Division of Geological & Geophysical Surveys

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MAJOR OXIDE, MINOR OXIDE, TRACE ELEMENT, AND GEOCHEMICAL DATA FROM ROCKS COLLECTED IN THE BIG DELTA QUADRANGLE, ALASKA IN 2001

by

J.E. Athey, M.B. Werdon, D.J. Szumigala, R.J. Newberry, and M.R. Johnson

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Note: This report (including all analytical data, tables, and map sheets) is available in digital format from the DGGS web site (http://wwwdggs.dnr.state.ak.us) at no charge. The digital data are available as PDF files and Excel spreadsheets.

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INTRODUCTION

Mineral resource personnel from the Alaska Division of Geological & Geophysical Surveys carried out a geological field survey, including mapping and sampling in the Big Delta quadrangle, Alaska from August 7-21, 2001. The fieldwork provides basic information critical to building an understanding of Alaska's geology and is part of an integrated program of airborne geophysical surveys followed by geological mapping programs. During 2001, 68 rock samples were collected for geochemical trace-element analysis, and 122 samples were collected for whole rock (major and minor oxides, and petrogenetically important trace element data) analysis. The locations of these samples are shown on Sheets 1 (whole rock) and 2 (trace-element geochemistry). Location data (in UTM coordinates based on Clark 1866 spheroid, NAD27 datum, UTM zone 6 projection), descriptions, and analytical results for each sample are tabulated in tables 1, 2, 3, and 4.

ANALYTICAL METHODS

All whole rock analyses (table 1) were performed by Chemex Labs, Inc. Major and minor element oxides were determined by X-ray fluorescence spectrometry (XRF) following a lithium tetraborate fusion. Trace elements (Ba, Nb, Rb, Sr, Y, and Zr) were also analyzed using XRF methods on a pressed powder pellet. Analytical detection limits are tabulated in table 5.

All 2001 trace-element geochemical analyses (table 3) were performed by Chemex Labs, Inc. Rock samples were crushed so that at least 70 percent of the material passed through a –10 (2 mm) mesh screen. Representative aliquots of 200 grams and 30 grams each were taken using a stainless steel riffle splitter. These samples were then pulverized in a chrome steel ring mill so that 85 percent of the sample passed through a –200 (75 micron) mesh screen. Most trace element analyses were performed on the 200 gram split while gold, platinum and palladium analyses were performed on the 30 gram representative split.

Most samples were analyzed for gold using atomic absorption spectroscopy following fire assay fusion (FA-AAS). A few gold analyses and all platinum and palladium analyses were done by inductively coupled plasma - mass spectrometry (ICP-MS) following a fire assay fusion. All other trace element geochemical analyses were performed by inductively coupled plasma - atomic emission spectroscopy (ICP-AES) methods after nitric aqua regia digestion. This method of digestion is possibly incomplete for some elements and may result in lower analytical results for certain elements. The elements that may be affected by incomplete digestion as well as analytical methods, detection limits and upper limits are tabulated in table 6.

Table 1. Concentration of major-oxides, minor oxides, and trace elements in rock samples collected in the Big Delta Quadrangle.

note: --- = not analyzed

SAMPLE	Al2O3 %	BaO %	CaO %	Cr2O3 %	FeO %	Fe2O3 %	K2O %	MgO %	MnO %	Na2O %	P2O5 %	SiO2 %	SrO %	TiO2 %	LOI %	TOTAL	Ba ppm	Rb ppm	Sr ppm	Nb ppm	Zr ppm	Y ppm
01JEA375A	14.09	0.01	0.98	<.01	---	1.33	4.48	0.22	0.04	2.54	0.2	73.7	0.01	0.15	0.81	98.56	340	184	80	14	63	24
01JEA381A	14.92	0.02	1.14	0.01	---	2.29	3.44	0.86	0.03	2.74	0.11	72.51	0.02	0.23	1.13	99.45	380	136	140	20	78	28
01JEA400A	15.68	0.06	3.02	0.01	---	3.64	2.94	1.1	0.06	2.53	0.1	69.17	0.03	0.47	0.89	99.7	730	120	196	16	150	30
01JEA403A	22.01	0.14	0.74	0.01	---	7.56	4.89	1.97	0.07	1.6	0.16	54.98	0.01	0.8	4.38	99.32	1310	176	166	28	144	40
01JEA405A	14.16	0.04	8.42	<.01	---	12.8	1.63	4.7	0.21	3.45	0.51	49.67	0.03	2.58	1.54	99.74	470	58	288	38	234	36
01JEA412A	12.82	0.05	0.89	<.01	---	2.06	4.21	0.19	0.02	2.11	0.08	76.22	<.01	0.31	0.68	99.64	650	200	50	12	165	40
01JEA424A	14.9	<.01	9.72	0.01	---	10.66	1.23	6.09	0.15	3.33	0.22	50.79	0.02	1.72	0.93	99.77	165	32	226	26	174	26
01JEA432A	14.34	0.06	1.09	<.01	---	5.4	3.26	1.83	0.08	0.93	0.09	69.71	0.01	0.59	1.89	99.28	665	128	116	16	189	28
01JEA437A	12.85	<.01	7.35	<.01	---	13.77	0.37	3.98	0.21	3.08	0.54	50.99	0.03	3.68	2.65	99.5	170	26	298	34	276	40
01JEA446A	13.17	0.02	0.57	<.01	---	1.41	5.13	0.08	0.03	2.6	0.03	76.24	0.01	0.13	0.48	99.9	385	162	108	30	111	30
01JEA447A	14.38	0.13	1.94	<.01	---	2.14	3.79	0.64	0.06	2.97	0.09	72.24	0.04	0.32	0.67	99.41	1335	158	338	18	141	24
01JEA463B	14.04	0.1	1.22	<.01	---	0.62	4.84	0.12	0.02	2.41	0.11	74.23	0.02	0.06	0.6	98.39	870	104	158	10	42	22
01JEA508A	8.9	0.03	0.78	0.01	---	3.55	1.83	0.96	0.05	2.26	0.05	79.16	0.01	0.44	1.06	99.08	515	74	102	14	255	20
01JEA518A	13.96	<.01	10.15	0.01	---	12.37	0.09	6.02	0.19	2.12	0.28	49.14	0.04	2.24	2.74	99.35	50	14	420	20	156	26
01JEA521A	4.4	<.01	0.07	<.01	---	1.69	0.35	0.14	0.01	0.95	0.04	90.94	<.01	0.19	0.9	99.68	110	30	12	12	174	18
01JEA527A	14	0.01	3.01	0.01	---	4.81	2.07	1.82	0.08	1.68	0.07	70.49	0.01	0.52	1	99.58	465	102	178	16	114	28
01JEA535A	14.63	0.1	1.62	0.01	---	2.02	3.64	0.4	0.04	2.67	0.1	73.55	0.03	0.22	0.75	99.78	1045	136	220	16	138	26
01JEA538A	17.66	0.06	1.11	<.01	---	9.83	3.37	2.06	0.1	1.56	0.18	59.65	0.01	1.35	2.76	99.7	---	---	---	---	---	---
01JEA543A	16.19	0.17	1.53	0.01	---	5.14	4.16	1.78	0.06	2.7	0.07	64.39	0.05	0.73	1.74	98.72	---	---	---	---	---	---
01JEA544A	16.37	0.15	5.29	0.01	---	6.5	2.76	3.29	0.11	2.94	0.24	59.63	0.05	0.86	1.34	99.54	1485	96	440	16	165	22
01JEA559A	14.87	0.12	1.69	0.01	---	6.96	3.22	2.14	0.08	1.72	0.08	66.25	0.01	0.98	1.5	99.63	1180	142	186	28	300	30
01MBW474A	13.99	0.01	0.45	0.01	---	1.1	5.2	0.16	0.01	2.47	0.14	74	<.01	0.1	0.99	98.63	310	182	66	10	60	28
01MBW477B	14.01	0.11	1.98	0.01	---	2.48	3.42	0.56	0.04	2.71	0.13	71.93	0.04	0.3	0.83	98.55	1030	112	280	18	159	24
01MBW486A	16.03	0.04	3.79	0.01	---	4.26	2.51	1.43	0.08	3.17	0.13	65.98	0.03	0.57	0.7	98.73	600	124	244	18	165	30
01MBW488A	12.95	0.09	0.94	0.01	---	3.25	5.18	0.99	0.07	1.99	0.07	72.37	0.01	0.49	1.3	99.71	880	134	164	20	252	34
01MBW494A	20.52	0.05	6.15	<.01	---	7.68	2.91	3.3	0.1	2.46	0.17	53.38	0.04	1.05	2.16	99.97	640	156	346	16	144	28
01MBW496A	17.55	0.08	3.92	<.01	---	4.14	3.37	1.67	0.07	3.66	0.2	62.3	0.04	0.66	0.95	98.61	855	158	338	18	189	26
01MBW512A	15.62	0.06	3.28	0.01	---	3.74	3.06	1.27	0.07	2.95	0.13	68.02	0.03	0.46	1.16	99.86	700	114	274	16	141	24
01MBW516A	13.55	0.15	1.4	<.01	---	3.05	5.75	0.58	0.04	2.21	0.18	70.84	0.02	0.42	0.57	98.76	1260	180	158	20	186	42
01MBW519C	16.84	0.11	3.06	<.01	---	3.58	3.29	1.58	0.06	3.55	0.15	65.95	0.04	0.6	0.91	99.72	1020	148	314	20	192	22
01MBW528A	13.69	0.06	2.14	0.01	---	3.82	3.62	1.13	0.06	2.29	0.1	69.64	0.01	0.39	1.47	98.43	730	150	152	22	165	36
01MBW534A	13.64	0.07	1.4	0.01	---	3.56	3.81	1.02	0.06	2.46	0.09	70.43	0.01	0.36	1.68	98.6	780	152	160	22	162	36
01MBW541B	15.18	0.09	2.93	0.01	---	3.85	3.35	2	0.07	2.9	0.1	66.53	0.03	0.5	2.06	99.6	865	154	256	16	141	28

