STATE OF ALASKA

DEPARTMENT OF NATURAL RESOURCES

DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS

Tony Knowles, *Governor*

John T. Shively, *Commissioner*

Milton A. Wiltse, *Acting Director and State Geologist*

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DESCRIPTION OF GROUND-WATER CONDITIONS AT STERLING, ALASKA

By
J.A. Munter and M.A. Maurer

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[in envelope]

DESCRIPTION OF GROUND-WATER CONDITIONS AT STERLING, ALASKA

by
James A. Munter[1] and Mary A. Maurer[2]

ABSTRACT

A collection and review of available ground-water data for the Sterling, Alaska, area has resulted in the creation of extensive well-log and water-quality databases. These databases indicate that most wells tap thin, discontinuous glaciofluvial sand and gravel deposits and that ground water flows toward the Moose and Kenai Rivers under a water-table gradient that ranges from 0.003 to 0.08. Some wells may tap a Tertiary aquifer in sandstones and conglomerates.

Ground water throughout most of the Sterling area meets state and federal drinking-water-quality standards. Ground water at the Sterling Special Waste Site has inorganic chemical concentrations that exceed drinking-water standards. Some domestic and public-supply water wells have concentrations of dissolved arsenic that exceed drinking-water standards. Water wells in the Sterling area commonly yield water with high concentrations of iron and manganese. Elevated concentrations of benzene, ethylbenzene, and toluene occur in ground water near several known fuel leaks along the Sterling Highway east of the Moose River.

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INTRODUCTION

Sterling, Alaska, is a small rural community located near the confluence of the Moose and Kenai Rivers on the Kenai Peninsula in south-central Alaska (fig. 1). Water supplies in the area are generally obtained from wells < 60 m deep that tap unconfined and confined glaciofluvial aquifers. Residents have become concerned about the possible effects of local fuel leaks or spills and past waste-disposal operations in the area on local water supplies. These concerns prompted an interest in developing a better understanding of local ground-water conditions. This study summarizes available information about local aquifers, ground-water flow directions, and ground-water quality.

SOURCES OF INFORMATION

Sources of information for this report include water-well drillers' logs, consultants' reports of site investigations (these commonly contain monitoring well logs, water-quality data, and related information), and analyses of local well water by the DEC, USGS and several public water suppliers. Site locations were determined from available site maps, plat maps, legal property descriptions, as-built property diagrams, and several engineering surveys of well locations. We have not field-verified the geologic, water-level, or water-quality data described above. Our primary purpose is to describe trends in existing data and to establish a relatively complete historical database. A complete listing of all water-data sites is shown in appendix A.

Ground-water records are available for 430 sites (sheet 1 and app. A) in the 41.2 km^2 study area. This represents an average of 11 data sites per km^2, excluding 6.2 km^2 of the study area in the Kenai National Wildlife Refuge. Most data site locations were determined to the

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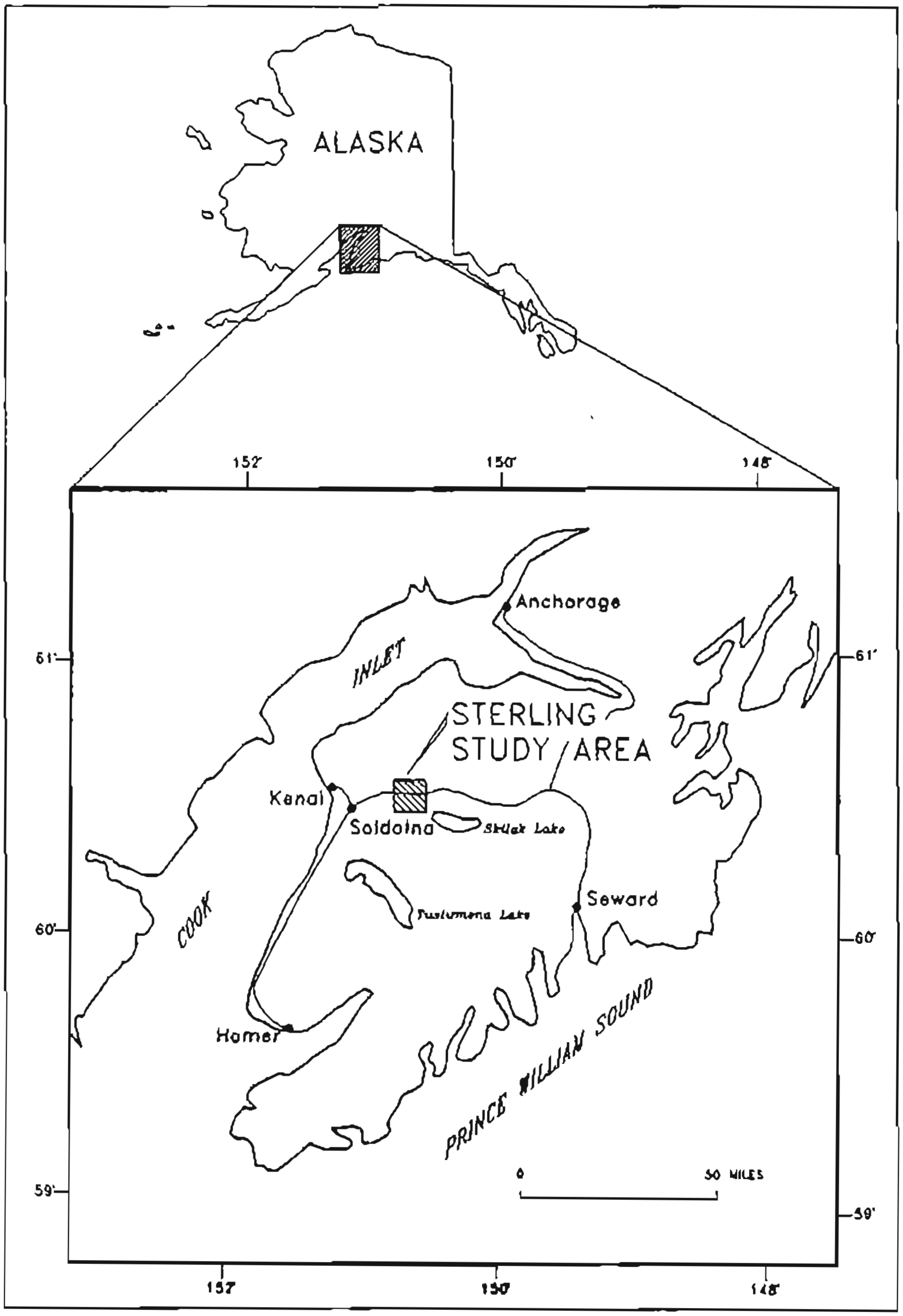


Figure 1. *Location of the Sterling study area, Kenai Peninsula, Alaska.*

nearest second of latitude and longitude. Detailed well-log data are stored in the U.S. Geological Survey's GWSI database.

Water-quality data for the Sterling area are contained in the Alaska Department of Natural Resources' "Kenai Peninsula Quality of Water" (KPQW) database. A precursor water-quality database (formatted in POWERBASE software) containing data for the Sterling Special Waste Site (SSWS) and nearby domestic wells was provided by the Alaska Department of Environmental Conservation (ADEC). These data were incorporated into the KPQW database, which is formatted in dBASE software. We subsequently expanded the KPQW database to include water-quality data from domestic, commercial, and monitoring wells throughout the western Kenai Peninsula.

The KPQW database is organized by analyzing laboratory and analysis type because sampling and analytical documentation differs significantly among ADEC and commercial laboratories. For example, ADEC commonly analyzed for either total or total recoverable metals, whereas the majority of commercial laboratories that performed analyses between 1980 and 1991 did not specify which metal fractions were analyzed. Consequently, only data in the ADEC part of the database are differentiated by total, total recoverable, or dissolved fractions. The term "total" refers to constituents in a water sample that are brought into solution by vigorous digestion during analysis; the term "total recoverable" refers to constituents that are brought into solution by treatment with a hot, dilute mineral acid during analysis; and the term "dissolved" refers to constituents that pass through a 0.45-μm membrane filter (Fishman and Friedman, 1985).

Ground-water-quality data are available from 114 wells and one spring in the study area (sheet 1). All water-quality data in the KPQW database are accessed with commercially available dBASE IV software from Borland International, Inc., of Scotts Valley, California. The database contains extensive water-quality data collected from 1966 to April 1993, but other data may exist about which we are unaware. Water-quality data summarized in this report are tabulated in Maurer and Ireland (1994).

Summary statistics on type and number of analyses in the database are presented in table 1. Most data are reported values from written analytical reports. Approximately 75 percent of the inorganic and organic analyses in the database were performed by commercial laboratories, about 25 percent by the ADEC's laboratory in Juneau, Alaska (formerly in Douglas, Alaska), and <4 percent by the USGS laboratory in Denver, Colorado. Water samples were collected by the ADEC, the USGS, the U.S. Environmental Protection Agency, and private consulting firms.

GEOLOGIC SETTING

Sterling is located on the glaciated lowland plain of the Kenai Peninsula. The area has been subjected to repeated glacial advances from surrounding mountains, including mountains on the west side of Cook Inlet. Past glacial advances have also blocked lower Cook Inlet, causing large lakes to form and inundate the Kenai Peninsula lowland plain (Karlstrom, 1964; Reger and Pinney, in press).

A preliminary geologic map has recently been prepared for the Sterling area (Kenai C-3 SE Quadrangle, scale 1:25,000) west of the Moose River (R.D. Reger, Alaska Division of Geological & Geophysical Surveys (DGGS), written commun., 1991). Surficial deposits in the Sterling area consist of glaciofluvial deposits, fluvial deposits, glacial and glaciolacustrine deposits, colluvium, paludal deposits, and manmade fill (R.D. Reger, DGGS, written commun., 1991).

Prominent abandoned meltwater channels and glaciofluvial fan complexes occur in the study area. Where saturated, these deposits commonly provide ground water to wells.

Glaciofluvial deposits in the Sterling area are underlain by Tertiary-age sedimentary rocks of the Kenai Group (sheet 3). Two exploratory oil wells in the study area penetrated several thousand feet of Tertiary rocks. The uppermost formation of the Kenai Group is the Sterling Formation, which consists of sandstone, interbedded silty claystone, conglomeratic sandstone, and lignitic coal (Calderwood and Fackler, 1972). Tertiary rocks are exposed on the south side of the Kenai River about 3.5 km southwest of the Moose River confluence at the site of a proposed bridge over the Kenai River (VEI Consultants, 1991). The Sterling Formation exposures at this site are described as "gray, moist-wet, very dense silty sand, with interlayered sandy silt and silt." Several water wells in the area may penetrate Tertiary-age rocks at depths

Table 1. *Summary of sample types, number of samples, and sampled wells in the Sterling ground-water water-quality database*

Sample type	Number of samples	Number of wells sampled
Nonmetallic inorganic constituents	328	84
Metallic constituents	329	70
Volatile organic compounds	327	105
Base-neutral and acid-extractable organic compounds	62	22

as shallow as several tens of meters. Wells that may have penetrated into the Sterling Formation, as interpreted from drillers logs, are noted in appendix A.

AQUIFERS

Sheet 1 shows the locations of known wells, boreholes, and springs in the study area. Most wells tap thin, water-bearing sand and gravel layers or zones in glacial drift or fluvial deposits. These deposits, together with overlying and underlying nonlithified silty deposits, are termed the Quaternary aquifer in this report. Water in these sand and gravel deposits occurs under perched, unconfined, semiconfined, and confined conditions.

The composition of the Quaternary aquifer varies considerably over short distances in the Sterling area, and individual water-yielding strata are typically thin and discontinuous. Water from the Quaternary aquifer is obtained from surface springs and from wells up to 78 m deep. Reported well yields range from 0.1 to 100 gallons per minute (gpm), with a median reported yield of 15 gpm.

Some wells in the study area appear to penetrate water-bearing rocks of Tertiary age (app. A). The Tertiary aquifer consists of water-bearing sandstones and conglomerates in the Sterling Formation of the Kenai Group. It is confined by silty claystones, siltstones, and coals in the Sterling Formation and by less permeable zones within the overlying, nonlithified deposits.

GEOLOGIC CROSS SECTION

Sheet 2 shows a geologic cross section through the study area. The end moraine complex west of the Moose River was deposited by glaciers that originated on the west side of Cook Inlet during the Moosehorn stade of the late-Wisconsin Naptowne glaciation (Reger and Pinney, in press). The glacial drift shown on the east end of the cross section was deposited by ice that emanated from the Kenai Mountains to the east during Late Wisconsin, but pre-Moosehorn, time (R.D. Reger, DGGS, written commun., 1991).

Numerous wells along the cross section tap confined or semi-confined parts of the aquifer. Sandy and gravelly deposits common at the land surface east of Moose River may be too thin to serve as significant water sources. In most cases, individual water-yielding strata are too thin and discontinuous to be correlated between wells. The depths of closely spaced wells are commonly dissimilar due to the irregular position of water-yielding strata in the Quaternary and Tertiary aquifers.

GROUND-WATER FLOW SYSTEMS

Sheet 3 shows water-level elevations calculated by using reported water levels from drillers' reports and consultants' reports and from land-surface elevations determined from 1:25,000 or 1:63,360 topographic maps. Where available, surveyed well elevations were used. Most water-level data were not field verified. Approximate water-table contours were manually drawn based on the plotted water-level elevations and surface water elevations. The water-table contours do not always match plotted water-level data because (1) some wells may tap perched, confined, or semi-confined parts of the aquifer with water levels above or below the water table; (2) data were collected during all seasons and during wet and dry years; and (3) most well locations and elevations are not precisely known. Although these sources of potential data error may be as great as the contour interval used on sheet 3, they are generally $< \pm 5$ m except for perched water tables that may be 30 m above the regional water table. Perched water tables may be common in the northwest part of the study area where small lakes and ponds are present in upland settings. The water-table-contour map shows regional trends rather than detailed flow systems at specific sites.

Approximate directions of ground-water flow are also shown on sheet 3. Flow directions are drawn perpendicular to the water-table contours and show the approximate horizontal direction of ground-water flow in the Quaternary aquifer. Water-level data also indicate that ground water has a downward component of flow across most of the study area, except near springs and near the Kenai River where four flowing wells (wells with reported water levels above the land surface) occur (app. A). Ground water generally flows toward the Moose and Kenai Rivers. Ground water also discharges into a wetland and small stream system in the central part of the study area. Two springs (labelled "1S" on sheet 1) are mapped in this area.

GROUND-WATER QUALITY

Several inorganic constituents and organic compounds found in drinking water are of public interest. The State of Alaska Drinking Water Regulations (ADEC, 1994) specify the maximum concentration, referred to as the maximum contaminant level (MCL), for public water systems (app. B). A contaminant is defined as "any physical, chemical, biological, or radiological substance or material in water which, in sufficient quantity, makes water unfit for human consumption" (ADEC, 1994). A **primary** MCL is health related and is legally enforceable for suppliers of public drinking water. A **secondary** MCL applies to the aesthetic qualities of drinking water and is a recommended guideline for public water suppliers. Most concentrations are reported in milligrams per liter (mg/L); 1 mg/L is approximately 1 part per million (ppm).

