHRISTMAS MINE SM-1	US 71 33-02 110-41	1.40	1.50
AZ BR RW1 RAINBOW VALLEY UCSD-2	WA 69 33-11 112-39	2.41	
AZ BR BC1 BUCKEYE HILLS UCSD-1	WA 69 33-17 112-38	3.42	
AZ BR HG1 HIGLEY D-1-6	US 71 33-19 111-43	1.70	
AZ BR TM1 TEMPE A-1-3	US 71 33-25 112-01	1.10	
AZ BR PH1 PHOENIX ST-1	US 71 33-32 112-20	3.00	
AZ BR QZ1 QUARTZSITE	RO 68 33-38 114-20	2.4	10.7
AZ BR BG2 BAGDAD 13-64	RO 68 34-35 113-11	1.64	
AZ BR BG1 BAGDAD 8-62	RO 68 34-36 113-12	1.6	6.6
AZ BR ML1 MUALAPAI MTS.	RO 68 35-08 113-49	2.14	2.0
AZ BR WH1 WHITE HILLS	RO 68 35-43 114-22	2.82	
U.S.A. -- CALIFORNIA			
CA SB ET1 EL CENTRO PO	ME 68 32-36 116-36	0.80	
CA SB ET2 EL CENTRO DU	ME 68 32-37 116-45	1.40	
CA SB ET3 EL CENTRO JA	ME 68 32-40 116-07	1.50	
CA SB ET4 EL CENTRO LO	ME 68 32-41 116-22	1.20	
CA SB ET5 EL CENTRO CW	ME 68 32-43 115-57	1.90	
CA BR IV1 IMPERIAL VALLEY UCR 127	CO 71 32-46 115-14	2.6	
CA BR IV2 IMPERIAL VALLEY UCR 116	CO 71 32-47 115-15	4.9	
CA BR IV3 IMPERIAL VALLEY UCR 123	CO 71 32-47 115-15	3.8	
CA BR IV4 IMPERIAL VALLEY UCR 122	CO 71 32-48 115-15	3.3	
CA BR IV5 IMPERIAL VALLEY UCR 124	CO 71 32-48 115-15	2.9	
CA BR IV6 IMPERIAL VALLEY UCR 125	CO 71 32-49 115-14	2.1	
CA BR IV7 IMPERIAL VALLEY UCR 126	CO 71 32-50 115-15	2.9	
CA FS ET6 EL CENTRO SV	ME 68 32-52 116-34	1.10	
CA FS AZ1 ANZA A-1	ME 68 33-30 116-36	1.87	3.60
CA FS AZ2 ANZA A-3	ME 68 33-32 116-36	1.76	2.80
CA SB AZ3 ANZA A-2	ME 68 33-32 116-48	1.46	2.20
CA BR CK3 EAGLE MT. CK-3	US 71 33-52 115-26	1.29	4.00
CA FS LB1 L. A. BASIN LB-1	US 71 33-53 118-02	1.74	
CA FS AC1 SANTA ANA AC-1	US 71 33-58 117-38	1.60	3.40
CA FS SB2 SAN BERNADINO SB-2	ME 68 34-15 117-19	1.63	
CA FS SB3 SAN BERNADINO SB-10	ME 68 34-15 117-20	1.58	3.70
CA FS SB4 SAN BERNADINO SB-5	ME 68 34-16 117-20	1.08	
CA BR LC1 LUCERNE VALLEY LV-1	ME 68 34-37 116-43	1.65	3.1
CA BR BRV BARSTOW M10-11	RO 68 34-39 116-41	1.6	

TABLE 1. Locations, heat flow (q, HFU) and heat production (A, HGU)
for published values plotted on Figures 1 through 4 (continued)

		q	A
CA FS LM3 LAKE HUGHES LM-3	ME 68 34-39 118-29	1.68	2.60
CA FS LM2 LAKE HUGHES LM-2	ME 68 34-41 118-26	1.56	3.40
CA FS LM1 LAKE HUGHES LM-1	ME 68 34-44 118-24	1.72	8.70
CA FE TE1 TEMACHAPI MT. DH15A	ME 68 34-51 118-44	1.48	
CA FE TE2 TEMACHAPI MT. DH-70	ME 68 34-52 118-45	2.21	
CA FE TE3 TEMACHAPI MT. DH-14	ME 68 34-52 118-45	2.03	7.70
CA FE TE4 TEMACHAPI MT. DH-43	ME 68 34-53 118-46	2.02	2.10
CA FE TE5 TEJON RANCH DH-43	US 71 34-53 118-46	1.83	
CA FE TE6 TEMACHAPI MT. DH-65,67	ME 68 34-56 118-49	1.30	1.10
CA FE TE7 TEJON RANCH DH-65,67,6	US 71 34-56 118-49	1.36	
CA FE EM1 ELK HILLS 382-36	US 71 35-16 119-23	1.26	
CA FE EM2 ELK HILLS 343-36	US 71 35-16 119-24	1.12	
CA FE EM3 ELK HILLS 344-35S	US 71 35-17 119-22	1.20	
CA FE EM4 ELK HILLS 372-35R	US 71 35-17 119-28	1.30	
CA FE EM5 ELK HILLS 326-28R	US 71 35-17 119-31	1.26	
CA FE EM6 ELK HILLS 385-24Z	US 71 35-18 119-33	1.20	
CA FE EM7 ELK HILLS 366-24Z	US 71 35-18 119-34	1.00	
CA FM TS1 LA PANZA TS-1	US 71 35-26 120-30	2.21	5.40
CA FE WB1 WEST OF BAKERSFIELD	BE 47 35-28 119-45	1.29	
CA BR CO3 COSO AREA	CO 75 36-03 117-46	10.3	
CA FM MT3 MOLLISTER MO-3	ME 68 36-32 121-40	1.20	
CA FM MT5 MOLLISTER MO-5	ME 68 36-35 121-27	1.90	
CA FM MT1 MOLLISTER MO-1	ME 68 36-43 121-24	1.71	3.40
CA FM MT4 MOLLISTER MO-4	ME 68 36-48 121-20	2.30	
CA FM MT6 MOLLISTER MO-6	ME 68 36-50 121-17	2.30	
CA FM MT2 MOLLISTER MO-2 & 7	ME 68 36-53 121-35	1.70	
CA FM MT7 MOLLISTER MO-8	ME 68 36-55 120-58	1.40	
CA SN JB1 JOSE BASIN	US 71 37-06 119-23	0.77	3.7
CA SN SJR SAN JOAQUIN EX. RANGE	US 71 37-06 119-44	0.61	2.1
CA SN MC1 HELMS CREEK	US 71 37-08 118-59	1.30	9.0
CA SN ST1 SHERMAN THOMAS	US 71 37-10 120-04	0.45	0.70
CA FE PRM PERMANENTE	US 71 37-19 122-07	2.20	
CA BR DSP DEEP SPRINGS	US 71 37-24 118-00	1.80	3.4
CA FE SE1 SUNNYVALE C-3	US 71 37-27 122-02	2.02	
CA FE MP1 MENLO PARK MP-1	US 68 37-27 122-10	2.16	
CA FE DM1 DUMBARTON S.F. BAY	US 71 37-29 122-08	2.25	
CA BR BRK BLACK ROCK	US 71 37-41 118-32	2.00	
CA FE TR1 TRACY DH-2	US 71 37-48 121-35	0.96	
CA FE MST BERKELEY MSTW	US 71 37-52 122-15	2.00	
CA SN OM1 OMO RANCH	RO 68 38-33 120-34	0.72	
CA SN WR1 WRIGHT'S LAKE	RO 68 38-50 120-15	0.83	4.70
CA SN LO1 LOOMIS	RO 68 38-50 121-10	0.62	1.80
CA SN BL1 BLODGETT	RO 68 38-52 120-39	1.06	6.40
CA SN ADM AUBURN DAM	US 71 38-52 121-03	0.70	
CA SN LK1 LOON LAKE	RO 68 38-59 120-19	1.25	6.8
CA SN GR1 GRASS VALLEY	CL 57 39-12 121-03	0.69	3.20
CA SN SJ3 SAN JUAN RIDGE	US 71 39-24 120-52	0.69	1.70
CA FE FBG FORT BRAGG	US 71 39-26 123-44	2.00	
CA FE WL1 WILLITTS EC-1	US 71 39-34 123-07	1.85	
CA CR EG7 COTTONWOOD GLADE EG-7	US 71 39-42 122-48	1.20	2.80
CA CR EG8 COLD CREEK EG-8	US 71 39-42 122-53	1.50	2.40
CA BS MLV MOONLIGHT VALLEY	US 71 40-13 120-48	1.93	10.50
U.S.A. -- COLORADO			
CO RM T11 TRINIDAD #1	RE 75 37-13 104-43	4.69	
CO RM HS1 HESPERUS DDH-1	RO 68 37-23 108-04	2.08	
CO RM SM SUMMITVILLE DDH-SM31	DB 74 37-26 106-36	2.46	
CO CP DV1 DOVE CREEK DDH-8,9	DB 74 37-47 108-46	2.17	
CO CP DV2 DOVE CREEK DDH-K1	DB 74 37-47 108-51	2.99	
CO RM SN1 SILVERTON	RE 75 37-48 107-37	2.22	
CO RM OU1 OURAY DDH-1	DB 74 37-56 107-40	3.7	
CO RM MAK MARY ALICE CREEK	RE 75 38-03 107-30	3.44	