Table 1. (continued)

SAMPLE	Al2O3 %	BaO %	CaO %	Cr2O3 %	FeO %	Fe2O3 %	K2O %	MgO %	MnO %	Na2O %	P2O5 %	SiO2 %	SrO %	TiO2 %	LOI %	TOTAL	Ba ppm	Rb ppm	Sr ppm	Nb ppm	Zr ppm	Y ppm
01MBW542B	15.35	0.08	7.17	0.01	---	7.39	2.39	7.79	0.13	2.98	0.12	53.13	0.06	0.68	1.81	99.09	795	96	510	12	117	22
01MBW585B	14.43	0.07	0.08	<.01	---	2.07	2.73	0.26	0.03	2.76	0.08	74.18	<.01	0.32	2.48	99.49	695	170	70	30	159	18
01MBW587A	13.91	0.01	10.25	0.01	---	12.79	0.09	6.14	0.18	1.84	0.29	48.18	0.06	2.27	3.57	99.59	185	14	592	18	159	28
01MBW613A	14.18	<.01	0.48	<.01	---	0.96	3.54	<.01	0.04	3.8	0.22	74.79	<.01	0.07	0.81	98.89	65	278	<2	16	42	16
01MBW666A	11.16	0.09	12.9	0.01	---	13.26	1.27	10.57	0.21	1.56	0.89	42.62	0.06	2.86	2.2	99.66	830	48	554	138	288	36
01MBW684A	10.5	0.01	9.75	0.01	---	13.56	0.75	9.07	0.17	0.46	0.54	48.84	<.01	3.86	2.04	99.56	180	42	72	60	276	30
01MBW693A	15.88	0.06	1.61	<.01	---	1.81	4.11	0.44	0.03	3.37	0.11	71.32	0.03	0.35	0.65	99.77	685	266	222	18	156	20
01MBW705A	8.15	0.01	11.57	0.01	---	13.47	0.87	11.72	0.2	0.47	0.48	47.64	0.01	2.62	1.71	98.93	270	30	88	46	192	22
01MBW708A	11.55	0.04	12.98	0.01	---	12.66	0.91	11.1	0.19	1.51	0.57	44.31	0.05	2.61	1.19	99.68	465	30	456	90	201	20
01MBW712A	6.89	<.01	20.22	0.01	---	10.68	0.25	11.22	0.22	0.95	0.37	37.29	0.09	2.4	9.07	99.66	80	18	748	38	168	22
01MBW716A	10.67	0.03	11.95	0.01	---	12.68	0.79	11.45	0.18	1.8	0.47	44.72	0.04	3.21	1.57	99.57	400	30	358	72	237	22
01MBW720C	10.3	<.01	10.79	0.01	---	11.99	0.73	10.26	0.2	0.81	0.42	49.61	0.01	2.93	1.43	99.49	155	34	112	54	219	22
01MBW724A	13.25	0.04	10.1	<.01	---	12.78	0.83	6.12	0.26	2.48	0.17	46.24	0.02	6.52	0.82	99.63	240	28	252	26	108	18
01MBW732A	11.77	0.02	9.76	0.01	---	13.55	0.47	8.58	0.21	2.61	0.67	46.59	0.06	4.46	0.75	99.51	250	22	580	62	279	24
01MBW736A	15.3	<.01	1.46	<.01	---	0.36	0.54	0.06	<.01	4.77	0.01	76.45	0.05	0.05	0.76	99.81	35	22	402	6	42	10
01MBW739A	9.18	0.01	12.68	0.01	---	13.76	0.44	11.37	0.18	1.42	0.5	45.17	0.03	3.28	1.16	99.19	110	18	294	50	225	22
01MBW740B	14.41	<.01	1.29	<.01	---	0.78	1.34	0.23	0.01	5.14	0.11	74.32	0.06	0.15	0.72	98.56	305	50	452	14	87	32
01MBW742C	15.08	<.01	0.48	<.01	---	0.88	2.11	0.05	0.16	3.97	0.05	74.63	<.01	0.04	1.14	98.59	55	196	6	26	36	22
01MBW746A	14.43	0.18	0.72	<.01	---	4.6	3.87	2.03	0.03	1.88	0.11	69.47	0.02	0.68	1.54	99.56	1685	142	102	24	273	30
01MBW753A	14.28	<.01	0.47	<.01	---	0.57	3.92	0.04	0.07	3.77	0.08	75.98	<.01	0.04	0.57	99.79	195	350	58	16	33	20
01MBW756A	14.49	<.01	10.79	0.01	---	14.22	0.75	6.77	0.2	2.61	0.26	45.81	0.03	2.29	1.11	99.34	145	26	244	14	141	34
01MBW765A	14.3	0.07	8.79	0.01	---	11.07	1.15	5.54	0.18	2.79	0.61	50.36	0.05	2.36	2.21	99.49	705	38	396	28	270	40
01MBW766A	16.03	0.15	4.87	0.01	---	4.84	1.59	1.41	0.08	2.77	0.14	65.85	0.04	0.66	1.13	99.57	1605	64	284	16	126	12
01MBW769A	13.62	0.08	7.59	<.01	---	9.2	1.61	5.17	0.16	1.88	0.43	51.26	0.04	2.03	6.24	99.31	680	52	324	26	225	32
01MBW799A	13.77	0.1	0.97	0.01	---	3.33	0.5	1.44	0.04	5.51	0.09	72.38	0.01	0.4	1.25	99.8	1065	24	134	24	168	30
01MBW801A	15.28	0.18	9.56	0.01	---	10.51	1.29	7.74	0.18	2.26	0.25	46.72	0.05	1.69	3.8	99.52	1705	44	392	16	114	26
01MBW804A	13.63	0.05	0.18	<.01	---	2.53	4.42	0.51	0.03	2.17	0.06	74.5	<.01	0.23	1.35	99.66	745	188	32	18	123	36
01MBW809A	13.71	0.06	0.45	0.01	---	2.83	4.65	0.34	0.03	2.32	0.14	73.35	<.01	0.41	1.4	99.7	705	234	62	18	201	36
01MBW813A	16.35	0.1	6.57	<.01	---	7.64	1.84	3.76	0.14	1.86	0.15	59.66	0.04	0.86	0.94	99.91	1105	62	288	14	105	24
01MBW816A	14.28	0.07	1.29	0.01	---	1.7	3.42	0.25	0.04	2.79	0.1	74.77	0.02	0.18	0.71	99.63	755	158	188	14	93	24
01MBW817C	16.18	0.11	2.31	0.01	---	5.13	4.57	2.08	0.07	2.8	0.21	63.42	0.03	0.73	1	98.65	1055	178	198	38	99	34
01MBW827B	16.57	0.08	3.62	0.01	---	3.94	2.33	1.65	0.05	3.49	0.21	65.06	0.05	0.67	0.98	98.71	895	88	354	20	72	20
01MBW827C	15.36	0.02	8.89	0.01	6.87	9.24	1.37	5.77	0.19	3	0.19	53.08	0.04	1.28	1.08	99.52	---	---	---	---	---	---

Table 1. (continued)