Data exist in the KPQW database for most inorganic contaminants and water properties with primary or secondary MCLs listed in the Alaska Drinking Water

Regulations (ADEC, 1994). There are no data for asbestos, corrosivity, foaming agents, or odor. The database contains data for many volatile organic compounds, total trihalomethanes, and "other organic contaminants" listed in ADEC (1994) (app. B). Data are present for 20 pesticides, nine of which are listed in ADEC (1994). Radioactive contaminant and bacteria data are sparse.

Most water-quality sampling was done in sections 1, 7, and 17 near the line of the geologic cross section (sheet 1). The Sterling Special Waste Site (SSWS), located about 2 km north of the Sterling Highway and 0.4 km east of the Swanson River Road, accounts for much of the sampling done in section 1. The SSWS was developed by the Kenai Peninsula Borough as a solid-waste landfill in 1973. From 1973 to 1986, it was a nonhazardous waste-disposal site used for disposal of solid waste, drilling mud, water-treatment sludge, and bilge water (Northern Test Lab, 1991). Leaking underground storage tanks and surface spills of petroleum products along the Sterling Highway Right-of-Way (ROW) between mileposts 81 and 82 accounts for most of the sampling in sections 7 and 17. Ground water with inorganic and organic chemical constituents of concern may occur in other sections because they were not sampled as intensively as the above-mentioned sections.

Generally, only contaminants that exceed the MCLs are reported and discussed below. Many inorganic constituents were detected below the MCL, and these data are not discussed except for water-type classification. General water-quality characteristics of regional ground waters are described by Anderson and Jones (1972).

The accuracy of the values could not be verified for most analyses. Data validity was checked in several cases when a quality-assurance report was available. Major cation-anion balances were performed on 11 USGS and three commercial laboratory analyses. Analytical error was <10 percent in these 14 samples.

In some cases, no follow-up sampling of constituents was done when the MCLs were exceeded. Consequently, single constituent values that exceed the MCLs are considered unconfirmed and should be used with caution.

PRIMARY MAXIMUM CONTAMINANT LEVELS

INORGANIC CHEMICAL CONSTITUENTS

Inorganic chemical constituents that exceed the primary MCLs in the study area are arsenic, barium, cadmium, chromium, lead, mercury, nickel, and nitrate (table 2). The SSWS was the only location in the study area where concentrations of barium, cadmium, chromium, nickel, and nitrate exceeded the MCLs. Total mercury concentrations above the MCL of 0.002 mg/L were measured in ground-water samples collected from five of 53 wells, four of which are SSWS wells. One mercury concentration (0.0021 mg/L) was slightly above the MCL in one sample of ground water collected from a public-supply well (map no. 1-1, section 11, sheet 1). Mercury was undetected in seven other analyses of ground water from this well. Lead concentrations >0.015 mg/L, the national primary drinking-water regulation (U.S. Environmental Protection Agency, 1993), were found in one sample from a public-supply system in section 11 and in a domestic water system in section 1 (sheet 4). The lead in these systems could be associated with plumbing solder rather than ground water. Total lead concentrations > 0.015 mg/L were also found in ground-water samples collected from 16 SSWS wells (table 2).

Most metallic contaminants mentioned above were present in sediment-laden SSWS samples (Northern Test Lab, 1991; DOWL Engineers, 1993a; 1993b; 1993c). These samples were unfiltered and underwent a total metal analysis. During the analytical procedure, the sample is digested and metals adsorbed to fine-grained sediments are included in the analytical results. The few SSWS samples that were filtered and underwent a dissolved-metal analysis generally produced metal concentrations less than the MCLs (DOWL Engineers, 1993a; 1993b; 1993c). These findings indicate that metallic contaminants in ground water at SSWS exceeded MCLs because of sediment in the sample. A comparison of silty samples from SSWS and other parts of the study area is not possible because documentation of other silty samples is unavailable. The probable sources of the metallic contaminants in the ground water at SSWS are solid wastes, industrial wastes, drilling-mud wastes, or associated soils because the contaminants were disposed of at the site and the concentrations are significantly above background levels.

Total arsenic concentrations greater than the MCL of 0.05 mg/L were measured in ground-water samples collected from 10 of 52 wells (table 2). The median value for total arsenic was <0.005 mg/L (table 2), which indicates that more than half of the 254 samples had arsenic concentrations below the detection limit. Elevated arsenic concentrations (>0.05 mg/L) in ground water do not seem to be correlated with well depth or well type (table 3). Seven of the 10 wells that exceeded the MCL for total arsenic are monitoring wells located at SSWS (sheet 5). The SSWS samples that exceeded the MCL had a mean value of 0.126 mg/L, and many were sediment-laden (Northern Test Lab, 1991; DOWL Engineers, 1993a, 1993b, 1993c). In the three instances where a total and dissolved arsenic analysis was performed on SSWS samples and the total arsenic value exceeded the MCL, the dissolved arsenic value was less than the detection limit (DOWL Engineers, 1993c). These results indicate

Table 2. *Contaminants in Sterling area ground water that exceed the primary maximum contaminant level (MCL) listed in Alaska Drinking Water Regulations. All values are in milligrams per liter (mg/L). D = Domestic well; P = Public-supply well; M = Monitoring well*

Property or constituent[1]	Total number of wells sampled	Number of wells sampled with concentrations > MCL			Median value	Maximum value	MCL[2]
		D	P	M			
Inorganic Constituents							
Arsenic	52	1	2	7	<0.005	0.229	0.05
Arsenic (dissolved)	15	4	1	0	0.013	0.094	0.05
Barium	50	0	0	6	0.018	5.05	2
Cadmium	52	0	0	6	<0.005	0.05	0.005
Chromium	53	0	0	9	<0.005	120	0.1
Lead	53	1	1	16	<0.01	0.88	0.015[3]
Mercury	53	1	0	4	<0.001	0.0105	0.002
Nickel	51	0	0	10	<0.05	3.2	0.1
Nitrate (as Nitrogen)	30	0	0	2	0.39	34	10
Organic Compounds							
Benzene	102	0	0	15	<0.001	8.6	0.005
Ethylbenzene	104	0	0	2	<0.001	2.4	0.7
Toluene	104	0	0	9	<0.001	13.4	1
Di(2-ethyl-hexyl)-phthalate	22	1	0	5	<0.02	0.036	0.006

[1]Total and total recoverable fractions unless otherwise noted.
[2]The maximum contaminant level listed in Alaska Department of Environmental Conservation, 1994, Drinking Water Regulations, 18 AAC 80: Juneau, Alaska, Title 18 Alaska Administrative Code, chapter 80, 196 p.
[3]The lead action level is from U.S. Environmental Protection Agency, 1993, National primary drinking water regulations: U.S. Code of Federal Regulations, Title 40, Part 141, Subpart I, section 80, July 1, 1993 ed., p. 708.

that elevated total arsenic in ground water at SSWS may be the result of sediment in the water samples.

Dissolved arsenic concentrations greater than the MCL were measured in ground-water samples collected from five of 15 wells (table 2). The five wells, four domestic and one public-supply system, are located near the Moose River or the confluence of the Moose and Kenai Rivers (sheet 5). The ground-water samples collected from these five wells contained scant silt (R.L. Glass, USGS, oral commun., 1993), and had a mean value of 0.065 mg/L.

There are insufficient data to determine whether the elevated arsenic near the Moose and Kenai Rivers is naturally occurring or is the result of waste-disposal activities. However, dissolved arsenic concentrations above the MCL do occur sporadically in ground water elsewhere on the Kenai Peninsula (USGS, 1978, 1992; Maurer, 1993;). ADEC reports that arsenic in ground water on the Kenai Peninsula is a natural occurrence (ADEC, 1989). One possible explanation for naturally occurring arsenic in ground water is that the aquifer near the Moose and Kenai Rivers contains arsenic-bearing river sediments derived from Tertiary-age or older rocks.

Table 3. *Characteristics of Sterling-area wells with total and dissolved arsenic concentrations that exceed the Alaska Drinking Water Regulation's maximum contaminant level of 0.05 mg/L*

Number of wells	Section no. (see sheet 5)	Range in well depth (meters)	Well type
4	5, 6, and 7	12 - 61	Domestic
3	7	21 - 78	Public
7	1	18 - 26	Monitoring

ORGANIC COMPOUNDS

Organic compounds that exceeded primary MCLs include benzene, dichloromethane, ethylbenzene, toluene, and di(2-ethylhexyl)phthalate (table 2). Benzene concentrations that exceeded the MCL of 0.005 mg/L were found in ground water collected from 15 wells in or adjacent to the Sterling Highway east of the Moose River (sheet 6). The highest benzene concentration was 8.6 mg/L in ground water collected from a gas-station monitoring well in section 7 (map no. 1-39, sheet 1 inset). The ethylbenzene and toluene concentrations that exceeded MCLs were found in ground water collected from gas-station monitoring wells in the same area.

Benzene concentrations between the MCL of 0.005 mg/L and the detection limit (from <0.0002 to <0.005 mg/L) were measured in 11 wells, primarily in single samples collected from seven wells located in or adjacent to the Sterling Highway ROW east of the Moose River. Benzene below the MCL was also measured in single samples from three SSWS monitoring wells and a domestic well located south of Scout Lake (map no. 1-19, section 15, sheet 1). Ethylbenzene and toluene were measured in concentrations between their respective detection limits and MCLs in 20 and 31 wells, respectively. Most are monitoring wells located in and adjacent to the Sterling Highway ROW east of the Moose River. A few are SSWS monitoring wells. Toluene was measured in two domestic wells, identified as map no. 1-19 in section 15 (south of Scout Lake) and map no. 1-21 in section 1 (sheet 1).

Di(2-ethylhexyl)phthalate (DEHP) concentrations above the MCL of 0.006 mg/L were measured in single samples collected from one domestic well and five SSWS monitoring wells (table 2). DEHP concentrations above the MCL ranged from 0.007 to 0.036 mg/L. DEHP is a widely used plasticizer that can enter ground water through improper waste disposal (ADEC, 1994). Another possible source of DEHP is contact with the Tygon tubing used during sample collection (U.S. Environmental Protection Agency, 1982). There is insufficient documentation to determine whether DEHP in the samples is representative of the ground water or the result of sample-handling contamination.

SECONDARY MAXIMUM CONTAMINANT LEVELS

The inorganic constituents that exceed secondary MCLs are aluminum, chloride, copper, iron, manganese, and zinc. The water property that exceeds the secondary MCL range is pH (table 4). Total aluminum concentrations above the MCL of 0.2 mg/L were measured in ground water from three of 28 wells; two are SSWS wells and the other a domestic well (map no. 1-21, section 1, sheet 1) where the highest concentration, 1.5 mg/L, was measured. Chloride concentrations above the MCL of 250 mg/L were measured in ground water from three of 34 wells. Two of these wells are located at SSWS and the other is a public-supply well (map no. 2-37, section 7, sheet 1 inset) where the highest chloride concentration, 600 mg/L, was measured. Total copper concentrations above the MCL were measured in ground water from three of 48 wells, two of which are SSWS wells. The highest copper concentration, 4.2 mg/L, was obtained from a public-supply well (map no. 1-1, section 11, sheet 1). Total zinc concentrations that were above the MCL of 5.0 mg/L were measured in ground water collected from four of 59 wells, all of which are SSWS wells.

Relatively high total iron and manganese concentrations occurred throughout the study area. Total iron concentrations above the MCL of 0.3 mg/L were measured in ground water in about two-thirds of 32 sampled wells. The highest total iron concentration (37 mg/L) was measured in ground water from a SSWS well. Dissolved iron concentrations exceeded the MCL only once in 11 samples, in groundwater obtained from a domestic well (map no. 1-8, section 6, sheet 1). Total manganese concentrations above the MCL of 0.05 mg/L were measured in more than two-thirds of 34 sampled wells, usually in the same wells with high iron. The highest total manganese concentration of 5.3 mg/L was obtained from a public-supply well (map no. 2-37, section 7, sheet 1 inset). Dissolved manganese concentrations

Table 4. *Contaminants in Sterling area ground water that exceed the secondary maximum contaminant level (MCL) listed in the Alaska Drinking Water Regulations. All concentrations are in milligrams per liter (mg/L). D = Domestic well; P = Public-supply well; M = Monitoring well*

Property or Constituent[1]	Total number of wells sampled	Number of wells sampled with concentrations > MCL			Median value	Maximum value	MCL[2]
		D	P	M			
Aluminum	28	1	0	2	<0.04	1.5	0.2
Chloride (dissolved)	34	0	1	2	5.8	600	250
Copper	48	0	1	2	<0.005	4.2	1.0
Iron	32	15	1	5	0.66	37	0.3
Iron (dissolved)	11	1	0	0	0.07	0.51	0.3
Manganese	34	15	3	5	0.10	5.3	0.05
Manganese (dissolved)	11	4	0	1	0.05	0.91	0.05
pH	80				7.05		
(<6.5)		4	1	17		5.2	6.5 min.
(>8.5)		3	0	5		9.7	8.5 max.
Zinc	59	0	0	4	0.18	28	5

[1]Total recoverable and total fractions unless otherwise noted.
[2]The maximum contaminant level listed in Alaska Department of Environmental Conservation, 1994, Drinking Water Regulations, 18 AAC 80: Juneau, Alaska, Title 18 Alaska Administrative Code, chapter 80, 196 p.

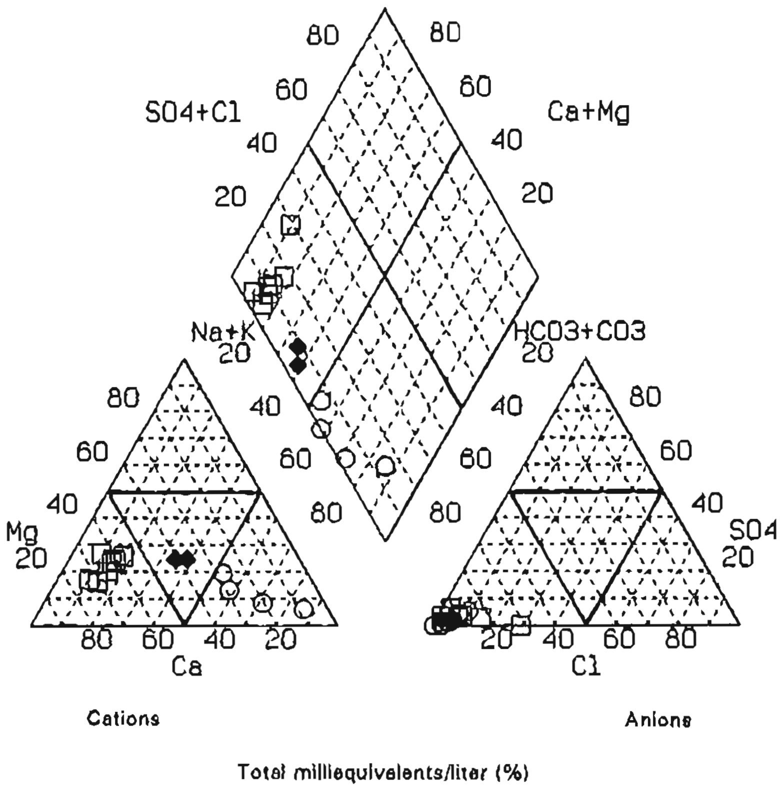
exceed the MCL in ground water in five of 11 sampled wells. These data indicate that most of the iron is oxidized and removable by filtering through a 0.45-µm membrane filter, whereas the manganese is not.

