WATER QUALITY EVALUATION FOR THE NORTH DAKOTA NATIONAL GUARD CAMP GRAFTON (SOUTH UNIT), EDDY COUNTY, NORTH DAKOTA: 2001 SAMPLING

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LIST OF COMMONLY USED ACRONYMS

CGS	Acronym for the "Camp Grafton South Unit" facility
DWEL	Drinking Water Equivalent Level: concentration for a lifetime exposure that is "protective of adverse, non-cancer health effects, that assumes all of the contaminant is from a drinking water source."
CPQL	Combat Pistol Qualification Range
EPA-MCL	The U.S. Environmental Agency Maximum Contaminant Level. Maximum permissible level of contaminant in water which is delivered to any user of a public water system.
EPA-MCL^{N}	The proposed new EPA-MCL for arsenic (10 µg/L), compared with the previous standard of 50 µg/L.
MDL	Laboratory minimum detection level
MPMG	Multiple Purpose Machine-Gun range
MRF	Modified Record Fire range
MICLIC	Mine Clearing Line Charge
RID	"Reference Dose": an estimate of daily exposure to the human population that is likely to b e non-deleterious to human health over a lifetime.
USEPA	U.S. Environmental Protection Agency
ZERO	Sighting range

EXECUTIVE SUMMARY

Comesky (1989) identified three layers or sub-units of the Cherry Lake aquifer underlying the Camp Grafton South Unit (labeled CGS). He observed that there was some question as to whether these units were hydraulically connected. Piezometric evidence at some sites near North Twin Lake and Lake Coe indicates that the upper and lower units of the aquifer are not hydraulically connected. At these sites water levels in the shallow aquifer units reflect water levels of the nearby lakes, while the deeper units appear to respond piezometrically to recharge events in the uplands, and flow under artesian pressure following large recharge events.

Background water chemistry was previously discussed in depth (Schuh 1997). In brief summary, water chemistry of the Cherry Lake aquifer underlying CGS is characterized by total dissolved solids varying from less than 200 mg/L, to as high as 5,000 mg/L. Ground water in the Cherry Lake aquifer varies from a calcium-bicarbonate type to a sodium-sulfate type. At some sites chloride concentrations are high (up to 1,000 mg/L). Generally, shallow water is fresher and has less dissolved solids, sodium, and sulfate than deeper aquifer subunits.

Water samples collected from 1986 through September of 2001 indicate some periodic freshening and resalinization of ground water, but there were no major sustained changes in any of the common ions. There is some evidence of long-term freshening of South Washington Lake and of the South spring, likely caused by the wet climate of recent years.

In previous samplings (1993 and 1996) nitrate concentrations were highly variable, with most at a fraction of a mg/L, a median level of 1 mg/L, and a maximum value of 7 mg/L (Schuh 1997). None approached the U.S. Environmental Protection Agency Maximum Contaminant Level (EPA-MCL) of 44 mg/L (as NO_3^-). Most higher concentrations were in shallow wells, and were likely due to mineralized manure under pasture. Results for 2001 were almost identical as those reported previously, with the exception that three shallow wells in pasture areas had approached or exceeded 25% of an MCL, with what appears to be a slow upward concentration trend. Nitrate stratification characterized by high nitrate in the upper few feet of aquifers is very common in North Dakota, however, and even the higher concentrations of these few samples are well below concentrations commonly measured and expected at similar depths beneath agricultural land. As of 2001, there is no evidence of nitrate contamination at levels of toxicological concern on the CGS facility, nor is there evidence of substantial anthropogenic effect under current management practices.

In 1996 (Schuh 1997) there was no evidence of contamination of ground water with trace elements, including barium, lead, selenium, or mercury. In 1993 (Schuh 1994) cadmium

and zinc were also tested. No evidence of anthropogenic effects were found. Only arsenic was detected at levels of toxicological concern.

Results were similar in 2001, with the exception that elevated lead and zinc were found in South Washington Lake. Because South Washington Lake is far from munitions ranges, and is not commonly used for training exercises, there is no reasonable explanation for this result. It is suspected that the data are spurious, with samples contaminated from other sources in the field or laboratory. This site should be resampled for lead and zinc in 2003 or 2004. Of particular interest is the reservoir at Site 4 (Figure 4) which is located in the drainage basin of the firing ranges, and within a southwest wind-drift exposure from the demolitions ranges. No indications of elevated lead, barium, or other trace metals were found in the reservoir.

In previous samplings arsenic was found to be present in concentrations approaching, or exceeding the EPA-MCL of 50 µg/L in several wells and surface waters. Causes of high concentrations are natural and non-anthropogenic. Concentrations have varied over time, with largest (sometimes approaching 70 µg/L) occurring in South Washington Lake.

New EPA standards (MCL < 10 µg/L) are expected to be promulgated soon. Based on the new standards almost 50% of all sample wells were above the new MCL either in the last 2001 sampling (about 30%) or in previous samplings (about 20%). High arsenic is found in the supply wells of the firing range complex. Highest concentrations have been found in South Washington Lake and to a lesser degree in Lake Coe. High arsenic is natural, and there is no evidence of increasing trends or of an anthropogenic source. Arsenic concentrations in 2001 samples from South Washington Lake and Lake Coe were less than previous years, likely due to freshening and dilution from wet climatic conditions prevailing since 1993. Arsenic concentrations are an ongoing concern on the CGS facility. The National Guard should consider carefully the requirements for drinking water, in consultation with the North Dakota Department of Health. In addition special care should be taken in handling filtrate from training exercises using reverse osmosis equipment, which can be very high in arsenic due to concentration. This too should be managed in consultation with the North Dakota Department of Health.

In previous years a limited number of munitions and explosives residues were monitored in appropriate operational areas using EPA extraction method 8330 (USEPA 1996b). In 2001 a wide range of potential residues were monitored using EPA Methods 8260B, 8270C, 8330, and 8332 (USEPA 1996b). There were detections of acetone, carbon disulfide, methylene chloride, toluene, benzoic acid, and di-n-butylphthalate in several samples. Of these, carbon disulfide was likely present, but concentrations were far below levels of toxicological concern. Benzoic acid and di-n-butylphthalate (using Method 8270C) were likely present, but absence of a trip blank means that contamination in transit cannot be ruled out. Both were at concentrations well below levels of toxicological concern. Acetone, methylene chloride, and toluene were detected at

similar concentrations in the trip blank, and methylene chloride was also detected in a laboratory blank, which indicates that these volatile (Method 8260B) extractants were most likely introduced to the samples in the process of handling, transit, or laboratory processing. These too were in concentrations well below levels of toxicological concern. There is no evidence of ground-water contamination from volatile organics at levels of concern under current management. Low concentrations of some residues do not require immediate resampling. All detected analytes, including those with indications of likely contamination in lab or transit, should be resampled for confirmation or deconfirmation in 2006. Sampling methods for volatile compounds (Method 8260B) should be reviewed and redesigned with special measures to avoid aerial contamination, or contamination from on-site cleaning compounds (like acetone), and to avoid storage of bottles in areas near potential sources of contamination.

In each of the sample years herbicides 2,4-D and picloram were evaluated. There have been no detections of 2,4-D, while picloram (used for leafy spurge control) has been consistently detected at low levels (appr. 0.1 to 0.2 µg/L) in South Washington Lake and Lake Coe. These concentrations are several orders of magnitude below the EPA-MCL for picloram. Picloram samples were collected annually for a four year period, and the trace presence was found to be consistent.

In 2001 water samples for 2,4-D, picloram, and prometon (which is used for vegetation control around buildings) were collected. There were no detections of any of the analytes. The lack of picloram detections (with the same laboratory detection resolution), after years of low level detections, is particularly significant. Decreased picloram detection may be related to changing use or management practices, or it may be related to rising lake waters and dilution, as in the case of decreasing arsenic concentrations. There were no detections of any of the herbicides tested in the 2001 sampling.

In previous sampling years, water samples were analyzed for malathion, chlorpyrifos, and dimethoate. Of these, only chlorpyrifos and malathion are known to have been used on the CGS facility. In 1993 dimethoate was detected in one well near Lake Coe, but later samples failed to confirm presence. Neither chlorpyrifos nor malathion have been detected in any of previous samplings. In 2001 only malathion was tested. There were no detections in wells or surface waters. There has been no evidence of ground-water or surface-water contamination with insecticides in any of the samplings.

In previous samplings years (1993 and 1996) water samples from wells and surface-waters near appropriate (vehicle staging) use sites were tested for petroleum residues using total petroleum hydrocarbon (TPH) as gasoline and as diesel. There were no detections. In 2001 water samples for gasoline range organics (GRO) and diesel range organics (DRO) indicated trace presence (appr. 0.05 µg/L) of diesel range organics at Site 9, near the engineering training site,

at site 10 in the northernmost site on the CGS facility, and at Site 8, which is in the northeast portion of the camp. These detections are considered qualitative, and are about 10,000 times below the levels of "concern" used by the North Dakota Department of Health. There is no evidence of substantial contamination of ground-water with petroleum residues due to CGS facility use.

In conclusion, as of 2001 there is no evidence of degradation of ground-water or surface-water on the CGS facility through inadequate management practices or any other form of human impact. The waters of the CGS facility do, however, have persistent high levels of arsenic from natural sources that need to be managed carefully with respect to drinking-water use and management of filtrate from training using reverse osmosis units.

South Washington Lake should be resampled for lead and trace metals in 2003 or 2004. The CGS facility should be comprehensively sampled again in 2006.

2001 Recommendations for Action

1. The 2001 sampling has indicated the first non-detections of picloram in Lake Coe and South Washington Lake. Previous recommendations for frequent (every year or every second year) sampling of picloram are now changed to testing for picloram only at the time of major sample sets (next recommended for 2006).

2. Consider the ramifications of the prospective new EPA-MCL for arsenic (10 mg/L) on appropriate use for water supply wells on the firing range complex.

3. During water purification training using reverse osmosis, filtrate should be analyzed for arsenic concentration. If filtrate has high arsenic, care should be taken in disposal. Sufficient filtered water to dilute the filtrate should be returned to the original source to offset the concentrated arsenic. Filtrate disposal methods should be approved by the North Dakota State Department of Health.

4. The use of the well-house area (T149N R63W Section 35A) as a staging area for storage of herbicide and for mixing pesticides should be reviewed for well-protection safety. Overflow from filling tanks may contaminate wells. Also, it is suggested that pesticides be stored away from the well site.

5. CGS use should be reviewed and sampled again for water quality in 2006.

6. Barbed wire at all well sites should be inspected and repaired .

7. The PVC protective cover for WS-2 well 13103 (Site 1, 149-062-28CCC1) should be extended three or four inches.

8. The elevations of the measuring points (tops) of all wells should be surveyed to the nearest 0.01 foot.

9. South Washington Lake should be resampled for lead and zinc to test whether high concentrations in the 2001 samples were spurious.

10. Sampling, storage, and handling procedures for volatile organic compounds should be reviewed before the next major sampling to assure non-contamination of samples.

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INTRODUCTION

In 1992 a water quality monitoring plan for the North Dakota National Guard Camp Grafton South (CGS) facility in Eddy County, North Dakota, was submitted to the North Dakota National Guard (Schuh 1992). The plan was designed to consider existing geologic and hydrologic information, current and future use patterns of the facility, objectives and goals of protection - including the sensitivity of resources to be protected, and the limitations of funding and resources available for implementing the plan. An attempt was also made to consider training objectives and resource conservation in a balanced manner, and to maximize the information obtainable from limited field data.

The initial sampling plan was laid out in two phases. Phase I consisted of selecting appropriate surface-water sites and constructing appropriate observation wells for monitoring munitions and explosives residues, petroleum residues, and pesticide contamination. Phase I also included the collection of water samples for chemical analysis to establish base-line concentrations of contaminants, major ions, trace elements, and selected chemical parameters of each of the selected sites. Phase I was implemented in 1992 and 1993. In 1994 a report was published describing the monitoring well network, the water sample collection plan, and results of the base-line samples taken for each of the potential contaminant groups sampled at CGS. (Schuh 1994). Included in the 1994 publication were:

1. well and sampling locations;
2. well completion information, including lithologies, materials, construction methods, development, and cleaning procedures;
3. sampling procedures, including well purging methods, sampling methods, and sample-handling methods and procedures;
4. baseline data for major ion chemistry and trace elements from each newly constructed sample well;
5. data for water quality and trace elements measured in wells constructed before Phase I; and
6. a brief analysis and interpretation of results.

Phase II consisted of a plan for ongoing periodic assessment of water quality at CGS. The provisions of the initial Phase II plan were designed to be flexible and to allow for modification as understanding of area hydrology and its effect on water quality increases. Sampling and assessment of CGS water quality were to be accomplished through periodic

(three to six year interval) re-evaluation of facility use patterns of CGS and the degree of water contamination (if any) resulting from those use patterns.

Summary of Results and Recommendations From the 1993 Sampling and Assessment

The following conclusions were reached in a previous ground-water quality study at CGS (Schuh 1994). Basic water quality of the Cherry Lake aquifer is of low to average total dissolved solids (TDS < 800), near-neutral pH, and low (<1) to high (appr. 7) sodium adsorption ratio (SAR); although a few sites are brackish (TDS 1,000 to 3,000 mg/L) and have SAR as high as 34. Shallow ground water is usually a calcium bicarbonate type, while deeper aquifer units are frequently a sodium sulfate type. There were no significant detections of lead, mercury, selenium, or cadmium in any of the wells sampled. However, arsenic was present in most samples, and in some of the deeper aquifer units approached and even exceed EPA-Maximum Contaminant Level (EPA-MCL). Natural lakes were very high in TDS (1,000 to 4,000 mg/L), sulfate, chloride, and sodium, with pH above 9 and very high SAR. There were no significant lead, mercury, selenium, or cadmium detections in any of the samples. However, arsenic approached or exceeded EPA-MCL in most samples. Nitrates were low in both surface and ground water. There were no indications of anthropogenic degradation of basic water quality on the reserve.

Of the wells sampled in 1992 and 1993 there was only one pesticide detection. Dimethoate was detected at a level just below the EPA Lifetime Health Advisory Level in one well near Lake Coe. However, dimethoate was never deliberately sprayed on CGS land. The well site of the detection was within the spray drift zone of aerially sprayed picloram during drilling and construction of the well. Dimethoate residual in the picloram spray is a possible source. The dimethoate detection does not indicate a likely case of environmental contamination from routine facility use and care. There were no detections of picloram, malathion, chlorpyrifos, or any other pesticides used on the reserve in any of the well or spring samples.

There were detections of picloram (at low levels) in Lake Coe and South Washington Lake in August of 1993. Because picloram was not detected in 1986, and because of the exceptionally heavy rainfall in 1993 it was suspected that these detections were a result of exceptional runoff. It is unlikely that contaminants entered Lake Coe or South Washington Lake through ground water.

There were no indications of total petroleum hydrocarbons (gasoline or fuel oil) in any of the samples taken from ground water in August of 1993.

There were no detections of munitions and explosives residues (HMX, RDX, Nitrobenzene, tetryl, 1,3-dinitrobenzene, 2,4,6-TNT, 2,4-DNT, and 2,6-DNT) in any of the water samples taken in the fall of 1992.

The following recommendations were offered based on conclusions from the 1994 report (Schuh 1994).

1. South Washington Lake and Lake Coe should be sampled at least once per year to determine if contamination with pesticides during spraying for leafy spurge is causing a serious or long-term problem. This should continue until detection levels remain below detection limits for at least three years. Other surface water samples may also be considered for annual pesticide sampling. Pesticide samples from other designated wells should be taken as planned for the three year resampling schedule laid out in PHASE II of the initial proposal.

2. Well 13102 on Site 6 should be sampled for dimethoate again in early 1994. If any detections are made, the entire site (wells 13101 and 13102) should be sampled at least once per year until no further detections are found.

3. Water samples for analysis of major ions, trace elements, total petroleum hydrocarbons, pesticides, and munitions and explosives residues should be collected again in 1996, and on a three-year rotating schedule as described under Phase II above.

4. All wells drilled in 1992 should be surveyed for measuring point elevation to the nearest 0.01 foot by the North Dakota National Guard.

5. All wells drilled in 1992 should be fitted with locked caps on the 4-inch protective covers by the North Dakota National guard.

6. After the next sampling period (1996), the North Dakota National Guard may wish to consider a comparative analysis and report on trends in water quality from 1986 to 1994.

Summary of Results and Recommendations From the 1996 Sampling and Assessment

In 1996 the use of the CGS facility was again evaluated, and a water-quality sampling plan was designed to monitor potential contamination from current land use practices. In September of 1996 water samples were collected from wells and surface waters at CGS. The 1996 report (Schuh 1996) evaluated progress in accomplishing previous recommendations resulting from the 1994 assessment, apparent water quality status of CGS water resources based on the most recent (1996) sample results, and trends in the chemical composition of water samples collected over the ten-year period from 1986 through 1996.

Results indicated that there was no evidence of significant anthropogenic impact on major ions or trace elements in the Cherry Lake aquifer, or in surface waters. Background water chemistry of the Cherry Lake aquifer varied from low TDS (total dissolved solids) of less than 200 mg/L to brackish water having TDS as high as 5,000 mg/L. Ground water in the Cherry Lake aquifer varied from a calcium-bicarbonate type to a sodium-sulfate type. In some cases, chloride concentrations were as large as 1,000 mg/L. Shallower water was usually freshest, having lowest TDS and sulfate concentrations. Deeply buried aquifer sub-units were characterized by larger dissolved solids, sodium, and sulfate concentrations. Sodium and sulfate appeared to be largest near the top of the Pierre shale bedrock, which unconformably underlies the glacial drift.

Nitrate concentrations in surface waters and ground-water at CGS were below levels of toxicological concern, based on an EPA-MCL of 44 mg/L. Of all water samples collected in 1996, the median nitrate concentration was 1 mg/L. The maximum concentration was 7 mg/L. Most of the higher nitrate concentrations were in shallower wells. Since fertilizer is not used on the CGS Reserve the most probable nitrate source was manure from cattle grazed on the land. Trends in nitrate concentration since 1987 are variable, but from 1991 through 1996 the overall trend was toward lower nitrate concentrations. South Washington Lake has low nitrate concentrations. However, presence of manure along the lake border and strong algal blooms indicate that substantial nitrate influx is likely, and that nitrate is biologically consumed.

Trace elements, including barium, lead, selenium, and mercury were not detected in significant quantities in 1996, nor in previous samplings in 1986, and 1991-1993. Arsenic concentrations were relatively high in waters sampled on CGS. In some wells and in some surface water samples, arsenic concentrations exceed levels of toxicological concern

(EPA-MCL was 50 mg/L). Arsenic concentrations have remained relatively consistent over time, but varied over the area of the facility. Concentrations were at levels of toxicological concern in South Washington Lake. They were high in Lake Coe, and in the area of the CGS supply wells. Concentrations were also high in the area of the M-60 machine-gun range. Arsenic concentrations are almost certainly natural in origin, and have not been caused by anthropogenic activity. However, certain activities that concentrate salts, such as use of reverse osmosis systems or boiling the water, were noted to cause concentration of arsenic. Care was suggested in disposal of reverse osmosis filtrate waters, or in consumptive use of boiled water.

Eleven water samples were collected from 9 sites, including five well sites, one spring (148-063-2DA) and one reservoir (149-062-2DA) for fourteen organic compounds used in munitions and explosives. Samples were collected from watersheds fed by the major munitions and demolition training areas. Results indicated no detections of any of the compounds tested.

Nine water samples were collected from nine sites, including one from South Washington Lake, two from Lake Coe, and six from two wells on each of three sites, for measurement of total petroleum hydrocarbon (TPH) as gasoline and as fuel oil (including diesel fuel). Chosen sites were in watersheds near, or fed by areas used for vehicle staging, such as the Engineering Training Site, or common bivouac areas. Results indicated no detections of TPH as gasoline or fuel oil in any of the water samples.

Fourteen water samples were collected from eight sites for determination of pesticide concentrations. Samples included one from South Washington Lake, two from Lake Coe, one from a spring (149-063-13BDA), and ten samples from two wells on each of five well sites. Sites were chosen in watersheds near or downstream of areas where herbicides (picloram and 2,4-D) are used for leafy spurge control, or insecticide (chlorpyrifos) is used for mosquito control. Samples were tested for chlorpyrifos and picloram. Results indicated no detections of chlorpyrifos in any of the water samples. Picloram was not detected in any of the well samples or in the spring sample. Picloram was detected at low concentration (about 0.1 mg/L) in Lake Coe and South Washington Lake. Annual samples from 1993 through 1996 have indicated that trace concentrations of picloram were consistently present in South Washington Lake and Lake Coe. Concentrations detected are several orders of magnitude below EPA-MCL (500 mg/L).

LOCATION AND NUMBERING SYSTEM

The location and numbering system used in this report is based on the public land classification system used by the U.S. Bureau of Land Management. The system is illustrated in Figure 1. The first number denotes the township north of a base line, the second number denotes the range west of the fifth principal meridian, and the third number denotes the section in which the well or test hole is located. The letters A, B, C, and D designate, respectively, the northeast, northwest, southwest, and southeast quarter section, quarter-quarter section, and quarter-quarter-quarter section (10-acre tract). For example, well 149-063-4ADD is located in the SE 1/4 SE 1/4 NE 1/4 Sec. 4, T. 149 N., R. 63 W. Consecutive terminal numerals are added if more than one well or test hole is located within a 10 acre tract.

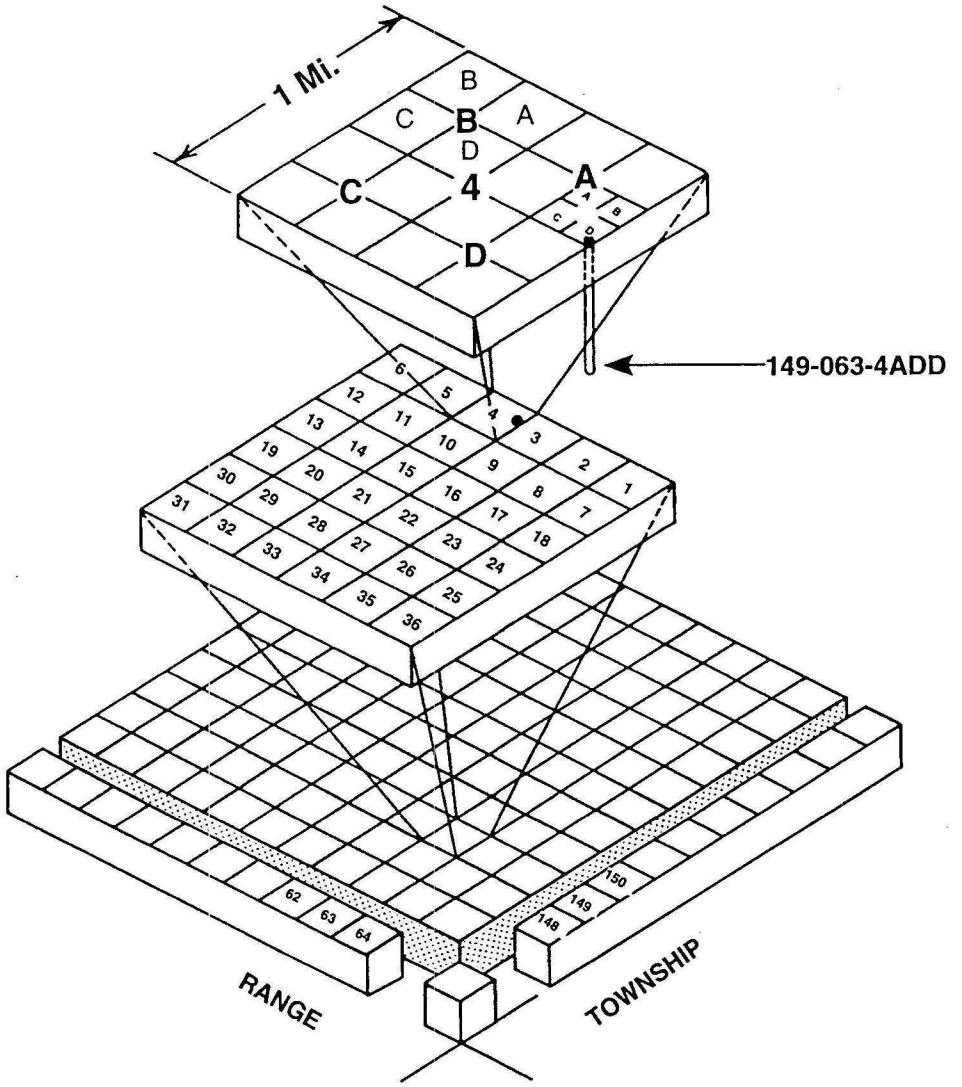


Figure 1. Location-numbering system used in this report (From U.S. Bureau of Land Management.)

CLIMATE, GEOLOGY, AND HYDROLOGY

CGS is located in Eddy County in East Central North Dakota (Figure 2). The facility occupies portions of four townships, Lake Washington (149-063), Colvin (149-062), Paradise (148-062), and Cherry Lake (148-062). CGS lands are approximately bisected by State Highway 15 which runs east-west.

Climate

The Climate of Eddy County North Dakota is continental, having cold winters and hot summers. The onset of cold weather usually begins in early November. The frost usually leaves the soil in mid April. The moisture regime is borderline between semi-arid and sub-humid, with a long term average precipitation of about 48 cm (19 inches).

Geologic and Hydrologic Setting

The general geological setting of Camp Grafton South has been described by Bluemle (1965), and by Comeskey (1989). Local geology and its relation to water resources on the CGS facility and the sampling plan were discussed in detail by Schuh (1994). In general, the surficial geology of the CGS facility consist of uplands which are composed of glacial drift which comprise sub-units of the McHenry End Moraine, and lowlands, or drainage basins, which drain toward the Sheyenne River about five miles north of CGS. A simple schematic of the relationship between moraine uplands and lowland basins is shown on Figure 3.

There are three distinct sub-units of the McHenry End Moraine on the CGS facility (called moraine units 1, 2, and 3 in this report). The largest subunit (moraine unit 1) extends from the southern through the northern boundary on the east side of the facility, and separates the drainage into two principal basins. On the east side, all drainage flows northeastward toward the Sheyenne River through the Colvin Creek basin. On the west side of moraine unit 1, all drainage flows toward the Sheyenne River through the Lake Coe and South Washington Lake basin. The other two sub-units of the McHenry End Moraine on the CGS facility (moraine units 2 and 3) are oriented north to south, and are located entirely in the southern half of the facility . Neither extends north of HWY 15. These two moraine sub-units serve to divide the southern portion of the Lake Coe and South Washington Lake basin into three sub basins. Most drainage through the Lake Coe and South Washington Lake

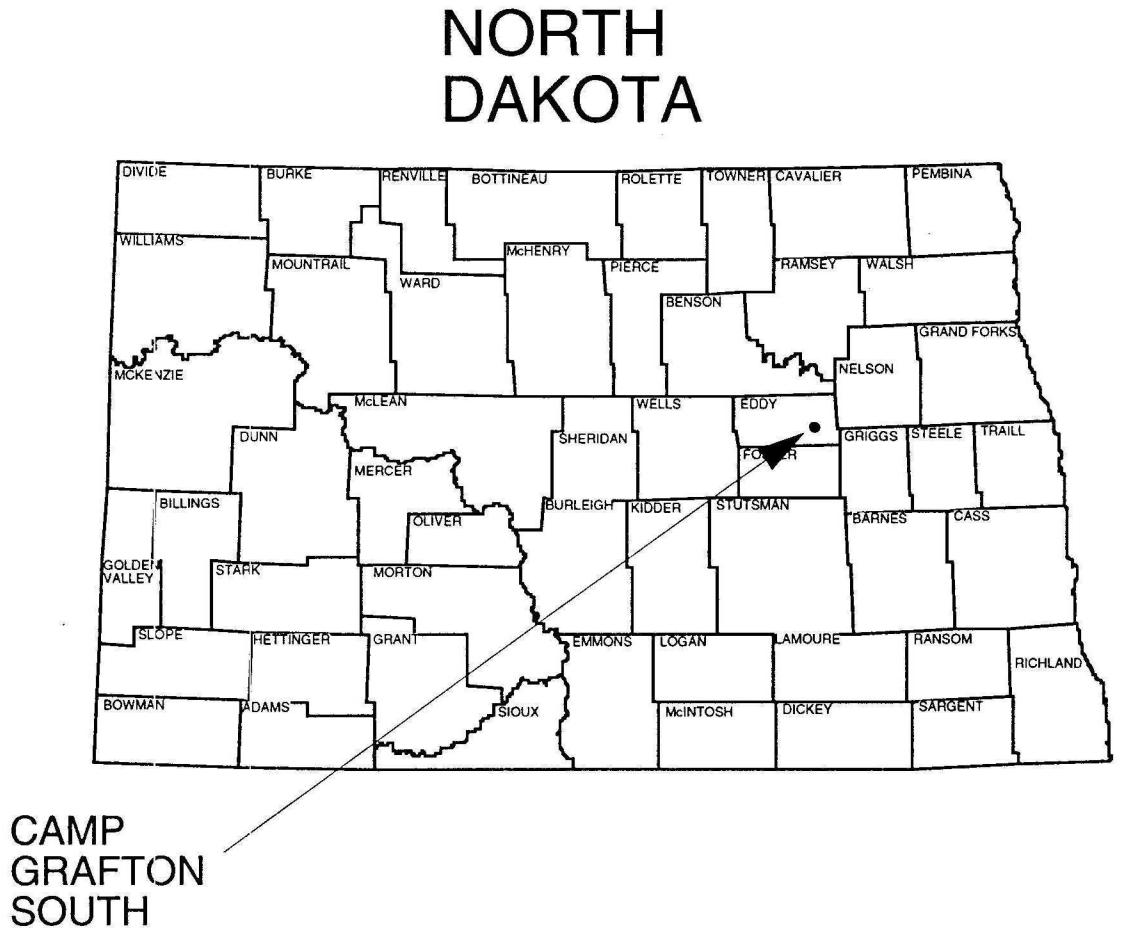
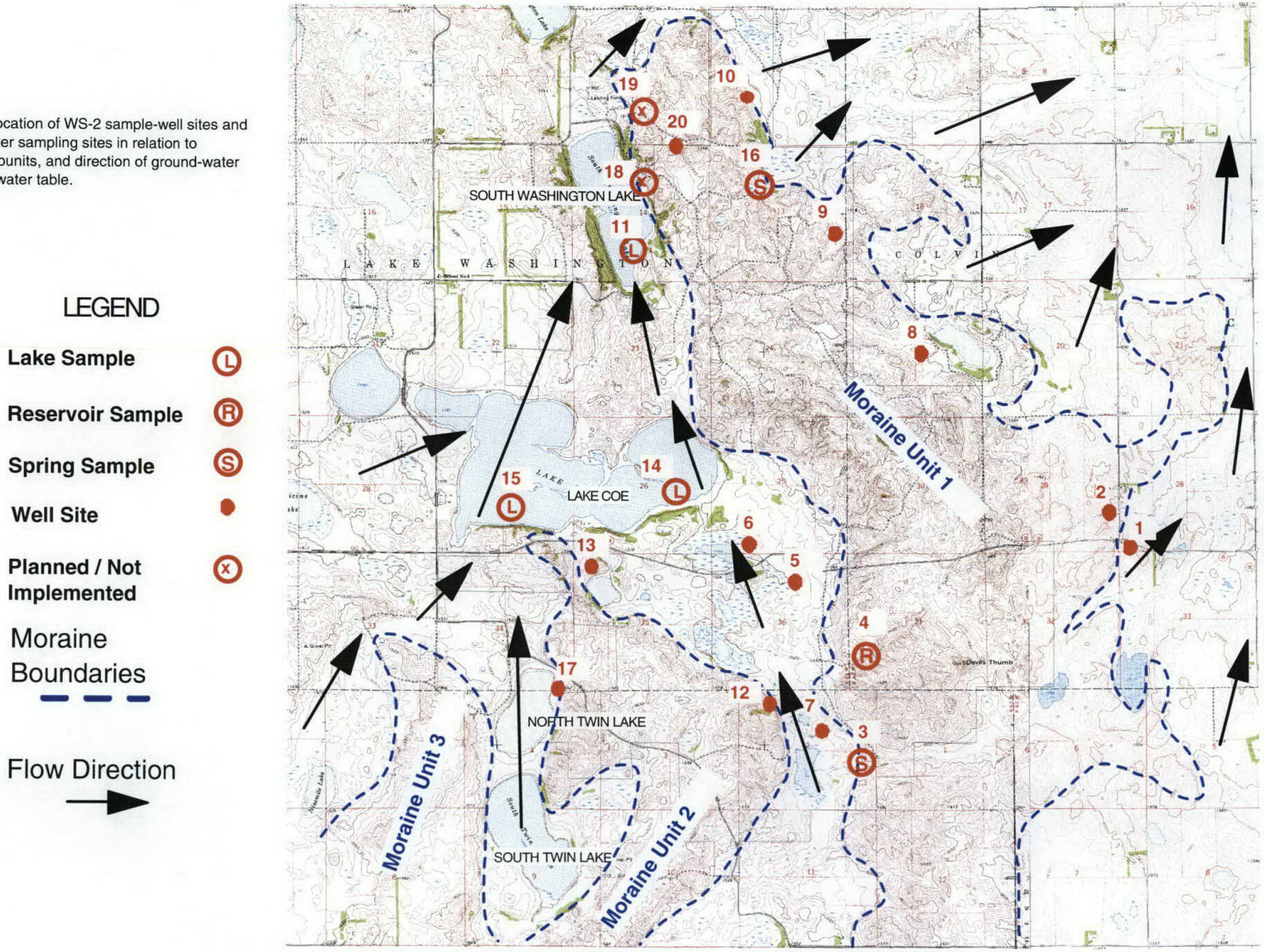


Figure 2. Location of the Camp Grafton (South Unit) training facility.

Figure 3. Location of WS-2 sample-well sites and surface-water sampling sites in relation to moraine subunits, and direction of ground-water flow at the water table.



basin originates from the eastern two of these sub basins. Between moraine unit 1 and moraine unit 2 water flows northward to Lake Coe through a series of small lakes and littoral areas. Between moraine unit 2 and moraine unit 3, water flows northward to Lake Coe through North and South Twin Lakes. Drainage from uplands to lowlands occurs through a series of coulees.

The principle ground-water resource underlying the CGS facility is the Cherry Lake aquifer. Trapp (1966b) and Comeskey (1989) described the Cherry Lake aquifer system as composed of two confined units, separated by 20 to 40 feet of glacial till. The top of the deepest (and least aerially extensive) unit is located approximately between 126 and 182 feet below land surface. Both Trapp (1996b) and Comesky (1989) have noted that the two confined units may be hydraulically connected in some areas. However, drilling and exploration to date have not succeeded in documenting where aquifer units are hydraulically connected. There is some recent piezometric evidence that shallower confined aquifer units are not connected to deeper confined units at some locations, notably at Sites 17 near North Twin Lake and Site 6 located in the littoral area southeast of Lake Coe (Fig. 3). At these locations deeper aquifer units were subjected to substantial increases in artesian pressure (to the point of becoming flowing wells) following large rains in 1993. Shallower confined aquifer units at the same location exhibited much smaller increases in piezometric pressure. These observations indicate that some areas of the deeper aquifer unit may be directly connected to recharge areas in the uplands, while being locally insulated from extensive interaction with overlying aquifer units or surface lakes. Conversely, in these examples surficial and shallow confined aquifer components do not appear to be strongly and directly affected by upland recharge, but rather appear to have piezometric responses more characteristic of water levels in nearby lakes.

In addition to the two confined units of the Cherry Lake aquifer, Comesky (1989) identified a surficial unconfined unit. The surficial unit consists of a sand mantle overlying the glacial till confining the lower aquifer units. In many areas, however, this mantle is not saturated. Comesky (1989) also described the presence of some coarse sand and gravel deposits within the glacial drift that are apparently locally isolated and not hydraulically connected with the larger aquifer aquifer units.

Comeskey (1989) has described recharge as occurring through closed depressional areas on the McHenry Moraine. The local flow system from the Moraine is described as occurring easterly and westerly toward the dividing lowlands. Numerous springs flow out from the moraine at lower elevations in coulees and near lowlands and littoral areas.

Springs may be exposures of contacts between surface sands and the underlying till, or they may consist of exposures of deeper buried units.

The lake system has been described as an exposure of the water table, and has been used to describe a general regional flow of the water-table aquifer. Water table maps (Trapp 1966a), which may or may not be related to piezometric levels in the underlying aquifers, indicate that overall regional ground-water flow at the water table is toward the Sheyenne River through the Washington lakes chain, and through the Colvin Creek lowland.

There is a very slight water table gradient southeastward toward the Johnson Lake aquifer, and some water movement may occur in that direction. Flow from Cherry Lake is indicated to be southward toward the Juanita Lake aquifer and the James River. Generally, however, CGS land is too far north to affect the southward drainage system. Also water-table gradients toward the Johnson Lake Aquifer are small. All indications from current information are that most ground water and surface water moves on a regional scale northward to the Sheyenne River through the Lake Coe/Washington Lake chain (and sub-units), and through the Colvin Creek basin.

Readers are also referred to Comesky (1989) and Trapp (1966b) for in depth studies of the Cherry Lake aquifer. In addition, Schuh (1994) described the relationship between local geology and hydrology, and land use practices and potential risk of ground-water contamination.

OBJECTIVES AND PRIORITIES

Objectives and priorities for the CGS water quality sampling plan were discussed in detail by Schuh (1994). In brief, priorities in designing the plan were:

Priority 1: protection of ground-water and surface-water exterior to CGS. The primary focus is on detection of contaminants migrating to regional rather than local flow systems, before they can substantially effect the regional resource.

Priority 2: protection of the wildlife, such as migratory waterfowl, that inhabit the lakes and wetlands of CGS.

Priority 3: protection of the local fresh-water supply.

Monitoring Plan Criteria

Factors considered in the water quality monitoring plan included: (1) the nature of local and regional surface drainage; (2) the nature of local and regional ground-water flow; (3) the disposition and use of water by others near the military reservation; (4) the sensitivity of specific water uses on and near the reservation to specific contaminants; and (5) land use patterns on the military reservation. Consideration was also given to the desirability of having all major use areas of the reserve given sample representation.

SELECTION OF SAMPLING POINTS AND MONITORING WELLS

Water samples were collected from three basic sources on CGS. The three sample sources include two sets of sampling and monitoring wells, and a number of surface water sources that include two lakes, two springs, and one reservoir.

Well Set 1 (WS-1)

The first well set (labeled Well Set 1, or WS-1) was installed by Comesky (1989), in mapping the Cherry Lake aquifer on CGS. This well set consists of 25 wells placed in nests of one to four wells at a total of 12 sites. Well placement was non-biased with respect to CGS use patterns, geology, and topography. Wells were placed at approximately evenly spaced intervals along two transects, one north to south, and the other east to west. Well construction was of 2-inch and 1.25-inch polyvinyl chloride (PVC) casing, and joints were bonded using solvent-weld cement containing methyl-ethyl ketone. WS-1 wells are protected from cattle by barbed wire fences, but they do not have a protective cover, nor are they locked and secured. Placement of these wells limits their usefulness for sampling contaminants from targeted land uses. Construction methods and security limitations also limit their usefulness for sampling organic contaminants (Parker et al. 1990, Sykes et al. 1986). However, both construction and placement methods render the WS-1 wells best suited for sampling inorganic constituents. In addition, these wells have the longest sampling record for major ion chemistry (dating to 1987). WS-1 wells are used for ongoing sampling of major ion chemistry and for piezometric readings. They may also be used for supplemental sampling of organic contaminants if needed for investigation of specific problems. Locations of WS-1 wells are summarized on Table 1, and illustrated on Figure 4. Detailed hydrologic setting of well nests, lithologic logs for WS-1 wells,

Table 1. List and locations of 1993 proposed sampling sites for the CGS training facility as presented in the initial plan proposal. WS-1designates wells placed by Comesky (1989). WS-2 designates wells placed by Schuh (1994).

