

U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

Regional sampling of waters and sediments variably impacted by mine
drainage in the Denver West 1: 100,000 quadrangle, October, 1994:
Preliminary data

compiled by
Sigrid Asher-Bolinder¹

from data and analyses obtained by
Sigrid Asher-Bolinder, William M. Aubrey, III, Linda C. S. Gundersen*, F. Allan
Hills, Bill Larson, Megan McCoy, John McHugh, Allen L. Meier, Elwin L. Mosier,
James K. Otton, Douglass E. Owen, Charles T. Pierson, Christopher J. Potter,
Jacques F. Robertson, R. Randall Schumann, Kathleen S. Smith, Mark R. Stanton,
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This database, identified as OFR95-0804, has been approved for release and publication by the Director of the USGS. Although this database has been subjected to rigorous review and is substantially complete, the USGS reserves the right to revise the data pursuant to further analysis and review. Furthermore, it is released on condition that neither the USGS nor the United States Government may be held liable for any damages resulting from its authorized or unauthorized use.

The database can be downloaded via 'anonymous ftp' from a USGS system named greenwood.cr.usgs.gov (136.177.48.5). The files are located in a directory named pub/open-file-reports/ofr950804. The data are presented as two spreadsheet computer files created in Microsoft Excel, version 5.0 saved as Lotus 1-2-3 worksheets, dwwat.wk1 and dwsed.wk1. The data are preliminary in nature and incomplete because data for dissolved anions and for trace elements in sediments are still pending. The purpose of this preliminary data release is to alert interested individuals and groups of the USGS's efforts to characterize the geochemical signature of past mining activities in this environmentally sensitive area.

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During the last century portions of the Colorado Front Range immediately west of Denver have been sites of extensive mining for base and precious metals and uranium. These largely abandoned mines and prospects are potential sources of radionuclides, heavy metals, and other toxic trace elements to major drainages that are the present source of industrial, domestic, and recreational waters to adjacent urban areas.

The U.S Geological Survey (USGS) is interested in contributing its expertise to ongoing studies of the environmental impact of past mining activities in the area. Towards this end, a new project was established in October, 1994, "Environmental Impact of Abandoned Uranium Mines in the Front Range of Colorado". The initial study area for this project is the Denver West 1:100,000 quadrangle, which includes all of Clear Creek and Gilpin Counties, the northern half of Jefferson County, and parts of Summit, Grand, and Boulder Counties. The study area includes the important Central City-Idaho Springs mining district, the Schwartzwalder uranium mine and associated uranium occurrences, other areas of low grade sulfide mineralization, and areas largely devoid of mineralization.

This report presents some preliminary chemical data for water and sediment samples collected by project members during mid-October, 1994 at nearly 90 sites in the Denver West quad. The purpose of this initial sampling was to provide a regional-scale synoptic overview of the chemical variability of waters as a function of geology and land use, including past mining activities. Water samples are assumed to be representative of a period of low flow in the annual hydrologic cycle in which ground-water return contributes substantially to stream flow. Areal coverage is extensive enough to include water and sediment samples from heavily mined areas and also from variably mineralized areas largely undisturbed by mining activities. Geographically based inspection of the chemical data allows for interesting comparisons based on differences in geology and/or land use. The data also serve as a useful reference for comparison with previous analyses of water and sediments in more geographically restricted portions of the Denver West quad.

Water samples were collected by depth-wise sampling at equally spaced intervals along a traverse of the stream perpendicular to its flow. At least four liters of water were collected in polyethylene bottles and combined in a larger plastic carboy. Aliquots of the mixed composite were taken for streamside measurements of temperature, pH, and specific conductance. Approximately two liters of raw water were transferred to a screw-capped polyethylene bottle and placed under refrigeration for transfer to the laboratory. Samples were returned to the laboratory within one day of collection. An aliquot of 125 ml of raw water (RA) was acidified to pH <2 with ultrapure nitric acid. The remaining sample was filtered through a cellulose acetate membrane of 0.45 micrometer opening. Alkalinity was then determined by titrations of 20-50 ml with standard acid. The remaining filtered sample was divided into unacidified (FU) and acidified fractions (FA) for subsequent analyses of anions and cations respectively.

Sediment samples of 2-3 kg dry weight were taken as composited grab samples after water sampling was completed. Sediments were collected from areas of quiet water within the main channel. Sampling spots included the downstream sides of large boulders, quiet pools, or shallow backwaters along sand or gravel bars. Samples were collected away from stream banks to avoid potential contamination by slope wash. Sediments were collected with plastic scoops and were placed into plastic buckets lined with plastic bags. Excess water was decanted from samples after ten minutes or more of settling. Upon their

return to the laboratory, sample bags were opened and the samples were air-dried at 40°C. Each sample was passed through a sieve of 2 mm opening and coarser materials were discarded. Five hundred grams of the <2 mm size fraction was saved for analysis, and the remaining material was further separated into specific size fractions for analysis.

Most of the entries on the spreadsheets are self explanatory or include text that describe the nature and location of each sample, estimates of stream flow, types of splits analyzed, and the method of analysis. Additional questions regarding details of sampling and analysis or future plans for sampling under this project should be directed to either of the co-project leaders, Linda C. S. Gundersen at 703/648-6471 (lgundersen@usgs.gov) or Robert A. Zielinski at 303/236-4719 (rzielinski@usgs.gov).

We thank U.S. Geological Survey volunteer P. K. Cavey for her help in sampling. This phase of the project also benefited from the support and advice of USGS colleagues Kevin F. Dennehy, Robert A. Kimbrough, Janice S. Heiny, and Gregory B. O'Neill.

Sample ID		Sample locality description	Date	Time	Latitude, In			Longitude, In			Sampling Conditions							Method of estimate	Stream gage type	Water quality estimate, Water temperature,		
											Discharge estimate,	degrees C.										
					Sample ID	Sample locality description	Date	Time	Deg	Min			Sec	Deg	Min	Sec	Sampling site			Bottom	Water color	Stream mixing
94DW W01		Gamble Gulch	10/1/84	10:00	39	54	25.9	105	30	3.975	Pool and riffle	rocks & gravel	Clear	Excellent	Good	Stable, low	cloudy	Other Observations	debris = leaves, twigs, wood, pine needles	f	cfs	2.2
94DW W02		Moon Gulch	10/1/84	11:15	39	54	51.65	105	30	35.73	Pool and riffle	bedrock & gravel & boulders	Clear	Good	Good	Stable, low	—	—	Serious anchored algal mats	f	0.67	4.0
94DW W03		South Boulder Creek at Johnson Mine	10/1/84	12:25	39	54	48.71	105	31	53.31	Riffle and open channel	rocks & cobble	Clear	Excellent	Clear	Stable, low	Clear, breezy	—	—	p on 10/13/84	31.4 by pygmy meter	5.7
94DW W04		Mammoth Gulch	10/1/84	13:52	39	54	6.619	105	36	39.62	Riffle	rocks & cobble	Clear	Good	Clear	Stable, low	Clear, breezy	—	Some floating leaves and some anchored algal mats along banks	f	33 by float 17 by gage	6.1
94DW W05		North Boulder Creek at Sherwood Creek	10/1/84	16:45	39	59	19.26	105	29	24.19	Pool and riffle	cobble & gravel & sand	Clear	Excellent	Clear	Stable, low	Pty cdy, breezy	—	—	f	41 by float	8.9
94DW W06		Beaver Creek	10/1/84	17:50	39	57	49.42	105	31	39.07	Pool, riffle	gravel & sand	Brown	Fair	Fair	Stable, low	Pty cdy, breezy	—	Some floating debris and floating algal mats	not possible	—	6.7
94DW W07		Middle Boulder Creek above Barker Reservoir at Gaging Station	10/1/84	09:50	39	57	41.47	105	30	14.59	Riffle, open channel	cobble & gravel & sand	Brown	Excellent	—	Stable, low	Clear, cold, breeze	—	Some floating debris	f	32	5.5
94DW W08		South Beaver Creek at Lincoln Hills	10/1/84	11:00	39	55	31.76	105	27	18	Pool, riffle	sand & mud & leaves	Brown	Fair to poor	Fair	Stable, low	Clear, cold, breezy	—	Moderate floating leaves and slight turbidity	f	0.5	7.0
94DW W09		South Boulder Creek at Pinediff Gage	10/1/84	13:44	39	55	53.39	105	25	26.38	Open channel	cobble	Clear	Excellent	Clear	Stable, low	Clear, warm, breeze	—	—	f	50 by float	8.9
94DW W10DUP		Beaver Creek at junction of Gap and Twin Spruce Roads	10/1/85	16:20	39	53	56.69	105	20	37.33	Pool, riffle	cobble & gravel	Brown	Fair to poor	Clear	Stable, low	Clear, cold, breezy	—	—	—	—	11.1
94DWW10		Beaver Creek at junction of Gap and Twin Spruce Roads	10/1/85	15:15	39	53	56.69	105	20	37.33	Pool, riffle	cobble & gravel	Brown	Fair to poor	Clear	Stable, low	Clear, cool, breezy	—	Some floating debris and garbage, some detergent suds	f	0.2	11.1