The pH of ground water, which has a secondary MCL range of 6.5 (minimum) to 8.5 (maximum), was measured in 80 wells (table 4). Ground water with a pH <6.5 was measured in about 28 percent of the wells. Ground water with a pH > 8.5 was measured in 10 percent of the wells. The lowest pH value (5.2) was measured in a domestic well (map no. 1-8, section 6, sheet 1). The highest pH value (9.7) was measured in a gas station monitoring well (map no. 7-39, section 7, sheet 1 inset).

WATER-TYPE CLASSIFICATION

Trilinear diagrams can be used to show the chemical character of a water sample (Piper, 1944). Ratios of selected cations (calcium, magnesium, and sodium plus potassium) and anions (bicarbonate plus carbonate, chloride, and sulfate) for 13 water analyses are shown in the diagram as percentages of the total cations and anions, in milliequivalents per liter (meq/L). A water type is classified on the basis of its predominant cations and anions.

The water types are differentiated by their cation composition only, because bicarbonate is the dominant anion in the 13 ground waters (fig. 2). Six wells and one spring sampled in the Sterling area have ground water that is of the calcium-bicarbonate type. Two wells have ground water of the mixed-cation-bicarbonate type because the percentage of no single cation is >50 percent. Four wells have ground water of the sodium-bicarbonate type. Generally, the sodium-bicarbonate and mixed-cation-bicarbonate waters are associated with well depths >30 m, whereas the calcium-bicarbonate waters are associated with well depths <30 m (fig. 2).



EXPLANATION

Symbol	Water type	Section No.	Map No.	Well Depth
□	Calcium bicarbonate	1	2-6	106
		2	1-4	100
		5	2-3	72
		6	1-8	40
		11	1-1	60
		11	2-25	38
		12	1S	Spring
◆	'Mixed-cation' bicarbonate	5	1-1	199
		7	1-27	256
○	Sodium bicarbonate	1	2-2	150
		6	1-9	132
		7	2-35	91
		17	1-1	147

Figure 2. *Trilinear diagram showing water analyses of ground water collected from 12 wells and one spring in the Sterling area.*

IMPAIRED GROUND WATER

Ground water is classified by ADEC (1992) as impaired if it "has definitive and credible documentation of a violation of State Water Quality Standards, or documentation of impairment of designated uses, as established in the Water Quality Standards." The preponderant criterion used to establish a waterbody as impaired is "water quality data showing exceedance of a criterion established in the Water Quality Standards (generally a minimum of two sample results or 10 percent of sample results, whichever is greater)" (ADEC, 1992). The ADEC identified three sites in the Sterling study area that meet or have met impaired ground-water criteria: Naptowne Trading Post, Sterling Chevron, and Mile 81 Sterling Highway (ADEC, 1992). These sites are located near the Sterling Highway ROW east of the Moose River. Ground-water contaminants at these sites are organic compounds from leaking underground storage tanks or surface spills of petroleum (ADEC, 1992).

Based on the data criterion described above, two additional sites that have impaired ground water in the Sterling study area are a gas station at Mile 81.7 Sterling Highway and the SSWS. Site-specific data and reports are documented in Maurer and Ireland (1994). The ground-water contaminants at Mile 81.7 Sterling Highway are organic compounds, whereas the contaminants at SSWS are inorganic chemicals.

CONTAMINANT MOVEMENT

Ground-water movement from the four Sterling Highway sites is westerly and southwesterly towards the Kenai River (sheet 2). Benzene concentrations greater than the MCL occurred within 60 m of the sites in monitoring wells and one water-supply well (sheet 6 inset). Several domestic wells and the Kenai River are located downgradient of the known contaminant plumes at distances of 15 to 100 m. Benzene was undetected in ground water from a domestic well located 15 m downgradient of a known contaminated ground-water plume. However, the data are not sufficient to assess the rate of migration of plumes, if any.

Ground-water movement from the SSWS is in an easterly and southeasterly direction (sheet 3). Numerous inorganic chemical-contaminant concentrations above the MCL were measured in ground water at the east, south, and southeast perimeter of SSWS (Northern Test Lab, 1991; DOWL Engineers 1993a, 1993b, 1993c). Because downgradient monitoring wells do not exist beyond the site perimeter, the extent of downgradient contamination is unknown. Inorganic chemical contaminants generally do not exceed MCLs in ground water from wells located more than 700 m downgradient. Arsenic is the only inorganic constituent that exceed MCLs in ground water from downgradient wells located between the SSWS and the Moose and Kenai Rivers. Possible sources of arsenic in ground water are discussed on page 6 of this report.

CONTAMINANT MONITORING AND RISK REDUCTION

The distribution of domestic wells immediately downgradient of sites with impaired ground water is sparse. At the SSWS, monitoring wells are absent between the site and domestic wells located greater than 700 m downgradient. Should monitoring of downgradient wells be warranted as a result of uncertainties about the extent of the SSWS contaminant plume, nitrate and chloride would be good indicator constituents due to their high solubility and mobility in ground water (Hem, 1985), and the nature of the wastes at SSWS (Northern Test Lab, 1991). Periodic monitoring for total metals (see tables 2 and 4) would also be warranted. In addition, ground water downgradient of SSWS that is used for drinking could be filtered when sediment is visible in the water to help reduce the concentrations of trace metals.

The presence of domestic wells within 100 m downgradient of all four Sterling Highway sites with impaired ground water may warrant periodic monitoring for benzene, toluene, ethylbenzene, and xylenes to detect potential movement of organic compounds in ground water in these areas.

SUMMARY AND CONCLUSIONS

Ground water at Sterling, Alaska, is generally obtained from unconfined, semi-confined, and confined glaciofluvial sand and gravel deposits of the Quaternary aquifer. Most wells are <60 m deep and their locations are known with sufficient accuracy to permit contouring of an approximate water-table map. This water-table map is used to illustrate that ground water generally flows towards the Moose and Kenai Rivers, with some variability from local aquifer heterogeneity and surface-water configurations. Water-level data indicate that ground water also has a downward component of flow across most of the study area, except near the Kenai River, where it is upward.

Several wells probably penetrated Tertiary rocks and tap sandstone or conglomerate beds within the Sterling Formation for water supplies. Limited data from these wells preclude a detailed description of the characteristics of the Tertiary aquifer.

Ground waters sampled in the Sterling area are generally acceptable for most uses. Most total dissolved solid concentrations are lower than the maximum contaminant level of 500 mg/L. The most commonly encountered inorganic chemical constituents that affect water quality are iron and manganese, which affect water taste, odor, and staining. Some ground water in the study area exceeds primary MCLs for several inorganic and organic contaminants. Most inorganic chemical constituents that exceed MCLs are found in ground water at the Sterling Special Waste Site and irregularly in ground water in a few other wells in the study area. Water-quality data from wells downgradient of SSWS are too sparse to determine the extent of inorganic chemical contaminants in ground water beyond the site perimeter. The nearest downgradient domestic wells to the SSWS are located at least 700 m away and do not show evidence of contamination of inorganic chemical constituents.

Arsenic exceeded primary MCLs in water from both monitoring wells at SSWS and domestic wells. The elevated concentrations of arsenic and trace metals in ground water at the SSWS are probably the result of past disposal activities because concentrations are substantially higher at SSWS than elsewhere in the study area. The source of the arsenic in ground water in domestic wells is unknown, but could result from water contact with naturally occurring arsenic-bearing rocks and nonlithified deposits.

Organic contaminants of particular concern (benzene, ethylbenzene, and toluene) are in ground water above MCLs in monitoring wells adjacent to the Sterling Highway. The available organic compound data indicate that no area-wide ground-water contamination by organic compounds is present.

The presence of domestic wells within 100 m downgradient of all four Sterling Highway sites with impaired ground water may warrant periodic monitoring for benzene, toluene, ethylbenzene, and xylenes to detect potential movement of organic compounds in ground water in these areas.

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APPENDIX A

Diagram showing derivation of local well number,
based on the official subdivision of public lands,

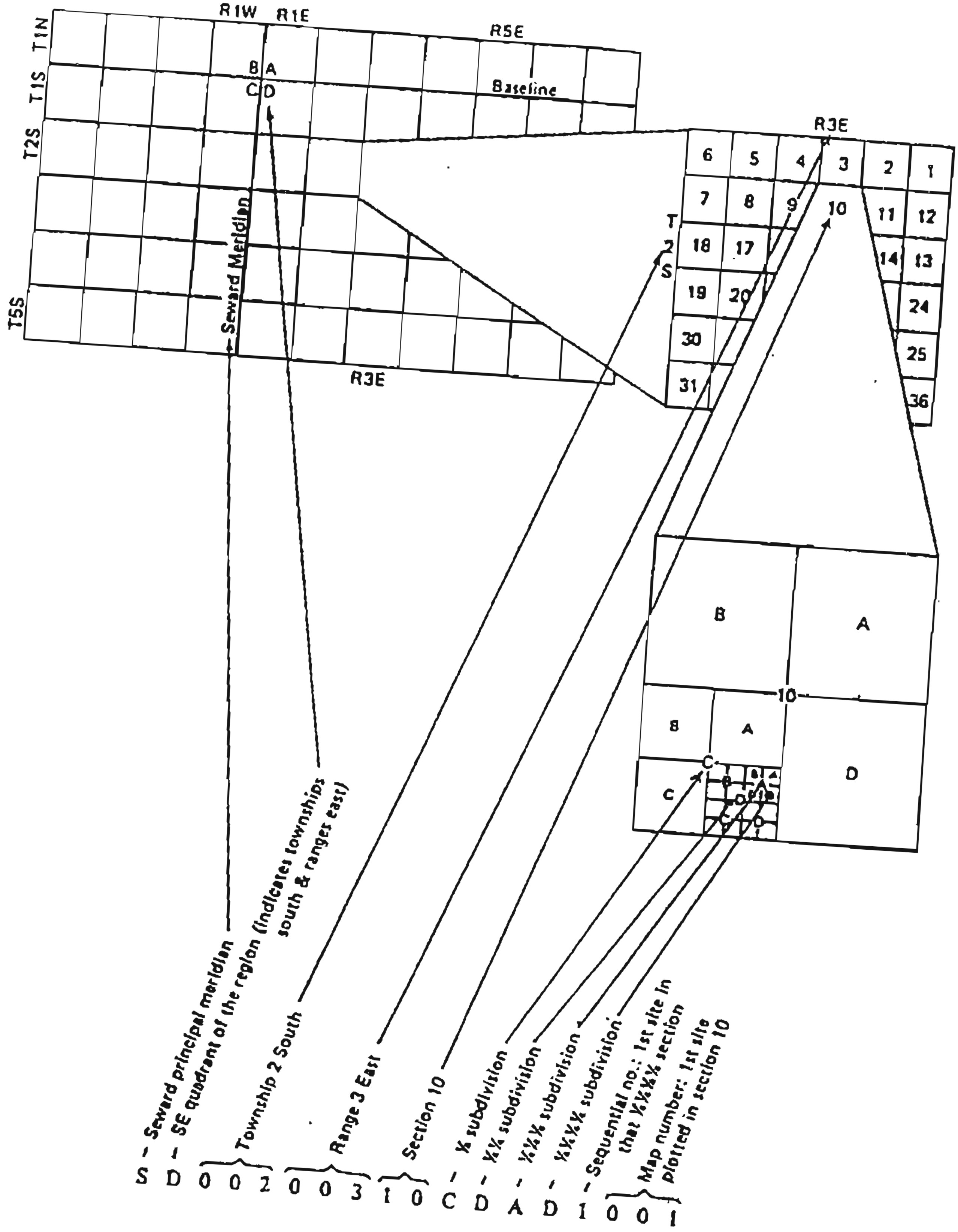
and

Listing of wells and springs in study area, based on ground-water records in the
Ground-Water Site Inventory (GWSI) database, U.S. Geological Survey
as of 11/02/93 in T. 5 N., R. 8 W., Sec. 5, 6, 7, 8, 17, 18, and
T. 5 N., R. 9 W., Sec. 1, 2, 3, 10, 11, 12, 13, 14, 15, Seward Meridian.

Notes: Wells that may have penetrated the Sterling Formation, as interpreted from drillers' logs, are noted with an asterisk.

A negative number listed for "water level below land surface" indicates a flowing, or artesian, well.

Diagram showing derivation of local well number, based on the official subdivision of public lands, used by the U.S. Geological Survey.