SAMPLE	Al2O3 %	BaO %	CaO %	Cr2O3 %	FeO %	Fe2O3 %	K2O %	MgO %	MnO %	Na2O %	P2O5 %	SiO2 %	SrO %	TiO2 %	LOI %	TOTAL	Ba ppm	Rb ppm	Sr ppm	Nb ppm	Zr ppm	Y ppm
01MBW834A	15.58	<.01	10.66	<.01	7.21	9.64	0.68	7.11	0.16	2.84	0.09	50.3	0.04	0.86	1.19	99.15	---	---	---	---	---	---
01MBW834B	13.93	0.14	1.21	0.01	---	2.81	5.66	0.97	0.04	2.33	0.19	70.14	0.03	0.47	0.68	98.61	1305	132	150	18	219	42
01MBW838A	15.66	0.1	7.22	<.01	---	8.33	1.92	6.12	0.13	3.09	0.26	50.19	0.05	1.24	4.63	98.94	1065	60	382	16	159	28
01MBW842A	19.52	0.07	6.94	<.01	---	6.63	2.68	3.35	0.1	2.64	0.2	54.75	0.05	1.1	1.52	99.55	895	104	362	14	114	30
01MBW852A	14.19	0.04	1.19	0.01	---	2.16	3.99	0.28	0.07	2.74	0.11	73.13	0.01	0.22	0.83	98.97	545	194	108	16	90	34
01MBW857A	12.17	<.01	0.53	<.01	---	1.58	4.76	0.14	0.02	1.81	0.03	77.96	<.01	0.18	0.42	99.6	265	240	40	22	129	28
01MBW860A	14.73	0.06	1.73	0.01	---	2.77	3.84	0.6	0.05	2.81	0.1	71.24	0.02	0.32	0.76	99.04	625	176	166	18	114	26
01MBW862A	15.07	0.03	10.67	0.01	---	9.94	0.96	8.2	0.17	1.55	0.07	48.93	0.02	0.94	2.6	99.16	310	48	182	6	36	20
01RN434A	15.73	0.06	5.96	0.01	---	5.7	2.99	3.95	0.1	2.48	0.12	59.49	0.04	0.68	1.44	98.75	690	120	232	14	117	24
01RN438A	15.13	0.01	7.97	0.01	---	10.39	1.61	5.97	0.16	3.34	0.16	51.75	0.03	1.3	1.59	99.42	300	60	238	18	141	36
01RN443A	16.1	0.06	4.17	<.01	---	4.72	2.94	1.67	0.09	2.86	0.16	64.9	0.04	0.61	1	99.32	685	114	256	16	144	32
01RN460B	14.73	<.01	0.68	<.01	---	0.88	3.9	0.05	0.05	3.2	0.11	74.54	<.01	0.05	0.71	98.9	40	194	12	16	33	26
01RN479A	11.45	0.04	0.03	<.01	---	5.56	2.17	2.2	0.03	0.73	0.06	73.54	<.01	0.56	2.99	99.36	525	98	34	18	240	22
01RN509C	14.72	0.12	2.92	<.01	---	4.19	2	0.87	0.05	3.13	0.1	66.34	0.04	0.41	3.91	98.8	1290	100	348	14	198	36
01RN511A	15	0.12	7.49	0.01	---	8.31	2.27	5.13	0.13	2.04	0.13	57.79	0.03	0.82	0.5	99.77	1185	74	228	12	120	28
01RN516A	15.73	0.12	7.37	0.01	---	7.72	2.12	4.32	0.13	2.08	0.13	58.53	0.04	0.79	0.54	99.63	1235	72	264	12	102	24
01RN522A	9.96	0.03	11.34	0.01	---	11.57	0.6	11.24	0.15	0.65	0.56	34.66	0.07	2.5	15.99	99.33	350	34	688	74	210	22
01RN523A	11.06	0.03	1.2	0.01	---	4.04	1.98	1.24	0.07	2.22	0.09	75.26	0.02	0.51	1.37	99.1	---	---	---	---	---	---
01RN533A	8.78	<.01	0.48	0.01	---	1.66	0.55	0.9	0.01	3.34	0.05	82.52	0.01	0.22	1.09	99.62	195	30	56	12	159	16
01RN533B	14.45	0.05	7.13	0.01	---	10.67	1.83	7.74	0.17	2.76	0.33	49.98	0.03	2.18	2.1	99.43	610	70	248	38	177	26
01RN534A	13.4	0.06	2.25	0.01	3.69	4.68	3.33	2.02	0.07	1.44	0.1	70.19	0.03	0.62	1.09	99.29	---	---	---	---	---	---
01RN535A	15.36	0.06	3.72	<.01	---	4.32	2.87	1.56	0.07	2.1	0.11	68.04	0.03	0.48	0.95	99.67	---	---	---	---	---	---
01RN538A	13.49	0.03	1.29	0.01	4.73	6.05	2.22	1.51	0.15	1.98	0.07	70.1	0.03	0.64	1.26	98.83	---	---	---	---	---	---
01RN540A	21.37	0.06	0.2	0.01	6.83	9.67	4.22	2.09	0.14	0.8	0.09	57.21	0.01	0.99	2.61	99.47	---	---	---	---	---	---
01RN546A	14.76	0.07	3.24	<.01	---	3.53	2.75	1.17	0.07	2.87	0.1	70.18	0.03	0.4	0.59	99.76	720	156	156	16	123	26
01RN546B	14.65	<.01	0.67	<.01	---	0.61	5.27	0.03	0.05	3.83	0.14	72.71	<.01	0.03	0.3	98.29	90	296	14	18	39	12
01RN551A	18.09	0.08	0.65	<.01	3.83	7.26	4.2	1.4	0.06	1.06	0.1	62.25	0.01	0.81	3.31	99.28	---	---	---	---	---	---
01RN560A	15.5	0.1	7.26	0.01	---	7.73	2.04	4.67	0.13	1.98	0.14	58.31	0.04	0.78	0.68	99.37	1060	72	262	12	102	22
01RN565A	14.13	0.12	1.74	0.01	---	2.15	3.5	0.4	0.04	2.83	0.08	74.09	0.03	0.25	0.55	99.92	---	---	---	---	---	---
01RN579A	13.63	<.01	0.9	<.01	---	4.08	0.82	1.99	0.05	5.02	0.1	70.09	<.01	0.53	1.53	98.74	265	38	76	26	180	30
01RN605A	15.93	<.01	11.69	0.01	---	11.47	0.43	6.86	0.19	1	0.1	49.92	0.02	1.24	0.92	99.78	65	14	164	8	72	28
01RN614B	15.91	<.01	10.36	0.01	---	10.39	0.84	7.49	0.17	2.46	0.09	48.45	0.03	0.87	1.8	98.87	195	44	172	4	45	24
01RN625A	16.91	<.01	14.71	0.01	---	10.29	0.73	8.27	0.17	1.21	0.04	44.07	0.04	1.13	1.98	99.56	245	38	294	2	57	26

Table 1. (continued)