TABLE 1. Locations, heat flow (q, HFU) and heat production (A, HCU)
for published values plotted on Figures 1 through 4 (continued)

		<u>q</u>	<u>A</u>
CO RM NE1 NELLIE CREEK	RE 75 38-04 107-23	3.07	
CO RM WJ1 WESTCLIFFE DDH-3,4,9,1	DB 74 38-08 105-27	1.62	
CO CP AT1 ATKLUSON MESA	RE 75 38-12 108-49	1.38	
CO RM WT1 WETMORE #1	RE 75 38-14 105-05	1.23	
CO RM GK1 GEM PARK DDH-3,4	DB 74 38-16 105-32	1.87	
CO CP WSM WILD STEER MESA	RE 75 38-26 108-46	1.33	
CO RM CCY CANON CITY DDH-1	RO 68 38-30 105-20	1.84	
CO RM CUP CUMBERLAND PASS DDH-CP2	DB 74 38-41 106-30	1.86	
CO RM BVA BUENA VISTA	RE 75 38-47 106-10	2.13	
CO GP REC RED CREEK 7	SI 50 38-49 104-49	1.4	
CO RM CBE CRESTED BUTTE	RE 75 38-55 107-07	2.40	
CO CP GL1 GLADE PARK DDH-10,11,16	DB 74 38-57 108-37	1.45	
CO RM PD1 PARADISE PASS DDHPP-2	RO 68 39-00 107-04	1.55	
CO RM KO1 KOKOMO DDH-1201	DB 74 39-26 106-08	2.8	
CO RM SPK SOUTH PARK	RE 75 39-28 105-47	2.33	
CO RM RB1 ROBERTS TUNNEL	RO 68 39-30 105-50	2.46	
CO RM RD1 REDCLIFFE	RE 75 39-31 106-22	2.64	
CO RM GMN GILMAN DDH E324	RO 68 39-33 106-24	2.25	
CO RM UR1 URAD DDH-CX111,124	DB 74 39-46 105-50	2.50	
CO CP TG2 RIO BLANCO TG2,3	US 71 39-46 108-09	1.50	
CO RM GD1 GOLDEN DDH-1	RO 68 39-47 105-16	1.52	
CO RM CRK CENTRAL CITY	RE 75 39-48 105-35	2.20	
CO RM RMA ROCKY MT. ARSENAL	US 71 39-51 104-51	2.00	3.90
CO RM APX APEX DDH-178H	DB 74 39-52 105-33	1.67	
CO CP RF1 RIFLE 28-1 & 14-1	RO 68 39-57 108-23	1.24	
CO CP YC2 YELLOW CREEK CH-2	US 71 39-58 108-28	1.40	
CO CP YC1 YELLOW CREEK CH-1	US 71 40-03 108-20	1.50	
CO CP BRU BARCUS CREEK 8C-1	US 71 40-03 108-31	2.00	
CO CP YC3 YELLOW CREEK CH-3	US 71 40-03 108-21	1.50	
CO RM AM1 ADAMS TUNNEL	SI 50 40-15 105-40	1.7	
U.S.A. -- DIST OF COLUM			
DC AP DC1 DRB-1	DM 64 39-00 77-00	1.12	
USA -- FLORIDA			
FL CN 001 NEAR ORLANDO	KI 72 28-28 81-13	0.92	
U.S.A. -- GEORGIA			
GA CN LR1 LA GRANGE	DR 63 33- 85-	1.0	
GA CN GH1 GRIFFIN	DR 63 33-13 84-15	0.97	
U.S.A. -- IDAHO			
ID CU ID1 PT. PICKED OFF MAP	RO 72 44-06 115-40	3.0	
ID RM WA1 WALLACE	US 71 47-29 115-58	2.30	
ID RM SR1 SILVER SUMMIT	RO 68 47-30 116-02	2.25	
ID RM CM1 CRESCENT MINE	RO 68 47-30 116-05	2.22	
U.S.A. -- ILLINOIS			
IL IP CY1 CRESCENT CITY, TADEN 1	CO 70 40-45 87-47	1.44	
IL IP CY2 CRESCENT CITY, F. WESSEL	CO 70 40-46 87-48	1.39	
IL IP CY3 CRESCENT CITY, CONDUIT 1	CO 70 40-49 87-54	1.42	
IL IP AN1 ANCONA, MUSSER 1	CO 70 41-01 88-54	1.41	
U.S.A. -- INDIANA			
IN IP RO1 ROYAL CENTER S-36,38	CO 70 40-53 86-28	1.40	
IN IP RO2 ROYAL CENTER S-55	CO 70 40-55 86-27	1.39	
IN IP RO3 ROYAL CENTER S-46	CO 70 40-55 86-28	1.41	
IN IP M11 MONROEVILLE, L. WELL	CO 70 40-59 84-52	0.97	
IN IP LF1 LINKVILLE FIELD	CO 70 41-23 86-14	1.28	
U.S.A. -- IOWA			
IA IP C10 CAIRO, P. MUTCHINSON 2	CO 70 41-12 91-20	1.47	
IA IP KE1 KEOTA, L. VOGEL 1	CO 70 41-22 91-55	1.49	
IA IP KE2 KEOTA, J. ANDERSON 1	CO 70 41-23 91-55	1.49	
IA IP RL1 REDFIELD, BOOK 1	CO 70 41-34 94-06	1.17	
IA IP RL2 REDFIELD, BRODERICK 1	CO 70 41-40 94-10	1.17	
IA IP RL3 REDFIELD, PRICE 1	CO 70 41-42 94-10	1.16	
IA IP V11 VINCENT, ANDERSON 1,3	CO 70 42-38 94-01	0.91	