LOCAL WELL NUMBER	OWNER	ALTITUDE OF LAND SURFACE (METERS)	DEPTH OF WELL BELOW LAND SURFACE (METERS)	WATER LEVEL BELOW LAND SURFACE (METERS)	DISCHARGE (GPM)	ASSIGNOR OF OTHER IDENTIFIER	OTHER IDENTIFIER
SB00500805ABAD1 002	KUIPER BOB	70.	17.	10.	40.	GOVT LOTS	L02 NE1/4
	--				--	LAS	005173
SB00500805BBDA1 003	FELLMAN JIM	52.	22.	14.	20.	VEIL OMIST 5	TR01
SB00500805BBDA2 003	FELLMAN JIM&JANE	52.	22.	13.20	--	VEIL OMIST 5	TR01
	--				--	VEIL OMIST 5	WELL 02 TR01
SB00500805BBDD1 001	MOORE RONALD H	58.	61.	14.	30.	VEIL OMIST 6	TR02
	FELLMAN JIM&JANE				--	LAS	008135
SB00500805BCCD1 004	GOSSMAN LARRY	60.	61.4	1.	--	VEIL OMIST 2	TR05
SB00500806ADDA1 001	COLLER AUSTIN E	52.	29.	9.	6.	VEIL OMIST 4	TR01
	--				--	ADL	211190
SB00500806CAAA1 002	BRINDEL JUDY&GEORGE	57.	50.	32.	30.	MOOSE RIVER HTS	L02B01
	--				--	LAS	002129
SB00500806CACC1 012	GORLAC STEVE	62.	--	--	--	SECTION 06 LOTS	UNSUBD LOT
SB00500806CADB1 011	WALTERS F A	58.	46.	17.	20.	MOOSE RIVER HTS	L09B02
SB00500806CCAB1 008	GILBERTSON DAVID K	67.	12.	--	12.	ELSA LOUISE SUB	L01B05
SB00500806CDAA1 003	TIMBES LAURA&JACK	50.	63.	3.	50.	LAS	004173
	--				--	GOVT LOTS	L12
	--				--	SECTION 06 LOTS	L12
SB00500806CDDB1 009	PENDERSEN ELSA&WALTE	48.	40.	3.	--	SECTION 06 LOTS	UNSUBD LOT
	--				--	ADL	209510
SB00500806DAAD1 005	WEST WILLIAM O	58.	20.	20.	--	SWAN VIEW	TR03
SB00500806DACA1 007	STASAK MIKE	48.	14.	4.	30.	SWAN VIEW	TR05
	--				--	LAS	007808
SB00500806DACA2 007	STASAK MIKE	48.	15.	0.	30.	SWAN VIEW	TR05
	--				--	LAS	007808
SB00500806DADC1 006	LINDLE HAL&RICE-WHIT	58.	12.	--	--	SWAN VIEW	TR07
	RICE-WHITFORD&HAL LI				--	--	--
SB00500806DBAB1 014	STANDINGER MARVIN	35.	21.	6.	12.	MOOSE RIVER HTS	L01B03
SB00500806DBBB1 004	FLOTRE GAIL&PERRY	58.	38.	19.1	15.	MOOSE RIVER HTS	L01B02
	--				--	LAS	006097
SB00500806DBCA1 013	HIEBERT AUGIE&PAT	48.	16.	0.	10.	MOOSE RIVER HTS	L05B03
SB00500806DBCC1 010	GRANT SUE&PATRICK	50.	17.	2.	25.	MOOSE RIVER HTS	L07B02
SB00500807AACD1 019	SANDERS HOWARD	52.	57.	--	15.	OTTER CREEK SUB	L03B03
	S&B CONSTRUCTION				--	--	--
SB00500807AACD2 019	FISKE HANK	52.	27.	9.	12.	OTTER CREEK SUB	L04B03
	SANDERS HOWARD				--	ADL	053045
SB00500807AADA1 033	MERKES KENNY	58.	21.95	6.	6.	OTTER CREEK SUB	L08B05
* SB00500807AADB1 010	ABURTO LORENZO	58.	52.	--	40.	OTTER CREEK SUB	L02B05
	--				--	LAS	008217
SB00500807AADD1 013	SANDERS HOWARD	58.	54.	0.	50.	OTTER CREEK SUB	L09B05
	MARSTERS EVERETT L				--	LAS	003694
SB00500807ADDC1 020	MERKAS DENNIS	55.	16.	7.5	15.	OTTER CREEK SUB	L11B02
SB00500807ADDD1 002	BOGARD RICHARD	57.93	14.6	--	--	--	--
SB00500807BAAD1 045	UNKNOWN	45.	--	--	--	ELSA LOUISE SUB	L01B04AD1984
SB00500807BADB1 021	POOLER DAVID	52.	11.	5.	10.	ELSA LOUISE SUB	L04B03
SB00500807BBDD1 044	MEEGAN FRANK	60.	--	--	--	ELSA LOUISE SUB	L02B01
SB00500807BCCC1 032	TOLLEFSEN ERIC	52.	15.	9.	15.	ELSA LOUISE SUB	L08B01
SB00500807BCDA1 025	BOLZ PHYLLIS J&WILLI	57.	20.	14.	6.	ELSA LOUISE SUB	L05B02
SB00500807BDBB1 036	LEA JANE&GERARD	58.	--	--	--	ELSA LOUISE SUB	L01B02
	GILBERTSON JANE				--	--	--
SB00500807BDBC1 024	KRAPP RICHARD	62.	19.	12.	6.	ELSA LOUISE SUB	L03B02
SB00500807BDBC2 024	POWELL HAROLD	58.	18.	--	--	ELSA LOUISE SUB	L04B02
SB00500807BDCC1 034	SHOWALTER	58.	--	--	--	ELSA LOUISE SUB	L08B02
SB00500807BDCD1 035	GILBERTSON KARROL	55.	--	--	--	PEDERSENS MR 1	L03
* SB00500807BDCD2 035	CHIAPPONE ESTHER	55.	28.	12.	5.	PEDERSENS MR	L04
SB00500807CAAD1 007	NAPTOWNE BAR	56.40	21.0	--	--	--	--
SB00500807CABA1 026	FISKE THERESA E&HENR	52.	13.	--	--	PEDERSENS MR 3	L01
SB00500807CABD1 005	ADH	48.57	--	--	--	ADH BRDG 672	TH 01
SB00500807CABD2 005	ADH	50.00	16.8	--	--	ADH BRDG 672	TH 02
SB00500807CABD3 005	BLOODWORTH HAROLD&BA	50.	19.	12.73	6.5	SECTION 07 LOTS	L06
	BALD EAGLE BAR&BLOOD				--	SECTION 07 LOTS	WELL 1 L06
SB00500807CACB1 003	MOOSE RIVER RESORT	53.35	30.	--	--	--	--
SB00500807CADB1 014	DNR ISAAC WALTON CMP	50.	26.	-3.	50.	SECTION 07 LOTS	L07
	ISAAC WALTON CMPGD D				--	LAS	002513
	AK DIV OF PARKS & RE				--	--	--
SB00500807CADD1 006	E&E UNION SERVICE	53.35	20.4	10.06	--	--	--
SB00500807CADD2 006	E&E UNION SERVICE	53.35	12.2	3.66	35.00	--	--
SB00500807CCCC1 042	CONNORS JOSEPH F	60.	27.	4.	30.	GOVT LOTS	L15
SB00500807DAAC1 015	MERKES LEON N	62.	16.	--	--	SECTION 07 LOTS	UNSUBD LOT
	--				--	ADL	040311

LOCAL WELL NUMBER	OWNER	ALTITUDE OF LAND SURFACE (METERS)	DEPTH OF WELL BELOW LAND SURFACE (METERS)	WATER LEVEL BELOW LAND SURFACE (METERS)	DISCHARGE (GPM)	ASSIGNOR OF OTHER IDENTIFIER	OTHER IDENTIFIER
SB00500807DABD1 016	MERKES LEON N	62.	16.	--	--	SECTION 07 LOTS	UNSUBD LOT
	--				--	ADL	040311B
SB00500807DACC1 017	MERKES LEON N	58.	46.	--	--	SECTION 07 LOTS	UNSUBD LOT
	--				--	ADL	040311A
* SB00500807DADC1 008	MERKES LEON	59.45	24.7	--	3.00	--	--
SB00500807DBAD1 011	MILLS SEYMOUR	62.	45.	17.	--	GATTEN SUB	L64
	--				--	ADL	209273
SB00500807DBBB1 022	POWELL HAROLD	58.	18.	5.	12.	GATTEN SUB	L18
SB00500807DBCB1 038	STERLING CHEVRON	58.	17.	15.	--	SECTION 07 LOTS	UNSUBD LOT
	--				--	STERLING CHEV	MW-1
	--				--	NORTHERN T LABS	STERLING CHEV
* SB00500807DBCC1 027	STERLING CHEVRON CAF	58.	78.	11.	20.	SCHWANKE SUB	L01A
	SCHWANKE DONNA-STERL				--	SCHWANKE SUB	WELL 02 L01A
SB00500807DBCC2 027	SWANKE ROLDON	58.	19.	12.	35.	SCHWANKE SUB	L01A
	STERLING CHEVRON				--	SCHWANKE SUB	WELL 01 L01A
SB00500807DBCC3 027	STERLING CHEVRON	55.	17.	14.8	--	SCHWANKE SUB	L01AB02
	--				--	STERLING CHEV	MW-2
	--				--	NORTHERN T LABS	STERLING CHEV
SB00500807DBCC4 027	STERLING CHEVRON	55.	17.	15.	--	SCHWANKE SUB	L01AB02
	--				--	STERLING CHEV	MW-3A
	--				--	NORTHERN T LABS	STRELING CHEV
SB00500807DBCC5 027	STERLING CHEVRON	55.	16.	14.	--	SCHWANKE SUB	L01AB02
	--				--	STERLING CHEV	VES-1
SB00500807DBCC6 027	STERLING CHEVRON	55.	16.	14.	--	SCHWANKE SUB	L01AB02
	--				--	STERLING CHEV	VES-2
SB00500807DBCC7 027	STERLING CHEVRON	55.	16.	14.	--	SCHWANKE SUB	L01AB02
	--				--	STERLING CHEV	VES-3
SB00500807DBCC8 027	STERLING CHEVRON	55.	16.	14.	--	SCHWANKE SUB	L01AB02
	--				--	STERLING CHEV	VES-4
SB00500807DBCD1 037	SCHWANKE RONALD-SEAF	58.	19.	12.	35.	SCHWANKE SUB	L02B02
	SEAFOODS OF ALASKA 1				--	SCHWANKE SUB	WELL 01 L02B02
SB00500807DBCD2 037	SCHWANKE RONALD-SEAF	58.	21.	12.	35.	SCHWANKE SUB	L02B02
	SEAFOODS OF ALASKA 2				--	SCHWANKE SUB	WELL 02 L02B02
SB00500807DBDA1 009	COOK JOHN	60.98	17.7	10.67	5.00	--	--
SB00500807DBDA2 009	COOKS TESORO	62.	11.28	8.7	--	DOSER SUB	L02APT02
	--				--	COOKS CORNER	B-15
SB00500807DBDA3 009	COOK JOHN	52.	27.	14.	15.	DOSER SUB	L01APT02
SB00500807DBDC1 043	COOKS STERLING TESOR	55.	12.0	--	--	NOBBY HTS	L01BB01NEAR
	--				--	GEI1 PROJECT	HO191162 AKA
	--				--	GILFILIAN ENGR	3-12-1992
	--				--	GILFILIAN	BORING 1
	--				--	GILFILIAN	GEI 1
SB00500807DBDC2 043	MCDOWELL JOYCE&SAM	57.5	13.	12.	--	SCHWANKE SUB	L02B02
	--				--	GILFILIAN ENGR	GEI 07
	--				--	GILFILIAN ENGR	GEI 191162
SB00500807DBDC3 043	MCDOWELL JOYCE&SAM	54.7	11.	9.	--	SCHWANKE SUB	L02B02
	--				--	GILFILIAN ENGR	GEI 09
	--				--	GILFILIAN	GEI 191162
SB00500807DBDD1 039	COOKS CORNER	58.	11.	8.	--	DOSER SUB	L01BPT02
	--				--	COOKS CORNER	CC-8
SB00500807DBDD10 039	STATE OF ALASKA	57.2	12.	10.2	--	SECTION 07 LOTS	L11 GOVT NEAR
	--				--	GILFILIAN ENGR	GEI 04
	--				--	GILFILIAN ENGR	GEI 191162
SB00500807DBDD11 039	EDWARDS THOMAS&RAYMI	57.8	11.	10.2	--	SECTION 07 LOTS	GOVT LOT 11
	--				--	GILFILIAN ENGR	GEI 06
	--				--	GILFILIAN ENGR	GEI 191162
SB00500807DBDD2 039	COOK JOHN&CAROL	58.	10.5	8.7	--	DOSER SUB	L01BPT02
	--				--	COOKS CORNER	CC-9
SB00500807DBDD3 039	COOK JOHN&CAROL	58.	11.	9.	--	DOSER SUB	L01BPT02
	--				--	COOKS CORNER	CC-10
SB00500807DBDD4 039	COOKS TESORO	58.	9.04	6.2	--	DOSER SUB	L01BPT02
	--				--	COOKS CORNER	B-1/SW01
SB00500807DBDD5 039	COOKS TESORO	58.	9.59	7.5	--	DOSER SUB	L01BPT02
	--				--	COOKS CORNER	B-2/SW02
SB00500807DBDD6 039	COOKS TESORO	58.	9.74	8.	--	DOSER SUB	L01BPT02
	--				--	COOKS CORNER	B-3/SW03
SB00500807DBDD7 039	COOKS TESORO	58.	12.28	11.	--	GOVT LOTS	L11
	--				--	COOKS CORNER	B-4/SW04
SB00500807DBDD8 039	COOKS TESORO	58.	9.22	7.5	--	DOSER SUB	L01BPT02
	--				--	COOKS CORNER	B-5/SW05