Well Set	Site	SWC Well No.	Township N	Range W	Section	Location	Water Source	Mun.	TPH	piclor-am	chlor-pyrifos	Basic	Trace
WS-1		12024A	148	63	1	CBBC1	W					x	x
WS-1		12024B	148	63	1	CBBC2	W					x	x
WS-1		12024C	148	63	1	CBBC3	W					x	x
WS-1		12020A	149	63	14	DACD1	W					x	x
WS-1		12020B	148	63	14	DACD2	W					x	x
WS-1		12020C	148	63	14	DACD3	W					x	x
WS-1		12019A	149	63	23	ADBB1	W					x	x
WS-1		12019B	149	63	23	ADBB2	W					x	x
WS-1		12019C	149	63	23	ADBB3	W					x	x
WS-1		12017A	149	63	25	DBBC1	W					x	x
WS-1		12017B	149	63	25	DBBC2	W					x	x
WS-1		12017C	149	63	25	DBBC3	W					x	x
WS-1		12017D	149	63	25	DBBB4	W					x	x
WS-1		12025	149	63	26	DCA	W					x	x
WS-1		12012	149	63	27	DDDC1	W					x	x
WS-1		12015B	149	63	31	ABBC2	W					x	x
WS-1		12015C	149	63	31	ABBC3	W					x	x
WS-1		12026A	149	63	34	BBB1	W					x	x
WS-1		12026B	149	63	34	BBB2	W					x	x
WS-1		12011B	149	63	35	ABBD2	W					x	x
WS-1		12014A	149	63	36	AACB1	W					x	x
WS-1		12014B	149	63	36	AACB2	W					x	x
WS-1		12014C	149	63	36	AACB3	W					x	x
WS-1		12014D	149	63	36	AACB4	W					x	x
WS-1		12023A	149	63	36	DDBBC1	W					x	x
WS-1		12023B	149	63	36	DDBBC2	W					x	x
WS-1		12023C	149	63	36	DDBC3	W					x	x
WS-1		12021A	149	63		BAAB1	W					x	x
WS-2	1	13104	149	62	28	CCC2	W	x		x	x	x	x
WS-2	2	13105	149	62	29	DAD	W	x				x	x
WS-2	3	Spring	148	63	2	DA	S	x				x	x
WS-2	4	Reservoir	149	62	31	C	R	x				x	x
WS-2	5	13098	149	63	36	ACA2	W	x				x	x
WS-2	6	13102	149	63	25	CDC2	W	x		x	x	x	x
WS-2	7	13087	148	63	2	ACA2	W	x				x	x
WS-2	8	13091	149	62	19	DBD2	W		x	x	x	x	x
WS-2	9	13089	149	63	13	DAA2	W		x	x	x	x	x
WS-2	10	13093	149	63	12	CAC2	W		x	x	x	x	x
WS-2	11	S W Lake	149	63	14	CAC	L		x	x	x	x	x
WS-2	12	13085	148	63	2	BABC2	W		x	x	x	x	x
WS-2	13	13100	149	63	35	BCBA2	W		x	x	x	x	x
WS-2	14	Lake Coe	149	63	26	ADD	L		x	x	x	x	x
WS-2	15	Lake Coe	149	63	27	DDB	L		x	x	x	x	x
WS-2	16	Spring	149	63	13	BDA	S			x	x	x	x
WS-2	17	13096	148	63	4	ABA2	W			x	x	x	x
WS-2	18a		149	63	14	BAA	S			x	x	x	x
WS-2	18b		149	63	14	BAA	S			x	x	x	x
WS-2	18c		149	63	14	BAA	S			x	x	x	x
WS-2	19		148	63	11	DDC	W			x	x	x	x
WS-2	20	13094	149	63	14	AAB	W			x	x	x	x

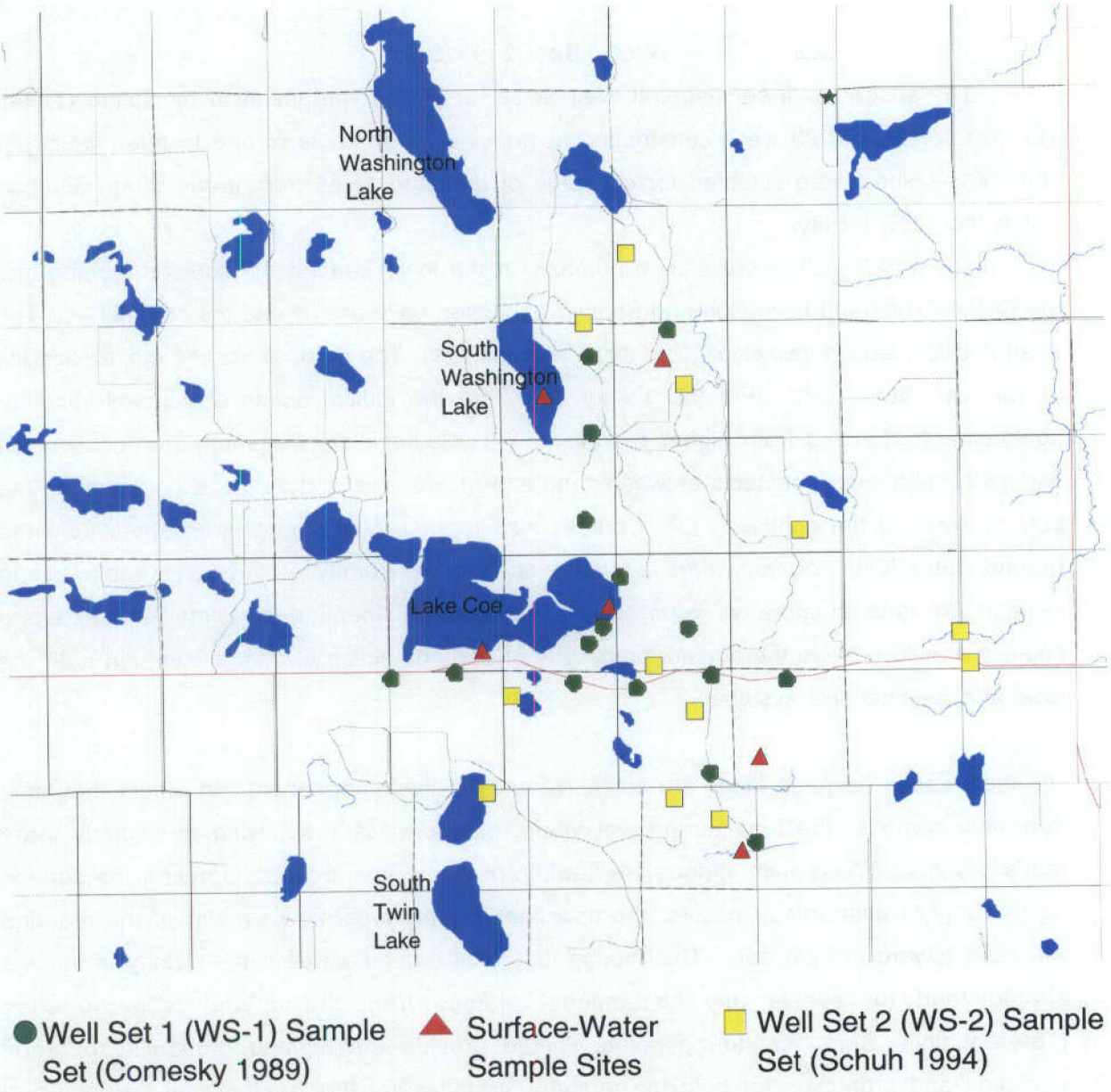


Figure 4. Location of ground water and surface-water sampling sites used for monitoring water quality on Camp Grafton(South Unit) lands.

and initial water chemistry data from samples collected in 1987 are in Comesky (1989). A list of locations and wells for the 1996 sampling is on Table 2.

Well Set 2 (WS-2)

The second well set (labeled Well Set 2, or WS-2) was installed by Schuh (1994). This set consists of 23 wells constructed at twelve sites in nests of one to three wells per site. WS-2 sites were selected for coverage of drainage areas from areas of specific use within the CGS facility.

The WS-2 wells were placed primarily in the lower reaches of coulees feeding into the Colvin Creek and Lake Coe and South Washington Lake basins and their tributaries. The mouths of coulees were selected for three reasons. (1) The coulees are the major conduits of surface water runoff. For this reason, they are the logical points of concentration for contaminants draining from higher elevations. (2) Coulees are frequently the locations of springs formed where contacts between sand and gravel units and till are exposed along the cuts or walls of the coulees. (3) Coulees also represent local discharge areas from the ground-water flow system, where seepage or closer proximity of the water table to the surface facilitate evaporative water loss. As a result, monitoring points located along coulees should provide the highest probability of early detection of contaminants in both the local and regional flow systems.

In some cases seepage faces are extensive and relatively permanent. In others they may flow only some of the time during wet years, or sporadically following particularly large rainfall events. When such springs are flowing, or when ground water is nearer the surface so that higher evaporation occurs, the flow lines for the local flow system of the moraine will bend toward the coulees. This means that local ground water in the vicinity of springs should tend to receive any contaminant plumes from the upland recharge sites preferentially. Such monitoring points should provide the highest probability of early detection and protection for both the regional ground-water flow system and the lake and littoral areas.

Well placement was also based on specific use of the watershed. Specific targeted uses included weapons and demolitions ranges, vehicle staging areas, bivouac areas, and pest control areas. To accommodate sampling for organic contaminants, well construction consisted of 2-inch PVC casing, with joints fastened using stainless steel screws, rather than solvent weld cement (Parker et al. 1990, Schuh et al. 1997, Sykes et al. 1986). Well annuli above the well-screen were sealed with high solids bentonite. Each well was secured

by a 6-inch PVC protective cover (PC) with concrete at the base, and by a locking aluminum cap.

Placement, construction, and security make WS-2 wells most appropriate for sampling organic contaminants, and site-specific contaminants from munitions, pesticides, and petroleum spills on weapons and demolitions ranges, vehicular staging areas, bivouac sites, and pest control areas. Specific uses and locations for each well set were described in detail by Schuh (1994). A summary of samples collected from each well site in 1996 is shown on Table 2. Piezometric readings are avoided in these wells because of the desirability of avoiding surface contamination. WS-2 wells were sampled after their construction to provide baseline data for major ion chemistry and trace elements. However, they are not routinely used to monitor changes in major ion chemistry on the CGS facility. These samples are collected from WS-1 wells. WS-2 wells may be used for supplementary samples for major ion chemistry if needed for a specific investigative purpose. Locations of WS-2 wells are summarized on Table 2, and illustrated on Figure 4. Detailed hydrologic setting of well nests, lithologic logs for WS-2 wells, and initial water-chemistry data from samples collected in 1992 and 1993 are described in Schuh (1994).

Surface-Water Sampling Sites

There are six surface-water sampling sites. These include two springs, two sampling sites on Lake Coe, one sampling site on South Washington Lake, and one sampling site on a small reservoir located west of the M-60 range. The two spring sites, and the three lake sites were sampled with the WS-1 well set in 1986. The reservoir was added with the 1993 sampling because of its position for collecting runoff from the firing range complex (Area Descriptions R-1-3 through R-1-8 on Fig. 5). Surface-water sampling locations are summarized on Table 2, and shown on Figures 3 and 4.

Table 2. List and locations of proposed 1996-1997 sampling sites for the CGS training facility. WS-1 designates wells placed by Comesky (1989), and WS-2 designates wells placed by Schuh (1994).

Well Set	Site	SWC Well No.	Township N	Range W	Section	Location	water source	Mun.	TPH	piclor-am	chlor-pyrifos	Basic	Trace
WS-1		12024A	148	63	1	CBBC1	W					x	x
WS-1		12024B	148	63	1	CBBC2	W					x	x
WS-1		12024C	148	63	1	CBBC3	W					x	x
WS-1		12020A	149	63	14	DACD1	W					x	x
WS-1		12020B	148	63	14	DACD2	W					x	x
WS-1		12020C	148	63	14	DACD3	W					x	x
WS-1		12019A	149	63	23	ADBB1	W					x	x
WS-1		12019B	149	63	23	ADBB2	W					x	x
WS-1		12019C	149	63	23	ADBB3	W					x	x
WS-1		12017A	149	63	25	DBBC1	W					x	x
WS-1		12017B	149	63	25	DBBC2	W					x	x
WS-1		12017C	149	63	25	DBBC3	W					x	x
WS-1		12017D	149	63	25	DBBB4	W					x	x
WS-1		12025	149	63	26	DCA	W					x	x
WS-1		12012	149	63	27	DDDC1	W					x	x
WS-1		12015B	149	63	31	ABBC2	W					x	x
WS-1		12015C	149	63	31	ABBC3	W					x	x
WS-1		12026A	149	63	34	BBB1	W					x	x
WS-1		12026B	149	63	34	BBB2	W					x	x
WS-1		12011B	149	63	35	ABBD2	W					x	x
WS-1		12014A	149	63	36	AACB1	W					x	x
WS-1		12014B	149	63	36	AACB2	W					x	x
WS-1		12014C	149	63	36	AACB3	W					x	x
WS-1		12014D	149	63	36	AACB4	W					x	x
WS-1		12023A	149	63	36	DDBBC1	W					x	x
WS-1		12023B	149	63	36	DDBBC2	W					x	x
WS-1		12023C	149	63	36	DDBC3	W					x	x
WS-1		12021A	149	63	13	BAAB1	W					x	x
WS-2	1	13103	149	62	28	CCC1	W	x				x	x
WS-2	1	13104	149	62	28	CCC2	W	x				x	x
WS-2	2	13105	149	62	29	DAD	W	x				x	x
WS-2	3	Spring	148	63	2	DA	S	x				x	x
WS-2	4	Reservoir	149	62	31	C	R	x				x	x
WS-2	5	13097	149	63	36	ACA1	W	x				x	x
WS-2	5	13098	149	63	36	ACA2	W	x				x	x
WS-2	6	13101	149	63	25	CDC1	W	x				x	x
WS-2	6	13102	149	63	25	CDC2	W	x				x	x
WS-2	7	13086	148	63	2	ACA1	W	x				x	x
WS-2	7	13087	148	63	2	ACA2	W	x				x	x
WS-2	8	13090	149	62	19	DBD1	W		x	x	x		
WS-2	8	13091	149	62	19	DBD2	W						
WS-2	8	13106	149	62	19	DBD3	W		x	x	x		
WS-2	9	13088	149	63	13	DAA1	W		x	x	x		
WS-2	9	13089	149	63	13	DAA2	W		x	x	x		
WS-2	10	13092	149	63	12	CAC1	W		x	x	x		
WS-2	10	13093	149	63	12	CAC2	W		x	x	x		
WS-2	11	S W Lake	149	63	14	CAC	L		x	x	x		
WS-2	12	13084	148	63	2	BABC1	W						
WS-2	12	13085	148	63	2	BABC2	W						
WS-2	13)	13099	149	63	35	BCBA1	W			x			
WS-2	13	13100	149	63	35	BCBA2	W			x			
WS-2	14	Lake Coe	149	63	26	ADD	L		x	x	x		
WS-2	15	Lake Coe	149	63	27	DDB	L		x	x	x		
WS-2	16	Spring	149	63	13	BDA	S			x	x		
WS-2	17	13095	148	63	4	ABA1	W			x			
WS-2	17	13096	148	63	4	ABA2	W			x			
WS-2	20	13094	149	63	14	AAB	W						

PREVIOUS SAMPLING RECOMMENDATIONS

Following water sampling and analysis in 1992 and 1993 six recommendations were made. These were listed above in the Introduction section. Recommendation #1994-1: that Lake Coe and South Washington Lake be sampled at least once per year to determine if picloram contamination is an ephemeral or long-term condition, has been implemented. Samples for picloram were collected in 1994, 1995, and 1996 from each lake. Results indicated that trace levels of picloram were consistently present, and that background picloram is therefore a consistent outcome of current weed-control management on the CGS facility. Status of pesticide detections will be presented and discussed in greater detail later in this report. Recommendation #1994-2: that dimethoate be resampled in WS-2 Well 13102 (Site 6) in early 1994 to determine whether the well was contaminated was implemented in June of 1994. Results indicated no further detections of dimethoate. The initial (fall 1993) detection was therefore either spurious or ephemeral. Recommendation #1994-3: that sampling for each potential contaminant group be selectively repeated in 1996 was implemented and will comprise the discussion of most of this report. Recommendation #1994-4: that all wells drilled in 1992 be surveyed for measuring point elevation (MP) has not yet been implemented. Recommendation #1994-5: that all wells drilled in 1992 be fitted with locking caps was completed by the North Dakota National Guard in 1995. However, WS-2 Well 13103 (Site 6, 149-062-28CCC1) was too long for the outside protective case, and the aluminum cap could not be closed without removing the inside cap, risking contamination of the well. This PC needs to be extended a few inches to allow for proper cap fit. Recommendation #1994-6: that a comparative analysis of water chemistry data trends be considered following the 1996 sampling was implemented in Schuh (1997), and will be updated in this report.

Following water sampling and analysis in 1996 eight recommendations were made (Schuh 1997). Recommendation #1997-1: that samples for picloram in Lake Coe and South Washington Lake be collected every other year instead of every year. The lakes were sampled in 2001. Recommendation #1997-2: that water supply wells locates south of HWY 15 (149-063-35A) should be sampled for water chemistry and for trace elements, and sampled annually to determine arsenic concentration. These wells were sampled and reported in a memorandum from W.M. Schuh to Mr. Neal Jacobson, titled Water Quality and Arsenic Concentrations in the Camp Grafton South Supply Wells, dated 5/20/98. Recommendation #1997-3: that appropriate procedures for disposal of high arsenic filtrate should be established following use or training in water purification using reverse

osmosis. Appropriate procedures have been worked out with the North Dakota Department of Health. Recommendation #1997-4: that the well-house area (149-063-35A) as a staging area for storage of herbicide and for mixing herbicides should be reviewed for well-protection safety, and that pesticides be stored away from the well site. No action has yet been collected. Recommendation #1997-5: that CGS wells should be sampled again for water quality in 2001 has been implemented and is completed with this report. Recommendation #1997-6: that the PVC protective cover for WS-2 well 13103 (Site 1, 149-062-28CCC1) should be extended three or four inches. No action has yet been taken. Recommendation #1997-1: that elevations of the measuring points (tops) of all wells should be surveyed. No action has yet been taken.

CAMP GRAFTON SOUTH USE PATTERNS

In 1996 major ion chemistry and trace elements were measured in all of the WS-1 wells. In 2001 only the shallow WS-1 wells were sampled. Deeper wells in nests were not sampled. Sampling from the WS-2 wells was designed to monitor potential contamination based on CGS use patterns. A summary of samples collected from each well and surface-water source is shown on Table 3. Sample results in this report will be discussed under categories: 1. background water quality, 2. munitions and explosives, 3. herbicides, 4. pesticides, and 5. petroleum residues. CGS use patterns affecting water quality can be summarized as follows.

1. Agricultural use: most of the CGS facility is used for grazing during part or all of the year. The primary chemical parameter of concern would be nitrate. Nitrate is tested with major ion quality sampling on the WS-1 wells and selected WS-2 wells (Table 3). Weed control (primarily leafy spurge) is practiced throughout CGS. Herbicides used are picloram and 2,4-D.

2. Bivouac sites: common bivouac site locations are shown on Figure 5. Potential contaminants on bivouac sites include gasoline and diesel fuel (from vehicles staged on site), and insecticides used for mosquito control (usually malathion or chlorpyrifos). Previously, potential nitrate and bacterial contamination from latrines was possible. Current CGS practice (since about 1990) is to use portable lavatories, which should minimize future contamination. Tests for bivouac areas previously included TPH as

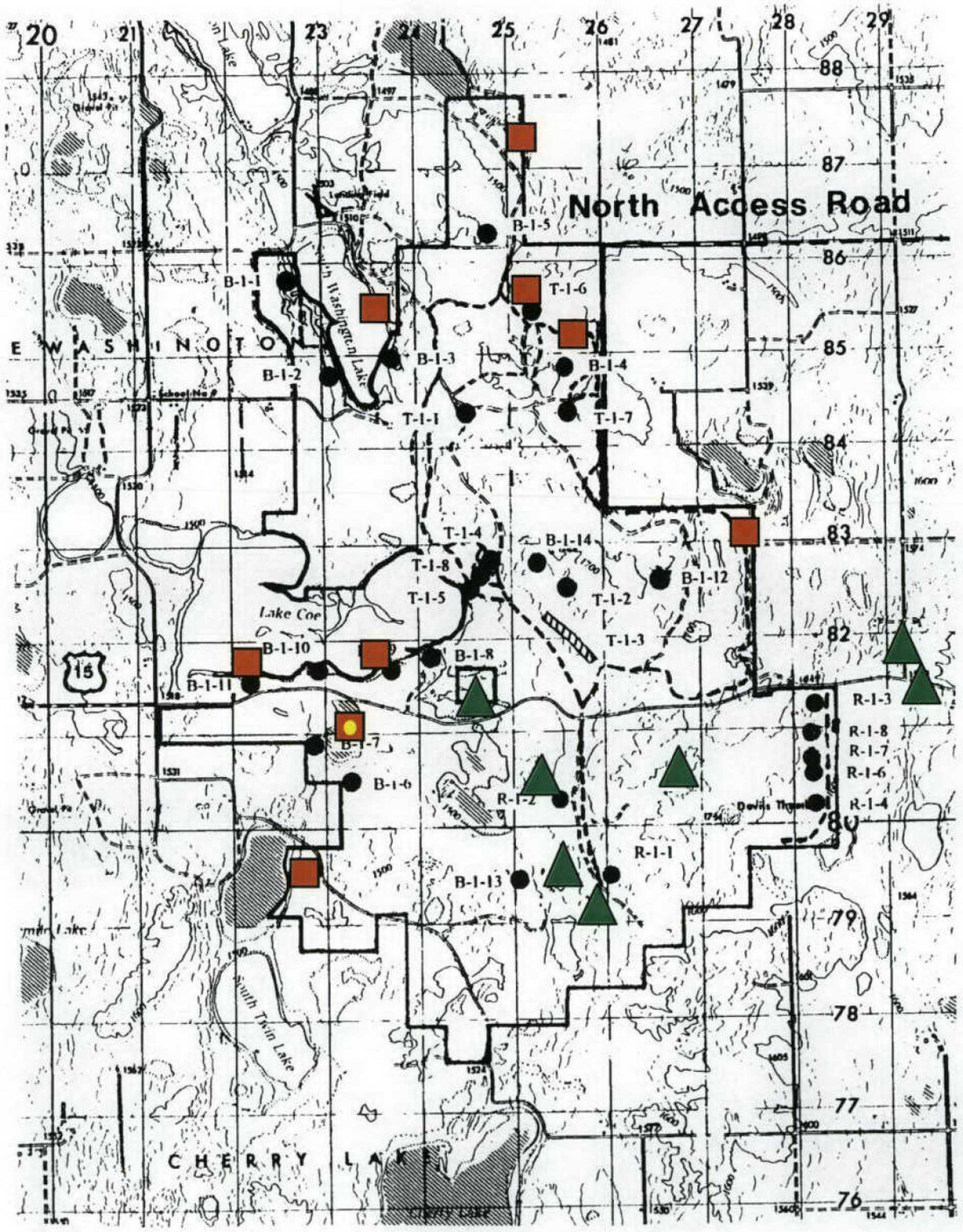
gasoline and TPH as fuel oil (which includes diesel fuel). This has been replaced by GRO (gasoline range organics) and DRO (diesel range organics). Insecticides tested in 1996 were chlorpyrifos and malathion. In 2001 only malathion was tested. Nitrates were tested for samples on bivouac sites. Some trace metals were also tested as possible indicators of contamination from spills of used motor oils. Locations of planned pesticide, petroleum, major ion chemistry, and trace element samples are on Table 3.

3. Munitions and explosives use sites: most of these are located south of HWY 15. The demolitions range, located at T149N R63W Section 36DC has been in operation since 1993. The M-60 range located at T149N R062W Section 32B was completed in 1993. The M203 range was completed in 1992; and the pistol range was completed in 1995.

CAMP GRAFTON SOUTH

BIVOUAC SITES, TRAINING AREAS & RANGES

AREA NO.	AREA DESCRIPTION	GRID LOCATION
B-1-1	BIVOUAC SITE	NH 22658585
B-1-2	BIVOUAC SITE	NH 23108489
B-1-3	BIVOUAC SITE	NH 23808503
B-1-4	BIVOUAC SITE	NH 25558490
B-1-5	BIVOUAC SITE	NH 24958630
B-1-6	BIVOUAC SITE	NH 23368054
B-1-7	BIVOUAC SITE	NH 22908090
B-1-8	BIVOUAC SITE	NH 24148175
B-1-9	BIVOUAC SITE	NH 23758175
B-1-10	BIVOUAC SITE	NH 22908160
B-1-11	BIVOUAC SITE	NH 22158155
B-1-12	BIVOUAC SITE	NH 26558268
B-1-13	BIVOUAC SITE	NH 25057945
B-1-14	BIVOUAC SITE	NH 25358280
T-1-1	INDIRECT WEAPONS EMPL.	VIC NH 245845
T-1-2	DIRECT FIRE EMPLACEMENT	VIC NH 257825
T-1-3	TANK DITCH / BARRIER AREA	NH 251825 TO 257817
T-1-4	TIMBER TRESTLE BRIDGE SITE	VIC NH 247827
T-1-5	BAILEY BRIDGE SITE	VIC NH 246824
T-1-6	ENGINEER EQUIP. TRNG. SITE	VIC NH 252858
T-1-7	M4T6 BRIDGE SITE, DRY (NORTH)	VIC NH 256845
T-1-8	M4T6 BRIDGE SITE, DRY (SOUTH)	VIC NH 146826
R-1-1	M203, AT 4, MK 19 RANGE	NH 25757995
R-1-2	DEMOLITION RANGE	NH 25608025
R-1-3	MULTIPURPOSE MG RANGE	NH 28308130
R-1-4	MODIFIED RECORD FIRE RANGE	NH 28308020
R-1-5	KD RANGE (NOT CONSTRUCTED)	
R-1-6	25 METER ZERO RANGE	NH 28308055
R-1-7	COMBAT PISTOL RANGE	NH 28308060
R-1-8	MICLIC RANGE	NH 28308085



Explosive Residue Samples

Pesticide

Figure 5. Location of sites for pesticide samples in relation to bivouac sites; and sample sites for explosives residue samples in relation to training areas involving demolitions and munitions training. ● indicates site with no TPH sample.

Table 3. List and locations of 2001 proposed sampling sites for the CGS training facility as presented in the initial plan proposal. WS-1designates wells placed by Comesky (1989). WS-2 designates wells placed by Schuh (1994).

Well Set	Site	SWC Well No.	Township N	Range W	Section	Location	Water Source	Mun. + Expl.	Petrol (GRO/ DRO)	prom-eton	piclor-am + 2,4-D	malat-thion	Basic	Trace
WS-1		12024A	148	63	1	CBBC1	W							
WS-1		12024B	148	63	1	CBBC2	W							
WS-1		12024C	148	63	1	CBBC3	W						x	x
WS-1		12020A	149	63	14	DACD1	W							
WS-1		12020B	149	63	14	DACD2	W							
WS-1		12020C	149	63	14	DACD3	W						x	x
WS-1		12019A	149	63	23	ADBB1	W							
WS-1		12019B	149	63	23	ADBB2	W							
WS-1		12019C	149	63	23	ADBB3	W						x	x
WS-1		12017A	149	63	25	DBBC1	W							
WS-1		12017B	149	63	25	DBBC2	W							
WS-1		12017C	149	63	25	DBBC3	W							
WS-1		12017D	149	63	25	DBBB4	W						x	x
WS-1		12025	149	63	26	DCA	W						x	x
WS-1		12012	149	63	27	DDDC1	W							
WS-1		12015B	149	62	31	ABBC2	W							
WS-1		12015C	149	62	31	ABBC3	W						x	x
WS-1		12026A	149	63	34	BBB1	W							
WS-1		12026B	149	63	34	BBB2	W							
WS-1		12011B	149	63	35	ABBD2	W						x	x
WS-1		12014A	149	63	36	AACB1	W							
WS-1		12014B	149	63	36	AACB2	W							
WS-1		12014C	149	63	36	AACB3	W							
WS-1		12014D	149	63	36	AACB4	W						x	x
WS-1		12023A	149	63	36	DDBBC1	W							
WS-1		12023B	149	63	36	DDBBC2	W							
WS-1		12023C	149	63	36	DDBC3	W						x	x
WS-1		12021A	149	63	13	BAAB1	W						x	x
WS-2	1	13103	149	62	28	CCC1	W	x	x	x			x	x
WS-2	1	13104	149	62	28	CCC2	W	x	x	x			x	x
WS-2	2	13105	149	62	29	DAD	W	x					x	x
WS-2	3	Spring	148	63	2	DA	S	x					x	x
WS-2	4	Reservoir	149	62	31	C	R	x	x	x			x	x
WS-2	5	13097	149	63	36	ACA1	W	x		x			x	x
WS-2	5	13098	149	63	36	ACA2	W	x	x	x			x	x
WS-2	6	13101	149	63	25	CDC1	W	x					x	x
WS-2	6	13102	149	63	25	CDC2	W	x			x		x	x
WS-2	7	13086	148	63	2	ACA1	W	x					x	x
WS-2	7	13087	148	63	2	ACA2	W	x	x		x		x	x
WS-2	8	13090	149	62	19	DBD1	W							
WS-2	8	13091	149	62	19	DBD2	W							
WS-2	8	13106	149	62	19	DBD3	W		x		x	x		
WS-2	9	13088	149	63	13	DAA1	W							
WS-2	9	13089	149	63	13	DAA2	W		x		x	x		
WS-2	10	13092	149	63	12	CAC1	W							
WS-2	10	13093	149	63	12	CAC2	W		x		x	x		
WS-2	11	S W Lake	149	63	14	CA	L		x		x	x	x	x
WS-2	12	13084	148	63	2	BABC1	W							
WS-2	12	13085	148	63	2	BABC2	W				x			
WS-2	13)	13099	149	63	35	BCBA1	W							
WS-2	13	13100	149	63	35	BCBA2	W			x	x	x		
WS-2	14	Lake Coe	149	63	26	ADD	L	x	x		x	x	x	x
WS-2	15	Lake Coe	149	63	27	DDB	L							
WS-2	16	Spring	149	63	13	BDA	S		x		x	x	x	x
WS-2	17	13095	148	63	4	ABA1	W							
WS-2	17	13096	148	63	4	ABA2	W				x			
WS-2	20	13094	149	63	14	AAB	W				x	x		

SAMPLING AND LABORATORY METHODS

Sampling methods were designed for specific contaminants. Sampling procedures for low level detection of organic compounds, such as petroleum products, explosives residues, and pesticides, require "clean-clean" procedures, which involve high assurance against spurious contamination caused by field procedures. Because of their low concentrations, trace elements also require greater cleanliness in sampling. Major ion chemistry can usually be sampled using less stringent procedures, although even for these elements specific protocals are necessary to avoid contamination.

In the CGS monitoring plan, major ion chemistry and trace elements were sampled using PVC bailers. They were collected from wells from which at least three well volumes had been purged using either air lift, or suction lift methods. Air-lift purging was used for wells having piezometric surface too deep for suction lift. A rubber compressor hose was field-cleaned by coiling it in a polyethylene tub, and scrubbing it with non-phosphate soap, and rinsing with distilled water. The tip was inserted in the well to a level at least 20 feet above the well screen. An air compressor was used to air lift the water. Suction lift was used on wells having piezometric surface near enough to the surface to support a water column (generally less than 20 feet). A 1-inch rigid polyethylene hose was washed with non-phosphate soap and stored in a polyethylene bag. The hose was inserted in the well, and water was pumped using a screw pump.

For organic contaminants, five well volumes were evacuated from the well to be sampled. Air lift was not used for these samples, because of concern over possible introduction of petroleum residues on a compressor hose. Clean-clean procedures were used. A polyethylene apron was placed on the soil around each well to be sampled, and weeds and brush were cut or flattened. The well-cap was removed, and the inside and outside of the well were cleaned using non-phosphate soap and a clean-white disposable laboratory tissue. Shallow wells were purged using the suction-lift procedure described above. Deeper wells were purged using a gas-squeeze pump. For petroleum samples the engine used for operating the gas-squeeze pump was moved as far downwind as possible from the sample well. Both the polyethylene hose of the suction pump and the gas squeeze pump were thoroughly cleaned with non-phosphate detergent and distilled water before placement in the well.

After purging, water samples were collected using a disposable polyethylene bailer. Before sampling the assistant washed his hands with soap and distilled water, and put on clean latex gloves from a container held by the clean worker. Throughout the sampling

process the assistant would periodically rinse his gloves with distilled water. The assistant washed the hands of the clean worker with non-phosphate soap and distilled water and then presented an opened package of disposable latex gloves to the clean worker, who removed them without touching the container and put them on his hands. The assistant opened the end of the disposable bailer package, without touching the bailer, and placed the still-covered body of the bailer under the arm of the clean worker. The assistant then removed a spool of nylon rope from a polyethylene bag, and without touching the rope presented the spool to the clean worker. The clean worker tied the rope to the bailer with gloved hand, and then placed the bailer down the well for sampling. About one additional well volume was bailed using the bailer, and the well was then sampled. The assistant opened caps of the bottles. Replicate bottles were partially filled from each bailer sample. Bottles were filled to the top before capping. After completion the samples were placed in coolers with frozen "blue-ice". Samples were placed in a refrigerator in a utility building at the CGS facility within two hours of sampling. Cold samples (appr. 3 ^{o}C) were packed on ice in insulated coolers and transported for arrival at the laboratory within 24 hours of packing. All samples arrived on ice.

The author maintained personal chain of custody of samples for determination of munitions and explosives residues from the field to the FEDERAL EXPRESS shipping point, where sealed containers were sent to DATA CHEM Laboratories in Salt Lake City Utah. The author maintained personal chain of custody from the field to Minnesota Valley Testing Laboratory in New Ulm, Minnesota, where samples for determination of GRO, DRO, and herbicide and pesticide residues were hand delivered.

Major Ion Chemistry and Trace Elements

Major ion chemistry [pH, total dissolved solids (TDS), hardness, specific conductivity, temperature, sodium adsorption ratio (SAR), bicarbonate (HCO_3), potassium (K), sodium (Na), sulfate (SO_4), nitrate (NO_3), chloride (Cl), fluoride (F), boron (B), silicate (SiO_2), iron (Fe), manganese (Mn), calcium (Ca), and magnesium (Mg)]; and trace elements [arsenic (As), barium (Ba), mercury (Hg), lead (Pb), and selenium (Se)] were determined from water samples collected from each well in the fall of 1996. Previous samples collected in 1994 included cadmium (Cd) and zinc (Zn) as well. All samples were collected after purging of at least three well volumes of water from the well. Samples were stored in 500 ml polyethylene bottles. All major ion chemistry bottles were washed with well water before collecting the sample. Bottles used for water samples for trace metal analysis were washed with concentrated nitric acid, two distilled water washes, and one

deionized water wash before use. In some samples, laboratory grade concentrated hydrochloric acid was used for wash. Trace element impurities in the hydrochloric acid were negligible. Samples for trace metal analysis were acidified in the field with 2 ml of concentrated nitric acid per 500 ml sample. Lab analytical methods for general chemistry and trace elements were described previously by Shaver (1991). Nitrate measurements were made using an Orion ion-specific electrode, using an Orion conductivity meter.

Organic Compounds

GRO (gasoline range organics), DRO (diesel range organics), malathion, prometon, and picloram were analyzed by Minnesota Valley Testing Laboratory (New Ulm, MN). For DRO and GRO the laboratory used Method 8015B (EPA-SW-846, Rev. 2, 1996). Prometon and malathion were extracted using Method 3510, and measured using Method 8270, while picloram and 2,4-D were extracted and measured using Method 8151 (EPA-SW-846, Rev. 2, 1996). Methods for determining TPH and pesticides in previous sampling (1992 and 1993) were described by Schuh (1994,1996). Water samples collected in 2001 for determination of munitions and explosives residues were analyzed by DATA CHEM LABORATORIES (Salt Lake City, Utah). Laboratory procedures used were Methods 8260B, 8270C, and 8332 (USEPA 1996b); and Method 8330 (USEPA 1996b). Methods for initial munitions and explosives samples collected prior to 1996 are described in Schuh (1994).

RESULTS

As previously described, changes in major ion chemistry and trace elements are routinely measured using water samples from WS-1 wells. In addition, WS-2 wells used for sampling potential contamination from munitions and explosives were also sampled for major ion chemistry and trace elements in 1996 because of potential elevated nitrate from ammonium nitrate, barium and nitrate from barium nitrate, and potential lead contamination from projectiles. Samples were also collected for selected munitions and explosives, pesticides, and petroleum hydrocarbons. A summary of wells and surface waters sampled is shown on Table 3.

Major Ion Chemistry

A summary of major ion chemistry for CGS surface and ground water samples collected through 1996 was discussed by Schuh (1997). It was reported that water chemistry of the Cherry Lake aquifer varied. Total dissolved solids (TDS) varied from as low as 200 mg/L to as much as 2,000 mg/L in well samples, and TDS in surface-water samples were gererally high (2,000 to 5,000 mg/L). pH varied from lows near 6, to high values near 9. Ground-water ranges from predominantly calcium bicarbonate to predominantly sodium sulfate types. Chloride concentrations varied from non-detects to more than 1,000 mg/L. Anionic composition of many deep water samples was a mixture of chloride, sulfate, and bicarbonate.

Highest specific conductance and TDS were usually in the deeper wells (screens placed more than 100 feet below land surface). Sodium concentrations were also highest in the deeper wells. Shallow wells commonly had a sodium adsorption ratio (SAR) of 2 or less. Several deep wells had SAR values greater than ten, and some were as large as 35. Sulfate concentrations were positively correlated with sodium and negatively correlated with calcium. Deeper wells were, in general, more sulfatic than shallower wells. Some, however, were also high in chloride. Highest SAR and specific conductance values were in the deep wells of nests placed in the uplands east of South Washington Lake.

Although Comesky (1989) identified three main sub-units of the Cherry Lake aquifer, the aquifer is heterogeneous. Some aquifer sub-units may be interconnected, while others may occur as isolated pockets within the glacial till. Temporal changes in water chemistry of some deep wells indicate that they are connected to other aquifer units, and can be freshened. For example, The deep well on Site 6 (Table 4) located in the littoral area southeast of Lake Coe changed from a specific conductance of 1,041 µS in October of 1992, to 471 µS in September of 1996. Following large rains in 1993 this well was flowing, indicating a large change in piezometric pressure caused by recharge in the uplands. Thus, both changing piezometric pressure and water chemistry data indicate a deep well

connected to the surface, and freshened by rainfall at some distance (more than one mile) from the well. Similar, but less marked decreases in specific conductance occurred for several deep wells, as shown by data on Tables 4 and 5. Differences in water chemistry between deep wells may be strongly related to their levels of isolation from other fresher bodies of water. In the most recent sampling (September 2001) the deep well on Site 6 had returned to an electrical conductivity of 1,072 µS (Table 4).

Most of the shallow wells were reported by Schuh (1997) to have low SAR values, low specific conductance, and low TDS. The pH of most shallow wells was slightly acid to neutral (6.5 to 7.5). Calcium was the predominant cation. Water from most shallow wells was reported to be of good quality for drinking. Water from springs was similar in chemistry to water samples collected from shallow wells.

Surface waters, and particularly water from Lake Coe and South Washington Lake, were described as exposures of the water table, and appeared to function as discharge areas for ground water moving slowly toward the Sheyenne River. Water in these lakes was reported to be brackish (Schuh 1997), having specific conductance ranging from 3,720 to 6,430 µS. Lake waters were high in sodium, sulfate and bicarbonate, and also had very large SAR values.

The previous report (Schuh 1997) examined deep well-water chemistry in detail. In the September 2001 sampling, it was decided to place primary emphasis on sampling the shallower wells, because these are most vulnerable to anthropogenic influence. Of the WS-1 (Comesky, 1989) well set, which is used primarily for non-organic species, only the shallow wells were sampled (Table 5). Of the WS-2 wells, which are used for sampling organic species (Schuh 1994), some of the deeper wells were also sampled (Table 4).

Results for samples collected in September, 2001 were similar for both well sets. Water samples collected in 2001 indicated no major changes in any of the previously determined parameters of major ion chemistry. Specific conductance values indicated a slight rise in salinity following a decrease due to freshening in the 1996 samples, but increases were almost always a return to previous concentrations. There is some evidence of long-term freshening of South Washington Lake and of the spring at T148 R63 Section 2DA (Table 4). However, these changes can be attributed to climatic conditions. The September 2001 sampling has provided no evidence of adverse anthropogenically induced changes in major ion chemistry at CGS.

Nitrate

Nitrate is one contaminant of potential concern. Nitrate has an EPA-MCL of 10 mg/L nitrate as N, or 44 mg/L as nitrate. Possible nitrate sources are fertilizers and manure from cattle. A certain amount of nitrate can result from atmospheric fixation and from mineralization of soil organic matter.

Table 4. Major ion chemistry and selected chemical parameters for CGS WS-2 Wells (Schuh 1994). Locations of site numbers for designated for WS-2 well sites are shown on map Figures 3, 4, and 5.