TABLE 1. Locations, heat flow (q, HFU) and heat production (A, HGU)
for published values plotted on Figures 1 through 4 (continued)

						q	A
IA IP V12 VINCENT, HOFFMAN 1-OLSON	CO 70 42-38	94-03	0.95				
IA IP SPE SPENCER	RO 68 43-10	95-11	0.44				
U.S.A. -- KANSAS							
KS IP SYR SYRACUSE	BI 50 37-57	101-45	1.55				
KS IP LY1 LYONS HOLE 1-2	US 71 38-23	98-10	1.50				
U.S.A. -- LAKE SUPERIOR							
MI CS LS1 STATION 8	MS 65 47-11	91-15	0.30				
MI CS LS2 STATION 5	MS 65 47-35	88-13	0.79				
MI CS LS3 STATION 4	MS 65 47-49	88-54	0.75				
MI CS LS4 STATION 7	MS 65 48-02	86-14	0.87				
U.S.A. -- MAINE							
ME AP CAO CASCO	RO 68 44-03	70-37	1.80	12.9			
ME AP BLU BLUE HILL	RO 68 44-24	68-37	1.44				
U.S.A. -- MASSACHUSETTS							
MA AP BW1 BREWSTER	RO 68 41-45	70-05	1.16				
MA AP CBR CAMBRIDGE	RO 68 42-23	71-07	1.20				
MA AP MF1 MILLERS FALLS	RO 68 42-37	72-27	1.67				
MA AP CHE CHELMSFORD	RO 68 42-38	71-25	1.63	11.6			
U.S.A. -- MICHIGAN							
MI IP LEN LENEY 1956	LE 56 42-06	83-23	0.8				
MI IP NV2 NORTHVILLE 106	JB 73 42-26	83-34	1.20				
MI IP NV1 NORTHVILLE, N-203	CO 70 42-26	83-34	1.39				
MI IP BP1 BURNIPS, S-503-E	CO 70 42-43	85-49	1.07				
MI IP OL1 OVERISEL 150	JB 73 42-44	86-00	0.90				
MI IP OL1 OVERISEL 157	JB 73 42-44	86-00	0.90				
MI IP OL1 OVERISEL 162	JB 73 42-44	86-00	0.90				
MI IP MUT MUTTONVILLE 2	JB 73 42-48	82-44	0.80				
MI IP BGY BILLINGSLEY 1	JB 73 43-32	85-36	1.00				
MI IP AU1 AUSTIN-MAREK 1	JB 73 43-32	85-16	1.20				
MI IP EE1 E. BREGGS 2	JB 73 43-50	85-35	1.20				
MI IP MO1 MARION 972	CO 70 44-03	85-05	1.10				
MI IP MO2 MARION 965	JB 73 44-04	85-05	1.30				
MI IP MO3 MARION 829	JB 73 44-09	85-00	1.20				
MI IP MO4 MARION 192	JB 73 44-12	85-11	1.10				
MI CS WP1 WHITE PINE, N-55.65	RO 68 46-45	89-34	1.05				
MI CS CJ1 CALUMET	BI 54 47-17	88-28	0.93				
MI CS DW1 DELAWARE	RO 68 47-24	88-01	0.99				
U.S.A. -- MINNESOTA							
MN CS W11 ROY CITES WILLIAMS 71	RO 72 44-54	93-12	1.15				
MN CS W12 ROY CITES WILLIAMS 71	RO 72 46-06	93-42	1.03				
MN CS W13 ROY CITES WILLIAMS 71	RO 72 47-09	95-12	0.89				
MN CS EY1 ELY 3,4	RO 68 47-49	91-43	0.82	1.4			
U.S.A. -- MISSOURI							
MO IP IT1 IRONTON K-13	RO 68 37-30	90-40	1.24				
MO IP BD1 BOSS USA-7	RO 68 37-39	91-10	1.2				
MO IP BF1 BOURBON B-20	RO 68 38-09	91-15	1.24				
MO IP LVY LEVASY	RO 68 39-05	94-10	1.17	5.5			
U.S.A. -- MONTANA							
MT RM CN1 COOKE CITY 1,2	BL 67 45-03	109-57	1.31				
MT RM DN1 DILLON	BL 73 45-19	112-53	1.5				
MT RM NB1 NYE BASIN HOLE NB-2	US 71 45-22	109-49	1.39	5.50			
MT RM VG1 VERDIGRIS CREEK M-22	US 71 45-23	109-54	1.63	5.50			
MT RM VG2 VERDIGRIS CREEK M-19A	US 71 45-23	109-55	1.41	5.50			
MT RM SD1 SILVER STAR	BL 73 45-43	112-20	1.94	5.2			
MT RM WL1 WHITEMALL	BL 73 45-55	112-01	1.8				
MT RM SF1 SILVER BOW	BL 73 45-57	112-42	2.0	4.8			
MT RM BJ1 BUTTE DOH B-3	BL 67 46-03	112-33	2.1	8.6			
MT RM SH1 SELK PARK	BL 73 46-15	112-27	1.98	7.0			
MT RM DG1 DEER LODGE	BL 73 46-23	112-35	1.93				
MT RM PG1 PHILIPSBURG	BL 73 46-28	113-25	1.91				
MT RM UN1 UNIONVILLE	BL 73 46-29	112-07	1.92				

TABLE 1. Locations, heat flow (q, HFU) and heat production (A, HGU)
for published values plotted on Figures 1 through 4 (continued)