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94DW W12	Coal Creek Gaging Station	10/12/94	17:30	39	52	39.81	105	16	37.42	Shallow pool	bedrock & gravel & sand	Brown	Poor	Fair	Stable, low	—	Stream barely trickling	Moderate floating leaves, anchored algal mats, slight turbidity	—	—	10.0	
94DW W13	Fall River near mouth; below Dover Mine	10/13/94	09:53	39	45	22.24	105	33	21.25	Riffle, open channel	cobble & minor gravel & minor sand	Clear	Excellent	Clear	Stable, low	Pty cdy, cold, calm	Moss and roots bright red at sample site; general increase in Fe stain on rocks below mine	Garbage on banks	f	g	4.0	
94DW W14	Above Cumberland on Fall River	10/13/94	12:05	39	47	52.28	105	37	27.89	Riffle, open channel	rocks & cobble	Clear	Excellent	Good	Stable, low	Pty cdy, lt breeze	—	Some floating leaves and some anchored algal mats	f	g	4.0	
94DW W15	West Fork of Clear Creek near Empire Gaging Station	10/13/94	15:02	39	45	31.46	105	39	34.22	Riffle, open channel	rocks & cobble	Brown	Excellent	Good	Stable, low	Pty cdy, lt breeze	—	Moderate floating leaves and moderate anchored algal mats	—	—	8.0	
94DW W16	Bard Creek upstream from ponds	10/13/94	16:10	39	45	3.654	105	41	9.444	Riffle, open channel	cobble & gravel	Brown	Good	Good	Stable, low	Pty cdy, breezy	—	Some floating debris	f	—	5.0	
94DW W17	Mad Creek	10/13/94	17:00	39	45	41.67	105	41	58.78	Riffle, steep rapids	rocks & cobble	Brown	Excellent	Good	Stable, low	Clear, lt breeze	Sulfur smell	Moderate floating debris such as leaves and pine needles; atmospheric (sulfur) odor	Very steep stream; high flow, did not do float	—	5.0	
94DW W18	West Fork of Clear Creek near Hoop Creek	10/14/94	10:15	39	46	32.18	105	47	34.03	Pool, riffle	cobble & gravel & sand	Clear	Excellent	Clear	Stable, low	Cdy, calm	—	—	f	12.1	3.0	
94DW W19	West Fork of Clear Creek below Henderson Mine; at Henderson Gauge	10/14/94	11:20	39	46	16.17	105	49	11.05	Riffle, open channel	cobble & gravel & sand	Clear	Excellent	Clear	Stable, low	Pty cdy, lt breeze	—	—	f	10.7 by float	3.0	
94DW W20	Jim Creek	10/14/94	13:15	39	52	55.5	105	45	15.37	Pool, riffle	rocks & cobble	Red	Good to fair	—	Stable, low	Cdy, calm	—	Algae coatings	f	0.1	5.0	
94DW W21	Fraser River at Fraser River Trail Campground	10/14/94	15:00	39	53	59.2	105	46	29.43	Riffle, open channel	cobble & gravel & sand & mud	Clear	Excellent	Clear	Stable, low	Pty cdy, lt breeze	—	—	f	16.1 by float	5.5	
94DW W22	Vasquez Creek Gauge	10/14/94	15:50	39	55	14.61	105	47	5.414	Pool, riffle, open channel	rocks & cobble & sand & mud	Clear	Excellent	Clear	—	Pty cdy, lt breeze	—	Lots of trash by creek	f	12.3 by float	5.5	
																			g			Rod and tape above small weir

DWWAT - WK1

94DW W23	Ralston Creek above Reservoir	10/18/94	10:00	39	49	18.9	105	15	41.38	Riffle, open channel	cobble & gravel	Clear	Fair	Clear	Stable low	Pty cdy, lt breeze	—	—	f	Staff and Electric tape	1.95 by float .33 by electric tape	6.2	
94DW W24	Ralston Creek below Schwartzwalder Mine	10/18/94	11:20	39	50	14.45	105	16	22.64	Riffle	rocks & cobble & gravel	Clear	Good	Clear	Stable low	Pty cdy, lt breeze	—	Algae growing on bottom	f		2.7	7.2	
94DW W26DUP	Ralston Creek at Ralston Roost Picnic Area	10/18/94	14:30	39	49	56.68	105	24	31.24	Riffle	rock & cobble & gravel & sand	Brown	Good	Clear	Stable, low	Cloudy, cold, gusty	—	—	f		1.07	4.5	
94DW W26	Ralston Creek at Ralston Roost Picnic Area	10/18/94	14:00	39	49	56.68	105	24	31.24	Riffle	rock & cobble & gravel & sand	Brown	Good	Clear	Stable, low	Cloudy, cold, gusty	—	—	f		0.8	4.5	
94DW W27	Deer Creek tributary to Ralston Creek	10/18/94	16:30	39	51	3.985	105	20	46.72	Pool, riffle	rock & cobble & gravel & sand	Clear	Good	Clear	Stable, low	Cdy, lt breeze	—	—	f		0.4	5.0	
94DW W28	Ralston Creek at lower end of Golden Gate State Park	10/18/94	17:45	39	51	4.005	105	20	46.8	Pool, riffle	rock & cobble & gravel & sand & mud	Clear	Good	Good	Stable, low	Pty cdy, lt breeze	—	—	f		0.95	6.0	
94DW W29	Ranch Creek	10/19/94	10:30	39	56	59.94	105	45	54.68	Open channel	cobble & gravel & sand	Clear	Good	Clear	—	Cdy, very cold, lt breeze	—	—	f		18.7 by float	2.5	
94DW W30	St. Louis Creek	10/19/94	12:15	39	56	41.69	105	49	46.29	Open channel	cobble	Clear	Good	Clear	Stable low	Cdy, very cold, breezy	—	—	f		27	3.5	
94DW W31	Elk Creek	10/19/94	14:30	39	56	3.386	105	48	44.07	Pool, riffle	rocks & cobble & gravel & sand & mud	Clear	Fair	Clear	Stable low	Cdy, very cold, lt breeze	—	—	f		5.2	4.0	
94DW W35	Loveland Ski Area, downstream from equipment building	10/11/94	09:20	39	41	16.21	105	52	52.04	Open channel	cobble & sand	Gray	Good	Slightly turbid	Stable, low	Clear, lt breeze, cold	Variable discharge from upstream pipe	—	f		7.1	2.5	

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94DW W36	Quayle Creek at bridge	10/11/94	13:30	39	41	27.72	105	48	18.59	Open channel	cobble & gravel	Clear	Excellent	Clear	—	Clear, lt breeze, cold	—	f	9.9	8.0
94DW W37	Clear Creek at Baker Gulch	10/11/94	15:30	39	41	32.18	105	48	12.88	Pool	cobble & gravel	Clear	Fair	Clear	—	Pty cdy, cold, lt breeze	Drainage pipe on north side, rocks and stream bottom weedy stained below it	f	19	3.5
94DW W38	Clear Creek at Silver Plume	10/12/94	08:00	39	41	46.86	105	44	43.83	Open channel	gravel & sand	Clear	Good	Clear	—	Pty cdy, cold, lt breeze	At edge of I-70 berm	f	24.5	1.5
94DW W39	Clear Creek at Georgetown Loop Railroad	10/12/94	10:40	39	42	2.45	105	42	23.91	Open channel	gravel & sand	Clear	Good	Clear	—	Clear, cold, breezy	Some iron staining on rocks	f	23.9	2.5
94DW W40	Clear Creek above Georgetown Lake	10/12/94	12:40	39	43	5.266	105	41	38.37	Open channel	cobble & gravel	Clear	Good	Clear	—	Clear, cool, lt breeze	Black coatings on emergent rocks at stream edge	f	39.9	5.5
94DW W41	Clear Creek at Empire Gage	10/12/94	14:00	39	45	9.542	105	39	40.67	Open channel	cobble & gravel	Clear	Good	Clear	—	Pty cdy, warm, lt breeze	Green algae on rocks in deeper water	g	Electric tape	9.0
94DW W42	Clear Creek at Lawson Gage	10/12/94	15:25	39	45	56.73	105	37	31.88	Open channel	rock & sand	Clear	Good	Clear	—	Pty cdy, cool, lt breeze	Rocks coated with algae, emergent rocks coated black	g	Electric tape	8.0
94DW W43DUP	Mill Creek at Dumont	10/13/94	10:00	39	45	54.33	105	36	4.186	Pool	gravel & sand	Clear	Excellent	Clear	—	Clear, cold, lt breeze	Green algae covering rocks at edge of pool	f	3.7	3.0
94DW W43	Mill Creek at Dumont	10/13/94	09:00	39	45	54.33	105	36	4.186	Pool	gravel & sand	Clear	Excellent	Clear	—	Clear, cold, lt breeze	Green algae covering rocks at edge of pool	f	4.3	2.5
94DW W44	Clear Creek above Turkey Gulch	10/13/94	11:05	39	45	26.64	105	34	1.17	Open channel	cobble & gravel	Clear	Good	Clear	—	Clear, cold, lt breeze	Rocks coated with mostly dead algae, some green colonies; black coatings on emergent rocks	f	77	5.5
94DW W45	Virginia Canyon	10/13/94	12:45	39	44	46.14	105	30	47.88	Open channel	cobble & gravel & sand	Clear	Excellent	Clear	—	Clear, cool, breezy	bare trickle of water	c	0.005	12.5
94DW W46	Clear Creek below Idaho Springs	10/13/94	14:05	39	44	38.26	105	29	25.02	Open channel	rocks & cobble & gravel	Clear	Good	Slightly cloudy	—	Clear, gusty, cool	Black stain on some emergent rocks	f	103	7.5

