UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

Chemical results for bottom material for Department of the Interior irrigation drainage task group studies 1988-1989

By

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INTRODUCTION

In response to Congressional requests, the Department of the Interior (DOI) formed a multi-agency task group in the fall of 1985 to examine the potential for damage to lands affected by DOI irrigation projects. The objective of the task group is to determine from existing information and reconnaissance studies if irrigation practices have the potential to cause harmful effects on human health, fish, wildlife, and other water users, or to reduce the suitability of water for beneficial uses.

In 1988, field-screening studies were conducted at ten areas in the western U.S. (fig. 1) where wildlife management areas receive irrigation drainage water from federally managed irrigation projects. The field-screening studies were designed as limited-sampling, reconnaissance-level investigations whose purposes are to recognize problem areas and problem elements, but not to characterize areas in detail. Following are brief descriptions of the ten areas:

Belle Fourche, South Dakota: The study area consists of about 57,000 acres of irrigable land near the northeastern edge of the Black Hills in western South Dakota. The lands are generally along the Belle Fourche River in an area approximately 12 miles wide and extending 24 miles downstream from the Belle Fourche Diversion Dam and Reservoir.

Angostura, South Dakota: The study area extends along the Cheyenne River for about 24 miles below Angostura Dam in Fall River and Custer Counties in southwestern South Dakota. Approximately 12,200 acres of land are irrigated; irrigation tail-water and ground-water return form a majority of the flow in the Cheyenne River in the project area during portions of the year.

American Falls Reservoir, Idaho: The reservoir is located on the Snake River in southeastern Idaho. As a portion of its inflow, it receives irrigation drainage water from about 560,000 acres of irrigated land and effluent from municipalities. Mini-doka National Wildlife Refuge (NWR) is located about 10 miles downstream of the reservoir.

Riverton, Wyoming: The study area is located in Fremont County in west-central Wyoming. Water from the Wind River is diverted for irrigating approximately 70,000 acres. Extensive fisheries, waterfowl nesting areas, and refuges have been developed in the project area by the state.

Middle Arkansas River, Colorado: The study area extends about 250 miles from Pueblo Reservoir near Pueblo, Colorado, to Finney County in western Kansas. The study area includes several state-operated wildlife areas with reservoirs that are heavily used by migratory waterfowl.

Gunnison River and Sweitzer Lake, Colorado: The study area includes parts of the Gunnison River basin and the Uncompahgre River basin in west-central Colorado; currently about 66,000 acres in the valley are irrigated. Also included in the study area is Sweitzer Lake, a Colorado state park that has been previously reported to contain high levels of selenium in biota, water, and bottom sediment.

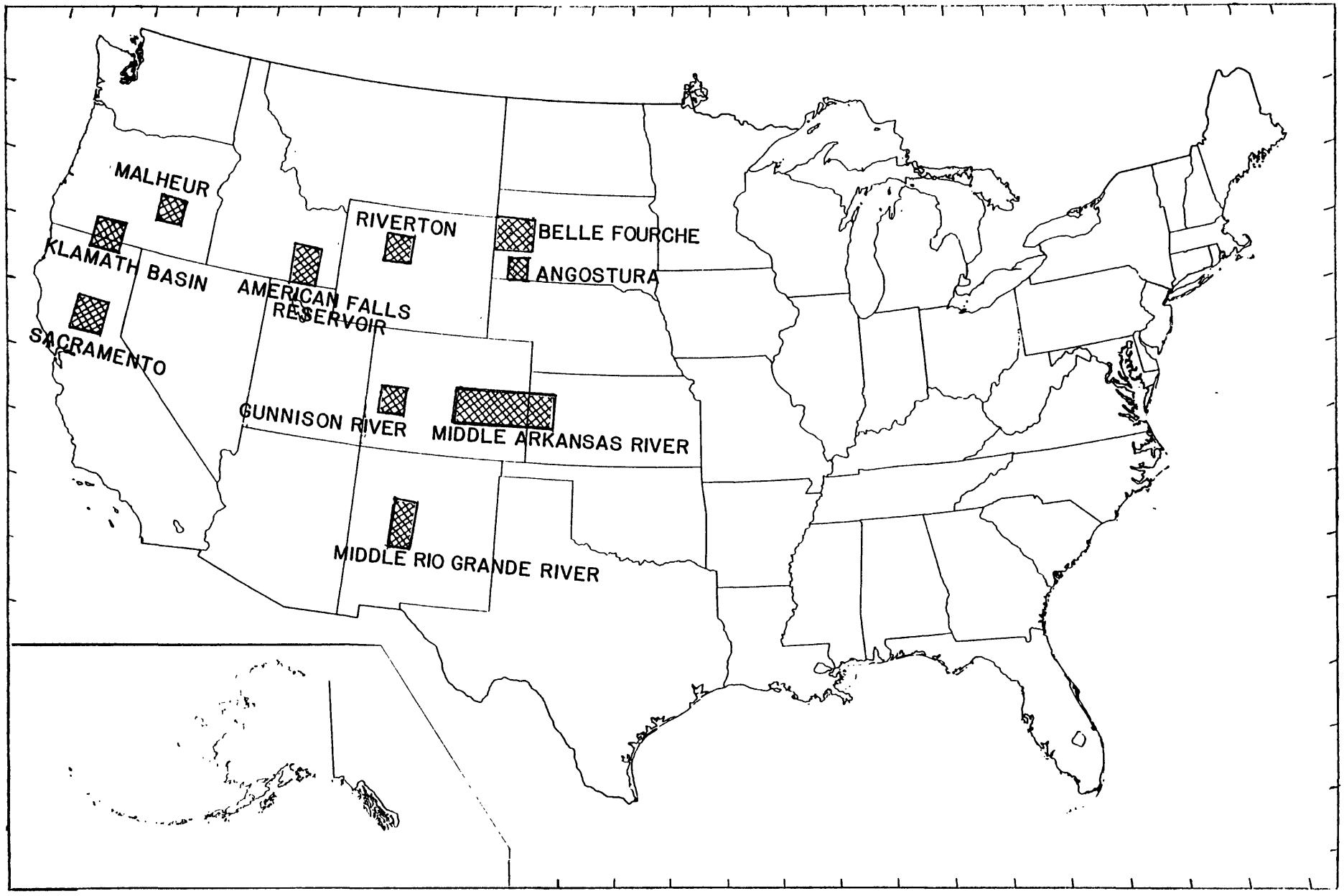


FIGURE 1. Map showing the general locations of the ten field-screening project areas.

Middle Rio Grande River, New Mexico: The study area extends about 40 miles along the Rio Grande River from San Acacia to San Marcial in Socorro County, New Mexico. The primary focus of the study is the Bosque del Apache NWR which contains 57,200 acres and is managed primarily for migratory birds, including a small experimental flock of whooping cranes.

Malheur National Wildlife Refuge, Oregon: The study area is located within a closed basin in southeastern Oregon. The refuge covers 184,000 acres and is one of the largest inland marshes in the United States.

Klamath Basin Refuge Complex, California: The study area is the upper Klamath River basin straddling the Oregon-California border. Upper Klamath NWR, Shoalwater Bay WMA (Wildlife Management Area), Squaw Point WMA, Clear Lake NWR, Lower Klamath Lake NWR, and Tule Lake NWR are all included in the study area. Lower Klamath Lake NWR and Tule NWR are the terminus for most agricultural drain water in the basin.

Sacramento Refuge Complex, California: The study area is located in the central portion of the Sacramento Valley. The refuge complex consists of five individual refuges--Delevan NWR, Colusa NWR, Butte Sink NWR, Sacramento NWR, and Sutter NWR. Levels of Se that exceed the EPA (Environmental Protection Agency) drinking water standard are associated with the Sacramento refuge complex.

In addition, samples were received from three areas identified by 1986-87 reconnaissance studies as needing additional sampling to define potential problems. These are:

Kendrick Reclamation Project, Wyoming: The study area is located just west of Casper, Wyoming in Natrona County. Approximately 200 square miles lie within the project area, although only 24,000 acres are irrigated for crop production. Elevated concentrations of selenium (up to 25 ppm in lake sediments) were found during the reconnaissance study.

Stillwater Wildlife Management Area (WMA), Nevada: The study area is part of the lower Carson River basin in Churchill County; it includes the Stillwater NWR and the Stillwater WMA. Mercury levels in bottom sediments as high as 18 ppm were observed in the reconnaissance study.

Middle Green River, Utah: The study area is located south of Vernal, Utah, and adjacent to the Green River. Selenium concentrations of up to 85 ppm were found in bottom sediments during the reconnaissance study.

The field screening studies were conducted by personnel from the Department of Interior, U.S. Geological Survey, Bureau of Reclamation, Fish and Wildlife Service, and other federal or state agencies as appropriate. The media sampled consisted of surface water, plant tissue, animal tissue, and bottom sediments from lakes and streams. This report presents only the results of the analyses of the bottom sediments.

FIELD SAMPLING

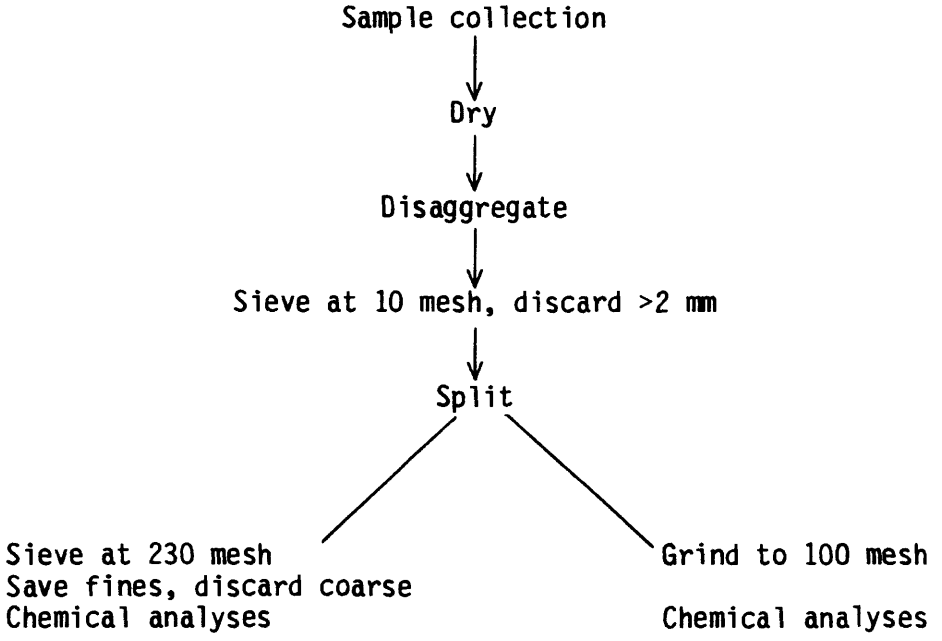
The bottom sediments consisted of the upper 5-10 cm of material deposited in streams, ponds, marshes, lakes, irrigation canals, and drainage ditches. Samples were collected near the end of the irrigation season after a period of

steady flow; generally they were not sieved. At each site, the sample was composited by collecting a number of subsamples (6-8) across a representative cross section of the stream channel and thoroughly mixing them in a non-contaminating container (glass, enamel, or stainless steel pan). Samples from lakes and ponds were composited from within a small area of the lake.

SAMPLE PREPARATION

Samples were mailed to the Geologic Division analytical laboratories of the U.S. Geological Survey in Denver as wet sediments. All samples were air-dried at 30°C; the drying time varied widely depending on the water content of the individual sample. Then the samples were disaggregated using a mechanical mortar and pestle, that is designed to break up aggregates of mud, clay, etc., but which does not alter the particle size distribution of a sample. The samples were sieved at 2 mm (10 mesh) to remove material larger than sand size and each sample was split. One-half of the sample was sieved at 0.0625 millimeters (230 mesh) and the less than 0.0625 mm material was retained for chemical analyses. An aliquot of the second half of the sample was ground in a ceramic plate grinder to minus 0.15 mm (100 mesh) and submitted for chemical analyses. Two size fractions of each sample were analyzed--a <0.063 mm. fraction and a <2 mm fraction that was ground.

The diagram below is a schematic representation of the preparation procedure.



ANALYTICAL TECHNIQUES

Following are abbreviated descriptions of the analytical methods used. In addition to the references cited in the text for each method, details for all the methods except uranium and selenium can be found in Baedecker (1987).

40-element ICP scan--Samples were analyzed simultaneously for 40 elements using inductively coupled plasma-atomic emission spectroscopy (Crock and others, 1983). Each sample (0.200 g) was digested at low temperatures using a

mixture of concentrated hydrochloric, hydrofluoric, nitric, and perchloric acids. The acidic sample solution gradually was taken to dryness; the residue was dissolved in 1.0 ml of aqua regia and the solution diluted to 10 g with demineralized water. Reagent blanks, reference samples, and sample replicates were digested by the same procedure and analyzed at the same time as the samples. Lutetium (100 mcg.) was added to all the samples and controls before the digestion procedure to serve as an internal procedural standard. The elements determined and their lower limits of determination are shown in table 1.

Arsenic/selenium--Arsenic and selenium were determined by hydride generation atomic absorption spectroscopy (Briggs and Crock, 1986; Crock and Lichte, 1982). Each sample (0.250 g) was digested in a mixture of concentrated nitric, perchloric, and hydrofluoric acids. The sample was gradually taken to dryness, and the residue dissolved in 6 N HCl and diluted to 50 ml with 6 N HCl. An aliquot of the solution was reacted with sodium borohydride in a continuous-flow system to generate the gaseous hydride which was then swept into a heated quartz furnace of an atomic absorption spectrophotometer. Arsenic and selenium were determined independently. Results were calculated from aqueous standard calibration curves. The lower limits of determination for arsenic and selenium are shown in table 1.

Mercury--Mercury was determined using an automated, continuous-flow, cold-vapor atomic absorption spectrometric method (Kennedy and Crock, 1987). A 0.100 g sample was digested with nitric acid and sodium dichromate at 90°C for 3 hours in a glass test tube and then the digestate was diluted to 12 g with demineralized water. The solution was reacted with sulfuric acid-hydroxylamine hydrochloride solution and stannous chloride solution, generating mercury vapor. The gaseous mercury was separated in a phase separator and swept into a quartz cell of an atomic absorption spectrophotometer. Mercury results were calculated from an aqueous standard calibration curve; the lower limit of determination is shown in table 1.

Boron--Boron was determined from a hot water extraction of the sediment (Crock and Severson, 1980). Five grams of sample were mixed with 25 ml of demineralized water in a polypropylene centrifuge tube. The tube was capped, placed in a boiling water bath for 1 hour, and then removed and cooled. Then the sample was centrifuged at 2,500 rpm for 10 minutes. The clear liquid was decanted, filtered through a 0.45 micron filter disk, and acidified with nitric acid. Boron was measured using inductively coupled plasma-atomic emission spectroscopy.

Uranium--Uranium was determined by ultra-violet fluorescence (Centanni and others, 1956). A 0.5 g sample was digested using nitric acid. Aluminum nitrate was added to the acid digestate to act as a complexing and salting agent, and the uranyl nitrate was extracted into ethyl acetate, separating it from the elements that quench the fluorescence. An aliquot of the ethyl acetate was evaporated in a platinum dish and the residue containing the uranyl nitrate fused with a mixture of sodium carbonate, potassium carbonate, and sodium fluoride. The fluorescence of the carbonate-fluoride phosphor was measured in an ultra-violet fluorometer and the uranium content determined by comparison to a similarly prepared set of standards.

Carbon--Total carbon was determined with an automated carbon analyzer. Each sample (0.5 g) was combusted in an oxygen atmosphere at 1,370°C. Carbon dioxide, generated as a result of the oxidation of carbon, was measured by an infrared CO_2 detector. The response of the infrared cell is nonlinear so that a calibration standard which closely matched that of the sample being analyzed was used. The limit of determination is 0.05 percent total C.

Carbonate carbon was determined by coulometric titration. Each sample was digested with 2 N perchloric acid and the evolved carbon dioxide collected in a coulometric cell, where it was converted to a strong acid by ethanolamine. The acid was titrated automatically with a coulometrically generated base, with the endpoint detected colorimetrically. The sample size varied from 0.02-0.5 g depending on the CO_2 content of the sample. The lower limit of determination is 0.01 percent.

Organic carbon was not determined directly, but was computed as the difference between the total carbon and carbonate carbon values.

QUALITY CONTROL

A reference sample was used to assess the accuracy and precision of the chemical analyses. The sample (KS-12E) is a pond sediment from the Kesterson National Wildlife Refuge in California collected in bulk quantities by Geologic Division personnel in 1986. It was included among the samples submitted from each of the study areas and was analyzed a total of 14 times. The range of values, mean, standard deviation, and mean of previously obtained values for this sample for the constituents analyzed are given in table 2.

DESCRIPTION OF RESULTS

Table 3 lists the sample numbers, sample descriptions, and sample locations (in degrees, minutes, and seconds of latitude and longitude). The sample number in table 3 corresponds to the same number in data tables 4 and 5 except that in table 4 and table 5 an "F" or a "C" has been added, generally in the fifth digit, to denote the analysis of either the <.063 mm fraction (F, "fine") or the <2 mm fraction (C, "coarse"), and an "88" has been added to identify the year of the study. Some of the individual areas listed in table 3 have samples labeled replicate or split. These samples consist, respectively, of a duplicate sample collected at the same site or a sample split made at the site after the sample was composited.