			q	A
MT RM OT1 OTTOWA GULCH DDH-1,2	BB 73 46-44 112-19		3.2	
MT RM W01 WOODCHOPPER G. DDH-4,6	BB 73 46-44 112-19		4.7	
MT RM C01 CONTINENTAL DIVIDE DDH-	BB 73 46-43 112-19		5.0	
MT RM B01 BALD BUTTE DDH-9,10-13	BB 73 46-43 112-21		6.5	
MT RM EM1 EMPIRE CREEK DDH-15	BB 73 46-45 112-22		9.5	
MT RM NH1 NEIMART 36,37	BL 67 46-58 110-43		1.66	
MT RM L11 LINCOLN 1,29	BL 67 47-02 112-23		2.16	
MT RM LE1 LIBBY	BL 67 48-14 115-55		1.75	
MT RM CK1 CONRAD	BL 69 48-20 111-55		0.9	
MT RM KN1 KEVIN-SUNBURST	BL 69 48-45 111-50		1.0	
U.S.A. -- NEVADA				
NV BR CE1 CRESCENT PEAK 1	RO 68 35-28 115-08		2.33	7.90
NV BR IN1 INDIAN SPR. VALLEY TW-4	US 71 36-36 115-47		2.17	
NV BR RK1 ROCK VALLEY TW-5	US 71 36-38 116-18		2.00	
NV BR FF1 FRENCHMAN FLAT TW-3	US 71 36-46 115-52		2.20	
NV BR MH1 MAMPEL HILL TW-F	US 71 36-46 116-07		1.81	
NV BR YM1 YUCCA MT. TW-6	US 71 36-48 116-24		1.60	
NV BR YF1 YUCCA FLAT TW-E	US 71 37-03 116-00		0.70	
NV BR DL1 DOLOMITE HILL	US 71 37-11 116-12		1.90	
NV BR PM1 PAHUTE MESA PH-1	US 71 37-17 116-24		1.00	
NV BR PM2 PAHUTE MESA PH-2	US 71 37-21 116-34		1.50	
NV BR TP4 TENPIUTE	US 71 37-38 115-33		1.10	5.40
NV BR SK1 SILVER PEAK	US 71 37-43 117-47		1.90	
NV BR GF0 GOLDFIELD	US 71 37-44 117-12		2.30	10.30
NV BR MH1 MANHATTAN GAP	US 71 37-58 114-36		1.74	
NV BR BS1 BRISTOL RANGE ESP-1	US 71 38-04 114-36		1.69	
NV BR P01 PIOCME B-1 & B-3	RO 68 38-05 114-37		1.92	
NV BR BS2 BRISTOL RANGE ESP-3	US 71 38-06 114-36		1.74	
NV BR C01 CROW SPRINGS 2,4,7,8,10	RO 68 38-14 117-33		2.30	
NV BR SV1 STONE CABIN VALLEY UCE-2	US 71 38-18 116-35		1.30	
NV BR HA1 HALL MINE 87 & 90	RO 68 38-19 117-18		2.52	
NV BR RY1 ROYSTON	RO 68 38-19 117-31		1.68	
NV BR PTM PILOT MTS. DH-1,2 & 3	US 71 38-19 117-52		1.95	2.7
NV BR LN1 LUNING M-4	US 71 38-29 118-12		7.20	
NV BR UE1 RALSTON VALLEY UCE-1	US 71 38-34 116-56		1.79	4.40
NV BR MY1 HOT CREEK VALLEY UCE-18	US 71 38-35 116-12		1.28	
NV BR PS1 PATTERSON PASS PP-2 & 3	US 71 38-36 114-44		1.22	
NV BR FV1 FISH LAKE VALLEY UCE-10	US 71 38-41 116-28		1.20	
NV BR LSV LITTLE SMOKEY VA. UCE-14	US 71 38-43 116-02		1.50	
NV BR FV2 FISH LAKE VALLEY UCE-9	US 71 38-49 116-27		1.20	
NV BS GRV GARDNERVILLE	RO 68 38-51 119-45		1.14	
NV BR PNC PINE NUT CANYON PH-19	US 71 38-52 119-35		2.45	5.00
NV BR FV3 FISH LAKE VALLEY UCE-12A	US 71 38-55 116-20		1.40	
NV BR YR1 YERINGTON	RO 63 38-55 119-04		2.36	
NV BR YR2 YERINGTON	US 71 38-56 119-04		1.84	
NV BR SC1 SCHURZ	RO 68 38-57 118-38		1.88	5.30
NV BR MV1 MONITOR VALLEY UCE-3	US 71 38-58 116-38		2.00	
NV BR SG1 SINGATSE RANGE	RO 68 38-58 119-16		1.56	
NV BR WM1 WARD MT.	RO 68 39-04 114-55		2.05	
NV BR TC1 TAYLOR CANYON	RO 68 39-05 114-41		5.32	
NV BR SS1 SAND SPRINGS	US 71 39-12 118-22		1.57	3.20
NV BR ME1 MONTE CRISTO 9 & 14	RO 68 39-14 115-34		2.14	
NV BR CV1 SILVER CITY CV-1	US 71 39-15 119-40		1.93	5.70
NV BR RT1 RUTH	RO 68 39-16 114-59		1.82	7.70
NV BR SP1 SPRING VALLEY	RO 68 39-17 114-21		1.83	
NV BR VC1 VIRGINIA CITY C-63	US 71 39-18 119-39		7.00	3.40
NV BR LW1 LOUSETOWN	US 71 39-23 119-38		2.80	
NV BR WM1 WASHINGTON HILL VC-4	US 71 39-28 119-38		2.10	
NV BR EK1 EUREKA	US 71 39-30 116-00		0.85	4.50
NV BR LL1 LOVELOCK	RO 68 40-02 118-19		2.50	
NV BR GAP GOLD ACRE PIT	US 71 40-16 116-45		2.50	4.60

TABLE 1. Locations, heat flow (q, HFU) and heat production (A, HGU)
for published values plotted on Figures 1 through 4 (continued)

			q	A
NV BR TN2 TENABO	US 71 40-18 116-40	3.53	4.1	
NV BR L01 LANDER	US 71 40-20 116-43	3.00		
NV BR IRC IRON CANYON	US 71 40-33 117-06	3.50	4.3	
NV BR BM1 PANTHER CANYON BM3 & 37	US 71 40-33 117-34	3.80		
NV BR BT1 BATTLE MT.	RO 68 40-33 117-14	2.06		
NV BR BUK BUCKINGHAM 8-6 & 11	US 71 40-37 117-04	2.70	7.60	
NV BR EC1 ELDER CREEK EC-4	US 71 40-41 117-04	3.20	3.90	
NV BR GV1 ADELAIDE GV-1	US 71 40-50 117-32	3.40	6.3	
NV BR WE1 WHITE ELEPHANT BUTTE	US 71 41-53 115-05	3.30		
U.S.A. -- NEW HAMPSHIRE				
NH AP FW1 FITZWILLIAM	RO 68 42-47 72-08	1.63	9.6	
NH AP DU1 DURHAM	RO 68 43-07 70-55	1.08	3.8	
NH AP CCD CONCORD	RO 68 43-12 71-32	1.73		
NH AP BX1 BRADFORD	RO 68 43-16 71-59	1.59		
NH AP WV1 WATERVILLE	RO 68 43-56 71-32	2.15	21.2	
NH AP KA1 KANCOMAGUS	RO 68 44-02 71-29	2.27	20.7	
NH AP NC1 NORTH CONWAY	RO 68 44-04 71-10	1.89	17.6	
NH AP NR1 NORTH HAVERHILL	RO 68 44-06 72-00	1.34	7.8	
U.S.A. -- NEW MEXICO				
NM BR H11 MACHITA	DS 75 31-51 108-18	2.40	4.5	
NM BR LT1 LITTLE MACHET MT.	RE 75 31-54 108-26	2.30		
NM BR CD1 CORNUOAS	DS 75 32-01 105-29	2.00		
NM BR GG1 GRANITE GAP	RE 75 32-07 108-56	1.22		
NM BR SI1 STEINS	RE 75 32-10 109-02	2.92		
NM IP SU1 SUPERIOR NO. 1	HC 56 32-14 104-07	1.20		
NM BR WS1 WHITE SANDS #2	RE 75 32-17 106-24	2.28		
NM IP MW1 MARLAND-OHIO #1	HC 56 32-18 103-45	1.00		
NM BR LG1 LORDSBURG	DS 75 32-20 108-47	1.70	2.30	
NM BR MR1 MIRAGE	RE 75 32-22 107-40	9.68		
NM IP BB1 BLUEBIRD #1	HC 56 32-24 104-16	0.90		
NM BR OG1 OROGRANDE	DS 75 32-24 106-07	3.10	5.10	
NM BR OG2 OROGRANDE UCSD-6	WA 69 32-26 106-06	2.24	6.70	
NM BR WS2 WHITE SANDS #3	RE 75 32-26 106-27	2.08		
NM BR ON1 ORGAN DOH-1	DB 74 32-27 106-36	2.76		
NM BR ON2 ORGAN	DS 75 32-27 106-36	2.80	3.40	
NM BR OG3 OROGRANDE NORTH	RE 75 32-30 106-00	1.75		
NM IP GO1 GETTY #7 DOOLEY	HC 56 32-31 104-09	1.00		
NM BR WS3 WHITE SANDS #4	RE 75 32-32 106-25	2.18		
NM BR CPK COOKS PEAK	DS 75 32-32 107-41	3.60	2.40	
NM BR WG1 WHITE SIGNAL	RO 68 32-32 108-21	2.06		
NM IP SAM SANDBURG AND MILLS #1	HC 56 32-38 104-14	1.20		
NM BR TY1 TYRONE UCSD-5	WA 69 32-40 108-29	2.16	7.10	
NM BR LAK LAKE VALLEY	DS 75 32-43 107-35	2.60	4.90	
NM IP CRO CAP ROCK OIL AND GAS #1	HC 56 32-47 103-48	1.2		
NM BR SRA SANTA RITA	DS 75 32-48 108-04	1.80	4.20	
NM BR BK1 BITTER CREEK	RO 68 32-54 109-02	2.77		
NM BR AP1 ANIMAS PEAK	RE 75 32-58 107-32	1.70		
NM BR CF1 CLIFFE	RO 68 33-03 108-30	2.56		
NM BR TT1 T OR C NORTH	RE 75 33-17 107-16	2.20		
NM BR CI1 CHLORIDE #1 & 2	RE 75 33-19 107-42	2.92		
NM BR SA1 SIERRA BLANCA	RE 75 33-28 105-47	1.77		
NM BR RS1 RAILROAD CAN. SOUTH	RE 75 33-31 108-11	1.98		
NM BR MC1 MONTICELLO CAN. #1 & 2	RE 75 33-34 107-36	3.36		
NM BR FT1 FORT CRAIG	RE 75 33-37 107-08	2.81		
NM BR CZ1 CARRIZO/NW	RE 75 33-44 106-02	1.44		
NM BR BN1 BIG RED CANYON	RE 75 33-44 107-21	1.28		
NM BR RS2 RAILROAD CAN. NORTH	RE 75 33-45 107-49	1.75		
NM BR BM1 BINGHAM SOUTH	RE 75 33-53 106-21	1.56		
NM BR BH2 BINGHAM NE	RE 75 33-57 106-17	1.46		
NM BR NY1 NORTH BALDY	RE 75 34-02 107-13	2.48		
NM BR CO1 CHUPADERA MESA	RE 75 34-06 106-48	2.20		