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94DW W47	Clear Creek near I-70 and US6 Jct.	10/13/94	15:25	39	44	46.42	105	26	10.05	Open channel	cobble & gravel	Green	Good	Slightly cloudy	Stable, low	Clear, cool, lt breeze	Dead algae and some green algae coating some submerged rocks. Black coating on emergent rocks.	—	f			97 by float	8.5	
				39	44	45.90	105	25	1.60										g	Electric tape				
				these values from handheld GPS																				
94DW W48	North Fork of Clear Creek at mouth	10/13/94	16:50	39	44	54.98	105	23	56.75	Open channel	gravel & sand	Brown	Good	Cloudy	Stable, low	Clear, calm, cool	All rocks coated with red silt; abundant green algae on bottom	—	f			3.3 by float	9.0	
				39	44	56.60	105	23	55.80										g	Electric tape				
				these values from handheld GPS																				
94DW W49	North Fork Clear Creek above Missouri Ck.	10/14/94	09:05	39	49	34.64	105	32	9.637	Pool	cobble & sand	Clear	Good	Clear	Stable, low	Ply idy, cold, calm	Thin film of organics on sediment surface	—	f	p on 10/13/94		2.3 by float 2.4 by pygmy meter	1.5	
94DW W50DUP	Missouri Canyon	10/14/94	11:00	39	49	12.85	105	30	34.78	Small pool	rocks & gravel & sand	Clear	Excellent	Clear	Stable, low	Ply idy, cold, lt breeze	Brown coating on emergent rocks	—	f		0.3	2.0		
94DW W50	Missouri Canyon	10/14/94	10:10	39	49	12.85	105	30	34.78	Small pool	rocks & gravel & sand	Clear	Excellent	Clear	Stable, low	Ply idy, cold, lt breeze	Leaf debris at margins	—	f		0.5	1.0		
94DW W51	Eureka Gulch above Central City	10/14/94	12:35	39	48	16.96	105	31	36.56	Flat, seepy channel through wetland	mud & vegetation	Clear	Excellent	Clear	Stable, low	Ply idy, cool, breezy	Heavily limonite-stained bottom; floes on bottom of channel	—	c		0.01	8.0		
94DW W52	Chase Gulch above Blackhawk	10/14/94	13:50	39	48	13.65	105	30	6.327	Pool	rocks	Clear	Excellent	Clear	Stable, low	Ply idy, cool, lt breeze	Narrow channel incised into flood plain	—	f		1.1	6.5		
94DW W53	North Fork Clear Creek below Blackhawk	10/14/94	15:00	39	47	47.6	105	28	32.71	Open channel	rock & sand & mud	Brown	Good	Murky	Stable, low	Ply idy, cool, breezy	All rocks in channel stained red-brown; sand in channel stained red-brown	Foam on surface; very turbid	f	p on 10/13/94	4.3 by float 2.3 by pygmy meter	11.0		
94DW W54	Clear Creek at Golden gage	10/18/94	08:40	39	45	10.54	105	14	3.82	Open channel	rocks & cobble & gravel	Green	Good	Cloudy	Stable, low	Ply idy, cold, calm	Silt and algae covering most rocks	Moderate turbidity	g	Electric tape		3.5		
94DW W55	Guy Gulch	10/18/94	10:10	39	44	50.18	105	18	10.77	Lip of pool	bedrock & mud	Clear	Excellent	Clear	Stable, low	ply idy, cold, lt breeze	Mud and algae in pools; lowest pool had a trout in it	—	c		0.005	8.5		
94DW W56	Elk Creek	10/18/94	11:35	39	44	31.33	105	19	51.91	Cascade below lip of pool	bedrock & sand & mud	Clear	Excellent	Clear	High falling	Ply idy, cold, breezy	Most of flow is recent meltwater	Floating algae mats in pool	c		0.03	8.5		

DWWAT - WK1

94DWW67DUP	Russell Gulch	10/18/94	14:15	39	45	51.35	105	26	48.02	Open channel	gravel & sand	Clear	Excellent	Clear	Stable, low?	Cloudy, cold, lt breeze	Active channel at edge of flood outwash surface	No staining on rocks in active channel	r		0.2	6.0
94DWW67	Russell Gulch	10/18/94	13:20	39	45	51.35	105	26	48.02	Open channel	gravel & sand	Clear	Excellent	Clear	Stable, low?	Cloudy, cold, lt breeze	Active channel at edge of flood outwash surface	No staining on rocks in active channel	r		0.1	5.5
94DWW68	Smith Hill Gulch	10/18/94	15:24	39	47	0.482	105	27	17.2	Open channel	cobble & gravel & sand	Clear	Excellent	Clear	Stable, low?	Cloudy, cold, lt breeze	Emergent rocks coated black; algal colonies in channel around some rocks	—	r		0.07	6.0
94DWW69	Clear Creek below North Fork of Clear Creek	10/18/94	09:45	39	44	28.76	105	19	54.78	Open channel	rocks & gravel & sand	Green	Good	Murky	Stable, low	Clear, cold, lt breeze	Black coating (Periphyton?) on rocks	Turbidity moderate	r		102	2.5
94DWW60	Keystone Gulch	10/11/94	10:30	39	35	40.08	105	58	19.82	Open channel	cobble & gravel	Clear	Excellent	Clear	Stable normal	Clear, cold	—	Mild floating debris and fish kill	r		5.4 by float	2.5
94DWW61	Snake River near Keystone Ski area	10/11/94	12:15	39	36	19.82	105	56	33.47	Open channel	cobble & gravel & rock	Clear	Good	Clear	Stable, low	Clear, cool, calm	Periphyton on rocks; iron and manganese stain	Some floating debris	r	Staff	50 by float	7.5
94DWW62	Snake River above Montezuma	10/11/94	14:15	39	33	49.49	105	51	34.75	Open channel	cobble & gravel	Clear	Excellent	Clear	Stable, low	Pkly cdy, cool, calm	Lots of iron-oxide staining on bed	—	r		8.5 by float	4.8
94DWW63	Deer Creek above Montezuma	10/11/94	15:30	39	33	48.31	105	51	38.10	Pool	rock & cobble & gravel & sand & mud	Clear	Excellent	Clear	Stable, low	Pkly cdy, cool	Mn on rocks; red bacteria at seeps	Floating garbage	r		4.5 by float	5.0
94DWW64	North Fork of Snake River	10/12/94	09:45	39	36	28.18	105	56	25.03	Riffle	rock & cobble & gravel & sand	Clear	Good	Clear	Stable, low	Clear and cool	Minor Fe and Mn staining on rocks	Floating garbage	p	Staff	6.5	2.0
94DWW65	Pinu Creek	10/12/94	12:00	39	35	56.94	105	51	26.15	Open channel	rock & cobble & gravel	Clear	Excellent	Clear	Stable, low	Clear, cool, lt breeze	Iron staining at seeps along stream edge; white coatings on rocks	Floating debris and faint sulfide odor	p		9.7	3.8
94DWW66	Snake River above confluence with Pinu Creek	10/12/94	13:45	39	35	29.01	105	52	15.58	Riffle	cobble & gravel & sand	Clear	Excellent	Clear	—	Pkly cdy, cool, calm	Minor to moderate iron staining on rocks	—	p		10	5.7
94DWW67	South Clear Creek above Georgetown	10/12/94	16:00	39	41	13.72	105	41	55.96	Pool	cobble & gravel & sand	Clear	Excellent	Excellent	Stable, low	Pkly cdy, lt breeze	Fe and Mn staining on rocks; some algae	Mild floating debris	r		17.9 by float	8.5

94DW W68	Leavenworth Creek at confluence of South Clear Creek	10/13/94 09:15	39	41	14.15	105	41	59.24	Pool	rocks & cobble & gravel & sand	Clear	Excellent	Clear	Stable, low	Pty cdy, cool	Minor Fe and Mn staining	Mild floating debris and garbage	f		Staff and Electric tape	4.19 by staff	1.8
94DW W69	Geneva Creek above Grant	10/13/94 11:30	Not on Denver West sheet						Pool	rocks & cobble & gravel & sand & mud	Slightly turbid	Excellent	Slightly milky	Stable, low	Pty cdy, cool	Fe and Mn staining on rocks	Mild floating debris and mild to moderate turbidity	f	Staff	4.20 by gauge	5.8	
94DW W70	Geneva Creek above confluence with Duck Creek	10/13/94 13:30	39	31	45.17	105	43	55.57	Riffle	rocks & cobble & gravel & sand & mud	Clear	Good	Clear	Stable, low	Pty cdy, cool, breeze	Abundant Fe on rocks	—	g	Electric wire	19	8.8	
94DW W71	Duck Creek	10/13/94 13:55	39	31	44.87	105	43	51.11	Pool	gravel & sand & mud, a few boulders	Clear	Good	Clear	Stable, low	Pty cdy, clear, breezy	Prominent Mn on rocks; really nice bacteria in the seeps	Some floating debris and garbage	f			4	7.7
94DW W72	*South Clear Creek above Cabin Creek Reservoir	10/13/94 15:20	39	39	10.40	105	42	28.10	Open channel	gravel & sand & mostly mud; cobble and peat on bank	Clear	Good to fair	Clear	Stable, low	Pty cdy, a breeze	—	—	f		Staff	11 by float	7.8
94DW W73	West Chicago Creek	10/14/94 09:00	39	41	36.16	105	37	0.86	Open channel	rocks & cobbles sand & mud	Clear	Excellent	Clear	Stable, low	Pty cdy, cool	Mn and Fe on rocks	Floating debris	f			9 by float	4.2
94DW W74	South Chicago Creek	10/14/94 09:30	39	41	34.85	105	36	58.83	Riffle	rock & cobble & gravel & sand	Clear	Excellent	Clear	Stable, low	Pty cdy, cool	—	Some floating debris and garbage	f			2.8 by pygmy meter	
94DW W75DUP	Chicago Creek gage	10/14/94 10:15	39	42	59.66	105	34	15.15	Open channel	rocks & cobble & gravel & sand & mud	Clear	Excellent	Clear	Stable, low	Pty cdy, cool, it breeze and gusty	Fe and Mn stain	Some floating debris and garbage	f and g	Electric wire		10 by float	4.2
94DW W75	Chicago Creek gage near Devils Canyon	10/14/94 10:15	39	42	59.66	105	34	15.15	Open channel	rocks & cobble & gravel & sand & mud	Clear	Excellent	Clear	Stable, low	Pty cdy, cool, it breeze and gusty	Fe and Mn stain	Some floating debris and garbage	f	Electric wire		13 by float	6.5