Four elements, silver, cadmium, europium, and tin, have less than ten values each for the entire set of samples. For ease in locating the results for these elements, the data are listed separately in table 4 and have been removed from table 5. For these four elements, the value for any sample not listed in table 4 is less than the lower limit of determination.

Table 5 lists the results obtained for 38 constituents. For each study area the results for the <.063 mm fraction (F) are listed first followed by the results from the <2 mm fraction (C). One group of samples (the FWA series) from the Stillwater Wildlife Management Area did not have enough material to split into two fractions; results for these samples are from the <2 mm fraction.

Table 6 presents a summary of the results from several background environmental geochemical studies, along with a summary of the data from irrigation drainage studies. In the irrigation drainage studies, bottom sediments were collected while soils were the sample medium in the background

geochemical studies. The validity of using soil baseline data for comparison to data obtained on bottom sediments is questionable. However, it can be rationalized that such comparisons are marginally acceptable because bottom sediments are partially derived from soils. Comparison of the observed range of values for this study to the background geochemical studies provides an indication as to whether individual samples from the study areas contain extreme values in their element content relative to existing background information.

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Severson, R.C., Wilson, S.A., and McNeal, J.M., 1987, Analyses of bottom material collected at nine areas in the western United States for the DOI irrigation drainage task group: U.S. Geological Survey Open-File Report 87-490, 24 p.

Shacklette, H.T. and Boerngen, J.G., 1984, Element concentrations in soils and other surficial materials of the conterminous United States: U.S. Geological Survey Professional Paper 1270, 105 p.

Table 1.--Lower limits of determination for the elements reported

[Values are ppm unless noted]

Method	Lower limit of Determination	Constitutents
ICP	2.0	Ag, Cd, Eu, La, Li, Mo, Ni, Sc, Sr, V, Y, Zn
	1.0	Ba, Be, Co, Cr, Cu, Yb
	4.0	Ce, Ga, Mn, Nb, Nd, Pb, Th
	10	Bi, Sn
	0.05%	Al, Ca, Fe, K,
	0.005%	Mg, Na, P, Ti
Hydride Generation	0.1	As, Se
Cold Vapor-AA	0.02	Hg
Hot-water extraction ICP	0.4	B
Fluorescence	0.1	U
Leco CR-12 carbon analyzer	0.05%	Total C
Coulometric titration	0.01%	Carbonate C
By difference	0.05%	Organic C

Table 2.--Basic statistics for selected constitutents for reference sample KS-12E

[Values are ppm unless noted. N = 14]

Element	Range	Mean	Std. Dev.	%RSD	Previous results (Mean of 7 analyses)
Al,%	7.0-7.6	7.3	.16	2.2	7.9
As	13-36	22	7.89	36	19
B	20-29	25	3.10	12	--
Ba	630-760	725	40.71	5.6	780
Be	2-2	2	--	--	1
Ca,%	2.9-3.1	3.0	.06	2.2	3.1
Ce	44-50	47	1.61	3.4	52
Co	12-13	13	.43	3.3	12
Cr	70-86	80	4.55	5.7	87
Cu	18-25	21	1.92	9.2	23
Fe,%	2.9-3.1	3.0	.06	2.1	3.2
Ga	15-17	16	.75	4.6	<4
Hg	<.02-.04	.033	.01	32	--
K,%	1.9-2.1	2.0	.05	2.4	2.2
La	26-30	28	1.23	4.4	28
Li	39-41	40	.83	2.1	41
Mg,%	1.5-1.6	1.6	.05	3.2	1.6
Mn	400-450	418	12.31	2.9	450
Mo	All <2	--	--	--	<2
Na,%	2.2-2.3	2.2	.05	2.3	2.4
Nb	6-12	8	1.45	19	7.7
Nd	19-23	22	1.05	4.8	23
Ni	50-58	55	2.21	4.1	58
P,%	.06-.07	.06	.004	6.9	.07
Pb	15-21	17	1.60	9.2	16
Sc	10-10	10	--	--	10
Se	2.3-2.6	2.4	.09	3.6	2.5
Sr	360-380	363	6.11	1.7	370
Th	10-13	11	2.52	22	13
Ti,%	.28-.35	.33	.02	6.4	.31
U	1.2-3.1	2.2	.53	25	--
V	74-85	80	4.15	5.2	81
Y	15-16	15	.36	2.4	16
Yb	2-2	2	--	--	2
Zn	69-78	73	2.58	3.5	78
Total C,%	1.17-1.26	1.22	.02	2.0	--
Org. C,%	.78-.86	.82	.02	2.9	--
Carb. C,%	.37-.43	.40	.01	3.5	--

Table 3.--Listing of sample identifiers, descriptions, and locations by study area

Field ID	Sample description	Latitude	Longitude
	Belle Fourche, South Dakota		
BF01	Belle Fourche Res. near Belle Fourche	44-44-06	103-41-21
02	Belle Fourche Res. near Belle Fourche	44-44-06	103-41-21
03	Belle Fourche Res. near Belle Fourche	44-44-06	103-41-21
04	North Canal near Fruitdale	44-44-12	103-40-19
05	Inlet Canal near Belle Fourche	44-42-14	103-49-23
06	Redwater River above Willow Creek	44-38-28	103-49-19
07	Sulfur Creek near Faith	44-52-30	102-47-30
BF08	Crow Creek near Belle Fourche	44-42-29	103-51-01
	Angostura, South Dakota		
AN01	Angostura Canal near Hot Springs	43-21-08	103-25-26
02	Angostura Res. near Hot Springs	43-19-22	103-25-29
03	Fall River at mouth	43-23-12	103-24-20
04	Horsehead Creek near Oelrichs	43-11-17	103-13-34
05	Cottonwood Creek near Buffalo Gap	43-31-36	103-06-14
06	Iron Draw near Buffalo Gap	43-26-55	103-09-23
07	Cheyenne River near Fairburn	43-40-25	103-52-12
08	Cheyenne River above Buffalo Gap	43-25-59	103-17-16
09	Cheyenne River near Hot Springs (split)	43-18-20	103-33-43
10	Cheyenne River near Hot Springs	43-18-20	103-33-43
AN11	Cheyenne River near Hot Springs (replicate)	43-18-20	103-33-43
	American Falls Reservoir, Idaho		
AF01	Snake river near Blackfoot	43-07-31	112-31-06
02	Crystal Wasteway near Springfield	42-02-52	112-40-49
03	Danielson Creek near Springfield	43-03-32	112-41-23
04	Aberdeen Wasteway near Springfield	42-55-27	112-48-38
05	Portneuf River near Tyhee	42-56-40	112-32-40
06	Snake River near Blackfoot	43-07-31	112-31-06
07	Ross Fork near Fort Hall	42-59-10	112-33-50
08	Bannock Creek near Pocatello	42-53-10	112-38-30
09	Aberdeen Wasteway near Springfield	42-55-27	112-48-38
10	American Falls Reservoir	42-46-45	112-52-45
AF11	Spring Creek near Fort Hall	43-05-45	112-30-15
	Riverton, Wyoming		
RV01	Wyoming Canal	43-13-45	108-53-40
02	Upper Five Mile Creek	43-18-05	108-42-08
03	State Wildlife Management Area	43-16-12	108-35-56
04	Pavillion Drain	43-13-00	108-30-00
05	Ocean Lake, Drain 6	43-12-40	108-37-22
06	Ocean Lake, Drain 7	43-11-39	108-38-08
07	Ocean Drain, outlet from Ocean Lake	43-11-56	108-34-08
08	Pond 04	43-11-35	108-33-19
09	Sand Gulch drain	43-11-38	108-18-50
10	Lower Five Mile Creek	43-13-20	108-13-06
11	Upper Muddy Creek	43-21-46	108-36-08
12	Middle Reservoir	43-19-07	108-20-25
13	Lower Muddy Creek	43-17-10	108-16-30
RV14	Sand Mesa inflow	43-19-38	108-15-19

Table 3.--continued

	Arkansas River, Colorado		
AR01	Arkansas River near Coolidge, KS	38-01-34	102-00-41
02	Arkansas River near Deerfield, KS	37-58-33	101-06-42
03	Arkansas River at Lamar, CO	38-06-21	102-37-05
04	Arkansas River below J. Martin Res.	38-03-59	102-55-55
05	Arkansas River at LaJunta, CO	37-59-26	103-31-55
06	Arkansas River at Flower, CO	37-57-35	103-46-27
07	Arkansas River at Nepesta, CO	38-11-03	104-10-22
08	St. Charles River at Vineland, CO	38-14-44	104-29-09
AR09	Fountain Creek at Pueblo, CO	38-17-16	104-36-02
AL01	Lake McKinney, KS	37-59-00	101-12-00
02	Neegronda Reservoir, CO	38-18-15	102-45-00
03	Pueblo Reservoir, CO, site 2	38-17-54	104-50-40
04	Lake Meredith, CO	38-11-40	103-41-31
AL05	John Martin Reservoir, CO	38-04-52	103-03-10
	Gunnison River, Colorado		
GR03	Gunnison River at Delta	38-45-01	108-04-06
04	Uncomphagre River at Colona	38-19-53	108-46-44
07	Sweitzer Lake (sampled 10/87)	38-42-45	108-01-56
09	Uncomphagre River at Delta	38-44-31	108-04-49
11	Gunnison River above Escalante Creek	38-45-27	108-15-27
GR12	Sweitzer Lake (sampled 1/88)	38-42-45	108-01-56
	Rio Grand River, New Mexico		
BA01	Bosque del Apache NWR, lake sed., 18D	33-48-00	106-53-00
02	Bosque del Apache NWR, lake sed., 18B	33-48-10	106-52-25
03	Bosque del Apache NWR, lake sed., 17A	33-49-07	106-52-05
04	South Marsh, Unit 25A	33-46-16	106-54-07
05	Elmendorf Drain	33-52-12	106-51-40
06	San Antonio Drain	33-52-11	106-51-27
07	Rio Grande Conveyance Channel	33-52-13	106-51-02
08	Bosque del Apache interior drain	33-49-28	106-52-50
09	Trench Pond, Unit 18C	33-48-32	106-52-57
10	Bosque del Apache interior drain outflow	33-46-12	106-54-05
11	Rio Grande FW at San Acacia	34-15-23	106-53-18
12	Rio Grande River at San Marcial	33-40-50	106-59-30
BA13	Rio Grande FW at San Acacia (replicate)	34-15-23	106-53-18
	Malheur NWR, Oregon		
ML01	Malheur Lake near inflow Silvies River	43-23-55	118-52-14
02	Malheur Lake near center	43-19-10	118-46-20
03	Malheur Lake near inflow Donner and Blitzen River	43-16-14	118-51-03
04	Harney Lake near center	43-14-44	119-07-04
05	Harney Lake near inflow Silver Creek	43-16-24	119-12-32
ML06	Malheur Lake near center	43-19-10	118-46-20

Table 3.--continued

	Klamath Basin Refuge Complex, OR and CA		
KR01	Klamath River at Link River Dam, Site 1	43-13-10	121-47-20
02	Malone Dam, Site 2	42-00-27	121-13-22
03	Miller Dam, Site 3	42-07-59	121-13-20
04	Anderson Rose Dam, Site 6	42-00-37	121-33-30
05	Tule Lake sump south, Site 7	41-51-19	121-27-56
06	Tule Lake sump north, Site 8	41-54-00	121-29-44
07	Tule Lake at Pump D, Site 9	41-55-05	121-33-47
08	Lower Klamath Lake, Site 10	41-54-21	121-39-48
09	Klamath #12	42-04-48	121-50-32
10	Caledonia, Site 14	42-17-54	121-55-45
11	Upper Klamath Lake, Site 17	42-25-25	121-58-40
12	Tule Lake at Pump X, Site 19	41-55-40	121-33-40
KR13	Lower Klamath Lake, Site 20	41-55-08	121-39-10
	Sacramento Refuge Complex, California		
SC01	Sacramento #3	39-24-09	122-10-21
02	Sacramento #4	39-23-34	122-08-27
03	Delevan #7	39-17-25	122-05-05
04	Delevan 10.5	39-16-57	122-06-19
05	Colusa #11	39-11-00	121-03-01
06	Colusa #12	39-11-18	122-02-35
07	Sutter #21	39-05-16	121-45-13
08	Butte Creek South	39-21-43	121-53-29
09	Duck Club Slough #17	39-19-42	121-52-50
10	Buttle Creek near Colusa	39-12-03	121-55-41
11	Sutter #23	39-01-59	121-43-42
12	Glen Colusa Canal	39-44-16	122-00-56
13	Butte Creek #27	39-32-06	121-51-17
14	Duck Club Slough #37	39-19-48	121-51-30
SC15	Sacramento #42	39-24-30	122-08-35
	Kendrick, Wyoming		
KD01	33 Mile Reservoir near outlet	42-58-18	106-30-27
02	33 Mile Reservoir near midpoint	42-58-28	106-30-35
03	33 Mile Reservoir near inlet	42-58-41	106-30-47
04	Goose Lake near west shore	42-45-21	106-36-38
05	Rasmus Lee Lake, midpoint	42-44-23	106-36-38
06	North Platte River oxbow above Poison Spider Creek	42-41-21	106-34-53
07	Rasmus Lee Lake	42-44-35	106-37-03
08	Illco Seep near outlet	43-00-18	106-30-02
09	North Platte River oxbow	42-41-21	106-34-53
KD10	Goose Lake near east end	42-45-09	106-36-18
KD11	Burlington Lake near Bucknum	43-01-04	106-42-16
BSS2	Onstadt Pond	42-48-44	106-34-59
4	FAA Station	42-49-24	106-33-48
5	Powerline Pond	42-49-56	106-26-37
6N	Lang Reservoir, North	42-51-27	106-29-35
6S	Lang Reservoir, South	42-51-23	106-29-29
2R	Onstadt Pond (replicate)	42-48-44	106-34-59
7	Emigrant Pond	42-48-18	106-36-25
8	Sheep Pond	42-47-53	106-35-12
BSS9	Illco Pond	43-00-29	106-30-00

Table 3.--continued

	Stillwater Wildlife Management Area, Nevada		
GLL	Goose Lake near landing	39-37-13	118-25-40
EAO	East Alkaline Lake at outlet	39-35-46	118-23-33
FPN	Freeway Pond	39-42-28	119-05-43
MSM	Massie Slough near Massie	39-37-40	119-05-51
NEO	North East Pond at outlet	39-37-30	119-06-41
FWA-2A	Lake core--60 ft	39-35-07	119-10-03
-2B	Lake core--45 ft	39-35-07	119-10-03
-3A	Lake core--50 ft	39-35-26	119-10-03
-3B	Lake core--35 ft	39-35-26	119-10-03
-3	FWA #3 well at 26 ft	39-35-47	119-09-58
-4	Lake core--16 ft	39-35-58	119-09-58
-5	Lake core--15 ft	39-36-10	119-10-04
-6	Lake core--16 ft	39-35-33	119-08-07
-7	Fernley Sink Well--14 ft	39-39-49	119-08-46
FWA-8	Freeway Well--13 ft	39-38-51	119-10-08
	Middle Green River, Utah		
UT01	Beer Creek	40-08-19	111-48-00
02	Spring Creek	40-12-08	111-39-20
03	Spanish Fork River	40-07-03	111-44-23
04	Desert Lake Wash	39-21-41	110-47-10
05	Timothy Marsh	39-21-54	110-48-17
06	Jordan River at Utah Lake	40-07-10	111-43-13
UT07	Provo River at Utah Lake	40-14-06	111-43-26
TS01	As drain Topaz Slough	39-26-59	112-46-55
TS02	Topaz Slough Spring	39-27-23	112-47-26

Table 4.--Analytical data for silver, cadmium, europium, and tin, 1988-1989 field-screening studies

Silver	Field Id.	ppm Ag
Riverton	RV13C88	2
Cadmium	Field Id.	ppm Cd
Arkansas River	AL03F88	2
	AL03C88	2
Green River	UT02F88	8
	UT02C88	4
Europium	Field Id.	ppm Eu
Malheur NWR	ML03F88	2
Tin	Field Id.	ppm Sn
American Falls Res.	AF02F88	40
Riverton	RV03F88	20
	RV04F88	120
	RV12F88	20
Gunnison River	GR03F88	10
Rio Grande River	8F01F88	10
Malheur NWR	ML05C88	10
Green River	UT02F88	30
	UT02C88	10

TABLE 5. DOI irrigation drainage task group analytical data, 1988-89.