TABLE 1. Locations, heat flow (q, HFU) and heat production (A, HGU)
for published values plotted on Figures 1 through 4 (continued)

	q	A
NM BR MG1 MAGDALENA WEST	RE 75 34-07 107-17	2.01
NM BR MG2 MAGDALENA NW	RE 75 34-09 107-18	1.91
NM BR NK1 NORTH LAKE	RE 75 34-14 107-38	1.91
NM BR IS1 INDIAN SPRINGS	RE 75 34-18 107-26	1.95
NM BR PI1 PIE TOWN NORTH	RE 75 34-19 108-07	1.55
NM BR QS1 QUEMADO SOUTH	RE 75 34-20 108-30	1.98
NM BR PIZ PIETOWN NW	RE 75 34-23 108-13	1.46
NM BR SY1 SILVER CITY	RE 75 34-47 108-16	2.33
NM BR AQ1 ALBUQUERQUE #1 & 2	RE 75 34-56 106-33	1.50
NM BR ZP1 ZUNI PIA MESA	RE 75 34-58 108-45	2.96
NM BR CF1 CLINES CORNERS	RE 75 35-00 105-37	0.82
NM BR WW1 WAGON WHEEL	RE 75 35-00 105-43	1.61
NM BR MYE MORIARTY EAST	RE 75 35-00 105-54	1.82
NM BR AQ2 ALBUQUERQUE	RE 75 35-03 106-31	1.08
NM BR GS1 GRANTS	RE 75 35-07 107-46	1.68
NM BR MW1 HOLWEG	RE 75 35-09 106-16	1.58
NM BR RU1 RIO PUERCO #2	RE 75 35-12 107-01	2.27
NM BR RU2 RIO PUERCO #3	RE 75 35-12 107-05	2.66
NM BR RU3 RIO PUERCO #1	RE 75 35-13 107-01	3.08
NM BR BB0 BIBO NORTH-SOUTH	RE 75 35-13 107-19	2.36
NM BR SPR SAN PEDRO #1 & 3	RE 75 35-15 106-11	1.32
NM BR MZ1 MARQUEZ SE	RE 75 35-15 107-13	2.11
NM BR MZ2 MARQUEZ	RE 75 35-17 107-15	2.14
NM BR SFP SAN FELIPE	RE 75 35-18 106-15	1.86
NM BR OZ1 ORTIZ MT.	RE 75 35-20 106-11	1.76
NM BR SMO SAN MATEO MESA	RE 75 35-20 107-37	1.66
NM BR G11 GALISTEO	RE 75 35-25 106-00	1.48
NM BR CS1 CERRILLOS	RO 68 35-28 106-07	1.22
NM BR GW1 GALLUP WEST	RE 75 35-33 108-46	2.94
NM BR GW2 GALLUP WEST #2	RE 75 35-35 108-51	1.66
NM BR MK1 MARIANO LAKE	RE 75 35-38 108-19	2.35
NM BR GW3 GALLUP WEST #3	RE 75 35-38 109-02	1.27
NM BR GW4 GALLUP	OB 74 35-39 108-31	1.61
NM BR CW1 CROWN POINT	RE 75 35-40 108-08	1.91
NM BR CW2 CROWN POINT EAST	RE 75 35-42 107-56	2.04
NM BR CSL CHACO SLOPE	RE 75 35-51 107-24	1.49
NM BR BU1 BUCKMAN	RE 75 35-52 106-09	1.91
NM BR GT1 LOS ALAMOS GT-1	PO 73 35 54 106 40	3.6
NM BR RA1 RED MT.	RE 75 35-55 107-49	1.70
NM BR CMH CHACO WASH	RE 75 35-56 107-48	1.63
NM BR CYN CHACO CAN.	RE 75 36-02 107-54	1.56
NM BR DX1 DIXON	RE 75 36-13 105-48	5.25
NM BR GAV GAVILIAN EAST	RE 75 36-22 106-54	1.51
NM BR TA1 TIERRA AMARILLA	RE 75 36-23 106 23	2.34
NM BR TO1 TAOS #1	RE 75 36-27 105-35	2.29
NM BR EV1 EL VADO SW	RE 75 36-32 106-51	1.60
NM BR GB2 GOBERNADOR SOUTH	RE 75 36-36 107-21	1.35
NM BR MU1 MUNOZ CREEK	RE 75 36-36 107-25	1.29
NM BR TAB TABLE MESA #1 & 2	RE 75 36-37 108-37	2.30
NM BR TRP TRES PIEDRAS	RE 75 36-39 105-59	2.66
NM BR CZK CARRIZO CREEK	RE 75 36-39 107-40	1.26
NM BR GB1 GOBERNADOR GB-1	US 71 36-41 107-12	2.01
NM BR QU1 QUESTA EAST	RE 75 36-42 105-28	2.04
NM BR QU2 QUESTA	RO 68 36-42 105-31	1.53
NM BR B01 BLANCO EAST #2	RE 75 36-42 107-43	1.33
NM BR RV1 RED RIVER ODH-1	OB 74 36-43 105-24	1.90
NM BR VJ1 VERMAJO RIVER	RE 75 36-45 104-53	1.93
NM BR B02 BLANCO EAST #1	RE 75 36-45 107-43	1.31
NM BR RN1 RATTLESNAKE	RE 75 36-45 108-48	1.46
NM BR NG1 NO AGUA	RE 75 36-46 105-58	3.02
NM BR B03 BLANCO NORTH	RE 75 36-47 107-50	1.72

