U.S. DEPARTMENT OF THE INTERIOR

U.S. GEOLOGICAL SURVEY

GEOCHEMICAL DATA FOR JURASSIC DIABASE ASSOCIATED WITH EARLY MESOZOIC BASINS IN THE EASTERN UNITED STATES: DURHAM AND SANFORD BASINS, NORTH CAROLINA

By

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Open-File Report 91-322-I

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1991

DURHAM AND SANFORD BASINS, NORTH CAROLINA

One hundred six (106) samples of diabase from eight (8) sheets and five (5) dikes were collected by Froelich and Gottfried and analyzed by the U.S. Geological Survey. All of the sheets and all but one of the dikes sampled in this study are representative of the olivine-normative magma type; the "JY" dike, however, is high Ti, quartz-normative.

Platinum (Pt) and palladium (Pd) abundances and ratios in the chilled margins of the olivine-normative sheets and dikes are subequal (at about 10 ppb each), and characteristic of this magma type elsewhere in the province. In the olivine-rich cumulate zones of the Creedmoor and Butner sheets, Pd and Pt abundances and ratios remain similar and fairly constant; in the Nello Teer-North Durham and Oak Grove sheets, however, Pt consistently exceeds Pd, commonly two- to four-fold, in places by an order of magnitude (see DDH-NTQ-90, Table 3D, for example). Although no thick or extensive zones of anomalous enrichment were discovered, some of the highest abundances of Pt (to 55 ppb in DDH-NTQ-90, Table 3D, and 62 ppb in DDH-A-93, Table 2C) and local enrichment of Pd (96 ppb in DDH-A-93, Table 2C) are present in local zones cored in the thick sheets at Nello Teer, North Durham and Butner. Whereas the NTQ zone of enriched Pt is in cumulate rocks, the Butner anomaly zone is in a late-stage, coarsely crystalline pegmatoidal and granophyric segregation. As diabase outcrops are poor due to deep weathering, many prospective sheets and areas were not sampled during this reconnaissance study.

EXPLANATION FOR PLATE 1

Geochemical sample locality

Froelich and Gottfried, USGS, 1984; 1985; 1987

Corehole

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SAMPLE NO.	MAGMA TYPE	DESCRIPTION OF SAMPLE
		Wilton sheet - Table 1
F-84-WC-2	Olivine normative	Cumulate
		Hester sheet - Table 1
FG-87-Db-24	Olivine normative (?)	Diabase, fine
FG-87-Db-24C	"	Diabase, altered
		Creedmoor sheet - Table 1
FG-87-Db-21	Olivine normative	Diabase
FG-87-Db-22	"	Cumulate
FG-87-Db-23	"	Diabase, coarse
		Butner sheet
		USGS core hole BUT-1
		Table 2a, 2b, 2c
DDH BUT-10′	Olivine normative	Diabase
30′	"	Cumulate
50′	"	"
80′	"	"
100′	"	"
140′	"	"
170′	"	"
190′	"	"
220′	"	"
250′	"	"
270′	"	"
300′	"	"
330′	"	"
350′	"	"
360′	"	Diabase
370′	"	Cumulate
380′	"	"
390′	"	"
395′	"	"
400′	"	"
402′	"	Diabase
403′	"	"
404′	"	Lower chill
DDH-BUT-404.5′	"	Lower chill
DDH-A-93′	"	Pegmatoid
		North Durham sheet
		Nello Teer quarry (north face)
		Table 3a
NTQ-1	Olivine diabase	Diabase-aphyric
-2	"	"
-3	"	"
-4	"	"
-5	"	U. chill margin

SAMPLE NO.	MAGMA TYPE	DESCRIPTION OF SAMPLE
		(west face) Table 3b
NTQ-8	Olivine diabase	Cumulate-gabbro/troctolite
-9	"	"
-10	"	"
-11	"	"
-12	"	"
-13	"	"
-14	"	Pegmatite
-14A	"	"
		North Durham sheet,
		USGS core hole DDH-NTQ-1
		Table 3c, 3d, 3e
		Nello-Teer quarry
DDH NTQ-7′	Olivine normative	Diabase
-10′	"	Pegmatite
-17′	"	Diabase
-30′	"	"
-40′	"	"
-50′	"	"
-60′	"	"
-70′	"	"
-80′	"	Cumulate
-90′	"	"
-100′	"	"
-110′	"	"
-120′	"	"
-130′	"	"
-140′	"	"
-150′	"	"
-160′	"	"
-170′	"	"
-180′	"	"
-190′	"	"
-200′	"	"
-210′	"	"
-211′	"	"
-212′	"	Lower chilled margin
		North Durham sheet
		Eno River Section
		Table 3f, 3g
DBF-85-11	Olivine normative	Pegmatoid
-12A	"	Cumulate
-12B	"	" (5 ft above 12A)
-12C	"	" (3 ft above 12B)
-12D	"	" (9 ft above 12C)
DBF-85-13A	Olivine normative	Cumulate
-13B	"	" (25 ft above 13A)

DURHAM AND SANFORD BASINS, NORTH CAROLINA

SAMPLE NO.	MAGMA TYPE	DESCRIPTION OF SAMPLE
DBF-85-14	Olivine normative	Cumulate
-15	"	"
-16	"	Aphanitic chill
-16A	"	Diabase
		Table 5
DBF-85-17	Olivine normative	Diabase dike
-17A	"	"
		North Durham sheet
		Braggtown quarry - Table 3h
BNC-85-1	Olivine normative	Diabase
BNC-85-1A	"	"
		North Durham sheet - Table 3h
DBF-85-10B	Olivine normative	Cumulate
		Ellerbe sheet - Table 3h
DBF-85-18	Olivine normative	Diabase
DBF-85-19	"	"
		Oak Grove sheet
		Oak Grove core hole DDH-1 - Table 4a
DDH-1-90.5′	Olivine normative	Cumulate
1-97′	"	"
1-98′	"	"
1-99.5′	"	"
		Oak Grove core hole DDH-2 - Table 4b
DDH-2-197′	Olivine normative	Cumulate
2-201′	"	"
2-204′	"	"
2-205′	"	"
2-212′	"	"
2-218.3′	"	"
2-220′	"	"
2-223′	"	"
2-224′	"	"
		Cumnock sheet, Sanford basin
		core hole NCMR3 - Table 5
NCMR3-257′	Olivine normative	Diabase, upper chilled margin
		(off 200 ft-thick sheet)
		Sanford basin, core hole NCCM1 - Table 5
NCCM1-258′	Olivine normative	Diabase dike, chilled margin

SAMPLE NO.	MAGMA TYPE	DESCRIPTION OF SAMPLE
		Durham basin - Table 5
DBF-85-17	Olivine normative	Diabase dike, float
DBF-85-17A	"	"
		Durham basin - Table 5
FG-87-DB-20	Olivine normative	Diabase dike
		JY dike, Durham basin - Table 5
JY-1	High Ti, quartz normative	Diabase dike
JY-2	"	"

Table 1. Durham and Sanford basins, North Carolina. Wilton, Hester, and Creedmoor sheets.