Well Set	Site	Well No.	Location	SI	Date	SiO2	Fe	Mn	Ca	Mg	Na	K	HCO3	CO3	SO4	Cl	F	NO3	B	TDS	CaCO3	NCH	PerNa	SAR	Cond	Temp	pH
				Ft.		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L				µmohs/cm	°C	
WS-2	1	13103	149-062-28CCC1	139-144	10/21/92	25	0.06	0.55	32	8	180	8.8	482	nd	130	6.1	0.3	2.9	0.58	631	110	nd	76	7.5	958	8	7.26
			149-062-28CCC1	139-144	9/5/96		0.06	0.61	34	8	180	7.4	481	nd	130	1.4	0.3	0.3		599	120	nd	75	7.1	794	9.4	
			149-062-28CCC1	**139-144**	**9/4/01**		**0.21**	**0.59**	**35**	**8**	**180**	**7.1**	**480**	nd	**130**	**4.2**	**0.4**	**0.2**		**602**	**120**	nd	**75**	**7.1**	**916**		
WS-2	1	13104	149-062-28CCC2	56-61	10/21/92	30	0.3	0.4	78	20	27	10	372	nd	49	3.5	0.2	4.3	0.15	406	280	nd	17	0.7	661	8	7.07
			149-062-28CCC2	56-61	9/4/96		0.47	0.37	76	19	25	9.7	376	nd	45	0.3	0.2	0.2		361	270	nd	16	0.7	515	9.1	
			149-062-28CCC2	56-61	9/4/01		0.36	0.37	76	20	27	10	380	nd	47	0	0.2	0.3		370	280	nd	17	0.7	519		
WS-2	2	13105	149-062-29DAD	50-55	10/21/92	33	0.1	0.52	88	24	12	7.3	365	nd	54	1.7	0.2	2	0.11	403	320	20	7	0.3	608	10	7
			149-062-29DAD	50-55	9/4/96		0.13	0.52	84	22	11	7.8	368	nd	49	0.2	0.2	0.2		356	300	nd	7	0.3	527	8.5	
			149-062-29DAD	**50-55**	**9/4/01**		**0.18**	**0.5**	**88**	**23**	**12**	**8**	**370**	nd	**51**	**0**	**0.2**	**0.1**		**365**	**310**	**11**	**7**	**0.3**	**600**		
WS-1	3	Spring	148-063-02DA	0	9/11/86	33	0.02	0.04	72	21	5.5	2.2	310	nd	27	2.6	0.1	0	0.03	316	270	12	4	0.1	540	13	
and			148-063-02DA	0	10/22/92	25	0.06	0.03	71	21	6	4	294	nd	34	2.7	0.2	0	0.03	309	260	23	5	0.2	502	9	6.8
WS-2			148-063-02DA	0	9/4/96		0.05	0.29	74	21	5.5	3.5	337	nd	16	0.3	0.2	0.3		287	270	0	4	0.1	424	13.3	
			148-063-02DA	**0**	**9/5/01**		**0.1**	**0.17**	**73**	**21**	**6**	**3**	**323**	nd	**18**	**0**	**0.2**	**0.1**		**281**	**270**	**4**	**5**	**0.2**	**469**		
WS-2	4	Reservoir	148-062-31C	0	10/22/92	3	0.12	0.01	36	9.5	3.5	18	182	nd	0.8	2.8	0.1	0.6	0.02	164	130	nd	5	0.1	331	10	7.25
			148-062-31C	0	9/4/96		0.09	0.14	26	8.5	2	8.8	145	nd	2.9	0	0.1	0.8		120	100	nd	4	0.1	224	20.2	
			148-062-31C	**0**	**9/5/01**		**0.12**	**0.25**	**33**	**14**	**5**	**11**	**193**	nd	**4.1**	**0**	**0.1**	**0.5**		**163**	**140**	nd	**7**	**0.2**	**303**		
WS-2	5	13097	149-063-36ACA1	41-48	10/22/92	25	0.12	0.34	60	15	23	6.7	302	nd	23	2.6	0.2	1.8	0.13	307	210	nd	18	0.7	543	10	6.65
			149-063-36ACA1	41-48	9/3/96		0.19	0.34	60	15	22	6.4	305	nd	26	0.2	0.2	0.1		280	210	nd	18	0.7	427	7.6	
			149-063-36ACA1	**41-48**	**9/4/01**		**0.24**	**0.3**	**58**	**15**	**28**	**6.4**	**311**	nd	**30**	**0**	**0.2**	**0.3**		**291**	**210**	nd	**22**	**0.8**	**472**		
WS-2	5	13098	149-063-36ACA2	21-27	10/22/92	24	0.61	0.66	67	16	8	5.3	288	nd	17	3.5	0.2	0	0.05	284	230	nd	7	0.2	491	10	6.63
			149-063-36ACA2	21-27	9/3/96		0.92	0.61	65	16	7	3.8	300	nd	16	0	0.2	0.2		258	230	nd	6	0.2	425	7.2	
			149-063-36ACA2	**21-27**	**9/4/01**		**0.49**	**0.71**	**69**	**17**	**8.5**	**4**	**296**	nd	**17**	**0**	**0.2**	**0.1**		**263**	**240**	nd	**7**	**0.2**	**455**		
WS-2	6	13101	149-063-25CDC1	110-115	10/22/92	25	0.04	1.5	94	19	120	13	250	nd	300	46	0.4	2.2	0.47	745	310	110	44	3	1041	10	
			149-063-25CDC2	110-115	9/5/96		0.02	1.8	91	19	120	11	246	nd	310	43	0.4	5		722	310	100	45	3	890	14.6	
			149-063-25CDC1	**110-115**	**9/5/01**		**0.07**	**1.8**	**94**	**19**	**120**	**12**	**245**	nd	**300**	**48**	**0.3**	**0.2**		**716**	**310**	**110**	**44**	**3**	**1072**		
WS-2	6	13102	149-063-25CDC2	25-30	10/22/92	25	0.27	0.46	77	25	11	4.3	359	nd	22	3.1	0.2	0.1	0.06	345	300	2	7	0.3	579	10	6.58
			149-063-25CDC1	25-30	9/5/96		0.23	0.42	75	24	10	4.3	366	nd	23	1.2	0.2	0.1		318	290	nd	7	0.3	471	12.4	
			149-063-25CDC2	**25-30**	**9/5/01**		**0.31**	**0.49**	**84**	**27**	**12**	**4.5**	**398**	nd	**28**	**4.5**	**0.2**	**0.1**		**357**	**320**	**nd**	**7**	**0.3**	**614**		
WS-2	7	13086	148-063-02ACA1	97-102	10/22/92	25	0.02	1.3	83	21	23	5.1	371	nd	37	3.8	0.2	1.1	0.12	384	290	nd	14	0.6	623	8	6.42
			148-063-02ACA1	97-102	9/3/96		0.03	1.3	78	20	23	5.4	369	nd	37	0.5	0.2	0.4		348	280	nd	15	0.6	524	8.5	
			148-063-02ACA1	**97-102**	**9/5/01**		**0.09**	**1.3**	**78**	**20**	**24**	**5.3**	**370**	nd	**37**	**2**	**0.2**	**0.2**		**350**	**280**	nd	**15**	**0.6**	**547**		
WS-2	7	13087	148-063-02ACA2	18-23	10/22/92	26	0.23	0.37	53	15	2.5	1.6	236	nd	4.5	2.2	0.1	0.8	0.03	222	190	1	3	0.1	464	10	6.6
			148-063-02ACA2	18-23	9/3/96		0.47	0.28	55	15	2	1.6	246	nd	4.5	0.2	0.1	0.5		201	200	nd	2	0.1	337	7.7	
			148-063-02ACA2	**18-23**	**9/5/01**		**0.26**	**0.28**	**51**	**14**	**3.5**	**1.7**	**223**	nd	**9.1**	**4.3**	**nd**	**0.3**		**194**	**180**	**2**	**4**	**0.1**	**347**		
WS-2	8	13090	149-062-19DBD1	95-100	8/25/93	31	0.18	0.56	89	21	16	13	375	nd	45	3.7	0.2	5.6	0.04	410	310	1	10	0.4	673	10	7.55
WS-2	8	13106	149-062-19DBD3	43-48	8/25/93	40	0.04	0.71	69	18	8	7.8	311	nd	23	4.7	0.2	1.1	0.09	326	250	nd	6	0.2	1109	10	6.87
WS-2	9	13088	149-063-13DAA1	95-100	8/25/93	59	0.04	0.07	13	4	300	8.9	716	nd	150	8.4	0.7	5	1.7	904	49	nd	92	19	1299	9	8.13
WS-2	9	13089	149-063-13DAA2	30-35	8/25/93	28	0.02	0.02	83	31	9	4.5	383	nd	35	6.2	0.2	1.2	0.05	387	330	21	5	0.2	776	11	7.69
WS-2	10	13092	149-063-12CAC1	105-110	8/25/93	28	0.18	0.28	38	11	150	9.9	453	nd	79	30	0.4	5.4	0.05	575	140	nd	68	5.5	867	11	7.23
WS-2	10	13093	149-063-12CAC2	45-50	8/25/93	26	0.14	0.48	78	23	13	5.1	346	nd	27	2.7	0.2	1.3	0.73	348	290	6	9	0.3	581	12	6.35
WS-2	11	S. Washington Lake	149-063-14CA	0	9/11/86	1.4	0.04		15	60	1000	280	737	400	930	360	0.1	1	2.7	3410	280	nd	77	26	5400	15	
			149-063-14CA	**0**	**9/12/01**		**2**	**0.45**	**30**	**45**	**230**	**68**	**582**	**50**	**220**	**91**	**0.1**			**1020**	**260**	**nd**	**59**	**6.2**	**1730**		
			149-063-14DBB	0	8/24/93	32	0.03	0.01	20	35	630	200	778	100	710	260	0.1	1.1	0.06	2370	190	nd	75	20	3720	26	9.05

Table 4. Major ion chemistry and selected chemical parameters for CGS WS-2 Wells (Schuh 1994). Locations of site numbers for designated for WS-2 well sites are shown on map Figures 3, 4, and 5.

Well Set	Site	Well No.	Location	Sl	Date	SiO2	Fe	Mn	Ca	Mg	Na	K	HCO3	CO3	SO4	Cl	F	NO3	B	TDS	CaCO3	NCH	PerNa	SAR	Cond	Temp	pH
				Ft.		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L				µmohs/cm	°C	
WS-2	12	13084	148-063-02BABC1	69-74	8/26/93	29	0.12	0.39	27	8.5	110	6.2	399	nd	26	12	0.3	4.5	0.22	421	100	nd	68	4.8	653	7	7.8
WS-2	12	13085	148-063-02BABC2	12-17	8/26/93	26	0.02	0.04	110	35	9.5	3.2	450	nd	65	7.1	0.1	5.7	0.04	484	420	50	5	0.2	746	8	7.56
WS-2	13	13099	149-063-35BCBA1	39.5-43.5	8/24/93	6.5	0.18	0.5	83	30	40	5.7	385	nd	100	7.8	0.1	1.5	2.3	468	330	15	20	1	728	13	7.08
WS-2	13	13100	149-063-35BCBA2	23-28	8/24/93	26	0.71	0.79	84	27	19	4.7	364	nd	60	7.7	0.2	0.9	0.08	410	320	22	11	0.5	629	14	7
WS-2	14	Lake Coe	149-063-26ADD	0	8/24/93	9.7	0.05	0.01	20	33	900	120	1060	200	730	370	0.1	2	3.8	2910	190	nd	85	28	3950	27	9.2
			149-063-26ADD	**0**	**9/5/01**		**0.15**	**0.03**	**17**	**33**	**620**	**81**	**773**	**100**	**470**	**210**	**0.2**	**0.1**		**1910**	**180**	**nd**	**83**	**20**	**2700**		
WS-1	15	Lake Coe	149-063-26DA	0	9/11/86	7.9	0.14	0.01	15	40	1300	160	1230	200	980	540	0.1	1	3.7	3850	200	nd	87	40	6000	15	
and			149-063-27CA	0	9/11/86	2.2	0.18	0.01	15	40	1400	180	1210	300	1100	580	0.2	0.1	4.8	4220	200	nd	88	43	6400	14	
WS-2			149-063-27DDB	0	8/24/93	9.4	0.13	0.01	20	35	1500	200	1510	400	1200	630	0.1	0	1.5	4740	190	nd	88	47	6430	26	9.46
WS-1	16	Spring	149-063-13BDA	0	9/11/86	30	0.03	0.13	79	25	17	7	365	nd	31	4.3	0.2	0.3	0.06	374	300	1	11	0.4	620	14	
and					8/25/93	34	0.09	1	90	30	15	4.8	428	nd	22	2.9	0.2	0	0.07	411	350	nd	8	0.3	660	18	7.22
WS-2					9/5/96		0.04	0.17	76	25	13	6.4	366	nd	32	0.9	0.3	0.2		334	290	nd	9	0.3	483	16.3	
					9/11/01		**0.3**	**0.43**	**50**	**17**	**8**	**8.3**	**271**	**nd**	**3.3**	**0**	**0.1**	**0.2**		**221**	**200**	nd	**8**	**0.2**	**400**		
WS-2	17	130954	148-063-04ABA1	39.67-44.67	8/24/93	28	0.41	0.19	57	16	39	7	311	nd	41	6.7	0.2	4	0.13	353	210	nd	28	1.2	656	10	7.35
WS-2	17	13096	148-063-04ABA2	25-30	8/26/93	26	0.43	0.68	81	25	46	4.6	369	nd	94	11	0.1	1	0.09	472	310	3	24	1.1	718	11	7.47
WS-2	20	13094	149-063-14AAB	17-22	8/25/93	29	1.9	0.58	88	30	12	3.9	409	nd	24	7.6	0.2	2.3	0.06	401	340	8	7	0.3	633	11	7.06

Table 5. General ion chemistry and selected chemical parameters for CGS WS-1 Wells (Comesky (1989). Locations for designated for WS-1 sites are shown on map Figure 4.

Well Set	Well No.	Location	SI	Date	SiO2	Fe	Mn	Ca	Mg	Na	K	HCO3	CO3	SO4	Cl	F	NO3	B	TDS	CaCO3	NCH	PerNa	SAR	Cond	Temp	pH
			Ft.		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L				µmohs/cm	°C	
WS-1	12024B	148-063-01CBBC2	151-156	9/2/87	30	0.01	0.79	40	11	75	7.9	339	nd	40	4.8	0.3	1.7	0.27	379	150	nd	51	2.7	590	11	
		148-063-01CBBC2	151-156	10/23/91	30	0.02	0.68	37	11	80	9.1	341	nd	42	7.3	0.3	nd	0.3	386	140	nd	54	2.9	583	6	8.03
		148-063-01CBBC2	151-156	9/11/96		0.04	0.79	38	11	82	7.5	344	nd	44	6.7	0.2	0.1		359	140	nd	54	3	509	8.1	
WS-1	12015B	149-062-31ABBC2	162-167	9/1/87	31	0.04	0.27	45	12	64	9.1	321	nd	43	4	0.3	2.8	0.28	370	160	nd	44	2.2	570	13	
		149-062-31ABBC2	162-167	10/23/91	29	0.02	0.2	42	12	65	9	325	nd	36	4.4	0.3	nd	0.26	358	150	nd	46	2.3	563	5	8.44
		149-062-31ABBC2	162-167	9/11/96		0.15	0.21	42	11	61	8.9	332	nd	37	4.2	0.3	0.1		329	150	nd	45	2.2	493	7.9	
WS-1	12015C	149-062-31ABBC3	78-83	10/23/91	32	0.02	1.1	63	18	5.5	6.2	290	nd	19	3	0.2	3.6	0.01	295	230	nd	5	0.2	455	6	7.97
		149-062-31ABBC3	78-83	9/11/96		0.3	0.64	69	18	4.5	5.2	300	nd	21	2.5	0.2	0.1		269	250	nd	4	0.1	410	7.6	
		149-062-31ABBC3	**78-83**	**9/6/01**		**0.08**	**0.46**	**68**	**18**	**6.5**	**5.5**	**300**	nd	**19**	**0**	**0.2**	**0.6**		**266**	**240**	nd	**5**	**0.2**	**470**		
WS-1	12021A	149-063-13BAAB1	96-101	9/1/87	25	0.02	0.22	64	18	470	17	633	nd	140	490	0.4	5.5	1.2	1540	230	nd	80	13	3710	12	
		149-063-13BAAB1	96-101	10/23/91	26	0.03	0.44	110	30	820	20	755	nd	79	1100	0.3	0.1	2.4	2560	400	nd	81	18	4440	6	8.03
		149-063-13BAAB1	96-101	9/11/96		0.43	0.42	110	30	830	25	782	nd	77	1100	0.3	17		2580	400	nd	81	18	3060	7.9	
		149-063-13BAAB1	**96-101**	**9/6/01**		**0.05**	**0.39**	**120**	**33**	**900**	**25**	**765**	**nd**	**67**	**1100**	**0.3**	**0.2**		**2620**	**440**	**nd**	**81**	**19**	**3980**		
WS-1	12020A	149-063-14DACD1	212-217	9/1/87	31	0.03	0.39	20	6	640	12	752	nd	430	360	0.5	0.6	3.4	1870	75	nd	94	32	3070	12	
		149-063-14DACD1	212-217	10/23/91	30	0.02	0.16	13	4	510	9.5	772	nd	340	160	0.6	3.7	2	1450	49	nd	95	32	2310	6	8.62
		149-063-14DACD1	212-217	9/11/96		0.01	0.17	9.3	4	490	10	782	nd	330	140	0.7	2.3		1370	40	nd	95	34	1858	8.3	
WS-1	12020B	149-063-14DACD2	151-156	9/1/87	31	0.01	0.22	14	4	310	8.4	659	nd	200	20	0.7	0.5	1.1	915	52	nd	92	19	1460	12	
		149-063-14DACD2	151-156	10/23/91	29	0.02	0.17	15	3	320	7.9	671	nd	190	23	0.6	1.8	1.3	923	50	nd	92	20	1384	6	8.41
		149-063-14DACD2	151-156	9/11/96		0.05	0.18	11	4	310	9	693	nd	190	19	0.6	0.2		885	44	nd	92	20	1173	8.4	
WS-1	12020C	149-063-14DACD3	38-43	9/1/87	32	0.01	0.06	73	23	18	6.8	341	nd	35	3.9	0.2	2.4	0.06	362	280	nd	12	0.5	580	12	
		149-063-14DACD3	38-43	10/23/91	29	0.08	0.07	70	23	15	5.8	335	nd	35	5.6	0.2	1.4	0.05	350	270	nd	11	0.4	567	6	8.04
		149-063-14DACD3	38-43	9/10/96		0.09	0.07	73	23	15	5.5	353	nd	31	4.5	0.2	1.8		328	270	nd	10	0.4	499	7.7	
		149-063-14DACD3	**38-43**	**9/6/01**		**0.02**	**0.02**	**74**	**23**	**16**	**4.9**	**338**	nd	**32**	**9.7**	**0.3**	**2.7**		**330**	**280**	**2**	**11**	**0.4**	**585**		
WS-1	12019A	149-063-23ADBB1	218-223	9/1/87	30	0.09	0.43	41	10	76	6.9	322	nd	19	21	0.2	2.9	0.15	367	140	nd	52	2.8	590	12	
		149-063-23ADBB1	218-223	10/23/91	28	0.11	0.41	44	11	67	6.3	331	nd	23	16	0.2	4.3	0.14	363	160	nd	47	2.3	569	6	8.3
		149-063-23ADBB1	218-223	9/11/96		0.12	0.42	41	9.5	70	6.5	337	nd	23	18	0.2	0.2		335	140	nd	50	2.6	491	8.5	
WS-1	12019B	149-063-23ADBB2	32-37	9/1/87	28	0.21	0.44	74	21	6.5	3.6	298	nd	40	1.6	0.2	0.4	0.04	323	270	27	5	0.2	515	11	
		149-063-23ADBB2	32-37	10/23/91	26	0.05	0.35	72	21	8	3.3	304	nd	45	3.9	0.2	0.7	0.05	331	270	17	6	0.2	524	9	8.08
		149-063-23ADBB2	32-37	9/10/96		0.25	0.4	77	22	6	3.1	310	nd	53	1.7	0.1	0.4		317	280	29	4	0.2	471	7.9	
WS-1	12019C	149-063-23ADBB3	7-12	9/1/87	38	0.11	0.33	77	18	4	2.3	287		16	1	0.2	3.4	0.05	301	270	31	3	0.1	585	14	
		149-063-23ADBB3	7-12	10/23/91	27	0	0.05	82	20	3.5	1.2	331	nd	9.9	3.4	0.2	24	0.03	334	290	16	3	0.1	537	10	8.08
		149-063-23ADBB3	7-12	9/10/96		1.7	1.3	80	18	3.5	1.4	315	nd	19	2.7	0.1	14		297	270	16	3	0.1	462	10.9	
		149-063-23ADBB3	7-12	**9/6/01**		**0.84**	**0.45**	**78**	**21**	**5**	**1.3**	**284**	nd	**37**	**nd**	**0.2**	**10**		**294**	**280**	**49**	**4**	**0.1**	**525**		
WS-1	12017A	149-063-25DBBC1	263-268	9/1/87	30	0.01	0.24	19	4.5	240	7.5	444	nd	100	99	0.4	0.6	0.65	721	66	nd	87	13	1200	12	
		149-063-25DBBC1	263-268	10/24/91	27	0	0.24	18	4.5	250	8	454	nd	100	96	0.4	0	0.71	729	64	nd	88	14	1144	5	8.15
		149-063-25DBBC1	263-268	9/11/96		0.02	0.28	18	4.5	250	7.4	458	nd	110	97	0.4	1.2		715	64	nd	88	14	1008	8.8	
WS-1	12017B	149-063-25DBBC2	78-83	9/2/87	22	0.01	0.15	26	7.5	160	14	376	nd	150	4.1	0.5	3.1	0.55	573	96	nd	75	7.1	860	11	
		149-063-25DBBC2	78-83	10/24/91	26	0.01	0.11	25	7.5	130	7.9	416	nd	45	7.5	0.5	5.6	0.47	460	94	nd	73	5.8	706	7	8.16
		149-063-25DBBC2	78-83	9/11/96		0.15	0.13	29	8.5	120	8.3	418	nd	53	8.4	0.5	0.9		435	110	nd	69	5	632	7.9	
WS-1	12017C	149-063-25DBBC3	51-56	9/2/87	31	0.09	0.5	72	20	6	5.1	314	nd	25	1	0.3	0.4	0.06	316	260	5	5	0.2	490	11	
		149-063-25DBBC3	51-56	10/24/91	24	0	0.03	62	17	6.5	3.9	264	nd	23	4.8	0.2	2.4	0.03	274	220	8	6	0.2	457	9	7.84
		149-063-25DBBC3	51-56	9/10/96		0.08	0.25	66	19	5	4.3	293	nd	26	3.7	0.2	0.6		269	240	3	4	0.1	411	9.4	
WS-1	12017D	149-063-25DBBC4	23-28	9/2/87	32	1.1	0.93	72	19	5.5	5.2	319	nd	19	1.3	0.2	1	0.07	314	260	nd	4	0.1	500	9	
		149-063-25DBBC4	23-28	10/24/91	32	1.8	0.74	70	19	7	4.9	316	nd	18	4	0.2	3	0.04	317	250	nd	5	0.2	500	9	7.32
		149-063-25DBBC4	23-28	9/10/96		1.8	0.69	74	19	6	4.3	325	nd	20	2.9	0.2	0.1		289	260	nd	5	0.2	442	7.5	
		149-063-25DBBC4	**23-28**	**9/6/01**		**2**	**0.61**	**74**	**20**	**8**	**2**	**324**	nd	**22**	**nd**	**0.2**	**0.1**		**289**	**270**	**2**	**6**	**0.2**	**504**		
WS-1	12025	149-063-26DCA	38-43	9/1/87	28	0.61	0.34	71	46	83	12	444	nd	170	14	0.3	2	0.26	647	370	2	32	1.9	975	11	
		149-063-26DCA	38-43	10/24/91	27	0.49	0.28	73	53	82	14	476	nd	190	14	0.3	0	0.21	688	400	10	30	1.8	996	7	7.87
		149-063-26DCA	38-43	9/12/96		1.4	0.31	87	58	83	14	500	nd	230	20	0.2	0.4		740	460	46	28	1.7	880	7.9	
		149-063-26DCA	**38-43**	**9/6/01**		**1.1**	**0.3**	**80**	**54**	**90**	**13**	**511**	**nd**	**190**	**17**	**0.2**	**0.2**		**698**	**420**	**3**	**31**	**1.9**	**992**		
WS-1		149-063-27DDDC2	158-163	9/1/87	10	0.15	0.24	29	8.5	2.5	14	161	nd	61	1.8	0.1	1	0.07	207	110	nd	4	0.1	241	13	
		149-063-27DDDC2	158-163	11/19/91	28	0.01	1.1	53	15	64	9.2	299	nd	89	15	0.3	1.2	0.31	423	190	nd	40	2	638	7	7.53
		149-063-27DDDC2	158-163	9/11/96		0.02	1.1	57	15	65	8.6	308	nd	94	41	0.3	0.2		434	200	nd	40	2	725	7.7	

Table 5. General ion chemistry and selected chemical parameters for CGS WS-1 Wells (Comesky (1989). Locations for designated for WS-1 sites are shown on map Figure 4.

Well Set	Well No.	Location	Sl	Date	SiO2	Fe	Mn	Ca	Mg	Na	K	HCO3	CO3	SO4	Cl	F	NO3	B	TDS	CaCO3	NCH	PerNa	SAR	Cond	Temp	pH
			Ft.		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L				µmohs/cm	°C	
WS-1	12026A	149-063-34BBB1	251-256	9/1/87	27	0.03	0.68	47	23	120	14	428	nd	110	23	0.5	1	0.28	577	210	nd	53	3.6			
		149-063-34BBB1	251-256	11/19/91	30	0.01	0.73	49	15	59	7.7	328	nd	47	13	0.5	0	0.2	384	180	nd	40	1.9	595	7	7.05
		149-063-34BBB1	251-256	9/12/96		0.07	0.72	52	14	50	7.2	318	nd	48	10	0.5	0.3		340	190	nd	36	1.6	491	8	
WS-1	12026B	149-063-34BBB2	27-32	9/1/87	27	0.01	0.34	74	25	28	4.7	298	nd	89	8.5	0.2	1	0.1	405	290	44	17	0.7	670	11	
		149-063-34BBB2	27-32	10/24/91	25	0.01	0.04	71	23	18	3.6	289	nd	72	8	0.2	5.1	0.05	368	270	35	12	0.5	566	6	7.95
		149-063-34BBB2	27-32	10/22/92	25	0.02	0.01	70	23	16	3.1	281	nd	66	5.6	0.1	7.6	0	354	270	39	11	0.4			
		149-063-34BBB2	27-32	9/12/96		0.01	0.33	75	24	18	3.5	305	nd	63	5.5	0.2	17		357	290	36	12	0.5	486	7.4	
CGS	Supply	149-063-35A1	28-36	9/3/97		0.99	0.33	81	29	96	9.8	463	nd	160	10	0.2	0.1		615	320	nd	38	2.3	932	7.9	
		149-063-35A1	28-36	3/5/98		0.44	0.33	88	31	110	9.9	479	nd	190	16	0.2	0.1		682	350	nd	40	2.6	1048	7.5	
CGS	Supply	149-063-35A2	26-34	9/3/97		0.93	0.34	83	29	96	9.9	465	nd	160	9.6	0.2	0.1		618	330	nd	38	2.3	935	7.9	
		149-063-35A2	26-34	3/5/98		0.35	0.33	89	31	110	9.8	468	nd	200	19	0.2	1.5		692	350	nd	40	2.6	1037	7.7	
WS-1	12011B	149-063-35ABBD2	45-50	9/1/87	29	0.76	0.29	68	25	93	9.6	422	nd	120	8.5	0.2	1.8	0.3	564	270	nd	42	2.5	880	10	
		149-063-35ABBD2	45-50	10/24/91	27	0.37	0.34	68	26	94	9.9	432	nd	130	10	0.3	5.5	0.24	585	280	nd	41	2.4	869	7	8.02
		149-063-35ABBD2	45-50	9/10/96		1.2	0.29	80	29	99	10	459	nd	170	11	0.2	0.1		627	320	nd	39	2.4	835	7.7	
		149-063-35ABBD2	**45-50**	**9/6/01**		**1**	**0.27**	**79**	**29**	**97**	**9.3**	**455**	**nd**	**160**	**9.4**	**0.2**	**0.1**		**609**	**320**	**nd**	**39**	**2.4**	**887**		
WS-1	12014B	149-063-36AACB2	181-186	9/2/87	31	0.03	1.1	63	13	140	9.8	452	nd	110	32	0.2	2.7	0.5	626	210	nd	58	4.2	950	10	
		149-063-36AACB2	181-186	10/22/91	28	0.03	1	62	13	140	9	457	nd	110	30	0.1	0.8	0.48	619	210	nd	58	4.2	929	7	7.75
		149-063-36AACB2	181-186	9/11/96		0.02	1.1	64	13	140	9.5	467	nd	110	33	0.2	0.2		601	210	nd	58	4.2	804	8.4	
WS-1	12014C	149-063-36AACB3	64-69	9/2/87	32	0.18	0.81	110	30	11	7.4	401	nd	57	3	0.2	0.4	0.06	450	400	70	6	0.2	740	10	
		149-063-36AACB3	64-69	10/22/91	29	0.23	0.61	120	32	11	7.4	486	nd	55	5	0.1	0	0.04	499	430	33	5	0.2	763	8	7.41
		149-063-36AACB3	64-69	9/11/96		0.37	0.6	110	29	9	6.5	472	nd	50	5.2	0.2	0.1		444	390	7	5	0.2	627	8.4	
WS-1	12014D	149-063-36AACB4	24-29	9/2/87	29	0.02	0.03	79	23	5.5	3.5	305	nd	29	2.9	0.2	3.2	0.03	325	290	42	4	0.1	540	12	
		149-063-36AACB4	24-29	10/22/91	26	0.01	0.02	78	23	6	5.6	329	nd	36	6	0.1	10	0.03	353	290	20	4	0.2	597	8	7.59
		149-063-36AACB4	24-29	9/10/96		0.01	0.02	82	23	4	2.8	342	nd	27	4.1	0.2	12		323	300	19	3	0.1	481	7.6	
		149-063-36AACB4	**24-29**	**9/6/01**		**0.08**	**0.04**	**91**	**26**	**5.5**	**3**	**352**	**nd**	**29**	**2.8**	**0.1**	**15**		**346**	**330**	**46**	**3**	**0.1**	**577**		
WS-1	12013B	149-063-36BBDA2	22-27	9/1/87	31	0.01	0.11	59	22	47	7.5	358	nd	43	8	0.3	1	0.23	395	240	nd	29	1.3	620	14	
		149-063-36BBDA2	22-27	10/24/91	30	0.01	0.34	60	19	49	7.7	358	nd	42	8.9	0.3	0.2	0.19	394	230	nd	31	1.4	620	9	7.96
		149-063-36BBDA2	22-27	9/11/96		0.03	0.36	66	19	45	7.6	370	nd	47	8.2	0.3	0.4		376	240	nd	28	1.3	536	8.7	
WS-1	12023A	149-063-36DDBC1	131-136	9/2/87	31	0.02	0.93	30	8	130	7.5	399	nd	49	18	0.5	2	0.38	474	110	nd	71	5.4	720	11	
		149-063-36DDBC1	131-136	10/22/91	27	0.29	0.77	28	7	140	6.9	413	nd	48	20	0.3	0	0.35	482	99	nd	74	6.1	748	6	8.18
		149-063-36DDBC1	131-136	9/11/96		0.1	0.62	29	7	130	6.9	403	nd	47	18	0.3	0.6		439	100	nd	72	5.7	613	7.7	
WS-1	12023B	149-063-36DDBC2	83-88	9/2/87	32	0.01	1.4	55	15	61	7.6	353	nd	38	9.4	0.3	0.4	0.22	394	200	nd	39	1.9	620	10	
		149-063-36DDBC2	83-88	10/22/91	29	0.02	1.3	56	16	52	7.6	353	nd	35	9.2	0.2	0.4	0.16	381	210	nd	34	1.6	598	6	7.83
		149-063-36DDBC2	83-88	9/11/96		0.01	1.3	59	16	52	7.3	360	nd	41	9.9	0.2	0.1		364	210	nd	34	1.6	509	7.4	
WS-1	12023C	149-063-36DDBC3	46-51	9/2/87	30	0.4	0.32	77	22	8	4.4	329	nd	28	3.3	0.2	0.5	0.08	336	280	13	6	0.2	540	10	
		149-063-36DDBC3	46-51	10/22/91	27	0.31	0.3	72	21	16	5.6	339	nd	30	5.5	0.2	3.7	0.05	349	270	nd	11	0.4	548	7	2
		149-063-36DDBC3	46-51	9/10/96		0.55	0.31	75	22	11	4.1	345	nd	27	5.3	0.2	0.1		316	280	nd	8	0.3	465	7.9	
		149-063-36DDBC3	**46-51**	**9/6/01**		**0.62**	**0.27**	**78**	**23**	**8.5**	**2.9**	**355**	**nd**	**20**	**4.5**	**0.2**	**0.1**		**313**	**290**	**nd**	**6**	**0.2**	**531**		

Small amounts of nitrate might be locally derived from ammonium nitrate and barium nitrate used in explosives. Moderate amounts of nitrate would be expected to be immobilized almost entirely within the grass vegetation on the CGS lands.

Nitrate concentrations in water samples were usually low, at a fraction of a mg/L on both WS-1 and WS-2 well sets (Tables 4 and 5). None of the water samples in any of the sampling years approached an EPA-MCL. On three sites (Location 149-063-23ADDB3, SWC Well No. 12019C; Location 149-063-34BBB2, SWC Well No. 12026B; and Location 149-063-36AACB4, SWC Well No. 12014D), (Table 5), nitrate concentrations have approached or exceeded 25% of an MCL. There also seems to be a slight upward trend at these three sites. All wells with elevated nitrate have shallow well screens. All three of these sites are in areas used to pasture cattle. Stratification of nitrate, with highest concentrations in the upper part of the aquifer is a common occurrence in North Dakota ground water, and these concentrations are considered low compared with most agricultural settings. Samples of WS-1 and WS-2 well sets through 2001 have shown no indications of nitrate contamination at levels of concern, nor is there substantial evidence of anthropogenically induced ground-water degradation with respect to nitrate.

Trace Elements

Trace elements arsenic, mercury, lead, and selenium were measured in WS-1 wells in 1987, 1991, and 1996 . In addition, barium was measured in 1991 and 1996, and cadmium and zinc were measured in 1991. There were no detections of barium, cadmium, mercury, lead, selenium and zinc at levels of toxicological concern in any of the samples (Schuh 1994, 1997). Most were non-detections. There were also no trends of rising concentrations.

Trace elements were measured for all WS-2 wells in 1993 (Table 7) and for selected wells in 1996 (Schuh 1997). Barium and lead were sampled as possible indicators of residuals from projectiles and barium nitrate, in wells designated as indicators of contamination from munitions and explosives. Other trace metals were sampled from wells associated with some bivouac areas. There were no detections of heavy metals approaching EPA-MCL.

In September 2001 water samples were collected for determination of arsenic, barium, lead, lithium, mercury, molybdenum, selenium, strontium, and zinc. All except arsenic, which was above EPA-MCL on several sites, were below EPA-MCL. Arsenic will be discussed in more detail in the next section. None of the other trace elements have evident increases in concentration since initial samples were collected in 1987 before development of the military facility. These data are summarized for WS-1 wells on Table 6, and for WS-2 wells on Table 7.

Table 6. Trace elements arsenic (As), mercury (Hg), lithium (Li), lead (Pb), selenium (Se), and strontium (Sr) concentrations for WS-1 wells (Comesky 1989). NS = not samples. nd = none detected.

Well No.	Location	Screened Interval (ft.)	Date Sampled	As	Hg	Li	Mo	Pb	Se	Sr
12024B	14806301CBBC2	151-156	9/2/87	1	nd	84	10	nd	nd	330
	14806301CBBC2	151-156	10/23/91	nd	nd	90	6	nd	nd	380
12015B	14906231ABBC2	162-167	9/1/87	42	nd	79	26	1	nd	330
	14906231ABBC2	162-167	10/23/91	1	nd	80	18	nd	nd	390
	14906231ABBC2	162-167	9/11/96	47	nd	70	19	nd	nd	320
12015C	14906231ABBC3	78-83	10/23/91	10	nd	20	4	nd	nd	350
	14906231ABBC3	78-83	9/11/96	10	nd	20	1	nd	nd	290
	14906231ABBC3	**78-83**	**9/6/01**	**11**	nd	**<100**	**3**	**<2**	**<3**	**300**
Supply Well	14906232BAA	-	3/5/98	6		90	17	nd	nd	270
12021A	14906313BAAB1	96-101	9/1/87	24	0.1	160	16	nd	nd	510
	14906313BAAB1	96-101	10/23/91	25	nd	250	18	nd	4	980
	14906313BAAB1	96-101	9/11/96	36	nd	240	19	nd	nd	890
	14906313BAAB1	**96-101**	**9/6/01**	**38**	**nd**	**240**	**15**	**<2**	**16**	**960**
12020A	14906314DACD1	212-217	9/1/87	4	NS	180	8	1	NS	280
	14906314DACD1	212-217	10/23/91	6	nd	140	6	nd	nd	230
	14906314DACD1	212-217	9/11/96	6	nd	130	47	nd	nd	190
12020B	14906314DACD2	151-156	9/1/87	4	NS	120	200	1	1	160
	14906314DACD2	151-156	10/23/91	4	nd	110	10	nd	nd	190
	14906314DACD2	151-156	9/11/96	4	nd	110	69	nd	nd	170
12020C	14906314DACD3	38-43	9/1/87	14	NS	29	5	NS	NS	290
	14906314DACD3	38-43	10/23/91	8	nd	30	4	nd	nd	330
	14906314DACD3	38-43	9/10/96	6	nd	30	2	nd	2	280
	14906314DACD3	**38-43**	**9/6/01**	**11**	nd	**<100**	**4**	**<2)**	**6**	**280**
12019A	14906323ADBB1	218-223	9/1/87	5	NS	45	9	NS	1	400
	14906323ADBB1	218-223	10/23/91	3	nd	50	7	nd	nd	450
	14906323ADBB1	218-223	9/11/96	3	nd	40	4	nd	nd	380
12019B	14906323ADBB2	32-37	9/1/87	3	0.1	17	1	NS	1	230
	14906323ADBB2	32-37	10/23/91	2	0.1	20	1	1	1	260
	14906323ADBB2	32-37	9/10/96	nd	nd	20	nd	nd	nd	250
12019C	14906323ADBB3	7-12	9/1/87	1	0.1	8	NS	NS	2	170
	14906323ADBB3	7-12	10/23/91	1	0.1	7	1	1	3	190
	14906323ADBB3	7-12	9/10/96	nd	nd	10	nd	nd	1	200
	14906323ADBB3	7-12	**9/6/01**	**2**	**0**	**<100**	**3**	**<2**	**<3**	**180**
12017A	14906325DBBC1	263-268	9/1/87	5	nd	99	200	nd	nd	170
	14906325DBBC1	263-268	10/24/91	2	0.1	100	4	1	nd	200
	14906325DBBC1	263-268	9/11/96	4	nd	100	20	nd	nd	190
12017B	14906325DBBC2	78-83	9/2/87	13	nd	87	300	nd	nd	270
	14906325DBBC2	78-83	10/24/91	19	0.1	80	12	nd	nd	260
	14906325DBBC2	78-83	9/11/96	25	nd	70	15	nd	nd	270
12017C	14906325DBBC3	51-56	9/2/87	6	0.3	21	4	nd	nd	270
	14906325DBBC3	51-56	10/24/91	3	0.1	20	2	nd	nd	260
	14906325DBBC3	51-56	9/10/96	3	nd	20	2	nd	nd	260

Table 6. Trace elements arsenic (As), mercury (Hg), lithium (Li), lead (Pb), selenium (Se), and strontium (Sr) concentrations for WS-1 wells (Comesky 1989). NS = not samples. nd = none detected.