SAMPLE	Al2O3 %	BaO %	CaO %	Cr2O3 %	FeO %	Fe2O3 %	K2O %	MgO %	MnO %	Na2O %	P2O5 %	SiO2 %	SrO %	TiO2 %	LOI %	TOTAL	Ba ppm	Rb ppm	Sr ppm	Nb ppm	Zr ppm	Y ppm
01Z313A	14.68	0.01	0.62	<.01	---	1.14	4.53	0.07	0.03	2.77	0.18	74.59	<.01	0.1	0.91	99.63	240	220	56	16	48	24
01Z332A	15.37	0.06	2.57	<.01	3.08	3.86	3.02	1.88	0.06	2.78	0.13	66.69	0.04	0.56	1.54	98.56	---	---	---	---	---	---
01Z336A	14.09	0.02	4.82	0.01	---	2.46	1.26	0.92	0.04	1.43	0.08	72.83	0.04	0.35	0.98	99.33	325	60	276	12	99	10
01Z339A	16.69	0.03	4.16	<.01	---	4.81	2.92	1.52	0.1	3.09	0.2	63.66	0.04	0.62	0.62	98.46	475	128	272	18	147	22
01Z342A	17.65	0.07	5.39	<.01	---	5.95	2.89	2.23	0.09	2.78	0.23	59.47	0.05	0.84	0.72	98.36	740	122	306	14	174	40
01Z343A	15.56	0.08	3.06	0.01	---	3.69	4.1	1.04	0.07	2.59	0.13	67.15	0.03	0.46	0.6	98.57	920	138	236	18	141	32
01Z344A	14.37	<.01	0.78	<.01	---	0.94	4.73	0.13	0.04	3.03	0.12	75.24	<.01	0.08	0.49	99.95	260	180	68	10	54	34
01Z373A	14.38	0.04	2.9	0.01	---	3.26	2.96	0.73	0.08	2.93	0.12	70.16	0.02	0.46	0.48	98.53	530	126	154	18	165	26
01Z378A	16.44	<.01	14.37	0.01	---	5.76	0.28	11.87	0.1	1.09	0.01	47.94	0.01	0.21	1.56	99.65	35	16	128	6	15	10
01Z418B	4.67	<.01	0.17	0.01	---	1.21	0.84	1.65	0.02	0.46	0.03	89.36	<.01	0.14	1.16	99.72	310	40	<2	8	96	12
01Z418C	13.69	<.01	10.61	0.01	---	12.1	0.07	6.37	0.18	2.41	0.26	48.39	0.06	2.13	3.61	99.89	70	14	518	16	126	24
01Z421A	5.87	<.01	0.08	<.01	---	1.32	0.62	0.66	0.01	1.06	0.05	89.03	<.01	0.19	1.01	99.9	185	42	22	12	144	14
01Z422A	9.21	<.01	0.18	0.01	---	4.45	0.99	1.29	0.06	1.75	0.09	79.56	<.01	0.43	1.66	99.68	295	60	44	18	264	22
01Z430A	14.16	0.06	0.19	<.01	---	6.3	2.97	2.06	0.06	1.53	0.1	67.44	0.01	0.65	2.98	98.51	625	118	46	20	231	24
01Z433A	13.98	0.15	4.48	<.01	---	4.95	2.73	2.14	0.11	2.28	0.09	66.53	0.04	0.4	0.78	98.66	1365	66	232	10	105	46
01Z439A	14.62	0.07	3.64	<.01	---	3.9	2.87	0.94	0.07	2.53	0.11	69.18	0.02	0.64	0.61	99.2	815	90	176	18	174	34
01Z439B	14.12	<.01	0.69	<.01	---	1.05	4.74	0.15	0.03	2.54	0.13	75.38	<.01	0.09	0.66	99.58	160	174	48	8	69	38
01Z445A	13.33	0.07	2.08	0.01	---	3.42	3.58	1.02	0.06	2.19	0.09	71.2	0.03	0.38	1.2	98.66	750	150	188	20	153	36
01Z451A	12.63	0.02	3.45	0.01	---	4.37	1.29	0.69	0.08	2.11	0.11	73.34	0.05	0.5	0.74	99.39	390	58	372	26	309	28
01Z454A	14.61	0.07	3.25	<.01	---	3.51	2.91	0.76	0.07	2.34	0.11	70.66	0.02	0.58	0.64	99.53	780	98	176	18	171	36
01Z459A	15.85	0.05	4.26	0.01	---	4.82	3.07	1.72	0.09	2.61	0.15	64.94	0.03	0.63	0.85	99.08	785	118	246	14	138	30
01Z475A	14.45	0.06	0.33	0.01	---	5.22	3.2	1.55	0.04	0.85	0.06	69.36	0.01	0.64	2.88	98.66	735	126	122	18	204	32
01Z477	12.36	0.05	1.13	0.01	---	4.21	2.48	1.03	0.06	1.26	0.1	73.16	0.02	0.49	1.87	98.23	610	90	134	16	195	26

Table 2. Location and description of rock samples collected for major-oxide, minor oxide, and trace element analyses in the Big Delta Quadrangle.

Sample	UTM E	UTM N	Sample description
01JEA375A	602764	7149209	Orthogneiss
01JEA381A	602595	7149637	Orthogneiss
01JEA400A	592110	7151118	Dike
01JEA403A	591229	7151494	Augen gneiss
01JEA405A	591009	7151621	Amphibolite
01JEA412A	589648	7151746	Orthogneiss
01JEA424A	587375	7151553	Amphibolite
01JEA432A	602596	7149095	Granodiorite
01JEA437A	586540	7160575	Volcanic rock
01JEA446A	585667	7158616	Rhyolite
01JEA447A	585868	7158354	Quartz monzonite
01JEA463A	598044	7146760	Orthogneiss
01JEA508A	579089	7158140	Metarhyolite
01JEA518A	581365	7155728	Gabbro
01JEA521A	581442	7155534	Metarhyolite
01JEA527A	608559	7147829	Orthogneiss
01JEA535A	608513	7148665	Orthogneiss
01JEA538A	589026	7147979	Amphibolite?
01JEA543A	588690	7147300	Amphibolite?
01JEA544A	588680	7147234	Plutonic rock
01JEA559A	600507	7147438	Orthogneiss
01MBW474A	602672	7149112	Metagranodiorite
01MBW477B	603132	7149061	Granodiorite
01MBW486A	603396	7149841	Orthogneiss
01MBW488A	603379	7149965	Augen gneiss
01MBW494A	603112	7150437	Igneous rock
01MBW496A	592190	7154919	Metagranodiorite
01MBW512A	589893	7154576	Granodiorite
01MBW516A	589435	7154480	Augen gneiss
01MBW519C	589019	7154552	Metadiorite
01MBW528A	592240	7143561	Orthogneiss
01MBW534A	594292	7143658	Augen gneiss
01MBW541B	596057	7144423	Dike

Table 2. (continued)

Sample	UTM E	UTM N	Sample description
01MBW542B	596304	7144578	Dike
01MBW585B	593446	7164778	Metavolcanic
01MBW587A	593469	7164890	Metamafic rock
01MBW613A	598446	7153393	Orthogneiss
01MBW666A	585532	7167913	Amphibolite
01MBW684A	578757	7161335	Amphibolite
01MBW693A	578348	7161951	Orthogneiss
01MBW705A	581318	7164909	Amphibolite
01MBW708A	581213	7164994	Amphibolite
01MBW712A	581086	7165184	Amphibolite
01MBW716A	581030	7165362	Amphibolite
01MBW720C	580612	7165555	Amphibolite
01MBW724A	580152	7165857	Amphibolite
01MBW732A	579377	7166314	Amphibolite
01MBW736A	578946	7166474	Orthogneiss
01MBW739A	578703	7166419	Amphibolite
01MBW740B	578667	7166410	Orthogneiss
01MBW742C	578582	7166401	Granite
01MBW746A	578258	7166248	Orthogneiss
01MBW753A	577697	7166317	Granite
01MBW756A	577547	7166314	Amphibolite
01MBW765A	605007	7147799	Basalt
01MBW766A	604982	7147833	Tonalite
01MBW769A	605027	7148479	Basalt
01MBW799A	586767	7144846	Orthogneiss
01MBW801A	586573	7145686	Gneiss
01MBW804A	586280	7146117	Orthogneiss
01MBW809A	585811	7147407	Augen gneiss
01MBW813A	601733	7147839	Diorite
01MBW816A	601344	7148195	Metagranite
01MBW817C	601226	7148323	Augen gneiss
01MBW827B	600576	7148479	Granite
01MBW827C	600576	7148479	Gneiss
01MBW834A	600168	7148952	Gneiss

Table 2. (continued)

Sample	UTM E	UTM N	Sample description
01MBW834B	600168	7148952	Augen gneiss
01MBW838A	599493	7149510	Diorite
01MBW842A	587961	7149089	Metadiorite
01MBW852A	587909	7149730	Plutonic rock
01MBW857A	587528	7149768	Augen gneiss
01MBW860A	587300	7149930	Metapluton
01MBW862A	586866	7150123	Amphibolite
01RN434A	593306	7154872	Granodiorite
01RN438A	594061	7154717	Amphibolite
01RN443A	595458	7154702	Monzogranite
01RN460B	598297	7148930	Granite
01RN479A	583663	7163079	Phyllite/meta-andestie?
01RN509C	594969	7150221	Porphyry
01RN511A	596139	7149405	Diorite
01RN516A	596711	7148864	Diorite
01RN522A	582844	7163345	Greenstone
01RN523A	582666	7163367	Metatuff
01RN533A	581784	7163340	Metarhyolite
01RN533B	581784	7163340	Phyllite/metabasite?
01RN534A	567861	7165300	Gneiss
01RN535A	567783	7165508	Orthogneiss
01RN538A	568080	7166168	Gneiss
01RN540A	568942	7166399	Schist
01RN546A	572612	7166440	Orthogneiss
01RN546B	572612	7166440	Aplite
01RN551A	573460	7167220	Schist
01RN560A	608489	7146958	Quartz diorite
01RN565A	607316	7147655	Orthogneiss
01RN579A	590462	7144930	Orthogneiss
01RN605A	605200	7143003	Amphibolite
01RN614B	587388	7148134	Amphibolite
01RN625A	590034	7148120	Amphibolite