	W-243048 F-84 WC2	W-243890 FG-87 DB-24	W-243891 FG-87C DB-24C	W-243887 FG-87 DB-21	W-243888 FG-87 DB-22	W-243889 FG-87 DB-23
Lat. Long.	36°15'N 78°30'W	36°10'N 78°39'W	36°10'N 78°39'W	36° 6'N 78°41'W	36° 6'N 78°41'W	36° 6'N 78°42'W
SiO_2 (%)	48.00	51.30	59.00	50.80	49.00	50.60
TiO_2	0.48	0.74	0.74	0.65	0.41	0.58
Al_2O_3	13.90	15.50	24.60	15.80	17.00	16.20
Fe_2O_3	2.32	2.87	3.22	3.00	2.23	2.44
FeO	8.10	7.20	3.10	7.00	6.20	6.80
MnO	0.18	0.19	0.07	0.18	0.15	0.18
MgO	13.60	6.77	1.49	7.69	10.10	7.63
CaO	9.96	11.60	1.56	12.00	12.10	12.40
Na_2O	1.71	2.29	1.82	2.16	1.93	2.16
K_2O	0.28	0.47	3.58	0.40	0.27	0.37
P_2O_5	0.09	0.15	0.11	0.12	0.09	0.11
H_2O^+	0.96	0.51	0.75	0.59	0.44	0.65
H_2O^-	0.63	0.29	0.10	0.25	0.18	0.22
CO_2	0.02	0.01	<0.01	0.04	0.01	0.02
S	0.07	0.04	0.03	0.08	0.01	0.02
F	0.01	0.01	0.05	0.01	0.01	0.02
Cl	0.00	0.01	<0.00	<0.00	<0.00	<0.00
Σ	100.32	99.94	100.22	100.77	100.13	100.39
B (ppm)	1.00	6.6	8.4	5.8	6.6	6.6
Sc	36	46	12.8	45	36	46
Cr	370	230	51	330	580	500
Co	78	40	16.4	43	48	41
Ni	320	66	28.0	101	157	88
Cu	82	93	38	85	50	70
Zn	65	60	124	62	46	56
Ga	—	19.0	32	17.0	16.0	17.0
As	<0.70	<2.70	1.80	<1.70	<1.70	<1.80
Rb	8.0	6.0	244	5.0	8.0	14.0
Sr	123	172	246	151	159	184
Ag	—	0.035	0.110	0.0290	0.0170	0.0250
Sb	<0.080	<0.180	<0.30	<0.160	<0.200	<0.230
Cs	0.35	<0.30	13.6	0.61	<0.30	<0.80
Ba	93	152	700	126	86	119
Y	28.0	27.0	18.0	24.0	16.0	20.0
La	4.4	7.2	36	6.0	4.0	5.0
Ce	9.9	15.0	66	14.0	9.6	12.0
Nd	6.3	9.4	30	7.8	<5.0	<14.0
Sm	1.68	2.60	6.4	2.29	1.50	2.01
Eu	0.56	0.82	1.40	0.75	0.54	0.68
Tb	0.40	0.60	0.90	0.56	0.40	0.50
Yb	2.20	3.3	2.80	3.0	1.90	2.60
Lu	0.31	0.47	0.39	0.44	0.270	0.39
Zr	57	73	177	68	56	64
Hf	1.10	1.70	5.2	1.60	0.90	1.50
Nb	2.20	2.50	20.0	2.60	1.50	2.00
Ta	0.230	0.170	2.39	0.210	<0.220	0.170
Th	0.49	0.71	16.8	0.73	0.51	0.52
U	<0.32	0.42	6.6	<0.60	<0.50	<0.60
Pd (ppb)	5.3	8.3	<0.50	11	5.2	11
Pt	9.7	7.4	<1.00	11	5.2	12
Rh	—	—	—	0.6	<0.5	<0.7
Ru	—	—	—	0.6	<0.5	<0.5
Ir	—	—	—	<0.5	<0.5	<0.5
Au	<6.0	<5.0	<11.0	<5.0	<7.0	<5.0

Table 2a. Butner sheet, USGS Corehole But-1.

	W-241802 DDH-BUT 10	W-241803 DDH-BUT 30	W-241804 DDH-BUT 50	W-241805 DDH-BUT 80	W-241806 DDH-BUT 110	W-241807 DDH-BUT 140	W-241808 DDH-BUT 170	W-241809 DDH-BUT 190
Lat.	36° 6'N	36° 6'N	36° 6'N	36° 6'N	36° 6'N	36° 6'N	36° 6'N	36° 6'N
Long.	78°46'W	78°46'W	78°46'W	78°46'W	78°46'W	78°46'W	78°46'W	78°46'W
SiO_2 (%)	49.50	49.10	49.00	48.50	48.70	49.00	49.00	49.10
TiO_2	0.39	0.31	0.41	0.32	0.35	0.39	0.43	0.44
Al_2O_3	20.20	18.10	15.50	16.90	15.90	15.80	17.20	16.80
Fe_2O_3	2.04	1.76	1.95	1.59	2.02	2.29	2.17	2.82
FeO	5.00	5.40	6.52	6.37	6.75	6.20	6.17	5.99
MnO	0.12	0.13	0.15	0.14	0.15	0.15	0.15	0.15
MgO	8.02	10.00	11.90	11.40	11.90	11.00	10.10	9.95
CaO	12.50	13.10	12.40	12.30	12.30	12.30	11.80	12.00
Na_2O	2.24	1.83	1.67	1.75	1.75	1.75	1.93	1.98
K_2O	0.32	0.20	0.25	0.20	0.21	0.24	0.30	0.29
P_2O_5	0.07	0.05	0.07	0.06	0.06	0.06	0.07	0.08
H_2O^+	0.41	0.36	0.55	0.50	0.52	0.54	0.75	0.64
H_2O^-	0.27	0.26	0.28	0.24	0.29	0.46	0.36	0.50
CO_2	0.06	0.04	0.05	0.04	0.04	0.08	0.07	0.08
S	0.03	0.02	0.02	0.02	0.03	<0.01	0.10	<0.01
F	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cl	0.00	<0.00	<0.00	0.01	<0.00	<0.00	<0.00	<0.00
Σ	101.17	100.67	100.73	100.34	100.98	100.27	100.60	100.83
B (ppm)	2.00	3.0	3.0	2.00	3.0	2.00	2.00	1.00
Sc	27.9	35	40	34	39	41	34	38
Cr	370	850	940	780	870	860	530	630
Co	42	47	57	57	59	53	52	53
Ni	178	218	267	267	271	233	222	221
Cu	70	55	56	54	58	59	69	73
Zn	64	72	70	74	58	72	80	84
As	<0.70	<0.90	<2.70	<0.80	<0.90	<0.90	<1.10	<1.60
Rb	12.0	4.0	4.0	15.0	6.0	<2.00	11.0	8.0
Sr	164	142	127	141	128	120	136	140
Sb	<0.130	<0.110	<0.130	<0.090	<0.100	<0.100	<0.130	<0.110
Cs	<0.180	<0.200	<0.30	<0.200	0.220	<0.200	0.54	<0.31
Ba	88	69	71	61	65	73	90	85
Y	24.0	12.0	24.0	13.0	14.0	14.0	25.0	22.0
La	3.9	2.70	3.7	2.80	3.3	3.6	4.2	4.1
Ce	9.0	7.0	9.2	7.5	8.2	8.1	9.2	9.8
Nd	5.0	4.2	4.6	4.0	5.1	4.0	5.3	6.4
Sm	1.42	1.10	1.47	1.16	1.31	1.41	1.56	1.60
Eu	0.54	0.44	0.49	0.44	0.46	0.50	0.56	0.54
Tb	0.31	0.280	0.37	0.280	0.31	0.32	0.41	0.36
Yb	1.70	1.50	1.79	1.40	1.70	1.80	1.90	2.10
Lu	0.250	0.210	0.260	0.190	0.230	0.240	0.280	0.290
Zr	49	41	53	40	44	40	59	52
Hf	0.91	0.73	1.00	0.77	0.85	1.20	1.10	1.00
Nb	1.50	<1.00	1.50	1.20	1.40	1.30	1.70	1.60
Ta	0.130	<0.100	0.140	0.170	<0.140	0.140	<0.260	0.31
Th	0.46	0.50	0.42	0.40	0.34	0.44	0.48	0.48
U	<0.30	0.290	<0.30	<0.30	<0.40	<0.30	<0.290	<0.40
Pd (ppb)	7.9	9.9	7.9	6.5	5.4	7.5	7.4	8.1
Pt	9.5	7.3	6.6	8.2	5.0	6.7	10.0	6.9
Rh	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Ru	2.40	2.20	2.40	2.00	1.00	2.00	2.20	2.00
Ir	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Au	<1.70	<7.0	5.4	<2.40	<4.0	10.0	<4.0	<2.60

Table 2b. Butner sheet, USGS Corehole But-1.