Well No.	Location	Screened Interval (ft.)	Date Sampled	(micrograms per liter) As	Hg	Li	Mo	Pb	Se	Sr
12017D	14906325DBBC4	23-28	9/2/87	8	nd	21	4	nd	nd	290
	14906325DBBC4	23-28	10/24/91	2	0.1	20	1	nd	nd	320
	14906325DBBC4	23-28	9/10/96	3	nd	20	nd	nd	nd	300
	14906325DBBC4	**23-28**	**9/6/01**	**6**	nd	**<100**	**3**	**<2**	**<3**	**280**
12025	14906326DCA	38-43	9/1/87	15	0.1	82	6	nd	nd	460
	14906326DCA	38-43	10/24/91	13	0.1	80	3	nd	nd	510
	14906326DCA	38-43	9/12/96	19	0.1	80	2	nd	nd	510
	14906326DCA	**38-43**	**9/6/01**	**19**	nd	**<100**	**5**	**<2**	**<3**	**500**
	14906327DDDC2	158-163	9/1/87	7	0.1	5	nd	nd	2	140
	14906327DDDC2	158-163	11/19/91	1	nd	80	9	nd	1	390
	14906327DDDC2	158-163	9/11/96	1	nd	80	13	nd	nd	320
12026A	14906334BBB1	251-256	9/1/87	2	nd	94	12	nd	nd	320
	14906334BBB1	251-256	11/19/91	4	nd	60	10	nd	1	390
	14906334BBB1	251-256	9/12/96	3	0.1	50	9	nd	nd	310
12026B	14906334BBB2	27-32	9/1/87	1	nd	30	nd	nd	n	170
	14906334BBB2	27-32	10/24/91	1	0.1	20	nd	nd	2	170
	14906334BBB2	27-32	9/12/96	1	nd	20	nd	nd	1	160
12011B	14906335ABBD2	45-50	9/1/87	22	nd	79	5	nd	nd	410
	14906335ABBD2	45-50	10/24/91	16	0.1	80	4	nd	nd	450
	14906335ABBD2	45-50	9/10/96	20	nd	80	3	nd	nd	460
	14906335ABBD2	**45-50**	**9/6/01**	**24**	nd	**<100**	**4**	**<2**	**<3**	**470**
12014B	14906336AACB2	181-186	9/2/87	1	nd	120	9	n	1	480
	14906336AACB2	181-186	10/22/91	1	nd	100	5	nd	nd	500
	14906336AACB2	181-186	9/11/96	0	nd	110	8	nd	nd	430
12014C	14906336AACB3	64-69	9/2/87	13	0.1	30	2	n	1	420
	14906336AACB3	64-69	10/22/91	11	nd	30	2	nd	nd	460
	14906336AACB3	64-69	9/11/96	8	nd	30	4	nd	nd	370
12014D	14906336AACB4	24-29	9/2/87	NS	nd	14	3	n	1	220
	14906336AACB4	24-29	10/22/91	nd	nd	10	1	nd	nd	250
	14906336AACB4	24-29	9/10/96	nd	nd	20	nd	nd	nd	220
	14906336AACB4	**24-29**	**9/6/01**	**2**	nd	**<100**	**2**	**<2**	**<3**	**220**
12013B	14906336BBDA2	22-27	9/1/87	20	nd	48	13	nd	nd	380
	14906336BBDA2	22-27	10/24/91	12	0.1	50	11	nd	nd	400
	14906336BBDA2	22-27	9/11/96	22	nd	40	10	nd	nd	360
12023A	14906336DDBC1	131-136	9/2/87	1	0.2	83	30	nd	nd	230
	14906336DDBC1	131-136	10/22/91	2	nd	80	16	nd	nd	250
	14906336DDBC1	131-136	9/11/96	1	nd	70	30	nd	nd	200
12023B	14906336DDBC2	83-88	9/2/87	1	nd	68	20	nd	nd	340
	14906336DDBC2	83-88	10/22/91	1	nd	60	14	nd	nd	400
	14906336DDBC2	83-88	9/11/96	1	nd	60	14	nd	nd	350
12023C	14906336DDBC3	46-51	9/2/87	5	nd	23	2	nd	nd	240
	14906336DDBC3	46-51	10/22/91	9	nd	30	4	nd	nd	340
	14906336DDBC3	46-51	9/10/96	5	nd	20	1	nd	nd	260
	14906336DDBC3	**46-51**	**9/6/01**	**4**	nd	**<100**	**2**	**<2**	**<3**	**240**

Table 7. Barium (Ba), lithium (Li), Strontium (Sr), and trace elements [arsenic (As), cadmium (Cd), mercury (Hg), lead (Pb), selenium (Se), and Zinc (Zn)] concentrations for WS-2 wells (Schuh 1994).

Site	Well No.	Location	Screened Interval (ft)	Date Sampled	(micrograms per liter)									
					As	Ba	Cd	Hg	Li	Mo	Pb	Se	Sr	Zn
1	13103	149-062-28CCC1	139-144	10/21/92	4	ns	nd	nd	90	21	nd	nd	300	ns
1		149-062-28CCC1	139-144	09/05/96	4	13	ns	nd	90	19	nd	nd	220	ns
1		**149-062-28CCC1**	**139-144**	**09/04/01**	**6**	**<100**	**ns**	nd	**<100**	**26**	**<2**	**<3**	**210**	**<50**
1	13104	149-062-28CCC2	56-61	10/21/92	52	ns	nd	nd	70	8	nd	nd	550	ns
1		149-062-28CCC2	56-61	09/04/96	47	53	ns	nd	60	6	nd	nd	440	ns
1		**149-062-28CCC2**	**56-61**	**09/04/01**	**62**	**<100**	**ns**	nd	**<100**	**9**	**<2**	**<3**	**470**	**<50**
2	13105	149-062-29DAD	50-55	10/21/92	25	ns	nd	nd	40	3	nd	nd	500	ns
2		149-062-29DAD	50-55	09/04/96	26	97	ns	nd	40	3	nd	nd	410	ns
2		**149-062-29DAD**	**50-55**	**09/04/96**	**28**	**110**	**ns**	**0.1**	**<100**	**5**	**<2**	**<3**	**430**	**<50**
3	South	148-063-02DA	0-0	09/11/86	1	ns	ns	0.1	21	1	1	1	200	ns
3	Spring	148-063-02DA	0-0	10/22/92	2	ns	nd	nd	20	nd	nd	nd	260	ns
3		148-063-02DA	0-0	09/04/96	1	82	ns	nd	20	nd	nd	nd	200	ns
3		**148-063-02DA**	**0-0**	**09/05/01**	**2**	**<100**	**ns**	**0.1**	**<100**	**<2**	**<2**	**<3**	**190**	**<50**
4	Reservoir	148-062-31C	0-0	10/22/92	2	ns	nd	nd	10	nd	nd	nd	170	ns
4		148-062-31C	0-0	09/04/96	4	93	ns	nd	5	nd	nd	nd	110	ns
4		**148-062-31C**	**0-0**	**09/04/96**	**5**	**<100**	**ns**	nd	**<100**	**<2**	**<2**	**<3**	**94**	**<50**
5	13097	149-063-36ACA1	41-48	10/22/92	26	ns	nd	nd	40	3	nd	nd	410	ns
5		149-063-36ACA1	41-48	09/03/96	20	130	ns	nd	40	4	nd	nd	350	ns
5		**149-063-36ACA1**	**41-48**	**09/05/01**	**22**	**<100**	**ns**	nd	**<100**	**5**	**<2**	**<3**	**370**	**<50**
5	13098	149-063-36ACA2	21-27	10/22/92	13	ns	nd	nd	20	2	nd	nd	320	ns
5		149-063-36ACA2	21-27	09/03/96	11	270	ns	nd	20	2	nd	nd	260	ns
5		**149-063-36ACA2**	**21-27**	**09/5/01**	**11**	**120**	**ns**	nd	**<100**	**4**	**<2**	**<3**	**260**	**<50**
6	13101	149-063-25CDC1	110-115	10/22/92	4	ns	nd	nd	130	14	nd	nd	580	ns
6		149-063-25CDC1	110-115	09/05/96	6	100	ns	nd	20	nd	nd	nd	300	ns
6		**149-063-25CDC1**	**110-115**	**09/05/96**	**3**	**<100**	**ns**	nd	**120**	**48**	**<2**	**<3**	**540**	**<50**
6	13102	149-063-25CDC2	25-30	10/22/92	7	ns	nd	nd	20	5	nd	nd	380	ns
6		149-063-25CDC2	25-30	09/05/96	1	29	ns	nd	120	2	nd	nd	470	ns
6		**149-063-25CDC2**	**25-30**	**09/05/96**	**7**	**<100**	**ns**	**0.1**	**<100**	**4**	**<2**	**<3**	**350**	**<50**

Table 7. Trace elements arsenic (As), barium (Ba), cadmium (Cd), lithium (Li), mercury (Hg), lead (Pb), selenium (Se), strontium (Sr), and Zinc (Zn)] concentrations for WS-2 wells (Schuh 1994).

Site	Well No.	Location	Screened Interval (ft)	Date Sampled	(micrograms per liter) As	Ba	Cd	Hg	Li	Mo	Pb	Se	Sr	Zn
7	13086	148-063-02ACA1	97-102	10/22/92	nd	nd	40	5	nd	nd	nd	nd	40	5
7		148-063-02ACA1	97-102	09/03/96	ns	nd	40	4	nd	nd	ns	nd	40	4
7		**148-063-02ACA1**	**97-102**	**09/05/01**	**ns**	**0.1**	**<100**	**6**	**<2**	**<3**	**ns**	**0.1**	**<100**	**6**
7	13087	148-063-02ACA2	18-23	10/22/92	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
7		148-063-02ACA2	18-23	09/03/96	ns	nd	3	nd	nd	nd	ns	nd	3	nd
7		**148-063-02ACA2**	**18-23**	**09/05/01**	**ns**	**nd**	**<100**	**2**	**<2**	**<3**	**ns**	**nd**	**<100**	**2**
8	13090	149-062-19DBD1	95-100	08/25/93	nd	nd	50	6	nd	nd	nd	nd	50	6
8	13106	149-062-19DBD3	43-48	08/25/93	nd	nd	20	4	nd	nd	nd	nd	20	4
9	13088	149-063-13DAA1	95-100	08/25/93	nd	nd	120	28	nd	nd	nd	nd	120	28
9	13089	149-063-13DAA2	30-35	08/25/93	nd	nd	10	2	nd	nd	nd	nd	10	2
10	13092	149-063-12CAC1	105-110	08/25/93	nd	14	110	17	nd	nd	nd	14	110	17
10	13093	149-063-12CAC2	45-50	08/25/93	nd	5	30	1	nd	nd	nd	5	30	1
11	S. Washington Lake	149-063-14DBB	0-0	08/24/93	nd	nd	240	4	nd	nd	nd	nd	240	4
11	**S. Washington Lake**	**149-063-14CA**	**0-0**	**09/12/01**	**ns**	**nd**	**120**	**3**	**320**	**<3**	**ns**	**nd**	**120**	**3**
12	13084	148-063-02BABC1	69-74	08/26/93	nd	nd	70	6	nd	nd	nd	nd	70	6
12	13085	148-063-02BABC2	12-17	08/26/93	nd	nd	20	nd	1	nd	nd	nd	20	nd
13	13099	149-063-35BCBA1	23-28	08/24/93	nd	nd	40	1	nd	nd	nd	nd	40	1
13	13100	149-063-35BCBA2	23-28	08/24/93	nd	nd	20	3	nd	nd	nd	nd	20	3
14	Lake Coe	149-063-26ADD	0-0	08/24/93	nd	nd	230	4	nd	nd	nd	nd	230	4
14		**149-063-26ADD**	**0-0**	**09/5/01**	**nd**	**nd**	**150**	**5**	**<2**	**8**	**nd**	**nd**	**150**	**5**

Table 7. Trace elements arsenic (As), barium (Ba), cadmium (Cd), lithium (Li), mercury (Hg), lead (Pb), selenium (Se), strontium (Sr), and Zinc (Zn)] concentrations for WS-2 wells (Schuh 1994).

Site	Well No.	Location	Screened Interval (ft)	Date Sampled	(micrograms per liter) As	Ba	Cd	Hg	Li	Mo	Pb	Se	Sr	Zn
15	Lake Coe	149-063-27DDB	0-0	08/24/93	24	ns	nd	0.1	320	8	1	nd	140	ns
16	North	149-063-13BDA	0-0	9/11/86	2	ns	ns	0.1	39	1	1	nd	**320**	ns
16	Spring	149-063-13BDA	0-0	8/25/93	2	ns	nd	nd	40	nd	nd	nd	**360**	ns
16		149-063-13BDA	0-0	9/5/96	3	91	ns	nd	**30**	**nd**	nd	nd	280	ns
16		**149-063-13BDA**	**0-0**	**9/11/01**	**4**	**<100**	**ns**	**nd**	**100**	**<2**	**<2**	**<3**	**120**	**<50**
17	13095	148-063-04ABA1	25-30	08/26/93	20	ns	nd	nd	60	6	nd	nd	430	ns
17	13096	148-063-04ABA2	25-30	08/26/93	4	ns	nd	nd	30	4	nd	nd	250	ns
Sites 18 and 19*			-	-	-	-	-	-	-	-	-	-	-	-
20	13094	149-063-14AAB	17-22	08/25/93	3	ns	nd	nd	20	2	nd	nd	280	ns
CGS	Supply Well	14906335A1		3/5/98	24	ns	ns	nd	80	4	nd	nd	460	ns
CGS	Supply Well	14906335A2		3/5/98	20	ns	ns	nd	80	4	nd	nd	460	ns
							nd	0.1	320	8	1	nd		

One sample, collected from South Washington Lake (Site 11) has very large concentrations of lead and zinc (Table 7). We suspect that these results may be spurious and might have resulted from field or laboratory contamination or other sources of error. South Washington Lake is located on the periphery of most training activities near the NW boundary of CGS. It is located far from munitions ranges and their fire fans, which are in the southern half of the camp, and far from areas of heavy equipment operation or fueling, such as the Engineering Training Site. There is no reasonable explanation for the high dissolved lead concentrations. A pH > 9 measured in 1993 renders lead and zinc presence in solution even more unlikely. This site should be resampled in 2002 or 2003.

The reservoir (Site 4, Table 7), and to a lesser extent wells on Sites 5 and 7 (Table 7) are of particular concern for lead and other heavy metal concentrations because of their position within the surface and ground-water drainage of the firing ranges. No traces of lead or barium have been found in current or previous samples from these surface- or ground-water locations.

Except for the South Washington Lake sample, there is no evidence of contamination from lead, barium, or heavy metals on any of the surface or ground-water sample sites. The single high-concentration sample from South Washington Lake may possibly be spurious, and needs to be confirmed.

Arsenic

One trace element of concern on the CGS facility is arsenic. In previous samplings (Schuh 1997) some water samples on the CGS facility have been found to exceed the previous EPA-MCL of 50 µg/L. This standard will soon be replaced with a new EPA-MCL of 10 µg/L (here labeled EPA-MCL^N). The lower standard will increase the number of locations and the relative exceedence margin with respect to the EPA-MCL. Arsenic concentrations for WS-1 and WS-2 are shown on Table 6 and Table 7, respectively. Arsenic samples have historically been variable with location and depth, with an upper limit (in Lake Washington) approaching 70 µg/L (about seven times EPA-MCL^N). There is some evidence (Schuh 1997) of lower concentrations being more prominent at well-screen depths below 160 feet, but both higher and lower concentrations can be found at all depths (Figure 6).

Of the WS-1 well samples, eight of 26 wells (31%) have arsenic concentrations above EPA-MCL^N in the most recent sampling, and an additional well (4%) have concentrations at or above EPA-MCL^N in a previous sample, for a total of 35%. Of the WS-2 well samples, six of 22 (27%) were above EPA-MCL^N in the most recent sampling. An additional five wells (22%) had previous concentrations above EPA-MCL^N, for a total of 49%. The range for the WS-1 well set was from non-detection to 47 µg/L, with a median of 4 µg/L. The range for the WS-2 well set was from non-detection to 62 µg/L with a median of 6 µg/L.) While there is some temporal variation, there are no long-term trends indicating consistent or systematic changes in arsenic concentrations.

All measured arsenic concentrations in both springs (Table 7, Site 3 and Site 16) were below EPA-MCL^N. The reservoir (Site 4) located in the drainage of the firing ranges was generally below EPA-MCL^N. However, both South Washington Lake and Lake Coe had consistently high arsenic concentrations. South Washington Lake had a maximum value of 71 µg/L in 1993, and a 2001 value of 30 µg/L; while Lake Coe had concentrations of 10 and 24 µg/L in 1993, and 16 µg/L in the 2001 sample. High concentrations in these lakes likely result from their function as evaporative discharge areas. There appears to have been some freshening and dilution of arsenic in both lakes since 1993, possibly caused by wet climatic conditions prevailing since 1993.

An interpolative map (Figure 6) was prepared using a kriging procedure to examine the spatial distribution of arsenic concentrations with respect to depth. Mean arsenic concentrations (using all available data) were computed for each well, and wells were divided into shallow, mid-depth confined, and deep confined groups. Groupings do not correspond to geological units (shallow, middle, and deep Cherry Lake aquifer) laid out by Comesky (1989), but rather to well depth and confinement alone. Shallow wells consist of shallow well-screens that are unconfined, and all wells that are confined and within ten feet of the water-table. Shallow "wells" also include surface-water samples. Mid-depth wells consist of confined wells more than about ten feet below the water table and less than about 80 feet below land surface. Deep wells are confined and have total depths greater than 80 feet. Data-mapping boundaries were determined as the close outer rectangle which included the outermost wells on its perimeter.

The map for shallow wells (Figure 6) indicates that highest arsenic is concentrated in the Lake Coe and South Washington Lake wetland complex, which is consistent with the previous hydrologic interpretation of these lakes and wetlands as areas of evaporative concentration. About half of the entire mapped area would be expected to have arsenic concentrations above the EPA-MCL^N of 10 µg/L. Highest concentrations for mid-depth wells are in the southeastern area of the camp, including the weapons range complex. Lowest concentrations are in the central area of the CGS lands. Again, about half of the overall area would be expected to have concentrations above the expected new EPA-MCL^N. The deep wells had highest concentrations in the northeast portion of CGS, with largest concentrations centering in the area of the Engineering Training Site. About one third of the mapped area was predicted to have arsenic concentrations exceeding the EPA-MCL^N. While understanding that these maps are limited by the non-uniformity of data, lack of total coverage, and an extremely heterogeneous aquifer, these maps demonstrate that high arsenic concentrations are found at each depth, and that predominant concentrations for each depth vary spatially from one another. Map predictions of total areas for concentrations above EPA-MCL^N, about half, are similar to those predicted using statistical summaries.

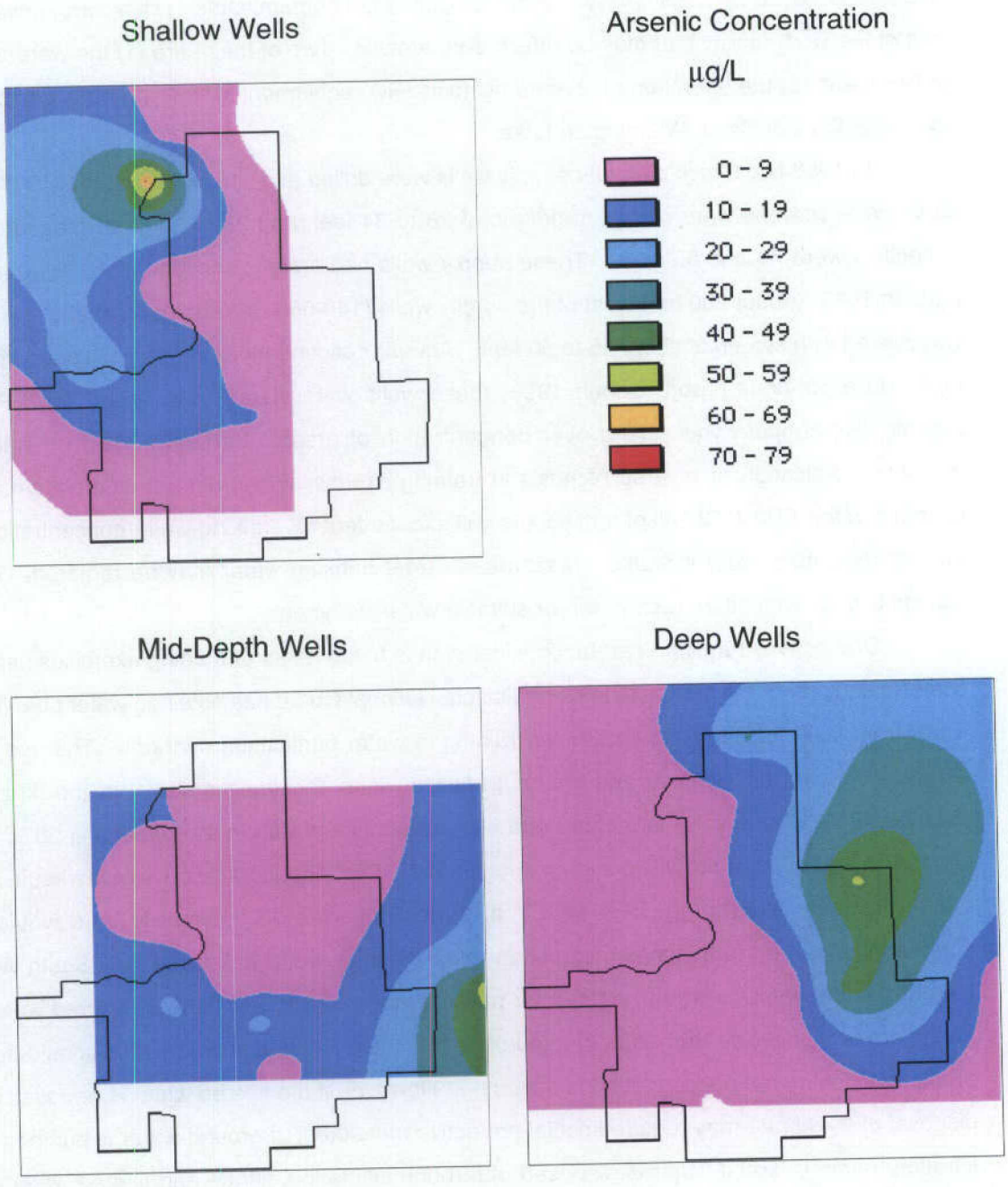


Figure 6. Krige map of arsenic concentrations in CGS wells.

There is no evidence that increasing concentrations of arsenic in ground- or surface-waters have been caused by CGS facility use or introduction of contaminants. There are, however, some uses of the CGS facility that may be affected by arsenic. Two of these are (1) the water supply used for CGS; and (2) the operation of reverse osmosis (RO) equipment for training purposes using waters from Lake Coe, or South Washington Lake.

In 1988 two 5-inch diameter supply wells were drilled at a site just south of HWY 15 (149-063-35A). Well-screens were placed at depths of 26 to 34 feet, and 28 to 36 feet. Measured pumping capacities were 51 and 55 gpm. These supply wells had arsenic concentrations of 20 µg/L and 24 µg/L in 1998. About 200 feet west of the supply wells (149-063-35ABBD2) a sample well (WS-1 set) was placed with screen at about 45 to 50 feet. Arsenic concentrations in this well varied from 16 to 24 µg/L. In a previous report (Schuh 1996) these wells were stated to be below the EPA-MCL for arsenic, but concern was raised over concentration of arsenic through certain potential causes, including application of reverse osmosis in training exercises, and natural evaporation. Following changes in the EPA-MCL, all of these wells will exceed federal drinking-water concentration limits for arsenic for public water systems. Measures to treat drinking water may be required. These may include dilution with other fresh water, or suitable water treatment.

One activity requiring careful consideration is the conduct of training exercises using reverse osmosis equipment. In the past the North Dakota National Guard has obtained water permits for using water from lakes on the CGS facility for training in water purification methods. The use of reverse osmosis causes the removal and concentration of salts, including arsenic, in the filtrate. If, for example, 80% of the water is purified and salts are concentrated in the remaining 20%, a five-fold concentration of arsenic will occur in the filtrate. Such concentration would result in arsenic concentrations exceeding EPA-MCL^{N} at almost all sites on the facility, and would result in concentrations of up to 25 times those allowable for supply wells, Lake Coe, and South Washington Lake if source waters were to be used for public water supplies. If both the filtered water and the filtrate are immediately returned to the source at the same location and time, this should not cause a problem, since no net concentration is occurring. However, if the filtered water is removed and used, disposal of the filtrate may require special protective measures. If ground-water is pumped for use in filtration training, and if water is disposed of through infiltration, filtrate and filtered water should be mixed before disposal. Arrangements for other practices should be cleared with the North Dakota Department of Health.

Other well sites having high arsenic concentrations are shown on Tables 6 and 7. One well having a particularly high arsenic concentration is located at T149 R62 Section 31ABBC2, which is just south of HWY 15, west of the M-60 range, and with a screened interval from 162 to 167 feet. Other WS-2 wells having high arsenic concentrations include the deep well at Site 1 (149-062-

28CCC2) located about one-half mile east of the previously described (149-062-31ABBC2) well having high arsenic concentration. The shallow well placed at Site 2 (149-062-29DAD) also had a high arsenic concentration. Wells at Site 1 and Site 2 are both located outside the boundaries of CGS lands. It is important to note that base-line measurements on samples collected in 1992, before development of the training facility, were high, and that they did not result from military sources.

Data on Tables 6 and 7 indicate that arsenic concentrations are generally high in the sections bordering the south side of HWY 15. These include wells at T149N R63W Sections 35 and 36 and T149N R63W Sections 29, 31, and 32. The area having potentially high arsenic concentrations would include the firing range complex, the equipment storage site located in T149N-R63W Section 36, and the main well site T149N R63W Section 35. Water supplies on each of these sites should be periodically tested for arsenic.

Munitions and Explosives

Almost all activities using live ammunition and explosives at CGS are concentrated in the plateau area of the eastern component McHenry End Moraine located on Sections 31 and 32 (T149 N R62W) and in the lowland of Section 36 (T149N R63W). Facilities located within these bounds include a demolition range, a recoilless rifle range, a modified record fire range, an M-203 range, and an M-60 machine gun range as shown on Figure 5. In general, well nests for monitoring these activities (Sites 5, 6 and 7) have been placed between the activity sites and the series of wetlands draining toward Lake Coe, and at the foot of drainage ways leading eastward from the firing ranges toward the Colvin Creek basin (Sites 1 and 2). In addition two surface-water sites, the Reservoir (Site 4) west of the firing range (Figure 3,4,5) and the South Spring (Site 3) are sampled for residues of munitions and explosives.

In 1992 water samples for residues of munitions and explosives were collected only from the shallow wells of each well nest. Because large increases in piezometric pressures in deeper wells in 1993 indicated a likely connection between deeper units of the Cherry Lake aquifer and recharge in the CGS uplands, deeper wells were also sampled on each of the sites in the fall of 1996. The only exception is Site 2, where there was only a single well.

Samples were analyzed for eight explosive compounds in 1992, and fourteen in 1996 using USEPA Method 8330 (Table 8). There were no detections of organic residues from explosives in any of the wells, springs, or surface water-bodies sampled in either year (Schuh 1994, 1997).

In addition to organic residues, elevated lead might indicate contamination from projectiles and from compounds like lead styphonate. Elevated barium or nitrate might be caused by

Table 8. List of analytes for EPA Methods 8260B, 8270C, 8330, and 8332 used for 2001 samples at CGS. * indicates partial list of specific target analytes known to be in use.

Method / Analyte	MDL / µg/L	Method / Analyte	MDL / µg/L	Method / Analyte	MDL µg/L
EPA Method 8260B		**EPA Method 8270C (cont.)**		**EPA Method 8270C (cont.)**	
1,1,1-Trichloroethane	0.0971	Benzyl Alcohol	0.0699	Carbazole	0.0726
1,1,2,2-Tetrachloroethane	0.182	1,2-Dichlorobenzene	0.0638	Di-n-butylphthalate *	0.347
1,1,2-Trichloroethane	0.116	2-Methylphenol	0.113	Fluoranthene	0.0723
1,1-Dichloroethane	0.0585	Bis (2-chloroisopropyl)ether	0.0967	Pyrene	0.0836
1,1-Dichloroethene	0.0507	2-Methylphenol	0.0552	Butylpenzylphthalate	0.204
1,2-Dichloroethane	0.0395	2-Nitrosodi-n-propyl amine	0.109	3,3'-Dichlorobenzidine	0.372
1,2-Dichloropropane	0.0752	Hexachloroethane	0.0773	Benzo (a) anthracene	0.075
2-Butanone	1.4	Nitrobenzene	0.0924	Chrysene	0.076
2-Hexanone	2.06	Isophorone	0.114	Bis (2-ethylhexyl) phthalate	2.49
2-methol-2-Pentanone	0.774	2-Nitrophenol	0.0830	Di-n-octylphthalate	0.126
Acetone	2.16	2,4-Dimethylphenol	0.285	Benzo (b) fluoranthene	0.105
Benzene	0.0357	Benzoic Acid	4.35	Benzo (k) fluoranthene	0.132
Bromodichloromethane	0.0544	bis (2-Chloroethoxy) methane	0.0508	Benzo (a) pyrene	0.0772
Bromoform	0.0868	2,4-Dichlorophenol	0.144	Ideno (1,2,3-c,d) pyrene	0.318
Bromoethane	0.0629	1,2,4-Trichlorobenzene	0.0492	Dibenz (a,h) Anthracene	0.287
Carbon Disulfide	0.0573	Naphthalene	0.0532	Benzo (g,h,i)perylene	0.276
Carbon Tetrachloride	0.0888	4--Chloroanaline	0.155		
Chlorobenzene	0.0706	Hexachlorobutadiene	0.112		
Chloroethane	0.127	4-Chloro-3-methylphenol	0.0794	**EPA Method 8330**	
Chloroform	0.0405	2-Methylnaphthalene	0.0687		
Chloromethane	0.0955	Hexachlorocyclopentadiene	0.0864	1,3,5-Trinitrobenzene	0.0758
Dibromochloromethane	0.0562	2,4,6-Trichlorophenol	0.0925	1,3-Dinitrobenzene	0.0256
Ethylbenzene *	0.0551	2,4,5-Trichlorophenol	0.112	2,4,6-Trinitrotoluene *	0.0769
Methylene Chloride	0.0491	2-Chloronaphthalene	0.0769	2,4-Dinitrotoluene *	0.0681
Styrene	0.0928	2-Nitroanaline	0.14	2,6-Dinitrotoluene *	0.0154
Tetrachloroethene	0.0696	Dimethylphthalate	0.0766	2-Amino-4,6-Dinitrotoluene	0.0582
Toluene *	0.0483	2.6-Dinitrotoluene	0.152	2-Nitrotoluene	0.0129
Trichloroethene	0.0548	Acenaphthylene	0.0467	3-Nitrotoluene	0.196
Vinyl Chloride	0.114	3-Nitroaniline	0.313	2-Amino-2,6-Dinitrotoluene	0.153
cis-1,3-Dichloropropene	0.0618	Acenapthene	0.0680	4-Nitrotoluene	0.123
trans-1,3-Dichloropropene	0.128	2,4-Dinitrophenol	1.24	HMX *	0.0445
cis-1,2-Dichloroethene	0.0667	4-Nitrophenol	0.7415	nitrobenzene	0.0696
trans-1,2-Dichloroethene	0.0791	Dibenzofuran	0.0519	RDX *	0.0539
o-Xylene *	0.0451	2,4-Dinitrotoluene	0.0981	Tetryl *	0.0853
m,p-Xylene *	0.136	Diethylphthalata	0.140		
		4-Chlorophenyl Phenyl Ether	0.0478		
		Fluroene	0.0737	**EPA Method 8332**	
EPA Method 8270C		4-Nitroanaline	0.341		
		2,4-Dinitro-2-Methylphenol	1.48	PETN *	0.354
Pyridine	0.315	N-nitrosodiphenylamine *	0.0865	Nitroglycerin *	0.376
Phenol	0.0525	4-Bromophenyl Phenyl Ether	0.108		
Bis (2-chloroethyl) ether	0.262	Hexachlorobenzene	0.151		
2-Chlorophenol	0.0851	Pentachlorophenol	1.03		
1,3-Dichlorobenzene	0.0369	Phenanthrene	0.0582		
1,4-Dichlorobenzene	0.0622	Anthracene	0.088		

barium nitrate. Various heavy metals, including zinc and cadmium, might be increased from use of flares or other pyrotechnical devices. In previous samplings (Schuh 1994,1997) there were no indications of elevated barium, nitrate, lead, or other heavy metals. Results for 2001 sampling of these analytes are discussed in "Major Ion Chemistry" and "Trace Element" sections of this report.

Aside from samples collected from the six sites specifically designated to test for residues from munitions and explosives, additional information can be obtained from several of the WS-1 wells placed by Comesky (1989) for piezometric measurements and sampling for major ion chemistry. Five of the WS-1 well nests (12013, 12014, 12015, 12023, and 12024, as shown on Figure 4) are located within the area of the demolitions and firing ranges. Water samples from these wells in 1986, 1992, and 1996 have shown no indications of increasing lead or nitrate.

In 2001 a more extensive sampling of munitions and explosives residues was planned. Procedures planned were: (1) Identify well and surface-water sample sites associated with each operational area; (2) Identify as many known compounds as possible for each use and operational area; (3) Identify sampling procedures and laboratory methods needed for those compounds; and (4) plan and sample each well and surface-water site for the required compounds and methods.

The demolitions range is located on the south half of T149N R63W Section 36. Surface-water and ground-water draining from this area would flow northwestward to the Lake Coe and South Washington Lake basins, and from there toward the Sheyenne River. In addition, possible contamination of the Reservoir between the demolitions range and the firing ranges (Site 4, Figures 3,4, 5) and the South Spring (Site 3, Figure 3,4,5) could occur through atmospheric deposit following demolitions exercises. Sample sites chosen for the demolition range are on Table 9.

The M203 range is located in the northeast quarter of T148N R63W, Section 2. The M203 range was not yet in use at the time of the 1996 sampling (Schuh 1997), but is in current use. Both ground-water and surface runoff from this area would flow westward toward the wetlands in the center of T148N R63W Section 2, and from there northward through the Lake Coe and South Washington Lake basins toward the Sheyenne river. Ground water from the M203 range may also discharge from the spring (148-063-02DA) located in the southeast quarter of T148N R63W Section 2.

The western half of T149N R62W, Section 32 is occupied by several training sites, including an M-60/ 50 caliber machine gun training site (MPMG), a pistol range, an M-16 zero range, and a modified record fire range (MRF). All of these facilities were in use in 1996. A KD (known distance) range has been used more recently. These training facilities are located on a ridge that occupies a divide between the Colvin Creek drainage basin, and the Lake Coe and South Washington Lake drainage basin (Figure 3). Depending on time, conditions, and specific locations of use, both surface-water and ground-water flow could carry contaminants in either direction. A reservoir located in the

southwest quarter of T149N R62W Section 31 collects water from the training area, and would be expected to trap contaminants.

Table 9. Water sample sites associated with ranges. Demo = Demolition Range, (R) = Reservoir, (S) = Spring, MPMG = Multiple Use Machine Gun, MRF = Modified Record Fire. Site Locations are shown on Figure 5.

Use Site	Sample Site
Demo	3(S),4(R), 5,6,7, 15 (Lake Coe)
M203	5,7
MPMG / MRF	1,2,3(S), 4(R),5,6

An inventory of known compounds for uses on each location was compiled by LTC David Anderson (Letter of 3/23/2000; Citation: Personal Communication, Appendix A-1). Most common uses of munitions and explosives are located at the Demolition Range and the assembly of ranges (MPMG, MICLIC, CPQL, ZERO, AND MRF) in the NE corner of the camp, south of HWY 29. Of the listed chemicals, there are standard EPA screening methods for Pentaerytrital Tetranitrate (PETN), 2,4,6-trinitrotoluene (TNT), Styrene, Nitroglycerin, Dibutylphthalate, and Toluene. Cadmium, magnesium, lead, nickel, and zinc components can also be tested using standard trace element methods. Target Compounds from this list were matched with laboratory procedures as shown on Table 10. A general list of all analytes determined for each of the four methods in Table 10 is presented on Table 8. A summary of sample sites for combined munitions and explosives residues, and laboratory procedures for each site are in the following table (Table 11).

Table 10. EPA Laboratory Method Procedures for known compounds from each designated use area.

Demo Range	MPMG/MRF	M203
8260B	-	-
-	8270C	-
8330	-	-
8332	8332	-
Zn, Pb, Ni, Cu	Zn, Pb	Zn, Pb

Table 11. Sample Sites, Number of Wells Sampled, and Laboratory Procedures for Munitions and Explosives Residues. (W) = Well, (S) = Spring, (L) = Lake. * = Lake Coe.

Well (Site) No.	No. Samples per site	EPA 8260B	EPA 8270C	EPA 8330	EPA 8332
1 (W)	2		x		
2 (W)	1		x		
3 (S)	1	x	x	x	x
4 (R)	1	x	x	x	x
5 (W)	2	x	x	x	x
6 (W)	2	x	x	x	x
7 (W)	2	x		x	x
15 (L)*	1	x	x	x	x

All Results for the 2001 samples are included in Appendix B. Included also in the sample summaries are case narratives; including: descriptions of method, analysis, matrix, general information, method summary, sample preparation, holding times, dilutions, quality control data, instrument QC, NC/CAR, confirmation analyses, and field and laboratory chain of custody.

A summary of detections is listed on Table 12. These must be interpreted cautiously, because samples of volatile compounds measured using EPA Method 8260B may have been contaminated with volatile compounds during handling, transit, or laboratory analysis. Four of the Method 8260B compounds were detected in water samples from several sites. Detected volatile compounds are acetone, carbon disulfide, methylene chloride, and toluene. Of these, all except

carbon disulfide were detected in the trip blank in concentrations comparable to, or greater than those in the environmental samples. One, methylene chloride, was also detected in the laboratory method blank. Only carbon disulfide was detected in field samples alone.

Table 12. Summary of organic analytes detected in water samples collected in 2001 for assessment of residues from munitions and explosives on the CGS facility.

* indicates "qualitative" detection (above MDL but below lowest calibration concentration).

Method >	**8260B**	**8260B**	**8260B**	**8260B**	**8270C**	**8270C**
Analyte >	Acetone	Carbon Disulfide	Methylene Chloride	Toluene	benzoic acid	di-n-butyl phthalate
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Sample				1 mg/L		
Method Blank	**ND**	**ND**	**0.13**	**ND**	ND	ND
1-13103	ns	ns	ns	ns	ND	ND
1-13104	ns	ns	ns	ns	ND	ND
2-13105	ns	ns	ns	ns	ND	2.9 *
3-Spring	8.2	0.068	0.16	ND	ND	ND
4-Resrvoir	ns	ns	ns	ns	5.7 *	ND
5-13097	3	0.64	0.23	0.084	**ND**	ns
5-13098	3.7	3.3	0.038	0.13	**ND**	ns
5-13098 Duplicate	4.5	0.44	0.26	0.22	**ND**	ns
6-13101	4.1	23	0.29	ND	**ND**	ND
6-13102	3	2	0.29	0.062	**ND**	ND
7-13086	4.7	1.9	0.23	0.092	ns	ns
7-13087	4.7	21	0.34	0.14	ns	n s
7-13087 Duplicate	5.4	13	0.37	0.17	ns	ns
15-Lake Coe	4.9	ND	0.17	0.095	7.2 *	11
Trip Blank	**4.6**	**ND**	**1.6**	**0.25**	ns	ns

Louise Parker of the U.S. Army ERDC-CRREL, New Hampshire, has kindly provided assistance in identifying some potential sources of detected compounds through a search of the Department of Defense (DOD) data base and additional sources in response to specific queries. In e-mail correspondence dated 10/1/2001 (Citation: Parker, 2001a; Appendix A-2a), and 11/1/2001 (Citation: Parker, 2001b; Appendix A-2b) she identified the following potential sources.

1. Di-n-butylphthalate: Parker (2001a, Appendix A-2a) cited an Encyclopedia of Explosives and Related Items (US Army Armament Research, Development, and Engineering Center,1999) in identifying its use as a solvent for nitroaromatic compounds such as DNT and Dinitroethylbenzene,

and as a coat for nitrocellulose and nitroguanidine propellants. She found it associated with 24 pages of munitions (20 munitions per page) in "one of the DOD data bases" queried.

2. Acetone: Parker (2001a, Appendix A-2a) found, in a DOD database query, 60 munitions listed, include "flares, fuses, hand grenades (smoke and riot types), anti-personnel mines, signals, and smoke pots."

3. Toluene: Citing the Encyclopedia of Explosives and Related Items, Parker (2001a, Appendix ME-3) found toluene to be one of the major components of explosives, including DNT and TNT. Citing Hawley's Condensed Chemical Dictionary (Sax and Lewis, 1987), "it is also a diluent and thinner for nitrocellulose and explosives such as TNT." In the DOD database, she found "78 munitions listed including fuses, fuse bombs, and several sizes of projectiles and ... rockets."

4. Methylene Chloride: In a search of the DOD database Parker (2001b, Appendix A-2b) found 15 matches for methylene chloride, including "several signals and smoke grenade launchers and a personnel signal kit."

5. Carbon Disulfide: Parker (2001b, Appendix A-2b) found carbon disulfide listed in the Encyclopedia of Explosives and Related Items as a compound that "had been tested as a developmental component for munitions", but was unable to find details of specific uses (there were no matches in the DOD database).

Detections of acetone, methylene chloride, and toluene in the trip blank in concentrations similar, and in some cases greater than those in field samples indicate that samples for volatile organic compounds (EPA Method 8260B) were likely contaminated in field, storage, packing, transit, or laboratory. Detection of methylene chloride in the laboratory blank means that these detections may have resulted from laboratory contamination. However, acetone and toluene contamination of samples likely occurred before the laboratory. Acetone was used for field cleaning the teflon dipper used in sampling surface waters, including Lake Coe (Site 15) and the Reservoir (Site 4). It was contained in a squeeze bottle placed within a container in the vehicle on each of the sample sites. Trip blanks were kept in the coolers during sampling, and were stored in refrigerators prior to shipping. Because trip blanks were contained in septum vials it is speculated that volatile contaminants may have passed the sealed septum, or that bottles themselves were contaminated on the outside, and that contaminants were not fully washed from the bottles before opening in the laboratory. While ground-water and surface-water samples were not collected during active demolition exercises, aerial

contamination from wind-born residues is possible, either through the septum membrane or as detritus on the bottle. Refrigerators used for storing organic samples were located in a utility building adjacent to the Multi-Purpose Machine-Gun (MPMG) range and contamination may have occurred in refrigerated storage on this site. While none of the bottles were ever opened within the utility building, it must be assumed that residues of munitions compounds used on the ranges would be present on site.

Carbon disulfide was detected in several samples, but not in trip blanks or in the method blank. It is known to be a toxic solvent (Parker 2001b, Appendix A-2b), but there is no currently published EPA-MCL value for carbon disulfide. Dr. Robert Benson of the USEPA in Denver, has provided, in an e-mail communication of 6/24/02, an approximation of 700 µg/L as a threshold of toxicological concern, using standard computation procedures for a 70 kg adult consuming 2 liters of water per day, a relative source contribution of 0.2, and an oral reference dose of 0.1 mg/kg-day (Citation: Benson 2002, Appendix A-3). All detections in water samples were several orders of magnitude below this approximation. Carbon disulfide detections are therefore considered to be "trace" detections, and of no immediate or long-term health concern, based on current toxicological information.