LOCAL WELL NUMBER	OWNER	ALTITUDE OF LAND SURFACE (METERS)	DEPTH OF WELL BELOW LAND SURFACE (METERS)	WATER LEVEL BELOW LAND SURFACE (METERS)	DISCHARGE (GPM)	ASSIGNOR OF OTHER IDENTIFIER	OTHER IDENTIFIER
SB00500807DBDD9 039	COOKS TESORO	58.	11.	9.0	--	DOSER SUB 02	L01BB01
	--				--	GILFILIAN ENGR	GEI 03
	--				--	GILFILIAN ENGR	GEI 191162
SB00500807DCAA1 041	LEALOS STEVE	58.	16.	14.	8.	GOVT LOTS	L11
SB00500807DCAA2 041	MCDOWELL JOYCE&SAM	57.6	13.	11.4	--	NOBBY HEIGHTS	L08
	--				--	GILFILIAN ENGR	GEI 08
	--				--	GILFILIAN ENGR	GEI 191162
SB00500807DCAA3 041	EDWARDS THOMAS&RAYMI	55.52	9.	8.74	--	GILFILIAN ENGR	GEI PW
SB00500807DCAB1 028	MCLANE&ASSOCIATES IN	58.	--	--	--	NOBBY HTS	L01B01NEAR
	--				--	STERLING PJ 83	BORING 02
SB00500807DCAB2 028	COOKS STERLING TESOR	58.	12.0	11.7	--	NOBBY HTS	L02&L03B01NEAR
	--				--	GEI12 PROJECT	NO191162 AKA
	--				--	GILFILLIAN ENGR	3-4-1922
	--				--	GILFILIAN	BORING 2
	--				--	GILFILIAN	GEI 2
SB00500807DCAB3 028	STATE OF ALASKA	56.6	12.	10.8	--	NOBBY HEIGHTS	L01B01 NEAR
	--				--	GILFILIAN ENGR	GEI 05
	--				--	GILFILIAN ENGR	GEI 191162
SB00500807DCAC1 040	COOKS TESORO	58.	13.25	12.	--	NOBBY HTS	L04B01
	--				--	COOKS CORNER	B-12
SB00500807DCAC2 040	COOKS TESORO	58.	13.36	12.0	--	NOBBY HTS	L03B01
	--				--	COOKS CORNER	B-13
SB00500807DCAC3 040	COOKS TESORO	58.	13.29	11.4	--	NOBBY HTS	L05B01
	--				--	COOKS CORNER	B-14
SB00500807DCAD1 029	MCLANE&ASSOCIATES IN	58.	--	--	--	NOBBY HTS	L05B01
	--				--	STERLING PJ 83	BORING 01
SB00500807DCAD2 029	COOKS TESORO	58.	13.45	12.	--	NOBBY HTS	L07B01
	--				--	COOKS CORNER	B-11
SB00500807DCBA1 018	MCDOWELL SAM E	52.	24.	--	--	SCHWANKE SUB	L03B02
SB00500807DCBD1 012	BRAZINGTON MARVIN G	52.	27.	--	--	DOSER SUB	L11
	--				--	ADL	200246
SB00500807DCDA1 030	ABURTO CARLOS	58.	21.	--	--	DOSER SUB	L05
SB00500807DDAC1 031	NORTHERN LIGHTS SEAF	58.	24.	11.	5.	MCFARLAND SUB	L20
	US POSTAL SERVICE				--	MCFARLAND SUB	WELL 01 L20
SB00500807DDAC2 031	NORTHERN LIGHTS SEAF	58.	30.	8.	30.	MCFARLAND SUB	L20
	US POSTAL SERVICE				--	MCFARLAND SUB	WELL 02 L20
SB00500807DDBB1 004	AUBRTO CARLOS	60.37	11.0	8.54	15.00	--	--
SB00500807DDBB2 004	HARDENBURGER DEAN	58.	30.	11.	60.	MCFARLAND SUB	TROF
	MOM&DADS GROCERY				--	MCFARLAND SUB	WELL 02 TROF
* SB00500807DDBD1 001	BRINKLEY RALPH	60.37	22.3	8.59	--	--	--
SB00500808CBBB1 001	WALBER DAVE	58.	54.	11.	2.	SCROGGS SUB	TROA
SB00500808CBCA1 002	BRADLEY WALLER PARTE	62.	23.	7.	6.	SCROGGS SUB	L0C4
SB00500817BBAD1 009	GRAIKA JOAN	65.	18.	--	--	SECTION 17 LOTS	UNSUBD LOT
	--				--	ADL	206477
SB00500817BBCA1 019	PALMA VINCENT P	62.	12.	8.	10.	BOLSTRIDGE ADDI	L07B01
	--				--	LAS	008445
SB00500817BBCB1 027	ADEC	62.	9.86	6.	--	BOLSTRIDGE SUB	L14B02
	--				--	BORING NO	B81-90-1
SB00500817BBDA1 017	STERLING BUILDERS &	62.	9.	--	--	JIMBO SUB	L01B01
	HITT HARRY J&BELVA L				--	ADEC SOIL GAS	TB04
SB00500817BBDA2 017	ALASKA STATE	62.	8.	7.	--	ADEC SOIL GAS	TB02
	--				--	JIMBO SUB	L01B01
SB00500817BBDA3 017	ADEC	62.	--	7.	--	JIMBO SUB	L01B01
	--				--	ADEC SOIL GAS	TB01
SB00500817BBDB1 022	ALASKA STATE	62.	9.	8.	--	TB	NO 3
	--				--	BOLSTRIDGE ADDI	L05B01
SB00500817BBDC1 005	BOLSTRIDGE BASIL S	65.55	18.3	8.54	5.00	BOLSTRIDGE ADDI	L04B01
SB00500817BBDC2 005	BOLSTRIDGE BASIL S	65.55	18.3	5.49	3.50	BOLSTRIDGE ADDI	L03B01
SB00500817BBDC3 005	MOM&DAD GROCERY	62.	44.	--	--	BOLSTRIDGE SUB	L02AB01
SB00500817BBDD1 028	ADEC	62.	9.05	7.	--	BOLSTRIDGE SUB	L02AB01
	--				--	BORING NO	B81-90-4
SB00500817BCAA1 026	BOLSTRIDGE BASIL	62.	16.	7.	15.	BOLSTRIDGE SUB3	L01AB01
SB00500817BCAD1 023	BOLSTRIDGE BASIL	62.	16.	7.	15.	BOLSTRIDGE ADDI	L01
SB00500817BCBD1 016	FENA JIM	62.	10.	4.	20.	BOLSTRIDGE SUB	L25
SB00500817BDBA1 001	BROWN BING	68.60	45.	--	--	--	--
* SB00500817BDBC1 006	EISCHEN JOYCE&NORMAN	65.	60.	12.	20.	GREGORY SUB NO4	L12B08
	--				--	LAS	003996
	--				--	UNKKNOWN	UNCONSOL
SB00500817BDBC2 006	ADEC	65.	5.28	4.	--	GREGORY SUB NO4	L11B08
	--				--	BORING NO	B81-90-3

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* SB00500817BDBD1	003	NAPTOWNE INN	65.55	109.	--	--	--	--
SB00500817BDBD2	003	KING LES&NAPTOWN TRA	62.	6.	4.4	--	GREGORY SUB NO4	L11B08
		NAPTOWN TRADING POST				--	NAPTOWN POST	N-5
SB00500817BDBD3	003	KING LES&NAPTOWN TRA	62.	6.	4.	--	GREGORY SUB NO4	L11B08
		NAPTOWN TRADING POST				--	NAPTOWN POST	N-6
SB00500817BDBD4	003	KING LES&NAPTOWN TRA	62.	6.	4.	--	GREGORY SUB NO4	L11B08
		NAPTOWN TRADING POST				--	NAPTOWN POST	N-7
SB00500817BDBD5	003	KING LES&NAPTOWN TRA	62.	6.6	5.0	--	GREGORY SUB NO4	L11B08
		NAPTOWN TRADING POST				--	NAPTOWN POST	N-8
SB00500817BDBD6	003	KING LES&NAPTOWN TRA	62.	6.6	5.0	--	GREGORY SUB NO4	L11B08
		NAPTOWN TRADING POST				--	NAPTOWN POST	N-9
SB00500817BDBD7	003	KING LES&NAPTOWN TRA	62.	6.	4.7	--	GREGORY SUB NO4	L11B08
		NAPTOWN TRADING POST				--	NAPTOWN POST	N-10
SB00500817BDBD8	003	KING LES&NAPTOWN TRA	62.	6.	4.4	--	GREGORY SUB NO4	L11B08
		NAPTOWN TRADING POST				--	NAPTOWN POST	N-11
SB00500817BDCB1	011	WORTHY CONRAD	62.	46.6	37.	--	GREGORY SUB NO5	L03B13
		WHITE MARK				--	--	--
SB00500817BDDC1	020	LEFLER CLIFF	62.	9.	5.	15.	GREGORY SUB NO2	L14B02
* SB00500817CABA1	008	FALL FRANK R	57.93	24.7	1.	--	GREGORY SUB	L06B01
		--				--	ADL	206560
SB00500817CBAB1	029	FLOTHE GLEN	62.	26.	6.	2.	EDGAR LAW	L01
		--				--	CONIFNED	UNCONSOL
SB00500817CBCA1	025	MELTON CECIL	48.	17.	11.	20.	EDGAR LAW ADD01	L01
SB00500817CBDB1	002	CONDE JOSEPH&EMILY	52.	17.	11.	15.	EDGAR LAW ADD01	L02
SB00500817CBDD1	031	WINTERS JOHN	52.	16.	10.	20.	SALMON BEND SUB	L01B01
SB00500817CCBA1	014	MORKUNAS AL	50.	11.	3.	50.	BOLSTRIDGE SUB	L04
SB00500817CCBB1	015	LEWIS LEE K&PAULINE	52.	9.	2.	25.	BOLSTRIDGE SUB	L02
SB00500817CCCA1	007	COLEMAN KEN	60.98	32.	13.72	40.	RIVERWIND II	L06B01
		--				40.	ADL	201954
SB00500817CCCB1	012	NATIONAL BANK OF ALA	50.	--	--	--	RIVERWIND II	L03B01
SB00500817CCDB1	004	MILLER JOHN	79.27	17.7	15.85	7.00	RIVERWIND II	L03B02
SB00500817DBAD1	013	PROUDFOOT CHESTER L	83.	43.	30.	20.	GREGORY SUB NO4	L10B06
		--				--	LAS	012402
SB00500817DBBA1	032	KRAPP RICHARD	67.	50.	19.	25.	GREGORY SUB	L05B03
SB00500817DBBD1	024	BUTT JACK	62.	28.	-3.	1.	GREGORY SUB	L19B01
		--				30.	--	--
SB00500817DCCD1	030	REEVES GORDON R	77.	52.	30.	15.	MOOSEHORN RAPID	L06
SB00500817DCDD1	021	SIEBERT JOHN&JOSEPHI	50.	36.	2.0	50.	BINGS LANDING 1	L11B04
		--				--	LAS	009708
SB00500817DDCB1	010	TITUS GARY	67.	53.	12.	24.	BINGS LANDING 1	L21B05
		MAINS BRIAN				--	--	--
SB00500817DDCC1	018	HODSON MIKE	27.	47.	9.	20.	BINGS LANDING 1	L15B03
SB00500818AAAD1	010	ACKERMAN JOE	65.55	19.2	9.15	10.00	MCFARLAND SUB	L01TR0K
SB00500818AABA1	002	SMITH TERRANCE DAVID	62.	18.	--	--	MCFARLAND SUB	L01TR00
		--				--	ADL	040078
SB00500818AABD1	003	KNIGHT OTHEL	62.	42.	9.	--	MCFARLAND SUB	L17
		--				--	ADL	206368
SB00500818AABD1	001	MCDERMETT W H	64.02	20.7	--	10.00	--	--
SB00500818AACB1	016	BRUCKLMAN JOHN	50.	19.	17.	3.5	MCFARLAND SUB	L13TR00
		JACOB JACK				--	--	--
SB00500818AADB1	009	ACKERMAN JOE&TONI M	62.	30.	9.	4.	MCFARLAND SUB	L02TR0K
		--				--	MULTIPLE	UNCONSOL
SB00500818ABDD1	015	BUCHER PETE	50.	60.	3.	18.	APACHE ACRES	TR0D
SB00500818ADAA1	005	SHELDON JAMES P	62.	18.	14.	--	HEATHER ADD	L03B01
		--				--	MCFARLAND SUB	L01TR0L
		--				--	LAS	008048
SB00500818ADBD1	014	MCKELVEY CHARLES	55.	30.	--	--	GAGE SUB	L04A
		--				--	GAGE SUB	WELL 1 L04A
SB00500818ADBD2	014	MCKELVEY CHARLES	55.	22.	11.	8.	GAGE SUB	L04A
		--				--	GAGE SUB	WELL 2 L04A
SB00500818BCBD1	011	GARNETT ED	52.	35.	12.	15.	TROTTER-GARNETT	L082
		VIOLET MUMM				--	--	--
SB00500818CCDB1	017	CUTSFORD ARLEN&RICE-	60.	9.	--	--	FUNNY RIVER EST	L08AAD01
SB00500818CDCC1	012	JOHNSON MIKE	62.	10.	1.	20.	HOLIDAY PARK	L01B01
SB00500818DABD1	006	SHELDON JAMES P	55.	19.	12.	4.	MCFARLAND SUB	L14B01
		--				--	GOBRIG ADD	L14
		--				--	LAS	005476
SB00500818DCAA1	007	HEIM MARLENE&MIKE	58.	53.	0.	30.	HOLIDAY PARK	L16B06
SB00500818DDAD1	004	IOANIN GEORGE A	50.	9.	5.	9.	MCFARLAND SUB	L01
		--				--	ADL	215386

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SB00500818DDBA1	013	VANDERVEOR NICK L	50.	41.	-3.	15.	MCFARLAND SUB	L08
		NELSON ROBERT M&SALL				--	--	--
SB00500818DDCB1	008	IMM LARRY	62.	65.	6.	20.	HOLIDAY PARK	L08B06
SB00500901BAAB1	004	KENAI PENINSULA BORO	103.	6.	--	--	BORING NO	SB01
		STERLING WASTE DISPO				--	WASTE SITE	AK0003
SB00500901BAAB2	004	KENAI PENINSULA BORO	102.85	5.3	4.2	--	BORING NO	MW14&SB02
		STERLING WASTE DISPO				--	BORING NO	SB02&MW14
		--				--	WASTE SITE	AK0003
		--				--	GOVT LOTS	L03
SB00500901BAAB3	004	KENAI PENINSULA BORO	102.80	37.	32.88	--	BORING NO	MW13
		STERLING WASTE DISPO				--	WASTE SITE	AK0003
		--				--	GOVT LOTS	L03
SB00500901BAAB4	004	STERLING WASTE SITE	102.9	58.	32.89	--	BORING NO	MW19
		--				--	WASTE SITE	AK0003
		--				--	GOVT LOTS	L03
SB00500901BAAC1	005	KENAI PENINSULA BORO	103.10	38.7	33.39	--	BORING NO	MW10
		STERLING WASTE DISPO				--	WASTE SITE	AK0003
		--				--	GOVT LOTS	L03
SB00500901BAAD1	006	KENAI PENINSULA BORO	92.	10.1	--	--	BORING NO	TW01
		STERLING WASTE DISPO				--	WASTE SITE	AK0003
SB00500901BAAD2	006	KENAI PENINSULA BORO	91.70	32.	21.9	9.	BORING NO	TW02
		STERLING WASTE DISPO				--	WASTE SITE	AK0003
		--				--	GOVT LOTS	L03
SB00500901BAAD3	006	STERLING WASTE SITE	91.6	26.	21.87	--	BORING NO	MW17
		--				--	WASTE SITE	AK0003
		--				--	GOVT LOTS	L03
SB00500901BAAD4	006	STERLING WASTE SITE	91.6	48.	21.82	--	BORING NO	MW16
		--				--	WASTE SITE	AK0003
		--				--	GOVT LOTS	L03
SB00500901BAAD5	006	KENAI PENINSULA BORO	94.6	49.6	23.9	9.	BORING NO	TW00
		STERLING WASTE DISPO				--	WASTE SITE	AK0003
		--				--	GOVT LOTS	L03
SB00500901BABB1	025	STERLING WASTE SITE	106.0	62.	35.26	--	BORING NO	MW18
		--				--	WASTE SITE	AK0003
		--				--	GOVT LOTS	L03
SB00500901BABB2	025	KENAI PENINSULA BORO	105.5	38.	35.5	--	BORING NO	MW12
		STERLING WASTE DISPO				--	WASTE SITE	AK0003
SB00500901BABC1	008	KENAI PENINSULA BORO	103.55	36.7	33.54	--	BORING NO	MW15
		STERLING WASTE DISPO				--	WASTE SITE	AK0003
* SB00500901BABD1	009	KENAI PENINSULA BORO	104.4	61.7	30.47	--	BORING NO	TW07
		STERLING WASTE DISPO				--	WASTE SITE	AK0003
		--				--	GOVT LOTS	L03
SB00500901BABD2	009	KENAI PENINSULA BORO	102.	33.	24.	25.	SECTION 01 LOTS	L03
SB00500901BACA1	010	KENAI PENINSULA BORO	91.9	11.89	12.	--	BORING NO	TW02
		STERLING WASTE DISPO				--	WASTE SITE	AK0003
		--				--	GOVT LOTS	L03
SB00500901BACC1	012	KENAI PENINSULA BORO	96.5	27.	23.	--	WASTE SITE	AK0003
		STERLING SPECIAL WAS				--	GOVT LOTS	L03
SB00500901BACC2	012	STERLING WASTE SITE	92.7	26.	22.44	--	BORING NO	MW20
		--				--	WASTE SITE	AK0003
		--				--	GOVT LOTS	L03
SB00500901BACC3	012	STERLING WASTE SITE	92.4	48.6	22.74	--	BORING NO	MW21
		--				--	WASTE SITE	AK0003
		--				--	GOVT LOTS	L03
SB00500901BACD1	011	KENAI PENINSULA BORO	89.88	23.4	20.89	--	BORING NO	MW11
		STERLING WASTE DISPO				--	WASTE SITE	AK0003
SB00500901BACD2	011	SHANNON&WILSON	87.11	20.	16.	--	--	--
SB00500901BACD3	011	STERLING WASTE DISPO	87.	20.	17.	--	STERLING S W S	TW05
		KENAI PENINSULA BORO				--	--	--
SB00500901BADA1	013	KENAI PENINSULA BORO	85.3	18.0	--	--	BORING NO	TW04
		STERLING SPECIAL WAS				--	WASTE SITE	AK0003
		--				--	GOVT LOTS	L03
SB00500901BADA2	013	KENAI PENINSULA BORO	86.00	21.	14.25	--	BORING NO	TW04
		STERLING WASTE DISPO				--	WASTE SITE	AK0003
		--				--	GOVT LOTS	L03
SB00500901BADA3	013	KENAI PENINSULA BORO	84.6	11.	9.73	--	BORING NO	TW03
		STERLING WASTE DISPO				--	WASTE SITE	AK0003
		--				--	GOVT LOTS	L03
SB00500901BADA4	013	SHANNON&WILSON	89.69	22.4	16.4	--	--	--
SB00500901BADA5	013	SHANNON&WILSON	86.48	16.4	15.	--	--	--