	W-241810 DDH-BUT 220	W-241811 DDH-BUT 250	W-241812 DDH-BUT 270	W-241813 DDH-BUT 300	W-241814 DDH-BUT 330	W-241815 DDH-BUT 350	W-241816 DDH-BUT 360	W-241817 DDH-BUT 370
Lat.	36° 6'N	36° 6'N	36° 6'N	36° 6'N	36° 6'N	36° 6'N	36° 6'N	36° 6'N
Long.	78°46'W	78°46'W	78°46'W	78°46'W	78°46'W	78°46'W	78°46'W	78°46'W
SiO_2 (%)	49.50	49.60	49.40	49.60	49.80	49.90	50.50	49.90
TiO_2	0.47	0.51	0.49	0.54	0.53	0.57	0.58	0.56
Al_2O_3	15.90	16.50	16.40	16.60	16.60	16.40	17.40	16.20
Fe_2O_3	2.41	2.66	2.59	2.49	3.19	2.75	2.71	2.49
FeO	6.66	6.59	6.68	6.91	6.93	7.16	6.05	7.36
MnO	0.16	0.16	0.16	0.17	0.17	0.17	0.16	0.18
MgO	10.70	9.98	9.83	9.41	8.99	9.25	7.01	9.32
CaO	12.20	12.00	11.90	11.70	11.90	11.60	12.60	11.50
Na_2O	1.87	2.08	2.02	2.12	2.17	2.14	2.20	2.14
K_2O	0.28	0.32	0.33	0.34	0.33	0.35	0.37	0.34
P_2O_5	0.08	0.08	0.08	0.09	0.09	0.10	0.10	0.10
H_2O^+	0.47	0.37	0.47	0.50	0.40	0.49	0.55	0.42
H_2O^-	0.25	0.34	0.31	0.27	0.30	0.25	0.34	0.37
CO_2	0.07	0.06	0.06	0.06	0.05	0.06	0.07	0.05
S	<0.01	0.04	<0.01	0.05	0.05	0.05	0.05	0.05
F	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cl	<0.00	<0.00	<0.00	<0.00	0.00	<0.00	<0.00	<0.00
Σ	101.03	101.29	100.73	100.85	101.52	101.26	100.70	100.99
B (ppm)	2.00	7.4	4.0	4.0	8.2	5.2	6.4	7.0
Sc	42	40	39	39	43	40	41	39
Cr	760	570	540	440	340	400	340	360
Co	54	51	52	52	49	51	41	110
Ni	224	208	207	195	178	188	106	408
Cu	73	80	81	86	90	93	92	206
Zn	100	88	95	98	100	100	96	93
As	<1.20	<1.30	<1.30	<1.50	<1.70	<1.70	<1.90	<1.80
Rb	8.0	8.0	4.0	5.0	6.0	11.0	11.0	<2.00
Sr	130	143	131	144	142	151	184	145
Sb	<0.110	<0.120	<0.110	<0.140	<0.130	<0.210	<0.130	<0.130
Cs	<0.30	<0.31	<0.30	0.32	0.80	0.45	0.34	0.45
Ba	86	89	90	100	110	108	109	106
Y	19.0	19.0	23.0	22.0	24.0	27.0	29.0	19.0
La	4.2	4.7	4.7	5.1	5.7	5.2	5.4	5.1
Ce	10.0	11.0	11.0	11.0	13.0	12.0	12.0	12.0
Nd	5.3	6.6	4.6	7.3	7.3	6.9	7.6	7.1
Sm	1.65	1.77	1.78	1.88	2.20	2.00	2.07	1.96
Eu	0.53	0.58	0.60	0.60	0.69	0.66	0.65	0.64
Tb	0.43	0.41	0.41	0.46	0.49	0.51	0.47	0.39
Yb	2.10	2.30	2.20	2.40	2.80	2.50	2.60	2.40
Lu	0.290	0.31	0.34	0.33	0.38	0.37	0.38	0.35
Zr	52	55	57	60	68	63	72	56
Hf	1.10	1.20	1.10	1.30	1.50	1.30	1.40	1.40
Nb	1.50	2.00	1.80	2.10	2.50	2.50	2.30	2.20
Ta	0.220	0.160	0.46	0.180	0.200	<0.280	0.230	0.200
Th	0.46	0.52	0.59	0.61	0.73	0.58	0.84	0.69
U	<0.32	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Pd (ppb)	8.3	9.1	12.0	9.6	10.0	11.0	10.0	11.0
Pt	9.2	8.2	8.4	9.1	10.0	13.0	9.9	11.0
Rh	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Ru	2.00	<1.00	2.80	2.00	2.00	2.00	2.20	2.00
Ir	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Au	<3.0	<7.0	<1.80	<2.10	<7.0	<8.0	<2.30	<2.90

Table 2c. Butner sheet, USGS Coreholes But-1 and DDH-A.

	W-241818 DDH-BUT 380	W-241819 DDH-BUT 390	W-241820 DDH-BUT 395	W-241821 DDH-BUT 400	W-241822 DDH-BUT 402	W-241823 DDH-BUT 403	W-241824 DDH-BUT 404	W-241825 DDH-BUT 404.5	W-241801 DDH-A 93
Lat.	36° 6'N	36° 6'N	36° 6'N	36° 6'N	36° 6'N	36° 6'N	36° 6'N	36° 6'N	36° 6'N
Long.	78°46'W	78°46'W	78°46'W	78°46'W	78°46'W	78°46'W	78°46'W	78°46'W	78°46'W
SiO_2 (%)	49.80	49.80	49.50	49.70	50.10	50.20	50.50	50.40	52.70
TiO_2	0.56	0.55	0.57	0.56	0.59	0.59	0.62	0.62	1.05
Al_2O_3	16.00	15.80	15.90	16.00	16.10	15.90	16.20	16.10	14.20
Fe_2O_3	2.52	2.65	2.64	2.97	2.69	3.27	3.81	3.41	4.71
FeO	7.27	6.89	7.27	7.27	7.11	6.82	6.66	6.76	7.39
MnO	0.17	0.17	0.17	0.17	0.18	0.17	0.18	0.18	0.23
MgO	9.47	9.37	9.44	9.17	8.48	8.47	7.76	7.72	5.90
CaO	11.50	11.40	11.40	11.40	11.60	11.30	11.80	11.80	9.92
Na_2O	2.05	1.95	2.05	2.13	2.22	2.08	2.25	2.21	2.76
K_2O	0.33	0.36	0.33	0.33	0.35	0.41	0.34	0.36	0.63
P_2O_5	0.10	0.09	0.10	0.10	0.10	0.10	0.11	0.11	0.18
H_2O^+	0.57	0.79	0.87	0.90	0.82	1.14	0.83	0.89	0.50
H_2O^-	0.23	0.42	0.19	0.29	0.32	0.40	0.35	0.25	0.52
CO_2	0.04	0.08	0.04	0.03	0.03	0.06	0.04	0.03	0.03
S	0.05	0.03	0.05	0.05	0.05	0.03	0.05	0.05	0.06
F	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02
Cl	<0.00	<0.00	<0.00	<0.00	0.00	<0.00	0.00	0.00	0.01
Σ	100.66	100.37	100.54	101.09	100.76	100.95	101.52	100.91	100.83
B (ppm)	13.7	4.8	6.4	12.8	2.60	6.4	6.0	6.0	2.00
Sc	40	40	40	42	42	43	46	45	49
Cr	360	350	360	360	460	350	350	350	19.0
Co	52	52	53	52	49	50	47	48	41
Ni	201	206	205	197	159	169	140	141	54
Cu	98	95	94	97	100	100	104	106	166
Zn	93	93	78	78	77	82	87	86	120
As	<1.90	<2.00	<0.50	<0.50	<0.70	<0.60	<0.80	<0.60	<1.10
Rb	3.0	9.0	11.0	15.0	6.0	13.0	8.0	7.0	14.0
Sr	155	172	146	151	153	169	136	149	151
Sb	<0.150	<0.140	<0.060	<0.100	<0.080	<0.070	<0.080	<0.070	<0.110
Cs	<0.30	0.91	0.84	1.00	0.35	0.88	0.65	0.69	<0.230
Ba	113	122	115	109	108	136	140	114	183
Y	21.0	19.0	29.0	28.0	26.0	20.0	27.0	27.0	44
La	5.2	5.4	5.3	5.5	5.2	5.7	6.0	6.0	9.5
Ce	12.0	13.0	12.0	12.0	12.0	13.0	13.3	14.0	21.0
Nd	6.4	7.0	6.5	7.0	6.7	8.0	7.4	7.1	12.0
Sm	2.00	2.00	2.06	2.08	1.94	2.15	2.29	2.24	3.4
Eu	0.64	0.64	0.65	0.65	0.63	0.70	0.74	0.73	1.08
Tb	0.46	0.42	0.46	0.55	0.46	0.48	0.60	0.51	0.82
Yb	2.50	2.50	2.61	2.62	2.50	2.60	2.83	2.75	4.1
Lu	0.36	0.35	0.35	0.38	0.36	0.39	0.41	0.40	0.60
Zr	57	66	69	69	65	65	68	69	105
Hf	1.30	1.30	1.50	1.60	1.40	1.60	1.70	1.50	2.60
Nb	2.00	2.20	2.20	2.50	2.50	2.50	2.80	2.70	4.7
Ta	0.190	0.140	0.210	0.180	0.250	0.170	0.200	0.200	0.33
Th	0.69	0.86	0.63	0.62	0.61	0.83	0.78	0.75	1.10
U	<0.30	<0.40	<0.270	<0.280	<0.280	0.46	<0.30	<0.290	0.35
Pd (ppb)	10.0	11.0	11.0	11.0	11.0	12.0	11.0	11.0	96
Pt	12.0	11.0	8.5	11.0	11.0	13.0	11.0	11.0	62
Rh	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	4.2
Ru	2.00	2.00	1.00	2.00	2.40	1.00	<1.00	2.00	<1.00
Ir	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Au	<3.0	<1.80	4.0	4.3	<2.00	6.5	<1.60	9.1	<7.0

Table 3a. North Durham sheet, Nello Teer quarry, north face.