Di-n-butylphthalate was detected in one sample (Site 2 in the Colvin Creek basin). The detection level is considered qualitative because, while above the minimum detection level (MDL), it is below the lowest concentration used in calibration of the lab procedure. Di-n-butyl phthalate does not have an established EPA-MCL, but it does have a Reference Dose (RID) of 0.03 mg/kg/d which is an estimate of daily exposure to the human population that is likely to be non-deleterious to human health over a lifetime; and a Drinking Water Equivalent Level (DWEL) of 4,000 µg/L, which is a concentration for lifetime exposure that is "protective of adverse, non-cancer health effects, that assumes all of the contaminant is from a drinking water source" (USEPA 1996a). Concentrations detected in Lake Coe and in the ground-water northeast of the firing range complex in the Colvin Creek basin (Site 2), are below the DWEL by a factor of 1,000. Di-n-butyl phthalate detections are therefore considered to be "trace" detections, and of no known health concern, based on current toxicological information.

Benzoic acid was detected in the reservoir west of the firing range complex (Site 4) and in Lake Coe (Site 15). Detections are considered to be qualitative, indicating a likely presence, but at concentrations below that of the lowest laboratory concentration standard. Benzoic acid is a constituent of many synthetic and natural organic compounds, and has no currently published drinking water standards (USEPA 1996a).

In summary, results of water samples in 2001 indicate the possible presence of benzoic acid or di-n-butyl phthalate in two surface waters and two ground-water samples. Absence of a trip blank

for these species leaves open the possibility that detections may be spurious. If present, however, they are well below levels of toxicological concern. Carbon disulfide has been detected in several ground-water and surface-water samples, and detections seem to be authentic. All concentrations are at least 30 times below levels of potential toxicological concern. All detected species should be targeted in future sampling for verification, or deverification, and for tracking of quantitative trends.

Acetone, methylene chloride, and toluene were detected in several water samples, but appear to have likely sources other than the wells and surface-waters sampled. Toluene has an EPA-MCL of 1,000 µg/L (USEPA 1996a). Detections are below the MCL by a factor of 1,000 to 10,000. Acetone and methylene chloride have no published EPA-MCL values (USEPA 1996a), and concentrations are low, at < 10 µg/L for acetone, and < 1 µg/L for methylene chloride. These detected species should also be targeted in future sampling for verification or deverification. Additional care needs to be taken in acquisition, transport, and storage of volatile organic compounds to avoid sample contamination. Storage and handling may have to be arranged outside of the CGS facilities.

Herbicides and Pesticides

The two primary pesticide uses at CGS are leafy-spurge control, which uses a mixture of 2,4-D and picloram, and mosquito control in bivouac areas, for which either malathion or chlorpyrifos (Lorsban) are most frequently used.

Herbicide Contamination

The primary herbicides used at CGS are 2,4-D and picloram which are used mainly for leafy spurge control, and prometon which is used for control of vegetation around buildings and operational facilities. Water samples from susceptible wells and surface waters, as described in the CGS sample plan, were analyzed for these species in 1992 and an 1995 and were discussed in two previous reports (Schuh 1994, Schuh 1997). In brief, the only herbicide detected was piclorarm, which was persistently present in Lake Coe and South Washington Lake at concentrations well below EPA-MCL. There were no herbicide detections in any of the wells sampled. A brief review from previous reports is given below.

Prometon is primarily of concern near buildings and operational facilities where it is used for clearing unwanted vegetation. One area of main concern is the M-60 range. Water was tested for prometon in samples collected from both shallow and deep wells at four sites in the basins draining from the M-60 range. These include wells at Sites 1 and 8 in the Colvin Creek basin; the Reservoir (Site 4), and the wells at Site 5 in the drainage toward Lake Coe. Additional water samples were collected in South Washington Lake, and shallow wells near the Engineering Training Site (Site 9),

and at Sites 13 and 20. Well Sites 13 and 20 were associated with bivouac areas. Sample site locations are summarized on Table 3. Prometon was not detected (MDL = 0.5 µg/L) in any of the samples.

Picloram and 2,4-D are used to control leafy spurge in many areas of CGS. Twelve water samples were planned for 2001, corresponding to known areas of leafy spurge infestation and historical spraying practices. These included nine shallow well samples as summarized on Table 3, and samples from the North Spring (Site 16), South Washington Lake, and Lake Coe. Of these, Site 17 near North Twin Lake was not sampled because wells had been submerged by rising waters from the lake and destroyed by ice action. There were no detections of picloram (MDL = 0.1 µg/L) or 2,4-D (MDL = 0.5 µg/L) in any of the samples. This marks a major change in herbicide contaminant status, because it is the first sampling in which picloram was not detected in the range of 0.1 to 0.4 µg/L in Lake Coe and South Washington Lake since sampling began in 1992. Either increased influx of fresh water to the lakes, a changing microbiological environment in the lake with respect to removal of picloram, or changing management practices have resulted in non-detections within the lakes.

There were no herbicides detected in any of the surface waters or wells sampled at CGS in 2001. Data and field and laboratory QR/QC are appended (Appendix C).

Insecticide Contamination

Water samples from all of the wells sampled for herbicides were also screened for insecticides in 1993. The primary use for insecticides is mosquito control in bivouac areas and work areas. Samples for insecticide screening are targeted to these sites. In the initial (1993) sampling a general and broad screening for herbicides and insecticides was performed. Target insecticides known to have been used at CGS included malathion (MDL = 1 µg/L) and chlorpyrifos (MDL = 0.5 µg/L) . There were no detections of either. However, there was one detection (Site 6 near Lake Coe) of dimethoate (Schuh 1994). Since dimethoate (MDL = 0.5 µg/L) was not known to have been sprayed at CGS, it was speculated that the source may have been residue in the spray tank of an aerial sprayer that had been spraying picloram about 2 miles northeast (and upwind) of Site 6 at the time of well construction. Site 6 was resampled for dimethoate in 1994, and none was detected.

In 1996 all water samples collected for insecticide screening were analyzed only for chlorpyrifos (MDL = 0.5 µg/L) . There were no detections in any of the wells and surface-water samples.

In 2001 eight water samples were collected from surface water and shallow wells for insecticide screening. Sites included the North Spring (Site 16), Lake Coe (Site 15), and South Washington Lake (Site 11), and generally the same wells sampled for 2,4-D and picloram. All samples were collected from north of HWY 15, however, because bivouac areas are not located within the

safety fan of the M-60 range, which is south of HWY 15. Sample sites are summarized on Table 3, and locations are shown on Figure 5. All samples were analyzed only for malathion.

There were no detections of malathion (MDL = 0.5 µg/L) at any of the sampled sites. Data and field and laboratory QR/QC are appended (Appendix C).

Petroleum Residues

Petroleum products are used primarily in transportation and construction vehicles at CGS. Areas considered most susceptible to petroleum product contamination are vehicle staging areas, such as the Engineering Training Site (near Well Site 9), and the shop complex near the M-60 range. Other common vehicle staging areas are bivouac sites. If on-site filling is attempted, or if vehicles are damaged, gasoline, diesel fuel, lubricating oil, or hydraulic fluids could spill onto the topsoil, and eventually leach to ground water.

Site selection criteria and results for TPH samples in 1993 and 1996 were discussed in detail in Schuh (1994, 1997). To summarize, in 1993 and 1996 water samples were analyzed for TPH as gasoline, which is a test for petroleum hydrocarbons in the gasoline fraction; and TPH as fuel oil, which is a test for petroleum hydrocarbons in the fuel oil fraction, and includes diesel fuel. These were treated as an index of site contamination from petroleum products. In 1993 only shallow wells were sampled. During 1993 rising piezometric pressure in the lower confined units of the Cherry Lake aquifer indicated that recharge in the uplands of CGS did effect, and was connected to the deeper units of the aquifer. For this reason, some of the deep wells were also sampled in 1996.

Of five lake samples collected from Lake Coe and South Washington Lake in 1993 and 1996, five shallow well-water samples collected in 1993, three shallow well-water samples collected in 1996, and three deep well-water samples collected in 1996, there have been no detections of petroleum hydrocarbons as gasoline or fuel oil. There is no evidence of ground-water or surface-water contamination from vehicle leakage, or any other petroleum-based product source on Camp Grafton (South Unit).

In 2001 twelve (12) water samples were collected from surface waters and wells. Surface-water samples included the Reservoir (Site 4) in the drainage from the M-60 range, Lake Coe, and South Washington Lake. Ground-water samples were collected from eight wells in operational and bivouac areas throughout CGS, and within upland drainage paths for all major basins, including the Lake Coe and South Washington Lake flow systems, and the Colvin Creek basin, which receives drainage and ground-water flux from the uplands containing the M-60 range and many of the bivouac sites. A summary of sample sites and results is on Table 13.

Gasoline and diesel fuel residues were evaluated using GRO (gasoline range organics) and DRO (diesel range organics) using EPA Method 8015B (USEPA 1996b). GRO is used in place of the

previous TPH as gasoline, and DRO in place of the TPH as diesel. The State of North Dakota, as represented by the Department of Health, generally uses a value of 0.5 mg/L DRO or GRO (or TPH values) as a threshold for "concern" over water quality. This value is not a regulatory standard in the strict sense and does not require action. Rather, it comprises a value at which regulatory agencies begin to take note and at which increased consideration of potential sources and possible effects of future deterioration are initiated.

Table 13. Summary of GRO and DRO data for well and surface-water samples collected on CGS in September 2001.

Site	SWC Well No.	T-N	R-W	Section	Location	GRO 0.2 µg/L	DRO 0.3 µg/L
1	13103	149	62	28	CCC1	<0.2	<0.3
1	13104	149	62	28	CCC2	<0.2	<0.3
4	Reservoir	149	62	31	C	<0.2	<0.3
5	13098	149	63	36	ACA2	<0.2	<0.3
5	13098 duplicate	149	63	36	ACA2	<0.2	<0.6
5	13098 MS-MSD	149	63	36	ACA2	<0.2	<0.99
7	13087	148	63	2	ACA2	<0.2	<0.3
8	13106	149	62	19	DBD3	<0.03	**0.041**
9	13089	149	63	13	DAA2	<0.03	**0.048**
10	13093	149	63	12	CAC2	<0.03	**0.07**
11	S W Lake	149	63	14	CA	<0.03	<0.035
14	Lake Coe	149	63	26	ADD	<0.2	<0.3
16	Spring	149	63	13	BDA	<0.03	<0.038
16	Spring duplicate	149	63	36	ACA2	<0.03	<0.035
17	13095 Trip Blank	148	63	4	ABA1	<0.2 <0.2	<0.3

All samples on Table 13 are below the levels of toxicological concern using drinking water standards. Lower detection limits on some samples are due to use of different methods in different sample sets. Method documentation and all data, including QR/QC, are in Appendix C. Samples having lower detection levels indicate that DRO contaminants are possibly present in the northeast portion of CGS, notably in the vicinity of the Engineering Training Site (Well Site 9). However, all detections are a full order of magnitude below the level of toxicological concern, and below common detection limits of 0.2 mg/L. At such low levels we must also consider the possibility of contamination from sample procedures in which gasoline- or diesel-run vehicles are present on site. At this time, we conclude that diesel-range organics may be present in some wells on CGS, but at levels that are extremely low in relation to currently understood levels of concern.

CONCLUSIONS

Water samples were collected from surface waters (lakes and springs) and ground water (sample wells) on the Camp Grafton South Unit facility in 2001, to evaluate evidence of contamination or degradation due to facility use. Water samples were tested for changes in major ion chemistry, nitrate, trace elements, residues of munitions and explosives, herbicides, insecticides, and petroleum residues from gasoline and diesel fuel sources.

Analyses were targeted to specific use areas. There has been no discernible change in major ion chemistry. Nitrate concentrations have risen slightly in three shallow wells, likely due to manure mineralization under pasture, but are still at concentrations well below those of toxicological concern. Measured nitrate concentrations are also below levels commonly measured and expected in the surficial layers of aquifers in North Dakota under agricultural use.

Elevated lead and zinc concentrations were detected in South Washington Lake, but it is considered likely that these detections were spurious and caused by sample adulteration in storage, transit, or laboratory. There are no obvious source with respect to CGS management and use, and previous high pH measurements indicate that lead and zinc solubility should be low. All other water samples were free of trace metal detections. This is most notable in samples collected from areas of the CGS facility used for munitions training, and particularly in the reservoir at Site 4 which receives runoff directly from the firing ranges.

Arsenic is present in many CGS surface waters and wells at concentrations above or near the proposed new EPA-MCL of 10 µg/L. About half of the sample sites (both wells and surface waters) have had at least one sample above the proposed EPA-MCL over the last decade, and about 30% were above the proposed EPA-MCL in the 2001 sampling. Highest concentrations are in South Washington Lake, with next highest in Lake Coe, both of which concentrate arsenic through evaporation. Concentrations are also high in supply wells located near the firing range complex. Care should be taken in managing supply wells and in managing or disposing of concentrated filtrate from reverse osmosis units used in training. Concentrations in South Washington Lake and Lake Coe have decreased compared with previous samplings in 1993 and 1996, likely due to dilution from higher precipitation during the 1990s. Arsenic sources are natural, originating as constituents of the parent shales, rather than through anthropogenic (human management and use) sources.

There were detections of munitions and explosives residues, including acetone, carbon disulfide, methylene chloride, toluene, benzoic acid, and di-n-butylphthalate in some wells, springs, and surface waters. Of these, quality control data indicate that acetone, methylene chloride, and toluene are likely spurious detections. Carbon disulfide is likely present, and benzoic acid and di-n-butyl phthalate may be present. All detection concentrations, however, are well below levels of

regulatory or toxicological concern. Most are considered to be "qualitative"; that is, beyond the lower limits of reliable quantitative detection. Sampling results indicate no evidence of degradation of surface water or ground water due to current facility use or management. Questionable detections are all volatile compounds, extracted using USEPA Method 8260B. Additional care in sampling, storage, and transit should be exercised in future sampling for volatile organics. Levels of possible detection do not, however, warrant confirmation sampling before the next (2006) scheduled major sampling.

Herbicides 2,4-D, picloram, and prometon were not detected in any of the waters sampled. Picloram has previously (1993, 1994, 1995 and 1996) been detected at a persistent background level of about 0.1 µg/L in South Washington Lake and Lake Coe. These concentrations are orders of magnitude below those of toxicological concern. In 2001 picloram, for the first time, was no longer detectable. Decreasing picloram could be due to dilution from large rainfall (similar to arsenic) or changing use patterns and practices on the CGS facility. Neither 2,4-D nor prometon were detected in any of the water samples.

In past years samples have been collected for chlorpyrifos, dimethoate, and malathion. There have been no confirmed detections. In 2001 samples for malathion indicated no detections.

Gasoline range organics (GRO) and Diesel range organics (DRO) were tested on samples collected from sites near vehicle staging areas, such as bivouac sites and the Engineering Training Site. Very low concentrations of DRO were detected in shallow wells near the Engineering Training Site, and at two other locations in the north half of the CGS facility. Measured concentrations were very low with respect to reliable detection limits and toxicological standards.

As of 2001, there are no historical or current indications of degradation of ground water or surface water of the CGS facility through management or use. The next major sampling should be scheduled for 2006.

RECOMMENDATIONS

1. The 2001 sampling has indicated the first non-detections of picloram in Lake Coe and South Washington Lake. Previous recommendations for frequent (every year or every second year) sampling of picloram are now changed to testing for picloram only at the time of major sample sets (next recommended for 2006).

2. Consider the ramifications of the prospective new EPA-MCL for arsenic (10 µg/L) on appropriate use for water supply wells on the firing range complex.

3. During water purification training using reverse osmosis, filtrate should be analyzed for arsenic concentration. If filtrate has high arsenic, care should be collected in disposal. Sufficient filtered water to dilute the filtrate should be returned to the original source to offset the concentrated arsenic. Use disposal methods approved by the North Dakota Department of Health.

4. The use of the well-house area (T149N R63W Section 35A) as a staging area for storage of herbicide and for mixing pesticides should be reviewed for well-protection safety. Overflow from filling tanks may contaminate wells. Also, it is suggested that pesticides be stored away from the well site.

5. CGS use should be reviewed and sampled again for water quality in 2006.

6. Barbed wire at all well sites should be inspected and repaired .

7. The PVC protective cover for WS-2 well 13103 (Site 1, 149-062-28CCC1) should be extended three or four inches.

8. The elevations of the measuring points (tops) of all wells should be surveyed.

9. South Washington Lake should be resampled for lead and zinc to test whether high concentrations in the 2001 samples were spurious.

10. Sampling, storage, and handling procedures for volatile organic compounds should be reviewed before the next major sampling to assure non-contamination of samples.

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APPENDIX A: LETTERS OF CORRESPONDENCE (INCLUDING E-MAIL)

APPENDIX A-1. LETTER OF 3/23/2000, LTC DAVID ANDERSON TO W.M. SCHUH, RE: LOCATIONS, USES, AND COMPOSITION OF MUNITIONS AND EXPLOSIVES USED ON THE CGS FACILITY.

OFFICE OF THE ADJUTANT GENERAL
DIVISION OF
INSTALLATIONS, RESOURCES AND ENVIRONMENTAL
NORTH DAKOTA NATIONAL GUARD
PO BOX 5511, BISMARCK, ND 58506-5511

AGND-IRE-ENV

23 March 2000

MEMORANDUM FOR Mr. W. M. Schuh, ND State Water Commission, 900 East Boulevard Ave., Dept. 770, Bismarck, ND 58505-0850

SUBJECT: Information regarding pesticides, ammunition and petroleum products at Camp Grafton

1. Reference your memo dated 7 January 2000.

2. Attached you will find information regarding the types of pesticides, petroleum products, ammunition and explosives used by the NDARNG at the Camp Grafton Training Site. Also attached is a map of the training site indicating the range locations.

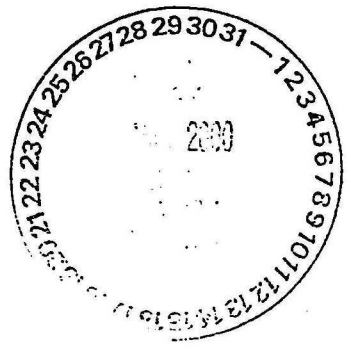
3. As we discussed on the phone, the use of the pesticides and the petroleum products is generally throughout the training site. The use of some of the munitions, such as blanks, smoke, and simulators would also be used throughout the site. The use of explosives and live ammunition is limited to the ranges marked on the attached map.

4. Please call me at 224-5244 should you have any questions.

David B. Anderson

DAVID B. ANDERSON
LTC, EN, NDARNG
Environmental Chief

Encl.
as



Munitions:

Type	Principle Ingredients	Location
5.56mm (ball & blank) (ball = live ammunition with bullet, fired only on ranges) (blank = ammunition without bullet fired throughout camp)	NC Graphite Nitroglycerin Ethyl Centralite K Sulfate Primer: SB Sulfide BA Nitrate PB Styphnate Tetracene PETN AL powder	Ball –MRF range blank – throughout camp
7.62mm	Graphite NA Sulfate CA Carbonate Nitroglycerin Diphenylamine Dibutylphthalate NC	MPMG Range
50 cal	Graphite K Nitrate NA Sulfate CA Carbonate Nitroglycerin Diphenylamine Dibutylphthalate NC	MPMG Range
40mm (practice)	Silica Basonyl Red Isobenzofurandione Formaldehyde/melamin Tetrachlorozincate	M203 range

NOTE:
Key for Range acronyms –
MPMG = Multi Purpose Machine Gun range
MICLIC = Mine Clearing LIne Charge
CPQL = Combat Pistol Qualification range
MRF = Modified Record Fire range
AT4, MK19, M203 = nomenclature for weapons (anti tank, & grenade) which fire only practice (non high-explosive) rounds at the range
Demo range = Demolitions range – location where live explosives are used for training

Explosives:

Type	Principle Ingredients	Location
Bangalor Torpedo	Toluene Triethylamine Phosphorus Xylene Methyl Ethyl Ketone Lead Nickel Copper Antimony Zinc Compounds Chromium Compounds	Demo range
Primacord Detonating Cord	Pentaerythritol Tetranitrate (PETN) Cyclonite Cyclotetramethylene Tetranitramine (HMX) Cyclonite 2,6-BIS(Picrylamino)-3,5-Dinitropyridine (PYX)	Demo range
C4	Toluene	Demo range
TNT	2,4,6-trinitrotoluene	Demo range
Cratering Charge	Toluene Xylene Nickel Lead Cobalt Zinc Compounds Chromium Compounds	Demo range
Artillery simulator	Methyl Isobutyl Ketone Methanol K Nitrate S Charcoal	Throughout camp
Smoke grenade	Ethylbenzene Cadmium Manganese Chromium Methyl Isobutyl Ketone Methanol Chromium Compound Lead Barium	Throughout camp
Claymore Mine	Styrene Phosphorus Nickel Chromium Methanol Triethylamine Lead Antimony Zinc compounds Lead compounds	Demo Range
CS Grenade	O-Chlorobenzylidene Malononitrile Potassium Chlorate	Throughout camp

Pesticides:

Pesticide	Principle Ingredients	Application Method	Location
Tordon 22K	Picloram: 4-Amino-3,5,6-trichloropicolinic Acid Potassium salt Polyglycol 26-2	Ground application (Have not used Aerial application since 1997) (Generally applied once every year at selected locations)	Throughout South Camp
2,4 –D	Dimethylamine Salt of 2, 4 –Dichlorophenoxyacetic Acid	Ground (Have not used Aerial application since 1997) (Generally applied once every year at selected locations	Throughout South Camp
Pramitol 25E	2,4-bis(isopropylamino)-6-methoxy-s-triazine	Ground (Selected locations, once every year)	Throughout South Camp
Malathion 55	O,O-Dimethyl phosphorodithioate of diethyl mercapotosuccinate	Ground (Selected locations, bivouac and work sites, with repeated applications – approx 6 applications per site - depending on troop use)	Throughout South Camp

Petroleum products:

Type	Principle Ingredients	Location
Diesel Fuel	Naphthalene Complex mixture of Paraffinic Olefinic, Naphthenic and Aromatic Hydrocarbons	Throughout South Camp
Unleaded Gasoline	Gasoline Benzene	Throughout South Camp
Leaded Gasoline	Gasoline Benzene	Throughout South Camp
Motor Oil	Refined heavy Paraffinic Distillates (solvent refined paraffinic petroleum oil) PEL/TLV as Oil Mist	Throughout South Camp
Jet fuel JP-8	2-Methoxyethanol (EGME)	Throughout South Camp

APPENDIX A-2a

From: "Parker, Louise V ERDC-CRREL-NH" <Louise.V.Parker@erdc.usace.army.mil>
To: bschuh@swc.state.nd.us
Subject: Munitions contaminants
Date: Wed, 31 Oct 2001 08:59:42 -0600
MIME-Version: 1.0

Hi Bill,

I thought I would share with you what I have so far. I have searched in two reference books and one DOD data base for the particular components of munitions. I have had trouble gaining access to the DOD database I use most frequently so, it may be a few days before I have the results of that query.

1) Concerning dibutyl phthalate:

According to an "Encyclopedia of Explosives and Related Items", it is used as a solvent for nitroaromatic compounds such as DNT and Dinitroethylbenzene. Is also used to coat nitrocellulose and nitroguanidine propellants. When I queried one of the DOD databases, I found 24 PAGES of munitions listed (with about 20 munitions per page)!

2) Concerning acetone:

When I queried the database, I found 60 munitions listed. These included flares, fuzes, hand grenades (smoke and riot types), anti-personnel mines, signals, and smoke pots.

3) Concerning toluene:

According to the "Encyclopedia of Explosives and Related Items", one of the major uses of toluene is explosives. Toluene is the precursor in the manufacture of DNT and TNT. According to "Hawley's Condensed Chemical Dictionary," it is also used as a diluent and thinner for nitrocellulose and explosives such as TNT.

When I queried the DOD database, I found 78 munitions listed including, fuzes, Fuze bombs, several sizes of projectiles (5". 16", 155 mm), and 2.75" rockets.

4) Concerning carbon disulfide,

I haven't had much luck here so I will have to keep looking. I found it listed in the "Encyclopedia of Explosives and Related Items" but it didn't say what it was used for other than it had been tested as a developmental component for munitions. This reference also claimed that it was quite toxic.

I also found it in the DOD database but the database did not list any munitions that it was a component of (0 matches). Since none of these DOD databases are complete yet, I will try the other one when I can get back into it.

Let me know which chemicals were you interested in maximum contaminant levels and anything else you still have questions on. I will let you know what I find on carbon disulfide when I get access to the other database.

Sincerely,

Louise Parker

APPENDIX A-2b

From: "Parker, Louise V ERDC-CRREL-NH" <Louise.V.Parker@erdc.usace.army.mil>
To: bschuh@swc.state.nd.us
Subject: Follow up- Munitions contaminants
Date: Thu, 1 Nov 2001 08:36:36 -0600
MIME-Version: 1.0

Hi Bill,

Here is what else I have found since I e-mailed you yesterday.

1) Concerning carbon disulfide,

I was able to get into the other DOD database yesterday. It had been a while since I used it and I had forgotten that it is great if you want to know the composition of a particular munition but it does not offer the capability of searching the entire database for component chemicals. After striking out there, I tried another book on explosives analysis and did not find it. So, I asked our most knowledgeable explosives chemist, Dr. Thomas Jenkins, if he had run into it. He said he had not but and he thought he would remember because it is a nasty solvent. I could probably give you some other names outside of CRREL if you still want to pursue this.

2) Concerning methylene chloride,

I forgot to mention in my last e-mail that I found some affiliation with munitions for this chemical also. When I searched the first DOD database, I found 15 matches for it. Munitions that contained it included several signals and smoke grenade launchers and a personnel signal kit.

I hope this has been helpful. Let me know what else I can do to help you.

Sincerely,

Louise Parker

APPENDIX A-3

Date: Mon, 24 Jun 2002 12:42:31 -0600
From: Benson.Bob@epamail.epa.gov
Subject: Re: Citation
To: William Schuh <bschuh@water.swc.state.nd.us>
MIME-version: 1.0
X-MIMETrack: Serialize by Router on EPAHUB11/USEPA/US(Release 5.0.9a |January 7, 2002) at 06/24/2002 02:42:33 PM

Revise the third sentence to read:
However, Dr. Robert Benson of the USEPA in Denver, has provided an approximation of 700 ug/L as a threshold of toxicological concern, using standard computation procedures for a 70 kg adult consuming 2 liters of water per day, a relative source contribution of 0.2, and an oral reference dose of 0.1 mg/kg-day(Personal Communication, June 24, 2002)

Here is the exact calculation using the standard approach of the Drinking Water Program: Lifetime Health Advisory = RfD x 70 kg x 1 day/2 L x Relative Source Contribution LHA = 0.1 mg/kg-day x 70 kg x 1 day/2 L x 0.2 = 0.7 mg/L or 700 micrograms per liter.

The RfD or 0.1 mg/kg-day is on IRIS (http://www.epa.gov/IRIS the under substance name). The Relative Source Contribution is intended to deal with any additional source of carbon disulfile other than drinking water, such as air, food, and dermal contact.

William Schuh
<bschuh@water.swc.state.nd.us>
06/24/02 12:30 PM

To: Bob Benson/P2/R8/USEPA/US@EPA
cc:
Subject: Citation

APPENDIX B: MUNITIONS AND EXPLOSIVES RESIDUES

Laboratory results, and case narratives (including description of method, analysis, matrix, general information, method summary, sample preparation, holding times, dilutions, quality control data, instrument ZC, NCC/NCAR, confirmation analyses, and field and laboratory chain of custody).

Includes:
- Appendix B-1, EPA Method 8260B
- Appendix B-2, EPA Method 8270C
- Appendix B-3, EPA Method 8330
- Appendix B-4, EPA Method 8332

Appendix B-1, EPA Method 8260B

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Case Narrative

Method: 8260B
Analysis: VOA
Preparation SOP #: NA
Analysis SOP#: OV-SW-8260B Rev # 1
Lot/Reference/SDG #: NA
DCL Set ID #(s): 01E-0300-01

Client: N. Dakota State Water Commission
Account #: 8001
Matrix: Water

Analysis / Method : Method 8260B is an EPA SW846 method (DCL SOP OV-SW-8260B Revision 1 - herein referred to as the "method") used in the analysis of water samples for volatile organics by GC/MS purge and trap techniques.

General Set Information: DataChem Laboratories received eleven water samples for VOA analysis. All samples were analyzed within fourteen days of sampling. Recoveries of target analytes are reported on the sample analysis data sheet in units of ug/L.

Sample Preparation: This method has no extraction procedure for the water matrix. The sample preparation date is the same as the date of analysis. Twenty-five milliliters of water sample was spiked with 2.5 uL of internal standard/surrogate solution and purged.

Instrument Calibration: The GC/MS was hardware tuned to meet the criteria for a 50 ng purging of 4-bromofluorobenzene as specified in the method. This tune check is valid for 12 hours.

Initial and Continuing Calibration Verification: The five point initial calibration curve which was analyzed prior to sample analysis met the specified criteria in the method. System performance check compounds (SPCC) are checked for a minimum response factor. These compounds are chloromethane (0.100), bromoform (0.100), 1,1-dichloroethane (0.100), chlorobenzene (0.100), and 1,1,2,2-tetrachloroethane (0.100). Response factors for the calibration check compounds (toluene, 1,1-dichloroethene, chloroform, 1,2-dichloropropane, ethylbenzene, and vinyl chloride) from the initial calibration curve are used to calculate percent relative standard deviations (%RSD). For the initial calibration standards, the %RSD for the calibration check compounds (CCC) must be less than 30% and the average %RSD for all spiked compounds must be less than 15%.

A calibration verification standard (CVS) which is used in the validation of the initial calibration was also analyzed prior to sample analysis. The CVS met the method criteria as specified. The response factors of the SPCC's met the minimum criteria as specified in the method. The CCC's were less than 20% difference from the target based on the initial calibration curve.

This report contains 001
41 pages

Method Blank Analysis: A method blank (BL-188052-1) was prepared using reagent water spiked with 2.5 uL of internal standard/surrogate solution and analyzed prior to sample analysis. The blank was free of volatile organic contaminants within the specifications of the method with the exception of methylene chloride detected below the CRDL.

MS / MSD Analysis: Matrix spike and matrix spike duplicate analyses were performed for sample 01E01966 (5-13098). The MS compounds are 1,1-dichloroethene, benzene, trichloroethene, toluene, and chlorobenzene and are spiked at a concentration of 10 ug/L. All matrix spike compound recoveries were within QC limits.

Laboratory Control Sample Analysis: A laboratory control sample (QC-188052-1) was analyzed for this analytical batch. The LCS compounds were spiked at a concentration of 10 ug/L. All recoveries met established QC acceptance criteria.

Data Qualifier Codes: A "J" qualifier indicates that the result is greater than the MDL but less than the CRDL or that the value is an estimate based on a relative response factor of one. Analytes found in field samples which also appear in the method blanks are reported with a "B" qualifier in the flag column.

NC/CAR: Not required.

Miscellaneous Comments: All surrogate recoveries were within established QC limits. Instrument designation is HP5971-L.

Sample Calculations :

Relative Response Factor:

$$RRF = \left[\frac{A_x}{A_{is}}\right]\left[\frac{C_{is}}{C_x}\right]$$

where A_x is the area of the characteristic ion for the compound to be measured, A_{is} is the area of the characteristic ion for the internal standard , C_{is} is the concentration of the internal standard, and C_x is the concentration of the compound to be measured.

Concentration in µg/L:

$$C = \left[\frac{(A_x)\,(I_s)\,(Df)}{(A_{is})\,(ARF)}\right]$$

where I_s is the amount of internal standard spiked in µg/L, **Df** is a dilution factor (1 if no dilutions are made), and **ARF** is the average response factor (assumed to be 1 for non target analytes).

10-1-01

Christopher Q. Coleman

DATA CHEM LABORATORIES, INC.
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Datapackage Table of Contents

Information pertaining to this datapackage is divided into the four categories listed below. A Case Narrative immediately precedes this Table of Contents and contains pertinent information about this datapackage.

♦ ♦ ♦ ♦ ♦ ♦ ♦ ♦ ♦ ♦

Analytical Results

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COVER PAGE

ANALYTICAL REPORT FOR
North Dakota State Water Commission

Phone(701) 328-2739 Fax(701) 328-3696

Form COVER-V1.3
10010116131
Page 1

G018601C

DCL Report Group..: 01E-0300-01

Date Printed.....: 01-OCT-01 16:11

Project Protocol #: P0186001
Client Ref Number.: Not Provided
Release Number....: Not Provided

Analysis Method(s): 8260B 25mL

North Dakota State Water Commission
Attention: William M. Schuh
900 East Boulevard
Bismark, ND 58505

Client Sample Name	Laboratory Sample Name	Date Sampled	Date Received
Method Blank	BL-188052-1	NA	NA
LCS	QC-188052-1	NA	NA
7-13086	01E01959	05-SEP-01	07-SEP-01
7-13087	01E01960	05-SEP-01	07-SEP-01
DUP 2	01E01961	05-SEP-01	07-SEP-01
3-SPRING	01E01962	05-SEP-01	07-SEP-01
6-13101	01E01964	05-SEP-01	07-SEP-01
6-13102	01E01965	05-SEP-01	07-SEP-01
5-13098	01E01966	04-SEP-01	07-SEP-01
5-13098	01E01966MS	04-SEP-01	07-SEP-01
5-13098	01E01966MSD	04-SEP-01	07-SEP-01
DUP 1	01E01967	04-SEP-01	07-SEP-01
LAKE COE	01E01970	04-SEP-01	07-SEP-01
5-13197	01E01972	04-SEP-01	07-SEP-01
TRIP BLANK	01E01973	04-SEP-01	07-SEP-01

Analyst: Christopher Q. Coleman — Date 10.1.01

Reviewed: Joseph Gress — Date 10/1/01

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DCL Report Group..: 01E-0300-01
Date Printed.....: 01-OCT-01 16:11

lient Name...:North Dakota State Water Commission

Release Number....: Not Provided

ample Group Comments

C and LCS data included in set 01E-0300-01.
urrogate and matrix spike compounds are spiked at 10 ug/L.
he QC and sample data for this set are within acceptable parameters.
he samples were analyzed by GC/MS according to method 8260 (OV-SW-8260B Rev 1).

eneral Information

The DCL QC Database maintains all numerical figures which are input from the pertinent data ource. These data have not been rounded to significant figures nor have they been moisture corrected. eports generated from the system, however, list data which have been rounded to the number of ignificant figures requested by the client or deemed appropriate for the method. This may create inor discrepancies between data which appear on the QC Summary Forms (Forms B-G) and those that would e calculated from rounded analytical results. Additionally, if a moisture correction is performed, ifferences will be observed between the QC data and the surrogate data reported on Form A (or other eport forms) and corresponding data reported on QC Summary Forms. In these cases, the Form A will ndicate the "Report Basis" as well as the moisture value used for making the correction.
eport generation options: X

esult Symbol Definitions

ND - Not Detected above the MDL or IDL (LLD or MDC for radiochemistry).
** - No result could be reported, see sample comments for details.

ualifier Symbol Definitions

U - Not Detected above the MDL or IDL (LLD or MDC for radiochemistry). For radiochemistry the nuclide was not identified by the Canberra Nuclear NID program, activity values reported are calculated using the Canberra Nuclear MINACT program.
B - For organic analysis the qualifier indicates that this analyte was found in the method blank. For inorganic analysis the qualifier signifies the value is between the IDL and PQL.
J - The qualifier indicates that the value is between the MDL and the PQL. It is also used for indicating an estimated value for tentatively identified compounds in mass spectrometry where a 1:1 response is assumed.

Date Printed.....: 01-OCT-01 16:11

Client Name.....: North Dakota State Water Commission
Client Ref Number....: Not Provided
Sampling Site.....: Not Applicable
Release Number.....: Not Provided

Date Received.....: Not Applicable

Client Sample Name: BL-188052-1
DCL Sample Name...: BL-188052-1
DCL Report Group..: 01E-0300-01

Matrix.....: WATER
Date Sampled.....: Not Applicable
Reporting Units...: ug/L

DCL Preparation Group: Not Applicable
Date Prepared.....: Not Applicable
Preparation Method...: 5030
Aliquot Weight/Volume: 25 mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G0190017
Analysis Method...: 8260B 25mL
Instrument Type...: GC/MS VO
Instrument ID.....: 5971-L
Column Type.....: DB 624
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
1,1,1-Trichloroethane	09-SEP-01 09:36	0.0971	ND			1	1
1,1,2,2-Tetrachloroethane	09-SEP-01 09:36	0.182	ND			1	1
1,1,2-Trichloroethane	09-SEP-01 09:36	0.116	ND			1	1
1,1-Dichloroethane	09-SEP-01 09:36	0.0585	ND			1	1
1,1-Dichloroethene	09-SEP-01 09:36	0.0507	ND			1	1
1,2-Dichloroethane	09-SEP-01 09:36	0.0395	ND			1	1
1,2-Dichloropropane	09-SEP-01 09:36	0.0752	ND			1	1
2-Butanone	09-SEP-01 09:36	1.40	ND			1	4
2-Hexanone	09-SEP-01 09:36	2.06	ND			1	4
4-Methyl-2-Pentanone	09-SEP-01 09:36	0.774	ND			1	4
Acetone	09-SEP-01 09:36	2.16	ND			1	4
Benzene	09-SEP-01 09:36	0.0357	ND			1	1
Bromodichloromethane	09-SEP-01 09:36	0.0544	ND			1	1
Bromoform	09-SEP-01 09:36	0.0868	ND			1	1
Bromomethane	09-SEP-01 09:36	0.0629	ND			1	1
Carbon Disulfide	09-SEP-01 09:36	0.0573	ND			1	1
Carbon Tetrachloride	09-SEP-01 09:36	0.0888	ND			1	1
Chlorobenzene	09-SEP-01 09:36	0.0706	ND			1	1
Chloroethane	09-SEP-01 09:36	0.127	ND			1	1
Chloroform	09-SEP-01 09:36	0.0405	ND			1	1
Chloromethane	09-SEP-01 09:36	0.0955	ND			1	1
Dibromochloromethane	09-SEP-01 09:36	0.0562	ND			1	1
Ethylbenzene	09-SEP-01 09:36	0.0551	ND			1	1
Methylene Chloride	09-SEP-01 09:36	0.0491	0.13		J	1	1
Styrene	09-SEP-01 09:36	0.0928	ND			1	1
Tetrachloroethene	09-SEP-01 09:36	0.0696	ND			1	1
Toluene	09-SEP-01 09:36	0.0483	ND			1	1
Trichloroethene	09-SEP-01 09:36	0.0548	ND			1	1
Vinyl Chloride	09-SEP-01 09:36	0.114	ND			1	1
cis-1,3-Dichloropropene	09-SEP-01 09:36	0.0618	ND			1	1
trans-1,3-Dichloropropene	09-SEP-01 09:36	0.128	ND			1	1
cis-1,2-Dichloroethene	09-SEP-01 09:36	0.0667	ND			1	1
trans-1,2-Dichloroethene	09-SEP-01 09:36	0.0791	ND			1	1
o-Xylene	09-SEP-01 09:36	0.0451	ND			1	1
m,p-Xylene	09-SEP-01 09:36	0.136	ND			1	2

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S0188001

Date Printed.....: 01-OCT-01 16:11
Client Name.....: North Dakota State Water Commission

DCL Sample Name...: BL-188052-1
DCL Report Group..: 01E-0300-01

Surrogate Recoveries

Analyte	Result	Spiked Amount	Percent Recovery
1,2-Dichloroethane-d4	10.2	10.0	102.
4-Bromofluorobenzene	10.9	10.0	109.
Toluene-d8	10.8	10.0	108.

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Date Printed.....: 01-OCT-01 16:11

Client Name.....: North Dakota State Water Commission
Client Ref Number....: Not Provided
Sampling Site.....: Not Applicable
Release Number.....: Not Provided

Date Received.....: Not Applicable

Client Sample Name: **QC-188052-1**
DCL Sample Name...: **QC-188052-1**
DCL Report Group..: **01E-0300-01**

Matrix.....: WATER
Date Sampled.....: Not Applicable
Reporting Units...: ug/L

DCL Preparation Group: Not Applicable
Date Prepared.....: Not Applicable
Preparation Method...: 5030
Aliquot Weight/Volume: 25 mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G0190017
Analysis Method...: 8260B 25mL
Instrument Type...: GC/MS VO
Instrument ID.....: 5971-L
Column Type.....: DB 624
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
1,1-Dichloroethene	09-SEP-01 10:08	0.0507	11.			1	1
Benzene	09-SEP-01 10:08	0.0357	9.4			1	1
Chlorobenzene	09-SEP-01 10:08	0.0706	9.8			1	1
Toluene	09-SEP-01 10:08	0.0483	9.3			1	1
Trichloroethene	09-SEP-01 10:08	0.0548	9.3			1	1

Surrogate Recoveries

Analyte	Result	Spiked Amount	Percent Recovery
1,2-Dichloroethane-d4	10.3	10.0	103.
4-Bromofluorobenzene	10.9	10.0	109.
Toluene-d8	10.7	10.0	107.