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94DW W76	Chicago Creek near confluence with Clear Creek at Clear Creek District School Station	10/14/94	11:00	39	44	12.09	105	31	27.77	Riffle	rocks & cobble & gravel & sand & mud	Clear	Excellent	Clear	Stable, low	Pity cdy, cool, it breeze	Moderate Fe and Mn on rocks	Some floating debris and garbage	f	p on 10/12/94	13 by float	7.1
94DW W77	Soda Creek at Idaho Springs	10/14/94	11:45	39	44	10.79	105	30	47.79	Riffle & open channel	rocks & cobble & gravel & sand & mud	Slightly cloudy	Good	Slightly cloudy	Stable, low	Cloudy and cool	Prominent Fe staining	Some floating debris and some turbidity	f		2.6 by float	7.3
94DW W78	Beaver Brook at I-70	10/14/94	13:40	39	42	53.39	105	23	31.99	Small riffle	rock & cobble & gravel & sand & mud	Clear	Good	Clear	Stable, low	Pity cdy, warm, it breeze	Fe bacteria at seeps at edge; heavy algae on rocks; heavy Mn and moderate Fe staining	Serious floating debris and slightly turbid	f		0.3	8.7
94DW W79	Soda Creek above El Rancho	10/14/94	14:30	39	42	37.34	105	22	5.90	Open channel	rock & cobble & gravel & sand & mud	Slightly turbid	Good	Clear	Stable, low	Pity cdy, cool	Mn coating on rocks	Some floating debris and light turbidity	f		0.3	12.3
94DWW81DUP	Bear Creek at Morrison	10/19/94	09:00	39	39	10.66	105	11	41.72	Riffle	rock & cobble & gravel & sand	Clear	Good	Clear	Falling low	Pity cdy, cool, it breeze	Some algae on rocks	Some floating debris and garbage and some detergent(?) suds	f		25 by float	5.7
94DW W81	Bear Creek at Morrison	10/19/94	09:00	39	39	10.66	105	11	41.72	Riffle	rock & cobble & gravel & sand	Clear	Good	Clear	Falling low	Pity cdy, cool, it breeze	Some algae on rocks	Some floating debris and garbage and some detergent(?) suds	g f	Chain Staff	25 by float	5.7
94DW W82	Corral Creek	10/19/94	10:45	39	37	41.42	105	25	49.34	Riffle	rock & cobble & gravel & sand	Clear	Good	Clear	Low	Pity cdy, cool, it breeze	Lot of mica	Some floating debris	f	p on 10/12/94	13 by pygmy meter	
94DW W83	Bear Creek at Singing River Ranch	10/19/94	11:45	39	37	24.92	105	26	39.49	Riffle	rock & cobble & gravel & sand	Clear	Good	Clear	Low	Pity cdy, cool, it breeze	Some algae on rocks	Some floating debris	f		5 by float	4.9
94DWW84DUP	Bear Creek at Golf Course above Evergreen Lake	10/19/94	13:00	39	37	58.71	105	19	59.63	Open channel	cobble & gravel & sand & mud	Clear	Good	Clear	Low	Pity cdy, cool, it breeze		Some floating debris and garbage	f and g		26 by float	5.5
94DW W84	Bear Creek at Golf Course above Evergreen Lake	10/19/94	13:00	39	37	58.71	105	19	59.63	Open channel	cobble & gravel & sand & mud	Clear	Good	Clear	Low	Pity cdy, cool, it breeze		Some floating debris and garbage	f and g		26 by float	5.5

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94DW W85	Cub Creek at Evergreen Library	10/19/94	13:45	39	37	25.12	105	19	24.11	Riffle	rocks & cobble & gravel & sand	Clear	Good to fair	Clear	Low	Pity ddy, cool, lt breeze	Fe on rocks, some algae too	Moderate floating debris and garbage; slight septic odor	f	f	2 by float	5.6
94DW W86	North Turkey Creek just west of Colorado Hwy 285	10/19/94	14:45	39	35	31.87	105	13	26.66	Open channel	rocks & cobble & gravel & sand & mud	Clear	—	Clear	Low	Pity ddy, cool, lt breeze	Minor Mn and Fe stains	Some floating debris and garbage	f	p on 10/12/94	0.5 by pygmy meter	5.0
94DW W87	South Turkey Creek just east of Colorado Hwy 285	10/19/94	15:15	39	35	30.12	105	13	5.32	Open channel	cobble & gravel & sand & mud	Clear	Poor	Good, some turbidity	Low	Pity ddy, cool, lt breeze	Fe bacteria on surface and bottom; Fe and Mn coatings on rocks	Some turbidity	—	Insufficient for measurement	9.2	
94DW W88	Turkey Creek near mouth of canyon	10/14/94	15:35	39	37	3.21	105	13	2.90	Open channel	bedrock & rocks & cobble & gravel & sand & mud	Clear	Fair	Slightly turbid	Low	Pity ddy, cool, lt breeze	Rocks slimy with Periphyton	Moderate debris and garbage; detergent(?) suds and slight turbidity	f	2.4	6.3	
94DW W89	Deer Creek at hogbacks	10/19/94	16:45	39	32	57.38	105	8	2.81	Riffle	cobble & gravel & sand	Clear	Fair	Clear	Low	Pity ddy, cool, lt breeze	Fe bacteria on water surface in more stagnant areas and Periphyton on rocks	Moderate floating debris and some detergent suds		Insufficient for measurement	10.3	

Field measurements Air temperature, degrees C.			RU=raw, unacidified RA=raw, acidified FU=filtered, unacidified FA=filtered, acidified		Analyses by atomic absorption spectrometry (cations), mg/L										Total organic carbon (TOC) and dissolved organic carbon (DOC), in mg/L, by persulfate oxidation/NDIR		Trace element analyses by inductively-coupled plasma-mass spectrometry, micrograms/L														Additional Notes																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
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12.0	8.13	FA 1350 RU	11	12.9	0.53	6	1.2	0.02									21	< 0.2	1.8	< 0.02	< 0.2	< 1	1	< 0.1	< 1	8.4	< 0.1	< 1	0.70	Watercress growing on creek and culvert downstream	
		RA	22	180.0	5.90	85	38.0	0.06									9	0.2	14.0	0.20	2.9	2	2	0.8	200	0.20	86.0	< 0.1	< 1		65.00
		FU FA	22	180.0	5.80	86	38.0	0.03							155.0	189.0	7	< 0.2	15.0	0.20	3.0	2	6	0.8	190	0.20	85.0	< 0.1	< 1		65.00
15.5	8.35	1220 RU																												—	
		RA FU FA	20 21	150.0 150.0	5.40 5.40	71 71	31.0 31.0	0.06 0.02							147.0	179.3	14 6	0.3 < 0.2	11.0 7.4	0.10 0.10	2.4 2.2	1 1	2 2	0.7 0.7	200 200	0.20 0.20	45.0 47.0	< 0.1 < 0.1	< 1 < 1	33.00 34.00	
9.0	8.01	260 RU 240 RU																													
		RA FU FA	11 11 11	12.0 13.0 12.0	2.00 1.90 2.00	27 27 27	8.1 8.1 8.1	1.60 0.97 0.60							75.6 76.2	92.2 92.9	290 80 28	3.2 0.2 2.4	220.0 160.0 120.0	0.30 0.20 0.10	1.2 1.2 0.8	< 1 < 1 < 1	17 2 2	0.3 0.3 0.3	< 1 < 1 < 1	< 0.02 < 0.02 0.05	43.0 35.0 32.0	0.5 0.1 < 0.1	1.1 0.3 0.2	3.80 3.50 3.30	
9.5	7.55	100 RU																													
		RA FU FA	13 13	6.6 6.6	1.10 1.10	11 11	2.7 2.7	0.11 0.08							35.1	42.8	77 51	1.2 1.3	3.3 4.0	0.05 0.04	0.4 0.3	< 1 < 1	< 1 1	0.2 0.1	< 0.02 < 0.02	15.0 14.0	< 0.1 0.1	0.3 0.2	1.00 0.90		
7.5	7.45	220 RU																													
		RA FU FA	16 17	13.0 13.0	2.20 2.20	23 23	6.7 6.6	0.25 0.23							62.1	75.7	46 17	< 0.2 < 0.2	11.0 4.6	0.06 0.05	0.8 0.7	< 1 < 1	< 1 1	0.1 0.1	< 0.02 < 0.02	33.0 32.0	< 0.1 < 0.1	0.2 < 1	1.60 1.50		
2.5	7.70	43 RU																													
		RA FU FA	12 13	2.5 2.5	0.61 0.62	7 7	1.2 1.2	0.13 0.10							19.1	23.3	21 15	< 0.2 < 0.2	2.8 2.4	0.02 < 0.02	0.2 0.2	< 1 < 1	< 1 < 1	< 0.1 < 0.1	< 0.02 < 0.02	11.0 11.0	< 0.1 < 0.1	0.2 0.1	0.06 0.07		
5.5	8.00	80 RU																													
		RA FU FA	10 10	2.2 2.2	1.10 1.10	12 12	2.6 2.8	0.22 0.17							36.5	44.5	25 12	1.3 1.2	14.0 9.8	0.05 0.03	0.3 0.3	< 1 2	< 1 2	< 0.1 < 0.1	< 0.02 0.02	9.5 9.5	< 0.1 < 0.1	0.1 < 1	0.80 0.80		
5.0	7.45	48 RU																													
		RA FU FA	21 20	3.3 3.3	1.40 1.30	7 7	1.6 1.5	1.60 0.43							22.1	27.0	580 55	1.9 1.0	120.0 16.0	0.60 0.08	1.1 0.4	1 < 1	4 < 1	0.5 < 0.1	< 1 < 1	0.02 0.02	28.0 14.0	1.0 0.2	1.4 0.1	0.30 0.06	
6.5	7.73	163 RU																												Sample site approximately 60 ft downstream from discharge pipe and small ditch. Pipe gave off large discharges while we were sampling. Discharges continued intermittently. Water level was up approximately 1 inch from initial stage but dropped again.	
		RA FU FA	6 6	9.3 9.3	0.80 0.78	17 17	4.3 4.1	0.72 0.34							44.5	54.3	71 13	< 0.2 < 0.2	67.0 58.0	0.20 0.10	0.6 0.5	< 1 1	7 6	< 0.1 < 0.1	< 1 < 1	0.02 0.02	38.0 38.0	0.5 0.5	0.5 0.2	1.50 1.50	