	W-228164 NTQ-1	W-228165 NTQ-2	W-228166 NTQ-3	W-228167 NTQ-4	W-228168 NTQ-5
Lat.	36° 4'N	36° 4'N	36° 4'N	36° 4'N	36° 4'N
Long.	78°49'W	78°49'W	78°49'W	78°49'W	78°49'W
SiO_2 (%)	47.80	48.80	48.00	48.70	48.20
TiO_2	0.71	0.72	0.55	0.71	0.72
Al_2O_3	16.70	16.60	17.60	16.70	16.50
Fe_2O_3	3.90	2.60	2.30	3.20	3.10
FeO	7.20	8.50	7.60	7.90	8.00
MnO	0.18	0.18	0.16	0.18	0.18
MgO	7.10	8.20	9.60	8.10	7.90
CaO	11.50	11.40	11.50	11.40	11.40
Na_2O	1.75	2.02	1.75	1.89	2.02
K_2O	0.26	0.29	0.24	0.29	0.24
P_2O_5	0.12	0.12	0.10	0.12	0.12
H_2O^+	1.60	0.62	0.55	0.89	1.00
H_2O^-	0.90	0.36	0.41	0.51	0.47
CO_2	0.02	0.02	0.01	0.02	0.03
S	0.07	0.08	0.06	0.08	0.06
F	0.00	<0.00	0.38	0.38	<0.00
Cl	0.00	<0.00	<0.00	0.00	0.00
Σ	99.82	100.52	100.82	101.07	99.95
B (ppm)	4.0	2.00	2.00	2.00	2.00
Sc	45	45	38	44	45
Cr	273	262	350	267	265
Co	53	51	54	51	50
Ni	160	140	230	150	140
Cu	139	142	135	154	163
Zn	81	78	71	84	79
Rb	11.0	5.0	6.0	10.0	5.0
Sr	170	179	200	147	157
Sb	0.38	<0.60	<0.70	<0.70	<0.70
Cs	1.20	0.33	0.45	0.55	0.51
Ba	122	169	126	146	150
Y	33	29.0	25.0	29.0	33
La	5.7	5.7	4.2	5.7	5.8
Ce	12.0	11.0	9.6	13.0	12.0
Nd	<17.0	<6.0	6.4	8.3	7.0
Sm	2.20	2.24	1.73	2.25	2.27
Eu	0.74	0.75	0.63	0.77	0.78
Tb	0.59	0.60	0.43	0.56	0.60
Yb	3.1	3.3	2.40	3.1	3.1
Lu	0.47	0.45	0.37	0.49	0.47
Zr	71	66	53	68	67
Hf	1.50	1.40	1.20	1.60	1.50
Nb	2.00	1.80	1.40	2.10	1.70
Ta	0.120	0.110	0.096	0.120	0.120
Th	0.35	0.39	0.47	0.35	0.46
U	<1.00	<0.40	<0.40	<0.40	<1.00
Pd (ppb)	4.4	4.8	6.0	4.6	6.2
Pt	11.0	11.0	12.0	11.0	11.0
Rh	<0.50	<0.50	<0.50	<0.50	<0.50

Table 3b. North Durham sheet, Nello Teer quarry, west face.

	W-228172 NTQ-9	W-228173 NTQ-10	W-228174 NTQ-11	W-228175 NTQ-12	W-228176 NTQ-13	W-243055 NTQ-14	W-243056 NTQ-14A
Lat.	36° 4'N	36° 4'N	36° 4'N	36° 4'N	36° 4'N	36° 4'N	36° 4'N
Long.	78°49'W	78°49'W	78°49'W	78°49'W	78°49'W	78°52'W	78°52'W
SiO_2 (%)	45.60	46.50	46.40	46.50	46.60	48.00	52.60
TiO_2	0.31	0.53	0.40	0.49	0.52	1.82	1.80
Al_2O_3	19.10	18.70	18.30	17.90	18.60	13.20	12.10
Fe_2O_3	1.60	2.00	2.20	1.90	2.10	6.46	5.44
FeO	7.40	7.20	6.70	7.80	7.00	8.60	6.40
MnO	0.14	0.14	0.14	0.15	0.14	0.23	0.24
MgO	13.00	10.60	10.70	11.20	9.80	7.81	2.91
CaO	11.20	10.40	11.20	10.30	11.00	11.10	8.91
Na_2O	1.48	1.89	1.75	1.75	1.75	2.48	3.85
K_2O	0.03	0.16	0.16	0.18	0.14	0.68	4.21
P_2O_5	0.06	0.10	0.07	0.09	0.10	0.18	0.63
H_2O^+	0.81	1.00	1.00	0.96	0.83	1.00	1.00
H_2O^-	0.19	0.48	0.39	0.54	0.47	0.82	0.72
CO_2	0.01	0.03	0.06	0.01	0.01	0.06	0.16
S	0.04	0.06	0.00	0.03	0.02	0.19	0.02
F	0.00	0.00	<0.00	0.00	0.00	0.02	0.05
Cl	<0.00	<0.00	<0.00	<0.00	<0.00	0.00	0.01
Σ	100.98	99.79	99.48	99.81	99.09	102.65	101.06
B (ppm)	2.00	2.00	2.00	2.00	3.0	—	3.0
Sc	23.4	22.6	29.5	25.1	28.3	65	39
Cr	251	227	370	211	164	81	4.1
Co	69	61	61	63	56	62	27.8
Ni	390	320	320	340	270	120	10.0
Cu	87	74	90	95	85	106	49
Zn	61	95	64	71	59	78	99
As	—	—	—	—	—	<1.30	<1.20
Rb	3.0	8.0	5.0	5.0	5.0	6.0	35
Sr	153	167	156	153	162	143	45
Sb	<0.50	<0.50	<0.60	<0.50	<0.50	<0.130	<0.120
Cs	0.220	0.270	<0.30	0.230	<0.40	<0.30	<0.270
Ba	84	128	123	111	138	197	284
Y	14.0	24.0	20.0	21.0	24.0	42	160
La	2.70	4.8	3.3	4.2	4.7	10.0	37
Ce	6.0	10.0	7.1	8.7	9.6	21.3	76
Nd	3.4	6.4	5.6	5.0	<5.0	12.0	41
Sm	1.00	1.77	1.30	1.57	1.74	4.1	12.0
Eu	0.43	0.62	0.52	0.56	0.63	1.31	3.4
Tb	0.290	0.49	0.36	0.37	0.43	1.20	3.1
Yb	1.30	2.30	1.90	2.20	2.40	5.4	15.8
Lu	0.210	0.34	0.280	0.34	0.36	0.79	2.25
Zr	34	57	47	49	57	90	340
Hf	0.73	1.30	0.94	1.10	1.30	2.80	9.5
Nb	0.70	1.50	1.00	1.30	1.50	6.8	17.0
Ta	0.060	0.130	0.072	0.097	0.110	0.46	1.00
Th	0.30	0.37	<0.50	0.280	0.36	0.85	2.80
U	<0.32	<0.80	<0.30	<0.50	<0.50	<0.50	0.84
Pd (ppb)	5.8	7.8	6.6	6.6	4.8	1.50	<0.50
Pt	12.0	29.0	15.0	13.0	9.0	5.2	<1.00
Rh	<0.50	<0.50	<0.50	<0.50	<0.50	—	—
Au	—	—	—	—	—	<1.60	<10.0

Table 3c. North Durham sheet, Nello Teer quarry, USGS Corehole NTQ-1.