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S018609W

ate Printed.....: 01-OCT-01 16:11

lient Name.....: North Dakota State Water Commission
lient Ref Number....: Not Provided
ampling Site.....: Not Provided
elease Number.....: Not Provided

ate Received.....: 07-SEP-01 00:00

CL Preparation Group: Not Applicable
ate Prepared.....: Not Applicable
reparation Method...: 5030
liquot Weight/Volume: 25 mL
et Weight/Volume....: Not Required

Client Sample Name: **7-13086**
DCL Sample Name...: **01E01959**
DCL Report Group..: **01E-0300-01**

Matrix.....: WATER
Date Sampled.....: 05-SEP-01 00:00
Reporting Units...: ug/L
Report Basis.....: ☒ As Received ☐ Dried

DCL Analysis Group: G0190017
Analysis Method...: 8260B 25mL
Instrument Type...: GC/MS VO
Instrument ID.....: 5971-L
Column Type.....: DB 624
☒ Primary
☐ Confirmation

nalytical Results

nalyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
,1,1-Trichloroethane	09-SEP-01 10:40	0.0971	ND			1	1
,1,2,2-Tetrachloroethane	09-SEP-01 10:40	0.182	ND			1	1
,1,2-Trichloroethane	09-SEP-01 10:40	0.116	ND			1	1
,1-Dichloroethane	09-SEP-01 10:40	0.0585	ND			1	1
,1-Dichloroethene	09-SEP-01 10:40	0.0507	ND			1	1
,2-Dichloroethane	09-SEP-01 10:40	0.0395	ND			1	1
,2-Dichloropropane	09-SEP-01 10:40	0.0752	ND			1	1
-Butanone	09-SEP-01 10:40	1.40	ND			1	4
-Hexanone	09-SEP-01 10:40	2.06	ND			1	4
-Methyl-2-Pentanone	09-SEP-01 10:40	0.774	ND			1	4
cetone	09-SEP-01 10:40	2.16	4.7			1	4
enzene	09-SEP-01 10:40	0.0357	ND			1	1
romodichloromethane	09-SEP-01 10:40	0.0544	ND			1	1
romoform	09-SEP-01 10:40	0.0868	ND			1	1
romomethane	09-SEP-01 10:40	0.0629	ND			1	1
arbon Disulfide	09-SEP-01 10:40	0.0573	1.9			1	1
arbon Tetrachloride	09-SEP-01 10:40	0.0888	ND			1	1
hlorobenzene	09-SEP-01 10:40	0.0706	ND			1	1
hloroethane	09-SEP-01 10:40	0.127	ND			1	1
hloroform	09-SEP-01 10:40	0.0405	ND			1	1
hloromethane	09-SEP-01 10:40	0.0955	ND			1	1
ibromochloromethane	09-SEP-01 10:40	0.0562	ND			1	1
thylbenzene	09-SEP-01 10:40	0.0551	ND			1	1
ethylene Chloride	09-SEP-01 10:40	0.0491	0.23		BJ	1	1
tyrene	09-SEP-01 10:40	0.0928	ND			1	1
etrachloroethene	09-SEP-01 10:40	0.0696	ND			1	1
oluene	09-SEP-01 10:40	0.0483	0.092		J	1	1
richloroethene	09-SEP-01 10:40	0.0548	ND			1	1
inyl Chloride	09-SEP-01 10:40	0.114	ND			1	1
is-1,3-Dichloropropene	09-SEP-01 10:40	0.0618	ND			1	1
rans-1,3-Dichloropropene	09-SEP-01 10:40	0.128	ND			1	1
is-1,2-Dichloroethene	09-SEP-01 10:40	0.0667	ND			1	1
rans-1,2-Dichloroethene	09-SEP-01 10:40	0.0791	ND			1	1
o-Xylene	09-SEP-01 10:40	0.0451	ND			1	1
m,p-Xylene	09-SEP-01 10:40	0.136	ND			1	2

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FAX (801) 268-9992 E-mail: lab@datachem.com

Date Printed.....: 01-OCT-01 16:11
Client Name.....: North Dakota State Water Commission

DCL Sample Name...: **01E01959**
DCL Report Group..: **01E-0300-01**

Surrogate Recoveries

Analyte	Result	Spiked Amount	Percent Recovery
1,2-Dichloroethane-d4	10.2	10.0	102.
4-Bromofluorobenzene	10.9	10.0	109.
Toluene-d8	10.6	10.0	106.

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S018609X

te Printed.....: 01-OCT-01 16:11

ient Name.....: North Dakota State Water Commission
ient Ref Number....: Not Provided
mpling Site.....: Not Provided
lease Number.....: Not Provided

te Received.....: 07-SEP-01 00:00

L Preparation Group: Not Applicable
te Prepared.....: Not Applicable
eparation Method...: 5030
liquot Weight/Volume: 25 mL
et Weight/Volume....: Not Required

Client Sample Name: **7-13087**
DCL Sample Name...: **01E01960**
DCL Report Group..: **01E-0300-01**

Matrix.....: WATER
Date Sampled.....: 05-SEP-01 00:00
Reporting Units...: ug/L
Report Basis.....: ☒ As Received ☐ Dried

DCL Analysis Group: G0190017
Analysis Method...: 8260B 25mL
Instrument Type...: GC/MS VO
Instrument ID.....: 5971-L
Column Type.....: DB 624
☒ Primary
☐ Confirmation

nalytical Results

nalyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
,1,1-Trichloroethane	09-SEP-01 17:26	0.0971	ND			1	1
,1,2,2-Tetrachloroethane	09-SEP-01 17:26	0.182	ND			1	1
,1,2-Trichloroethane	09-SEP-01 17:26	0.116	ND			1	1
,1-Dichloroethane	09-SEP-01 17:26	0.0585	ND			1	1
,1-Dichloroethene	09-SEP-01 17:26	0.0507	ND			1	1
,2-Dichloroethane	09-SEP-01 17:26	0.0395	ND			1	1
,2-Dichloropropane	09-SEP-01 17:26	0.0752	ND			1	1
-Butanone	09-SEP-01 17:26	1.40	ND			1	4
-Hexanone	09-SEP-01 17:26	2.06	ND			1	4
-Methyl-2-Pentanone	09-SEP-01 17:26	0.774	ND			1	4
cetone	09-SEP-01 17:26	2.16	4.7			1	4
enzene	09-SEP-01 17:26	0.0357	ND			1	1
romodichloromethane	09-SEP-01 17:26	0.0544	ND			1	1
romoform	09-SEP-01 17:26	0.0868	ND			1	1
romomethane	09-SEP-01 17:26	0.0629	ND			1	1
arbon Disulfide	09-SEP-01 17:26	0.0573	21.			1	1
arbon Tetrachloride	09-SEP-01 17:26	0.0888	ND			1	1
hlorobenzene	09-SEP-01 17:26	0.0706	ND			1	1
hloroethane	09-SEP-01 17:26	0.127	ND			1	1
hloroform	09-SEP-01 17:26	0.0405	ND			1	1
hloromethane	09-SEP-01 17:26	0.0955	ND			1	1
ibromochloromethane	09-SEP-01 17:26	0.0562	ND			1	1
thylbenzene	09-SEP-01 17:26	0.0551	ND			1	1
ethylene Chloride	09-SEP-01 17:26	0.0491	0.34		BJ	1	1
tyrene	09-SEP-01 17:26	0.0928	ND			1	1
etrachloroethene	09-SEP-01 17:26	0.0696	ND			1	1
oluene	09-SEP-01 17:26	0.0483	0.14		J	1	1
richloroethene	09-SEP-01 17:26	0.0548	ND			1	1
inyl Chloride	09-SEP-01 17:26	0.114	ND			1	1
is-1,3-Dichloropropene	09-SEP-01 17:26	0.0618	ND			1	1
rans-1,3-Dichloropropene	09-SEP-01 17:26	0.128	ND			1	1
is-1,2-Dichloroethene	09-SEP-01 17:26	0.0667	ND			1	1
rans-1,2-Dichloroethene	09-SEP-01 17:26	0.0791	ND			1	1
-Xylene	09-SEP-01 17:26	0.0451	ND			1	1
m,p-Xylene	09-SEP-01 17:26	0.136	ND			1	2

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Date Printed.....: 01-OCT-01 16:11
Client Name.....: North Dakota State Water Commission

DCL Sample Name...: **01E01960**
DCL Report Group..: **01E-0300-01**

Surrogate Recoveries

Analyte	Result	Spiked Amount	Percent Recovery
1,2-Dichloroethane-d4	10.1	10.0	101.
4-Bromofluorobenzene	10.7	10.0	107.
Toluene-d8	10.6	10.0	106.

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DATA CHEM LABORATORIES
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FORM A (TYPE I)
SINGLE METHOD ANALYSES

S018609Y

SAMPLE ANALYSIS DATA SHEET

te Printed.....: 01-OCT-01 16:11

ient Name.....: North Dakota State Water Commission
ient Ref Number....: Not Provided
mpling Site.....: Not Provided
lease Number.....: Not Provided

te Received.....: 07-SEP-01 00:00

Client Sample Name: DUP 2
DCL Sample Name...: 01E01961
DCL Report Group..: 01E-0300-01

Matrix.....: WATER
Date Sampled.....: 05-SEP-01 00:00
Reporting Units...: ug/L
Report Basis.....: ☒ As Received ☐ Dried

L Preparation Group: Not Applicable
te Prepared.....: Not Applicable
eparation Method...: 5030
liquot Weight/Volume: 25 mL
et Weight/Volume....: Not Required

DCL Analysis Group: G0190017
Analysis Method...: 8260B 25mL
Instrument Type...: GC/MS VO
Instrument ID.....: 5971-L
Column Type.....: DB 624
☒ Primary
☐ Confirmation

nalytical Results

nalyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
,1,1-Trichloroethane	09-SEP-01 11:42	0.0971	ND			1	1
,1,2,2-Tetrachloroethane	09-SEP-01 11:42	0.182	ND			1	1
,1,2-Trichloroethane	09-SEP-01 11:42	0.116	ND			1	1
,1-Dichloroethane	09-SEP-01 11:42	0.0585	ND			1	1
,1-Dichloroethene	09-SEP-01 11:42	0.0507	ND			1	1
,2-Dichloroethane	09-SEP-01 11:42	0.0395	ND			1	1
,2-Dichloropropane	09-SEP-01 11:42	0.0752	ND			1	1
-Butanone	09-SEP-01 11:42	1.40	ND			1	4
-Hexanone	09-SEP-01 11:42	2.06	ND			1	4
-Methyl-2-Pentanone	09-SEP-01 11:42	0.774	ND			1	4
cetone	09-SEP-01 11:42	2.16	5.4			1	4
enzene	09-SEP-01 11:42	0.0357	ND			1	1
romodichloromethane	09-SEP-01 11:42	0.0544	ND			1	1
romoform	09-SEP-01 11:42	0.0868	ND			1	1
romomethane	09-SEP-01 11:42	0.0629	ND			1	1
arbon Disulfide	09-SEP-01 11:42	0.0573	13.			1	1
arbon Tetrachloride	09-SEP-01 11:42	0.0888	ND			1	1
hlorobenzene	09-SEP-01 11:42	0.0706	ND			1	1
hloroethane	09-SEP-01 11:42	0.127	ND			1	1
hloroform	09-SEP-01 11:42	0.0405	ND			1	1
hloromethane	09-SEP-01 11:42	0.0955	ND			1	1
ibromochloromethane	09-SEP-01 11:42	0.0562	ND			1	1
thylbenzene	09-SEP-01 11:42	0.0551	ND			1	1
ethylene Chloride	09-SEP-01 11:42	0.0491	0.37		BJ	1	1
tyrene	09-SEP-01 11:42	0.0928	ND			1	1
etrachloroethene	09-SEP-01 11:42	0.0696	ND			1	1
oluene	09-SEP-01 11:42	0.0483	0.17		J	1	1
richloroethene	09-SEP-01 11:42	0.0548	ND			1	1
inyl Chloride	09-SEP-01 11:42	0.114	ND			1	1
is-1,3-Dichloropropene	09-SEP-01 11:42	0.0618	ND			1	1
trans-1,3-Dichloropropene	09-SEP-01 11:42	0.128	ND			1	1
is-1,2-Dichloroethene	09-SEP-01 11:42	0.0667	ND			1	1
trans-1,2-Dichloroethene	09-SEP-01 11:42	0.0791	ND			1	1
o-Xylene	09-SEP-01 11:42	0.0451	ND			1	1
m,p-Xylene	09-SEP-01 11:42	0.136	ND			1	2

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Date Printed.....: 01-OCT-01 16:11
Client Name.....: North Dakota State Water Commission

DCL Sample Name...: 01E01961
DCL Report Group..: 01E-0300-01

Surrogate Recoveries

Analyte	Result	Spiked Amount	Percent Recovery
1,2-Dichloroethane-d4	9.95	10.0	99.5
4-Bromofluorobenzene	10.4	10.0	104.
Toluene-d8	10.7	10.0	107.

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S018609Z

:e Printed.....: 01-OCT-01 16:11

ient Name.....: North Dakota State Water Commission
ient Ref Number....: Not Provided
mpling Site.....: Not Provided
lease Number.....: Not Provided

te Received.....: 07-SEP-01 00:00

Client Sample Name: 3-SPRING
DCL Sample Name...: 01E01962
DCL Report Group..: 01E-0300-01

Matrix.....: WATER
Date Sampled.....: 05-SEP-01 00:00
Reporting Units...: ug/L
Report Basis.....: ☒ As Received ☐ Dried

L Preparation Group: Not Applicable
te Prepared.....: Not Applicable
eparation Method...: 5030
iquot Weight/Volume: 25 mL
t Weight/Volume....: Not Required

DCL Analysis Group: G0190017
Analysis Method...: 8260B 25mL
Instrument Type...: GC/MS VO
Instrument ID.....: 5971-L
Column Type.....: DB 624
☒ Primary
☐ Confirmation

ıalytical Results

ıalyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
1,1-Trichloroethane	09-SEP-01 12:13	0.0971	ND			1	1
1,2,2-Tetrachloroethane	09-SEP-01 12:13	0.182	ND			1	1
1,2-Trichloroethane	09-SEP-01 12:13	0.116	ND			1	1
1-Dichloroethane	09-SEP-01 12:13	0.0585	ND			1	1
1-Dichloroethene	09-SEP-01 12:13	0.0507	ND			1	1
2-Dichloroethane	09-SEP-01 12:13	0.0395	ND			1	1
2-Dichloropropane	09-SEP-01 12:13	0.0752	ND			1	1
-Butanone	09-SEP-01 12:13	1.40	ND			1	4
-Hexanone	09-SEP-01 12:13	2.06	ND			1	4
-Methyl-2-Pentanone	09-SEP-01 12:13	0.774	ND			1	4
cetone	09-SEP-01 12:13	2.16	8.2			1	4
enzene	09-SEP-01 12:13	0.0357	ND			1	1
romodichloromethane	09-SEP-01 12:13	0.0544	ND			1	1
romoform	09-SEP-01 12:13	0.0868	ND			1	1
romomethane	09-SEP-01 12:13	0.0629	ND			1	1
arbon Disulfide	09-SEP-01 12:13	0.0573	0.068		J	1	1
arbon Tetrachloride	09-SEP-01 12:13	0.0888	ND			1	1
hlorobenzene	09-SEP-01 12:13	0.0706	ND			1	1
hloroethane	09-SEP-01 12:13	0.127	ND			1	1
hloroform	09-SEP-01 12:13	0.0405	ND			1	1
hloromethane	09-SEP-01 12:13	0.0955	ND			1	1
ibromochloromethane	09-SEP-01 12:13	0.0562	ND			1	1
thylbenzene	09-SEP-01 12:13	0.0551	ND			1	1
ethylene Chloride	09-SEP-01 12:13	0.0491	0.16		BJ	1	1
tyrene	09-SEP-01 12:13	0.0928	ND			1	1
etrachloroethene	09-SEP-01 12:13	0.0696	ND			1	1
oluene	09-SEP-01 12:13	0.0483	ND			1	1
richloroethene	09-SEP-01 12:13	0.0548	ND			1	1
inyl Chloride	09-SEP-01 12:13	0.114	ND			1	1
is-1,3-Dichloropropene	09-SEP-01 12:13	0.0618	ND			1	1
rans-1,3-Dichloropropene	09-SEP-01 12:13	0.128	ND			1	1
is-1,2-Dichloroethene	09-SEP-01 12:13	0.0667	ND			1	1
rans-1,2-Dichloroethene	09-SEP-01 12:13	0.0791	ND			1	1
-Xylene	09-SEP-01 12:13	0.0451	ND			1	1
ı,p-Xylene	09-SEP-01 12:13	0.136	ND			1	2

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S018609Z

Date Printed.....: 01-OCT-01 16:11
Client Name.....: North Dakota State Water Commission

DCL Sample Name...: **01E01962**
DCL Report Group..: **01E-0300-01**

Surrogate Recoveries

Analyte	Result	Spiked Amount	Percent Recovery
1,2-Dichloroethane-d4	10.4	10.0	104.
4-Bromofluorobenzene	11.4	10.0	114.
Toluene-d8	10.6	10.0	106.

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DATA CHEM LABORATORIES
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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S01860B0

ate Printed.....: 01-OCT-01 16:11

lient Name.....: North Dakota State Water Commission
lient Ref Number....: Not Provided
ampling Site.....: Not Provided
elease Number.....: Not Provided

ate Received.....: 07-SEP-01 00:00

Client Sample Name: 6-13101
DCL Sample Name...: 01E01964
DCL Report Group..: 01E-0300-01

Matrix.....: WATER
Date Sampled.....: 05-SEP-01 00:00
Reporting Units...: ug/L
Report Basis.....: ☒ As Received ☐ Dried

CL Preparation Group: Not Applicable
ate Prepared.....: Not Applicable
reparation Method...: 5030
liquot Weight/Volume: 25 mL
et Weight/Volume....: Not Required

DCL Analysis Group: G0190017
Analysis Method...: 8260B 25mL
Instrument Type...: GC/MS VO
Instrument ID.....: 5971-L
Column Type.....: DB 624
☒ Primary
☐ Confirmation

nalytical Results

nalyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
,1,1-Trichloroethane	09-SEP-01 12:45	0.0971	ND			1	1
,1,2,2-Tetrachloroethane	09-SEP-01 12:45	0.182	ND			1	1
,1,2-Trichloroethane	09-SEP-01 12:45	0.116	ND			1	1
,1-Dichloroethane	09-SEP-01 12:45	0.0585	ND			1	1
,1-Dichloroethene	09-SEP-01 12:45	0.0507	ND			1	1
,2-Dichloroethane	09-SEP-01 12:45	0.0395	ND			1	1
,2-Dichloropropane	09-SEP-01 12:45	0.0752	ND			1	1
-Butanone	09-SEP-01 12:45	1.40	ND			1	4
-Hexanone	09-SEP-01 12:45	2.06	ND			1	4
-Methyl-2-Pentanone	09-SEP-01 12:45	0.774	ND			1	4
cetone	09-SEP-01 12:45	2.16	4.1			1	4
enzene	09-SEP-01 12:45	0.0357	ND			1	1
romodichloromethane	09-SEP-01 12:45	0.0544	ND			1	1
romoform	09-SEP-01 12:45	0.0868	ND			1	1
romomethane	09-SEP-01 12:45	0.0629	ND			1	1
arbon Disulfide	09-SEP-01 12:45	0.0573	23.			1	1
arbon Tetrachloride	09-SEP-01 12:45	0.0888	ND			1	1
hlorobenzene	09-SEP-01 12:45	0.0706	ND			1	1
hloroethane	09-SEP-01 12:45	0.127	ND			1	1
hloroform	09-SEP-01 12:45	0.0405	ND			1	1
hloromethane	09-SEP-01 12:45	0.0955	ND			1	1
ibromochloromethane	09-SEP-01 12:45	0.0562	ND			1	1
thylbenzene	09-SEP-01 12:45	0.0551	ND			1	1
ethylene Chloride	09-SEP-01 12:45	0.0491	0.29		BJ	1	1
tyrene	09-SEP-01 12:45	0.0928	ND			1	1
etrachloroethene	09-SEP-01 12:45	0.0696	ND			1	1
oluene	09-SEP-01 12:45	0.0483	ND			1	1
richloroethene	09-SEP-01 12:45	0.0548	ND			1	1
inyl Chloride	09-SEP-01 12:45	0.114	ND			1	1
is-1,3-Dichloropropene	09-SEP-01 12:45	0.0618	ND			1	1
rans-1,3-Dichloropropene	09-SEP-01 12:45	0.128	ND			1	1
is-1,2-Dichloroethene	09-SEP-01 12:45	0.0667	ND			1	1
rans-1,2-Dichloroethene	09-SEP-01 12:45	0.0791	ND			1	1
o-Xylene	09-SEP-01 12:45	0.0451	ND			1	1
m,p-Xylene	09-SEP-01 12:45	0.136	ND			1	2

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A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S01860B0

Date Printed.....: 01-OCT-01 16:11
Client Name.....: North Dakota State Water Commission

DCL Sample Name...: 01E01964
DCL Report Group..: 01E-0300-01

Surrogate Recoveries

Analyte	Result	Spiked Amount	Percent Recovery
1,2-Dichloroethane-d4	11.1	10.0	111.
4-Bromofluorobenzene	11.2	10.0	112.
Toluene-d8	10.6	10.0	106.

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S01860B1

.te Printed.....: 01-OCT-01 16:11

.ient Name.....: North Dakota State Water Commission
.ient Ref Number....: Not Provided
ımpling Site.....: Not Provided
elease Number.....: Not Provided

ıte Received.....: 07-SEP-01 00:00

CL Preparation Group: Not Applicable
ıte Prepared.....: Not Applicable
reparation Method...: 5030
liquot Weight/Volume: 25 mL
et Weight/Volume....: Not Required

Client Sample Name: 6-13102
DCL Sample Name...: 01E01965
DCL Report Group..: 01E-0300-01

Matrix.....: WATER
Date Sampled.....: 05-SEP-01 00:00
Reporting Units...: ug/L
Report Basis.....: ☒ As Received ☐ Dried

DCL Analysis Group: G0190017
Analysis Method...: 8260B 25mL
Instrument Type...: GC/MS VO
Instrument ID.....: 5971-L
Column Type.....: DB 624
☒ Primary
☐ Confirmation

nalytical Results

nalyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
,1,1-Trichloroethane	09-SEP-01 13:16	0.0971	ND			1	1
,1,2,2-Tetrachloroethane	09-SEP-01 13:16	0.182	ND			1	1
,1,2-Trichloroethane	09-SEP-01 13:16	0.116	ND			1	1
,1-Dichloroethane	09-SEP-01 13:16	0.0585	ND			1	1
,1-Dichloroethene	09-SEP-01 13:16	0.0507	ND			1	1
,2-Dichloroethane	09-SEP-01 13:16	0.0395	ND			1	1
,2-Dichloropropane	09-SEP-01 13:16	0.0752	ND			1	1
-Butanone	09-SEP-01 13:16	1.40	ND			1	4
-Hexanone	09-SEP-01 13:16	2.06	ND			1	4
-Methyl-2-Pentanone	09-SEP-01 13:16	0.774	ND			1	4
cetone	09-SEP-01 13:16	2.16	3.0		J	1	4
enzene	09-SEP-01 13:16	0.0357	ND			1	1
romodichloromethane	09-SEP-01 13:16	0.0544	ND			1	1
romoform	09-SEP-01 13:16	0.0868	ND			1	1
romomethane	09-SEP-01 13:16	0.0629	ND			1	1
arbon Disulfide	09-SEP-01 13:16	0.0573	2.0			1	1
arbon Tetrachloride	09-SEP-01 13:16	0.0888	ND			1	1
hlorobenzene	09-SEP-01 13:16	0.0706	ND			1	1
hloroethane	09-SEP-01 13:16	0.127	ND			1	1
hloroform	09-SEP-01 13:16	0.0405	ND			1	1
hloromethane	09-SEP-01 13:16	0.0955	ND			1	1
ibromochloromethane	09-SEP-01 13:16	0.0562	ND			1	1
thylbenzene	09-SEP-01 13:16	0.0551	ND			1	1
ethylene Chloride	09-SEP-01 13:16	0.0491	0.29		BJ	1	1
tyrene	09-SEP-01 13:16	0.0928	ND			1	1
etrachloroethene	09-SEP-01 13:16	0.0696	ND			1	1
oluene	09-SEP-01 13:16	0.0483	0.062		J	1	1
richloroethene	09-SEP-01 13:16	0.0548	ND			1	1
inyl Chloride	09-SEP-01 13:16	0.114	ND			1	1
is-1,3-Dichloropropene	09-SEP-01 13:16	0.0618	ND			1	1
rans-1,3-Dichloropropene	09-SEP-01 13:16	0.128	ND			1	1
is-1,2-Dichloroethene	09-SEP-01 13:16	0.0667	ND			1	1
rans-1,2-Dichloroethene	09-SEP-01 13:16	0.0791	ND			1	1
-Xylene	09-SEP-01 13:16	0.0451	ND			1	1
m,p-Xylene	09-SEP-01 13:16	0.136	ND			1	2

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Date Printed.....: 01-OCT-01 16:11
Client Name.....: North Dakota State Water Commission

DCL Sample Name...: 01E01965
DCL Report Group..: 01E-0300-01

Surrogate Recoveries

Analyte	Result	Spiked Amount	Percent Recovery
1,2-Dichloroethane-d4	11.0	10.0	110.
4-Bromofluorobenzene	11.2	10.0	112.
Toluene-d8	10.6	10.0	106.

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

S01860B2

SAMPLE ANALYSIS DATA SHEET

ate Printed.....: 01-OCT-01 16:11

lient Name.....: North Dakota State Water Commission
lient Ref Number....: Not Provided
ampling Site.....: Not Provided
elease Number.....: Not Provided

ate Received.....: 07-SEP-01 00:00

CL Preparation Group: Not Applicable
ate Prepared.....: Not Applicable
reparation Method...: 5030
liquot Weight/Volume: 25 mL
et Weight/Volume....: Not Required

Client Sample Name: **5-13098**
DCL Sample Name...: **01E01966**
DCL Report Group..: **01E-0300-01**

Matrix.....: WATER
Date Sampled.....: 04-SEP-01 00:00
Reporting Units...: ug/L
Report Basis.....: ☒ As Received ☐ Dried

DCL Analysis Group: G0190017
Analysis Method...: 8260B 25mL
Instrument Type...: GC/MS VO
Instrument ID.....: 5971-L
Column Type.....: DB 624
☒ Primary
☐ Confirmation

nalytical Results

nalyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
,1,1-Trichloroethane	09-SEP-01 13:47	0.0971	ND			1	1
,1,2,2-Tetrachloroethane	09-SEP-01 13:47	0.182	ND			1	1
,1,2-Trichloroethane	09-SEP-01 13:47	0.116	ND			1	1
,1-Dichloroethane	09-SEP-01 13:47	0.0585	ND			1	1
,1-Dichloroethene	09-SEP-01 13:47	0.0507	ND			1	1
,2-Dichloroethane	09-SEP-01 13:47	0.0395	ND			1	1
,2-Dichloropropane	09-SEP-01 13:47	0.0752	ND			1	1
-Butanone	09-SEP-01 13:47	1.40	ND			1	4
-Hexanone	09-SEP-01 13:47	2.06	ND			1	4
-Methyl-2-Pentanone	09-SEP-01 13:47	0.774	ND			1	4
cetone	09-SEP-01 13:47	2.16	3.7		J	1	4
enzene	09-SEP-01 13:47	0.0357	ND			1	1
romodichloromethane	09-SEP-01 13:47	0.0544	ND			1	1
romoform	09-SEP-01 13:47	0.0868	ND			1	1
romomethane	09-SEP-01 13:47	0.0629	ND			1	1
arbon Disulfide	09-SEP-01 13:47	0.0573	3.3			1	1
arbon Tetrachloride	09-SEP-01 13:47	0.0888	ND			1	1
hlorobenzene	09-SEP-01 13:47	0.0706	ND			1	1
hloroethane	09-SEP-01 13:47	0.127	ND			1	1
hloroform	09-SEP-01 13:47	0.0405	ND			1	1
hloromethane	09-SEP-01 13:47	0.0955	ND			1	1
ibromochloromethane	09-SEP-01 13:47	0.0562	ND			1	1
thylbenzene	09-SEP-01 13:47	0.0551	ND			1	1
ethylene Chloride	09-SEP-01 13:47	0.0491	0.38		BJ	1	1
tyrene	09-SEP-01 13:47	0.0928	ND			1	1
etrachloroethene	09-SEP-01 13:47	0.0696	ND			1	1
oluene	09-SEP-01 13:47	0.0483	0.13		J	1	1
richloroethene	09-SEP-01 13:47	0.0548	ND			1	1
inyl Chloride	09-SEP-01 13:47	0.114	ND			1	1
cis-1,3-Dichloropropene	09-SEP-01 13:47	0.0618	ND			1	1
trans-1,3-Dichloropropene	09-SEP-01 13:47	0.128	ND			1	1
cis-1,2-Dichloroethene	09-SEP-01 13:47	0.0667	ND			1	1
trans-1,2-Dichloroethene	09-SEP-01 13:47	0.0791	ND			1	1
o-Xylene	09-SEP-01 13:47	0.0451	ND			1	1
m,p-Xylene	09-SEP-01 13:47	0.136	ND			1	2

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Date Printed.....: 01-OCT-01 16:11
Client Name.....: North Dakota State Water Commission

DCL Sample Name...: 01E01966
DCL Report Group..: 01E-0300-01

Surrogate Recoveries

Analyte	Result	Spiked Amount	Percent Recovery
1,2-Dichloroethane-d4	11.1	10.0	111.
4-Bromofluorobenzene	11.2	10.0	112.
Toluene-d8	10.6	10.0	106.

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S01860B5

e Printed.....: 01-OCT-01 16:11

ent Name.....: North Dakota State Water Commission
ent Ref Number....: Not Provided
pling Site.....: Not Provided
ease Number.....: Not Provided

e Received.....: 07-SEP-01 00:00

L Preparation Group: Not Applicable
te Prepared.....: Not Applicable
eparation Method...: 5030
iquot Weight/Volume: 25 mL
t Weight/Volume....: Not Required

Client Sample Name: DUP 1
DCL Sample Name...: 01E01967
DCL Report Group..: 01E-0300-01

Matrix.....: WATER
Date Sampled.....: 04-SEP-01 00:00
Reporting Units...: ug/L
Report Basis.....: ☒ As Received ☐ Dried

DCL Analysis Group: G0190017
Analysis Method...: 8260B 25mL
Instrument Type...: GC/MS VO
Instrument ID.....: 5971-L
Column Type.....: DB 624
☒ Primary
☐ Confirmation

alytical Results

alyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
1,1-Trichloroethane	09-SEP-01 15:21	0.0971	ND			1	1
1,2,2-Tetrachloroethane	09-SEP-01 15:21	0.182	ND			1	1
1,2-Trichloroethane	09-SEP-01 15:21	0.116	ND			1	1
1-Dichloroethane	09-SEP-01 15:21	0.0585	ND			1	1
1-Dichloroethene	09-SEP-01 15:21	0.0507	ND			1	1
2-Dichloroethane	09-SEP-01 15:21	0.0395	ND			1	1
2-Dichloropropane	09-SEP-01 15:21	0.0752	ND			1	1
-Butanone	09-SEP-01 15:21	1.40	ND			1	4
-Hexanone	09-SEP-01 15:21	2.06	ND			1	4
-Methyl-2-Pentanone	09-SEP-01 15:21	0.774	ND			1	4
cetone	09-SEP-01 15:21	2.16	4.5			1	4
enzene	09-SEP-01 15:21	0.0357	ND			1	1
romodichloromethane	09-SEP-01 15:21	0.0544	ND			1	1
romoform	09-SEP-01 15:21	0.0868	ND			1	1
romomethane	09-SEP-01 15:21	0.0629	ND			1	1
arbon Disulfide	09-SEP-01 15:21	0.0573	0.44		J	1	1
arbon Tetrachloride	09-SEP-01 15:21	0.0888	ND			1	1
hlorobenzene	09-SEP-01 15:21	0.0706	ND			1	1
hloroethane	09-SEP-01 15:21	0.127	ND			1	1
hloroform	09-SEP-01 15:21	0.0405	ND			1	1
hloromethane	09-SEP-01 15:21	0.0955	ND			1	1
ibromochloromethane	09-SEP-01 15:21	0.0562	ND			1	1
thylbenzene	09-SEP-01 15:21	0.0551	ND			1	1
ethylene Chloride	09-SEP-01 15:21	0.0491	0.26		BJ	1	1
tyrene	09-SEP-01 15:21	0.0928	ND			1	1
etrachloroethene	09-SEP-01 15:21	0.0696	ND			1	1
oluene	09-SEP-01 15:21	0.0483	0.22		J	1	1
richloroethene	09-SEP-01 15:21	0.0548	ND			1	1
inyl Chloride	09-SEP-01 15:21	0.114	ND			1	1
is-1,3-Dichloropropene	09-SEP-01 15:21	0.0618	ND			1	1
rans-1,3-Dichloropropene	09-SEP-01 15:21	0.128	ND			1	1
is-1,2-Dichloroethene	09-SEP-01 15:21	0.0667	ND			1	1
rans-1,2-Dichloroethene	09-SEP-01 15:21	0.0791	ND			1	1
-Xylene	09-SEP-01 15:21	0.0451	ND			1	1
m,p-Xylene	09-SEP-01 15:21	0.136	ND			1	2

SAMPLE ANALYSIS DATA SHEET

Date Printed.....: 01-OCT-01 16:11
Client Name.....: North Dakota State Water Commission

DCL Sample Name...: 01E01967
DCL Report Group..: 01E-0300-01

Surrogate Recoveries

Analyte	Result	Spiked Amount	Percent Recovery
1,2-Dichloroethane-d4	10.6	10.0	106.
4-Bromofluorobenzene	11.1	10.0	111.
Toluene-d8	10.7	10.0	107.

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

S01860B6

SAMPLE ANALYSIS DATA SHEET

:e Printed.....: 01-OCT-01 16:11

.ent Name.....: North Dakota State Water Commission
lent Ref Number....: Not Provided
npling Site.....: Not Provided
lease Number.....: Not Provided

te Received.....: 07-SEP-01 00:00

Client Sample Name: LAKE COE
DCL Sample Name...: 01E01970
DCL Report Group..: 01E-0300-01

Matrix.....: WATER
Date Sampled.....: 04-SEP-01 00:00
Reporting Units...: ug/L
Report Basis.....: ☒ As Received ☐ Dried

L Preparation Group: Not Applicable
te Prepared.....: Not Applicable
eparation Method...: 5030
iquot Weight/Volume: 25 mL
t Weight/Volume....: Not Required

DCL Analysis Group: G0190017
Analysis Method...: 8260B 25mL
Instrument Type...: GC/MS VO
Instrument ID.....: 5971-L
Column Type.....: DB 624
☒ Primary
☐ Confirmation

ıalytical Results

ıalyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
,1,1-Trichloroethane	09-SEP-01 15:53	0.0971	ND			1	1
,1,2,2-Tetrachloroethane	09-SEP-01 15:53	0.182	ND			1	1
,1,2-Trichloroethane	09-SEP-01 15:53	0.116	ND			1	1
,1-Dichloroethane	09-SEP-01 15:53	0.0585	ND			1	1
,1-Dichloroethene	09-SEP-01 15:53	0.0507	ND			1	1
,2-Dichloroethane	09-SEP-01 15:53	0.0395	ND			1	1
,2-Dichloropropane	09-SEP-01 15:53	0.0752	ND			1	1
-Butanone	09-SEP-01 15:53	1.40	ND			1	4
-Hexanone	09-SEP-01 15:53	2.06	ND			1	4
-Methyl-2-Pentanone	09-SEP-01 15:53	0.774	ND			1	4
cetone	09-SEP-01 15:53	2.16	4.9			1	4
enzene	09-SEP-01 15:53	0.0357	ND			1	1
romodichloromethane	09-SEP-01 15:53	0.0544	ND			1	1
romoform	09-SEP-01 15:53	0.0868	ND			1	1
romomethane	09-SEP-01 15:53	0.0629	ND			1	1
arbon Disulfide	09-SEP-01 15:53	0.0573	ND			1	1
arbon Tetrachloride	09-SEP-01 15:53	0.0888	ND			1	1
hlorobenzene	09-SEP-01 15:53	0.0706	ND			1	1
hloroethane	09-SEP-01 15:53	0.127	ND			1	1
hloroform	09-SEP-01 15:53	0.0405	ND			1	1
hloromethane	09-SEP-01 15:53	0.0955	ND			1	1
ibromochloromethane	09-SEP-01 15:53	0.0562	ND			1	1
thylbenzene	09-SEP-01 15:53	0.0551	ND			1	1
ethylene Chloride	09-SEP-01 15:53	0.0491	0.17		BJ	1	1
tyrene	09-SEP-01 15:53	0.0928	ND			1	1
etrachloroethene	09-SEP-01 15:53	0.0696	ND			1	1
oluene	09-SEP-01 15:53	0.0483	0.095		J	1	1
richloroethene	09-SEP-01 15:53	0.0548	ND			1	1
inyl Chloride	09-SEP-01 15:53	0.114	ND			1	1
is-1,3-Dichloropropene	09-SEP-01 15:53	0.0618	ND			1	1
rans-1,3-Dichloropropene	09-SEP-01 15:53	0.128	ND			1	1
is-1,2-Dichloroethene	09-SEP-01 15:53	0.0667	ND			1	1
rans-1,2-Dichloroethene	09-SEP-01 15:53	0.0791	ND			1	1
-Xylene	09-SEP-01 15:53	0.0451	ND			1	1
m,p-Xylene	09-SEP-01 15:53	0.136	ND			1	2

Date Printed.....: 01-OCT-01 16:11
Client Name.....: North Dakota State Water Commission

DCL Sample Name...: **01E01970**
DCL Report Group..: **01E-0300-01**

Surrogate Recoveries

Analyte	Result	Spiked Amount	Percent Recovery
1,2-Dichloroethane-d4	10.3	10.0	103.
4-Bromofluorobenzene	11.0	10.0	110.
Toluene-d8	10.6	10.0	106.

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S01860B7

.e Printed.....: 01-OCT-01 16:11

.ent Name.....: North Dakota State Water Commission
.ent Ref Number....: Not Provided
.pling Site.....: Not Provided
.ease Number.....: Not Provided

:e Received.....: 07-SEP-01 00:00

L Preparation Group: Not Applicable
te Prepared.....: Not Applicable
eparation Method...: 5030
iquot Weight/Volume: 25 mL
t Weight/Volume....: Not Required

Client Sample Name: 5-13197
DCL Sample Name...: 01E01972
DCL Report Group..: 01E-0300-01

Matrix.....: WATER
Date Sampled.....: 04-SEP-01 00:00
Reporting Units...: ug/L
Report Basis.....: ☒ As Received ☐ Dried

DCL Analysis Group: G0190017
Analysis Method...: 8260B 25mL
Instrument Type...: GC/MS VO
Instrument ID.....: 5971-L
Column Type.....: DB 624
☒ Primary
☐ Confirmation

ıalytical Results

ıalyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
1,1-Trichloroethane	09-SEP-01 16:24	0.0971	ND			1	1
1,2,2-Tetrachloroethane	09-SEP-01 16:24	0.182	ND			1	1
1,2-Trichloroethane	09-SEP-01 16:24	0.116	ND			1	1
1-Dichloroethane	09-SEP-01 16:24	0.0585	ND			1	1
1-Dichloroethene	09-SEP-01 16:24	0.0507	ND			1	1
2-Dichloroethane	09-SEP-01 16:24	0.0395	ND			1	1
2-Dichloropropane	09-SEP-01 16:24	0.0752	ND			1	1
-Butanone	09-SEP-01 16:24	1.40	ND			1	4
-Hexanone	09-SEP-01 16:24	2.06	ND			1	4
-Methyl-2-Pentanone	09-SEP-01 16:24	0.774	ND			1	4
cetone	09-SEP-01 16:24	2.16	3.0		J	1	4
enzene	09-SEP-01 16:24	0.0357	ND			1	1
romodichloromethane	09-SEP-01 16:24	0.0544	ND			1	1
romoform	09-SEP-01 16:24	0.0868	ND			1	1
romomethane	09-SEP-01 16:24	0.0629	ND			1	1
arbon Disulfide	09-SEP-01 16:24	0.0573	0.64		J	1	1
arbon Tetrachloride	09-SEP-01 16:24	0.0888	ND			1	1
hlorobenzene	09-SEP-01 16:24	0.0706	ND			1	1
hloroethane	09-SEP-01 16:24	0.127	ND			1	1
hloroform	09-SEP-01 16:24	0.0405	ND			1	1
hloromethane	09-SEP-01 16:24	0.0955	ND			1	1
ibromochloromethane	09-SEP-01 16:24	0.0562	ND			1	1
thylbenzene	09-SEP-01 16:24	0.0551	ND			1	1
ethylene Chloride	09-SEP-01 16:24	0.0491	0.23		BJ	1	1
tyrene	09-SEP-01 16:24	0.0928	ND			1	1
etrachloroethene	09-SEP-01 16:24	0.0696	ND			1	1
oluene	09-SEP-01 16:24	0.0483	0.084		J	1	1
richloroethene	09-SEP-01 16:24	0.0548	ND			1	1
inyl Chloride	09-SEP-01 16:24	0.114	ND			1	1
is-1,3-Dichloropropene	09-SEP-01 16:24	0.0618	ND			1	1
rans-1,3-Dichloropropene	09-SEP-01 16:24	0.128	ND			1	1
is-1,2-Dichloroethene	09-SEP-01 16:24	0.0667	ND			1	1
rans-1,2-Dichloroethene	09-SEP-01 16:24	0.0791	ND			1	1
o-Xylene	09-SEP-01 16:24	0.0451	ND			1	1
m,p-Xylene	09-SEP-01 16:24	0.136	ND			1	2

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S01860B7

Date Printed.....: 01-OCT-01 16:11
Client Name.....: North Dakota State Water Commission

DCL Sample Name...: 01E01972
DCL Report Group..: 01E-0300-01

Surrogate Recoveries

Analyte	Result	Spiked Amount	Percent Recovery
1,2-Dichloroethane-d4	10.2	10.0	102.
4-Bromofluorobenzene	11.0	10.0	110.
Toluene-d8	10.6	10.0	106.