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SB00500901BADB1 015	KENAI PENINSULA BORO	91.7	21.7	--	--	BORING NO	TH03
	STERLING WASTE DISPO				--	WASTE SITE	AK0003
	--				--	GOVT LOTS	L03
SB00500901BADC1 016	KENAI PENINSULA BORO	85.74	18.	16.00	--	BORING NO	MW09
	STERLING WASTE DISPO				--	WASTE SITE	AK0003
SB00500901BADC2 016	KENAI PENINSULA BORO	84.4	9.	--	--	BORING NO	TH01
	STERLING WASTE DISPO				--	WASTE SITE	AK0003
	--				--	GOVT LOTS	L03
SB00500901BADC3 016	KENAI PENINSULA BORO	89.22	46.	19.2	--	BORING NO	TW06
	STERLING SPECIAL WAS				--	WASTE SITE	AK0003
SB00500901BADC4 016	KENAI PENINSULA BORO	87.7	9.	--	--	BORING NO	TH05
	STERLING WASTE DISPO				--	WASTE SITE	AK0003
	--				--	GOVT LOTS	L03
SB00500901BADC5 016	SHANNON&WILSON	86.20	19.1	15.	--	--	--
SB00500901BADD1 026	STERLING WASTE SITE	85.9	43.	16.20	--	BORING NO	MW22
	--				--	WASTE SITE	AK0003
	--				--	GOVT LOTS	L03
SB00500901BADD2 026	KENAI PENINSULA BORO	86.18	26.	16.45	--	BORING NO	MW08
	STERLING WASTE DISPO				--	WASTE SITE	AK0003
	--				--	GOVT LOTS	L03
* SB00500901BBBA1 024	ARCO ALASKA	123.	113.	--	50.	SECTION 01 LOTS	L04
	--				--	ARCO ALASKA	MR 1
SB00500901BBCC1 022	JOHNSON	108.	--	--	--	SECTION 01 LOTS	UNSUBD LOT
SB00500901CACC1 001	MURPHEE C C	76.22	12.2	--	--	--	--
SB00500901CBBD1 014	FRANZMANN CARL	83.	18.98	--	5.	FRANZMANN SUB	L03B01
SB00500901CDBB1 017	MCLANE&ASSOCIATES IN	73.	--	--	--	GRANDVIEW	L01AB01
	--				--	STERLING PJ 85	BORING 01
SB00500901CDBB2 017	BROW PAMELA&SAMUEL	73.	20.	9.	50.	GRANDVIEW	L01A
SB00500901CDCB1 018	MCLANE&ASSOCIATES IN	73.	--	--	--	GRANDVIEW	L01CB01
	--				--	STERLING PJ 85	BORING 02
SB00500901CDCB2 018	--	73.	23.	--	--	GRANDVIEW	L03TR01
SB00500901CDCC1 019	MCLANE&ASSOCIATES IN	70.	--	--	--	GRANDVIEW	L01DB01
	--				--	STERLING PJ 85	BORING 03
SB00500901DCAA1 020	KISHBAUM ED	67.	22.	3.	15.	GRANDVIEW	L08A
SB00500901DCCC1 021	LARROW	67.	--	--	--	GRANDVIEW	L05
SB00500901DCDC1 002	GELLER GREG	68.60	22.6	6.10	20.00	GRANDVIEW	L07
SB00500901DCDC2 002	GELLER GREG&RITA	69.	46.	6.16	--	GRANDVIEW	L07
SB00500901DCDD1 023	SHUEY	62.	--	--	--	GRANDVIEW	L08B
* SB00500902AAAD1 003	POHL LEONARD B	121.95	64.	54.57	15.00	--	--
SB00500902AAAD2 003	HARVEY PAUL	123.	78.	55.	--	SWANSON RIVER 2	TR02B
SB00500902ACDD1 005	JENSEN ROBERT F	108.	61.	55.	10.	SECTION 02 LOTS	UNSUBD LOT
	--				--	LAS	008809
SB00500902ADAD1 004	JENSEN GARY C	98.	30.	27.	10.	SLATE SUB	TR01
	--				--	LAS	005924
SB00500902BADC1 010	HANSEN JIM	92.	10.	--	--	JACOBSEN SUB 2	TR02
SB00500902BBAC1 007	YODER BILLY JEAN&WAL	98.	37.	--	--	SCHLERETH SUB	TR01
	--				--	ADL	202730
* SB00500902CABA1 015	VASILIE DAVID	83.	105.	12.	4.	WHISPERING MDWS	L15B01
SB00500902CABC1 021	GRANGERS PREST R	83.	17.	--	20.	WHISPERING MDWS	L06B02
SB00500902CADB1 018	MCKENZIE CALLEN	75.	20.	10.	25.	WHISPERING MDWS	L13B01
SB00500902CBAC1 016	PISTILLI KAREN	83.	--	--	--	WHISPERING MDWS	L09AB03
SB00500902CBCC1 014	BISHOP JOHN	83.	15.	9.	30.	WHISPERING MDWS	L10B03
SB00500902CCBC1 017	SANDBERG ERIC	77.	15.	10.	8.	WHISPERING MDWS	L12B03PT02
SB00500902CDAC1 012	SCHANKLE JOHN	77.	14.	11.	10.	WHISPERING MDWS	L02B03
SB00500902CDBA1 020	RICH PATTY	80.	15.	9.	20.	WHISPERING MDWS	L10AB01
SB00500902CDBB1 002	DAVIS LARRY	99.09	45.	12.20	30.00	WHISPERING MDWS	L03B01
SB00500902CDBB2 002	WEEKLEY CLAUDIA&CLAU	83.	18.	13.	15.	WHISPERING MDWS	L11B01
SB00500902CDBD1 006	HALL JOE	77.	52.	12.	--	WHISPERING MDWS	L04B01
	DENINSON MIKE&DOROTH				--	--	--
SB00500902DAAA1 008	FRANZMANN LOUISE A	87.	18.	--	--	VALLEY VW SUB 2	L05
	--				--	ADL	040417
SB00500902DAAA2 008	SPONSEL ARTHUR H	87.	29.	19.	12.	VALLEY VW SUB	L05
	--				--	LAS	012597
SB00500902DADC1 009	SLATE BOB	83.	18.4	15.4	37.5	VALLEY VW SUB 2	L04
	EBNET MARV				--	--	--
SB00500902DBBD1 013	SHAULES DAVID	77.	21.	--	--	DUTCH BASIN	TR0A1
SB00500902DCDD1 001	MCGHEE V E	76.22	18.3	--	.10	--	--
SB00500902DDDB1 019	HUMECKY MARK	83.	43.	15.	50.	MCGHEE SUB	TR01A
SB00500903BDBC1 007	CHRISTINSEN FRANK	90.	28.	24.	20.	SECTION 03 LOTS	UNSUBD LOT
SB00500903CBAA1 002	TED FORSI&ASSOCIATES	87.	--	--	--	BRUCE SUB	L04B02

LOCAL WELL NUMBER	OWNER	ALTITUDE OF LAND SURFACE (METERS)	DEPTH OF WELL BELOW LAND SURFACE (METERS)	WATER LEVEL BELOW LAND SURFACE (METERS)	DISCHARGE (GPM)	ASSIGNOR OF OTHER IDENTIFIER	OTHER IDENTIFIER
SB00500903CBAA1 002	FORSI TED&ASSOCIATES	87.	--	--	--	STERLING PJ 84	TH 01
SB00500903CBDB1 003	TED FORSI&ASSOCIATES	87.	--	--	--	BRUCE SUB	L02B02
	FORSI TED&ASSOCIATES				--	STERLING PJ 84	TH 02
SB00500903CCAA1 004	TED FORSI&ASSOCIATES	92.	--	--	--	BRUCE SUB	L04B01
	FORSI TED&ASSOCIATES				--	STERLING PJ 84	TH 03
SB00500903CCDA1 005	TED FORSI&ASSOCIATES	92.	--	--	--	BRUCE SUB	L02B01
	FORSI TED&ASSOCIATES				--	STERLNG PJ 84	TH 04
SB00500903CCDC1 006	PENNER DALE	90.	27.	20.	16.	BRUCE SUB	L01B02
SB00500903DCCD1 001	OREAGAN LEWIS	91.46	27.4	--	--	--	--
	TOLBERT JAMES W				--	--	--
SB00500910AAAA1 002	BURBACK ROBERT	83.	34.	11.	35.	BURBACK SUB	L01
SB00500910ACBB1 003	TED FORSI&ASSOCIATES	83.	--	--	--	SHADY NOOK SUB	L07B01
	FORSI TED&ASSOCIATES				--	--	--
SB00500910ACBC1 004	TED FORSI&ASSOCIATES	83.	--	--	--	SHADY NOOK SUB	L05B01
	FORSI TED&ASSOCIATES				--	--	--
SB00500910ACBD1 005	TED FORSI&ASSOCIATES	83.	--	--	--	SHADY NOOK SUB	L05B02
	FORSI TED&ASSOCIATES				--	--	--
SB00500910ACCA1 006	TED FORSI&ASSOCIATES	85.	--	--	--	SHADY NOOK SUB	L03B02
	FORSI TED&ASSOCIATES				--	--	--
SB00500910ACCC1 007	TED FORSI&ASSOCIATES	83.	--	--	--	SHADY NOOK SUB	L01B01
	FORSI TED&ASSOCIATES				--	--	--
SB00500910ACCD1 008	TED FORSI&ASSOCIATES	87.	--	--	--	SHADY NOOK SUB	L01B02
	FORSI TED&ASSOCIATES				--	--	--
SB00500910ADBB1 009	BUSTER ALLEN	83.	65.	2.	8.	TOD NELSON SUB	L08B01
SB00500910BAAB1 012	MARKS LORI L&ROBERT	87.	36.	11.	50.	LEILANI SUB	L01
SB00500910BBBB1 010	WEAVER EUGENE	83.	29.	14.	30.	SECTION 10 LOTS	UNSUBD LOT
	--				--	LAS	000819
SB00500910DABA1 001	HOFFMEIER MORRICE	88.41	22.6	--	--	--	--
SB00500910DACB1 011	AK DIV PKS SCOUT LK	83.	18.	13.19	20.	SECTION 10 LOTS	UNSUBD LOT
	--				--	LAS	000401
	--				--	REC FACILITY	SCOUT LAKE
	--				--	AK DIV PKS	SCOUT LK REC FA
SB00500911AABB1 034	STERLING PENTECOSTAL	83.	21.	8.	12.	STERLING HTS	L08B02
SB00500911AABC1 007	NICHOLSON WALTER D	97.	41.	18.	40.	STERLING HTS	L10B03
	--				--	LAS	009545
SB00500911AACC1 009	BUNTZ LEN	77.	18.	11.	12.	STERLING HTS	L09B07
SB00500911AACC2 009	BUNTZ DAVE	77.	17.	11.	15.	STERLING HTS	L10B07
SB00500911AACC3 009	BUNTZ LEN-MCLEOD BUI	77.	16.	10.	40.	STERLING HTS	L11B07
	MCLEOD BUILDERS-LEN				--	--	--
SB00500911AACC4 009	MCLEOD BUILDERS, BUN	77.	17.	10.	20.	STERLING HTS 2	L12B07
	BUNTZ, MCLEOD BUILDE				--	--	--
SB00500911AACD1 033	BUNTY LEN	77.	18.	11.	12.	STERLING HTS	L04B07
SB00500911AADC1 032	LOVE JOHN	77.	16.	10.	12.	STERLING HTS	L07B08
SB00500911ABAA1 012	HOVIS BLANCH&JAMES	83.	44.	20.	35.	STERLING HTS 2	L04B01
	HIBPSHAM REBECCA&TOM				--	--	--
SB00500911ABAB1 013	SMITH CHARLENE&DENNI	73.	12.7	9.	12.	STERLING HTS 2	L03B01
SB00500911ABDD1 014	ANDERSON ROD	75.	14.	9.	10.	STERLING HTS 2	L08B01
SB00500911ACBB1 036	VOHS ART	77.	12.	9.	12.	STERLING HTS 3	L03AB01
	KIFFMEYER JEFFRY				--	--	--
SB00500911ACBD1 010	HERSHBERGER DALE&RIC	77.	16.	10.	--	STERLING HTS 1	L01B01
	RICE-WHITFORD&DALE H				--	--	--
SB00500911ACCD1 031	MCCALL THELMA F	77.	13.	--	--	STERLING HTS 1	L08B02
SB00500911ADAA1 015	DECHENNE DEBBIE	77.	16.	8.	10.	STERLING HTS 2	L07B02
SB00500911ADDA1 037	POWELL HAROLD&WASH O	77.	25.	12.	30.	STERLING HTS 2	L05B03
	WASH OUT LAUNDRY&POW				--	--	--
SB00500911ADDD1 011	MCCALL FRED	77.	16.	9.	10.	STERLING HTS 2	L09AB03
SB00500911BAAA1 016	WM J NELSON&ASSOCIAT	73.	--	--	--	WEAVER	L06B01
	NELSON WM J&ASSOCIAT				--	STERLING PJ 83	BORING 16
SB00500911BAAB1 017	WM J NELSON&ASSOCIAT	73.	--	2.	--	WEAVER PT1	L05BB01NEAR
	NELSON WM J&ASSOCIAT				--	STERLING PJ 83	BORING 17
SB00500911BACA1 018	ROBINSON DEAN	83.	17.	12.	30.	WEAVER	L01B02
SB00500911BADA1 019	NORTHERN TEST LAB	83.	3.	--	--	WEAVER	L03B02NEAR
	--				--	STERLING PJ 81	TH 08
SB00500911BADB1 020	HILER HOWARD	83.	14.	9.	8.	WEAVER PT1	L05AB01
SB00500911BADC1 021	NORTHERN TEST LAB	83.	--	--	--	WEAVER	L02B02
	--				--	STERLING PJ 81	TH 09
SB00500911BADC2 021	TORO	83.	20.	14.	12.	WEAVER	L02B02
	ELDRIDGE ROYAL				--	--	--
SB00500911BCDC1 002	WEAVERS JACK	83.84	52.	15.24	--	--	--
SB00500911CBAA1 035	ELLISON LINDA M&L D	77.	--	--	--	SECTION 11 LOTS	L13