Table 2. continued

Sample	UTM E	UTM N	Sample description
01Z313A	600244	7149834	Granodiorite
01Z332A	595529	7152930	Gneiss/orthogneiss?
01Z336B	596508	7152449	Aplite
01Z339A	597098	7152595	Monzodiorite
01Z342A	598011	7152381	Granodiorite
01Z343A	598194	7152337	Granodiorite
01Z344A	598564	7152251	Granodiorite
01Z373A	601495	7145927	Tonalite
01Z378A	599984	7145364	Amphibolite
01Z418B	580907	7157316	Metatuff
01Z418C	580907	7157316	Greenstone
01Z421A	581183	7157077	Metatuff
01Z422A	581229	7156988	Greenstone
01Z430A	580270	7156121	Greenstone
01Z433A	608540	7147596	Orthogneiss
01Z439A	608003	7148838	Quartz diorite
01Z439B	608003	7148838	Granite
01Z445A	593855	7144643	Orthogneiss/meta-pluton?
01Z451A	594013	7146096	Gneiss
01Z454A	607633	7149322	Quartz diorite
01Z459A	608226	7149769	Granodiorite
01Z475A	601875	7151882	Orthogneiss
01Z477A	601544	7152070	Orthogneiss

Table 3. Concentration of trace elements in rock samples collected in the Big Delta quadrangle.

Note: --- = not analyzed.

SAMPLE	Au ppb	Au ppb	Pt ppb	Pd ppb	Ag ppm	Al %	As ppm	B ppm	Ba ppm	Be ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	Ga ppm	Hg ppm	K %
01JEA377A	<5	---	---	---	<.2	2.12	28	10	110	<.5	6	0.07	<.5	7	148	14	3.45	10	<1	1.17
01JEA394A	150	---	---	---	<.2	0.26	>10000	<10	220	<.5	<2	0.04	0.5	3	142	5	1.81	<10	1	0.21
01JEA403B	<5	---	---	---	<.2	8.3	44	<10	80	3.5	<2	5.55	<.5	2	73	19	0.98	30	3	0.08
01JEA551A	45	---	---	---	<.2	2.71	254	10	150	<.5	<2	0.59	<.5	13	133	15	3.82	30	1	0.27
01MBW476A	10	---	---	---	0.2	0.45	8	<10	30	<.5	<2	0.03	0.5	1	186	13	0.95	10	<1	0.16
01MBW477A	20	---	---	---	<.2	0.34	<2	<10	10	<.5	10	0.29	<.5	<1	99	11	0.58	<10	<1	0.16
01MBW492A	<5	---	---	---	0.2	0.29	8	<10	<10	<.5	<2	0.33	<.5	2	171	539	0.41	<10	4	0.03
01MBW501A	105	---	---	---	<.2	6.46	<2	<10	150	1.5	<2	4.24	<.5	8	65	43	1.43	30	<1	0.05
01MBW519B	<5	---	---	---	<.2	0.03	<2	<10	<10	<.5	<2	0.01	<.5	<1	236	8	0.31	<10	<1	0.01
01MBW531B	<5	---	---	---	<.2	0.22	2	10	10	<.5	<2	0.02	0.5	<1	164	6	0.53	10	1	0.07
01MBW534B	<5	---	---	---	<.2	0.01	2	10	<10	<.5	8	0.01	<.5	1	214	10	0.38	<10	<1	<.01
01MBW535B	<5	---	---	---	<.2	0.58	2	<10	40	<.5	<2	0.03	<.5	3	126	8	1.11	10	<1	0.12
01MBW541C	<5	---	---	---	<.2	0.15	<2	<10	<10	<.5	6	<.01	<.5	8	174	36	0.76	10	<1	0.02
01MBW552A	<5	---	---	---	<.2	0.44	10	<10	10	<.5	<2	0.02	<.5	1	90	10	0.87	10	<1	0.06
01MBW560C	<5	---	---	---	<.2	0.24	<2	<10	<10	<.5	6	0.01	<.5	1	156	7	0.59	<10	1	0.01
01MBW567B	<5	---	---	---	0.2	0.15	4	<10	<10	<.5	6	<.01	1	1	225	19	1.41	10	<1	<.01
01MBW616A	<5	---	---	---	<.2	0.27	6	<10	10	<.5	6	0.04	<.5	1	122	8	0.96	<10	3	0.15
01MBW668A	<5	---	---	---	<.2	2.28	10	10	60	0.5	2	0.32	<.5	13	93	42	3.6	20	1	0.25
01MBW670A	<5	---	---	---	<.2	0.07	<2	<10	<10	<.5	8	<.01	<.5	11	148	105	2.37	<10	3	0.02
01MBW699A	---	1	23	17	<.2	0.37	<2	10	<10	<.5	<2	0.78	<.5	41	633	47	2.58	10	<1	<.01
01MBW707C	<5	---	---	---	<.2	0.14	12	<10	20	<.5	<2	0.04	<.5	3	196	37	1.13	<10	3	0.06
01MBW760A	---	<1	8.5	9	<.2	3.77	<2	<10	10	<.5	<2	2.67	<.5	5	82	43	0.58	10	<1	0.07
01MBW760D	---	<1	2.5	1	<.2	0.36	<2	10	<10	<.5	<2	0.07	<.5	42	416	9	2.53	10	<1	<.01
01MBW760E	---	<1	3.5	<1	<.2	0.72	<2	<10	<10	<.5	<2	0.08	<.5	9	565	8	0.66	10	<1	<.01
01MBW761A	<5	---	---	---	<.2	2.77	<2	10	200	<.5	6	1.24	<.5	12	117	10	3.17	10	<1	0.36
01MBW768A	<5	---	---	---	0.2	2.53	2	10	650	<.5	8	0.81	<.5	5	71	1	3.19	<10	<1	0.81
01MBW792B	<5	---	---	---	<.2	0.17	<2	<10	<10	<.5	8	0.06	<.5	<1	116	<1	0.27	<10	<1	0.03
01MBW793B	5	---	---	---	0.2	0.16	<2	10	<10	<.5	2	0.12	<.5	<1	64	<1	0.1	<10	1	0.01
01MBW811A	<5	---	---	---	<.2	0.07	<2	10	<10	<.5	2	<.01	<.5	1	182	<1	0.38	<10	1	0.02
01MBW817B	510	---	---	---	1	0.66	726	<10	70	<.5	12	0.05	<.5	1	48	40	1.39	<10	<1	0.27
01MBW826C	490	---	---	---	0.2	5.06	16	10	<10	2	8	4.67	<.5	6	93	35	1.01	10	<1	0.03
01MBW828B	510	---	---	---	1	1.64	832	<10	<10	1	10	1.27	<.5	16	96	211	3.85	<10	<1	<.01
01MBW839A	35	---	---	---	0.2	0.43	84	10	10	<.5	<2	0.47	<.5	2	163	3	0.55	<10	1	0.04
01MBW848A	<5	---	---	---	0.2	0.69	4	10	50	<.5	6	0.3	<.5	4	126	82	2.16	<10	<1	0.25
01MBW849B	<5	---	---	---	0.2	0.39	<2	<10	<10	<.5	8	0.01	<.5	2	108	4	0.59	<10	<1	0.14
01MBW850A	<5	---	---	---	0.2	0.49	<2	<10	10	<.5	4	0.06	<.5	1	63	<1	0.88	<10	<1	0.14
01RN460B	5	---	---	---	0.2	0.32	36	<10	<10	0.5	14	0.04	<.5	<1	91	<1	0.53	<10	3	0.18

Table 3 (continued)