Sample	AL pct	AS ppm	XWB ppm	BA ppm	BE ppm	CA %	CE ppm	CO ppm	CR ppm
				Belle Fourche, SD					
BF01F88	4.2	6.0	1.1	530	1	4.40	53	9	36
BF02F88	4.3	5.9	.9	530	1	4.50	48	10	38
BF03F88	4.3	5.9	.9	530	1	4.40	51	9	36
BF04F88	4.9	30.0	.7	590	2	1.90	49	10	54
BF05F88	5.0	8.8	1.1	610	2	4.20	53	19	43
BF06F88	3.6	6.1	1.1	380	1	12.00	45	7	32
BF07F88	6.3	11.0	2.1	160	2	2.10	54	14	62
BF08F88	5.0	16.0	5.6	91	2	9.80	47	13	55
BF01C88	4.6	8.6	1.7	480	2	3.40	51	11	39
BF02C88	4.7	9.2	1.7	460	2	3.20	47	11	40
BF03C88	4.6	7.8	1.7	480	2	3.40	49	10	39
BF04C88	4.2	59.0	1.4	820	2	2.40	55	10	41
BF05C88	3.6	16.0	.6	720	2	2.80	44	20	22
BF06C88	2.7	7.5	1.6	440	<1	13.00	33	7	21
BF07C88	5.9	19.0	2.2	220	2	2.70	49	16	54
BF08C88	3.5	25.0	3.6	110	2	11.00	48	16	35
				Angostura, SD					
AN01F88	5.1	6.2	2.1	400	2	8.30	58	12	47
AN02F88	9.3	7.2	2.1	440	2	2.80	66	11	85
AN03F88	5.6	12.0	1.2	760	2	9.80	53	12	50
AN04F88	6.3	8.6	5.5	720	2	2.20	48	13	64
AN05F88	6.6	15.0	7.3	150	2	3.20	46	14	67
AN06F88	5.6	8.9	--	930	2	5.00	57	12	57
AN07F88	6.0	6.5	1.4	1,200	2	6.20	57	9	35
AN08F88	6.1	13.0	1.8	720	2	7.80	50	13	72
AN09F88	3.0	7.6	--	700	1	16.00	34	13	22
AN10F88	3.2	11.0	--	510	1	14.00	41	13	23
AN11F88	2.9	6.6	--	480	<1	14.00	32	9	20
AN01C88	4.0	5.8	1.8	570	1	6.00	38	9	31
AN02C88	9.6	6.7	1.6	440	3	2.70	68	11	86
AN03C88	5.2	14.0	.9	770	2	9.10	43	12	48
AN04C88	6.1	9.0	5.3	420	2	2.60	47	13	65
AN05C88	7.1	11.0	6.4	280	2	2.30	44	12	73
AN06C88	3.8	5.6	.6	730	<1	.87	20	4	12
AN07C88	3.6	12.0	.6	1,700	1	3.20	25	8	10
AN08C88	4.2	17.0	.7	860	1	2.70	29	9	20
AN09C88	3.8	6.2	<.4	820	<1	1.60	19	6	5
AN10C88	3.8	9.7	<.4	820	<1	1.40	21	6	6
AN11C88	3.8	8.6	<.4	810	<1	1.30	18	6	5

TABLE 5. DOI irrigation drainage task group analytical data, 1988-89.

Sample	AL pct	AS ppm	XWB ppm	BA ppm	BE ppm	CA %	CE ppm	CO ppm	CR ppm
				American Falls, ID					
AF01F88	4.1	2.5	--	490	2	7.60	74	8	58
AF02F88	2.8	3.6	--	470	<1	17.00	44	5	71
AF03F88	3.9	2.0	--	520	1	3.90	59	5	53
AF04F88	4.8	3.8	--	500	2	4.20	70	10	72
AF05F88	3.5	2.3	--	500	<1	10.00	63	7	54
AF06F88	3.9	2.4	--	500	1	7.20	73	7	65
AF07F88	4.1	3.0	--	510	1	3.40	94	8	76
AF08F88	4.9	2.9	1.3	550	1	4.20	74	8	65
AF09F88	5.0	3.9	--	530	2	4.00	67	9	75
AF10F88	5.7	4.3	2.3	450	2	6.70	61	9	66
AF11F88	3.2	2.0	--	490	<1	8.90	57	5	51
AF01C88	4.2	3.0	.9	410	2	2.30	81	3	23
AF02C88	3.9	2.0	.8	430	2	2.70	59	4	36
AF03C88	4.1	1.0	1.1	490	2	1.60	69	3	34
AF04C88	4.4	2.7	.8	400	2	1.50	81	5	30
AF05C88	2.0	2.1	.9	280	<1	16.00	42	6	32
AF06C88	4.2	2.6	.7	440	2	2.40	71	4	25
AF07C88	3.2	2.8	.8	400	1	1.70	56	5	41
AF08C88	4.8	2.9	1.4	550	2	4.30	68	8	59
AF09C88	4.3	5.7	.7	380	2	1.50	89	5	31
AF10C88	5.5	4.3	3.1	440	2	6.00	58	9	62
AF11C88	3.6	1.0	.7	430	2	2.30	57	3	30
				Riverton, WY					
RV01F88	6.6	2.0	--	1,100	1	5.10	170	20	190
RV02F88	4.5	4.2	3.2	760	1	6.10	51	9	43
RV03F88	6.4	4.4	1.7	740	2	3.60	59	12	73
RV04F88	4.9	4.2	.8	800	1	3.70	120	10	63
RV05F88	6.2	2.8	.7	640	2	3.60	73	11	77
RV06F88	6.1	2.2	.4	760	2	3.00	130	10	82
RV07F88	5.2	4.4	1.5	1,100	2	9.30	69	12	79
RV08F88	6.5	3.2	.6	640	2	1.60	68	12	86
RV09F88	5.5	3.2	.5	690	2	3.10	110	9	63
RV10F88	4.8	3.1	<.4	760	1	3.60	100	8	57
RV11F88	5.0	4.5	1.2	620	1	4.00	53	10	52
RV12F88	6.1	6.3	1.0	2,200	2	6.20	67	14	74
RV13F88	4.0	2.6	.5	810	1	3.80	85	7	46
RV14F88	7.1	2.2	.4	840	2	3.60	120	10	59
RV01C88	6.1	.6	<.4	1,100	1	3.20	87	12	85
RV02C88	3.7	7.1	1.3	1,300	<1	5.60	38	6	20
RV03C88	5.7	2.4	1.3	790	2	2.80	52	9	51
RV04C88	4.6	3.1	.4	870	1	2.70	49	5	19
RV05C88	5.6	1.0	.4	680	1	2.10	50	7	39
RV06C88	6.1	1.0	<.4	720	1	1.90	37	4	19
RV07C88	6.0	1.4	.7	1,000	1	3.30	89	6	34
RV08C88	5.9	1.0	.4	690	2	1.40	53	7	42
RV09C88	5.9	3.3	<.4	870	1	2.30	51	6	35
RV10C88	4.7	2.0	<.4	850	1	2.30	65	5	24
RV11C88	3.1	7.2	.8	900	<1	6.00	40	8	34
RV12C88	4.8	3.2	.8	1,400	1	3.40	48	8	40
RV13C88	3.2	2.5	.4	950	<1	2.50	75	5	25
RV14C88	7.4	2.0	<.4	1,900	2	2.50	290	8	28

TABLE 5. DOI irrigation drainage task group analytical data, 1988-89.

Sample	AL pct	AS ppm	XWB ppm	BA ppm	BE ppm	CA %	CE ppm	CO ppm	CR ppm
				Arkansas River, CO					
AR01F88	4.8	2.8	--	910	1	3.70	45	7	28
AR02F88	5.2	3.0	--	1,000	2	2.50	47	7	99
AR03F88	5.2	4.4	--	860	2	3.70	82	12	58
AR04F88	5.9	6.2	--	770	2	3.50	65	12	81
AR05F88	5.9	4.6	--	1,100	2	3.40	64	11	38
AR06F88	6.0	3.2	--	1,100	2	2.10	60	7	26
AR07F88	6.2	3.0	--	1,100	2	2.20	61	7	28
AR08F88	5.9	6.9	--	750	2	8.30	68	10	59
AR09F88	5.9	4.8	--	990	3	.72	76	5	37
AR01C88	3.8	1.0	.5	880	<1	1.10	18	3	4
AR02C88	3.9	1.0	.5	850	1	.73	20	3	5
AR03C88	3.9	2.3	.5	840	1	.90	46	5	11
AR04C88	3.7	2.4	.7	730	1	1.50	26	5	16
AR05C88	4.6	1.0	.4	930	1	1.10	27	4	7
AR06C88	4.7	1.0	.4	910	1	.89	26	3	8
AR07C88	4.8	1.0	.4	920	1	.93	29	4	8
AR08C88	4.9	2.7	.6	1,200	2	4.50	59	8	19
AR09C88	3.1	2.0	.4	560	1	.23	24	2	3
AL01F88	5.6	4.4	2.7	680	2	3.40	69	10	38
AL02F88	5.4	4.8	.8	690	2	3.60	82	9	34
AL03F88	7.3	9.1	1.1	600	2	5.10	89	14	55
AL04F88	6.8	15.0	--	610	2	4.90	70	14	59
AL05F88	7.1	7.6	2.2	500	2	5.90	77	12	55
AL01C88	5.8	4.7	4.1	670	2	3.60	65	10	39
AL02C88	4.5	3.4	.9	800	1	3.10	51	7	21
AL03C88	7.1	8.1	.9	610	2	5.00	90	14	54
AL04C88	6.8	19.0	4.4	630	2	4.70	76	14	60
AL05C88	7.0	6.1	2.4	520	2	5.10	72	12	54
				Gunnison River, CO					
GR03F88	5.6	8.9	1.4	610	2	6.50	68	11	51
GR04F88	5.8	16.0	.9	600	2	5.80	63	12	47
GR07F88	5.3	12.0	1.3	770	2	12.00	46	10	64
GR09F88	3.8	8.4	1.2	520	<1	5.20	44	7	35
GR11F88	5.2	8.2	1.0	720	1	5.20	72	11	49
GR12F88	5.3	6.6	1.7	480	1	12.00	48	11	59
GR03C88	5.7	8.1	1.3	640	2	6.00	65	12	49
GR04C88	6.7	12.0	.8	740	2	6.30	60	13	35
GR07C88	5.0	12.0	1.3	1,100	1	14.00	42	10	60
GR09C88	4.5	4.9	.9	670	1	4.00	45	9	23
GR11C88	4.8	7.2	.7	740	1	4.10	53	10	34
GR12C88	4.5	5.9	1.9	450	1	9.20	39	9	46

TABLE 5. DOI irrigation drainage task group analytical data, 1988-89.

Sample	AL pct	AS ppm	XWB ppm	BA ppm	BE ppm	CA %	CE ppm	CO ppm	CR ppm
				Bosque del Apache, NM					
BA01F88	6.7	7.7	1.6	470	2	1.90	60	11	47
BA02F88	6.6	3.6	1.6	650	1	3.90	59	10	53
BA03F88	6.8	6.8	1.4	660	2	3.60	70	12	52
BA04F88	6.2	6.2	2.0	710	2	4.90	65	13	44
BA05F88	4.9	6.8	1.3	630	1	2.60	52	10	35
BA06F88	7.0	6.6	1.0	630	2	3.50	67	13	53
BA07F88	4.6	4.4	--	930	1	4.30	81	13	49
BA08F88	5.1	4.2	1.7	820	1	3.40	71	11	45
BA09F88	4.7	12.0	1.8	390	1	6.80	48	9	37
BA10F88	5.3	6.3	2.4	920	2	3.30	74	14	54
BA11F88	--	--	--	--	--	--	--	--	--
BA12F88	5.2	4.9	3.6	1,100	1	3.40	100	15	85
BA13F88	--	--	--	--	--	--	--	--	--
BA01C88	9.2	5.8	1.3	530	2	2.40	79	14	58
BA02C88	5.5	4.5	1.6	660	2	3.80	59	10	37
BA03C88	6.8	6.0	1.2	630	2	3.10	60	11	48
BA04C88	7.2	3.3	1.1	750	2	3.30	56	8	30
BA05C88	6.1	7.4	1.4	990	2	2.70	56	12	40
BA06C88	7.7	6.4	.8	600	2	3.50	73	14	57
BA07C88	4.0	2.0	<.4	640	<1	1.40	25	5	18
BA08C88	4.2	2.4	.5	690	<1	1.30	59	8	28
BA09C88	4.5	6.7	1.3	560	1	4.20	38	8	22
BA10C88	4.3	3.7	.6	730	1	1.30	35	7	19
BA12C88	3.8	2.2	.7	620	<1	1.50	31	6	24
BA13C88	3.9	2.0	<.4	700	<1	1.50	30	6	16
				Malheur NWR, OR					
ML01F88	6.0	3.5	15.0	550	1	6.50	34	12	49
ML02F88	4.0	6.1	21.0	360	<1	7.90	28	11	32
ML03F88	8.5	2.2	1.0	620	1	3.90	33	28	90
ML04F88	4.5	11.0	55.0	340	1	7.70	27	13	40
ML05F88	4.8	9.3	34.0	350	1	4.30	30	10	47
ML06F88	4.0	6.1	19.0	360	<1	7.90	27	12	32
ML01C88	6.5	3.0	13.0	520	1	6.70	31	17	75
ML02C88	3.8	6.2	21.0	340	<1	7.60	27	11	30
ML03C88	8.5	2.2	1.2	630	2	4.00	34	27	72
ML04C88	4.4	11.0	51.0	320	1	7.40	27	13	39
ML05C88	8.2	4.5	16.0	490	1	4.00	33	9	31
ML06C88	3.9	6.1	19.0	350	<1	7.90	28	12	31

TABLE 5. DOI irrigation drainage task group analytical data, 1988-89.

Sample	AL pct	AS ppm	XWB ppm	BA ppm	BE ppm	CA %	CE ppm	CO ppm	CR ppm
				Klamath Basin Complex, OR-CA					
KR01F88	4.7	6.8	.8	330	<1	1.60	13	12	55
KR02F88	9.4	1.0	<.4	340	1	3.20	30	31	120
KR03F88	9.5	.6	<.4	340	<1	4.80	17	38	170
KR04F88	7.4	2.6	<.4	520	1	2.50	23	22	78
KR05F88	5.0	6.3	.7	240	<1	5.30	13	12	49
KR06F88	5.5	5.8	1.7	250	<1	3.10	14	12	58
KR07F88	4.3	6.7	1.2	190	<1	7.70	12	10	43
KR08F88	2.6	14.0	2.7	170	<1	11.00	9	10	21
KR09F88	2.7	16.0	2.5	140	<1	2.20	11	11	27
KR10F88	2.0	8.5	.8	67	<1	.53	7	5	23
KR11F88	2.1	5.1	.9	87	<1	.51	6	4	25
KR12F88	4.3	6.8	1.8	200	<1	7.60	11	10	43
KR13F88	2.5	15.0	--	170	<1	10.00	9	9	21
KR01C88	7.3	5.5	1.0	520	<1	2.80	17	19	63
KR02C88	9.3	1.0	<.4	380	1	3.70	24	31	120
KR03C88	8.7	1.0	<.4	340	1	4.70	25	37	180
KR04C88	9.2	2.8	<.4	490	1	3.90	27	15	61
KR05C88	5.3	5.8	1.1	230	<1	6.00	13	12	50
KR06C88	5.8	5.2	1.0	280	1	3.20	16	13	55
KR07C88	4.5	6.8	1.7	240	<1	6.60	11	10	44
KR08C88	2.7	11.0	2.3	170	<1	9.50	8	8	20
KR09C88	2.7	15.0	2.4	150	<1	2.30	10	11	27
KR10C88	2.8	8.6	--	89	<1	.97	8	7	30
KR11C88	2.3	5.2	--	94	<1	.56	7	5	27
KR12C88	4.5	6.7	1.2	240	<1	6.80	12	10	44
KR13C88	2.5	12.0	3.4	160	<1	9.30	7	8	19

TABLE 5. DOI irrigation drainage task group analytical data, 1988-89.

Sample	AL pct	AS ppm	XWB ppm	BA ppm	BE ppm	CA %	CE ppm	CO ppm	CR ppm
				Sacramento Complex, CA					
SC01F88	7.1	6.9	.7	590	<1	1.60	29	23	130
SC02F88	7.5	7.1	1.2	540	1	1.20	30	22	140
SC03F88	7.7	9.6	.9	660	1	1.10	31	34	210
SC04F88	8.2	12.0	1.2	650	1	1.70	33	31	170
SC05F88	7.4	8.5	.8	850	1	1.50	35	22	260
SC06F88	8.3	10.0	2.8	560	1	1.20	30	30	180
SC07F88	8.2	8.2	<.4	510	1	2.90	37	27	190
SC08F88	8.3	9.6	.4	450	<1	2.00	30	36	210
SC09F88	8.3	8.5	<.4	530	1	3.10	38	40	240
SC10F88	8.4	13.0	.4	590	1	1.80	32	33	190
SC11F88	8.4	6.9	.5	690	1	2.50	37	34	210
SC12F88	7.1	9.3	--	400	1	1.40	31	25	220
SC13F88	8.3	5.7	<.4	410	<1	3.30	26	30	270
SC14F88	7.6	5.9	<.4	460	1	3.30	43	35	330
SC15F88	7.5	7.5	.9	540	1	1.20	29	22	150
SC01C88	6.4	9.2	1.3	570	<1	1.80	28	22	110
SC02C88	7.3	6.8	1.7	530	1	1.10	30	22	140
SC03C88	7.4	9.7	1.0	470	1	1.20	30	33	220
SC04C88	8.6	16.0	1.5	670	1	1.50	41	39	170
SC05C88	6.1	8.8	.8	660	<1	1.30	26	24	110
SC06C88	7.7	8.3	2.4	520	1	1.30	25	25	180
SC07C88	7.3	7.8	<.4	530	1	2.70	31	21	140
SC08C88	7.1	7.7	.4	400	<1	2.20	25	32	230
SC09C88	6.1	6.3	1.1	390	<1	2.30	25	25	160
SC10C88	8.0	12.0	.5	560	1	1.90	31	34	190
SC11C88	7.0	4.9	.4	570	<1	2.40	27	22	120
SC12C88	4.3	4.0	<.4	300	<1	1.60	14	17	140
SC13C88	7.1	4.9	<.4	370	<1	3.40	18	32	300
SC14C88	5.9	6.0	<.4	380	<1	2.00	26	23	150
SC15C88	7.3	7.2	1.5	520	1	1.10	28	22	140

TABLE 5. DOI irrigation drainage task group analytical data, 1988-89.