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SB00500911CBBA1 008	PETERSON JAMES	83.	20.	13.	25.	PATTERSON NO2	TR03
	RENNEY LOUIS, STERLI				--	ADL	207039
	STERLING BUILDERS, L				--	--	--
SB00500911CBBB1 022	RENNEY LEWIS	83.	20.	13.	20.	PATTERSON NO2	L02TR01
	OBRIEN NIKKI&DOUG				--	--	--
SB00500911DAAB1 001	STERLING SCHOOL	76.22	21.3	--	20.00	SECTION 11 LOTS	GOVT LOT 2
	KENAI BOROUGH STERLI				--	ADL	041050
SB00500911DAAB2 001	AK DEPT EDUC STERLIN	76.22	9.8	8.38	--	--	--
SB00500911DABB1 006	CHUMLEY LEE	73.17	14.9	11.59	8.00	GOVT TRACTS	L12
SB00500911DABC1 023	STERLING FIRE STATIO	73.	12.	5.	100.	STRLNG FIRE STA	L02
	KENAI BOROUGH, STERL				--	--	--
SB00500911DACB1 024	TAURIAINEN MIKE	73.	--	--	--	BARKER RON SUB	L02B02
	--				--	RON BARKER SUB	L02B02
	--				--	STERLING PJ 78	TP 03
SB00500911DACC1 025	BARKER ENTERPRISES	70.	11.	4.	10.	BARKER RON SUB	L04B02
	--				--	RON BARKER SUB	L04B02
SB00500911DACC2 025	DEMARIS DAVID C&DONN	65.	12.	4.	20.	BARKER RON SUB	L03B02
SB00500911DACD1 026	TAURIAINEN MIKE	73.	--	--	--	BARKER RON SUB	L06B02
	--				--	RON BARKER SUB	L06B02
	--				--	STERLING PJ 78	TP 02
SB00500911DADC1 027	TAURIAINEN MIKE	73.	--	--	--	BARKER RON SUB	L08B02
	--				--	RON BARKER SUB	L08B02
	--				--	STERLING PJ 78	TP 01
SB00500911DADD1 028	BARKER RAYMOND H	73.	--	--	--	BARKER RON SUB	L09B02
	--				--	RON BARKER SUB	L09B02
SB00500911DBCA1 005	NAT BANK OF AK.	76.22	12.2	8.97	--	--	--
SB00500911DBDB1 003	HANDLEY JOHN	76.22	10.4	--	--	--	--
SB00500911DBDD1 004	CLARK NED	76.22	9.	--	--	--	--
SB00500911DDAC1 029	ANDERSON RITA&MEL	70.	19.	7.	40.	COTTONWD SPRUCE	L07B01
	BAHNER DONALD				--	--	--
SB00500911DDBA1 030	ROBINETTS ED CONSTRU	73.	18.	18.	12.	COTTONWD SPRUCE	L05B01
SB00500912ABBA1 022	CRAIG ENID	67.	--	--	--	GRANDVIEW	L03
SB00500912ABBB1 012	BROWN ERIC	67.	24.	7.	10.	GRANDVIEW	L09B01
SB00500912ABCB1 007	THORPE WAYNE	62.	19.	--	40.	GRANDVIEW	L11A
SB00500912ABCC1 013	CHUMLEY HUGH	67.	18.	8.	8.	GRANDVIEW 5	L01
SB00500912ABCD1 008	CHUMLEY HUGH	65.	29.	8.	60.	GRANDVIEW 5	L03B03
	PALMA VINCENT P				--	LAS	008470
SB00500912ABDC1 014	CHUMLEY HUGH	67.	27.	9.	35.	GRANDVIEW 5	L05
SB00500912ABDC2 014	NATIONAL BANK OF ALA	67.	24.	--	--	GRANDVIEW 3	L11B-2
SB00500912ACAB1 015	MCDOWELL SAM	67.	26.	--	--	GRANDVIEW	L13
	--				--	LAS	008467
	--				--	ADL	210045
SB00500912ACCC1 016	GRIZZELL JIM	67.	16.	6.	35.	GRANDVIEW	L16A
SB00500912ACDC1 017	LISKEY WAYNE	67.	23.	18.	--	GRANDVIEW	L16-C
SB00500912BCCB1 001	LEVANS KEN	76.22	12.8	--	--	--	--
	CARTER JAMES W				--	--	--
SB00500912BCCB2 001	CARTER JAMES W	76.22	15.2	7.93	5.00	--	--
SB00500912CBCB1 009	STERLING BAPTIST CHU	73.	12.	8.	12.	MISSION SUB	L02
	--				--	ADL	040381
SB00500912CBCD1 018	BROWNING JENNIFER&JA	70.	9.	5.	15.	ANOTHER RD SUB	L01
	--				--	ADL	209181
SB00500912CBCD1S	BROWING JAMES&JENNIF	70.	--	--	--	ANOTHER RD SUB	L01
	--				--	ADL	209186
SB00500912CBDB1S	UNKNOWN	67.	--	--	--	--	--
	BROWNING JAMES				--	--	--
SB00500912DAAD1 002	MOOSE RIVR BAR	68.60	18.3	--	--	--	--
SB00500912DABD1 019	FISKE HENRY H	62.	11.	--	--	GREATLAND EST 2	TR01
	MCDOWELL SAM				--	LAS	008466
SB00500912DADC1 003	WHITE COLLEEN	68.60	9.8	4.57	20.00	GREATLAND EST 2	L09B02
SB00500912DBBC1 023	BOLSTRIDGE BASIL	67.	17.	6.	30.	SUMPTER SUB	L03B02
SB00500912DCAA1 010	FISKE HANK	67.	16.	8.	20	SUMPTER SUB	L20B08
	--				--	LAS	011290
SB00500912DCAD1 020	FISKE HANK	67.	23.	5.	18.	SUMPTER SUB	L16B08
SB00500912DDAD1 024	HAAKENSON JOHN	73.	46.	14.	15.	GREATLAND EST 2	L05B01
SB00500912DDBB1 021	ZOLLMAN KAREN PARRIS	65.	13.	6.	20.	GREATLAND EST 2	L07B02
	PARRISH KAREN ZOLLMA				--	--	--
SB00500912DDBC1 006	GRIZZELL JIM	73.	14.	6.	20.	GREATLAND EST 2	L06B02
	LEESMAN VERN E				--	LAS	005951
SB00500912DDCC1 005	COLLINS JIM	68.60	20.7	14.63	12.00	GREATLAND EST 2	L02B02
SB00500912DDCD1 004	FISKE HANK	67.07	9.1	4.57	15.00	GREATLAND EST 2	L01B02

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SB00500912DDCD2 004	FISKE HANK	67.07	34.	15.85	10.00	GREATLAND EST 2	L01B02
SB00500912DDDD1 011	HECHT PAUL	67.	10.	--	--	GREATLAND EST 2	L01B01
	--				--	LAS	008341
SB00500913AAAB1 008	LEQUIRE MICHAEL	62.	22.	11.	20.	MOOSE RIVER EST	L07B01
	PJEIFFER SHAUN J				--	--	--
SB00500913AAAC1 020	ENBERG CHRISTINE	58.	28.	12.	10.	MOOSE RIVER EST	L08B01
	--				10.	--	--
SB00500913AABA1 019	GRIZZELL JIM	62.	34.	-3.	60.	MOOSE RIVER EST	L11B01
SB00500913AACB1 010	GRIZZELL JIM&GRIZZEL	62.	17.	9.	8.	MOOSE RIVER EST	L03B02
	ZIMMERMAN JACK				--	--	--
SB00500913ACAA1 011	PALMER LLOYD L	48.	9.	--	--	MOOSE RIVER EST	L01B04
SB00500913ACAC1 003	HARRIS LEE	48.	9.	-1.	30.	MOOSE RIVER EST	L20B03
	--				30.	LAS	001403
SB00500913ACAC2 003	DOWLING&RICE ASSOCIA	48.	--	0.51	--	MOOSE RIVER EST	L21B03
	--				--	STERLING PJ 84	TH 01
SB00500913ACAD1 004	NELSON DAVE	48.	10.	--	25.	MOOSE RIVER EST	L17B03
	--				10.	LAS	001135
SB00500913ACCA1 012	PROFESSIONAL DESIGN	48.	--	--	--	MOOSE RIVER EST	L25B03
	--				--	STERLING PJ 83	BORING MR3
SB00500913ACCA2 012	PROFESSIONS DESIGN A	48.	--	1.	--	MOOSE RIVER EST	L25B03
	--				--	STERLING PJ 83	BORING MR1
SB00500913ACCA3 012	RICE-WHITFORD&ASSOCI	48.	--	0.8	--	MOOSE RIVER EST	L25B03
	PFEIFFER PAUL				--	STERLING PJ 86	TH 01
SB00500913ACCA4 012	PFEIFFER PAUL J	48.	41.	--	15.	MOOSE RIVER EST	L25B03
	--				10.	--	--
SB00500913ADAB1 017	HIEBERT AUGIE&PAT	50.	16.	0.	10.	MOOSE RIVER EST	L05B03
*SB00500913BBAA1 013	HAUSEN JAN&PATRICIA	65.	45.3	11.	100.	WRANGLE SUB 2	TR09
*SB00500913BBAC1 014	HANSEN SAM	73.	45.3	11.	100.	WRANGLE SUB 3	L03
SB00500913BBBD1 002	JAMES HOVIS	68.60	53.	8.84	--	--	--
SB00500913BBCB1 018	AULDRIDGE DALE H	67.	16.	9.	8.	AULDRIDGE SUB	L01
	--				--	ADL	040047
SB00500913BBCC1 001	AULDRIDGE T H	68.60	18.0	--	7.00	--	--
SB00500913BCDC1 009	RICKETTS CLIFF	62.	35.	7.	20.	WRANGLE SUB	TR05
SB00500913BDAB1 005	DOWLING-RICE & ASSOC	67.	3.	3.	--	WRANGLE SUB	TR0A
	--				--	WRANGLE Q R ADD	L04
	--				--	STERLING PJ 83	TH02
SB00500913BDAC1 006	--	65.	2.3	2.	--	WRANGLE SUB	TR0A
	--				--	WRANGLE Q R ADD	L05
	--				--	STERLING PJ 83	TH03
SB00500913BDAD1 007	DOWLING-RICE & ASSOC	67.	3.	--	--	WRANGLE SUB	TR0A
	--				--	WRANGLE Q R ADD	L08
	--				--	STERLING PJ 83	TH01
SB00500913CBBB1 015	DORCAS LEE E	62.	9.	--	--	DORCAS SUB	TR01
*SB00500913CBBC1 016	LUNDELL DALE	67.	36.	21.	8.	SECTION 13 LOTS	UNSUBD LOT
*SB00500914ADAD1 004	RATLIFF WANDA&TERRY	73.	48.	9.	15.	SCOUT RIDGE SUB	L03
SB00500914BACB1 005	WHITE MARK	73.	12.	7.	10.	DAYTON SUB	L04
	--				--	LAS	008775
SB00500914BADC1 001	KIMBALL PHILIP E	67.	9.	4.	20.	DAYTON SUB	L01
	--				--	LAS	004085C
SB00500914BBAA1 006	MCLANE&ASSOCIATES IN	67.	--	1.7	--	CARMICHAEL SUB	TR0A
	--				--	STERLING PJ 82	BORING 04
SB00500914BBBB1 007	MCLANE&ASSOCIATES IN	73.	--	--	--	CARMICHAEL SUB	L01B01
	--				--	STERLING PJ 82	BORING 03
SB00500914BBCC1 008	MCLANE&ASSOCIATES IN	77.	--	3.	--	CARMICHAEL SUB	TR0B
	--				--	STERLING PJ 82	BORING 01
SB00500914BBDD1 009	MCLANE&ASSOCIATES IN	73.	--	--	--	CARMICHAEL SUB	TR0B
	--				--	STERLING PJ 82	BORING 02
SB00500914BCBB1 010	WHITE DAVID L	75.	17.	--	--	FORSTNER SUB	TR0A
	--				--	ADL	040135
SB00500914BDAB1 011	FORSTNER LOUIS G	67.	11.	9.	15.	FORSTNER SUB 2	L01B02
SB00500914BDAC1 012	FORSTNER LOUIS G	67.	35.	35.	--	FORSTNER SUB 2	L08B02
SB00500914BDAD1 013	PENINSULA ENGINEERIN	62.	--	2.	--	FORSTNER SUB 2	L03B02
	--				--	STERLING PJ 79	TH 03
SB00500914BDBC1 014	PENINSULA ENGINEERIN	73.	--	--	--	FORSTNER SUB 2	L08B01
	--				--	STERLING PJ 79	TH 01
SB00500914BDBC2 014	STEGER KEVIN	73.	13.	6.	8.	FORSTNER SUB 2	L08B01
SB00500914BDBD1 003	CALIGAN HAROLD	70.	14.	--	--	FORSTNER SUB 2	L03B01
	SANDERS HOWARD				--	LAS	009259
SB00500914BDCB1 015	RAMSEY ROBIN&CHARLE	77.	26.	7.	7.	FORSTNER SUB 2	L07B01
SB00500914BDCB2 015	PENINSULA ENGINEERIN	77.	--	--	--	FORSTNER SUB 2	L07B01