SAMPLE	La ppm	Mg %	Mn ppm	Mo ppm	Na %	Ni ppm	P ppm	Pb ppm	S %	Sb ppm	Sc ppm	Sr ppm	Ti %	Tl ppm	U ppm	V ppm	W ppm	Zn ppm
01JEA377A	30	0.89	530	1	0.03	18	290	4	0.03	6	5	19	0.15	<10	<10	44	<10	64
01JEA394A	20	0.01	50	3	<.01	6	190	8	0.31	130	1	14	<.01	<10	<10	4	<10	10
01JEA403B	40	0.15	85	6	0.11	7	830	<2	0.13	22	2	289	0.05	<10	<10	11	260	10
01JEA551A	30	2.01	720	3	0.06	15	510	<2	0.03	14	14	29	0.06	<10	<10	97	<10	54
01MBW476A	20	0.18	70	1	0.01	8	150	4	<.01	<2	<1	11	0.01	<10	<10	7	<10	12
01MBW477A	10	0.05	135	3	0.07	1	640	10	0.03	<2	1	12	<.01	<10	<10	<1	<10	10
01MBW492A	10	<.01	20	2	<.01	7	60	<2	<.01	8	<1	8	<.01	<10	<10	<1	<10	12
01MBW501A	50	0.25	120	5	0.2	28	420	58	0.36	16	1	298	0.06	<10	<10	14	<10	50
01MBW519B	10	<.01	20	<1	<.01	4	10	<2	<.01	<2	<1	12	<.01	<10	<10	<1	<10	<2
01MBW531B	20	0.09	50	3	0.01	3	80	6	<.01	<2	<1	15	<.01	<10	<10	1	<10	12
01MBW534B	10	<.01	25	<1	<.01	3	<10	2	<.01	4	<1	10	<.01	<10	<10	<1	<10	12
01MBW535B	30	0.35	145	3	0.02	5	150	<2	<.01	<2	1	10	<.01	<10	<10	5	<10	14
01MBW541C	10	0.02	45	<1	<.01	16	<10	<2	<.01	<2	<1	7	<.01	<10	<10	<1	<10	8
01MBW552A	30	0.13	70	3	0.06	3	140	<2	<.01	24	3	12	<.01	<10	<10	3	<10	10
01MBW560C	10	0.14	45	<1	0.01	5	70	<2	<.01	<2	<1	11	<.01	<10	<10	1	<10	8
01MBW567B	10	0.06	30	<1	<.01	4	70	4	<.01	<2	<1	4	<.01	<10	<10	<1	<10	8
01MBW616A	40	0.02	100	6	0.05	2	60	12	<.01	<2	2	7	<.01	<10	<10	1	<10	22
01MBW668A	30	1.26	425	<1	0.05	31	360	4	<.01	<2	5	28	0.04	<10	<10	41	<10	46
01MBW670A	10	<.01	40	1	<.01	20	<10	<2	0.01	<2	<1	6	<.01	<10	<10	1	<10	6
01MBW699A	10	4.73	425	2	<.01	287	10	<2	0.13	<2	4	4	0.01	<10	<10	28	<10	12
01MBW707C	10	0.09	40	1	0.01	36	70	<2	0.09	<2	<1	10	0.03	<10	<10	7	<10	6
01MBW760A	10	0.66	110	2	0.13	32	<10	<2	<.01	2	6	116	0.03	<10	<10	19	<10	6
01MBW760D	10	8.59	475	<1	<.01	791	<10	<2	0.06	2	1	6	0.06	<10	<10	14	<10	26
01MBW760E	10	1.53	55	<1	<.01	214	30	<2	<.01	<2	<1	2	<.01	<10	<10	11	<10	8
01MBW761A	20	1.43	485	3	0.2	10	320	<2	<.01	10	9	55	0.12	<10	<10	90	<10	50
01MBW768A	<10	0.8	545	3	0.22	4	690	<2	<.01	<2	7	45	0.32	<10	30	34	100	84
01MBW792B	<10	0.04	30	<1	0.06	3	240	<2	<.01	<2	<1	<1	<.01	<10	10	1	<10	<2
01MBW793B	<10	<.01	10	<1	0.11	1	640	<2	<.01	<2	<1	3	<.01	<10	10	1	<10	<2
01MBW811A	<10	0.01	30	<1	<.01	4	<10	<2	<.01	<2	<1	<1	<.01	<10	30	1	<10	2
01MBW817B	30	0.1	295	4	0.07	<1	180	6	0.11	<2	4	16	0.03	<10	<10	1	<10	8
01MBW826C	10	0.11	265	2	0.08	15	600	<2	0.04	6	1	536	0.04	<10	<10	14	340	12
01MBW828B	10	0.73	465	1	<.01	26	660	<2	0.94	<2	3	62	0.12	<10	<10	27	10	28
01MBW839A	<10	0.07	90	<1	<.01	6	600	<2	<.01	<2	<1	43	0.04	<10	10	6	<10	4
01MBW848A	10	0.27	20	1	0.05	9	170	<2	0.08	<2	6	55	0.15	<10	<10	43	<10	12
01MBW849B	10	0.01	65	2	<.01	3	110	6	<.01	<2	1	<1	<.01	<10	<10	3	<10	28
01MBW850A	10	<.01	105	11	<.01	2	350	12	<.01	<2	3	<1	<.01	<10	<10	3	<10	32
01RN460B	<10	0.01	95	<1	0.05	1	150	<2	<.01	<2	<1	1	<.01	<10	20	<1	<10	12

Table 3. (continued)

SAMPLE	Au ppb	Au ppb	Pt ppb	Pd ppb	Ag ppm	Al %	As ppm	B ppm	Ba ppm	Be ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	Ga ppm	Hg ppm	K %
01RN461B	<5	---	---	---	<.2	0.32	14	<10	30	<.5	6	0.03	<.5	1	140	5	0.86	<10	<1	0.16
01RN463B	<5	---	---	---	<.2	0.22	2	<10	10	<.5	8	0.1	<.5	3	121	11	0.34	<10	<1	0.05
01RN474C	<5	---	---	---	0.2	0.5	6	<10	<10	<.5	2	0.07	<.5	5	110	4	1.01	<10	<1	0.04
01RN509C	85	---	---	---	2.2	1.32	<2	<10	120	0.5	12	0.83	<.5	3	28	51	2.51	<10	<1	0.2
01RN563B	<5	---	---	---	<.2	0.56	34	<10	80	0.5	2	0.06	0.5	15	96	17	3.25	<10	<1	0.25
01RN572A	<5	---	---	---	1	0.03	<2	<10	<10	<.5	2	<.01	<.5	<1	124	<1	0.3	<10	1	0.01
01RN576B	<5	---	---	---	1.4	0.01	<2	<10	20	<.5	4	<.01	<.5	<1	153	<1	0.22	<10	<1	<.01
01RN577B	<5	---	---	---	0.2	0.05	<2	10	<10	<.5	8	<.01	<.5	1	154	<1	0.29	<10	1	<.01
01RN591B	<5	---	---	---	<.2	0.09	28	<10	<10	<.5	6	<.01	<.5	<1	112	<1	0.29	<10	<1	0.04
01RN612C	<5	---	---	---	0.2	0.03	<2	10	<10	<.5	6	<.01	<.5	<1	126	<1	0.24	<10	<1	0.01
01RN623B	<5	---	---	---	0.2	0.02	<2	10	<10	<.5	4	<.01	<.5	<1	140	2	0.22	<10	<1	0.01
01Z310C	65	---	---	---	1	0.01	>10000	<10	10	<.5	12	<.01	<.5	6	133	51	1.46	<10	<1	0.02
01Z323B	<5	---	---	---	<.2	0.94	10	<10	40	<.5	4	0.1	<.5	6	125	4	1.79	<10	<1	0.16
01Z348C	<5	---	---	---	0.2	0.19	30	10	<10	<.5	2	<.01	<.5	2	118	3	0.77	<10	1	0.02
01Z350B	<5	---	---	---	0.2	0.23	8	<10	<10	<.5	6	<.01	<.5	6	61	37	1.6	<10	<1	0.03
01Z359A	<5	---	---	---	0.2	0.07	68	<10	<10	<.5	6	<.01	<.5	3	104	<1	0.83	<10	<1	0.01
01Z379A	<5	---	---	---	0.2	0.15	2	10	<10	<.5	6	0.01	<.5	1	112	1	0.53	<10	<1	<.01
01Z390A	<5	---	---	---	1.4	<.01	<2	10	<10	<.5	2	15.00	<.5	1	21	1	1.07	<10	<1	<.01
01Z391A	<5	---	---	---	1.4	2.3	<2	<10	60	0.5	<2	15.00	<.5	39	258	81	4.59	10	<1	0.1
01Z424A	<5	---	---	---	0.2	0.21	<2	<10	10	<.5	8	0.27	<.5	2	140	1	0.65	<10	1	0.05
01Z428A	<5	---	---	---	<.2	0.28	2	10	20	<.5	10	0.08	<.5	4	89	7	1.25	<10	1	0.04
01Z432A	30	---	---	---	<.2	1.97	8	<10	70	<.5	<2	0.06	<.5	6	112	42	3.74	10	<1	0.31
01Z432B	<5	---	---	---	<.2	0.29	6	10	20	<.5	<2	0.07	<.5	1	54	22	0.77	<10	<1	0.17
01Z442A	<5	---	---	---	1	0.79	18	<10	40	<.5	12	0.07	<.5	6	73	8	1.66	<10	<1	0.23
01Z444C	<5	---	---	---	<.2	0.04	<2	<10	<10	<.5	<2	<.01	0.5	<1	194	4	0.26	<10	2	<.01
01Z446A	<5	---	---	---	0.2	1.46	<2	<10	70	0.5	6	0.74	<.5	6	77	5	2	<10	1	0.36
01Z449B	<5	---	---	---	<.2	0.7	56	<10	20	<.5	6	0.03	<.5	3	134	8	1.23	<10	<1	0.14
01Z456B	160	---	---	---	1	0.28	150	<10	10	<.5	6	0.02	<.5	2	78	<1	2.84	<10	<1	0.11
01Z465C	<5	---	---	---	0.2	0.92	14	<10	90	<.5	2	0.51	<.5	4	51	2	1.86	<10	1	0.25
01Z466B	<5	---	---	---	0.2	0.27	<2	<10	30	<.5	4	0.31	<.5	<1	65	<1	0.12	<10	1	0.15
01Z469C	<5	---	---	---	0.2	0.41	<2	10	<10	<.5	4	0.88	<.5	1	126	<1	0.48	<10	<1	0.03