Sample site approximately 60 ft downstream from discharge pipe and small ditch. Pipe gave off large discharges while we were sampling. Discharges continued intermittently. Water level was up approximately 1 inch from initial stage but dropped again.

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17.2	7.40	125	RU	4	1.3	0.62	17	4.6	<01	41.1	50.1	0.71	0.68	4	<0.2	0.3	0.03	0.6	<1	89	<0.1	<1	0.70	32.0	0.6	<1	1.50	Adjacent to, and slightly downstream from house; 20 feet upstream from bridge
12.0	7.60	110	RU	4	1.3	0.62	17	4.5	<01	41.1	50.1	1.22	0.68	4	<0.2	0.6	0.03	0.6	<1	85	<0.1	<1	0.60	32.0	0.4	<1	1.60	Stream has had artificial waterfalls put in upstream; could not find field gage noted on 7.5' quad. Drainage pipe enters about 100 feet upstream from sample site.
6.5	7.96	121	RU	6	3.2	0.59	13	3.6	0.11	36.7	44.8	1.05	1.05	15	<0.2	8.9	0.04	0.3	<1	23	<0.1	<1	0.20	30.0	0.3	0.2	1.10	
10.5	7.70	138	RU	6	3.2	0.57	13	3.5	0.08					6	<0.2	7.5	0.04	0.3	<1	21	<0.1	<1	0.20	30.0	0.2	0.1	1.10	Stream has been highly channelized along edge of 170 with artificial races, channels, and pools. Minor iron staining on some rocks.
15.5	7.88	133	RU	5	4.4	0.76	17	4.9	0.09	45.9	56.0			17	1.0	22.0	0.07	0.6	<1	280	0.2	<1	1.10	39.0	1.1	0.2	1.40	
18.0	7.61	143	RU	5	3.4	0.93	16	4.7	0.12	43.1	52.6	0.96		24	<0.2	20.0	0.07	0.6	1	190	0.2	<1	0.90	36.0	1.1	0.1	1.20	Stream has been channelized here. Houses nearby.
13.0	7.69	200	RU	7	3.9	1.10	17	5.4	0.10	44.5	54.3		1.01	9	<0.2	20.0	0.06	0.9	<1	180	0.1	<1	0.20	36.0	0.6	<1	1.20	Water sample location about 60 feet downstream from gage station.
8.5	7.36	45	RUDUP	6	15.0	2.00	16	4.5	0.12	47.4	57.8	0.93		8	<0.2	11.0	0.05	0.6	<1	77	0.2	<1	0.20	35.0	1.5	<1	1.20	
5.5	7.58	46	RU	10	2.0	0.70	6	1.8	0.25					74	0.6	21.0	0.10	0.3	<1	3	<0.1	<1	<0.02	16.0	0.4	0.2	0.10	
10.0	8.36	198	RU	10	2.0	0.68	6	1.7	0.04	17.5	21.0		0.97	100	<0.2	29.0	0.20	0.4	<1	6	<0.1	<1	0.02	17.0	0.7	0.3	0.20	
14.0	3.34	2760	RU	6	14.0	1.90	18	4.9	0.15	47.6	58.0	1.63		9	0.4	9.0	0.02	0.2	<1	4	<0.1	<1	0.02	14.0	<0.1	<1	0.10	
13.0	7.40	210	RU	8	13.0	1.90	20	5.4	0.94	39.4	48.0	0.91	1.01	10	<0.2	12.0	0.07	0.3	<1	8	<0.1	<1	0.07	13.0	0.1	<1	0.10	
				8	13.0	1.90	20	5.4	0.20					67	<0.2	73.0	0.30	1.0	2	70	0.2	9	0.20	26.0	1.1	0.4	2.20	
				110	29.0	9.00	320	137.0	3.00	NA		1.68		49	<0.2	58.0	0.20	1.0	2	53	0.2	9	0.20	25.0	0.4	0.2	2.20	Most acid sample collected
				110	28.0	9.00	320	134.0	2.80					68000	110.0	78000.0	330.00	750.0	8800	82000	10.0	<100	430.00	20.0	60.0	400.0	240.00	
				110	28.0	9.00	320	134.0	2.80					65000	100.0	74000.0	310.00	710.0	8300	77000	<10	<100	420.00	20.0	60.0	390.0	240.00	
				8	13.0	1.90	20	5.4	0.94					220	<0.2	580.0	1.20	3.1	31	330	0.5	8	1.20	25.0	1.3	2.1	2.50	
				8	13.0	1.90	20	5.4	0.20					70	<0.2	540.0	1.00	2.9	11	240	0.2	7	1.00	24.0	0.3	0.6	2.20	

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[illegible]

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2.8	7.35	RA	8	1.7	1.40	13	4.1	0.04	43.5	53.0					12	< 0.2	6.6	< 0.02	0.4	< 1	< 0.1	< 1	< 0.02	28.0	< 0.1	0.1	0.80	-	
		FU	7	1.7	1.40	13	4.0	< 0.1							6	< 0.2	3.4	< 0.02	0.4	< 1	2	< 0.1	< 1	0.04	28.0	< 0.1	< 1		0.80
		FA	92	RU																									
13.8	6.75	RA	8	1.8	0.68	13	3.9	0.05	22.7	27.7					32	< 0.2	23.0	0.06	1.5	2	240	< 0.1	< 1	0.70	35.0	1.7	0.1	0.80	-
		FU	8	1.8	0.68	13	3.7	0.03							25	< 0.2	21.0	0.07	1.5	2	240	< 0.1	< 1	0.70	36.0	1.0	< 1	0.80	
		FA	91	RU																									
10.0	4.65	RA	11	2.4	1.00	10	3.0	0.32	5.1	6.2					930	0.2	210.0	1.90	4.7	6	75	< 0.1	< 1	0.40	33.0	< 0.1	0.6	0.80	-
		FU	10	2.4	1.00	10	3.0	< 0.1							11	< 0.2	210.0	1.80	4.5	2	70	< 0.1	< 1	0.40	32.0	< 0.1	< 1	0.09	
		FA	190	RU																									
10.0	7.40	RA	12	1.9	1.30	12	5.2	1.00	NA						4100	< 0.2	720.0	6.80	15.0	24	250	< 0.1	< 1	1.40	41.0	0.4	1.8	2.10	-
		FU	12	1.9	1.30	12	5.2	0.55							4300	< 0.2	740.0	7.10	15.0	25	250	< 0.1	< 1	1.40	43.0	0.4	1.8	2.10	
		FA	50	RU																									
11.2	7.35	RA	10	2.2	1.20	8	1.8	0.41	23.3	28.4					24	0.9	15.0	0.09	0.4	< 1	< 1	< 0.1	< 1	< 0.02	33.0	< 0.1	0.4	0.10	-
		FU	10	2.2	1.10	8	1.8	0.28							13	0.9	10.0	0.04	0.3	< 1	< 1	< 0.1	< 1	< 0.02	32.0	< 0.1	0.2	0.10	
		FA	80	RU																									
8.5	7.50	RA	5	1.5	1.00	10	3.5	0.32	32.1	39.1					42	1.0	14.0	0.07	0.3	< 1	< 1	< 0.1	< 1	< 0.02	32.0	< 0.1	0.3	0.70	-
		FU	5	1.5	1.00	10	3.5	0.17							8	0.9	12.0	0.05	0.3	< 1	1	< 0.1	< 1	0.10	31.0	< 0.1	0.1	0.60	
		FA	55	RU																									
8.5	7.40	RA	13	2.5	0.94	9	2.1	0.31	28.2	34.4					29	< 0.2	9.6	0.06	0.3	< 1	< 1	< 0.1	< 1	< 0.02	20.0	< 0.1	0.2	0.10	-
		FU	12	2.5	0.92	9	2.1	0.20							9	< 0.2	4.9	0.02	0.2	< 1	< 1	< 0.1	< 1	< 0.02	19.0	< 0.1	0.1	0.10	
		FA	45	RU																									
13.3	7.10	RA	10	2.1	0.96	7	1.5	0.09	19.2	23.4					14	< 0.2	3.4	0.05	0.3	< 1	< 1	< 0.1	< 1	< 0.02	18.0	< 0.1	0.3	0.06	-
		FU	10	2.1	0.97	7	1.5	0.05							8	1.5	3.6	0.08	1.6	< 1	< 1	< 0.1	< 1	< 0.02	18.0	< 0.1	0.2	0.08	
		FA	55	RU																									
13.3	7.10	RADUP	12	2.6	1.10	9	2.0	0.16	24.1	29.4					22	0.6	8.4	0.06	0.3	< 1	1	< 0.1	< 1	< 0.02	21.0	0.1	0.4	0.20	-
		RA	10	2.6	1.10	8	2.0	0.34							66	< 0.2	15.0	0.10	0.4	< 1	2	< 0.1	< 1	< 0.02	23.0	0.4	0.2	0.20	
		FUDUP	11	2.6	1.10	9	2.0	0.10							9	0.6	6.1	0.04	0.2	< 1	2	< 0.1	< 1	< 0.02	21.0	< 0.1	0.1	0.20	
		FADUP	10	2.6	1.00	8	1.9	0.12						10	< 0.2	5.8	0.02	0.2	< 1	2	< 0.1	< 1	< 0.02	21.0	< 0.1	0.1	0.20		