Sample	AL pct	AS ppm	XWB ppm	BA ppm	BE ppm	CA %	CE ppm	CO ppm	CR ppm
				Kendrick, WY					
KD01F88	5.4	7.8	1.0	780	2	2.70	55	10	59
KD02F88	5.9	6.8	1.2	760	2	2.00	53	10	65
KD03F88	5.2	7.4	1.3	780	2	2.20	51	13	64
KD04F88	4.8	7.6	2.3	620	1	1.40	67	7	43
KD05F88	6.6	3.4	8.2	410	2	6.80	58	11	57
KD06F88	3.4	2.0	6.3	420	<1	14.00	34	6	31
KD07F88	6.4	11.0	5.0	660	2	1.10	62	8	67
KD08F88	5.7	3.4	2.6	640	2	2.00	61	9	58
KD09F88	3.0	1.0	6.8	370	<1	15.00	29	6	27
KD10F88	5.9	7.4	6.9	550	2	2.70	56	10	56
KD11F88	6.3	8.5	2.2	690	2	2.50	63	10	73
KD01C88	4.4	6.2	1.0	800	1	1.90	47	8	35
KD02C88	5.1	5.1	1.4	730	2	1.70	47	9	49
KD03C88	4.2	5.9	1.2	730	1	1.70	41	10	43
KD04C88	4.3	3.8	2.0	610	1	.81	53	4	19
KD05C88	7.1	3.0	6.7	230	2	5.50	63	11	56
KD06C88	4.0	1.0	3.7	550	<1	8.40	28	4	20
KD07C88	4.9	7.0	3.9	640	1	.73	47	6	41
KD08C88	4.5	2.4	1.7	640	1	1.40	39	6	38
KD09C88	3.3	1.0	4.3	450	<1	13.00	58	5	22
KD10C88	5.3	4.8	5.2	440	1	2.30	44	6	34
KD11C88	4.6	3.9	1.8	630	1	1.40	43	6	41
BSS2F88	7.0	7.8	2.0	700	2	2.60	67	11	81
BSS4F88	6.0	5.4	1.6	570	2	2.40	62	10	55
BSS5F88	6.1	2.5	8.8	580	2	2.20	64	9	59
BSS6NF88	6.0	4.2	5.0	550	2	4.40	58	8	51
BSS6SF88	6.3	4.8	3.0	560	2	4.40	58	8	60
BSS2RF88	6.8	8.0	1.7	690	2	2.70	63	11	80
BSS7F88	6.6	11.0	3.4	790	2	4.30	50	12	93
BSS8F88	8.1	7.0	1.2	890	2	.85	67	14	110
BSS9F88	6.2	3.5	2.6	700	2	2.00	55	10	72
BSS2C88	6.3	5.8	2.0	670	2	2.20	60	9	66
BSS4C88	4.6	1.6	1.1	620	1	.67	21	3	13
BSS5C88	4.7	1.5	5.9	680	1	1.10	30	5	22
BSS6NC88	4.7	2.1	4.5	590	1	2.90	46	5	30
BSS6SC88	5.5	3.3	2.7	580	1	3.60	49	7	46
BSS2RC88	6.0	6.3	1.6	660	2	2.40	52	9	64
BSS7C88	6.7	12.0	3.6	810	2	4.20	53	13	95
BSS8C88	8.1	6.9	1.1	890	2	.82	70	14	110
BSS9C88	5.6	2.9	3.2	690	2	1.70	47	9	60

TABLE 5. DOI irrigation drainage task group analytical data, 1988-89.

Sample	AL pct	AS ppm	XWB ppm	BA ppm	BE ppm	CA %	CE ppm	CO ppm	CR ppm
				Stillwater, NV					
GLL-F88	6.2	27.0	104.0	550	2	5.10	41	15	31
EAO-F88	8.1	14.0	28.0	850	2	5.20	55	16	33
FPN-F88	5.5	47.0	390.0	570	1	11.00	29	12	24
MSM-F88	6.9	120.0	19.0	1,200	2	3.00	45	18	52
NEO-F88	8.0	45.0	--	680	1	4.50	41	19	43
GLL-C88	6.3	26.0	88.0	550	2	5.00	42	15	30
EAO-C88	7.0	11.0	24.0	960	2	9.30	50	13	27
FPN-C88	4.5	41.0	360.0	460	<1	9.90	23	11	20
MSM-C88	7.3	52.0	9.9	440	2	3.30	34	12	37
NEO-C88	8.4	20.0	59.0	730	1	3.70	30	14	33
FWA2A88	8.2	12.0	1.0	750	1	7.70	36	20	41
FWA2B88	7.3	22.0	.8	790	1	9.60	36	24	58
FWA3A88	9.7	16.0	2.9	890	2	2.60	57	19	32
FWA3B88	9.3	25.0	3.0	830	1	2.80	50	21	32
FWA0388	9.1	18.0	2.3	790	1	3.60	39	17	31
FWA0488	9.3	16.0	1.9	840	1	3.80	39	18	43
FWA0588	9.3	28.0	5.6	850	2	2.80	52	21	30
FWA0688	9.0	21.0	2.7	820	1	3.50	42	17	29
FWA0788	8.6	6.9	4.6	740	1	3.30	34	15	24
FWA0888	9.0	13.0	4.8	880	1	2.80	49	18	33
				Middle Green River, UT					
UT01F88	3.5	4.5	1.7	420	<1	9.80	32	7	32
UT02F88	2.4	9.0	3.5	420	<1	20.00	29	15	37
UT03F88	3.1	2.8	.9	390	<1	11.00	36	7	36
UT04F88	4.6	4.4	1.7	310	1	7.20	34	7	55
UT05F88	4.6	4.7	2.5	340	1	7.60	33	7	50
UT06F88	4.4	6.7	.6	450	1	5.90	44	8	49
UT07F88	3.7	6.3	.5	410	1	7.70	41	8	54
TS01F88	3.5	14.0	5.7	280	1	20.00	32	7	27
TS02F88	3.2	8.9	10.3	180	1	18.00	30	6	25
UT01C88	3.2	4.4	2.0	400	<1	9.50	27	7	31
UT02C88	1.8	5.0	1.8	340	<1	15.00	18	9	22
UT03C88	2.1	2.0	.8	270	<1	8.90	20	5	20
UT04C88	4.4	4.2	1.6	300	1	7.00	33	7	54
UT05C88	4.4	4.4	2.9	330	1	7.40	29	7	50
UT06C88	3.8	5.1	.6	450	1	5.40	36	7	37
UT07C88	3.2	4.3	.5	400	<1	6.10	31	7	36
TS01C88	3.4	14.0	5.6	290	1	19.00	32	7	26
TS02C88	3.0	8.4	11.7	100	<1	19.00	26	6	22

TABLE 5. DOI irrigation drainage task group analytical data, 1988-89.

Sample	CU ppm	FE %	GA ppm	HG ppm	K pct	LA ppm	LI ppm	MG %	MN ppm	MO ppm
					Belle Fourche, SD					
BF01F88	14	2.00	10	<.02	1.60	30	27	.95	580	<2
BF02F88	13	2.00	11	<.02	1.60	27	27	.94	620	<2
BF03F88	13	2.00	11	<.02	1.60	28	27	.95	580	<2
BF04F88	16	2.10	12	<.02	1.80	28	38	.61	220	<2
BF05F88	18	2.60	12	<.02	1.50	29	29	.84	1,700	<2
BF06F88	11	1.50	8	<.02	1.60	26	23	1.70	390	<2
BF07F88	21	3.20	15	.02	1.80	30	37	1.30	730	<2
BF08F88	25	3.50	14	.02	1.40	27	40	.74	770	5
BF01C88	15	2.40	12	.02	1.50	28	30	.81	590	<2
BF02C88	16	2.60	12	<.02	1.50	27	31	.78	610	<2
BF03C88	17	2.40	12	<.02	1.50	28	30	.80	570	<2
BF04C88	15	2.90	11	.02	1.70	30	33	.56	320	2
BF05C88	12	3.90	10	<.02	1.80	25	17	.34	1,800	2
BF06C88	10	1.40	6	<.02	1.30	21	17	1.30	360	<2
BF07C88	22	4.50	14	.02	1.80	28	35	1.10	1,100	2
BF08C88	21	6.30	9	<.02	1.30	28	26	.54	1,200	9
					Angostura, SD					
AN01F88	19	2.10	13	<.02	1.30	32	41	.74	730	<2
AN02F88	26	3.00	23	.04	1.90	39	54	1.20	360	<2
AN03F88	20	3.20	13	.02	1.40	30	45	1.00	710	<2
AN04F88	23	2.90	15	.04	2.00	28	36	1.10	470	<2
AN05F88	28	4.40	17	.04	1.80	26	43	1.00	3,400	<2
AN06F88	21	3.90	14	.04	1.80	34	34	.79	860	<2
AN07F88	16	2.00	13	.02	1.90	33	28	.73	560	<2
AN08F88	28	2.80	15	.04	1.90	29	47	.93	770	4
AN09F88	9	2.10	8	<.02	1.30	21	18	.53	1,100	<2
AN10F88	8	2.80	9	<.02	1.50	24	16	.57	1,300	<2
AN11F88	7	1.60	7	<.02	1.40	20	14	.46	780	<2
AN01C88	14	2.10	9	<.02	1.50	22	25	.53	540	<2
AN02C88	27	3.00	23	.04	1.90	39	56	1.20	340	<2
AN03C88	19	3.70	13	<.02	1.20	25	43	.93	600	<2
AN04C88	24	3.00	14	.06	2.00	27	35	1.10	520	<2
AN05C88	27	3.70	18	.02	2.00	26	46	1.00	1,800	<2
AN06C88	5	1.60	8	<.02	2.70	14	8	.15	220	<2
AN07C88	7	2.30	9	<.02	2.30	18	8	.20	660	<2
AN08C88	10	2.90	9	<.02	2.60	20	13	.27	530	2
AN09C88	4	1.60	8	<.02	2.90	14	4	.09	350	<2
AN10C88	3	1.70	9	<.02	2.80	15	4	.10	360	<2
AN11C88	4	1.50	8	<.02	2.90	13	4	.08	300	<2

TABLE 5. DOI irrigation drainage task group analytical data, 1988-89.

Sample	CU ppm	FE %	GA ppm	HG ppm	K pct	LA ppm	LI ppm	MG %	MN ppm	MO ppm
					American Falls, ID					
AF01F88	6	1.60	11	<.02	1.70	43	19	1.00	440	<2
AF02F88	20	1.10	8	.08	.94	27	16	.80	160	<2
AF03F88	8	1.20	8	.02	1.50	35	18	.77	190	<2
AF04F88	16	2.20	12	.08	1.70	41	24	1.10	360	<2
AF05F88	11	1.30	8	.10	1.40	37	18	.72	330	<2
AF06F88	7	1.60	10	<.02	1.50	43	18	1.20	410	<2
AF07F88	8	2.00	9	<.02	1.60	53	19	1.10	420	<2
AF08F88	15	2.00	12	.04	1.70	41	26	1.20	380	<2
AF09F88	19	2.20	12	.08	1.70	39	25	1.10	350	<2
AF10F88	17	2.40	15	.12	1.80	35	39	1.60	650	<2
AF11F88	5	1.10	7	.04	1.20	33	16	.85	160	<2
AF01C88	3	1.00	13	<.02	2.30	48	22	.26	220	<2
AF02C88	4	.86	11	<.02	2.00	37	19	.27	140	<2
AF03C88	4	.82	12	<.02	2.10	39	21	.31	140	<2
AF04C88	5	1.20	14	.04	2.40	49	25	.34	230	<2
AF05C88	4	.93	5	.04	.84	29	11	.59	300	<2
AF06C88	3	1.00	12	<.02	2.30	44	22	.28	230	<2
AF07C88	5	1.20	9	<.02	1.40	32	15	.46	280	<2
AF08C88	13	1.90	11	<.02	1.70	39	26	1.10	390	<2
AF09C88	71	1.30	14	<.02	2.40	52	25	.35	240	<2
AF10C88	17	2.30	14	.08	1.70	33	37	1.50	600	<2
AF11C88	3	.77	10	<.02	1.80	35	19	.28	110	<2
					Riverton, WY					
RV01F88	22	4.00	16	.14	1.70	110	17	2.30	660	<2
RV02F88	11	1.70	11	.02	1.60	30	23	1.20	880	<2
RV03F88	19	2.80	17	.02	2.10	35	30	1.50	460	<2
RV04F88	16	2.20	12	<.02	1.80	69	22	1.20	780	<2
RV05F88	17	2.60	16	.04	1.90	43	28	1.40	550	<2
RV06F88	13	2.50	16	.30	1.90	79	22	1.20	790	<2
RV07F88	20	2.50	14	.04	1.70	41	27	1.40	580	<2
RV08F88	23	2.90	17	<.02	2.20	40	29	1.50	360	<2
RV09F88	13	2.10	14	<.02	1.90	62	21	1.00	580	<2
RV10F88	9	2.00	12	.02	1.80	60	20	1.10	490	<2
RV11F88	12	2.00	13	.02	1.70	32	27	1.30	720	<2
RV12F88	23	2.70	15	.08	2.00	39	33	1.30	500	<2
RV13F88	8	1.60	10	<.02	1.60	51	18	1.10	440	<2
RV14F88	13	2.50	19	.02	1.50	73	28	1.80	430	<2
RV01C88	7	2.10	14	<.02	1.80	55	10	1.20	390	<2
RV02C88	6	1.40	8	<.02	1.40	26	12	.50	630	<2
RV03C88	14	2.00	14	<.02	2.00	32	22	1.10	330	<2
RV04C88	5	.99	10	<.02	1.60	32	11	.40	310	<2
RV05C88	8	1.40	14	<.02	1.80	31	16	.72	310	<2
RV06C88	3	.72	13	<.02	1.60	24	10	.31	250	<2
RV07C88	4	1.20	14	<.02	1.70	58	14	.53	320	<2
RV08C88	8	1.40	14	<.02	1.90	34	15	.69	230	<2
RV09C88	7	1.30	14	<.02	2.00	33	14	.56	320	<2
RV10C88	4	1.10	11	<.02	1.50	40	12	.51	300	<2
RV11C88	9	2.10	7	<.02	1.00	28	15	1.00	580	<2
RV12C88	12	1.70	12	.04	1.80	29	19	.76	310	<2
RV13C88	4	1.20	8	<.02	1.10	47	10	.54	340	<2
RV14C88	5	1.70	18	<.02	1.40	190	16	.91	320	<2

TABLE 5. DOI irrigation drainage task group analytical data, 1988-89.

Sample	CU ppm	FE %	GA ppm	HG ppm	K pct	LA ppm	LI ppm	MG %	MN ppm	MO ppm
				Arkansas River, CO						
AR01F88	8	1.00	11	.04	2.80	27	10	.29	510	<2
AR02F88	520	1.10	12	.56	3.20	28	10	.23	310	<2
AR03F88	12	2.90	13	<.02	2.10	44	18	.60	940	<2
AR04F88	22	2.70	14	.02	2.00	36	27	.75	880	<2
AR05F88	9	2.10	15	<.02	3.20	35	13	.41	850	<2
AR06F88	7	1.50	15	.04	3.60	35	10	.27	460	<2
AR07F88	7	1.50	15	<.02	3.70	35	10	.26	460	<2
AR08F88	21	2.70	15	<.02	2.10	37	27	.69	510	4
AR09F88	14	1.20	17	.06	4.20	42	10	.15	330	<2
AR01C88	3	.39	8	.02	2.80	12	5	.07	220	<2
AR02C88	7	.36	9	<.02	2.80	12	5	.06	99	<2
AR03C88	3	1.20	9	<.02	2.50	25	6	.13	360	<2
AR04C88	5	1.10	8	<.02	2.00	15	9	.19	320	<2
AR05C88	4	.64	10	<.02	2.90	16	6	.12	240	<2
AR06C88	4	.67	11	<.02	3.00	16	6	.12	190	<2
AR07C88	4	.70	10	<.02	3.10	18	6	.13	200	<2
AR08C88	6	3.20	11	<.02	2.70	30	8	.23	380	<2
AR09C88	3	.38	9	<.02	2.70	15	6	.04	110	<2
AL01F88	15	2.20	14	.06	2.10	39	26	.79	300	<2
AL02F88	15	2.10	13	.04	2.20	45	21	.69	320	<2
AL03F88	40	3.60	20	.10	2.20	50	41	1.30	730	2
AL04F88	32	3.60	18	.04	2.10	40	47	1.30	570	<2
AL05F88	26	3.00	19	.04	2.00	43	42	1.10	510	<2
AL01C88	20	2.40	14	.04	2.10	37	29	.83	280	<2
AL02C88	10	1.50	11	.02	2.40	30	15	.46	240	<2
AL03C88	38	3.50	19	.06	2.20	50	39	1.20	710	2
AL04C88	33	3.90	18	.04	2.10	43	47	1.30	560	2
AL05C88	24	3.00	18	.06	2.00	41	41	1.00	480	2
				Gunnison River, CO						
GR03F88	26	2.60	14	.04	1.80	39	35	1.20	580	<2
GR04F88	69	3.50	13	.04	1.80	36	37	1.20	580	4
GR07F88	24	2.40	12	<.02	1.70	30	36	1.60	280	6
GR09F88	18	2.00	9	.04	1.30	27	26	1.10	360	<2
GR11F88	22	3.10	12	.02	1.70	42	32	1.20	580	<2
GR12F88	26	2.40	12	.04	1.60	31	41	1.30	370	4
GR03C88	23	3.00	13	.02	1.80	38	33	1.10	620	<2
GR04C88	55	3.80	16	.02	1.90	36	31	.94	730	3
GR07C88	18	2.60	12	.02	1.60	28	34	1.50	260	7
GR09C88	18	2.40	9	<.02	1.50	29	25	.68	460	<2
GR11C88	15	2.60	11	.02	1.70	32	26	.86	520	<2
GR12C88	21	2.00	11	<.02	1.40	25	33	1.10	310	3

TABLE 5. DOI irrigation drainage task group analytical data, 1988-89.