	W-243049 DDH-NTQ 7	W-243027 DDH-NTQ 10	W-243050 DDH-NTQ 17	W-243051 DDH-NTQ 30	W-243028 DDH-NTQ 40	W-243029 DDH-NTQ 50	W-243030 DDH-NTQ 60	W-243031 DDH-NTQ 70
Lat.	36° 4'N	36° 4'N	36° 4'N	36° 4'N	36° 4'N	36° 4'N	36° 4'N	36° 4'N
Long.	78°53'W	78°53'W	78°53'W	78°53'W	78°53'W	78°53'W	78°53'W	78°53'W
SiO_2 (%)	46.30	53.70	46.60	46.30	46.10	46.30	46.50	46.60
TiO_2	0.46	2.51	0.44	0.44	0.41	0.46	0.45	0.46
Al_2O_3	17.60	12.50	17.90	17.20	16.40	17.20	17.20	17.70
Fe_2O_3	2.40	4.63	2.22	2.43	1.82	1.85	1.36	0.70
FeO	8.30	5.70	6.70	7.40	8.80	8.20	9.00	9.30
MnO	0.16	0.18	0.14	0.15	0.16	0.15	0.16	0.15
MgO	11.70	3.80	11.30	12.00	13.30	12.00	12.20	11.40
CaO	10.50	8.39	11.90	11.40	10.90	11.00	11.10	11.20
Na_2O	1.94	2.91	1.74	1.77	1.66	1.85	1.79	1.93
K_2O	0.22	3.49	0.18	0.18	0.18	0.20	0.19	0.20
P_2O_5	0.08	0.69	0.07	0.07	0.07	0.07	0.07	0.07
H_2O^+	0.94	0.76	1.10	0.91	0.26	0.80	0.74	0.46
H_2O^-	0.52	0.96	0.53	0.56	1.20	0.92	0.63	0.68
CO_2	0.03	0.15	0.06	0.06	0.06	0.08	0.05	0.05
S	0.10	0.01	0.03	0.05	0.03	0.04	0.03	0.07
F	0.01	0.05	0.01	0.01	0.01	0.01	0.01	0.01
Cl	0.00	0.02	0.00	<0.00	0.00	0.01	0.01	0.00
Σ	101.26	100.46	100.92	100.93	101.35	101.14	101.49	100.98
B (ppm)	31	25.5	—	4.3	7.0	12.1	5.1	1.00
Sc	25.8	42	32	34	33	31	33	32
Cr	236	28.0	530	530	630	490	500	420
Co	72	31	66	69	77	73	72	70
Ni	350	34	310	330	390	340	350	310
Cu	80	51	98	94	100	90	102	93
Zn	78	72	62	65	58	65	58	57
As	<0.90	<1.20	<1.00	<1.10	<1.60	<1.10	<1.20	<1.20
Rb	14.0	40	6.0	<2.00	4.0	5.0	4.0	7.0
Sr	139	110	136	137	133	138	145	143
Sb	<0.080	<0.110	<0.080	<0.170	<0.120	0.160	<0.120	<0.120
Cs	0.250	<0.30	<0.250	<0.250	<0.30	<0.31	<0.32	<0.31
Ba	103	540	85	102	81	95	99	109
Y	22.0	157	22.0	19.0	16.0	21.0	26.0	22.0
La	4.0	37	3.2	3.4	3.2	3.4	3.4	3.6
Ce	8.3	77	8.3	8.2	7.5	8.2	8.1	8.8
Nd	6.4	43	5.3	4.8	3.3	4.8	4.4	5.0
Sm	1.51	12.4	1.30	1.33	1.22	1.35	1.33	1.40
Eu	0.60	3.1	0.52	0.52	0.51	0.54	0.51	0.55
Tb	0.41	3.0	0.37	0.38	0.47	0.34	0.40	0.41
Yb	2.10	15.6	1.80	1.90	1.70	1.90	1.90	2.00
Lu	0.31	2.18	0.260	0.260	0.250	0.280	0.260	0.290
Zr	52	340	44	45	40	47	43	49
Hf	1.00	9.6	0.81	0.87	0.78	0.90	1.00	0.93
Nb	1.90	17.0	1.50	1.40	1.40	1.70	1.40	1.60
Ta	0.270	1.20	0.250	0.200	<0.260	0.250	0.190	0.280
Th	0.290	3.0	0.260	<0.40	<0.30	0.35	0.270	<0.40
U	<0.30	0.73	<0.30	<0.30	<0.40	<0.40	<0.50	<0.50
Pd (ppb)	5.1	<0.50	5.3	4.3	5.0	4.8	5.3	6.0
Pt	9.8	<0.100	9.3	13.0	16.0	14.0	20.0	20.0
Au	<3.0	<8.0	4.9	8.6	<2.60	8.3	<4.0	5.0

Table 3d. North Durham sheet, Nello Teer quarry, USGS Corehole NTQ-1.

	W-243032 DDH-NTQ 80	W-243033 DDH-NTQ 90	W-243034 DDH-NTQ 100	W-243035 DDH-NTQ 110	W-243036 DDH-NTQ 120	W-243037 DDH-NTQ 130	W-243038 DDH-NTQ 140	W-243039 DDH-NTQ 150
Lat.	36° 4'N	36° 4'N	36° 4'N	36° 4'N	36° 4'N	36° 4'N	36° 4'N	36° 4'N
Long.	78°53'W	78°53'W	78°53'W	78°53'W	78°53'W	78°53'W	78°53'W	78°53'W
SiO_2 (%)	46.60	46.90	47.10	46.90	47.30	47.20	47.20	47.40
TiO_2	0.46	0.52	0.55	0.55	0.58	0.54	0.62	0.61
Al_2O_3	17.10	17.60	17.70	17.10	17.60	17.20	17.30	17.00
$Fe_2O_3^*$	—	—	—	11.48	—	—	11.58	—
Fe_2O_3	1.81	1.85	1.43	—	1.14	2.37	—	2.87
FeO	8.60	8.10	8.80	—	9.00	7.90	—	7.80
MnO	0.16	0.15	0.16	0.16	0.16	0.16	0.17	0.17
MgO	11.90	10.50	10.60	11.30	10.50	10.60	10.20	10.30
CaO	11.20	11.60	11.30	11.00	11.20	11.60	11.10	11.30
Na_2O	1.91	1.97	2.01	1.94	2.04	1.98	2.06	2.06
K_2O	0.20	0.20	0.22	0.22	0.25	0.24	0.28	0.27
P_2O_5	0.08	0.08	0.09	0.09	0.09	0.07	0.09	0.08
H_2O^+	0.33	0.96	0.95	—	0.75	0.56	—	1.10
H_2O^-	0.74	0.72	0.46	—	0.59	0.72	—	0.56
CO_2	0.07	0.06	0.06	0.05	0.06	0.06	0.12	0.07
S	0.07	0.07	0.06	0.10	0.10	0.10	0.08	0.08
F	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cl	0.01	0.00	0.00	0.00	0.01	0.00	0.01	0.00
LOI 900C	—	—	—	0.53	—	—	0.51	—
Σ	101.25	101.29	101.50	101.44	101.37	101.32	101.33	101.69
B (ppm)	4.0	13.5	1.00	12.4	36	15.8	12.1	22.0
Sc	35	36	33	34	33	37	34	37
Cr	500	420	350	390	360	420	320	390
Co	75	68	66	76	66	67	79	65
Ni	330	280	280	300	270	270	260	250
Cu	97	98	101	109	104	105	114	114
Zn	55	63	56	76	59	67	68	62
As	<1.30	<1.40	<1.30	<1.50	<1.40	<1.50	<1.50	<1.60
Rb	3.0	7.0	4.0	6.0	6.0	6.0	4.0	7.0
Sr	141	161	151	142	147	148	168	170
Sb	<0.40	<0.130	<0.120	<0.130	<0.140	<0.130	0.240	<0.160
Cs	0.34	<0:30	<0.70	<0.30	<0.31	0.37	<0.30	0.50
Ba	99	118	123	98	121	112	132	140
Y	21.0	25.0	24.0	26.0	27.0	21.0	26.0	31
La	3.6	4.0	4.1	4.0	4.7	4.1	4.9	4.8
Ce	8.4	9.1	8.8	9.3	10.0	8.7	11.0	11.0
Nd	4.9	5.5	4.9	5.2	5.9	5.9	5.7	5.8
Sm	1.42	1.57	1.63	1.63	1.75	1.64	1.85	1.86
Eu	0.57	0.61	0.63	0.63	0.65	0.64	0.67	0.69
Tb	0.42	0.51	0.45	0.50	0.45	0.44	0.50	0.58
Yb	2.08	2.30	2.30	2.20	2.40	2.40	2.60	2.60
Lu	0.289	0.32	0.32	0.33	0.35	0.34	0.37	0.37
Zr	46	48	52	51	55	51	58	60
Hf	1.00	1.10	1.10	1.20	1.30	1.10	1.30	1.20
Nb	1.70	2.00	1.80	<10.0	1.90	1.80	2.30	2.00
Ta	0.31	0.32	0.30	0.41	0.270	0.240	0.31	0.290
Th	0.35	0.35	0.41	0.33	0.42	0.37	0.40	0.34
U	<0.50	<0.50	<0.80	<0.50	<0.50	<0.50	<0.50	<0.50
Pd (ppb)	7.7	3.7	5.0	4.1	4:5	3.5	3.6	3.8
Pt	24.0	55	13.0	8.7	13.0	9.3	8.8	10.0
Au	6.4	<5.0	<7.0	<5.0	<8.0	<2.30	<8.0	<6.0

Table 3e. North Durham sheet, Nello Teer quarry, USGS Corehole NTQ-1.