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12.2	7.32	FA 220	RU	11	3.4	0.81	7	1.6	0.23							14	< 0.2	9.0	0.03	0.4	< 1	1	< 0.1	< 1	< 0.02	14.0	< 0.1	0.1	0.20	-				
12.6	7.68	350	RU	14	16.0	1.60	16	4.6	0.34	49.5	60.4					62	< 0.2	42.0	0.10	0.9	< 1	1	0.2	< 1	< 0.02	31.0	< 0.1	0.3	0.40					
				13	16.0	1.60	16	4.6	0.28					39	< 0.2	39.0	0.10	0.9	< 1	< 1	0.2	< 1	< 0.02	30.0	< 0.1	0.2	0.40					-		
12.4	7.08	580	RU																												-			
				11	25.0	1.80	27	7.6	0.27	63.1	77.0			36	2.0	14.0	0.09	0.9	< 1	< 1	0.3	2	< 0.02	40.0	< 0.1	0.2	1.70							
12.4	7.65	490	RU																												-			
				17	44.0	3.10	52	13.0	0.97	113.0	137.8			44	4.2	240.0	0.40	1.6	< 1	3	0.4	< 1	< 0.02	150.0	0.2	0.2	0.90							
12.4	7.65	490	RU	17	44.0	3.10	52	13.0	0.26							8	4.0	240.0	0.40	1.4	< 1	2	0.4	< 1	0.05	150.0	< 0.1	< 1	1.00		-			
14.5	7.66	1100	RU																												-			
				10	30.0	2.40	31	8.8	0.36	72.8	88.8			73	< 0.2	22.0	0.10	1.6	< 1	2	0.4	1	< 0.02	61.0	0.2	0.3	2.00							
				9	30.0	2.30	31	8.8	0.23							20	< 0.2	16.0	0.09	1.5	< 1	1	0.4	1	< 0.02	59.0	< 0.1	0.1	2.00					
																															-			
				21	57.0	4.60	66	21.0	0.13							65	0.5	16.0	0.30	3.1	1	< 1	0.5	2	< 0.02	94.0	0.1	0.2	34.00					
				21	57.0	4.60	66	21.0	< 01							8	< 0.2	9.2	0.20	2.8	< 1	< 1	0.4	1	< 0.02	94.0	< 0.1	< 1	35.00					

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Sample Number; Dup = duplicate sample	Latitude			Longitude			Remainder, in grams				Coarse sand, 2.0-0.18 mm	Fine sand, 0.18-.09 mm, percent	Fine sand, silt, and clay, <0.09 mm	Gamma spectro- metry, wt in g, >10 mesh	Gamma spectrometry of coarse fraction, >10 mesh; ---, data missing										Delayed neutron analyses of fine fraction, <170 mesh; --- not calculated				
	Deg	Min	Sec	10-80 mesh	80-170mesh	<170 mesh	10-80 mesh	80-170mesh	<170 mesh	Wt, g					K, pct	+ or - pct K	eU, ppm	+ or - ppm eU	eTh, ppm	+ or - ppm eTh	eTh/eU	Th/U	Th, ppm	+ or - percent relative standard deviation Th	U, ppm	+ or - percent relative standard deviation U			
	39	54	25.90	105	30	3.98	2,341.1	100.0	105.6	91.9%	3.9%	4.1%	601.2	3.2	0.1	2.5	0.2	15.2	0.5	6.1	1.9	33.2	7	17.8	1				
94DW-S2	39	54	51.65	105	30	35.73	1,130.2	80.7	53.4	89.4%	6.4%	4.2%	549.5	2.7	0.1	5.7	0.4	62.9	0.8	11.1	4.5	42.3	4	9.4	2				
94DW-S3	39	54	48.71	105	31	53.31	1,272.8	106.1	82.3	87.1%	7.3%	5.6%	515.3	2.9	0.1	3.7	0.3	19.3	0.6	5.2	3.3	33.6	4	10.2	1				
94DW-S4	39	54	6.62	105	36	39.62	2,465.0	122.1	44.0	93.7%	4.6%	1.7%	568.0	2.8	0.1	3.7	0.3	23.2	0.5	6.2	4.4	69.8	3	15.7	1				
94DW-S5	39	59	19.26	105	29	24.19	2,104.8	428.4	121.2	79.3%	16.1%	4.6%	552.6	3.3	0.1	2.5	0.2	15.5	0.5	6.3	6.8	64.1	3	9.4	2				
94DW-S6	39	57	49.42	105	31	39.07	1,657.8	93.5	33.1	92.9%	5.2%	1.9%	571.0	3.4	0.1	8.2	0.6	130.9	1.2	16.0	6.8	66.2	3	9.7	2				
94DW-S7	39	57	41.47	105	30	14.59	966.2	26.1	9.9	96.4%	2.6%	1.0%	519.0	3.1	0.1	3.0	0.3	25.0	0.6	8.3	5.0	71.4	3	14.3	1				
94DW-S8	39	55	31.76	105	27	18.00	1,341.1	131.1	86.3	86.1%	8.4%	5.5%	466.1	2.7	0.1	2.2	0.3	10.8	0.6	5.0	3.9	29.0	5	7.4	2				
94DW-S9	39	55	53.39	105	25	26.38	722.2	30.4	13.8	94.2%	4.0%	1.8%	525.8	2.9	0.1	3.1	0.3	16.2	0.5	5.2	2.3	62.8	5	27.2	1				
94DW-S10	39	53	56.69	105	20	37.33	1,505.8	61.2	71.0	91.9%	3.7%	4.3%	509.7	3.1	0.1	3.3	0.3	15.4	0.8	4.6	4.8	41.1	4	8.8	2				
94DW-S10Dup	39	53	56.69	105	20	37.33	1,457.8	71.3	60.8	91.7%	4.5%	3.8%	518.8	3.1	0.1	3.9	0.3	24.0	0.6	6.1	5.7	58.6	3	10.3	1				
94DW-S12	39	52	39.81	105	16	37.42	2,265.8	21.7	6.1	98.8%	0.9%	0.3%	607.7	3.9	0.1	1.7	0.2	7.7	0.4	4.4	7.1	102.0	2	14.4	2				
94DW-S13	39	45	22.24	105	33	21.25	1,176.9	112.7	31.9	89.1%	8.5%	2.4%	583.2	2.5	0.1	5.0	0.3	27.9	0.8	5.6	3.5	52.4	4	14.8	1				
94DW-S14	39	47	52.28	105	37	27.89	730.7	10.2	3.9	98.1%	1.4%	0.5%	526.4	2.9	0.1	3.7	0.3	19.4	0.6	5.3	3.3	57.2	5	17.5	2				
94DW-S15	39	45	31.46	105	39	34.22	1,492.2	129.6	194.0	82.2%	7.1%	10.7%	505.9	3.5	0.1	9.5	0.3	35.4	0.7	3.7	2.2	32.4	6	14.7	1				
94DW-S16	39	45	3.65	105	41	9.44	1,821.7	101.9	32.4	93.1%	5.2%	1.7%	569.8	3.2	0.1	7.4	0.3	39.4	0.6	5.3	4.4	187.0	2	42.3	1				
94DW-S17	39	45	41.67	105	41	58.78	488.5	14.1	4.9	96.3%	2.8%	1.0%	590.0	3.7	0.1	5.5	0.3	22.1	0.5	4.0	2.7	92.6	4	34.7	2				
94DW-S18	39	46	32.18	105	47	34.03	822.6	27.9	11.5	95.4%	3.2%	1.3%	557.0	4.2	0.1	12.7	0.4	39.5	0.7	3.1	2.7	127.0	4	47.7	1				
94DW-S19	39	46	16.17	105	49	11.05	538.6	26.1	16.1	92.7%	4.5%	2.8%	575.7	4.1	0.1	9.5	0.4	58.8	0.8	6.2	5.6	233.0	2	41.7	1				
94DW-S20	39	52	55.50	105	45	15.37	635.7	63.1	29.5	87.3%	8.7%	4.1%	532.6	2.7	0.1	5.5	0.3	17.2	0.5	3.1	1.8	63.3	6	39.1	1				
94DW-S21	39	53	59.20	105	46	29.43	1,774.6	282.7	216.0	78.1%	12.4%	9.5%	522.3	3.5	0.1	6.0	0.3	20.0	0.6	3.4	1.2	53.7	7	45.9	1				
94DW-S22	39	55	14.61	105	47	5.41	2,765.6	39.5	16.8	98.0%	1.4%	0.6%	539.9	3.3	0.1	2.3	0.2	13.1	0.5	5.6	2.3	64.2	4	28.0	1				
94DW-S23	39	49	18.90	105	15	41.38	1,576.9	145.1	64.0	88.3%	8.1%	3.6%	602.8	2.8	0.1	14.1	0.3	11.1	0.5	0.8	1.4	40.5	6	28.8	1				
94DW-S24	39	50	14.45	105	16	22.64	1,298.7	134.9	62.1	86.8%	9.0%	4.2%	597.8	2.6	0.1	25.6	0.4	15.5	0.5	0.6	1.1	42.0	7	38.1	1				
94DW-S25	39	49	25.94	105	15	48.20	697.2	121.4	91.2	76.6%	13.3%	10.0%	323.8	2.2	0.1	7.2	0.4	11.1	0.8	1.6	1.6	25.1	8	15.7	2				
94DW-S26	39	49	56.68	105	24	31.24	739.4	74.8	42.8	86.3%	8.7%	5.0%	524.8	2.6	0.1	7.0	0.3	32.4	0.6	4.6	2.0	36.0	6	18.2	1				
94DW-S26Dup	39	49	56.68	105	24	31.24	1,386.4	161.0	63.2	86.1%	10.0%	3.9%	516.8	2.6	0.1	5.1	0.3	23.6	0.6	4.6	2.2	46.9	5	21.4	1				
94DW-S27	39	51	3.99	105	20	46.72	1,342.0	84.9	49.4	90.9%	5.8%	3.3%	502.9	3.6	0.1	4.5	0.3	16.4	0.6	3.7	1.4	58.3	6	41.6	1				
94DW-S28	39	51	4.01	105	20	46.80	1,692.1	158.4	53.2	88.9%	8.3%	2.8%	579.8	3.2	0.1	4.8	0.3	22.7	0.5	4.9	3.4	91.0	3	26.7	1				
94DW-S29	39	56	59.94	105	45	54.68	1,436.1	52.2	27.6	94.7%	3.4%	1.8%	535.6	3.5	0.1	3.2	0.3	15.5	0.5	4.8	3.0	41.2	5	13.9	2				
94DW-S30	39	56	41.69	105	49	46.29	486.8	26.3	10.5	93.0%	5.0%	2.0%	517.1	2.8	0.1	3.4	0.3	13.9	0.5	4.1	2.2	44.3	5	20.5	1				
94DW-S31	39	56	3.39	105	48	44.07	1,597.2	105.8	91.2	89.0%	5.9%	5.1%	505.9	2.6	0.1	2.8	0.3	17.9	0.8	6.3	5.0	43.0	3	8.7	2				
94DW-S33	39	46	18.19	105	14	46.25	1,708.4	208.3	54.3	86.7%	10.6%	2.8%	517.6	1.2	0.1	2.2	0.2	5.0	0.5	2.3	2.8	14.2	7	5.0	2				