Sample	CU ppm	FE %	GA ppm	HG ppm	K pct	LA ppm	LI ppm	MG %	MN ppm	MO ppm
				Bosque del Apache, NM						
BA01F88	22	2.80	16	.06	1.40	35	41	.97	360	<2
BA02F88	25	2.00	12	.02	1.90	35	32	.91	380	<2
BA03F88	24	2.70	15	.02	1.90	41	37	1.10	470	<2
BA04F88	22	2.70	15	.04	1.90	39	42	1.00	720	<2
BA05F88	21	1.90	11	.04	1.40	30	26	.73	880	<2
BA06F88	27	2.80	15	.04	1.90	39	36	1.10	740	<2
BA07F88	16	2.70	11	.02	1.80	47	20	.72	1,700	<2
BA08F88	16	2.60	11	.02	1.90	41	25	.83	1,100	<2
BA09F88	17	2.00	11	.02	1.30	29	32	.85	1,300	<2
BA10F88	17	2.70	14	.02	1.90	42	28	.84	4,500	<2
BA11F88	--	--	--	<.02	--	--	--	--	--	--
BA12F88	18	3.90	12	.04	1.70	58	26	.93	680	<2
BA13F88	--	--	--	<.02	--	--	--	--	--	--
BA01C88	29	3.70	22	.04	1.90	45	53	1.30	460	<2
BA02C88	20	2.10	12	<.02	1.90	34	34	.90	380	<2
BA03C88	21	2.40	15	.02	1.90	35	34	.95	440	<2
BA04C88	17	1.90	16	<.02	2.20	34	28	.64	430	<2
BA05C88	21	2.20	14	.02	2.00	34	29	.76	1,900	<2
BA06C88	28	3.20	18	.04	1.90	42	42	1.20	830	<2
BA07C88	9	1.00	8	<.02	1.60	17	10	.20	330	<2
BA08C88	8	2.30	10	<.02	1.80	37	12	.28	820	<2
BA09C88	13	1.40	10	<.02	1.70	25	24	.57	850	<2
BA10C88	9	1.10	9	<.02	1.90	22	13	.26	2,100	<2
BA12C88	7	1.40	8	<.02	1.40	20	11	.39	300	<2
BA13C88	5	1.40	9	<.02	1.80	21	10	.22	280	<2
				Malheur NWR, OR						
ML01F88	33	2.80	14	.04	1.40	20	25	2.20	620	<2
ML02F88	36	2.50	10	.06	1.10	16	27	2.60	590	<2
ML03F88	120	6.10	22	.02	.98	22	17	1.40	770	<2
ML04F88	39	2.70	11	.02	1.60	15	110	4.80	520	<2
ML05F88	30	2.60	12	.02	1.30	16	47	2.30	410	<2
ML06F88	34	2.50	9	.04	1.10	15	27	2.60	590	<2
ML01C88	38	3.20	14	.02	1.30	18	23	2.30	670	<2
ML02C88	34	2.40	9	.04	1.10	15	26	2.50	570	<2
ML03C88	100	5.60	22	.02	1.00	21	17	1.30	720	<2
ML04C88	39	2.70	10	.02	1.60	15	110	4.80	520	<2
ML05C88	14	2.20	17	<.02	1.40	18	28	1.20	390	<2
ML06C88	37	2.50	10	.04	1.10	15	27	2.50	590	<2

TABLE 5. DOI irrigation drainage task group analytical data, 1988-89.

Sample	CU ppm	FE %	GA ppm	HG ppm	K pct	LA ppm	LI ppm	MG %	MN ppm	MO ppm
Klamath Basin Complex, OR-CA										
KR01F88	44	2.50	10	.22	.35	8	17	.77	320	4
KR02F88	63	4.90	18	.04	.48	16	18	1.40	720	<2
KR03F88	67	5.30	18	<.02	.64	11	13	2.40	1,600	<2
KR04F88	36	3.90	15	.06	.55	14	22	.86	700	<2
KR05F88	48	2.80	10	.04	.46	10	23	.74	470	4
KR06F88	51	3.10	12	.06	.51	11	26	.71	530	2
KR07F88	36	2.50	10	.04	.37	10	24	1.20	480	2
KR08F88	24	1.60	5	.04	.39	8	18	1.60	640	3
KR09F88	30	1.90	6	.06	.26	7	16	.59	340	<2
KR10F88	21	1.20	5	.04	.12	3	11	.20	66	<2
KR11F88	19	1.20	4	.06	.14	4	11	.20	85	<2
KR12F88	38	2.50	9	.04	.37	10	24	1.10	470	<2
KR13F88	21	1.50	6	.04	.38	8	16	1.50	600	2
KR01C88	51	3.70	14	.26	.57	11	23	1.60	470	<2
KR02C88	53	4.70	18	<.02	.62	16	17	1.70	740	<2
KR03C88	44	6.30	18	<.02	.85	18	15	2.80	1,400	<2
KR04C88	16	3.00	18	.10	1.10	17	20	1.30	520	<2
KR05C88	43	2.80	11	.06	.51	10	23	.80	440	3
KR06C88	45	3.30	12	.02	.57	11	26	.89	510	<2
KR07C88	37	2.50	9	.04	.40	10	24	1.10	440	<2
KR08C88	20	1.40	6	.02	.43	8	16	1.20	480	2
KR09C88	30	1.90	5	.04	.26	7	17	.59	350	<2
KR10C88	35	1.60	6	.02	.15	4	12	.41	130	<2
KR11C88	20	1.30	5	.12	.15	4	11	.22	96	<2
KR12C88	37	2.50	9	.04	.40	9	24	1.10	450	<2
KR13C88	17	1.40	5	.04	.40	8	15	1.20	480	2

TABLE 5. DOI irrigation drainage task group analytical data, 1988-89.

Sample	CU ppm	FE %	GA ppm	HG ppm	K pct	LA ppm	LI ppm	MG %	MN ppm	MO ppm
					Sacramento Complex, CA					
SC01F88	45	3.30	13	.02	1.20	16	37	1.20	1,100	<2
SC02F88	62	4.00	15	.06	1.20	16	48	1.40	910	<2
SC03F88	66	4.90	15	.08	1.10	16	53	2.10	860	<2
SC04F88	69	5.20	17	.50	1.30	18	66	1.90	1,400	<2
SC05F88	46	4.70	15	.12	1.10	20	46	1.40	980	<2
SC06F88	79	5.30	17	.12	1.20	16	53	1.90	880	<2
SC07F88	45	4.50	17	.08	.91	21	22	2.00	1,100	<2
SC08F88	62	4.80	17	.50	.64	16	28	1.60	2,600	<2
SC09F88	63	5.20	17	1.00	.76	21	24	2.20	1,700	<2
SC10F88	63	4.90	17	.40	.94	18	37	1.80	1,900	<2
SC11F88	61	4.80	18	.12	1.00	21	25	2.00	1,800	<2
SC12F88	65	4.30	13	--	.96	16	39	1.60	790	<2
SC13F88	57	5.20	17	.24	.73	16	29	2.20	1,400	<2
SC14F88	45	5.20	17	.28	.69	24	19	2.20	1,700	<2
SC15F88	60	4.00	13	.16	1.20	16	47	1.40	910	<2
SC01C88	44	3.50	13	.04	1.20	15	37	1.30	850	<2
SC02C88	72	4.00	14	.06	1.20	16	48	1.40	900	<2
SC03C88	59	5.00	15	.10	1.10	15	53	2.30	840	<2
SC04C88	75	6.00	19	.04	1.30	19	75	2.00	1,500	<2
SC05C88	31	3.40	11	<.02	1.40	13	32	1.00	910	<2
SC06C88	68	4.70	16	.06	1.10	15	47	1.80	780	<2
SC07C88	30	3.60	15	<.02	1.00	17	15	1.60	770	<2
SC08C88	46	4.40	14	.02	.68	14	24	1.90	1,600	<2
SC09C88	36	3.50	12	.02	.69	14	16	1.60	840	<2
SC10C88	53	5.10	17	.04	.98	16	35	1.80	1,600	<2
SC11C88	31	3.40	14	.02	1.30	16	14	1.70	730	<2
SC12C88	24	2.60	9	<.02	.62	8	16	1.30	500	<2
SC13C88	39	4.90	15	.02	.72	12	22	2.90	930	<2
SC14C88	31	3.30	11	.04	.68	14	16	1.60	850	<2
SC15C88	63	4.00	13	.06	1.20	15	48	1.40	900	<2

TABLE 5. DOI irrigation drainage task group analytical data, 1988-89.

Sample	CU ppm	FE %	GA ppm	HG ppm	K pct	LA ppm	LI ppm	MG %	MN ppm	MO ppm
					Kendrick, WY					
KD01F88	16	2.50	14	.02	1.90	32	41	1.30	230	<2
KD02F88	20	2.50	14	.02	2.00	30	44	1.10	210	<2
KD03F88	16	2.50	13	.04	1.80	30	44	1.30	260	<2
KD04F88	11	1.80	11	.06	1.90	38	27	.73	310	<2
KD05F88	19	2.60	18	.14	1.70	34	55	1.80	390	<2
KD06F88	13	1.50	7	.02	1.30	21	19	.93	290	<2
KD07F88	15	2.40	13	<.02	2.20	35	43	1.00	200	<2
KD08F88	19	2.10	13	<.02	2.00	34	35	1.30	190	<2
KD09F88	12	1.40	7	<.02	1.10	19	18	.93	290	<2
KD10F88	17	2.10	12	<.02	1.90	34	32	.91	380	<2
KD11F88	17	2.70	14	<.02	2.00	37	41	1.30	240	<2
KD01C88	11	1.80	10	.02	1.90	27	26	.74	200	<2
KD02C88	22	2.00	12	.04	1.90	27	35	.86	180	<2
KD03C88	13	1.90	11	.14	1.60	23	32	.83	200	<2
KD04C88	5	.91	10	.54	2.30	31	14	.33	160	<2
KD05C88	19	2.80	19	.28	1.80	37	58	1.90	390	<2
KD06C88	8	1.00	8	<.02	2.00	19	11	.54	190	<2
KD07C88	10	1.60	11	<.02	2.00	27	29	.60	120	<2
KD08C88	10	1.30	9	<.02	1.80	23	21	.69	130	<2
KD09C88	11	1.20	7	<.02	1.50	34	13	.72	240	<2
KD10C88	12	1.40	12	<.02	2.30	26	21	.60	280	<2
KD11C88	10	1.50	10	<.02	1.80	26	23	.64	150	<2
BSS2F88	20	2.70	17	.04	2.00	41	43	1.10	360	<2
BSS4F88	15	2.30	14	<.02	1.90	36	27	.71	280	2
BSS5F88	15	2.30	15	<.02	2.10	37	35	1.00	330	<2
BSS6NF88	11	2.50	15	<.02	2.00	34	37	1.20	370	<2
BSS6SF88	11	2.50	15	.02	1.90	34	44	1.30	270	<2
BSS2RF88	19	2.60	17	<.02	2.00	38	43	1.10	370	2
BSS7F88	19	3.10	16	.02	2.00	30	59	1.30	800	<2
BSS8F88	21	3.40	20	<.02	2.30	39	68	1.30	240	<2
BSS9F88	16	2.60	16	.02	2.20	32	43	1.30	230	<2
BSS2C88	15	2.30	15	.02	2.00	36	36	.90	300	<2
BSS4C88	4	.62	10	<.02	2.70	14	7	.16	86	<2
BSS5C88	5	.91	10	<.02	2.40	20	14	.39	130	<2
BSS6NC88	7	1.50	10	<.02	1.80	29	27	.66	210	<2
BSS6SC88	10	2.00	12	<.02	1.80	31	36	.93	190	<2
BSS2RC88	16	2.20	14	<.02	1.90	32	35	.86	300	2
BSS7C88	18	3.20	18	.04	2.10	32	59	1.30	770	<2
BSS8C88	19	3.40	20	.02	2.30	40	67	1.20	240	<2
BSS9C88	15	2.20	14	<.02	2.10	28	37	1.10	190	<2

TABLE 5. DOI irrigation drainage task group analytical data, 1988-89.

Sample	CU ppm	FE %	GA ppm	HG ppm	K pct	LA ppm	LI ppm	MG %	MN ppm	MO ppm
					Stillwater, NV					
GLL-F88	67	3.60	16	.28	2.20	25	120	3.10	640	9
EAO-F88	42	3.60	19	.06	2.30	33	97	2.20	850	6
FPN-F88	34	2.60	13	<.02	1.90	18	220	2.60	830	44
MSM-F88	400	5.10	17	.14	1.80	22	57	1.50	850	73
NEO-F88	49	4.30	18	.04	1.70	24	56	2.60	940	32
GLL-C88	53	3.70	17	.30	2.30	25	130	3.10	640	9
EAO-C88	34	2.80	16	.04	2.00	29	75	1.90	830	5
FPN-C88	32	2.30	11	.04	1.60	15	200	2.30	710	37
MSM-C88	180	2.70	15	.04	1.90	19	31	1.00	490	22
NEO-C88	25	3.00	17	.02	1.60	21	27	1.70	590	15
FWA2A88	23	4.40	19	<.02	1.10	23	46	1.80	850	<2
FWA2B88	19	5.70	18	.04	1.20	23	30	1.70	1,200	<2
FWA3A88	46	4.50	22	.10	1.70	32	47	1.40	800	<2
FWA3B88	45	4.60	22	.04	1.60	29	42	1.60	930	<2
FWA0388	26	3.60	21	.04	1.60	24	30	1.40	750	<2
FWA0488	25	3.80	21	.06	1.50	24	26	1.50	730	<2
FWA0588	47	4.60	22	.06	1.80	29	47	1.60	850	<2
FWA0688	29	3.70	19	.04	1.60	25	31	1.40	770	<2
FWA0788	19	3.20	19	<.02	1.60	21	22	1.20	600	<2
FWA0888	34	4.20	22	.08	1.70	28	36	1.30	830	<2
					Middle Green River, UT					
UT01F88	15	1.40	9	.04	1.20	19	29	1.40	330	<2
UT02F88	51	4.50	8	.52	.73	21	36	1.40	550	<2
UT03F88	15	1.50	8	<.02	1.30	22	29	1.20	480	<2
UT04F88	14	1.70	11	<.02	1.60	21	34	1.80	270	<2
UT05F88	14	1.70	11	<.02	1.60	19	35	1.70	320	<2
UT06F88	13	1.90	10	<.02	1.50	27	30	.91	320	<2
UT07F88	17	1.80	8	.02	1.30	25	28	1.10	350	<2
TS01F88	16	1.50	9	.08	1.20	20	40	2.40	800	3
TS02F88	17	1.30	8	.02	1.20	19	47	2.30	290	9
UT01C88	16	1.30	8	.02	1.10	20	27	1.30	320	<2
UT02C88	25	2.60	6	.24	.62	16	23	.95	580	<2
UT03C88	9	.97	5	.02	.77	16	18	.79	290	<2
UT04C88	13	1.60	10	.02	1.60	21	33	1.70	260	<2
UT05C88	14	1.70	11	.02	1.60	18	34	1.50	300	<2
UT06C88	9	1.40	8	<.02	1.30	23	23	.71	270	<2
UT07C88	12	1.40	7	.02	1.10	20	19	.81	320	<2
TS01C88	18	1.50	9	.06	1.20	19	40	2.40	750	3
TS02C88	16	1.20	7	<.02	1.10	19	44	2.20	280	11

TABLE 5. DOI irrigation drainage task group analytical data, 1988-89.

Sample	NA %	NB ppm	ND ppm	NI ppm	P %	PB ppm	SC ppm	SE ppm	SR ppm	TH ppm
				Belle Fourche, SD						
BF01F88	.52	5	28	19	.08	13	6	.6	250	10
BF02F88	.51	5	23	26	.08	14	6	.6	250	9
BF03F88	.52	4	26	21	.08	13	6	.6	250	10
BF04F88	.39	7	25	27	.09	13	8	.9	180	11
BF05F88	.42	4	26	36	.08	18	7	.8	270	9
BF06F88	.63	<4	25	13	.08	11	5	1.0	460	6
BF07F88	1.20	<4	27	33	.09	19	9	.7	220	11
BF08F88	.76	4	29	36	.13	12	8	1.2	360	10
BF01C88	.37	5	26	26	.07	16	7	.7	220	11
BF02C88	.35	5	24	27	.08	15	7	.8	210	9
BF03C88	.36	5	25	26	.07	14	7	.7	220	9
BF04C88	.37	5	30	28	.12	47	7	1.0	210	10
BF05C88	.49	<4	21	35	.10	21	4	.9	210	7
BF06C88	.47	<4	19	8	.07	10	3	.9	460	5
BF07C88	1.20	<4	26	36	.11	19	8	.9	220	10
BF08C88	.71	<4	29	43	.19	14	6	1.3	380	7
				Angostura, SD						
AN01F88	.29	6	28	24	.06	28	8	2.1	410	9
AN02F88	.26	14	30	26	.07	23	13	1.0	240	13
AN03F88	.22	4	28	19	.09	18	8	.9	470	9
AN04F88	1.30	5	25	26	.09	55	9	1.0	240	10
AN05F88	.52	6	24	31	.14	18	10	14.0	250	10
AN06F88	.65	6	28	23	.11	18	8	1.6	220	11
AN07F88	1.10	6	26	15	.06	17	6	.6	460	10
AN08F88	.42	6	28	35	.10	18	9	4.3	400	10
AN09F88	.44	<4	20	15	.08	12	4	1.0	760	5
AN10F88	.49	<4	22	15	.10	12	4	.9	740	8
AN11F88	.51	<4	16	9	.06	12	3	.6	760	5
AN01C88	.44	<4	18	18	.05	29	5	1.2	270	6
AN02C88	.26	12	32	27	.07	22	13	1.0	240	14
AN03C88	.16	<4	22	20	.09	15	8	.8	360	7
AN04C88	1.20	6	22	25	.09	67	9	1.0	240	9
AN05C88	.51	7	22	29	.10	18	11	10.0	200	11
AN06C88	.81	<4	10	4	.04	15	2	.4	110	6
AN07C88	.87	<4	14	8	.05	19	2	.5	180	6
AN08C88	.89	<4	13	15	.07	19	3	1.6	190	5
AN09C88	1.00	<4	10	4	.05	19	<2	.2	150	6
AN10C88	1.00	<4	11	4	.05	18	<2	.2	140	6
AN11C88	1.00	<4	10	5	.04	18	<2	.3	140	6

TABLE 5. DOI irrigation drainage task group analytical data, 1988-89.