	W-243040 DDH-NTQ 160	W-243041 DDH-NTQ 170	W-243042 DDH-NTQ 180	W-243043 DDH-NTQ 190	W-243044 DDH-NTQ 200	W-243045 DDH-NTQ 210	W-243046 DDH-NTQ 211	W-243047 DDH-NTQ 212
Lat.	36° 4'N	36° 4'N	36° 4'N	36° 4'N	36° 4'N	36° 4'N	36° 4'N	36° 4'N
Long.	78°53'W	78°53'W	78°53'W	78°53'W	78°53'W	78°53'W	78°53'W	78°53'W
SiO_2 (%)	47.30	47.00	47.40	47.00	47.20	47.50	47.80	48.00
TiO_2	0.59	0.64	0.61	0.59	0.61	0.66	0.70	0.74
Al_2O_3	16.70	16.90	16.40	16.00	16.20	16.50	16.40	16.40
$Fe_2O_3^*$	11.51	—	—	—	—	—	—	—
Fe_2O_3	—	3.23	2.45	2.45	2.89	3.33	3.71	3.31
FeO	—	7.90	8.60	8.60	8.40	8.00	8.00	8.20
MnO	0.17	0.17	0.17	0.17	0.17	0.18	0.18	0.19
MgO	10.40	10.10	10.90	11.90	10.70	9.52	9.17	8.32
CaO	11.40	11.00	11.10	10.80	11.20	11.20	11.40	11.50
Na_2O	2.08	2.10	2.06	2.04	2.09	2.14	2.24	2.25
K_2O	0.25	0.26	0.28	0.26	0.24	0.24	0.26	0.28
P_2O_5	0.08	0.09	0.08	0.08	0.10	0.10	0.11	0.11
H_2O^+	—	0.92	0.45	1.30	1.20	1.70	0.88	1.60
H_2O^-	—	0.73	0.72	0.38	0.37	0.63	0.55	0.68
CO_2	0.11	0.06	0.05	0.05	0.05	0.04	0.02	0.02
S	0.09	0.04	0.09	0.09	0.08	0.12	0.15	0.08
F	0.01	0.01	0.01	0.01	0.02	0.02	0.01	0.02
Cl	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LOI 900C	0.52	—	—	—	—	—	—	—
Σ	101.22	101.16	101.38	101.72	101.52	101.89	101.58	101.71
B (ppm)	6.5	11.2	36	22.3	21.4	25.4	28.2	29.3
Sc	39	39	39	38	41	42	45	46
Cr	430	430	520	650	420	299	290	278
Co	67	71	71	75	70	68	61	61
Ni	260	260	280	340	270	210	190	160
Cu	120	108	109	119	128	135	124	144
Zn	62	67	63	75	74	88	67	81
As	<0.70	<0.50	<0.60	<0.60	<0.60	<0.70	<0.70	3.5
Rb	<2.00	9.0	4.0	2.00	<2.00	2.00	6.0	6.0
Sr	159	152	142	148	146	143	141	150
Sb	<0.150	<0.110	0.130	0.085	<0.140	<0.50	<0.190	0.250
Cs	0.55	0.75	0.48	0.98	0.91	2.10	1.40	1.10
Ba	134	142	133	143	136	127	117	140
Y	23.0	25.0	29.0	26.0	21.0	23.0	24.0	27.0
La	4.5	5.0	4.8	4.6	4.8	5.1	5.5	5.9
Ce	10.0	11.0	11.0	11.0	11.0	11.0	12.0	13.0
Nd	6.5	6.2	6.0	6.8	6.3	6.8	7.3	8.4
Sm	1.84	1.90	1.87	1.80	1.92	2.03	2.20	2.23
Eu	0.70	0.73	0.71	0.65	0.74	0.74	0.78	0.82
Tb	0.52	0.57	0.51	0.48	0.55	0.65	0.61	0.62
Yb	2.60	2.81	2.66	2.56	2.70	2.92	3.1	3.1
Lu	0.35	0.39	0.37	0.36	0.37	0.41	0.42	0.44
Zr	52	56	54	56	54	55	59	60
Hf	1.20	1.30	1.30	1.30	1.30	1.30	1.40	1.40
Nb	<10.0	2.40	2.00	2.00	2.10	2.40	2.40	2.40
Ta	0.180	0.30	0.31	0.270	0.260	0.260	0.180	0.270
Th	0.34	0.41	0.35	0.250	0.280	0.35	0.42	0.46
U	<0.31	<0.40	<0.30	<0.40	<0.30	<0.30	<0.30	<0.30
Pd (ppb)	3.5	2.80	2.90	3.9	3.1	3.4	3.2	2.60
Pt	11.0	5.9	8.0	9.4	9.1	7.1	11.0	9.8
Au	6.1	28.0	7.2	<2.30	<6.0	5.1	<8.0	8.6

Table 3f. North Durham sheet, Eno River section.

	W-232407 DBF-85-11	W-232408 DBF85-12A	W-232409 DBF85-12B	W-232410 DBF85-12C	W-232411 DBF85-12D
Lat.	36° 4'N	36° 4'N	36° 4'N	36° 4'N	36° 4'N
Long.	78°53'W	78°53'W	78°53'W	78°53'W	78°53'W
SiO_2 (%)	50.10	47.70	47.30	46.90	46.90
TiO_2	0.96	0.62	0.55	0.55	0.60
Al_2O_3	17.10	18.10	17.80	17.80	17.40
Fe_2O_3	3.00	2.00	2.50	1.80	2.20
FeO	7.10	7.50	7.20	7.60	7.80
MnO	0.16	0.15	0.15	0.15	0.16
MgO	5.40	9.90	10.30	9.90	9.80
CaO	11.10	11.30	10.80	11.00	11.00
Na_2O	2.83	2.02	1.89	2.02	1.90
K_2O	0.51	0.28	0.19	0.24	0.21
P_2O_5	0.15	0.10	0.09	0.09	0.10
H_2O^+	0.86	0.45	1.20	1.10	0.84
H_2O^-	0.44	0.37	0.43	0.29	0.36
CO_2	0.01	0.01	0.01	0.01	0.01
S	0.20	0.12	0.07	0.09	0.13
Σ	99.92	100.62	100.48	99.54	99.41
B (ppm)	2.00	2.00	2.00	2.00	2.00
Sc	49	36	35	36	37
Cr	115	340	350	350	310
Co	40	58	60	59	60
Ni	62	230	260	240	230
Cu	120	98	100	100	110
Zn	90	78	76	73	78
Rb	9.0	2.00	9.0	4.0	6.0
Sr	185	155	160	148	151
Sb	0.56	<0.50	<0.60	<0.50	<0.50
Cs	<1.00	0.50	0.63	<0.80	0.57
Ba	193	124	134	115	133
Y	32	24.0	26.0	23.0	26.0
La	7.1	5.0	4.5	4.8	<50
Ce	15.0	11.0	9.8	8.8	9.2
Nd	8.1	<10.0	5.1	<6.0	6.1
Sm	2.68	1.85	1.69	1.74	1.80
Eu	1.01	0.70	0.65	0.66	0.67
Tb	0.65	0.53	0.47	0.47	0.51
Yb	3.7	2.50	2.40	2.30	2.80
Lu	0.57	0.40	0.38	0.38	0.40
Zr	77	55	54	50	56
Hf	1.70	1.20	1.20	1.10	1.20
Nb	2.10	<2.00	<2.00	<2.00	<2.00
Ta	0.230	0.130	0.098	0.120	0.120
Th	0.41	<0.50	0.48	<0.50	0.39
U	<0.290	<0.240	<0.31	<0.250	<0.250
Pd (ppb)	1.10	3.6	0.90	1.40	3.9
Pt	1.10	9.4	8.4	9.6	13.0
Rh	<0.50	<0.50	<0.50	<0.50	<0.50

Table 3g. North Durham sheet, Eno River section.