TABLE 1. Locations, heat flow (q, HFU) and heat production (A, HGU)
for published values plotted on Figures 1 through 4 (continued)

				q	A
NM BR AE1	AZTEC NE	RE 75 36-50	107-55	1.47	
NM BR VJ2	VERMAJO PARK	RE 75 36-54	104-55	2.86	
NM BR AE2	AZTEC NORTH	RE 75 36-54	108-01	1.46	
NM BR CHW	CEDAR HILL WEST	RE 75 36-57	107-59	1.51	
U.S.A. --	NEW JERSEY				
NJ AP FR1	FRANKLIN-OGDENSBURG	UR 71 41-06	74-35	0.91	
U.S.A. --	NEW YORK				
NY AP WK1	WATKINS GLEN HOLE 23	UR 71 42-25	76-54	1.72	
NY AP GA1	GILBOA B-1,2	UR 71 42-27	74-26	1.00	
NY AP WY1	WEST VALLEY HOLE-1	UR 71 42-27	78-38	1.19	
NY AP MH1	HIMROD M-7,8	UR 71 42-34	76-37	1.55	
NY AP LX1	LACKAWANNA, BUFFALO HOLE	UR 71 42-48	78-51	1.20	
NY AP NF1	NIAGARA FALLS WPL-1	UR 71 43-05	79-00	1.16	
NY AP MT1	MIDDLEPORT FMC-1	UR 71 43-12	78-28	1.18	
NY AP GN1	GLENN FALLS	RO 68 43-18	73-37	1.05	
NY AP EZ1	ELIZABETHTOWN	RO 68 44-13	73-32	0.81	0.4
NY AP WD1	WADHAMS	RO 68 44-14	73-28	0.79	0.4
NY CS BZ1	BALMAT	UR 71 44-16	75-25	1.22	
NY AP SQ1	SARANAC LAKE	RO 68 44-20	74-16	0.81	0.4
NY AP RX1	RIVERVIEW	RO 68 44-35	73-54	1.22	5.8
U.S.A. --	NORTH DAKOTA				
ND IP LJ1	LONE TREE	BL 69 48-18	101-40	1.4	
ND IP CHV	CARRIE HOVLAND #1	CO 70 48-55	102-26	2.20	
ND IP EN1	E.L.K. #1 NELSON	CO 70 48-56	100-50	2.20	
U.S.A. --	OKLAHOMA				
OK IP PC1	PICHER 43-C,P-5	RO 60 36-59	94-52	1.4	7.6
U.S.A. --	OREGON				
OR BR KL1	KLAMATH CO.	BL 69 42-12	121-50	1.6	
OR CU AL1	ALVORD 39-34S2	BO 73 42-17	118-41	2.3	
OR BR TK1	THOMAS CR. 37-18S14	BO 73 42-22	120-27	3.2	
OR CU BR5	BURNS	BL 69 43-27	118-06	2.0	
OR CU GY1	GRASSY MT. 21-43S36	BO 73 43-41	117-23	1.5	
OR CU VE1	VALE	BL 69 43-46	117-22	1.6	
OR CU CB1	CHALK BUTTE 19-45S26	BO 73 43-52	117-10	3.6	
OR CU CB2	CHALK BUTTE 19-45S25	BO 73 43-53	117-09	6.9	
OR CU CB3	CHALK BUTTE 19-45S22	BO 73 43-53	117-11	3.3	
OR CU CB4	CHALK BUTTE 19-45S14	BO 73 43-54	117-10	5.4	
OR CU CB5	CHALK BUTTE 19-45S11	BO 73 43-55	117-10	5.7	
U.S.A. --	PENNSYLVANIA				
PA AP MH1	MT. HOLLY SPRING	UR 71 40-06	77-11	0.57	
PA AP RP1	READING -OLEY	UR 71 40-22	75-50	0.70	
PA AP RQ1	RIEGELSVILLE	UR 71 40-34	75-12	0.89	
PA AP LU1	LEMIGH P.C.CO. #1	JO 60 40-59	80-08	1.2	
PA AP SX1	SABULA	UR 71 41-12	78-39	1.31	
PA AP ER1	E.N.CLAIR #1	JO 60 41-52	78-00	1.31	
PA AP EI1	EARL A. MILL #1	JO 60 41-56	77-51	1.47	
U.S.A. --	SOUTH CAROLINA				
SC CN AK1	AIKEN	DI 65 33-17	81-40	1.06	
U.S.A. --	SOUTH DAKOTA				
SD IP AS1	ASSMAN #1	CO 70 43-15	100-12	2.10	
SD IP MOO	MOONSHINE GULCH NBH-2	US 71 44-08	103-43	0.50	
SD IP WFS	WINDY FLATS NBH-1	US 71 44-18	103-40	0.50	
SD IP LM1	LEAD-YATES	BL 67 44-21	103-45	1.9	
SD IP DY1	DACY RTM-1	US 71 44-22	103-53	1.90	
U.S.A. --	TENNESSEE				
TN AP OE1	OAK RIDGE	DR 63 35-55	84-19	0.82	
U.S.A. --	TEXAS				
TX IP UV1	NEAR UVALDE	KI 72 29-07	99-41	1.11	
TX BR SZ1	SHAFTER	DS 75 29-48	104-24	1.5	3.5
TX IP GJ1	GULF #1 NORTHRUP	MC 56 31-10	103-14	1.1	
TX IP BE1	BIG LAKE #1-B	BC 45 31-12	101-29	2.0	

TABLE 1. Locations, heat flow (q, HFU) and heat production (A, HGU)
for published values plotted on Figures 1 through 4 (continued)

			q	A
TX IP BE2	BIG LAKE-UNIVERSITY	MC 56 31-15 101-28	1.1	
TX IP DK1	DONNELLY AND GERKE #1	MC 56 31-23 101-48	1.1	
TX IP VH1	VAN HORN	OS 75 31-27 104-53	1.0	
TX IP STP	STANDARD POTASH #2 TEST	MC 56 31-39 102-15	1.2	
U.S.A. -- UTAH				
UT BR CC2	CEDAR CITY N-6	US 71 37-38 113-26	2.19	
UT BR CC1	CEDAR CITY DE HOLES	US 71 37-42 113-16	2.12	5.50
UT CP MB1	MORSE RANGE MESA	RE 75 37-59 109-03	1.46	
UT CP LA1	LA SAL	WR 66 38-15 109-17	1.2	
UT BR MD1	MILFORD	RO 68 38-29 113-08	2.22	10.3
UT CP BY1	BALSLEY #1-C	SP 64 38-46 109-38	1.10	
UT CP HE1	HYDE #1	SP 64 38-51 109-30	1.01	
UT CP RE1	REED., CRESC. EAGLE, BR.	SP 64 38-55 109-50	1.32	
UT BR SO1	SPOR MOUNTAIN	WR 66 39-43 113-13	2.8	
UT BR GC1	GOVERNMENT CANYON GC-1A	RO 68 39-52 112-03	1.90	
UT BR EA1	EUREKA ET-5(A)	RO 68 39-57 112-03	2.0	
UT CP OUR	OURAY W-EX-1	US 71 39-59 109-36	1.50	
UT BR B11	BINGHAM KCC-124	RO 68 40-31 112-09	1.91	
UT BR B12	BINGHAM D-142	CW 73 40-32 112-09	2.3	
UT BR JV1	JORDAN VALLEY	WR 66 40-47 112-04	1.8	
U.S.A. -- VERMONT				
VT AP LZ1	LONDONDERRY	RO 68 43-15 72-50	1.23	
VT AP WN1	WESTON	RO 68 43-17 72-49	1.22	
VT AP NS1	NORTH SPRINGFIELD	RO 68 43-20 72-33	1.20	
U.S.A. -- VIRGINIA				
VA AP CR1	CRIPPLE CREEK	RE 73 36-49 81-06	1.03	
VA AP AA1	ALBERTA	DI 65 36-52 77-54	1.4	
VA AP GG1	GRUNDY	RE 73 37-20 82-00	1.70	
U.S.A. -- WASHINGTON				
WA CU RZ1	RICHLAND DM-3	US 71 46-21 119-17	1.50	
WA PC RAE	RANDLE	BL 74 46-21 122-06	1.5	
WA CU BO1	BENTON CITY	BL 69 46-25 119-34	1.7	
WA CU RZ5	RATTLESNAKE HILLS	US 71 46-26 119-47	1.38	
WA PC CHH	CHEMALIS	US 71 46-32 122-50	0.83	
WA CU RZ4	VILLA DH-1	US 71 46-35 119-31	1.52	
WA PC WQ1	WESTPORT	BL 74 46-51 124-06	0.9	
WA PC MQ1	MOCLIPS	BL 69 47-12 124-06	1.1	
WA CU OD2	ODESSA	BL 74 47-20 118-55	1.7	
WA PC WU1	WENATCHEE	BL 74 47-22 120-18	1.5	
WA PC ND1	NORTH BEND	BL 69 47-30 121-22	1.26	
WA CU RE0	REARDON	BL 74 47-52 118-07	2.1	
WA CU WX1	WILBUR	RO 68 48-04 118-42	1.68	
WA RM NM1	NESPELEM	BL 74 48-22 118-53	1.7	
WA PC AO1	ANACORTES	BL 74 48-28 122-38	0.9	
WA PC MX1	MAZAMA	BL 74 48-37 120-23	1.7	
WA RM RU1	REPUBLIC	BL 74 48-40 118-46	1.8	
WA RM TQ1	TONASKIT	BL 74 48-43 119-31	1.8	
WA RM NIE	METALINE	RO 68 48-55 117-20	2.52	
WA RM LO1	LEADPOINT	BL 69 48-55 117-36	2.96	
WA RM CUW	CURLEW	BL 74 49-00 118-36	1.7	
WA RM OV1	OROVILLE	BL 74 49-00 119-29	1.7	
U.S.A. -- WEST VIRGINIA				
WV AP LW1	LEWIS MAXWELL #11-F	JO 60 39-17 80-46	1.22	
WV AP GX1	M.O. GOFF #1	JO 60 39-18 80-14	1.26	
WV AP JL1	J.H. LAKE #1	JO 60 39-25 80-05	1.20	
WV AP MW0	MORGANTOWN	UR 71 39-40 79-59	1.12	
U.S.A. -- WYOMING				
WY RM GZ1	GREEN RIVER GR1-1	US 71 41-32 109-25	1.60	
WY RM RIE	ROCK R. FIELD	BL 69 41-40 106-07	1.2	
WY RM FD1	FERRIS FIELD	BL 69 42-10 107-08	1.4	
WY RM PE1	PINEDALE DHPW	US 71 42-46 109-34	1.30	4.30