Sample	NA %	NB ppm	ND ppm	NI ppm	P %	PB ppm	SC ppm	SE ppm	SR ppm	TH ppm
				American Falls, ID						
AF01F88	1.20	7	36	14	.08	14	5	.2	230	10
AF02F88	.77	7	27	8	.12	7	4	1.9	580	5
AF03F88	1.00	6	27	11	.09	11	4	.7	240	6
AF04F88	1.00	6	34	20	.08	15	7	.7	190	11
AF05F88	.77	<4	33	12	.17	14	4	.4	240	8
AF06F88	1.00	4	35	14	.09	11	5	.2	230	10
AF07F88	1.00	<4	40	16	.09	12	6	.1	190	12
AF08F88	.92	5	35	17	.11	16	6	.4	200	12
AF09F88	1.00	6	30	20	.08	16	7	.7	200	10
AF10F88	.60	8	30	21	.11	18	8	.6	190	10
AF11F88	.84	4	29	11	.09	8	4	.5	290	6
AF01C88	1.50	8	37	5	.04	17	3	.1	91	12
AF02C88	1.40	6	30	5	.05	14	3	.4	120	9
AF03C88	1.40	5	28	6	.04	16	3	.3	150	9
AF04C88	1.50	11	37	8	.06	19	3	.4	74	13
AF05C88	.24	<4	26	8	.41	9	3	.3	220	<4
AF06C88	1.50	8	32	6	.04	17	3	.1	96	11
AF07C88	.79	5	26	10	.06	9	4	.1	94	8
AF08C88	.89	5	33	17	.10	15	6	.4	190	10
AF09C88	1.50	6	39	8	.06	19	3	.4	73	12
AF10C88	.58	8	29	20	.11	19	8	.5	180	10
AF11C88	1.30	<4	26	6	.04	13	2	.3	120	7
				Riverton, WY						
RV01F88	1.60	7	75	52	.13	49	12	.1	550	45
RV02F88	.67	<4	28	17	.07	14	6	.6	460	9
RV03F88	.88	8	30	28	.07	17	9	.3	250	12
RV04F88	.86	6	56	19	.10	17	7	.4	200	23
RV05F88	1.00	7	36	27	.08	14	8	1.1	260	13
RV06F88	1.40	8	60	23	.09	16	8	.3	340	23
RV07F88	1.20	4	30	32	.08	15	7	1.1	470	13
RV08F88	.85	9	33	28	.08	19	9	.2	170	14
RV09F88	1.30	5	49	20	.09	14	7	.2	250	18
RV10F88	1.00	<4	49	18	.09	14	6	.2	210	17
RV11F88	.51	4	27	19	.07	15	7	1.2	200	8
RV12F88	.84	5	34	29	.07	17	8	3.0	260	11
RV13F88	.72	<4	41	13	.09	12	5	.3	190	14
RV14F88	1.20	7	52	22	.08	18	8	1.3	400	19
RV01C88	1.90	<4	37	29	.07	19	7	.1	520	20
RV02C88	1.10	<4	19	10	.05	14	3	.5	370	5
RV03C88	1.00	5	23	20	.05	14	6	.2	240	9
RV04C88	1.50	<4	21	10	.04	12	3	.1	290	6
RV05C88	1.60	<4	22	15	.04	12	5	.6	300	8
RV06C88	2.20	<4	16	8	.02	11	3	<.1	480	<4
RV07C88	2.20	<4	32	12	.03	14	4	.2	460	11
RV08C88	1.60	4	23	16	.04	13	5	.1	300	8
RV09C88	1.90	<4	21	15	.04	14	4	.1	360	7
RV10C88	1.50	<4	28	11	.04	11	4	.1	310	10
RV11C88	.62	<4	23	17	.11	14	4	.8	200	<4
RV12C88	1.00	<4	23	16	.04	11	5	1.9	200	7
RV13C88	.87	<4	31	7	.05	10	3	.2	210	10
RV14C88	2.40	5	100	12	.05	13	5	.4	650	24

TABLE 5. DOI irrigation drainage task group analytical data, 1988-89.

Sample	NA %	NB ppm	ND ppm	NI ppm	P %	PB ppm	SC ppm	SE ppm	SR ppm	TH ppm
					Arkansas River, CO					
AR01F88	1.40	<4	21	14	.05	20	3	.6	310	7
AR02F88	1.50	<4	21	46	.04	29	3	.6	300	7
AR03F88	1.30	<4	41	22	.09	20	6	1.0	320	15
AR04F88	1.10	7	32	24	.08	23	7	1.3	280	10
AR05F88	1.80	6	31	22	.09	27	5	.7	320	9
AR06F88	1.80	<4	29	15	.06	26	4	.5	250	10
AR07F88	1.90	<4	30	12	.07	29	4	.5	250	9
AR08F88	.87	8	34	24	.09	17	7	2.1	380	10
AR09F88	1.60	9	35	18	.05	28	2	.5	160	13
AR01C88	1.10	<4	8	2	.02	16	<2	.1	170	<4
AR02C88	1.10	<4	10	3	.02	16	<2	.1	160	<4
AR03C88	1.10	4	19	4	.03	17	<2	.2	160	6
AR04C88	1.00	<4	13	8	.03	15	2	.3	170	<4
AR05C88	1.40	<4	12	3	.02	19	<2	.2	190	<4
AR06C88	1.40	<4	13	4	.03	19	<2	.2	190	4
AR07C88	1.50	<4	14	3	.03	19	<2	.2	190	5
AR08C88	1.40	5	31	8	.05	19	3	.8	310	7
AR09C88	.76	<4	11	<2	.01	18	<2	.2	74	<4
AL01F88	1.10	9	32	21	.08	16	7	2.1	310	11
AL02F88	1.20	8	39	20	.10	19	7	1.4	310	12
AL03F88	.78	11	43	33	.11	61	12	2.1	290	16
AL04F88	.76	9	34	34	.12	32	10	5.4	350	13
AL05F88	.60	10	37	32	.09	21	10	4.2	410	14
AL01C88	.96	9	31	21	.07	19	8	3.7	310	12
AL02C88	1.00	6	26	13	.06	19	4	1.4	280	8
AL03C88	.84	12	42	33	.11	64	11	2.0	300	14
AL04C88	.72	11	38	35	.15	33	10	5.6	340	12
AL05C88	.62	11	35	29	.08	21	10	4.0	370	12
					Gunnison River, CO					
GR03F88	.69	8	37	20	.11	26	8	2.3	330	10
GR04F88	.76	7	30	21	.12	66	9	1.9	340	10
GR07F88	.47	6	25	31	.10	23	8	8.6	630	9
GR09F88	.55	5	22	14	.08	24	6	2.2	250	8
GR11F88	.76	7	36	18	.11	32	8	1.5	290	12
GR12F88	.59	7	24	27	.11	46	8	41.0	610	9
GR03C88	.87	5	35	21	.10	29	8	4.0	370	10
GR04C88	1.30	7	30	17	.10	59	9	3.0	580	10
GR07C88	.45	5	21	30	.09	21	8	18.0	680	12
GR09C88	.99	5	21	10	.07	25	5	2.3	380	7
GR11C88	.88	6	26	13	.08	26	7	2.0	320	8
GR12C88	.56	5	19	21	.09	37	7	40.0	500	8

TABLE 5. DOI irrigation drainage task group analytical data, 1988-89.

Sample	NA %	NB ppm	ND ppm	NI ppm	P %	PB ppm	SC ppm	SE ppm	SR ppm	TH ppm
				Bosque del Apache, NM						
BA01F88	.35	9	28	17	.05	30	10	.4	180	11
BA02F88	1.10	8	29	14	.07	18	7	.3	270	10
BA03F88	.91	9	34	18	.07	21	9	.3	260	13
BA04F88	1.10	8	31	16	.07	23	9	.3	400	11
BA05F88	.71	5	24	13	.04	50	6	.3	180	9
BA06F88	.94	10	33	19	.07	21	9	.4	260	12
BA07F88	1.30	5	39	15	.05	17	6	.2	320	14
BA08F88	1.20	4	34	14	.05	23	7	.2	280	11
BA09F88	.57	5	23	12	.06	15	7	.3	500	9
BA10F88	1.20	8	37	15	.07	27	7	.3	280	15
BA11F88	--	--	--	--	--	--	--	--	--	--
BA12F88	1.00	13	49	19	.09	21	8	.2	240	18
BA13F88	--	--	--	--	--	--	--	--	--	--
BA01C88	.49	11	36	21	.07	27	13	.3	240	14
BA02C88	1.00	7	29	14	.06	19	7	.3	280	10
BA03C88	.91	8	30	16	.06	20	8	.3	250	11
BA04C88	2.10	7	26	10	.05	18	6	.2	630	9
BA05C88	1.00	7	26	14	.05	130	7	.2	240	10
BA06C88	.77	11	35	22	.07	23	11	.4	260	12
BA07C88	1.20	<4	12	6	.03	10	2	<.1	280	4
BA08C88	1.20	7	27	8	.04	13	3	<.1	230	9
BA09C88	.97	5	18	9	.05	13	5	.2	390	6
BA10C88	1.20	4	18	6	.03	14	3	.1	240	5
BA12C88	1.10	6	16	7	.04	11	4	.1	230	4
BA13C88	1.40	<4	17	6	.03	10	2	.1	300	5
				Malheur NWR, OR						
ML01F88	1.40	5	21	27	.11	11	11	.5	440	4
ML02F88	.91	<4	18	23	.14	8	8	.6	430	<4
ML03F88	2.10	9	27	46	.11	8	21	.1	430	4
ML04F88	1.70	<4	19	26	.07	8	10	.1	490	<4
ML05F88	1.60	<4	17	19	.09	7	9	.3	310	<4
ML06F88	.91	<4	18	23	.14	8	8	.7	430	<4
ML01C88	1.60	5	20	39	.10	10	13	.4	420	<4
ML02C88	.85	<4	16	22	.14	8	8	.7	410	<4
ML03C88	2.10	8	26	43	.11	7	18	.2	460	5
ML04C88	1.70	<4	19	26	.06	7	9	.1	470	<4
ML05C88	2.90	8	20	13	.05	8	8	.1	500	<4
ML06C88	.88	<4	17	22	.14	8	8	.7	420	<4

TABLE 5. DOI irrigation drainage task group analytical data, 1988-89.

Sample	NA %	NB ppm	ND ppm	NI ppm	P %	PB ppm	SC ppm	SE ppm	SR ppm	TH ppm
Klamath Basin Complex, OR-CA										
KR01F88	.76	<4	7	29	.11	46	9	.4	250	<4
KR02F88	1.30	<4	16	76	.06	8	24	.1	280	<4
KR03F88	1.70	<4	13	93	.05	<4	29	.1	340	<4
KR04F88	1.30	4	14	39	.08	16	15	.2	370	<4
KR05F88	.59	10	10	36	.10	8	12	.7	280	<4
KR06F88	.64	10	10	42	.10	8	12	.6	230	<4
KR07F88	.35	<4	9	33	.13	5	11	.6	340	<4
KR08F88	.68	<4	7	18	.14	<4	5	.6	560	<4
KR09F88	.44	<4	6	19	.11	<4	6	.6	190	<4
KR10F88	.20	7	5	14	.05	<4	4	.5	59	<4
KR11F88	.24	<4	<4	12	.06	<4	4	.4	61	<4
KR12F88	.36	7	8	32	.13	4	11	.6	330	<4
KR13F88	.67	<4	7	16	.14	<4	4	.6	530	<4
KR01C88	1.30	<4	11	41	.12	33	13	.4	570	<4
KR02C88	1.70	<4	15	71	.05	7	25	.1	380	<4
KR03C88	2.10	4	18	85	.05	<4	30	.1	380	<4
KR04C88	2.60	7	15	26	.05	10	12	.1	550	<4
KR05C88	.76	<4	10	35	.11	6	12	.6	290	<4
KR06C88	.76	<4	10	41	.10	8	13	.5	340	<4
KR07C88	.40	<4	7	33	.13	5	11	.6	310	<4
KR08C88	.78	<4	7	15	.15	<4	4	.5	460	<4
KR09C88	.43	<4	5	19	.11	5	6	.6	190	<4
KR10C88	.41	<4	<4	18	.06	4	6	.5	110	<4
KR11C88	.27	<4	<4	13	.06	<4	5	.4	69	<4
KR12C88	.39	9	10	33	.13	<4	11	.6	310	<4
KR13C88	.70	<4	7	15	.14	<4	4	.6	440	<4

TABLE 5. DOI irrigation drainage task group analytical data, 1988-89.

Sample	NA %	NB ppm	ND ppm	NI ppm	P %	PB ppm	SC ppm	SE ppm	SR ppm	TH ppm
				Sacramento Complex, CA						
SC01F88	1.80	6	14	58	.05	11	14	.3	250	5
SC02F88	1.60	5	16	72	.08	11	16	.4	190	4
SC03F88	1.60	4	17	150	.07	14	18	.3	160	4
SC04F88	1.20	<4	19	110	.09	14	20	.3	180	6
SC05F88	1.60	6	20	79	.08	11	17	.2	200	5
SC06F88	1.30	<4	17	120	.10	14	21	.3	170	4
SC07F88	1.60	5	20	83	.06	34	20	.1	300	6
SC08F88	1.30	<4	17	110	.07	15	21	.2	200	5
SC09F88	1.40	5	23	100	.08	14	23	.1	270	6
SC10F88	1.40	4	19	110	.08	11	21	.2	180	5
SC11F88	1.60	6	21	100	.08	16	21	.2	280	6
SC12F88	1.90	5	18	130	.08	13	15	.2	98	6
SC13F88	1.40	<4	16	110	.06	7	24	.2	230	4
SC14F88	1.60	5	24	90	.07	12	24	.2	280	6
SC15F88	1.60	<4	16	71	.08	10	16	.4	200	5
SC01C88	1.40	<4	14	59	.05	10	13	.3	240	4
SC02C88	1.50	<4	15	75	.07	78	16	.4	180	5
SC03C88	1.40	<4	17	160	.06	17	17	.3	130	4
SC04C88	.92	<4	18	120	.10	16	23	.3	170	6
SC05C88	1.50	<4	13	62	.05	10	11	.2	190	<4
SC06C88	1.30	<4	14	110	.09	16	19	.3	190	4
SC07C88	1.70	<4	17	62	.05	12	15	.1	310	4
SC08C88	1.30	<4	14	110	.06	12	19	.2	180	<4
SC09C88	1.30	<4	15	71	.05	9	15	.1	220	4
SC10C88	1.40	<4	16	110	.07	11	20	.2	200	4
SC11C88	1.80	<4	15	77	.05	12	13	.1	300	<4
SC12C88	1.30	<4	8	64	.04	6	10	.1	130	<4
SC13C88	1.40	<4	13	130	.05	7	24	.1	210	<4
SC14C88	1.30	<4	13	65	.04	8	14	.1	210	<4
SC15C88	1.50	4	15	73	.07	11	16	.4	190	5

TABLE 5. DOI irrigation drainage task group analytical data, 1988-89.