	W-232412 DBF-85 13A	W-232413 DBF-85 13B	W-232414 DBF-85 14	W-232415 DBF-85 15	W-232416 DBF-85 16	W-232417 DBF-85 16A
Lat.	36° 4'N	36° 4'N	36° 3'N	36° 3'N	36° 3'N	36° 3'N
Long.	78°53'W	78°53'W	78°52'W	78°52'W	78°52'W	78°52'W
SiO_2 (%)	47.60	47.80	47.00	45.50	47.70	48.30
TiO_2	0.62	0.66	0.46	0.31	0.73	0.74
Al_2O_3	17.50	17.40	19.30	19.80	16.40	16.50
Fe_2O_3	2.30	2.00	1.10	0.90	2.10	2.20
FeO	7.70	8.10	7.60	7.60	8.60	8.60
MnO	0.16	0.16	0.14	0.14	0.18	0.18
MgO	9.50	9.10	9.90	12.80	7.90	8.30
CaO	11.20	11.20	11.20	10.80	11.20	11.20
Na_2O	2.02	2.02	2.16	1.62	2.16	2.16
K_2O	0.26	0.43	0.19	0.13	0.27	0.30
P_2O_5	0.09	0.10	0.07	0.19	0.11	0.10
H_2O^+	0.95	0.82	0.77	0.58	1.10	0.83
H_2O^-	0.25	0.38	0.18	0.12	0.19	0.27
CO_2	0.02	0.01	0.01	0.02	0.01	0.01
S	0.15	0.11	0.13	0.13	0.17	0.24
Σ	100.32	100.29	100.21	100.64	98.82	99.93
B (ppm)	3.0	<2.00	<2.00	<2.00	<2.00	<2.00
Sc	40	41	28.7	22.3	46	47
Cr	330	360	234	274	268	284
Co	57	55	57	67	52	53
Ni	210	200	240	400	120	130
Cu	110	120	94	71	130	130
Zn	89	110	67	57	96	91
Rb	7.0	7.0	5.0	<2.00	4.0	3.0
Sr	156	183	152	139	140	161
Sb	<0.50	<0.60	<0.40	<0.50	<0.70	<0.70
Cs	<0.70	0.44	0.53	<0.60	0.50	0.38
Ba	123	137	102	79	150	161
Y	27.0	29.0	20.0	12.0	29.0	26.0
La	5.1	5.1	4.0	2.30	5.8	5.5
Ce	10.0	12.0	8.0	4.6	12.0	12.0
Nd	5.9	6.6	<4.0	<9.0	8.5	8.3
Sm	1.84	2.03	1.40	0.91	2.30	2.31
Eu	0.70	0.74	0.58	0.41	0.82	0.81
Tb	0.51	0.55	0.37	0.220	0.58	0.55
Yb	2.60	2.90	2.10	1.20	3.2	3.2
Lu	0.40	0.45	0.290	0.200	0.48	0.49
Zr	59	65	44	27.0	66	65
Hf	1.30	1.50	0.90	0.54	1.40	1.50
Nb	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00
Ta	0.100	0.130	0.100	0.068	0.130	0.150
Th	0.38	0.41	0.63	<0.60	<0.90	0.46
U	<0.290	<0.30	<0.270	0.270	<0.40	<0.60
Pd (ppb)	3.1	3.2	3.9	8.7	4.1	4.2
Pt	10.0	16.0	11.0	21.0	10.0	8.0
Rh	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50

Table 3h. North Durham sheet, Braggtown quarry and Ellerbe sheet.

	W-239866 BNC85-1	W-239867 BNC85-1A	W-232405 DBF85-10B	W-232420 DBF-85-18	W-232421 DBF-85-19
Lat.	36° 1'N	36° 1'N	36° 3'N	36° 2'N	36° 2'N
Long.	78°54'W	78°54'W	78°54'W	78°49'W	78°46'W
SiO_2 (%)	—	—	46.70	48.50	49.20
TiO_2	—	—	0.47	0.47	0.52
Al_2O_3	—	—	18.50	16.20	15.40
$Fe_2O_3^*$	12.36	12.30	—	—	—
Fe_2O_3	—	—	1.60	2.70	3.00
FeO	—	—	7.60	7.60	7.40
MnO	—	—	0.15	0.18	0.19
MgO	—	—	11.00	8.80	8.30
CaO	10.49	9.65	10.90	11.90	11.70
Na_2O	1.58	1.56	1.89	2.02	2.02
K_2O	—	—	0.24	0.16	0.27
P_2O_5	—	—	0.08	0.09	0.11
H_2O^+	—	—	0.62	0.90	0.95
H_2O^-	—	—	0.20	0.20	0.35
CO_2	—	—	0.01	0.01	0.01
S	0.03	0.05	0.10	0.13	0.11
Σ	—	—	100.06	99.86	99.53
B (ppm)	—	—	2.00	2.00	2.00
Sc	42	39	29.7	46	49
Cr	1280	1810	370	360	310
Co	74	80	64	52	50
Ni	500	560	300	140	110
Cu	88	83	83	100	100
Zn	88	84	75	97	90
As	<2.20	<2.20	—	—	—
Rb	3.0	4.0	5.0	5.0	7.0
Sr	79	96	146	118	138
Sb	<0.50	<0.50	<0.50	0.39	<0.70
Cs	1.80	1.30	<0.90	0.81	<0.80
Ba	32	57	100	72	109
Y	20.0	21.0	19.0	25.0	27.0
La	2.70	2.90	3.8	3.5	5.1
Ce	6.1	6.5	8.1	8.2	11.0
Nd	4.1	3.4	5.9	<40	5.4
Sm	1.10	1.10	1.45	1.46	1.75
Eu	0.38	0.39	0.57	0.50	0.58
Tb	0.33	0.31	0.41	0.38	0.45
Yb	2.20	2.12	1.90	2.70	2.80
Lu	0.34	0.31	0.290	0.38	0.44
Zr	36	34	43	46	58
Hf	0.91	0.67	1.00	0.89	1.20
Nb	1.30	1.40	<2.00	<2.00	<2.00
Ta	0.160	0.200	0.095	0.100	0.130
Th	<0.30	0.31	0.30	<0.80	0.76
U	<0.40	<0.40	0.100	<0.40	0.33
Pd (ppb)	10.0	19.0	5.0	8.9	9.6
Pt	14.0	19.0	9.8	17.0	10.0
Rh	<0.50	1.70	<0.50	<0.50	<0.50

Table 4a. Oak Grove sheet, Corehole DDH-1.

	W-239868 DDH-1-90.5	W-239860 DDH-1-97	W-239869 DDH-1-98	W-239870 DDH-1-99.5
Lat.	35°58'N	35°38'N	35°58'N	35°58'N
Long.	78°48'W	78°48'W	78°48'W	78°48'W
$Fe_2O_3^*$ (%)	12.11	—	11.81	12.00
CaO	9.93	—	11.61	10.35
Na_2O	1.67	—	1.87	1.63
S	0.05	—	0.03	0.05
Sc (ppm)	39	—	46	40
Cr	1320	1100	730	1310
Co	82	60	64	95
Ni	600	310	220	530
Cu	83	95	100	88
Zn	82	80	89	79
As	<2.30	—	<2.50	<2.50
Rb	6.0	—	3.0	<2.00
Sr	85	—	95	86
Sb	<0.50	—	<0.50	<0.50
Cs	0.51	—	0.87	0.73
Ba	57	—	51	54
Y	23.0	—	22.0	18.0
La	3.2	—	3.4	3.0
Ce	7.0	—	7.3	6.8
Nd	4.5	—	4.5	3.8
Sm	1.20	—	1.33	1.10
Eu	0.39	—	0.44	0.39
Tb	0.33	—	0.36	0.32
Yb	2.16	—	2.53	2.11
Lu	0.33	—	0.38	0.32
Zr	43	—	42	33
Hf	0.81	—	<1.10	0.66
Nb	2.30	—	2.20	2.40
Ta	0.79	—	0.89	1.30
Th	0.37	—	0.250	<0.40
U	<0.40	—	<0.40	<0.40
Pd (ppb)	11.0	—	11.0	17.0
Pt	16.0	—	14.0	14.0
Rh	<0.50	—	<0.50	0.80

Table 4b. Oak Grove sheet, Corehole DDH-2.