DWSED.WK1

94DW-S34	39	46	44.71	105	17	10.86	281.2	49.9	140.5	59.6%	10.6%	29.8%	472.3	2.8	0.1	6.4	0.3	25.0	0.6	3.9	3.9	19.3	6	5.0	2
94DW-S35	39	41	16.21	105	52	52.04	2,779.1	141.0	82.4	92.6%	4.7%	2.7%	527.5	3.2	0.1	3.7	0.3	23.1	0.6	6.2	5.9	74.9	2	12.6	1
94DW-S36	39	41	27.72	105	48	18.59	1,035.6	18.5	9.5	97.4%	1.7%	0.9%	511.7	3.6	0.1	4.3	0.3	47.3	0.7	11.1	4.4	84.6	3	19.4	1
94DW-S37	39	41	32.18	105	48	12.68	2,257.1	42.2	29.4	96.9%	1.8%	1.3%	619.2	3.4	0.1	3.1	0.2	23.8	0.5	7.7	6.2	88.3	2	14.3	1
94DW-S38	39	41	46.86	105	44	43.83	3,243.5	28.4	5.8	99.0%	0.9%	0.2%	514.2	3.2	0.1	3.7	0.3	24.7	0.6	6.7	6.6	113.0	2	17.1	2
94DW-S39	39	42	2.45	105	42	23.91	1,583.6	45.7	12.2	96.5%	2.8%	0.7%	544.1	3.1	0.1	3.9	0.3	30.0	0.6	7.6	8.4	128.0	2	15.3	1
94DW-S40	39	43	5.27	105	41	38.37	1,448.2	44.5	22.0	95.6%	2.9%	1.5%	541.6	3.2	0.1	4.0	0.3	29.6	0.6	7.3	6.4	82.6	2	13.0	1
94DW-S41	39	45	9.54	105	39	40.67	1,267.7	32.8	20.0	96.0%	2.5%	1.5%	494.7	3.1	0.1	4.4	0.3	30.2	0.7	6.9	5.8	107.0	1	18.6	2
94DW-S42	39	45	56.73	105	37	31.88	3,062.2	93.6	34.3	96.0%	2.9%	1.1%	571.4	3.4	0.1	5.3	0.3	23.8	0.6	4.5	4.4	73.4	1	16.8	3
94DW-S43	39	45	54.33	105	36	4.19	1,917.3	43.6	26.7	96.5%	2.2%	1.3%	567.3	2.8	0.1	3.5	0.2	15.3	0.5	4.4	3.5	44.0	1	12.4	4
94DW-S43Dup	39	45	54.33	105	36	4.19	2,766.8	96.1	51.5	94.9%	3.3%	1.8%	563.0	2.8	0.1	3.4	0.2	16.0	0.5	4.7	4.3	67.4	1	15.8	3
	39	45	26.64	105	34	1.17	926.4	37.6	14.6	94.7%	3.8%	1.5%	598.1	3.3	0.1	7.7	0.3	34.4	0.6	4.5	4.0	83.6	1	21.0	3
94DW-S45	39	44	46.14	105	30	47.98	1,721.4	316.9	167.7	78.0%	14.4%	7.6%	565.8	2.5	0.1	5.0	0.3	13.3	0.5	2.6	3.5	51.5	1	14.8	4
94DW-S46	39	44	38.26	105	29	25.02	2,089.9	320.4	57.4	84.7%	13.0%	2.3%	550.6	2.6	0.1	4.9	0.3	16.1	0.5	3.3	4.2	90.3	1	21.6	3
94DW-S47	39	44	46.42	105	26	10.05	2,008.5	355.8	101.1	81.5%	14.4%	4.1%	615.9	2.5	0.1	4.1	0.2	16.8	0.5	4.1	3.5	38.1	1	10.9	4
94DW-S48	39	44	54.98	105	23	56.75	778.5	70.7	103.9	81.7%	7.4%	10.9%	544.5	2.7	0.1	4.3	0.3	12.9	0.5	3.0	1.5	17.5	2	11.3	10
94DW-S49	39	49	34.64	105	32	9.64	870.5	189.4	143.7	72.3%	15.7%	11.9%	464.1	2.9	0.1	4.6	0.3	23.8	0.6	5.2	4.6	33.7	2	7.4	5
94DW-S50	39	49	12.85	105	30	34.78	2,272.2	220.1	379.0	79.1%	7.7%	13.2%	517.4	2.4	0.1	2.8	0.3	10.4	0.5	3.7	3.8	22.4	2	5.9	6
94DW-S50Dup	39	49	12.85	105	30	34.78	1,305.3	248.2	310.2	70.0%	13.3%	16.6%	505.4	2.4	0.1	2.4	0.2	8.6	0.5	3.7	3.3	20.4	2	6.2	7
94DW-S51	39	48	16.96	105	31	36.56	1,785.7	165.6	167.4	84.3%	7.8%	7.9%	583.0	2.2	0.1	4.2	0.2	12.3	0.5	3.0	2.1	19.3	2	9.1	8
94DW-S52	39	48	13.65	105	30	6.33	960.8	64.7	60.8	88.4%	6.0%	5.6%	571.5	2.2	0.1	5.0	0.3	23.4	0.5	4.7	2.2	29.7	1	13.8	6
94DW-S53	39	47	47.60	105	28	32.71	1,085.4	282.6	191.6	69.2%	18.6%	12.2%	514.2	2.4	0.1	3.8	0.3	12.5	0.5	3.3	2.2	19.4	2	8.9	7
94DW-S54	39	45	10.54	105	14	3.82	2,047.0	35.5	35.6	96.6%	1.7%	1.7%	--	--	--	--	--	--	--	--	2.3	32.8	1	14.0	6
94DW-S55	39	44	50.18	105	18	10.77	142.1	16.1	27.3	76.6%	8.7%	14.7%	194.7	1.9	0.2	3.0	0.6	11.2	1.3	3.8	2.6	19.3	2	7.4	8
94DW-S56	39	44	31.33	105	19	51.91	503.6	72.2	42.7	81.4%	11.7%	6.9%	367.8	1.4	0.1	2.0	0.3	6.8	0.7	3.4	4.1	17.0	3	4.2	7
94DW-S57	39	45	51.35	105	26	48.02	2,241.7	150.9	61.3	91.4%	6.1%	2.5%	626.6	2.2	0.1	3.6	0.2	10.6	0.4	2.9	3.0	54.0	1	17.8	4
94DW-S57Dup	39	45	51.35	105	26	48.02	1,401.4	110.4	53.1	89.6%	7.1%	3.4%	548.8	2.2	0.1	4.3	0.3	14.4	0.5	3.4	2.7	43.4	1	16.3	5
94DW-S58	39	47	0.48	105	27	17.20	495.1	108.6	66.2	73.9%	16.2%	9.9%	469.9	1.8	0.1	3.6	0.3	10.1	0.6	2.8	1.2	14.3	2	11.5	11
94DW-S59	39	44	28.76	105	19	54.78	592.1	220.9	520.9	44.4%	16.6%	39.1%	492.6	2.9	0.1	5.5	0.3	16.8	0.6	3.0	1.8	15.8	2	9.0	9
94DW-S60	39	35	40.08	105	58	19.92	2,541.3	153.5	62.7	92.2%	5.6%	2.3%	569.0	2.2	0.1	3.0	0.2	11.7	0.5	3.9	1.5	36.4	1	24.4	6
94DW-S61	39	36	19.82	105	56	33.47	1,104.9	57.0	11.0	94.2%	4.9%	0.9%	512.7	3.3	0.1	4.6	0.3	17.4	0.6	3.6	1.8	51.6	1	28.5	5
94DW-S62	39	33	49.49	105	51	34.75	2,686.1	197.4	95.9	90.2%	6.6%	3.2%	512.9	2.5	0.1	4.7	0.3	17.4	0.6	3.7	3.1	32.7	2	10.5	5
94DW-S63	39	33	48.31	105	51	36.10	1,083.0	104.3	41.6	88.1%	8.5%	3.4%	567.7	2.0	0.1	5.6	0.3	14.1	0.5	2.5	1.1	35.1	1	32.5	9
94DW-S64	39	36	28.18	105	56	25.03	2,443.7	160.7	57.6	91.8%	6.0%	2.2%	538.4	3.3	0.1	5.0	0.3	23.5	0.6	4.7	3.2	112.0	1	35.4	3
94DW-S65	39	35	56.94	105	51	26.15	2,107.3	219.2	76.0	87.7%	9.1%	3.2%	522.0	3.1	0.1	5.1	0.3	18.8	0.6	3.7	2.1	57.6	1	27.3	5
94DW-S66	39	35	29.01	105	52	15.58	2,441.1	150.2	50.1	92.4%	5.7%	1.9%	531.1	2.5	0.1	4.7	0.3	12.7	0.5	2.7	0.0	<7.5	1	25.9	--
94DW-S67	39	41	13.72	105	41	55.96	1,989.8	185.9	38.3	89.9%	8.4%	1.7%	536.5	2.3	0.1	2.5	0.2	14.2	0.5	5.6	4.5	98.9	1	21.9	2
94DW-S68	39	41	14.15	105	41	59.24	1,408.9	62.8	34.4	93.5%	4.2%	2.3%	592.8	2.8	0.1	4.2	0.2	17.2	0.5	4.1	3.6	50.4	1	14.1	4
94DW-S69	39	28	21.00	105	40	58.00	1,686.9	55.9	34.9	94.9%	3.1%	2.0%	584.0	3.2	0.1	4.3	0.2	12.1	0.5	2.8	1.9	39.1	1	20.6	5
94DW-S70	39	31	45.17	105	43	55.57	839.1	27.1	17.5	95.0%	3.1%	2.0%	600.0	2.8	0.1	4.7	0.2	15.0	0.5	3.2	1.2	41.8	1	34.2	8
94DW-S71	39	31	44.87	105	43	51.11	505.5	44.0	11.1	90.2%	7.8%	2.0%	557.0	3.3	0.1	9.1	0.4	59.7	0.8	6.6	5.1	160.0	1	31.2	2
94DW-S72	39	39	10.40	105	42	26.10	171.7	308.5	188.1	25.7%	46.2%	28.1%	283.1	2.6	0.1	8.7	0.5	22.7	1.0	2.6	1.6	34.9	1	21.5	7
94DW-S73	39	41	36.16	105	37	0.86	1,524.2	194.1	75.4	85.0%	10.8%	4.2%	565.5	2.8	0.1	3.0	0.2	10.0	0.5	3.3	4.0	34.4	1	8.6	4
94DW-S74	39	41	34.85	105	36	58.83	798.2	21.0	9.6	96.3%	2.5%	1.2%	590.1	2.6	0.1	1.6	0.2	5.3	0.4	3.4	2.8	28.9	1	10.3	5