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S01860B8

te Printed.....: 01-OCT-01 16:11

ient Name.....: North Dakota State Water Commission
ient Ref Number....: Not Provided
mpling Site.....: Not Provided
lease Number.....: Not Provided

te Received.....: 07-SEP-01 00:00

Client Sample Name: TRIP BLANK
DCL Sample Name...: 01E01973
DCL Report Group..: 01E-0300-01

Matrix.....: WATER
Date Sampled.....: 04-SEP-01 00:00
Reporting Units...: ug/L
Report Basis.....: ☒ As Received ☐ Dried

'L Preparation Group: Not Applicable
.te Prepared.....: Not Applicable
'eparation Method...: 5030
.iquot Weight/Volume: 25 mL
:t Weight/Volume....: Not Required

DCL Analysis Group: G0190017
Analysis Method...: 8260B 25mL
Instrument Type...: GC/MS VO
Instrument ID.....: 5971-L
Column Type.....: DB 624
☒ Primary
☐ Confirmation

nalytical Results

nalyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
,1,1-Trichloroethane	09-SEP-01 16:55	0.0971	ND			1	1
,1,2,2-Tetrachloroethane	09-SEP-01 16:55	0.182	ND			1	1
,1,2-Trichloroethane	09-SEP-01 16:55	0.116	ND			1	1
,1-Dichloroethane	09-SEP-01 16:55	0.0585	ND			1	1
,1-Dichloroethene	09-SEP-01 16:55	0.0507	ND			1	1
,2-Dichloroethane	09-SEP-01 16:55	0.0395	ND			1	1
,2-Dichloropropane	09-SEP-01 16:55	0.0752	ND			1	1
-Butanone	09-SEP-01 16:55	1.40	ND			1	4
-Hexanone	09-SEP-01 16:55	2.06	ND			1	4
-Methyl-2-Pentanone	09-SEP-01 16:55	0.774	ND			1	4
cetone	09-SEP-01 16:55	2.16	4.6			1	4
enzene	09-SEP-01 16:55	0.0357	ND			1	1
romodichloromethane	09-SEP-01 16:55	0.0544	ND			1	1
romoform	09-SEP-01 16:55	0.0868	ND			1	1
romomethane	09-SEP-01 16:55	0.0629	ND			1	1
arbon Disulfide	09-SEP-01 16:55	0.0573	ND			1	1
arbon Tetrachloride	09-SEP-01 16:55	0.0888	ND			1	1
hlorobenzene	09-SEP-01 16:55	0.0706	ND			1	1
hloroethane	09-SEP-01 16:55	0.127	ND			1	1
hloroform	09-SEP-01 16:55	0.0405	ND			1	1
hloromethane	09-SEP-01 16:55	0.0955	ND			1	1
ibromochloromethane	09-SEP-01 16:55	0.0562	ND			1	1
thylbenzene	09-SEP-01 16:55	0.0551	ND			1	1
ethylene Chloride	09-SEP-01 16:55	0.0491	1.6		B	1	1
tyrene	09-SEP-01 16:55	0.0928	ND			1	1
etrachloroethene	09-SEP-01 16:55	0.0696	ND			1	1
oluene	09-SEP-01 16:55	0.0483	0.25		J	1	1
richloroethene	09-SEP-01 16:55	0.0548	ND			1	1
inyl Chloride	09-SEP-01 16:55	0.114	ND			1	1
is-1,3-Dichloropropene	09-SEP-01 16:55	0.0618	ND			1	1
rans-1,3-Dichloropropene	09-SEP-01 16:55	0.128	ND			1	1
is-1,2-Dichloroethene	09-SEP-01 16:55	0.0667	ND			1	1
rans-1,2-Dichloroethene	09-SEP-01 16:55	0.0791	ND			1	1
o-Xylene	09-SEP-01 16:55	0.0451	ND			1	1
m,p-Xylene	09-SEP-01 16:55	0.136	ND			1	2

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Date Printed.....: 01-OCT-01 16:11
Client Name.....: North Dakota State Water Commission

DCL Sample Name...: 01E01973
DCL Report Group..: 01E-0300-01

Surrogate Recoveries

Analyte	Result	Spiked Amount	Percent Recovery
1,2-Dichloroethane-d4	10.1	10.0	101.
4-Bromofluorobenzene	10.7	10.0	107.
Toluene-d8	10.3	10.0	103.

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FORM B (TYPE I)
SINGLE METHOD ANALYSES

QUALITY CONTROL DATA SHEET
LABORATORY CONTROL SAMPLE (LCS)

S0188002

ient Name.....: North Dakota State Water Commission
lease Number.....: Not Provided

trix.....: 25ML
porting Units.....: ug/L

L Preparation Group: Not Applicable
te Prepared.....: Not Applicable
eparation Method...: 5030

DCL Sample Name...: QC-188052-1
Date Printed.....: 01-OCT-01 16:11

DCL Analysis Group: G0190017
Analysis Method...: SW 8260B
Instrument Type...: GC/MS VO
Instrument ID.....: 5971-L
Column Type.....: DB 624
☒ Primary
☐ Confirmation

QC Limit Type.....: Method

alytical Results

alyte	Date Analyzed	Target	Result	Percent Recovery	QC Limits	QC Flag
1-Dichloroethene	09-SEP-01 10:08	10.0	10.8	108.	75.0/125.	
enzene	09-SEP-01 10:08	10.0	9.42	94.2	75.0/125.	
lorobenzene	09-SEP-01 10:08	10.0	9.76	97.6	75.0/125.	
oluene	09-SEP-01 10:08	10.0	9.28	92.8	74.0/125.	
ichloroethene	09-SEP-01 10:08	10.0	9.27	92.7	71.0/125.	

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FORM F (TYPE I)
SINGLE METHOD ANALYSES

QUALITY CONTROL DATA SHEET
MATRIX SPIKE SAMPLE
MATRIX SPIKE DUPLICATE SAMPLE

S01860B3

Client Name.....: North Dakota State Water Commission
Release Number.....: Not Provided

Matrix.....: 25ML
Reporting Units.....: ug/L

DCL Preparation Group: Not Applicable
Date Prepared.....: Not Applicable
Preparation Method...: 5030

DCL Sample Name...: **01E01966MS**
Date Printed.....: 01-OCT-01 16:11

DCL Analysis Group: G0190017
Analysis Method...: SW 8260B
Instrument Type...: GC/MS VO
Instrument ID.....: 5971-L
Column Type.....: DB 624
☒ Primary
☐ Confirmation

QC Limit Type.....: Method

Analytical Results

Analyte	Date Analyzed	Sample Result	Spiked Result	Spike Added	Percent Recovery	QC Limits	QC Flag
1,1-Dichloroethene	09-SEP-01 14:18	ND	10.2	10.0	102.	75.0/125.	
Benzene	09-SEP-01 14:18	ND	9.02	10.0	90.3	75.0/125.	
Chlorobenzene	09-SEP-01 14:18	ND	9.17	10.0	91.7	75.0/125.	
Toluene	09-SEP-01 14:18	0.128	8.78	10.0	86.5	74.0/125.	
Trichloroethene	09-SEP-01 14:18	ND	8.74	10.0	87.4	71.0/125.	

S01860B4

DCL Sample Name...: **01E01966MSD**

Analytical Results

Analyte	Date Analyzed	Duplicate Result	Percent Recovery	Mean	Range	RPD	QC Limits	QC Flag
1,1-Dichloroethene	09-SEP-01 14:50	9.69	96.9	9.95	0.515	5.2	0.00/20.0	
Benzene	09-SEP-01 14:50	8.78	87.8	8.90	0.248	2.8	0.00/20.0	
Chlorobenzene	09-SEP-01 14:50	9.21	92.1	9.19	0.0360	0.39	0.00/20.0	
Toluene	09-SEP-01 14:50	8.65	85.2	8.71	0.138	1.6	0.00/20.0	
Trichloroethene	09-SEP-01 14:50	8.45	84.5	8.60	0.288	3.4	0.00/20.0	

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

QUALITY CONTROL DATA SHEET
SURROGATE SUMMARY

Client Name.....: North Dakota State Water Commission
Release Number.....: Not Provided

Matrix.....: 25ML
Reporting Units.....: ug/L

Date Printed.....: 01-OCT-01 16:11

DCL Analysis Group: G0190017
Analysis Method...: SW 8260B

DCL Prep Group....: Not Applicable
Preparation Method: 5030

QC Limit Type.....: Method

Surrogate Recoveries

Surr. ID	1,2-Dichloroethane-d4				4-Bromofluorobenzene				Toluene-d8			
QC Limits	62.0/139.				75.0/125.				75.0/125.			
DCL Sample Number	Analyte Result	Spiked Amount	% Rec.	Q	Analyte Result	Spiked Amount	% Rec.	Q	Analyte Result	Spiked Amount	% Rec.	Q
01E01959	10.2	10.0	102.		10.9	10.0	109.		10.6	10.0	106.	
01E01960	10.1	10.0	101.		10.7	10.0	107.		10.6	10.0	106.	
01E01961	9.95	10.0	99.5		10.4	10.0	104.		10.7	10.0	107.	
01E01962	10.4	10.0	104.		11.4	10.0	114.		10.6	10.0	106.	
01E01964	11.1	10.0	111.		11.2	10.0	112.		10.6	10.0	106.	
01E01965	11.0	10.0	110.		11.2	10.0	112.		10.6	10.0	106.	
01E01966	11.1	10.0	111.		11.2	10.0	112.		10.6	10.0	106.	
01E01966MS	10.5	10.0	105.		10.7	10.0	107.		10.8	10.0	108.	
01E01966MSD	10.9	10.0	109.		11.4	10.0	114.		10.8	10.0	108.	
01E01967	10.6	10.0	106.		11.1	10.0	111.		10.7	10.0	107.	
01E01970	10.3	10.0	103.		11.0	10.0	110.		10.6	10.0	106.	
01E01972	10.2	10.0	102.		11.0	10.0	110.		10.6	10.0	106.	
01E01973	10.1	10.0	101.		10.7	10.0	107.		10.3	10.0	103.	
BL-188052-1	10.2	10.0	102.		10.9	10.0	109.		10.8	10.0	108.	
QC-188052-1	10.3	10.0	103.		10.9	10.0	109.		10.7	10.0	107.	

Earliest Sampling Date: 4-Sep-2001

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 28-Sep-2001

Project/Job/Task: P0186001 | *Split:* | **Root Set ID:** 01E-0300 * | **Reporting Group** 01

Client: North Dakota State Water Commission | **Account:** 08001

Comments:

Verified: PS 9/7/01

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Customer ID 2	Analysis: Volatiles by 8260B	# Bottles
5-Sep-2001	7-13086	01E01959			WATER		X	2
5-Sep-2001	7-13087	01E01960			WATER		X	3
5-Sep-2001	DUP 2	01E01961			WATER		X	3
5-Sep-2001	3-SPRING	01E01962			WATER		X	3
5-Sep-2001	6-13101	01E01964			WATER		X	3
5-Sep-2001	6-13102	01E01965			WATER		X	3
4-Sep-2001	5-13098	01E01966			WATER		X	3
4-Sep-2001	5-13098	01E01966MS		MS	WATER		X	0
4-Sep-2001	5-13098	01E01966MSD		MSD	WATER		X	3
4-Sep-2001	DUP 1	01E01967			WATER		X	3

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Walk-in/ ~~Room~~/ Shelf/ Fridge	9/7/01 1606	R-24-2 JR	Labeling/~~Shelving~~
Storage area	4-7-01 1030	Walk-in/ Room/ Shelf/ Fridge	Storage: 12-4027 1 Wet Analysis area

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

Printed 9/7/2001 16:0

Check box if there is a continuation page ☐

Form: COFC1.01-SWV2.30

Earliest Sampling Date: 4-Sep-2001

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 28-Sep-2001

Project/Job/Task: P0186001 | *Split:* | **Root Set ID:** 01E-0300 * | **Reporting Group** 01

Client: North Dakota State Water Commission | **Account:** 08001

Comments:

Verified: PS 9/7/01

Analysis

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Customer ID 2	Volatiles by 8260B	# Bottles
4-Sep-2001	LAKE COE	01E01970			WATER		X	3
4-Sep-2001	5-13197	01E01972			WATER		X	3
4-Sep-2001	TRIP BLANK	01E01973			WATER		X	7

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Walk-in/ ~~Room~~/ Shelf/ Fridge	9/7/01 1600	R-24-2 JP	Labeling/ ~~Shelving~~
Storage R-14-Low	9.8.01 10:30	Walk-in/ Room/ Shelf/ Fridge	Storage: Room 1 with Analysis

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

01E-0300

Samples To: DATA CHEM LABORATORIES
960 WEST LEVOY DRIVE
SALT LAKE CITY, UTAH 84123-2547
TEL. (801

North Dakota State Water Commission
900 East Boulevard
Bismarck, ND 58505
Dates Sampled: 9/5 9/7 By:
Change of Custody: Date 9/7 By:
Change of Custody: Date By:
Date Shipped: 9/6 By:
Carrier Fedex

North Dakota State Water Commission
900 East Boulevard
Bismarck, ND 58505

Analysis Requested: 8260B 8270 8330 8332

	No	Location	No. Bottles	Sample Date	Test For 8260 B	8270	8330	8332	Comments
		7-							
1959	1	TB 13086	3 1L 3-40ml		3 40ml		1L	1L	1 x fsa r-C
	2								
	3								
		7-							
60	4	13081	2 1-L 3 40ml		3 40		1L	1L	
	5								
	6								
61	7	Dup 2	2 1-L 3x 40ml		2 1-L 3 40ml		1L	1L	
	8								
	9								
	10	Trip Blank							
	11								
	12								
	13								
	14								

Blank Temperature at time of shipping_____

01E-0300

Samples To: DATA CHEM LABORATORIES
960 WEST LEVOY DRIVE
SALT LAKE CITY, UTAH 84123-2547
TEL. (801

North Dakota State Water Commission
900 East Boulevard
Bismarck, ND 58505
Dates Sampled: 9/5
Change of Custody: Date 9/7
Change of Custody: Date
Date Shipped: 9/9
Carrier FED EX

North Dakota State Water Commission
900 East Boulevard
Bismarck, ND 58505
By:
By: SD
By:
By:

Analysis Requested: 8260B 8270 8330 8332

No	Location	No. Bottles	Sample Date	Test For				Comments
				8260 B	8270	8330	8332	
62 1	3 - Spring	3 1L	9/5	3	1	1	1	1 x extra Bottle
		3 40ml	9/5	3				
63 2	4 - Reservoir	4 1L	9/5		1	1	1	
		3 40ml	9/5	3				
3								
	6 - 1301							12 extra Bottles
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								

Blank Temperature at time of shipping_____

OIE-0300

Samples To: DATA CHEM LABORATORIES
960 WEST LEVOY DRIVE
SALT LAKE CITY, UTAH 84123-2547
TEL. (801

North Dakota State Water Commission
900 East Boulevard
Bismarck, ND 58505
Dates Sampled: 9/5
Change of Custody: Date 9/5
Change of Custody: Date
Date Shipped: 9/6
Carrier FEDEX

North Dakota State Water Commission
900 East Boulevard
Bismarck, ND 58505
By:
By:
By:
By:

Analysis Requested: 8260B 8270 8330 8332

No	Location	No. Bottles	Sample Date	Test For				Comments
				8260 B	8270	8330	8332	
1964 1	6-13101	3@1L	9/5		X	X	X	additional 1L Bottles shipped room cool (13101
		3/40mL	9/5	X				
65 2	6-13102	1L	9/5		X	X	X	
	~~6-13~~	3/40mL	9/5	X				
3	Trip Blank	(1)40mL						
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								

Blank Temperature at time of shipping_____

01E-0300

Samples To: DATA CHEM LABORATORIES
960 WEST LEVOY DRIVE
SALT LAKE CITY, UTAH 84123-2547
TEL. (801

North Dakota State Water Commission
900 East Boulevard
Bismarck, ND 58505
Dates Sampled: 9/4
Change of Custody: Date 9/7
Change of Custody: Date 9/06
Date Shipped:
Carrier Feder

North Dakota State Water Commission
900 East Boulevard
Bismarck, ND 58505
By:
By:
By:

Analysis Requested: 8260B 8270 8330 8332

No	Location	No. Bottles	Sample Date	Test For 8260 B	8270	8330	8332	Comments
1	5-130985	3	9/4		1	1	1	
		3	9/4	1				
2		4 VOA						
3	5-130986 MS/MSD	1		3	1			2 more for the case
4								
5	Dup 1	3	9/4		1	1	1	
		3	9/4	3				
6								
7								
8								
9								
10								
11								
12								
13								
14								

Blank Temperature at time of shipping

01E-0300

Samples To: DATA CHEM LABORATORIES
960 WEST LEVOY DRIVE
SALT LAKE CITY, UTAH 84123-2547
TEL. (801

North Dakota State Water Commission
900 East Boulevard
Bismarck, ND 58505
Dates Sampled: 9/4
Change of Custody: Date 9/5
Change of Custody: Date
Date Shipped: 9/6
Carrier

North Dakota State Water Commission
900 East Boulevard
Bismarck, ND 58505
By: MK
By: SR
By:
By: MVK

Analysis Requested: 8260B 8270 8330 8332

No	Location	No. Bottles	Sample Date	Test For				Comments
				8260 B	8270	8330	8332	
1	5-13.095 MS/MSD	3	9/4		X	X	X	1L extra for other codes
2		3	9/4	X3				
3	~~1-13095~~							
4	1-13103	2			X1L			1L extra
5								
6	~~1~~ 1-13104	2			X1L			1L extra
7								
8								
9								
10								
11								
12								
13								
14								

1966 MS/MSD

68

69

Blank Temperature at time of shipping

OIE-0300

Samples To: DATA CHEM LABORATORIES
960 WEST LEVOY DRIVE
SALT LAKE CITY, UTAH 84123-2547
TEL. (801

2-13105

5-13107, Lake Oe

North Dakota State Water Commission
900 East Boulevard
Bismarck, ND 58505
Dates Sampled: 9/4 9/5 By:
Change of Custody: Date 9/7 By:
Change of Custody: Date By:
Date Shipped: 9/6 By:
Carrier Fedex

North Dakota State Water Commission
900 East Boulevard
Bismarck, ND 58505

Analysis Requested: 8260B 8270 8330 8332

No	Location	No. Bottles	Sample Date	Test For				Comments
			9/5	8260 B	8270 C	8330	8332	
1	Lake Oe	3			1L	1L	1L	
		3	9/5	40mL				
2	~~2-~~							
3	2-13105		9/4		1L			
4								
5	5-13107	3	9/4		1L	1L	1L	
		3	9/4	40mL				
6								
	Trip Blank			40mL				
7								
8								
9								
10								
11								
12								
13								
14								

Blank Temperature at time of shipping_____

Appendix B-2, EPA Method 8270C

DATA CHEM
LABORATORIES, INC.
A SORENSON COMPANY

September 17, 2001

Mr. William Schuh
North Dakota State Water Commission
900 East Boulevard
Bismarck, ND 58505

Dear Mr. Schuh:

Enclosed is a copy of the analytical report for DCL Set Id #: 01E-0300-04.

Should you have any questions about the enclosed data package, please feel free to contact Mr. Kevin Griffiths, Project Manager, at (801) 266-7700. We would welcome any suggestions that you believe would help us serve you better.

Sincerely,

Heather Taysom
Document Control

CINCINNATI LABORATORY
4388 Glendale-Milford Road
Cincinnati, Ohio 45242-3706
513-733-5336, Fax 513-733-5347

CORPORATE OFFICE
SALT LAKE CITY LABORATORY
960 West LeVoy Drive
Salt Lake City, Utah 84123-2547
801-266-7700, Fax 801-268-9992
www.datachem.com

NOVATO OFFICE
11 Santa Yorma Court
Novato, California 94945-1123
415-897-9471, Fax 415-893-9469

DATA CHEM LABORATORIES
A SORENSON COMPANY

Case Narrative

Method: 8270C
Analysis: Semivolatiles by GC/MS
DCL SOP ref: OE-SW-3510, 0S-SW-8270C
DCL Set ID: 01E-0300-04

Client: North Dakota State Water Commission
Matrix: Water

General Set Information: There are eleven field samples plus MS/MSD in this batch.

Method Summary : This is a GC/MS method for determination of semivolatile organic compounds in water according to the SW-846 Guidelines. A 1-liter portion of the sample is spiked with surrogates, extracted by separatory funnel and then concentrated to a final volume of 1.0 mL. The resulting extract is analyzed using a Hewlett Packard model 5972 GC/MS system with an electron impact ionization source and a quadrapole mass-filter detector.

Sample Preparation: All samples were prepared in accordance with method 3510. All samples had final extract volumes of 1.0 mL.

Holding Times: All preparation and analysis holding times were met for this sample.

Dilution(s): None.

Method and Sample QC data: All samples met surrogate recovery and internal standards area QC limits.

MS/MSD Analysis: Matrix spiking was performed on sample 01E01996 (5-13098). Most recoveries and reproducibilities were within QC limits.

Instrument QC: The instrument is tuned with 50 ng DFTPP at the beginning of every twelve hour period of analysis. A five point initial calibration curve is analyzed prior to sample analysis. The concentrations of the standards for most analytes are: 100, 75, 50, 25 and 5 µg/mL. Five analytes are clalibrated from 25 to 125 ug/mL. The initial calibration curve passed all required QC criteria. A calibration verification standard at a concentration of 50 µg/mL is analyzed at the beginning of sample analysis for each twelve hour period. The calibration verification standard passed all required QC criteria.

Miscellaneous Comments: None.

This report contains 47 pages

9-17-01
Reed A. Hendricks Date

DATA CHEM
LABORATORIES, INC.
A SORENSON COMPANY

Datapackage Table of Contents

Information pertaining to this datapackage is divided into the four categories listed below. A Case Narrative immediately precedes this Table of Contents and contains pertinent information about this datapackage.

♦ ♦ ♦ ♦ ♦ ♦ ♦ ♦ ♦ ♦

Analytical Results

DATA CHEM LABORATORIES
A Sorenson Company

COVER PAGE

ANALYTICAL REPORT FOR
North Dakota State Water Commission

Phone(701) 328-2739 Fax(701) 328-3696

Form COVER-V1.3
09140115030957
Page 1

G018601G

DCL Report Group..: **01E-0300-04**

Date Printed.....: 14-SEP-01 15:03

Project Protocol #: P0186001
Client Ref Number.: Not Provided
Release Number....: Not Provided

Analysis Method(s): 8270C

North Dakota State Water Commission
Attention: William M. Schuh
900 East Boulevard
Bismark, ND 58505

Client Sample Name	Laboratory Sample Name	Date Sampled	Date Received
Method Blank	BL-188055-1	NA	NA
LCS	QC-188055-1	NA	NA
LCS Dup	QD-188055-1	NA	NA
3-SPRING	01E01962	05-SEP-01	07-SEP-01
4-RESERVOIR	01E01963	05-SEP-01	07-SEP-01
6-13101	01E01964	05-SEP-01	07-SEP-01
6-13102	01E01965	05-SEP-01	07-SEP-01
5-13098	01E01966	04-SEP-01	07-SEP-01
5-13098	01E01966MS	04-SEP-01	07-SEP-01
5-13098	01E01966MSD	04-SEP-01	07-SEP-01
DUP 1	01E01967	04-SEP-01	07-SEP-01
1-13103	01E01968	04-SEP-01	07-SEP-01
1-13104	01E01969	04-SEP-01	07-SEP-01
LAKE COE	01E01970	04-SEP-01	07-SEP-01
2-13105	01E01971	04-SEP-01	07-SEP-01
5-13197	01E01972	04-SEP-01	07-SEP-01

Analyst: Reed A. Hendricks — Date 9-14-01

Reviewer: Eric C. Anderson — Date 9/15/01

Lab Supervisor: Richard W. Wade — Date 9/17/01

003

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

DCL Report Group..: 01E-0300-04
Date Printed.....: 14-SEP-01 15:03

Client Name...: North Dakota State Water Commission

Release Number....: Not Provided

General Information

The DCL QC Database maintains all numerical figures which are input from the pertinent data source. These data have not been rounded to significant figures nor have they been moisture corrected. Reports generated from the system, however, list data which have been rounded to the number of significant figures requested by the client or deemed appropriate for the method. This may create minor discrepancies between data which appear on the QC Summary Forms (Forms B-G) and those that would be calculated from rounded analytical results. Additionally, if a moisture correction is performed, differences will be observed between the QC data and the surrogate data reported on Form A (or other report forms) and corresponding data reported on QC Summary Forms. In these cases, the Form A will indicate the "Report Basis" as well as the moisture value used for making the correction.
Report generation options: X

Result Symbol Definitions

ND - Not Detected above the MDL or IDL (LLD or MDC for radiochemistry).
** - No result could be reported, see sample comments for details.

Qualifier Symbol Definitions

U - Not Detected above the MDL or IDL (LLD or MDC for radiochemistry).
For radiochemistry the nuclide was not identified by the Canberra Nuclear NID program, activity values reported are calculated using the Canberra Nuclear MINACT program.

B - For organic analysis the qualifier indicates that this analyte was found in the method blank.
For inorganic analysis the qualifier signifies the value is between the IDL and PQL.

J - The qualifier indicates that the value is between the MDL and the PQL. It is also used for indicating an estimated value for tentatively identified compounds in mass spectrometry where a 1:1 response is assumed.

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

Form RLIMS63A-V1.3
09140115030957

SAMPLE ANALYSIS DATA SHEET

S018903G

te Printed.....: 14-SEP-01 15:03

ient Name.....: North Dakota State Water Commission
ient Ref Number....: Not Provided
mpling Site.....: Not Applicable
lease Number.....: Not Provided

te Received.....: Not Applicable

Client Sample Name: BL-188055-1
DCL Sample Name...: BL-188055-1
DCL Report Group..: 01E-0300-04

Matrix.....: WATER
Date Sampled.....: Not Applicable
Reporting Units...: ug/L

L Preparation Group: G018B007
te Prepared.....: 11-SEP-01 00:00
eparation Method...: 3510B
iquot Weight/Volume: 1000 mL
t Weight/Volume....: Not Required

DCL Analysis Group: G018B007
Analysis Method...: 8270C
Instrument Type...: GC/MS SV
Instrument ID.....: 5972-Q
Column Type.....: DB5 30m x .32mm
☒ Primary
☐ Confirmation

nalytical Results

nalyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
yridine	13-SEP-01 12:45	0.315	ND			1	5
henol	13-SEP-01 12:45	0.0525	ND			1	5
is(2-chloroethyl)ether	13-SEP-01 12:45	0.262	ND			1	5
-Chlorophenol	13-SEP-01 12:45	0.0851	ND			1	5
,3-Dichlorobenzene	13-SEP-01 12:45	0.0369	ND			1	5
,4-Dichlorobenzene	13-SEP-01 12:45	0.0622	ND			1	5
enzyl Alcohol	13-SEP-01 12:45	0.0699	ND			1	5
,2-Dichlorobenzene	13-SEP-01 12:45	0.0638	ND			1	5
-Methylphenol	13-SEP-01 12:45	0.113	ND			1	5
is(2-chloroisopropyl)ether	13-SEP-01 12:45	0.0967	ND			1	5
-Methylphenol	13-SEP-01 12:45	0.0552	ND			1	5
-Nitrosodi-n-propyl amine	13-SEP-01 12:45	0.109	ND			1	5
exachloroethane	13-SEP-01 12:45	0.0773	ND			1	5
itrobenzene	13-SEP-01 12:45	0.0924	ND			1	5
sophorone	13-SEP-01 12:45	0.114	ND			1	5
-Nitrophenol	13-SEP-01 12:45	0.0830	ND			1	5
,4-Dimethylphenol	13-SEP-01 12:45	0.285	ND			1	5
enzoic acid	13-SEP-01 12:45	4.37	ND			1	25
is(2-Chloroethoxy)methane	13-SEP-01 12:45	0.0508	ND			1	5
,4-Dichlorophenol	13-SEP-01 12:45	0.144	ND			1	5
,2,4-Trichlorobenzene	13-SEP-01 12:45	0.0492	ND			1	5
aphthalene	13-SEP-01 12:45	0.0532	ND			1	5
-Chloroaniline	13-SEP-01 12:45	0.155	ND			1	5
exachlorobutadiene	13-SEP-01 12:45	0.112	ND			1	5
-Chloro-3-methylphenol	13-SEP-01 12:45	0.0794	ND			1	5
-Methylnaphthalene	13-SEP-01 12:45	0.0687	ND			1	5
exachlorocyclopentadiene	13-SEP-01 12:45	0.0864	ND			1	5
,4,6-Trichlorophenol	13-SEP-01 12:45	0.0925	ND			1	5
,4,5-Trichlorophenol	13-SEP-01 12:45	0.112	ND			1	5
-Chloronaphthalene	13-SEP-01 12:45	0.0769	ND			1	5
-Nitroaniline	13-SEP-01 12:45	0.140	ND			1	5
imethylphthalate	13-SEP-01 12:45	0.0766	ND			1	5
,6-Dinitrotoluene	13-SEP-01 12:45	0.152	ND			1	5
cenaphthylene	13-SEP-01 12:45	0.0467	ND			1	5
-Nitroaniline	13-SEP-01 12:45	0.313	ND			1	5
cenaphthene	13-SEP-01 12:45	0.0680	ND			1	5
,4-Dinitrophenol	13-SEP-01 12:45	1.24	ND			1	25
-Nitrophenol	13-SEP-01 12:45	0.715	ND			1	25
ibenzofuran	13-SEP-01 12:45	0.0519	ND			1	5
,4-Dinitrotoluene	13-SEP-01 12:45	0.0981	ND			1	5
iethylphthalate	13-SEP-01 12:45	0.140	ND			1	5

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DATA CHEM LABORATORIES
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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S018903G

Date Printed.....: 14-SEP-01 15:03
Client Name.....: North Dakota State Water Commission

DCL Sample Name...: BL-188055-1
DCL Report Group..: 01E-0300-04

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
4-Chlorophenyl Phenyl Ether	13-SEP-01 12:45	0.0478	ND			1	5
Fluorene	13-SEP-01 12:45	0.0737	ND			1	5
4-Nitroaniline	13-SEP-01 12:45	0.341	ND			1	5
4,6-Dinitro-2-Methylphenol	13-SEP-01 12:45	1.48	ND			1	25
N-nitrosodiphenylamine	13-SEP-01 12:45	0.0865	ND			1	5
4-Bromophenyl Phenyl Ether	13-SEP-01 12:45	0.108	ND			1	5
Hexachlorobenzene	13-SEP-01 12:45	0.151	ND			1	5
Pentachlorophenol	13-SEP-01 12:45	1.03	ND			1	25
Phenanthrene	13-SEP-01 12:45	0.0582	ND			1	5
Anthracene	13-SEP-01 12:45	0.0880	ND			1	5
Carbazole	13-SEP-01 12:45	0.0726	ND			1	5
Di-n-butylphthalate	13-SEP-01 12:45	0.347	ND			1	5
Fluoranthene	13-SEP-01 12:45	0.0723	ND			1	5
Pyrene	13-SEP-01 12:45	0.0836	ND			1	5
Butylbenzylphthalate	13-SEP-01 12:45	0.204	ND			1	5
3,3'-Dichlorobenzidine	13-SEP-01 12:45	0.372	ND			1	5
Benzo(a)anthracene	13-SEP-01 12:45	0.0750	ND			1	5
Chrysene	13-SEP-01 12:45	0.0760	ND			1	5
Bis(2-ethylhexyl)phthalate	13-SEP-01 12:45	2.49	ND			1	5
Di-n-octylphthalate	13-SEP-01 12:45	0.126	ND			1	5
Benzo(b)fluoranthene	13-SEP-01 12:45	0.105	ND			1	5
Benzo(k)fluoranthene	13-SEP-01 12:45	0.132	ND			1	5
Benzo(a)pyrene	13-SEP-01 12:45	0.0772	ND			1	5
Indeno(1,2,3-c,d)pyrene	13-SEP-01 12:45	0.318	ND			1	5
Dibenz(a,h)Anthracene	13-SEP-01 12:45	0.287	ND			1	5
Benzo(g,h,i)perylene	13-SEP-01 12:45	0.276	ND			1	5

Tentatively Identified Compound Results

Analyte(Retention Time)	Date Analyzed	Result	Comment	Qual.	Dilution
Polycyclic hydrocarbon(18.36)	13-SEP-01 12:45	16.		J	1

Surrogate Recoveries

Analyte	Result	Spiked Amount	Percent Recovery
2,4,6-Tribromophenol	49.0	50.0	98.0
2-Fluorobiphenyl	41.6	50.0	83.3
2-Fluorophenol	26.1	50.0	52.1
Nitrobenzene-d5	43.3	50.0	86.7
Phenol-d5	19.2	50.0	38.3
Terphenyl-d14	47.1	50.0	94.2

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

Form RLIMS63A-V1.3
09140115030957

S018903H

SAMPLE ANALYSIS DATA SHEET

ate Printed.....: 14-SEP-01 15:03

lient Name.....: North Dakota State Water Commission
lient Ref Number....: Not Provided
ampling Site.....: Not Applicable
elease Number.....: Not Provided

ate Received.....: Not Applicable

Client Sample Name: QC-188055-1
DCL Sample Name...: QC-188055-1
DCL Report Group..: 01E-0300-04

Matrix.....: WATER
Date Sampled.....: Not Applicable
Reporting Units...: ug/L

CL Preparation Group: G018B007
ate Prepared.....: 11-SEP-01 00:00
reparation Method...: 3510B
liquot Weight/Volume: 1000 mL
et Weight/Volume....: Not Required

DCL Analysis Group: G018B007
Analysis Method...: 8270C
Instrument Type...: GC/MS SV
Instrument ID.....: 5972-Q
Column Type.....: DB5 30m x .32mm
☒ Primary
☐ Confirmation

nalytical Results

nalyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
yridine	13-SEP-01 13:16	0.315	19.			1	5
henol	13-SEP-01 13:16	0.0525	18.			1	5
is(2-chloroethyl)ether	13-SEP-01 13:16	0.262	38.			1	5
-Chlorophenol	13-SEP-01 13:16	0.0851	45.			1	5
,3-Dichlorobenzene	13-SEP-01 13:16	0.0369	36.			1	5
,4-Dichlorobenzene	13-SEP-01 13:16	0.0622	37.			1	5
enzyl Alcohol	13-SEP-01 13:16	0.0699	44.			1	5
,2-Dichlorobenzene	13-SEP-01 13:16	0.0638	42.			1	5
-Methylphenol	13-SEP-01 13:16	0.113	34.			1	5
is(2-chloroisopropyl)ether	13-SEP-01 13:16	0.0967	39.			1	5
-Methylphenol	13-SEP-01 13:16	0.0552	33.			1	5
-Nitrosodi-n-propyl amine	13-SEP-01 13:16	0.109	40.			1	5
exachloroethane	13-SEP-01 13:16	0.0773	34.			1	5
itrobenzene	13-SEP-01 13:16	0.0924	45.			1	5
sophorone	13-SEP-01 13:16	0.114	46.			1	5
-Nitrophenol	13-SEP-01 13:16	0.0830	51.			1	5
,4-Dimethylphenol	13-SEP-01 13:16	0.285	41.			1	5
enzoic acid	13-SEP-01 13:16	4.37	11.		J	1	25
is(2-Chloroethoxy)methane	13-SEP-01 13:16	0.0508	46.			1	5
,4-Dichlorophenol	13-SEP-01 13:16	0.144	49.			1	5
,2,4-Trichlorobenzene	13-SEP-01 13:16	0.0492	44.			1	5
aphthalene	13-SEP-01 13:16	0.0532	40.			1	5
-Chloroaniline	13-SEP-01 13:16	0.155	45.			1	5
exachlorobutadiene	13-SEP-01 13:16	0.112	41.			1	5
-Chloro-3-methylphenol	13-SEP-01 13:16	0.0794	56.			1	5
-Methylnaphthalene	13-SEP-01 13:16	0.0687	49.			1	5
exachlorocyclopentadiene	13-SEP-01 13:16	0.0864	33.			1	5
,4,6-Trichlorophenol	13-SEP-01 13:16	0.0925	49.			1	5
,4,5-Trichlorophenol	13-SEP-01 13:16	0.112	47.			1	5
-Chloronaphthalene	13-SEP-01 13:16	0.0769	45.			1	5
-Nitroaniline	13-SEP-01 13:16	0.140	54.			1	5
imethylphthalate	13-SEP-01 13:16	0.0766	52.			1	5
,6-Dinitrotoluene	13-SEP-01 13:16	0.152	54.			1	5
cenaphthylene	13-SEP-01 13:16	0.0467	47.			1	5
-Nitroaniline	13-SEP-01 13:16	0.313	60.			1	5
cenaphthene	13-SEP-01 13:16	0.0680	50.			1	5
,4-Dinitrophenol	13-SEP-01 13:16	1.24	54.			1	25
-Nitrophenol	13-SEP-01 13:16	0.715	23.		J	1	25
ibenzofuran	13-SEP-01 13:16	0.0519	48.			1	5
,4-Dinitrotoluene	13-SEP-01 13:16	0.0981	53.			1	5
iethylphthalate	13-SEP-01 13:16	0.140	55.			1	5

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Date Printed.....: 14-SEP-01 15:03
Client Name.....: North Dakota State Water Commission

DCL Sample Name...: QC-188055-1
DCL Report Group..: 01E-0300-04

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
4-Chlorophenyl Phenyl Ether	13-SEP-01 13:16	0.0478	54.			1	5
Fluorene	13-SEP-01 13:16	0.0737	51.			1	5
4-Nitroaniline	13-SEP-01 13:16	0.341	46.			1	5
4,6-Dinitro-2-Methylphenol	13-SEP-01 13:16	1.48	55.			1	25
N-nitrosodiphenylamine	13-SEP-01 13:16	0.0865	52.			1	5
4-Bromophenyl Phenyl Ether	13-SEP-01 13:16	0.108	47.			1	5
Hexachlorobenzene	13-SEP-01 13:16	0.151	50.			1	5
Pentachlorophenol	13-SEP-01 13:16	1.03	61.			1	25
Phenanthrene	13-SEP-01 13:16	0.0582	53.			1	5
Anthracene	13-SEP-01 13:16	0.0880	55.			1	5
Carbazole	13-SEP-01 13:16	0.0726	63.			1	5
Di-n-butylphthalate	13-SEP-01 13:16	0.347	54.			1	5
Fluoranthene	13-SEP-01 13:16	0.0723	55.			1	5
Pyrene	13-SEP-01 13:16	0.0836	58.			1	5
Butylbenzylphthalate	13-SEP-01 13:16	0.204	58.			1	5
3,3'-Dichlorobenzidine	13-SEP-01 13:16	0.372	48.			1	5
Benzo(a)anthracene	13-SEP-01 13:16	0.0750	52.			1	5
Chrysene	13-SEP-01 13:16	0.0760	60.			1	5
Bis(2-ethylhexyl)phthalate	13-SEP-01 13:16	2.49	64.			1	5
Di-n-octylphthalate	13-SEP-01 13:16	0.126	68.			1	5
Benzo(b)fluoranthene	13-SEP-01 13:16	0.105	49.			1	5
Benzo(k)fluoranthene	13-SEP-01 13:16	0.132	60.			1	5
Benzo(a)pyrene	13-SEP-01 13:16	0.0772	53.			1	5
Indeno(1,2,3-c,d)pyrene	13-SEP-01 13:16	0.318	53.			1	5
Dibenz(a,h)Anthracene	13-SEP-01 13:16	0.287	52.			1	5
Benzo(g,h,i)perylene	13-SEP-01 13:16	0.276	53.			1	5

Surrogate Recoveries

Analyte	Result	Spiked Amount	Percent Recovery
2,4,6-Tribromophenol	59.1	50.0	118.
2-Fluorobiphenyl	44.0	50.0	88.1
2-Fluorophenol	23.4	50.0	46.7
Nitrobenzene-d5	43.3	50.0	86.6
Phenol-d5	16.8	50.0	33.6
Terphenyl-d14	58.4	50.0	117.