Table 3 (continued)

SAMPLE	La ppm	Mg %	Mn ppm	Mo ppm	Na %	Ni ppm	P ppm	Pb ppm	S %	Sb ppm	Sc ppm	Sr ppm	Ti %	Tl ppm	U ppm	V ppm	W ppm	Zn ppm
01RN461B	<10	0.03	35	<1	0.02	5	130	6	<.01	<2	<1	3	<.01	<10	10	6	<10	6
01RN463B	<10	0.04	145	<1	<.01	7	40	<2	0.01	<2	<1	4	<.01	<10	20	3	590	6
01RN474C	<10	0.3	115	4	<.01	9	230	<2	<.01	<2	<1	<1	<.01	<10	10	4	<10	16
01RN509C	10	0.44	335	1	0.03	7	410	16	0.01	<2	5	17	<.01	<10	10	11	<10	48
01RN563B	<10	0.12	310	1	<.01	30	230	28	0.75	<2	4	1	<.01	<10	30	11	<10	140
01RN572A	<10	<.01	15	<1	<.01	3	<10	<2	<.01	<2	<1	<1	<.01	<10	20	1	<10	<2
01RN576B	<10	<.01	15	1	<.01	2	<10	<2	<.01	<2	<1	<1	<.01	<10	20	<1	<10	<2
01RN577B	<10	0.01	30	<1	<.01	3	30	<2	<.01	<2	<1	<1	<.01	<10	30	<1	<10	<2
01RN591B	<10	0.01	70	<1	0.01	2	30	<2	<.01	<2	<1	<1	<.01	<10	20	<1	<10	2
01RN612C	<10	<.01	20	<1	<.01	3	20	<2	<.01	<2	<1	<1	<.01	<10	20	<1	<10	<2
01RN623B	<10	<.01	15	1	<.01	3	10	<2	<.01	<2	<1	<1	<.01	<10	20	<1	<10	<2
01Z310C	<10	<.01	10	1	<.01	3	10	<2	0.57	6	<1	<1	<.01	<10	20	<1	10	<2
01Z323B	10	0.34	405	1	0.01	14	350	6	<.01	<2	1	1	<.01	<10	10	16	<10	32
01Z348C	<10	0.07	105	<1	<.01	5	110	<2	<.01	<2	<1	<1	<.01	<10	30	1	<10	8
01Z350B	<10	0.1	85	1	<.01	9	60	62	0.01	<2	<1	<1	<.01	<10	30	3	<10	122
01Z359A	<10	<.01	45	<1	<.01	7	20	10	<.01	<2	<1	<1	<.01	<10	20	1	<10	14
01Z379A	<10	0.08	30	<1	<.01	4	60	<2	<.01	<2	<1	<1	<.01	<10	20	2	<10	6
01Z390A	<10	8.73	1300	<1	<.01	2	800	<2	0.01	<2	<1	102	<.01	<10	30	2	<10	<2
01Z391A	10	2.26	1680	2	<.01	187	2000	<2	0.37	<2	10	1250	<.01	<10	30	71	<10	46
01Z424A	<10	0.17	90	<1	0.01	7	110	2	<.01	<2	<1	2	<.01	<10	<10	2	<10	10
01Z428A	<10	0.03	180	<1	<.01	12	90	8	<.01	<2	1	15	<.01	<10	30	8	<10	12
01Z432A	30	0.9	340	3	0.01	16	190	<2	0.16	12	5	15	0.01	<10	<10	49	<10	46
01Z432B	20	0.01	80	2	0.03	1	370	74	0.01	<2	<1	15	<.01	<10	<10	<1	<10	48
01Z442A	10	0.35	200	<1	0.02	8	290	14	<.01	<2	1	5	<.01	<10	<10	9	<10	24
01Z444C	10	0.02	20	1	<.01	3	10	<2	<.01	<2	<1	9	<.01	<10	<10	<1	<10	2
01Z446A	10	0.56	425	1	0.08	11	350	18	0.01	<2	7	50	0.04	10	10	25	<10	46
01Z449B	<10	0.3	75	2	<.01	8	110	6	<.01	<2	1	<1	0.01	<10	10	9	<10	14
01Z456B	<10	0.01	65	1	<.01	3	330	<2	0.01	2	<1	6	<.01	<10	20	5	<10	20
01Z465C	<10	0.24	170	1	0.08	2	250	6	0.54	<2	2	18	0.03	<10	20	6	<10	20
01Z466B	<10	<.01	10	<1	0.02	1	40	6	<.01	<2	<1	16	0.01	<10	20	1	<10	2
01Z469C	<10	0.16	170	1	<.01	3	210	<2	<.01	<2	<1	23	0.01	<10	30	3	<10	14

Table 4. Location and description of rock samples collected in the Big Delta quadrangle for trace element geochemical analyses.

Sample	UTM E	UTM N	Description
01JEA377A	602684	7149343	Sericite-altered biotite-quartz-feldspar gneiss just below possible fault
01JEA394A	592561	7150677	Quartz veins with yellow oxide, trace green oxide (scorodite?), trace gray mineral (arsenopyrite?)
01JEA403B	591229	7151494	Quartz veins with leached carbonate, trace fine grained gray sulfide
01JEA551A	602206	7147427	Vuggy quartz vein with limonite
01MBW476A	603028	7149069	1-inch to 2-inch wide, massive milky quartz vein with dark brown limonite along marginal contact with wall rock
01MBW477A	603132	7149061	Carbonate-quartz-hematite vein in possible fault zone. Carbonate is coarse grained with trace hematite. Quartz, when present, is massive and translucent.
01MBW492A	603168	7150316	Pod of translucent to milky white quartz. Between <1 inch, and up to 12 inches wide. One fracture surface with possible malachite(?). Limonite coating on fractures. Locally contains carbonate.
01MBW501A	591442	7154805	1-inch to 2-inch-wide, milky and gray quartz veins with disseminated pyrrhotite (~3%). Pyrrhotite is anhedral and irregularly intergrown with quartz.
01MBW519B	589019	7154552	2-foot to 3-foot-wide rubble zone of granular milky quartz with no visible sulfides. Locally brecciated with open space.
01MBW531B	593162	7143120	Translucent milky quartz veins ranging from 1 inch to 8 inches wide. Wall rock on margin of veins is slightly limonite stained.
01MBW534B	594292	7143658	Quartz boulders in tundra cross ridgeline. Trace limonite on fractures.
01MBW535B	594547	7143763	Sparse, milky to grayish-white massive quartz veins that vary in width from 1 cm to 3 inches. Rare limonite patches, possibly after iron sulfides.
01MBW541C	596057	7144423	Massive milky quartz vein up to 5 foot wide.
01MBW552A	597647	7145051	Medium orange, weathered, possible plutonic rock cut by thin quartz veins.
01MBW560C	589025	7163963	Mottled gray and white quartz veins ranging from 1 mm to 2 inches wide.
01MBW567B	590208	7163945	Iron-stained milky quartz vein.
01MBW616A	598551	7153266	1-cm-thick quartz veins cutting variably altered orthogneiss
01MBW668A	579635	7159377	Brecciated and quartz-veined silicified rock that contains patches of limonite. Matrix of rock is almost aphanitic but appears to preserve relict foliation.
01MBW670A	579689	7159423	Variably iron-stained quartz boulders in a 2- to 3-foot-wide zone. Quartz is locally brecciated. Fractures contain limonite, and limonite is disseminated within quartz adjacent to fractures (after pyrite?).
01MBW699A	577283	7163647	Very magnetic clinopyroxenite with disseminated magnetite or pyrrhotite.
01MBW707C	581252	7164977	Slightly limonite-stained quartz veins.
01MBW760A	577235	7166240	Clinopyroxene gabbro or clinopyroxenite.
01MBW760D	577235	7166240	Serpentinite
01MBW760E	577235	7166240	Actinolite granofels.