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94DW-S75	39	42	59.66	105	34	15.15	748.2	46.8	11.8	92.7%	5.8%	1.5%	609.2	2.9	0.1	4.2	0.2	15.2	0.5	3.6	3.0	50.9	1	17.2	4
94DW-S75Dup	39	42	59.66	105	34	15.15	913.1	45.7	14.1	93.9%	4.7%	1.4%	525.8	3.0	0.1	3.4	0.2	9.6	0.5	2.8	2.8	45.3	1	16.2	4
94DW-S76	39	44	12.09	105	31	27.77	748.3	190.9	64.8	74.5%	19.0%	6.5%	507.7	2.7	0.1	3.3	0.3	11.1	0.5	3.4	4.4	41.5	1	9.5	3
94DW-S77	39	44	10.79	105	30	47.79	1,202.0	126.1	89.8	84.8%	8.9%	6.3%	538.7	2.6	0.1	4.6	0.3	15.0	0.5	3.3	4.1	38.5	4	9.3	2
94DW-S78	39	42	53.39	105	23	31.99	1,352.6	52.9	19.5	94.9%	3.7%	1.4%	514.3	2.3	0.1	2.3	0.2	9.2	0.5	3.9	4.5	37.9	4	8.4	2
94DW-S79	39	42	37.34	105	22	5.90	906.8	138.4	40.1	83.6%	12.8%	3.7%	592.4	1.6	0.1	5.7	0.3	34.1	0.6	6.0	6.6	138.0	2	21.0	1
94DW-S80	39	39	36.22	105	17	24.80	957.4	309.1	151.6	67.5%	21.8%	10.7%	472.6	2.1	0.1	3.8	0.3	17.5	0.6	4.6	5.7	69.1	3	12.2	1
94DW-S81	39	39	10.66	105	11	41.72	1,402.9	21.8	7.6	97.9%	1.5%	0.5%	571.7	3.0	0.1	2.8	0.2	15.4	0.5	5.4	5.2	105.0	2	20.1	1
94DW-S81Dup	39	39	10.66	105	11	41.72	1,604.5	35.1	15.2	97.0%	2.1%	0.9%	484.0	3.0	0.1	2.9	0.3	13.6	0.6	4.7	5.2	91.2	2	17.7	1
94DW-S82	39	37	41.42	105	25	49.34	424.3	181.7	141.7	56.7%	24.3%	19.0%	441.2	2.9	0.1	9.7	0.4	25.0	0.7	2.6	3.3	45.0	4	13.6	2
94DW-S83	39	37	24.92	105	26	39.49	2,506.9	138.7	41.9	93.3%	5.2%	1.6%	567.0	3.4	0.1	2.6	0.2	10.6	0.5	4.1	3.4	53.1	4	15.7	1
94DW-S84	39	37	58.71	105	19	59.83	1,497.3	111.1	8.8	92.6%	6.9%	0.5%	618.8	3.0	0.1	3.8	0.2	14.1	0.5	3.7	5.4	464.0	2	85.6	0.9
94DW-S84Dup	39	37	58.71	105	19	59.83	879.1	179.6	30.5	80.7%	16.5%	2.8%	630.8	3.2	0.1	4.5	0.2	15.3	0.5	3.4	4.3	132.0	2	30.6	1
94DW-S85	39	37	25.12	105	19	24.11	2,192.1	129.4	112.3	90.1%	5.3%	4.6%	553.9	3.7	0.1	2.9	0.3	17.3	0.5	5.9	5.2	57.4	3	11.1	1
94DW-S86	39	35	31.87	105	13	26.66	2,952.2	86.4	42.6	95.8%	2.8%	1.4%	541.6	3.7	0.1	3.1	0.3	18.3	0.5	5.9	6.5	148.0	2	22.9	1
94DW-S87	39	35	30.12	105	13	5.32	738.3	20.1	20.1	94.8%	2.6%	2.6%	584.8	3.5	0.1	2.8	0.2	11.5	0.5	4.2	4.8	41.8	4	8.7	2
94DW-S88	39	37	3.21	105	13	2.94	1,223.4	58.6	23.5	93.7%	4.5%	1.8%	600.9	2.9	0.1	3.5	0.2	16.7	0.5	4.8	5.5	78.7	3	14.4	1
94DW-S89	39	32	57.38	105	8	2.81	448.4	5.4	9.5	96.8%	1.2%	2.1%	502.1	3.1	0.1	2.7	0.3	9.8	0.5	3.7	2.8	31.5	6	11.1	2