TABLE 1. Locations, heat flow (q, HFU) and heat production (A, HGU) for published values plotted on Figures 1 through 4 (continued)

			q	A
WY RM PE1 PINEDALE DHPW	US 71 42-46 109-34		1.30	4.30
WY RM SY1 BIG MUDDY FIELD	BL 69 42-51 106-58		1.4	
WY IP LCF LANCE CK. FIELD	BL 69 43-04 104-36		2.0	
WY IP SCF SALT CK. FIELD	BL 69 43-35 106-15		1.8	
WY RM GEL GEB0 FIELD	BL 69 43-48 108-14		1.6	
WY RM MEE MEETEETSE	RO 68 43-52 109-17		1.95	
WY RM LSD LITTLE SAND DRAW FIELD	BL 69 44-22 109-00		1.3	
WY RM OB1 OREGON BASIN FIELD	BL 69 44-22 108-56		1.3	
WY RM YS1 YELLOWSTONE	WH 65 44-27 110-50		3.49	

BB 73	Blackwell and Baag, 1973
BC 45	Birch and Clark, 1945
BE 47	Benfield, 1947
BI 50	Birch, 1950
BI 54	Birch, 1954
BL 67	Blackwell, 1967
BL 69	Blackwell, 1969
BL 73	Blackwell and Robertson, 1973
BL 74	Blackwell, 1974
BO 73	Bowen, 1973
CL 57	Clark, 1957
CO 70	Combs, 1970
	(see also Combs and Simmons, 1973)
CO 71	Combs, 1971
CO 75	Combs, 1975
CW 73	Costain and Wright, 1973
DB 74	Decker and Birch, 1974
	(see also Decker and Smithson, 1973)
DI 65	Diment et al., 1965a, 1965b
DR 63	Diment and Robertson, 1963
DS 75	Decker and Smithson, 1975
DW 64	Diment and Werre, 1964
HC 56	Herrin and Clark, 1956
HE 68	Heney, 1968; Heney and Wasserburg, 1971
HS 65	Hart and Steinhart, 1965
JB 73	Judge and Beck, 1973
JO 60	Joyner, 1960
KI 72	King and Simmons, 1972
LE 56	Leney, 1956
LO 48	Lovering, 1948
PO 73	Potter, 1973
RE 65	Reiter et al., 1975
RO 68	Roy et al., 1968a, 1968b
RO 72	Roy et al., 1972
SP 64	Spicer, 1964
UR 71	Urban, 1970; Diment et al., 1972
US 68	Sass et al., 1968
US 71	Sass et al., 1971
WA 69	Warren et al., 1969
WH 65	White, 1965
WR 66	Wright, 1966
	(see also Costain and Wright, 1973)

References

Benfield, A. E., 1947, A heat flow value for a well in California: Am. Jour. Sci., v. 245, no. 1, p. 1-18.

Birch, Francis, 1950, Flow of heat in the Front Range, Colorado: Geol. Soc. America Bull., v. 61, no. 6, p. 567-630.

Birch, Francis, 1954, Thermal conductivity, climatic variation, and heat flow near Calumet, Michigan: Am. Jour. Sci., v. 252, no. 1, p. 1-25.

Birch, Francis, and Clark, Harry, 1945, An estimate of the surface flow of heat in the west Texas permian basin: Am. Jour. Sci., v. 243-A, p. 69-74.

Birch, F., Roy, R. F., and Decker, E. R., 1968, Heat flows and thermal history in New England and New York, in Zen, E., White, W. S., Hadley, J. B., and Thompson, J. B., Jr., eds., Studies of Appalachian Geology--Northern and maritime: New York, Interscience, p. 437-451.

Blackwell, D. D., 1967, Terrestrial heat-flow determinations in the northwestern United States: Harvard Univ., Cambridge, Mass., Ph. D. thesis.

Blackwell, D. D., 1969, Heat-flow determinations in the northwestern United States: Jour. Geophys. Research, v. 74, no. 4, p. 992-1007.

Blackwell, D. D., 1974, Terrestrial heat flow and its implications on the location of geothermal reservoirs in Washington: Washington Div. Mines and Geology Inf. Circ., no. 50, p. 21-33.

Blackwell, D. D., and Baag, C. G., 1973, Heat flow in a "blind" geothermal area near Marysville, Montana: Geophysics, v. 38, p. 941-956.

Blackwell, D. D., and Robertson, E. C., 1973, Thermal studies of the Boulder batholith and vicinity, Montana: Soc. Econ. Geologists Guidebook, Butte Field Meeting, Aug. 18-21, p. D-1 to D-8.

Bowen, R. G., 1973, Geothermal activity in 1972: Ore Bin, v. 35, no. 1, p. 4-7.

Clark, S. P., Jr., 1957, Heat flow at Grass Valley, California: Am. Geophys. Union Trans., v. 38, p. 239-244.

Combs, J. B., 1970, Terrestrial heat flow in North Central United States: Massachusetts Institute of Technology, Cambridge, Mass., Ph. D. thesis.

Combs, J., 1971, Heat flow and geothermal resource estimates for the Imperial Valley, in cooperative geological-geophysical-geochemical investigations of geothermal resources in The Imperial Valley area of California: Univ. California, Riverside, Education Research Service, p. 5-27.

Combs, J., 1975, Heat flow and microearthquake studies, Coso geothermal area, China Lake, California: Final Report, Contract No. N00123-74-C-2099, Advanced Research Projects Agency Order No. 2800, 65 p.

Combs, J., and Simmons, G., 1973, Terrestrial heat flow determinations in the North Central United States: Jour. Geophys. Research, v. 78, no. 2, p. 441-461.