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SB00500914BDCB2 015	--	77.	--	--	--	STERLING PJ 79	TH 02
SB00500914BDDA1 016	PENINSULA ENGINEERIN	62.	--	2.	--	FORSTNER SUB 2	L04B02
	--				--	STERLING PJ 79	TH 04
SB00500914BDDD1 017	PENINSULA ENGINEERIN	62.	--	--	--	FORSTNER SUB 2	L05B02NEAR
	--				--	STERLING PJ 79	TH 07
SB00500914CAAB1 029	WEST MIKE&DONNA	67.	18.	--	--	FORSTNER SUB 3	L01B03
SB00500914CAAD1 028	PENINSULA ENGINEERIN	67.	--	3.	--	FORSTNER SUB 3	L03B03
	--				--	STERLING PJ 79	TH 06
SB00500914CABB1 002	TYGER CARL	73.	55.	15.	--	FORSTNER SUB 3	L01B04
	--				--	LAS	006323
SB00500914CABB2 002	PENINSULA ENGINEERIN	73.	--	3.	--	FORSTNER SUB 2	L01B04
	--				--	STERLING PJ 79	TH 05
SB00500914CABC1 018	PENINSULA ENGINEERIN	67.	--	--	--	FORSTNER SUB 3	L08B04
	--				--	STERLING PJ 79	TH 09
SB00500914CABD1 019	PENINSULA ENGINEERIN	67.	--	--	--	STERLING PJ 79	TH 08
	--				--	FORSTNER SUB 3	L03B04
SB00500914CACB1 020	PENINSULA ENGINEERIN	67.	--	--	--	FORSTNER SUB 3	L07B04
	--				--	STERLING PJ 79	TH 10
SB00500914CADC1 021	PENINSULA ENGINEERIN	62.	--	2.	--	FORSTNER SUB 3	L05B03
	--				--	STERLING PJ 79	TH 11
SB00500914DCBC1 023	FISKE HANK	65.	16.	12.	4.	MTN RIDGE HTS	L02B01
SB00500914DCBD1 030	MERRIT CLAY	62.	11.	5.	4.	MTN RIDGE HTS	L02B02PT01
	UDELHOVEN KAREN&JESS				--	--	--
SB00500914DCCA1 024	FISKE HANK	62.	66.	7.	100.	MTN RIDGE HTS	L03B02
SB00500914DDAC1 025	AIKINS ROBERT E	58.	8.45	3.2	--	SECTION 14 LOTS	UNSUBD LOT
	--				--	STERLING PJ 88	BORING B3
SB00500914DDCA1 026	AK DNR STERLING DUMP	62.	9.35	7.70	--	SECTION 14 LOTS	UNSUBD LOT
	--				--	STERLING PJ 88	BORING B1
SB00500914DDDA1 027	AK DNR STERLING DUMP	55.	6.99	1.75	--	SECTION 14 LOTS	UNSUBD LOT
	--				--	STERLING PJ 88	BORING B4
SB00500914DDDB1 022	AK DNR STERLING DUMP	62.	9.41	4.4	--	SECTION 14 LOTS	UNSUBD LOT
	--				--	STERLING PJ 88	BORING B2
SB00500915AABA1 005	LUPTON WILLIAM	76.22	5.2	--	--	--	--
SB00500915AABB1 001	GLEN JIMMY	76.22	19.2	--	--	--	--
SB00500915ABBB1 003	YOUNG ROY	76.22	6.1	--	--	--	--
SB00500915ABBC1 008	YOUNG RICK&KATHY	73.	20.	12.	10.	MCNUTT R A SUB2	L01B
	HAWKINSON DOUGLAS C				--	LAS	001151C
	--				--	HAWKINSON-YOUNG	L02
SB00500915ACBB1 010	ORTH MARK	83.	35.	15.	15.	VALERIE ACRES 2	L01
SB00500915ACBC1 011	ORTH LEROY C/O RICE-	83.	25.	15.	10.	VALERIE ACRES 2	L02
	RICE-WHITFORD&ASSOCI				--	--	--
SB00500915ACCB1 012	DOWLING-RICE&ASSOCIA	83.	--	--	--	VALERIE ACRES	TR0H
	DESMIDT JOE				--	--	--
SB00500915ACCC1 007	DESMIDT J	83.84	33.	13.72	20.00	VALERIE ACRES	TR0H
	--				--	ADL	200245
SB00500915BADA1 013	MERKES LEON N	77.	12.	--	--	MERNAFF SUB	L01
SB00500915BBAA1 009	ABURTO LORENZO	80.	19.3	12.	25.	SCOUT LAKE SUB	L09B01
	--				--	LAS	008218
SB00500915BBAA2 009	STONE KEN	80.	31.0	12.	17.	SCOUT LAKE SUB	L11B01
SB00500915BBAD1 015	GEESLIN JAMES	77.	19.	10.	25.	SCOUT LAKE SUB	L07B01
SB00500915BBBC1 016	WRIGHT BOB	80.	--	15.	20.	SCOUT LAKE SUB	L01B01
SB00500915BBCB1 018	BARR PAUL J	83.	21.	--	--	SCOUT LAKE SUB	L01B02
SB00500915BBCD1 017	RATCLIFF TERRY	73.	48.	9.	15.	SCOUT LAKE SUB	L03
SB00500915BCBB1 019	SISSON CLIF	73.	26.	14.	20.	NAFF SUB	TR01
SB00500915BCCC1 014	VANRYZIN CHRIS	73.	17.	10.	15.	NAFF SUB	TR04
SB00500915BDAB1 020	MCLANE&ASSOCIATES IN	83.	--	--	--	NAFF SUB PT2	L03B01
	--				--	STERLING PJ 84	BORING 04
SB00500915BDAD1 021	MCLANE&ASSOCIATES IN	83.	--	--	--	NAFF SUB PT2	L04&05B02
	--				--	STERLING PJ 84	BORING 01
SB00500915BDBD1 022	MCLANE&ASSOCIATES IN	83.	--	--	--	NAFF SUB PT2	L07B01
	--				--	STERLING PJ 84	BORING 05
SB00500915BDCC1 023	MCLANE&ASSOCIATES IN	83.	--	--	--	NAFF SUB PT2	L15B02
	--				--	STERLING PJ 84	BORING 03
SB00500915BDDB1 024	MCLANE&ASSOCIATES IN	83.	--	--	--	NAFF SUB PT2	L09B02
	--				--	STERLING PJ 84	BORING 02
SB00500915CBBB1 025	R&M CONSULTANTS	73.	--	--	--	COURSEN SUB	TR0A
	--				--	STERLING PJ 77	TH 04
SB00500915CBCA1 026	R&M CONSULTANTS	83.	--	--	--	SECTION 15 LOTS	UNSUBD LOT
	--				--	STERLING PJ 77	TH 03
SB00500915CBCC1 027	R&M CONSULTANTS	73.	--	2.	--	SECTION 15 LOTS	UNSUBD LOT

LOCAL WELL NUMBER	OWNER	ALTITUDE OF LAND SURFACE (METERS)	DEPTH OF WELL BELOW LAND SURFACE (METERS)	WATER LEVEL BELOW LAND SURFACE (METERS)	DISCHARGE (GPM)	ASSIGNOR OF OTHER IDENTIFIER	OTHER IDENTIFIER
SB00500915CBCC1 027	--	73.	--	2.	--	STERLING PJ 77	TH 06
SB00500915CBCD1 029	R&M CONSULTANTS	83.	--	--	--	SECTION 15 LOTS	UNSUBD LOT
	--				--	STERLING PJ 77	TH 05
SB00500915CBDA1 028	R&M CONSULTANTS	83.	--	5.	--	SECTION 15 LOTS	UNSUBD LOT
	--				--	STERLING PJ 77	TH 01
SB00500915CBDC1 030	R&M CONSULTANTS	83.	--	3.8	--	SECTION 15 LOTS	UNSUBD LOT
	--				--	STERLING PJ 77	TH 02
SB00500915CCAA1 038	STREHLOW LEONARD F	83.	46.	24.	50.	SECTION 15 LOTS	UNSUBD LOT
	--				--	LAS	000614
SB00500915CCCC1 031	MCLANE&ASSOCIATES IN	77.	--	4.	--	WOODFIN SUB	L10
	--				--	STERLING PJ 83	BORING 02
SB00500915CCCC2 031	MORAN DANIEL	77.	31.	20.	8.	WOODFIN SUB	L11
SB00500915CCDC1 032	MCLANE&ASSOCIATES IN	83.	--	--	--	WOODFIN SUB	L13
	--				--	STERLING PJ 83	BORING 01
SB00500915CCDD1 033	FNMA C/O RICE-WHITFO	80.	33.	21.4	--	WOODFIN SUB	L14
	RICE-WHITFORD ASSOCI				--	--	--
SB00500915CDAD1 004	GORDON ARTHUR	76.22	45.	--	--	--	--
SB00500915CDDA1 039	BRADFORD RALPH	83.	45.	27.98	5.	SECTION 15 LOTS	UNSUBD LOT
SB00500915CDDB1 002	BRADFORD RALPH	76.22	44.	--	--	--	--
SB00500915DBAC1 037	NORTHLAND MORTGAGE	83.	29.	--	5.	CUSTER SUB	LOA4
SB00500915DBDA1 034	SPURGEON RON	83.	27.	18.	8.	EAGLE SCOUT 2	L02
	CARROLL RHEBA&DELTON				--	--	--
SB00500915DBDB1 035	EVANS JAMES	83.	29.	--	--	EAGLE SCOUT 2	L01
SB00500915DBDC1 036	SPURGEON RON	83.	29.	20.	20.	EAGLE SCOUT 2	L04
	HODDOX BOBBY				--	--	--
SB00500915DBDC2 036	HADDOCK ROBERT S	83.	51.	36.	10.	EAGLE SCOUT 2	L04
	--				--	EAGLE SCOUT 2	WELL 2 L04
SB00500915DCDB1 006	TRINITY CH DRLNG CO	83.84	--	--	--	--	--

APPENDIX B

State of Alaska Drinking Water Regulations,
maximum contaminant concentration levels,
18 AAC 80.070

18 AAC 80.070. **MAXIMUM CONTAMINANT CONCENTRATION LEVELS (MCLs).** (a) The primary maximum contaminant concentration levels (MCLs) for a public water system are

(1) **Inorganic Chemical Contaminants**

Contaminant	Maximum contaminant level (mg/L)
*Antimony	0.006
Arsenic	0.05
Asbestos	7 million fibers/liter (longer than 10 μm)
Barium	2
*Beryllium	0.004
Cadmium	0.005
Chromium	0.1
*Cyanide (as free cyanide)	0.2
Fluoride	4.0
Mercury	0.002
*Nickel	0.1
Nitrate	10 (as Nitrogen)
Nitrite	1 (as Nitrogen)
Total Nitrate and Nitrite	10 (as Nitrogen)
Selenium	0.05
*Thallium	0.002

*For a public water system with less than 150 service connections, monitoring for this contaminant is not required until January 1, 1996.

(2) **Organic Chemical Contaminants**
(A) Pesticides

Contaminant	Maximum contaminant level (mg/L)
Alachlor	0.002
Aldicarb	0.003
Aldicarb sulfoxide	0.004
Aldicarb sulfone	0.002
Atrazine	0.003
Carbofuran	0.04
Chlordane	0.002
*Dalapon	0.2
Dibromochloropropane	0.0002
*Dinoseb	0.007
*Diquat	0.02
*Endothall	0.1
*Endrin	0.002
Ethylene dibromide	0.00005

*Glyphosate	0.7
Heptachlor	0.0004
Heptachlor epoxide	0.0002
Lindane	0.0002
Methoxychlor	0.04
*Oxamyl (Vydate)	0.2
Pentachlorophenol	0.001
*Picloram	0.5
*Simazine	0.004
Toxaphene	0.003
2,4-D	0.07
2,4,5-TP	0.05

*For a public water system with less than 150 service connections, monitoring for this contaminant is not required until January 1, 1996.

(B) **Volatile Organic Chemicals (VOCs)**

Contaminant	**Maximum contaminant level (mg/L)**
1,1-Dichloroethylene	0.007
1,1,1-Trichloroethane	0.2
*1,1,2-Trichloroethane	0.005
1,2-Dichloroethane	0.005
1,2-Dichoropropane	0.005
*1,2,4-Trichlorobenzene	0.07
Benzene	0.005
Carbon tetrachloride	0.005
cis-1,2-Dichloroethylene	0.07
*Dichloromethane	0.005
Ethylbenzene	0.7
Monochlorobenzene	0.1
o-Dichlorobenzene	0.6
para-Dichlorobenzene	0.075
Styrene	0.1
Tetrachloroethylene	0.005
Toluene	1
trans-1,2-Dichloroethylene	0.1
Trichloroethylene	0.005
Vinyl chloride	0.002
Xylenes (total)	10

*For a public water system with less than 150 service connections, monitoring for this contaminant is not required until January 1, 1996.

(C) **Total Trihalomethanes (TTHMs)**

Contaminant	**Maximum contaminant level (mg/L)**
Total Trihalomethanes (the sum of the concentrations of bromodichloromethane, dibromochloromethane, tribromomethane, (bromoform), and trichloromethane (chloroform)	0.10

(D) **Other Organic Contaminants**

Contaminant	Maximum contaminant level (mg/L)
*Benzo[a]pyrene	0.0002
*Di(2-ethylhexyl)adipate	0.4
*Di(2-2ethylhexyl)phthalate	0.006
*Hexachlorobenzene	0.001
*Hexachlorocyclopentadiene	0.05
Polychlorinated biphenyls (PCBS)	0.0005
*2,3,7,8-TCDD (Dioxin)	3×10^{-8}

*For a public water system with less than 150 service connections, monitoring for this contaminant is not required until January 1, 1996.

(3) **Turbidity** (applies only to a Class A or Class B public water system using a surface water source in whole or in part, as described in 18 AAC 80.505):

Maximum contaminant level (nephelometric turbidity unit, NTU)

(A) 1 NTU, based on a monthly average as required in 18 AAC 80.505, except that five or less NTUs may be allowed if the supplier of water demonstrates to the department that the higher turbidity does not

(i) interfere with disinfection;

(ii) prevent maintenance of a detectable residual disinfectant concentration throughout the distribution system; or

(iii) interfere with microbiological determinations;

(B) 5 NTUs, based on an average for two consecutive days as required in 18.505;

(4) **Radioactive contaminants**

Contaminant	Maximum contaminant level (pCi/L)
Gross Alpha	15
Combined Radium-226 and 228	5
Gross Beta	50
Strontium-90	8
Tritium	20,000

(5) **Total coliform bacteria**

(A) for a system that collects 40 or more routine and repeat samples in a month, if no more than 5.0 percent of the samples collected during a month are total coliform-positive, the system is in compliance with the MCL for total coliforms;

(B) for a system that collects less than 40 routine and repeat samples in a month, if no more than one sample collected during a month is total coliform-positive, the system is in compliance with the MCL for total coliforms; and

(C) any fecal coliform-positive or *E. coli*-positive repeat sample, or any total coliform-positive repeat sample following a fecal coliform-positive or *E. coli*-positive routine sample, is an acute risk violation of the MCL for total coliforms for the purposes of public notice requirements in 18 AAC 80.900.

(b) The secondary maximum contaminant levels (MCLs) for a public-water system are

Contaminant	**Maximum contaminant level**
Aluminum	0.2 mg/L
Chloride	250 mg/L
Color	15 color units
Copper	1.0 mg/L
Corrosivity	Noncorrosive
Fluoride	2.0 mg/L
Foaming agents	0.5 mg/L
Iron	0.3 mg/L
Manganese	0.05 mg/L
Odor	3 threshold odor number
pH	6.5 (minimum)-8.5 (maximum)
Silver	0.1 mg/L
Sodium	250 mg/L
Sulfate	250 mg/L
Total dissolved solids	500 mg/L
Zinc	5 mg/L

(c) The secondary levels set by (b) of this section represent reasonable goals for drinking water quality and provide a general guideline for public water suppliers. These secondary contaminants mainly affect the aesthetic qualities of drinking water. However, at considerably higher concentrations health problems might exist. The department will, in its discretion, require a public water system to meet the secondary MCLs if public health is threatened or if there is a strong public objection to exceeding a listed secondary MCL. (Eff. 6/14/91, Register 118; am 3/18/93, Register 125; am 5/18/94, Register 130)

Authority: AS46.03.020 AS46.03.070 AS46.03.720
AS46.03.050 AS46.03.710