Sample	NA %	NB ppm	ND ppm	NI ppm	P %	PB ppm	SC ppm	SE ppm	SR ppm	TH ppm
					Kendrick, WY					
KD01F88	.65	<4	29	26	.08	15	8	2.3	160	10
KD02F88	.63	6	26	30	.08	17	9	2.5	160	11
KD03F88	.58	<4	26	29	.08	15	8	2.0	150	10
KD04F88	1.40	6	29	18	.07	15	6	34.0	210	13
KD05F88	1.40	8	28	24	.07	18	10	8.0	590	14
KD06F88	.66	<4	18	10	.09	14	4	2.1	790	7
KD07F88	1.10	8	28	22	.08	18	8	5.3	170	12
KD08F88	.68	6	28	21	.08	18	7	11.0	170	11
KD09F88	.60	4	17	9	.09	10	4	2.5	820	6
KD10F88	1.10	8	26	22	.06	17	7	43.0	300	12
KD11F88	.67	5	31	25	.08	18	9	.7	210	11
KD01C88	.88	<4	20	19	.05	16	5	1.5	160	9
KD02C88	.71	5	22	22	.07	15	7	2.2	160	9
KD03C88	.65	<4	19	21	.06	14	6	1.4	140	8
KD04C88	1.40	<4	22	10	.03	16	3	20.0	140	13
KD05C88	1.50	9	30	27	.07	18	11	9.0	490	16
KD06C88	1.10	<4	14	7	.06	15	3	1.3	530	6
KD07C88	.95	5	20	14	.05	15	5	4.0	140	8
KD08C88	.79	<4	17	13	.05	15	4	5.9	160	6
KD09C88	.83	<4	27	8	.07	12	3	2.2	690	15
KD10C88	1.20	4	20	14	.04	17	5	33.0	260	10
KD11C88	.80	<4	19	14	.05	16	5	.3	180	7
BSS2F88	.66	8	33	28	.07	18	10	1.0	180	13
BSS4F88	.85	9	29	23	.07	18	7	4.2	230	14
BSS5F88	1.00	9	30	19	.08	17	8	1.0	460	12
BSS6NF88	1.10	8	29	17	.09	14	7	.9	340	10
BSS6SF88	.79	9	28	18	.08	15	8	1.5	340	12
BSS2RF88	.56	9	33	28	.07	18	10	1.2	190	12
BSS7F88	.51	8	26	28	.09	16	11	8.0	360	8
BSS8F88	.37	12	33	34	.09	20	13	.5	130	12
BSS9F88	.62	6	27	24	.08	17	9	3.5	180	9
BSS2C88	.74	6	29	23	.06	17	8	1.0	170	11
BSS4C88	1.30	<4	8	6	.02	17	<2	1.0	110	5
BSS5C88	1.30	<4	15	7	.03	14	3	.3	260	5
BSS6NC88	1.10	5	22	9	.06	11	4	.4	240	7
BSS6SC88	.88	8	23	14	.06	12	6	1.2	300	8
BSS2RC88	.63	7	26	22	.06	16	8	1.0	170	11
BSS7C88	.53	9	27	28	.08	17	11	8.0	350	9
BSS8C88	.37	12	33	34	.08	20	13	.5	130	14
BSS9C88	.66	5	23	20	.07	14	8	2.6	170	8

TABLE 5. DOI irrigation drainage task group analytical data, 1988-89.

Sample	NA %	NB ppm	ND ppm	NI ppm	P %	PB ppm	SC ppm	SE ppm	SR ppm	TH ppm
					Stillwater, NV					
GLL-F88	4.00	<4	21	22	.12	16	10	.5	660	9
EAO-F88	2.30	4	26	20	.13	19	11	.2	630	13
FPN-F88	3.90	6	18	16	.09	12	8	.8	1,600	5
MSM-F88	1.70	7	21	24	.12	32	11	8.3	430	8
NEO-F88	3.00	6	22	21	.15	15	13	1.8	720	8
GLL-C88	3.80	5	20	21	.13	15	10	.4	630	10
EAO-C88	2.10	<4	27	15	.13	15	9	.2	780	12
FPN-C88	8.50	<4	14	13	.08	11	7	.6	1,400	5
MSM-C88	2.10	5	17	13	.08	30	8	4.0	470	7
NEO-C88	3.20	<4	16	16	.09	13	11	.8	590	6
FWA2A88	2.00	9	23	21	.10	9	16	<.1	760	8
FWA2B88	2.10	<4	22	24	.12	8	14	.1	770	6
FWA3A88	2.10	5	30	25	.11	11	15	<.1	460	12
FWA3B88	2.20	5	24	22	.09	13	15	<.1	480	10
FWA0388	2.50	5	21	21	.08	13	13	<.1	590	8
FWA0488	2.50	<4	20	27	.09	11	13	.1	630	8
FWA0588	2.30	5	27	21	.10	13	15	<.1	470	11
FWA0688	2.50	4	20	19	.08	12	13	.1	570	8
FWA0788	2.50	<4	18	14	.05	11	11	.1	520	7
FWA0888	2.30	5	24	22	.09	13	13	.2	510	8
					Middle Green River, UT					
UT01F88	.54	<4	15	11	.09	13	5	.7	370	<4
UT02F88	.27	<4	19	38	.17	500	4	1.5	1,500	5
UT03F88	.44	<4	20	11	.08	14	5	.3	280	6
UT04F88	.43	<4	19	18	.11	16	6	.8	210	8
UT05F88	.55	<4	20	20	.11	13	6	2.1	260	8
UT06F88	.74	<4	24	19	.11	15	6	.3	320	7
UT07F88	.56	<4	21	18	.12	27	5	.8	290	5
TS01F88	.56	<4	19	11	.07	10	5	4.0	940	6
TS02F88	1.00	<4	19	10	.07	10	5	2.1	1,100	8
UT01C88	.50	<4	15	13	.08	14	4	.8	350	4
UT02C88	.23	<4	17	21	.11	250	3	.9	1,200	4
UT03C88	.36	<4	13	5	.06	10	3	.2	230	<4
UT04C88	.38	<4	18	17	.11	15	6	1.1	210	6
UT05C88	.51	<4	19	18	.11	14	6	2.2	260	7
UT06C88	.74	<4	18	15	.08	11	4	.2	310	6
UT07C88	.59	<4	16	12	.08	24	4	.3	290	<4
TS01C88	.63	<4	20	14	.07	10	5	3.4	920	6
TS02C88	1.20	<4	18	10	.07	10	4	2.4	1,100	6

TABLE 5. DOI irrigation drainage task group analytical data, 1988-89.

Sample	TI %	U ppm	V ppm	Y ppm	YB ppm	ZN ppm	C %TOTAL	C %ORG	C %CBNT
				Belle Fourche, SD					
BF01F88	.18	1.10	57	20	2	59	1.91	.58	1.33
BF02F88	.16	1.20	58	19	2	62	2.00	.64	1.36
BF03F88	.17	1.20	57	19	2	60	1.92	.59	1.33
BF04F88	.19	1.90	100	20	2	72	1.22	.76	.46
BF05F88	.16	1.70	67	20	2	91	2.20	1.01	1.19
BF06F88	.16	1.70	40	14	2	35	4.44	.83	3.61
BF07F88	.30	2.10	100	20	2	82	1.65	1.21	.44
BF08F88	.16	5.30	110	24	2	110	3.84	1.34	2.50
BF01C88	.14	1.10	65	18	2	74	1.87	.94	.93
BF02C88	.15	.95	66	19	2	75	1.84	.96	.88
BF03C88	.14	1.20	64	18	2	72	1.86	.90	.96
BF04C88	.15	2.40	83	26	2	78	1.26	.66	.60
BF05C88	.07	1.90	45	18	1	93	1.29	.54	.75
BF06C88	.09	1.60	33	10	1	33	6.03	2.03	4.00
BF07C88	.23	2.30	100	21	2	95	1.86	1.22	.64
BF08C88	.11	3.70	77	28	2	150	3.76	.89	2.87
				Angostura, SD					
AN01F88	.23	3.70	74	17	2	67	3.95	1.66	2.29
AN02F88	.36	2.10	140	20	2	110	1.71	1.07	.64
AN03F88	.20	1.90	84	18	2	76	3.54	.66	2.88
AN04F88	.27	2.00	110	18	2	96	5.53	5.09	.44
AN05F88	.25	5.30	140	18	2	140	3.47	2.84	.63
AN06F88	.29	3.40	110	20	2	90	1.76	.47	1.29
AN07F88	.23	2.10	67	17	2	58	2.41	.89	1.52
AN08F88	.23	3.80	200	17	2	120	3.74	1.56	2.18
AN09F88	.11	1.90	39	14	1	49	4.61	.29	4.32
AN10F88	.10	2.00	38	16	2	49	4.20	.37	3.83
AN11F88	.10	2.00	31	12	1	39	4.03	.25	3.78
AN01C88	.14	2.70	50	11	1	55	2.76	1.16	1.60
AN02C88	.35	2.30	140	20	2	110	1.55	.94	.61
AN03C88	.17	1.60	83	15	1	78	3.10	.39	2.71
AN04C88	.25	1.90	100	18	2	97	1.98	1.42	.56
AN05C88	.26	3.50	140	17	2	120	4.54	4.18	.36
AN06C88	.05	1.20	26	7	<1	25	.32	.14	.18
AN07C88	.06	1.50	24	11	1	31	.97	.12	.85
AN08C88	.07	2.20	56	10	<1	51	1.13	.45	.68
AN09C88	.03	1.10	14	8	<1	22	.44	.05	.39
AN10C88	.02	1.10	13	8	<1	23	.41	.07	.34
AN11C88	.02	1.50	12	8	<1	21	.35	.05	.30

TABLE 5. DOI irrigation drainage task group analytical data, 1988-89.

Sample	TI %	U ppm	V ppm	Y ppm	YB ppm	ZN ppm	C %TOTAL	C %ORG	C %CBNT
				American Falls, ID					
AF01F88	.20	.60	40	21	2	46	2.89	.80	2.09
AF02F88	.22	1.30	39	11	1	38	2.93	2.44	4.89
AF03F88	.20	.95	35	14	2	31	2.03	1.08	.95
AF04F88	.25	1.00	54	24	3	56	1.80	.79	1.01
AF05F88	.16	1.10	41	17	2	44	3.58	.79	2.79
AF06F88	.23	.45	44	19	2	43	2.74	.78	1.96
AF07F88	.28	.65	56	20	2	44	1.18	.34	.84
AF08F88	.25	.75	50	21	2	63	2.16	1.06	1.10
AF09F88	.26	.90	56	23	3	57	1.60	.71	.89
AF10F88	.21	1.20	65	21	2	85	3.34	1.36	1.98
AF11F88	.18	.80	32	13	1	27	3.56	1.15	2.41
AF01C88	.09	.50	15	29	3	43	.62	.11	.51
AF02C88	.12	.45	21	22	2	35	.67	.24	.43
AF03C88	.11	.60	20	22	2	32	.60	.35	.25
AF04C88	.12	.80	20	34	3	49	.40	.12	.28
AF05C88	.10	2.10	25	15	1	29	5.16	.58	4.58
AF06C88	.10	.50	16	27	3	42	.62	.13	.49
AF07C88	.14	.60	28	14	1	28	.42	.06	.36
AF08C88	.24	.75	47	21	2	63	2.38	1.28	1.10
AF09C88	.12	.65	20	33	3	48	.41	.17	.24
AF10C88	.20	1.40	61	20	2	82	3.23	1.44	1.79
AF11C88	.09	.70	16	20	2	30	.86	.34	.52
				Riverton, WY					
RV01F88	.43	1.70	130	23	2	66	1.44	.48	.96
RV02F88	.19	2.60	52	16	2	45	2.21	.50	1.71
RV03F88	.26	2.70	74	17	2	63	1.37	.49	.88
RV04F88	.31	1.50	62	26	3	50	1.47	.40	1.07
RV05F88	.27	4.40	57	18	2	59	1.85	1.12	.73
RV06F88	.34	1.60	60	25	3	49	.67	.19	.48
RV07F88	.23	5.70	54	16	2	56	3.08	.72	2.36
RV08F88	.28	1.60	67	19	2	510	1.53	1.36	.17
RV09F88	.28	1.30	52	22	3	42	.86	.22	.64
RV10F88	.25	1.00	54	23	3	40	1.20	.22	.98
RV11F88	.20	1.50	65	17	2	57	1.91	.59	1.32
RV12F88	.25	2.60	84	19	2	61	2.03	.38	1.65
RV13F88	.25	.90	51	21	2	36	1.48	.27	1.21
RV14F88	.26	2.90	55	18	2	55	.94	.25	.69
RV01C88	.22	.65	57	11	1	30	.47	.08	.39
RV02C88	.08	1.30	25	10	<1	26	1.78	.22	1.56
RV03C88	.18	1.30	53	14	1	43	1.02	.41	.61
RV04C88	.09	.80	23	9	<1	20	.64	.09	.55
RV05C88	.15	1.60	32	10	1	30	.98	.71	.27
RV06C88	.09	.50	17	6	<1	13	.11	.02	.09
RV07C88	.11	1.70	24	9	1	23	.73	.20	.53
RV08C88	.15	.80	33	11	1	230	.69	.62	.07
RV09C88	.13	.65	29	10	1	25	.44	.12	.32
RV10C88	.14	.70	28	12	1	20	.51	.07	.44
RV11C88	.10	1.30	40	14	1	41	2.14	.30	1.84
RV12C88	.15	2.00	50	12	1	33	1.03	.21	.82
RV13C88	.15	1.00	30	13	1	19	.81	.14	.67
RV14C88	.17	1.30	33	14	1	34	.22	.06	.16

TABLE 5. DOI irrigation drainage task group analytical data, 1988-89.

Sample	TI %	U ppm	V ppm	Y ppm	YB ppm	ZN ppm	C %TOTAL	C %ORG	C %CBNT
				Arkansas River, CO					
AR01F88	.13	1.20	27	15	2	29	1.31	.48	.83
AR02F88	.11	.70	25	13	2	210	1.12	.63	.49
AR03F88	.35	1.50	80	26	3	62	1.39	.56	.83
AR04F88	.26	1.80	77	19	2	76	2.07	1.20	.87
AR05F88	.20	.70	46	21	2	81	--	--	--
AR06F88	.15	.70	32	19	2	56	.78	.40	.38
AR07F88	.15	.90	32	20	2	55	.80	.41	.39
AR08F88	.24	2.30	91	20	2	72	2.93	.69	2.24
AR09F88	.09	1.30	20	25	3	44	--	--	--
AR01C88	.03	.60	7	6	<1	10	.31	.08	.23
AR02C88	.03	.55	7	5	<1	15	.78	.67	.11
AR03C88	.13	.60	24	9	1	17	.20	.08	.12
AR04C88	.10	.55	23	8	<1	23	.52	.23	.29
AR05C88	.06	.45	13	7	<1	23	.24	.09	.15
AR06C88	.06	.65	13	8	<1	24	.16	.07	.09
AR07C88	.07	.50	13	8	<1	26	.17	.07	.10
AR08C88	.17	.80	63	18	2	26	1.25	.14	1.11
AR09C88	.03	.50	5	9	1	11	.10	.08	.02
AL01F88	.24	2.30	69	20	2	64	1.79	1.06	.73
AL02F88	.25	1.10	66	22	3	85	1.88	1.08	.80
AL03F88	.28	1.70	130	25	3	360	2.93	1.65	1.28
AL04F88	.24	2.80	140	22	2	150	3.17	1.86	1.31
AL05F88	.28	1.80	110	21	2	100	3.27	1.70	1.57
AL01C88	.25	2.90	74	20	2	72	3.18	2.41	.77
AL02C88	.16	.65	44	15	2	66	1.84	1.14	.70
AL03C88	.29	1.40	130	25	3	370	2.96	1.73	1.23
AL04C88	.26	2.40	150	25	3	150	3.14	1.93	1.21
AL05C88	.28	1.80	110	20	2	98	2.94	1.64	1.30
				Gunnison River, CO					
GR03F88	.28	1.10	100	22	2	110	2.99	1.14	1.85
GR04F88	.32	2.10	120	19	2	300	2.76	1.08	1.68
GR07F88	.24	4.10	140	18	2	110	4.83	1.03	3.80
GR09F88	.22	1.60	79	15	2	88	2.70	.64	2.06
GR11F88	.35	1.50	110	22	3	110	2.35	.78	1.57
GR12F88	.24	9.90	130	17	2	120	5.40	1.83	3.57
GR03C88	.27	1.70	97	20	2	100	2.54	1.06	1.48
GR04C88	.32	2.30	130	19	2	270	2.57	1.13	1.44
GR07C88	.21	3.50	150	17	2	96	6.64	2.40	4.24
GR09C88	.24	1.30	73	13	2	84	1.08	.34	.74
GR11C88	.28	1.00	84	16	2	87	1.54	.53	1.01
GR12C88	.20	7.60	110	14	2	96	5.24	2.19	3.05

TABLE 5. DOI irrigation drainage task group analytical data, 1988-89.