	W-239871 DDH-2 197	W-239872 DDH-2 201	W-239873 DDH-2 204	W-239874 DDH-2 205	W-239863 DDH-2 212	W-239876 DDH-2 218.3	W-239877 DDH-2 220	W-239864 DDH-2 223	W-239878 DDH-2 224
Lat.	35°58'N	35°58'N	35°58'N	35°58'N	35°58'N	35°58'N	35°58'N	35°58'N	35°58'N
Long.	78°49'W	78°49'W	78°49'W	78°49'W	78°49'W	78°49'W	78°49'W	78°49'W	78°49'W
$Fe_2O_3^*$ (%)	12.59	11.30	12.27	11.96	—	12.08	10.34	—	11.57
CaO	8.53	12.03	9.37	8.67	—	9.37	11.75	—	11.05
Na_2O	1.46	1.94	1.51	1.35	—	1.46	1.36	—	1.85
S	0.05	0.06	0.03	0.02	—	<0.01	<0.01	—	<0.01
Sc (ppm)	34	45	38	37	—	38	36	—	45
Cr	4300	820	1540	1450	700	1620	1010	940	570
Co	93	63	95	86	53	81	56	63	57
Ni	770	240	710	720	270	650	300	310	200
Cu	69	93	80	85	82	87	72	93	100
Zn	82	83	86	80	59	87	73	69	83
As	<2.50	<2.80	<2.70	<2.90	—	<3.0	2.30	—	<3.0
Rb	5.0	4.0	9.1	5.0	—	<2.00	4.0	—	7.0
Sr	86	109	74	89	—	101	103	—	112
Sb	<0.50	<0.60	<0.50	<0.50	—	<0.50	<0.40	—	<0.60
Cs	1.90	0.48	1.20	1.50	—	1.10	0.59	—	1.20
Ba	47	68	56	47	—	41	28.0	—	53
Y	13.0	20.0	14.0	22.0	—	16.0	16.0	—	25.0
La	3.7	3.6	3.3	3.0	—	2.50	2.40	—	3.2
Ce	9.7	7.4	8.0	6.1	—	5.8	6.3	—	8.1
Nd	4.8	4.3	4.0	4.0	—	4.1	3.4	—	4.3
Sm	1.17	1.30	1.10	1.10	—	1.03	1.04	—	1.31
Eu	0.36	0.43	0.38	0.37	—	0.36	0.36	—	0.43
Tb	0.31	0.37	0.32	0.30	—	0.32	0.31	—	0.41
Yb	1.80	2.37	2.06	1.96	—	1.90	1.93	—	2.44
Lu	0.280	0.36	0.31	0.30	—	0.299	0.30	—	0.39
Zr	34	44	37	39	—	34	36	—	45
Hf	0.79	0.85	0.71	0.62	—	0.65	0.68	—	0.79
Nb	1.90	2.20	1.80	1.70	—	1.80	1.30	—	1.90
Ta	0.56	0.85	0.72	0.41	—	0.280	0.160	—	0.30
Th	0.36	0.35	0.290	0.30	—	<0.40	0.290	—	0.260
U	<0.50	<0.40	<0.50	<0.40	—	<0.50	<0.40	—	<0.50
Pd (ppb)	10.0	8.7	14.0	14.0	—	12.0	8.8	—	20.0
Pt	12.0	14.0	20.0	22.0	—	15.0	16.0	—	21.0
Rh	<0.50	2.60	<0.50	<0.50	—	<0.50	1.20	—	<0.50

Table 4c. Oak Grove sheet, Corehole DDH-2.

	W-239876 DDH-2-218.3	W-239877 DDH-2-220	W-239864 DDH-2-223	W-239878 DDH-2-224
Lat.	35°58'N	35°58'N	35°58'N	35°58'N
Long.	78°49'W	78°49'W	78°49'W	78°49'W
$Fe_2O_3^*$ (%)	12.08	10.34	—	11.57
CaO	9.37	11.75	—	11.05
Na_2O	1.46	1.36	—	1.85
S	<0.01	<0.01	—	<0.01
Sc (ppm)	38	36	—	45
Cr	1620	1010	940	570
Co	81	56	63	57
Ni	650	300	310	200
Cu	87	72	93	100
Zn	87	73	69	83
As	<3.0	2.30	—	<3.0
Rb	<2.00	4.0	—	7.0
Sr	101	103	—	112
Sb	<0.50	<0.40	—	<0.60
Cs	1.10	0.59	—	1.20
Ba	41	28.0	—	53
Y	16.0	16.0	—	25.0
La	2.50	2.40	—	3.2
Ce	5.8	6.3	—	8.1
Nd	4.1	3.4	—	4.3
Sm	1.03	1.04	—	1.31
Eu	0.36	0.36	—	0.43
Tb	0.32	0.31	—	0.41
Yb	1.90	1.93	—	2.44
Lu	0.299	0.30	—	0.39
Zr	34	36	—	45
Hf	0.65	0.68	—	0.79
Nb	1.80	1.30	—	1.90
Ta	0.280	0.160	—	0.30
Th	<0.40	0.290	—	0.260
U	<0.50	<0.40	—	<0.50
Pd (ppb)	12.0	8.8	—	20.0
Pt	15.0	16.0	—	21.0
Rh	<0.50	1.20	—	<0.50

Table 5. Cumnock sheet, Sanford basin, and dikes, Sanford and Durham basins.

	W-223097 NCMR3 257	W-223096 NCCM1 258	W-232418 DBF-85 17	W-232419 DBF-85 17A	W-243886 FG-87 DB-20	W-243820 JY-1	W-243821 JY-2
Lat.	35°29'N	35°33'N	36° 5'N	36° 5'N	37°58'N	35°52'N	35°52'N
Long.	79°20'W	79°13'W	78°51'W	78°51'W	78°56'W	78°56'W	78°56'W
SiO_2 (%)	49.20	49.50	48.00	48.70	47.30	52.40	52.00
TiO_2	0.79	0.79	0.73	0.87	0.61	1.20	1.15
Al_2O_3	16.20	16.30	16.40	15.60	16.20	14.00	14.10
Fe_2O_3	3.30	3.20	2.20	3.30	2.55	3.10	3.08
FeO	8.50	8.40	8.60	8.60	8.10	7.90	7.90
MnO	0.20	0.19	0.18	0.20	0.18	0.17	0.17
MgO	7.20	7.40	7.90	7.60	11.10	7.37	7.56
CaO	9.80	9.90	11.30	11.20	10.90	10.80	10.80
Na_2O	2.72	2.80	2.16	2.29	1.90	2.06	1.95
K_2O	0.44	0.48	0.24	0.32	0.25	0.58	0.47
P_2O_5	0.14	0.13	0.11	0.13	0.10	0.15	0.15
H_2O^+	1.20	0.79	1.20	0.90	1.00	0.62	0.63
H_2O^-	0.78	0.61	0.30	0.30	0.11	0.38	0.47
CO_2	0.02	0.13	0.04	0.02	0.05	0.02	0.02
S	—	—	0.17	0.16	0.09	0.04	0.05
F	—	—	—	—	0.01	0.03	0.03
Cl	—	—	—	—	<0.00	<0.00	<0.00
Σ	100.49	100.62	99.53	100.19	100.45	100.82	100.52
B (ppm)	—	—	2.00	<2.00	6.9	6.3	6.5
Sc	36	37	47	53	37	37	37
Cr	78	114	272	285	480	242	279
Co	52	52	53	54	61	47	49
Ni	130	140	130	91	296	74	92
Cu	89	118	130	140	96	94	107
Zn	84	79	90	110	60	61	76
Ga	—	—	—	—	16.0	19.0	19.0
As	—	—	—	—	<1.50	1.60	1.30
Rb	12.0	3.0	3.0	6.0	6.0	28.0	17.0
Sr	184	186	136	157	156	185	177
Ag	—	—	—	—	0.0290	—	—
Sb	<0.60	<0.60	<0.70	<0.70	<0.170	0.100	0.180
Cs	1.40	0.42	0.83	0.46	<0.30	0.56	0.30
Ba	168	196	147	171	171	166	217
Y	35	31	32	35	21.0	22.0	20.0
La	7.3	7.4	5.7	6.9	4.7	11.4	10.5
Ce	15.6	15.8	12.0	14.0	9.9	23.0	22.0
Nd	10.0	12.0	<11.0	8.3	<5.0	14.0	12.0
Sm	2.77	2.76	2.28	2.63	1.84	3.6	3.4
Eu	0.87	0.85	0.78	0.92	0.69	1.10	1.10
Tb	0.62	0.72	0.60	0.75	0.49	0.72	0.64
Yb	3.4	3.2	3.0	3.6	2.50	2.50	2.40
Lu	0.50	0.49	0.51	0.55	0.39	0.35	0.34
Zr	94	92	67	76	59	107	99
Hf	2.00	2.12	1.40	1.80	1.20	2.60	2.50
Nb	3.5	3.6	<2.00	2.00	1.80	8.5	8.3
Ta	0.240	0.250	0.150	0.170	<0.230	0.54	0.50
Th	0.83	0.77	<0.80	<0.90	0.44	2.30	2.40
U	<0.30	<0.30	<0.40	<0.60	<0.40	0.51	0.35
Pd (ppb)	4.6	11.0	3.7	3.2	4.7	8.0	8.5
Pt	4.0	8.0	18.0	17.0	9.4	14.0	15.0
Rh	<0.50	<0.50	<0.50	<0.50	—	—	—
Au	—	—	—	—	<4.0	5.4	<7.0