01MBW761A	604931	7147403	Quartz-veined diorite. Quartz veins are sharp-edged but form irregular branching veins. Some quartz is crystalline and vuggy, but most is solid milky quartz.
01MBW768A	605006	7148387	Granodiorite cut by sparse quartz veins.
01MBW792B	587114	7143598	1-cm to 1-foot-wide, straight-edged milky quartz veins.
01MBW793B	587048	7143633	White, granular, either a meta-aplite or quartz vein with sparse disseminated limonite, cut by later milky quartz veins.
01MBW811A	585909	7146968	Milky quartz vein with limonite on fractures.
01MBW817B	601226	7148323	Limonite-stained granite dike(?).
01MBW826C	600702	7148446	Small (5 foot by 3 foot), iron-stained, quartz-garnet-clinopyroxene-limonite-iron-sulfide skarn.
01MBW828B	600568	7148521	Gossanous zone in orthogneiss.
01MBW839A	599469	7149521	Gray quartz vein.
01MBW848A	588076	7149592	Faintly- to moderately-iron-stained quartzite.
01MBW849B	588050	7149677	Fault gouge. Brecciated, aphanitic, limonite-stained rock. Very narrow zone.
01MBW850A	587976	7149707	Leisegang color-banded, very weathered, granite(?) cut by microveinlets of quartz.
01RN460B	598297	7148930	Tourmaline-veined, tourmaline-garnet granite.
01RN461B	598576	7148740	Quartz vein.
01RN463B	598775	7148656	~10-cm-wide, nearly vertically-dipping quartz vein.
01RN474C	584764	7162278	Foliation-parallel quartz veins with inclusions of sheared out clasts of shale.
01RN509C	594969	7150221	Felsic porphyry dike?
01RN563B	607761	7147361	Gneiss? with 1-3 percent disseminated pyrite.
01RN572A	590702	7142990	Milky quartz vein with some iron oxide staining.
01RN576B	590097	7143965	Foliation-parallel quartz veins in gneiss.
01RN577B	590308	7144479	Foliation-parallel, iron oxide-stained, 20-cm-thick quartz vein in gneiss.
01RN591B	605437	7146303	Foliation-parallel quartz veins with pieces of included gneiss with disseminated ankerite(?).
01RN612C	587236	7148369	Foliation-parallel quartz veins with pieces of included gneiss.
01RN623B	589695	7148400	Foliation-parallel quartz veins with pieces of included wall rock.
01Z310C	600841	7149880	Arsenopyrite- and pyrite-bearing quartz vein. Scorodite and brown iron oxide staining on weathered surfaces.
01Z323B	593789	7152811	Quartz-veined gneiss. Veins are less than 1 cm wide and open fractures contain iron oxide. Vein margins have carbonate and weak chloritization.
01Z348C	588709	7163745	Vuggy, 5-cm-thick, iron oxide-coated, quartz vein in phyllite.
01Z350B	589057	7163192	Vuggy, iron oxide-coated, quartz vein.
01Z359A	589495	7161123	Quartz-veined quartzite.
01Z379A	587326	7163053	4-cm-wide quartz vein with trace disseminated, 2 mm diameter, iron oxide spots.
01Z390A	586215	7165515	Quartz veins cutting dolomite.
01Z391A	586251	7165609	Schist with up to 5 percent pyrite +/- pyrrhotite.
01Z424A	581053	7156666	Quartz veinlets with open spaces and weak iron oxide stain in quartzite?
01Z428A	580595	7156256	Quartz-veined and strongly iron oxide stained quartzite and quartz breccia.

01Z432A	608299	7147268	Quartz veins in paragneiss or quartzite?
01Z432B	608299	7147268	Quartz-feldspar-sericite layer with 1-2 percent disseminated pyrite.
01Z442A	593854	7143433	Orthogneiss (biotite, quartz, feldspar) with veinlets of iron oxide.
01Z444C	593872	7144473	Quartz veins, up to 4 cm wide collected from 5 different veins over 30 m.
01Z446A	593816	7144776	Orthogneiss, highly iron stained and fractured with tiny speck of scorodite(?), collected over 30 x 6 m area.
01Z449B	593893	7145718	White, sucratic quartz vein, sparse vugs, moderate amounts of iron oxide, especially coating fractures.
01Z456B	607393	7149763	Highly iron oxide stained plutonic(?) rock, quartz in fractures, iron oxide obliterates texture, possible fault?
01Z465C	608499	7148704	Grayish-white, sucratic igneous rock with 3-5% disseminated pyrite clots (2 mm across), pyrite in veinlets.
01Z466B	603071	7150646	White, coarse-grained, feldspar quartz dike or vein, trace fuchsite(?) and oxidized sulfide.
01Z469C	602841	7151088	Quartz vein, white to clear, 8 cm wide cutting paragneiss; minor vugs, iron oxide stain and some carbonate.

Table 5. Limits and analytical methods for major oxide, minor oxide and trace element analyses. Analytical method XRF = X-Ray Fluorescence Spectroscopy. Note: LOI* = Loss on Ignition. Total* = Total percent as oxide.

Elemental Oxide or Element	Analytical Method	Detection Limit	Upper Limit
FeO	Titration	0.01%	100%
Al2O3	XRF	0.01%	100%
BaO	XRF	0.01%	100%
CaO	XRF	0.01%	100%
Cr2O3	XRF	0.01%	100%
Fe2O3	XRF	0.01%	100%
K2O	XRF	0.01%	100%
MgO	XRF	0.01%	100%
MnO	XRF	0.01%	100%
Na2O	XRF	0.01%	100%
P2O5	XRF	0.01%	100%
SiO2	XRF	0.01%	100%
SrO	XRF	0.01%	100%
TiO2	XRF	0.01%	100%
LOI*	XRF	0.01%	100%
Total*	XRF	0.01%	100%
Ba	XRF	5 ppm	5%
Rb	XRF	2 ppm	5%
Sr	XRF	2 ppm	5%
Nb	XRF	2 ppm	5%
Zr	XRF	3 ppm	5%
Y	XRF	2 ppm	5%

Table 6. Limits and analytical methods for trace element geochemical analyses. Analytical methods include: FA-AAS = Fire Assay-Atomic Absorption Spectroscopy, ICP-MS = Inductively Coupled Plasma-Mass Spectroscopy, ICP-AES = Inductively Coupled Plasma-Atomic Emission Spectroscopy

Element	Possible Incomplete Digestion	Analytical Method	Detection Limit	Upper Limit
Au		FA-AAS	5 ppb	10000%
Au		ICP-MS	1 ppb	1000ppb
Pt		ICP-MS	0.5 ppb	1000ppb
Pd		ICP-MS	1 ppb	1000ppb
Ag		ICP-AES	0.2 ppm	0.01%
Al	*	ICP-AES	0.01%	15%
As		ICP-AES	2 ppm	1%
B		ICP-AES	10 ppm	10000 ppm
Ba	*	ICP-AES	10 ppm	1%
Be	*	ICP-AES	0.5 ppm	0.01%
Bi		ICP-AES	2 ppm	1%
Ca	*	ICP-AES	0.01%	15%
Cd		ICP-AES	0.5 ppm	0.05%
Co		ICP-AES	1 ppm	1%
Cr	*	ICP-AES	1 ppm	1%
Cu		ICP-AES	1 ppm	1%
Fe		ICP-AES	0.01%	15%
Ga	*	ICP-AES	10 ppm	1%
Hg		ICP-AES	1 ppm	1%
K	*	ICP-AES	0.01%	0.01%
La	*	ICP-AES	10 ppm	1%
Mg	*	ICP-AES	0.01%	15%
Mn		ICP-AES	5 ppm	1%
Mo		ICP-AES	1 ppm	1%
Na	*	ICP-AES	0.01%	10%
Ni		ICP-AES	1 ppm	1%
P		ICP-AES	10 ppm	1%
Pb		ICP-AES	2 ppm	1%
S		ICP-AES	0.01%	10%
Sb		ICP-AES	2 ppm	1%
Sc	*	ICP-AES	1 ppm	1%
Sr	*	ICP-AES	1 ppm	1%
Ti	*	ICP-AES	0.01%	10%
Tl	*	ICP-AES	10 ppm	1%
U		ICP-AES	10 ppm	1%
V		ICP-AES	1 ppm	1%
W	*	ICP-AES	10 ppm	1%
Zn		ICP-AES	2 ppm	1%