Sample	TI %	U ppm	V ppm	Y ppm	YB ppm	ZN ppm	C %TOTAL	C %ORG	C %CBNT
				Bosque del Apache, NM					
BA01F88	.33	1.50	81	20	2	70	2.41	1.92	.49
BA02F88	.31	.65	57	20	2	52	2.19	1.17	1.02
BA03F88	.37	1.00	74	23	3	67	1.94	1.03	.91
BA04F88	.34	1.50	72	22	3	67	2.52	1.32	1.20
BA05F88	.24	1.30	52	17	2	55	2.00	1.11	.89
BA06F88	.39	1.60	74	23	3	66	1.72	.88	.84
BA07F88	.39	1.30	80	24	3	52	1.88	.78	1.10
BA08F88	.37	1.00	71	24	3	54	1.33	.49	.84
BA09F88	.24	1.20	51	17	2	50	4.46	2.15	2.31
BA10F88	.39	.85	72	24	3	60	1.72	.91	.81
BA11F88	--	--	--	--	--	--	--	--	--
BA12F88	.65	1.30	120	29	4	75	1.45	.55	.90
BA13F88	--	--	--	--	--	--	--	--	--
BA01C88	.39	1.20	110	22	2	94	2.09	1.65	.44
BA02C88	.28	1.10	57	19	2	55	2.44	1.46	.98
BA03C88	.31	.80	67	20	2	60	1.71	.94	.77
BA04C88	.23	.90	51	20	2	45	1.21	.67	.54
BA05C88	.29	1.10	60	19	2	67	1.54	.92	.62
BA06C88	.39	1.60	86	23	3	75	1.75	.96	.79
BA07C88	.13	.65	28	9	1	18	.32	.09	.23
BA08C88	.31	.65	61	14	2	37	.29	.12	.17
BA09C88	.18	.80	36	13	2	36	2.23	1.21	1.02
BA10C88	.15	.70	29	13	1	32	.50	.30	.20
BA12C88	.23	.40	39	12	1	24	.34	.12	.22
BA13C88	.16	.40	35	10	1	23	.26	.06	.20
				Malheur NWR, OR					
ML01F88	.35	.70	80	20	2	100	4.83	3.38	1.45
ML02F88	.28	.70	71	15	2	69	9.13	7.10	2.03
ML03F88	1.10	.75	220	24	3	97	1.33	1.33	<.01
ML04F88	.31	.60	110	16	2	60	4.12	2.02	2.10
ML05F88	.33	.55	78	16	2	54	3.34	2.46	.88
ML06F88	.28	.40	69	15	2	69	8.86	6.80	2.06
ML01C88	.37	.35	96	22	3	94	3.85	2.52	1.33
ML02C88	.27	.70	69	15	2	67	9.49	7.49	2.00
ML03C88	.93	.80	180	25	4	85	1.98	1.97	.01
ML04C88	.29	.75	110	15	2	59	4.22	2.22	2.00
ML05C88	.29	.40	50	22	3	46	1.02	.67	.35
ML06C88	.28	.65	71	15	2	69	9.42	7.43	1.99

TABLE 5. DOI irrigation drainage task group analytical data, 1988-89.

Sample	TI %	U ppm	V ppm	Y ppm	YB ppm	ZN ppm	C %TOTAL	C %ORG	C %CBNT
				Klamath Basin Complex, OR-CA					
KR01F88	.28	.70	100	8	1	77	7.10	7.08	.02
KR02F88	.55	.75	140	22	3	64	1.39	1.38	.01
KR03F88	.69	.25	180	17	3	65	.97	.97	<.01
KR04F88	.49	.55	150	15	2	66	1.36	1.32	.04
KR05F88	.29	.55	130	10	1	53	7.27	6.08	1.19
KR06F88	.32	.50	120	11	2	58	7.76	7.37	.39
KR07F88	.26	.85	130	10	1	44	9.71	7.68	2.03
KR08F88	.15	.55	92	5	<1	27	10.90	8.01	2.89
KR09F88	.17	.45	110	6	<1	43	6.99	6.73	.26
KR10F88	.11	.70	64	4	<1	26	7.15	7.14	.01
KR11F88	.13	.40	53	4	<1	23	5.89	5.78	.02
KR12F88	.26	1.10	130	10	1	45	9.66	7.65	2.01
KR13F88	.14	.90	86	5	<1	25	11.40	8.56	2.84
KR01C88	.44	.40	160	11	2	86	5.80	5.78	.02
KR02C88	.57	.35	150	20	3	59	1.04	1.02	.02
KR03C88	1.00	.15	220	17	3	75	.33	.33	<.01
KR04C88	.38	.15	76	17	2	48	.26	.23	.03
KR05C88	.30	.55	120	11	2	64	7.08	5.70	1.38
KR06C88	.35	.60	120	12	2	55	8.87	8.43	.44
KR07C88	.27	1.10	130	9	1	44	9.79	8.08	1.71
KR08C88	.13	.65	74	5	<1	23	12.40	9.94	2.46
KR09C88	.17	.50	110	6	<1	43	7.50	7.24	.26
KR10C88	.16	.80	83	5	<1	34	8.14	8.14	<.01
KR11C88	.14	.50	58	5	<1	25	6.61	6.61	<.01
KR12C88	.27	.75	130	9	1	45	9.74	8.00	1.74
KR13C88	.13	.55	75	5	<1	23	12.90	10.60	2.43

TABLE 5. DOI irrigation drainage task group analytical data, 1988-89.

Sample	TI %	U ppm	V ppm	Y ppm	YB ppm	ZN ppm	C %TOTAL	C %ORG	C %CBNT
				Sacramento Complex, CA					
SC01F88	.44	.70	110	14	2	70	.81	.67	.14
SC02F88	.43	.80	120	15	2	99	1.24	1.22	.02
SC03F88	.42	.40	150	18	2	110	.86	.79	.07
SC04F88	.42	.50	160	19	2	230	1.05	.78	.27
SC05F88	.56	.60	160	18	2	93	.42	.34	.08
SC06F88	.41	.70	160	19	2	130	2.15	2.14	.01
SC07F88	.51	1.00	150	18	2	81	.71	.64	.07
SC08F88	.49	.85	160	19	2	89	1.57	1.54	.03
SC09F88	.59	1.20	180	20	3	100	.65	.48	.17
SC10F88	.47	1.10	160	20	2	110	1.35	1.29	.06
SC11F88	.52	1.50	160	19	2	100	.90	.88	.02
SC12F88	.42	.60	140	18	2	290	--	--	--
SC13F88	.53	.80	200	18	2	82	.78	.51	.27
SC14F88	.73	.85	200	21	3	91	.52	.47	.05
SC15F88	.43	.75	120	15	2	100	1.12	1.12	<.01
SC01C88	.36	.55	110	15	2	66	1.18	.84	.34
SC02C88	.41	.60	120	16	2	100	1.46	1.44	.02
SC03C88	.37	.60	140	18	2	100	.99	.84	.15
SC04C88	.43	1.10	170	20	2	180	1.04	.80	.24
SC05C88	.30	.65	100	13	2	67	.32	.20	.12
SC06C88	.37	1.00	150	17	2	120	2.37	2.35	.02
SC07C88	.35	2.20	110	14	2	56	.48	.40	.08
SC08C88	.40	.80	150	15	2	72	.92	.91	.01
SC09C88	.34	.65	110	13	2	62	.35	.27	.08
SC10C88	.41	.70	150	17	2	99	1.08	1.01	.07
SC11C88	.32	.90	110	12	2	60	.22	.22	<.01
SC12C88	.21	.25	84	9	1	170	<.05	<.05	<.01
SC13C88	.41	.40	180	14	2	64	.25	.18	.07
SC14C88	.34	.65	100	12	2	58	.32	.26	.06
SC15C88	.43	1.30	120	16	2	100	1.51	1.50	.01

TABLE 5. DOI irrigation drainage task group analytical data, 1988-89.

Sample	TI %	U ppm	V ppm	Y ppm	YB ppm	ZN ppm	C %TOTAL	C %ORG	C %CBNT
				Kendrick, WY					
KD01F88	.21	2.80	120	17	2	79	1.48	.55	.93
KD02F88	.20	4.20	130	17	2	87	1.34	.74	.60
KD03F88	.20	1.90	120	17	2	85	1.42	.65	.77
KD04F88	.22	1.40	82	16	2	53	.95	.73	.22
KD05F88	.22	1.20	100	17	2	86	3.76	2.07	1.69
KD06F88	.13	6.10	46	9	1	47	8.26	4.45	3.81
KD07F88	.26	1.90	110	17	2	73	1.03	.87	.16
KD08F88	.24	7.50	100	18	2	73	1.83	1.22	.61
KD09F88	.12	8.70	39	8	1	40	9.25	4.93	4.32
KD10F88	.24	2.30	95	17	2	68	2.03	1.61	.42
KD11F88	.31	1.70	130	20	2	84	1.78	1.08	.70
KD01C88	.12	2.40	73	12	1	55	.90	.36	.54
KD02C88	.17	4.30	98	15	2	70	1.21	.75	.46
KD03C88	.13	1.70	91	13	1	66	1.16	.66	.50
KD04C88	.11	1.40	37	9	<1	25	.50	.40	.10
KD05C88	.23	15.00	110	18	2	92	3.43	2.05	1.38
KD06C88	.10	4.80	28	7	<1	27	5.26	3.08	2.18
KD07C88	.16	1.60	70	12	1	46	.59	.51	.08
KD08C88	.16	6.70	61	12	1	43	1.32	.99	.33
KD09C88	.10	13.00	31	8	<1	32	8.19	4.78	3.41
KD10C88	.16	2.60	61	12	1	43	1.80	1.42	.38
KD11C88	.17	1.20	73	12	1	46	.88	.57	.31
BSS2F88	.28	3.30	150	20	2	87	1.74	1.09	.65
BSS4F88	.20	4.90	73	20	2	69	2.29	1.83	.46
BSS5F88	.24	8.30	81	19	2	69	2.55	2.08	.47
BSS6NF88	.22	7.70	80	17	2	62	2.81	1.73	1.08
BSS6SF88	.24	3.50	97	16	2	66	2.53	1.35	1.18
BSS2RF88	.25	3.20	150	20	2	86	1.53	.84	.69
BSS7F88	.25	4.30	180	16	2	93	2.76	1.40	1.36
BSS8F88	.30	2.30	210	20	2	120	1.01	.88	.13
BSS9F88	.24	4.50	120	18	2	82	1.74	1.17	.57
BSS2C88	.24	3.10	120	18	2	72	1.35	.86	.49
BSS4C88	.05	1.50	17	6	<1	16	.40	.32	.08
BSS5C88	.10	2.90	31	8	<1	25	.87	.72	.15
BSS6NC88	.15	4.10	50	12	1	37	1.71	1.00	.71
BSS6SC88	.21	2.50	74	14	2	51	1.97	1.15	.82
BSS2RC88	.23	2.10	120	17	2	70	1.19	.66	.53
BSS7C88	.29	4.30	190	16	2	96	2.75	1.46	1.29
BSS8C88	.32	2.10	210	20	2	110	.86	.75	.11
BSS9C88	.21	3.70	110	16	2	70	1.61	1.15	.46

TABLE 5. DOI irrigation drainage task group analytical data, 1988-89.

Sample	TI %	U ppm	V ppm	Y ppm	YB ppm	ZN ppm	C %TOTAL	C %ORG	C %CBNT
				Stillwater, NV					
GLL-F88	.31	6.70	110	11	1	85	3.64	2.35	1.29
EAO-F88	.39	8.00	100	15	2	90	1.96	.84	1.12
FPN-F88	.28	21.00	140	9	1	59	4.75	1.72	3.03
MSM-F88	.40	18.00	310	14	2	160	4.56	4.27	.29
NEO-F88	.43	5.30	130	13	2	87	4.09	3.27	.82
GLL-C88	.31	5.10	120	11	1	87	3.57	2.34	1.23
EAO-C88	.31	6.10	81	15	2	69	3.28	.80	2.48
FPN-C88	.23	16.00	120	8	1	52	4.36	1.72	2.64
MSM-C88	.28	6.20	140	12	2	87	2.55	2.29	.26
NEO-C88	.31	2.50	89	11	2	57	1.36	1.13	.23
FWA2A88	.42	.85	150	16	2	77	1.26	.12	1.14
FWA2B88	.51	1.50	210	15	2	94	2.00	.19	1.81
FWA3A88	.40	2.30	110	18	2	89	.08	.06	.02
FWA3B88	.41	1.70	120	16	2	92	.06	.06	<.01
FWA0388	.33	1.10	100	13	2	71	.05	.04	.01
FWA0488	.36	.85	110	14	2	70	<.05	<.05	<.01
FWA0588	.41	1.70	120	17	2	97	.06	.06	<.01
FWA0688	.34	.90	100	14	2	72	.10	.08	.02
FWA0788	.29	.85	95	12	1	61	.09	.09	<.01
FWA0888	.38	2.30	110	15	2	80	.14	.08	.06
				Middle Green River, UT					
UT01F88	.13	.65	38	11	1	62	4.27	1.42	2.85
UT02F88	.09	1.10	76	7	<1	1,600	9.75	3.89	5.86
UT03F88	.12	.90	43	12	1	55	4.40	1.04	3.36
UT04F88	.12	4.80	66	14	1	61	3.39	.88	2.51
UT05F88	.13	2.30	71	14	1	64	3.50	1.01	2.49
UT06F88	.22	.60	54	15	2	64	2.08	.59	1.49
UT07F88	.17	.70	53	14	1	96	3.65	1.53	2.12
TS01F88	.13	5.70	56	10	1	40	7.65	1.59	6.06
TS02F88	.12	15.00	45	9	<1	38	6.93	2.31	4.62
UT01C88	.13	.85	35	10	1	61	4.58	1.84	2.74
UT02C88	.07	.80	70	5	<1	860	7.20	2.84	4.36
UT03C88	.07	.55	25	8	<1	33	3.37	.80	2.57
UT04C88	.10	1.20	63	13	1	59	3.35	1.02	2.33
UT05C88	.11	1.90	68	13	<1	64	3.52	1.17	2.35
UT06C88	.16	.55	37	12	1	48	1.78	.56	1.22
UT07C88	.13	.75	39	9	1	77	2.96	1.40	1.56
TS01C88	.12	5.30	57	9	<1	41	7.81	1.99	5.82
TS02C88	.11	18.00	45	8	<1	36	7.60	2.88	4.72

Table 6.--Concentrations of elements in soils from selected studies

Element	Western United States[1] Geometric mean	Western United States[1] Observed range	Northern Great Plains[2] Geometric mean	Northern Great Plains[2] Observed range	Piceance/Unita Basin[3] Geometric mean	Piceance/Unita Basin[3] Observed range	1986-87 DOI Study[4] <.063mm fraction Observed range	Present Study Observed range
Al, %	5.8	0.5->10	5.6	3.4-12	4.6	2.1-6.8	3.6-9.8	1.8-9.7
As, ppm	5.5	<0.1-97	7.1	<0.1-26	9.3	4.2-23	2.4-15	.6-120[5]
B, ppm	23	<20-300	41	<2.2-99	7.4	2.4->100	0.6-210[5]	<.4-390[5]
Ba, ppm	580	70-5,000	1,100	420-2.320	1,200	710-1,900	310-990	67-2200
Be, ppm	0.68	<1-15	1.6	<0.22-3.5	2.4	0.88-4.4	1.0-2.0	<1-3
Ca, %	1.8	0.06-32	0.97	<0.014-7.0	5.5	0.72-13	0.65-19	.23-20
Ce, ppm	65	<150-300	38	<22-130	52	25-110	21-210	6.0-290
Co, ppm	7.1	<3-50	6.4	<1.0-23	7.3	4.0-12	6.0-28	2.0-40
Cr, ppm	41	3-2,000	45	11-160	50	20-98	20-210	3.0-330
Cu, ppm	21	2-300	19	4.3-110	30	12-85	10-110	3.0-520
Fe,%	2.1	0.1->10	2.1	0.26-6.5	2.0	1.1-2.8	1.6-6.1	.36-6.3
Ga, ppm	16	<5-70	11	4.2-29	15	7.2-29	8.0-26	4.0-23
Hg, ppm	0.046	<0.01-4.6	0.023	<0.01-0.07	0.027	0.02-0.05	<0.02-18	<.02-1.0
K, %	1.8	0.19-6.3	1.8	1.3-2.7	2.1	0.96-3.1	1.1-2.4	.12-4.2
La, ppm	30	<30-200	23	<10-49	39	26-65	13-110	3.0-190
Li, ppm	22	5.0-130	19	7.0-40	37	15-85	22-180	4.0-220
Mg, %	0.74	0.03->10	0.66	0.18-2.7	1.4	0.45-3.9	0.58-2.7	.04-4.8
Mn, ppm	380	30-5,000	460	<200-3,800	450	190-740	200-3,000	66-4500
Mo, ppm	0.85	<3-7	3.8	<1.0-12	5.7	2.6-10	<2.0-40	<2-73
Na, %	0.97	0.05-10	0.83	0.22-1.6	1.1	0.3-2.0	0.38-5.3	.16-8.5
Nd, ppm	36	<70-300	---	<46-140	---	<53-74	9.0-95	<4-100
Ni, ppm	15	<5-700	18	4.3-64	20	8.9-35	11-170	<2-160
P, %	0.032	0.004-0.45	0.074	<0.044-0.13	---	---	0.04-0.21	.01-.41
Pb, ppm	17	<10-700	16	5.1-41	12	4.8-26	9.0-52	<4-500
Sc, ppm	8.2	<5.0-50	5.4	<3.0-17	7.8	3.1-12	4.0-20	<2-30
Se, ppm	0.23	<0.1-4.3	0.45	<0.1-20	0.079	<0.1-0.57	<0.1-85	<.1-43
Sr, ppm	200	10-3,000	160	58-440	370	170-770	170-920	59-1600
Th, ppm	9.1	2.4-31	8.4	3.0-13	9.3	5.4-30	<4.7-18.6	<4-45
Ti, %	0.22	0.05-2.0	0.2	0.11-0.37	0.27	0.07-0.42	0.16-0.64	.02-1.1
U, ppm	2.5	0.68-7.9	2.3	1.1-4.9	3.5	2.4-6.0	3.0-56	.15-21
V, ppm	70	70-500	54	20-96	68	41-110	36-210	5-310
Y, ppm	22	<10-150	18	3.1-54	18	11-29	5.0-56	4-34
Yb, ppm	2.6	<1.0-20	2.4	0.78-5.8	2.6	1.4-4.6	<1.0-5.0	<1-4
Zn, ppm	55	10-2,000	63	14-170	65	33-110	49-510	10-1600
Tot.C, %	1.7	0.16-10	1.9	0.10-3.7	---	---	---	<.05-12.9

[1]Shacklette and Boerngen, 1974; [2]Severson and Tidball, 1979; [3]Ebens and Shacklette, 1982; [4]Severson and others, 1987; [5]Hot-water soluble