Costain, J. K., and Wright, P. M., 1973, Heat flow at Spor Mountain, Jordan Valley, Bingham, and La Sal, Utah: Jour. Geophys. Research, v. 78, no. 35, p. 8687-8698.

Decker, E. R., and Birch, F., 1974, Basic heat-flow data from Colorado, Minnesota, New Mexico, and Texas: U.S. Geol. Survey Open-File Rept. 74-9, p. 5-1 to 5-59.

Decker, E. R., and Smithson, S. B., 1973, Geophysical studies in the southern Rio Grande rift: EOS (Am. Geophys. Union Trans.), v. 54, p. 463.

Decker, E. R., and Smithson, S. B., 1975, Heat flow and gravity interpretation across the Rio Grande rift in southern New Mexico and west Texas: Jour. Geophys. Research, v. 80, no. 17, p. 2542-2552.

Diment, W. H., Marine, I. W., Neiheisel, J., and Siple, G. E., 1965a, Subsurface temperature, thermal conductivity and heat flow near Aiken, South Carolina: Jour. Geophys. Research, v. 70, no. 22, p. 5635-5644.

Diment, W. H., Raspet, R., Mayhew, M. A., and Werre, R. W., 1965b, Terrestrial heat flow near Alberta, Virginia: Jour. Geophys. Research, v. 70, no. 4, p. 923-929.

Diment, W. H., and Robertson, E. C., 1963, Temperature, thermal conductivity, and heat flow in a drilled hole near Oak Ridge, Tennessee: Jour. Geophys. Research, v. 68, no. 17, p. 5035-5047.

Diment, W. H., Urban, T. C., and Revetta, F. A., 1972, Some geophysical anomalies in the eastern United States, in Robertson, E. C., ed., The Nature of the Solid Earth: New York, McGraw-Hill, Inc., p. 544-572.

Diment, W. H., Urban, T. C., Sass, J. H., Marshall, B. V., Munroe, R. J., and Lachenbruch, A. H., 1975, Temperatures and heat contents based on conductive transport of heat, in White, D. E., and Williams, D. L., eds., Assessment of geothermal resources of the United States--1975: U.S. Geol. Survey Circ. 726, p. 84-103.

Diment, W. H., and Werre, R. W., 1964, Terrestrial heat flow near Washington, D. C.: Jour. Geophys. Research, v. 69, no. 10, p. 2143-2149.

Fenneman, N. M., 1946, Physical divisions of the United States: U.S. Geol. Survey, scale 1:7,000,000.

Hart, S. R., and Steinhart, J. S., 1965, Terrestrial heat flow--Measurement in lake bottoms: Science, v. 149, no. 3691, p. 1499-1501.

Henye, T. L., 1968, Heat flow near major strike-slip faults in central and southern California: California Institute of Technology, Pasadena, California, Ph. D. thesis, 415 p.

Henye, T. L., and Wasserburg, G. J., 1971, Heat flow near major strike-slip faults in California: Jour. Geophys. Research, v. 76, no. 32, p. 7924-7946.

Herrin, E., and Clark, S. P., Jr., 1956, Heat flow in west Texas and eastern New Mexico: Geophysics, v. 21, no. 4, p. 1087-1099.

Joyner, W. B., 1960, Heat flow in Pennsylvania and West Virginia: Geophysics, v. 25, p. 1229-1241.

Judge, A. S., and Beck, A. E., 1973, Analysis of heat-flow data--
Several boreholes in a sedimentary basin: Canadian Jour. Earth Sci.,
v. 10, p. 1494-1507.

King, W., and Simmons, G., 1972, Heat flow near Orlando, Florida,
and Uvalde, Texas, determined from well cuttings: Geothermics, v. 1,
no. 4, p. 133-139.

Leney, G. W., 1956, Preliminary investigation of rock conductivity
and terrestrial heat flow in southeastern Michigan: Univ. Michigan,
Ann Arbor, Michigan, Ph. D. thesis.

Lovering, T. S., 1948, Geothermal gradients, recent climatic changes,
and rate of sulfide oxidation in the San Manuel district, Arizona:
Econ. Geology, v. 43, no. 1, p. 1-20.

Potter, R. M., 1973, Heat flow of the Jemez Plateau (abs.): EOS
(Am. Geophys. Union Trans.), v. 54, no. 11, p. 1214.

Reiter, M., Edwards, C. L., Hartman, H., and Weidman, C., 1975,
Terrestrial heat flow along the Rio Grande rift, New Mexico and southern
Colorado: Geol. Soc. America Bull., v. 86, p. 811-818.

Roy, R. F., Blackwell, D. D., and Birch, F., 1968a, Heat generation
of plutonic rocks and continental heat-flow provinces: Earth and
Planetary Sci. Letters, v. 5, no. 1, p. 1-12.

Roy, R. F., Decker, E. R., Blackwell, D. D., and Birch, F., 1968b,
Heat flow in the United States: Jour. Geophys. Research, v. 73, no. 16,
5207-5221.

Roy, R. F., Blackwell, D. D., and Decker, E. R., 1972, Continental heat flow, in Robertson, E. C., ed., The Nature of the Solid Earth: New York, McGraw-Hill, Inc., p. 506-543.

Sass, J. H., Munroe, R. J., and Lachenbruch, A. H., 1968, Measurement of geothermal flux through poorly consolidated sediments: Earth and Planetary Sci. Letters, v. 4, no. 4, p. 293-298.

Sass, J. H., Lachenbruch, A. H., Munroe, R. J., Greene, G. W., and Moses, T. H., Jr., 1971, Heat flow in the western United States: Jour. Geophys. Research, v. 76, no. 26, p. 6376-6413.

Spicer, H. C., 1964, Geothermal gradients and heat flow in the Salt Valley anticline, Utah: Boll. Geofisica Teor. ed. Appl., v. 6, no. 23, p. 263-282.

Urban, T. C., 1970, Terrestrial heat flow in the Middle Atlantic States: Univ. Rochester, Rochester, New York, Ph. D. thesis, 398 p.

Warren, R. E., Sclater, J. G., Vacquier, V., and Roy, R. F., 1969, A comparison of terrestrial heat flow and transient geomagnetic fluctuations in the southwestern United States: Geophysics, v. 34, no. 3, p. 463-478.

White, D. E., 1965, Geothermal energy: U.S. Geol. Survey Circ. 519, 17 p.

Wright, P. M., 1966, Geothermal gradient and regional heat flow in Utah: Univ. Utah, Salt Lake City, Utah, Ph. D. thesis, 181 p.

Figure 1a. Locations of heat-flow determinations in the western United States. Dots are USGS values, open circles, those published by other investigators.

Figure 1b. Locations of heat-flow determinations in the eastern United States. Dots are USGS values, open circles, those published by other investigators.

Figure 2. Observed heat flow (q) in the United States. Physiographic boundaries (Figure 4) have been generalized from Fenneman (1946).

$$1 \text{ HFU} = 1 \times 10^{-6} \text{ cal/cm}^2\text{sec} = 41.8 \text{ mW/m}^2$$

Figure 3a. A generalized representation of heat flow (q) in the United States. Contours are conjectural in places and will undoubtedly change with additional measurements.

$$1 \text{ HFU} = 1 \times 10^{-6} \text{ cal/cm}^2\text{sec} = 41.8 \text{ mW/m}^2$$

Figure 3b. Enlargement of the western part of Figure 3a. BMH is the Battle Mountain High, and EL, the Eureka Low (cf. Sass and others, 1971).

Figure 4. Reduced heat flow (q^*) in the United States. Physiographic provinces after Fenneman (1946).

$$1 \text{ HFU} = 1 \times 10^{-6} \text{ cal/cm}^2\text{sec} = 41.8 \text{ mW/m}^2$$