DATA CHEM LABORATORIES
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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S018903J

ate Printed.....: 14-SEP-01 15:03

lient Name.....: North Dakota State Water Commission
lient Ref Number....: Not Provided
ampling Site.....: Not Applicable
elease Number.....: Not Provided

ate Received.....: Not Applicable

Client Sample Name: QD-188055-1
DCL Sample Name...: QD-188055-1
DCL Report Group..: 01E-0300-04

Matrix.....: WATER
Date Sampled.....: Not Applicable
Reporting Units...: ug/L

CL Preparation Group: G018B007
ate Prepared.....: 11-SEP-01 00:00
reparation Method...: 3510B
liquot Weight/Volume: 1000 mL
et Weight/Volume....: Not Required

DCL Analysis Group: G018B007
Analysis Method...: 8270C
Instrument Type...: GC/MS SV
Instrument ID.....: 5972-Q
Column Type.....: DB5 30m x .32mm
☒ Primary
☐ Confirmation

nalytical Results

nalyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
yridine	13-SEP-01 13:46	0.315	23.			1	5
henol	13-SEP-01 13:46	0.0525	19.			1	5
is(2-chloroethyl)ether	13-SEP-01 13:46	0.262	43.			1	5
-Chlorophenol	13-SEP-01 13:46	0.0851	42.			1	5
,3-Dichlorobenzene	13-SEP-01 13:46	0.0369	36.			1	5
,4-Dichlorobenzene	13-SEP-01 13:46	0.0622	36.			1	5
enzyl Alcohol	13-SEP-01 13:46	0.0699	45.			1	5
,2-Dichlorobenzene	13-SEP-01 13:46	0.0638	38.			1	5
-Methylphenol	13-SEP-01 13:46	0.113	39.			1	5
is(2-chloroisopropyl)ether	13-SEP-01 13:46	0.0967	38.			1	5
-Methylphenol	13-SEP-01 13:46	0.0552	34.			1	5
-Nitrosodi-n-propyl amine	13-SEP-01 13:46	0.109	43.			1	5
exachloroethane	13-SEP-01 13:46	0.0773	31.			1	5
itrobenzene	13-SEP-01 13:46	0.0924	48.			1	5
sophorone	13-SEP-01 13:46	0.114	50.			1	5
-Nitrophenol	13-SEP-01 13:46	0.0830	51.			1	5
,4-Dimethylphenol	13-SEP-01 13:46	0.285	43.			1	5
enzoic acid	13-SEP-01 13:46	4.37	11.		J	1	25
is(2-Chloroethoxy)methane	13-SEP-01 13:46	0.0508	50.			1	5
,4-Dichlorophenol	13-SEP-01 13:46	0.144	50.			1	5
,2,4-Trichlorobenzene	13-SEP-01 13:46	0.0492	43.			1	5
aphthalene	13-SEP-01 13:46	0.0532	39.			1	5
-Chloroaniline	13-SEP-01 13:46	0.155	48.			1	5
exachlorobutadiene	13-SEP-01 13:46	0.112	41.			1	5
-Chloro-3-methylphenol	13-SEP-01 13:46	0.0794	55.			1	5
-Methylnaphthalene	13-SEP-01 13:46	0.0687	48.			1	5
exachlorocyclopentadiene	13-SEP-01 13:46	0.0864	32.			1	5
,4,6-Trichlorophenol	13-SEP-01 13:46	0.0925	47.			1	5
,4,5-Trichlorophenol	13-SEP-01 13:46	0.112	46.			1	5
-Chloronaphthalene	13-SEP-01 13:46	0.0769	46.			1	5
-Nitroaniline	13-SEP-01 13:46	0.140	53.			1	5
imethylphthalate	13-SEP-01 13:46	0.0766	52.			1	5
,6-Dinitrotoluene	13-SEP-01 13:46	0.152	53.			1	5
cenaphthylene	13-SEP-01 13:46	0.0467	48.			1	5
-Nitroaniline	13-SEP-01 13:46	0.313	56.			1	5
cenaphthene	13-SEP-01 13:46	0.0680	49.			1	5
,4-Dinitrophenol	13-SEP-01 13:46	1.24	54.			1	25
-Nitrophenol	13-SEP-01 13:46	0.715	21.		J	1	25
ibenzofuran	13-SEP-01 13:46	0.0519	50.			1	5
,4-Dinitrotoluene	13-SEP-01 13:46	0.0981	55.			1	5
iethylphthalate	13-SEP-01 13:46	0.140	57.			1	5

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Date Printed.....: 14-SEP-01 15:03
Client Name.....: North Dakota State Water Commission

DCL Sample Name...: QD-188055-1
DCL Report Group..: 01E-0300-04

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
4-Chlorophenyl Phenyl Ether	13-SEP-01 13:46	0.0478	55.			1	5
Fluorene	13-SEP-01 13:46	0.0737	55.			1	5
4-Nitroaniline	13-SEP-01 13:46	0.341	49.			1	5
4,6-Dinitro-2-Methylphenol	13-SEP-01 13:46	1.48	53.			1	25
N-nitrosodiphenylamine	13-SEP-01 13:46	0.0865	48.			1	5
4-Bromophenyl Phenyl Ether	13-SEP-01 13:46	0.108	48.			1	5
Hexachlorobenzene	13-SEP-01 13:46	0.151	49.			1	5
Pentachlorophenol	13-SEP-01 13:46	1.03	59.			1	25
Phenanthrene	13-SEP-01 13:46	0.0582	54.			1	5
Anthracene	13-SEP-01 13:46	0.0880	55.			1	5
Carbazole	13-SEP-01 13:46	0.0726	60.			1	5
Di-n-butylphthalate	13-SEP-01 13:46	0.347	56.			1	5
Fluoranthene	13-SEP-01 13:46	0.0723	54.			1	5
Pyrene	13-SEP-01 13:46	0.0836	53.			1	5
Butylbenzylphthalate	13-SEP-01 13:46	0.204	54.			1	5
3,3'-Dichlorobenzidine	13-SEP-01 13:46	0.372	51.			1	5
Benzo(a)anthracene	13-SEP-01 13:46	0.0750	50.			1	5
Chrysene	13-SEP-01 13:46	0.0760	57.			1	5
Bis(2-ethylhexyl)phthalate	13-SEP-01 13:46	2.49	57.			1	5
Di-n-octylphthalate	13-SEP-01 13:46	0.126	55.			1	5
Benzo(b)fluoranthene	13-SEP-01 13:46	0.105	49.			1	5
Benzo(k)fluoranthene	13-SEP-01 13:46	0.132	56.			1	5
Benzo(a)pyrene	13-SEP-01 13:46	0.0772	53.			1	5
Indeno(1,2,3-c,d)pyrene	13-SEP-01 13:46	0.318	52.			1	5
Dibenz(a,h)Anthracene	13-SEP-01 13:46	0.287	51.			1	5
Benzo(g,h,i)perylene	13-SEP-01 13:46	0.276	54.			1	5

Surrogate Recoveries

Analyte	Result	Spiked Amount	Percent Recovery
2,4,6-Tribromophenol	57.7	50.0	115.
2-Fluorobiphenyl	45.3	50.0	90.6
2-Fluorophenol	24.2	50.0	48.4
Nitrobenzene-d5	41.9	50.0	83.9
Phenol-d5	17.9	50.0	35.7
Terphenyl-d14	53.6	50.0	107.

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S01860C3

Date Printed.....: 14-SEP-01 15:03

Client Name.....: North Dakota State Water Commission
Client Ref Number....: Not Provided
Sampling Site.....: Not Provided
Release Number.....: Not Provided

Date Received.....: 07-SEP-01 00:00

Client Sample Name: **3-SPRING**
DCL Sample Name...: **01E01962**
DCL Report Group..: **01E-0300-04**

Matrix.....: WATER
Date Sampled.....: 05-SEP-01 00:00
Reporting Units...: ug/L
Report Basis.....: ☒ As Received ☐ Dried

DCL Preparation Group: G018B007
Date Prepared.....: 11-SEP-01 00:00
Preparation Method...: 3510B
Aliquot Weight/Volume: 1000 mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G018B007
Analysis Method...: 8270C
Instrument Type...: GC/MS SV
Instrument ID.....: 5972-Q
Column Type.....: DB5 30m x .32mm
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
Pyridine	13-SEP-01 14:17	0.315	ND			1	5
Phenol	13-SEP-01 14:17	0.0525	ND			1	5
Bis(2-chloroethyl)ether	13-SEP-01 14:17	0.262	ND			1	5
2-Chlorophenol	13-SEP-01 14:17	0.0851	ND			1	5
1,3-Dichlorobenzene	13-SEP-01 14:17	0.0369	ND			1	5
1,4-Dichlorobenzene	13-SEP-01 14:17	0.0622	ND			1	5
Benzyl Alcohol	13-SEP-01 14:17	0.0699	ND			1	5
1,2-Dichlorobenzene	13-SEP-01 14:17	0.0638	ND			1	5
2-Methylphenol	13-SEP-01 14:17	0.113	ND			1	5
Bis(2-chloroisopropyl)ether	13-SEP-01 14:17	0.0967	ND			1	5
4-Methylphenol	13-SEP-01 14:17	0.0552	ND			1	5
N-Nitrosodi-n-propyl amine	13-SEP-01 14:17	0.109	ND			1	5
Hexachloroethane	13-SEP-01 14:17	0.0773	ND			1	5
Nitrobenzene	13-SEP-01 14:17	0.0924	ND			1	5
Isophorone	13-SEP-01 14:17	0.114	ND			1	5
2-Nitrophenol	13-SEP-01 14:17	0.0830	ND			1	5
2,4-Dimethylphenol	13-SEP-01 14:17	0.285	ND			1	5
Benzoic acid	13-SEP-01 14:17	4.37	ND			1	25
bis(2-Chloroethoxy)methane	13-SEP-01 14:17	0.0508	ND			1	5
2,4-Dichlorophenol	13-SEP-01 14:17	0.144	ND			1	5
1,2,4-Trichlorobenzene	13-SEP-01 14:17	0.0492	ND			1	5
Naphthalene	13-SEP-01 14:17	0.0532	ND			1	5
4-Chloroaniline	13-SEP-01 14:17	0.155	ND			1	5
Hexachlorobutadiene	13-SEP-01 14:17	0.112	ND			1	5
4-Chloro-3-methylphenol	13-SEP-01 14:17	0.0794	ND			1	5
2-Methylnaphthalene	13-SEP-01 14:17	0.0687	ND			1	5
Hexachlorocyclopentadiene	13-SEP-01 14:17	0.0864	ND			1	5
2,4,6-Trichlorophenol	13-SEP-01 14:17	0.0925	ND			1	5
2,4,5-Trichlorophenol	13-SEP-01 14:17	0.112	ND			1	5
2-Chloronaphthalene	13-SEP-01 14:17	0.0769	ND			1	5
2-Nitroaniline	13-SEP-01 14:17	0.140	ND			1	5
Dimethylphthalate	13-SEP-01 14:17	0.0766	ND			1	5
2,6-Dinitrotoluene	13-SEP-01 14:17	0.152	ND			1	5
Acenaphthylene	13-SEP-01 14:17	0.0467	ND			1	5
3-Nitroaniline	13-SEP-01 14:17	0.313	ND			1	5
Acenaphthene	13-SEP-01 14:17	0.0680	ND			1	5
2,4-Dinitrophenol	13-SEP-01 14:17	1.24	ND			1	25
4-Nitrophenol	13-SEP-01 14:17	0.715	ND			1	25
Dibenzofuran	13-SEP-01 14:17	0.0519	ND			1	5
2,4-Dinitrotoluene	13-SEP-01 14:17	0.0981	ND			1	5
Diethylphthalate	13-SEP-01 14:17	0.140	ND			1	5

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Date Printed.....: 14-SEP-01 15:03
Client Name.....: North Dakota State Water Commission

DCL Sample Name...: **01E01962**
DCL Report Group..: **01E-0300-04**

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
4-Chlorophenyl Phenyl Ether	13-SEP-01 14:17	0.0478	ND			1	5
Fluorene	13-SEP-01 14:17	0.0737	ND			1	5
4-Nitroaniline	13-SEP-01 14:17	0.341	ND			1	5
4,6-Dinitro-2-Methylphenol	13-SEP-01 14:17	1.48	ND			1	25
N-nitrosodiphenylamine	13-SEP-01 14:17	0.0865	ND			1	5
4-Bromophenyl Phenyl Ether	13-SEP-01 14:17	0.108	ND			1	5
Hexachlorobenzene	13-SEP-01 14:17	0.151	ND			1	5
Pentachlorophenol	13-SEP-01 14:17	1.03	ND			1	25
Phenanthrene	13-SEP-01 14:17	0.0582	ND			1	5
Anthracene	13-SEP-01 14:17	0.0880	ND			1	5
Carbazole	13-SEP-01 14:17	0.0726	ND			1	5
Di-n-butylphthalate	13-SEP-01 14:17	0.347	ND			1	5
Fluoranthene	13-SEP-01 14:17	0.0723	ND			1	5
Pyrene	13-SEP-01 14:17	0.0836	ND			1	5
Butylbenzylphthalate	13-SEP-01 14:17	0.204	ND			1	5
3,3'-Dichlorobenzidine	13-SEP-01 14:17	0.372	ND			1	5
Benzo(a)anthracene	13-SEP-01 14:17	0.0750	ND			1	5
Chrysene	13-SEP-01 14:17	0.0760	ND			1	5
Bis(2-ethylhexyl)phthalate	13-SEP-01 14:17	2.49	ND			1	5
Di-n-octylphthalate	13-SEP-01 14:17	0.126	ND			1	5
Benzo(b)fluoranthene	13-SEP-01 14:17	0.105	ND			1	5
Benzo(k)fluoranthene	13-SEP-01 14:17	0.132	ND			1	5
Benzo(a)pyrene	13-SEP-01 14:17	0.0772	ND			1	5
Indeno(1,2,3-c,d)pyrene	13-SEP-01 14:17	0.318	ND			1	5
Dibenz(a,h)Anthracene	13-SEP-01 14:17	0.287	ND			1	5
Benzo(g,h,i)perylene	13-SEP-01 14:17	0.276	ND			1	5

Surrogate Recoveries

Analyte	Result	Spiked Amount	Percent Recovery
2,4,6-Tribromophenol	56.0	50.0	112.
2-Fluorobiphenyl	44.0	50.0	88.1
2-Fluorophenol	26.4	50.0	52.8
Nitrobenzene-d5	44.2	50.0	88.4
Phenol-d5	21.0	50.0	42.1
Terphenyl-d14	51.9	50.0	104.

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FORM A (TYPE I)

SIN(

SAMPLI

Note: Benzoic acid is real - not in final Blank

Form RLIMS63A-V1.3
09140115030957

S01860C4

)ate Printed.....: 14-SEP-01 15:03

:lient Name.....: North Dakota State Wa

:lient Ref Number....: Not Provided
:ampling Site.....: Not Provided
:elease Number.....: Not Provided

)ate Received.....: 07-SEP-01 00:00

nple Name: **4-RESERVOIR**
e Name...: **01E01963**
t Group..: **01E-0300-04**

Matrix.....: WATER
Date Sampled.....: 05-SEP-01 00:00
Reporting Units...: ug/L
Report Basis.....: ☒ As Received ☐ Dried

)CL Preparation Group: G018B007
)ate Prepared.....: 11-SEP-01 00:00
)reparation Method...: 3510B
.liquot Weight/Volume: 1000 mL
Jet Weight/Volume....: Not Required

DCL Analysis Group: G018B007
Analysis Method...: 8270C
Instrument Type...: GC/MS SV
Instrument ID.....: 5972-Q
Column Type.....: DB5 30m x .32mm
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
Pyridine	13-SEP-01 14:48	0.315	ND			1	5
Phenol	13-SEP-01 14:48	0.0525	ND			1	5
Bis(2-chloroethyl)ether	13-SEP-01 14:48	0.262	ND			1	5
2-Chlorophenol	13-SEP-01 14:48	0.0851	ND			1	5
1,3-Dichlorobenzene	13-SEP-01 14:48	0.0369	ND			1	5
1,4-Dichlorobenzene	13-SEP-01 14:48	0.0622	ND			1	5
Benzyl Alcohol	13-SEP-01 14:48	0.0699	ND			1	5
1,2-Dichlorobenzene	13-SEP-01 14:48	0.0638	ND			1	5
2-Methylphenol	13-SEP-01 14:48	0.113	ND			1	5
Bis(2-chloroisopropyl)ether	13-SEP-01 14:48	0.0967	ND			1	5
4-Methylphenol	13-SEP-01 14:48	0.0552	ND			1	5
N-Nitrosodi-n-propyl amine	13-SEP-01 14:48	0.109	ND			1	5
Hexachloroethane	13-SEP-01 14:48	0.0773	ND			1	5
Nitrobenzene	13-SEP-01 14:48	0.0924	ND			1	5
Isophorone	13-SEP-01 14:48	0.114	ND			1	5
2-Nitrophenol	13-SEP-01 14:48	0.0830	ND			1	5
2,4-Dimethylphenol	13-SEP-01 14:48	0.285	ND			1	5
Benzoic acid	13-SEP-01 14:48	4.37	5.7		JB	1	25
Bis(2-Chloroethoxy)methane	13-SEP-01 14:48	0.0508	ND			1	5
2,4-Dichlorophenol	13-SEP-01 14:48	0.144	ND			1	5
1,2,4-Trichlorobenzene	13-SEP-01 14:48	0.0492	ND			1	5
Naphthalene	13-SEP-01 14:48	0.0532	ND			1	5
4-Chloroaniline	13-SEP-01 14:48	0.155	ND			1	5
Hexachlorobutadiene	13-SEP-01 14:48	0.112	ND			1	5
4-Chloro-3-methylphenol	13-SEP-01 14:48	0.0794	ND			1	5
2-Methylnaphthalene	13-SEP-01 14:48	0.0687	ND			1	5
Hexachlorocyclopentadiene	13-SEP-01 14:48	0.0864	ND			1	5
2,4,6-Trichlorophenol	13-SEP-01 14:48	0.0925	ND			1	5
2,4,5-Trichlorophenol	13-SEP-01 14:48	0.112	ND			1	5
2-Chloronaphthalene	13-SEP-01 14:48	0.0769	ND			1	5
2-Nitroaniline	13-SEP-01 14:48	0.140	ND			1	5
Dimethylphthalate	13-SEP-01 14:48	0.0766	ND			1	5
2,6-Dinitrotoluene	13-SEP-01 14:48	0.152	ND			1	5
Acenaphthylene	13-SEP-01 14:48	0.0467	ND			1	5
3-Nitroaniline	13-SEP-01 14:48	0.313	ND			1	5
Acenaphthene	13-SEP-01 14:48	0.0680	ND			1	5
2,4-Dinitrophenol	13-SEP-01 14:48	1.24	ND			1	25
4-Nitrophenol	13-SEP-01 14:48	0.715	ND			1	25
Dibenzofuran	13-SEP-01 14:48	0.0519	ND			1	5
2,4-Dinitrotoluene	13-SEP-01 14:48	0.0981	ND			1	5
Diethylphthalate	13-SEP-01 14:48	0.140	ND			1	5

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Date Printed.....: 14-SEP-01 15:35
Client Name.....: North Dakota State Water Commission

DCL Sample Name...: **01E01963**
DCL Report Group..: **01E-0300-04**

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
4-Chlorophenyl Phenyl Ether	13-SEP-01 14:48	0.0478	ND			1	5
Fluorene	13-SEP-01 14:48	0.0737	ND			1	5
4-Nitroaniline	13-SEP-01 14:48	0.341	ND			1	5
4,6-Dinitro-2-Methylphenol	13-SEP-01 14:48	1.48	ND			1	25
N-nitrosodiphenylamine	13-SEP-01 14:48	0.0865	ND			1	5
4-Bromophenyl Phenyl Ether	13-SEP-01 14:48	0.108	ND			1	5
Hexachlorobenzene	13-SEP-01 14:48	0.151	ND			1	5
Pentachlorophenol	13-SEP-01 14:48	1.03	ND			1	25
Phenanthrene	13-SEP-01 14:48	0.0582	ND			1	5
Anthracene	13-SEP-01 14:48	0.0880	ND			1	5
Carbazole	13-SEP-01 14:48	0.0726	ND			1	5
Di-n-butylphthalate	13-SEP-01 14:48	0.347	ND			1	5
Fluoranthene	13-SEP-01 14:48	0.0723	ND			1	5
Pyrene	13-SEP-01 14:48	0.0836	ND			1	5
Butylbenzylphthalate	13-SEP-01 14:48	0.204	ND			1	5
3,3'-Dichlorobenzidine	13-SEP-01 14:48	0.372	ND			1	5
Benzo(a)anthracene	13-SEP-01 14:48	0.0750	ND			1	5
Chrysene	13-SEP-01 14:48	0.0760	ND			1	5
Bis(2-ethylhexyl)phthalate	13-SEP-01 14:48	2.49	ND			1	5
Di-n-octylphthalate	13-SEP-01 14:48	0.126	ND			1	5
Benzo(b)fluoranthene	13-SEP-01 14:48	0.105	ND			1	5
Benzo(k)fluoranthene	13-SEP-01 14:48	0.132	ND			1	5
Benzo(a)pyrene	13-SEP-01 14:48	0.0772	ND			1	5
Indeno(1,2,3-c,d)pyrene	13-SEP-01 14:48	0.318	ND			1	5
Dibenz(a,h)Anthracene	13-SEP-01 14:48	0.287	ND			1	5
Benzo(g,h,i)perylene	13-SEP-01 14:48	0.276	ND			1	5

Tentatively Identified Compound Results

Analyte(Retention Time)	Date Analyzed	Result	Comment	Qual.	Dilution
Unknown ALkane(4.59)	13-SEP-01 14:48	5.4		J	1
Unknown Acid(13.51)	13-SEP-01 14:48	4.4		J	
Unsaturated Hydrocarbon(16.21)	13-SEP-01 14:48	5.6		J	1
Polycyclic hydrocarbon(18.37)	13-SEP-01 14:48	19.		JB	1

Surrogate Recoveries

Analyte	Result	Spiked Amount	Percent Recovery
2,4,6-Tribromophenol	49.3	50.0	98.7
2-Fluorobiphenyl	40.0	50.0	80.0
2-Fluorophenol	21.6	50.0	43.1
Nitrobenzene-d5	44.2	50.0	88.4
Phenol-d5	19.4	50.0	38.8
Terphenyl-d14	50.2	50.0	100.

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S01860C5

)ate Printed.....: 14-SEP-01 15:03

:lient Name.....: North Dakota State Water Commission
:lient Ref Number....: Not Provided
!ampling Site.....: Not Provided
!elease Number.....: Not Provided

)ate Received.....: 07-SEP-01 00:00

Client Sample Name: **6-13101**
DCL Sample Name...: **01E01964**
DCL Report Group..: **01E-0300-04**

Matrix.....: WATER
Date Sampled.....: 05-SEP-01 00:00
Reporting Units...: ug/L
Report Basis.....: ☒ As Received ☐ Dried

)CL Preparation Group: G018E007
)ate Prepared.....: 11-SEP-01 00:00
'reparation Method...: 3510B
.liquot Weight/Volume: 1000 mL
Jet Weight/Volume....: Not Required

DCL Analysis Group: G018B007
Analysis Method...: 8270C
Instrument Type...: GC/MS SV
Instrument ID.....: 5972-Q
Column Type.....: DB5 30m x .32mm
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
Pyridine	13-SEP-01 15:19	0.315	ND			1	5
Phenol	13-SEP-01 15:19	0.0525	ND			1	5
Bis(2-chloroethyl)ether	13-SEP-01 15:19	0.262	ND			1	5
2-Chlorophenol	13-SEP-01 15:19	0.0851	ND			1	5
1,3-Dichlorobenzene	13-SEP-01 15:19	0.0369	ND			1	5
1,4-Dichlorobenzene	13-SEP-01 15:19	0.0622	ND			1	5
Benzyl Alcohol	13-SEP-01 15:19	0.0699	ND			1	5
1,2-Dichlorobenzene	13-SEP-01 15:19	0.0638	ND			1	5
2-Methylphenol	13-SEP-01 15:19	0.113	ND			1	5
Bis(2-chloroisopropyl)ether	13-SEP-01 15:19	0.0967	ND			1	5
4-Methylphenol	13-SEP-01 15:19	0.0552	ND			1	5
N-Nitrosodi-n-propyl amine	13-SEP-01 15:19	0.109	ND			1	5
Hexachloroethane	13-SEP-01 15:19	0.0773	ND			1	5
Nitrobenzene	13-SEP-01 15:19	0.0924	ND			1	5
Isophorone	13-SEP-01 15:19	0.114	ND			1	5
2-Nitrophenol	13-SEP-01 15:19	0.0830	ND			1	5
2,4-Dimethylphenol	13-SEP-01 15:19	0.285	ND			1	5
Benzoic acid	13-SEP-01 15:19	4.37	ND			1	25
Bis(2-Chloroethoxy)methane	13-SEP-01 15:19	0.0508	ND			1	5
2,4-Dichlorophenol	13-SEP-01 15:19	0.144	ND			1	5
1,2,4-Trichlorobenzene	13-SEP-01 15:19	0.0492	ND			1	5
Naphthalene	13-SEP-01 15:19	0.0532	ND			1	5
4-Chloroaniline	13-SEP-01 15:19	0.155	ND			1	5
Hexachlorobutadiene	13-SEP-01 15:19	0.112	ND			1	5
4-Chloro-3-methylphenol	13-SEP-01 15:19	0.0794	ND			1	5
2-Methylnaphthalene	13-SEP-01 15:19	0.0687	ND			1	5
Hexachlorocyclopentadiene	13-SEP-01 15:19	0.0864	ND			1	5
2,4,6-Trichlorophenol	13-SEP-01 15:19	0.0925	ND			1	5
2,4,5-Trichlorophenol	13-SEP-01 15:19	0.112	ND			1	5
2-Chloronaphthalene	13-SEP-01 15:19	0.0769	ND			1	5
2-Nitroaniline	13-SEP-01 15:19	0.140	ND			1	5
Dimethylphthalate	13-SEP-01 15:19	0.0766	ND			1	5
2,6-Dinitrotoluene	13-SEP-01 15:19	0.152	ND			1	5
Acenaphthylene	13-SEP-01 15:19	0.0467	ND			1	5
3-Nitroaniline	13-SEP-01 15:19	0.313	ND			1	5
Acenaphthene	13-SEP-01 15:19	0.0680	ND			1	5
2,4-Dinitrophenol	13-SEP-01 15:19	1.24	ND			1	25
4-Nitrophenol	13-SEP-01 15:19	0.715	ND			1	25
Dibenzofuran	13-SEP-01 15:19	0.0519	ND			1	5
2,4-Dinitrotoluene	13-SEP-01 15:19	0.0981	ND			1	5
Diethylphthalate	13-SEP-01 15:19	0.140	ND			1	5

Date Printed.....: 14-SEP-01 15:03
Client Name.....: North Dakota State Water Commission

DCL Sample Name...: **01E01964**
DCL Report Group..: **01E-0300-04**

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
4-Chlorophenyl Phenyl Ether	13-SEP-01 15:19	0.0478	ND			1	5
Fluorene	13-SEP-01 15:19	0.0737	ND			1	5
4-Nitroaniline	13-SEP-01 15:19	0.341	ND			1	5
4,6-Dinitro-2-Methylphenol	13-SEP-01 15:19	1.48	ND			1	25
N-nitrosodiphenylamine	13-SEP-01 15:19	0.0865	ND			1	5
4-Bromophenyl Phenyl Ether	13-SEP-01 15:19	0.108	ND			1	5
Hexachlorobenzene	13-SEP-01 15:19	0.151	ND			1	5
Pentachlorophenol	13-SEP-01 15:19	1.03	ND			1	25
Phenanthrene	13-SEP-01 15:19	0.0582	ND			1	5
Anthracene	13-SEP-01 15:19	0.0880	ND			1	5
Carbazole	13-SEP-01 15:19	0.0726	ND			1	5
Di-n-butylphthalate	13-SEP-01 15:19	0.347	ND			1	5
Fluoranthene	13-SEP-01 15:19	0.0723	ND			1	5
Pyrene	13-SEP-01 15:19	0.0836	ND			1	5
Butylbenzylphthalate	13-SEP-01 15:19	0.204	ND			1	5
3,3'-Dichlorobenzidine	13-SEP-01 15:19	0.372	ND			1	5
Benzo(a)anthracene	13-SEP-01 15:19	0.0750	ND			1	5
Chrysene	13-SEP-01 15:19	0.0760	ND			1	5
Bis(2-ethylhexyl)phthalate	13-SEP-01 15:19	2.49	ND			1	5
Di-n-octylphthalate	13-SEP-01 15:19	0.126	ND			1	5
Benzo(b)fluoranthene	13-SEP-01 15:19	0.105	ND			1	5
Benzo(k)fluoranthene	13-SEP-01 15:19	0.132	ND			1	5
Benzo(a)pyrene	13-SEP-01 15:19	0.0772	ND			1	5
Indeno(1,2,3-c,d)pyrene	13-SEP-01 15:19	0.318	ND			1	5
Dibenz(a,h)Anthracene	13-SEP-01 15:19	0.287	ND			1	5
Benzo(g,h,i)perylene	13-SEP-01 15:19	0.276	ND			1	5

Tentatively Identified Compound Results

Analyte(Retention Time)	Date Analyzed	Result	Comment	Qual.	Dilution
Polycyclic hydrocarbon(18.36)	13-SEP-01 15:19	16.		JB	1

Surrogate Recoveries

Analyte	Result	Spiked Amount	Percent Recovery
2,4,6-Tribromophenol	60.6	50.0	121.
2-Fluorobiphenyl	42.3	50.0	84.7
2-Fluorophenol	29.1	50.0	58.2
Nitrobenzene-d5	43.6	50.0	87.2
Phenol-d5	21.2	50.0	42.3
Terphenyl-d14	41.2	50.0	82.4

DATA CHEM LABORATORIES
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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S01860C6

ate Printed.....: 14-SEP-01 15:03

lient Name.....: North Dakota State Water Commission
lient Ref Number....: Not Provided
ampling Site.....: Not Provided
elease Number.....: Not Provided

ate Received.....: 07-SEP-01 00:00

CL Preparation Group: G018B007
ate Prepared.....: 11-SEP-01 00:00
reparation Method...: 3510B
liquot Weight/Volume: 1000 mL
et Weight/Volume....: Not Required

Client Sample Name: **6-13102**
DCL Sample Name...: **01E01965**
DCL Report Group..: **01E-0300-04**

Matrix.....: WATER
Date Sampled.....: 05-SEP-01 00:00
Reporting Units...: ug/L
Report Basis.....: ☒ As Received ☐ Dried

DCL Analysis Group: G018B007
Analysis Method...: 8270C
Instrument Type...: GC/MS SV
Instrument ID.....: 5972-Q
Column Type.....: DB5 30m x .32mm
☒ Primary
☐ Confirmation

nalytical Results

nalyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
yridine	13-SEP-01 15:49	0.315	ND			1	5
henol	13-SEP-01 15:49	0.0525	ND			1	5
is(2-chloroethyl)ether	13-SEP-01 15:49	0.262	ND			1	5
-Chlorophenol	13-SEP-01 15:49	0.0851	ND			1	5
,3-Dichlorobenzene	13-SEP-01 15:49	0.0369	ND			1	5
,4-Dichlorobenzene	13-SEP-01 15:49	0.0622	ND			1	5
enzyl Alcohol	13-SEP-01 15:49	0.0699	ND			1	5
,2-Dichlorobenzene	13-SEP-01 15:49	0.0638	ND			1	5
-Methylphenol	13-SEP-01 15:49	0.113	ND			1	5
is(2-chloroisopropyl)ether	13-SEP-01 15:49	0.0967	ND			1	5
-Methylphenol	13-SEP-01 15:49	0.0552	ND			1	5
-Nitrosodi-n-propyl amine	13-SEP-01 15:49	0.109	ND			1	5
exachloroethane	13-SEP-01 15:49	0.0773	ND			1	5
itrobenzene	13-SEP-01 15:49	0.0924	ND			1	5
sophorone	13-SEP-01 15:49	0.114	ND			1	5
-Nitrophenol	13-SEP-01 15:49	0.0830	ND			1	5
,4-Dimethylphenol	13-SEP-01 15:49	0.285	ND			1	5
enzoic acid	13-SEP-01 15:49	4.37	ND			1	25
is(2-Chloroethoxy)methane	13-SEP-01 15:49	0.0508	ND			1	5
,4-Dichlorophenol	13-SEP-01 15:49	0.144	ND			1	5
,2,4-Trichlorobenzene	13-SEP-01 15:49	0.0492	ND			1	5
aphthalene	13-SEP-01 15:49	0.0532	ND			1	5
-Chloroaniline	13-SEP-01 15:49	0.155	ND			1	5
exachlorobutadiene	13-SEP-01 15:49	0.112	ND			1	5
-Chloro-3-methylphenol	13-SEP-01 15:49	0.0794	ND			1	5
-Methylnaphthalene	13-SEP-01 15:49	0.0687	ND			1	5
exachlorocyclopentadiene	13-SEP-01 15:49	0.0864	ND			1	5
,4,6-Trichlorophenol	13-SEP-01 15:49	0.0925	ND			1	5
,4,5-Trichlorophenol	13-SEP-01 15:49	0.112	ND			1	5
-Chloronaphthalene	13-SEP-01 15:49	0.0769	ND			1	5
-Nitroaniline	13-SEP-01 15:49	0.140	ND			1	5
imethylphthalate	13-SEP-01 15:49	0.0766	ND			1	5
,6-Dinitrotoluene	13-SEP-01 15:49	0.152	ND			1	5
cenaphthylene	13-SEP-01 15:49	0.0467	ND			1	5
-Nitroaniline	13-SEP-01 15:49	0.313	ND			1	5
cenaphthene	13-SEP-01 15:49	0.0680	ND			1	5
,4-Dinitrophenol	13-SEP-01 15:49	1.24	ND			1	25
-Nitrophenol	13-SEP-01 15:49	0.715	ND			1	25
ibenzofuran	13-SEP-01 15:49	0.0519	ND			1	5
,4-Dinitrotoluene	13-SEP-01 15:49	0.0981	ND			1	5
iethylphthalate	13-SEP-01 15:49	0.140	ND			1	5

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Date Printed.....: 14-SEP-01 15:35
Client Name.....: North Dakota State Water Commission

DCL Sample Name...: **01E01965**
DCL Report Group..: **01E-0300-04**

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
4-Chlorophenyl Phenyl Ether	13-SEP-01 15:49	0.0478	ND			1	5
Fluorene	13-SEP-01 15:49	0.0737	ND			1	5
4-Nitroaniline	13-SEP-01 15:49	0.341	ND			1	5
4,6-Dinitro-2-Methylphenol	13-SEP-01 15:49	1.48	ND			1	25
N-nitrosodiphenylamine	13-SEP-01 15:49	0.0865	ND			1	5
4-Bromophenyl Phenyl Ether	13-SEP-01 15:49	0.108	ND			1	5
Hexachlorobenzene	13-SEP-01 15:49	0.151	ND			1	5
Pentachlorophenol	13-SEP-01 15:49	1.03	ND			1	25
Phenanthrene	13-SEP-01 15:49	0.0582	ND			1	5
Anthracene	13-SEP-01 15:49	0.0880	ND			1	5
Carbazole	13-SEP-01 15:49	0.0726	ND			1	5
Di-n-butylphthalate	13-SEP-01 15:49	0.347	ND			1	5
Fluoranthene	13-SEP-01 15:49	0.0723	ND			1	5
Pyrene	13-SEP-01 15:49	0.0836	ND			1	5
Butylbenzylphthalate	13-SEP-01 15:49	0.204	ND			1	5
3,3'-Dichlorobenzidine	13-SEP-01 15:49	0.372	ND			1	5
Benzo(a)anthracene	13-SEP-01 15:49	0.0750	ND			1	5
Chrysene	13-SEP-01 15:49	0.0760	ND			1	5
Bis(2-ethylhexyl)phthalate	13-SEP-01 15:49	2.49	ND			1	5
Di-n-octylphthalate	13-SEP-01 15:49	0.126	ND			1	5
Benzo(b)fluoranthene	13-SEP-01 15:49	0.105	ND			1	5
Benzo(k)fluoranthene	13-SEP-01 15:49	0.132	ND			1	5
Benzo(a)pyrene	13-SEP-01 15:49	0.0772	ND			1	5
Indeno(1,2,3-c,d)pyrene	13-SEP-01 15:49	0.318	ND			1	5
Dibenz(a,h)Anthracene	13-SEP-01 15:49	0.287	ND			1	5
Benzo(g,h,i)perylene	13-SEP-01 15:49	0.276	ND			1	5

Tentatively Identified Compound Results

Analyte(Retention Time)	Date Analyzed	Result	Comment	Qual.	Dilution
Unknown Acid(9.22)	13-SEP-01 15:49	5.5		J	
Polycyclic hydrocarbon(18.37)	13-SEP-01 15:49	18.		JB	1

Surrogate Recoveries

Analyte	Result	Spiked Amount	Percent Recovery
2,4,6-Tribromophenol	58.3	50.0	117.
2-Fluorobiphenyl	45.8	50.0	91.5
2-Fluorophenol	24.6	50.0	49.2
Nitrobenzene-d5	40.8	50.0	81.6
Phenol-d5	19.2	50.0	38.4
Terphenyl-d14	43.4	50.0	86.8

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S01860C7

ate Printed.....: 14-SEP-01 15:03

lient Name.....: North Dakota State Water Commission
lient Ref Number....: Not Provided
ampling Site.....: Not Provided
elease Number.....: Not Provided

ate Received.....: 07-SEP-01 00:00

Client Sample Name: 5-13098
DCL Sample Name...: 01E01966
DCL Report Group..: 01E-0300-04

Matrix.....: WATER
Date Sampled.....: 04-SEP-01 00:00
Reporting Units...: ug/L
Report Basis.....: ☒ As Received ☐ Dried

CL Preparation Group: G018B007
ate Prepared.....: 11-SEP-01 00:00
reparation Method...: 3510B
liquot Weight/Volume: 1000 mL
let Weight/Volume....: Not Required

DCL Analysis Group: G018B007
Analysis Method...: 8270C
Instrument Type...: GC/MS SV
Instrument ID.....: 5972-Q
Column Type.....: DB5 30m x .32mm
☒ Primary
☐ Confirmation

nalytical Results

nalyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
yridine	13-SEP-01 16:20	0.315	ND			1	5
henol	13-SEP-01 16:20	0.0525	ND			1	5
is(2-chloroethyl)ether	13-SEP-01 16:20	0.262	ND			1	5
-Chlorophenol	13-SEP-01 16:20	0.0851	ND			1	5
,3-Dichlorobenzene	13-SEP-01 16:20	0.0369	ND			1	5
,4-Dichlorobenzene	13-SEP-01 16:20	0.0622	ND			1	5
enzyl Alcohol	13-SEP-01 16:20	0.0699	ND			1	5
,2-Dichlorobenzene	13-SEP-01 16:20	0.0638	ND			1	5
-Methylphenol	13-SEP-01 16:20	0.113	ND			1	5
is(2-chloroisopropyl)ether	13-SEP-01 16:20	0.0967	ND			1	5
-Methylphenol	13-SEP-01 16:20	0.0552	ND			1	5
-Nitrosodi-n-propyl amine	13-SEP-01 16:20	0.109	ND			1	5
exachloroethane	13-SEP-01 16:20	0.0773	ND			1	5
itrobenzene	13-SEP-01 16:20	0.0924	ND			1	5
sophorone	13-SEP-01 16:20	0.114	ND			1	5
-Nitrophenol	13-SEP-01 16:20	0.0830	ND			1	5
,4-Dimethylphenol	13-SEP-01 16:20	0.285	ND			1	5
enzoic acid	13-SEP-01 16:20	4.37	ND			1	25
is(2-Chloroethoxy)methane	13-SEP-01 16:20	0.0508	ND			1	5
,4-Dichlorophenol	13-SEP-01 16:20	0.144	ND			1	5
,2,4-Trichlorobenzene	13-SEP-01 16:20	0.0492	ND			1	5
aphthalene	13-SEP-01 16:20	0.0532	ND			1	5
-Chloroaniline	13-SEP-01 16:20	0.155	ND			1	5
exachlorobutadiene	13-SEP-01 16:20	0.112	ND			1	5
-Chloro-3-methylphenol	13-SEP-01 16:20	0.0794	ND			1	5
-Methylnaphthalene	13-SEP-01 16:20	0.0687	ND			1	5
exachlorocyclopentadiene	13-SEP-01 16:20	0.0864	ND			1	5
,4,6-Trichlorophenol	13-SEP-01 16:20	0.0925	ND			1	5
,4,5-Trichlorophenol	13-SEP-01 16:20	0.112	ND			1	5
-Chloronaphthalene	13-SEP-01 16:20	0.0769	ND			1	5
-Nitroaniline	13-SEP-01 16:20	0.140	ND			1	5
imethylphthalate	13-SEP-01 16:20	0.0766	ND			1	5
,6-Dinitrotoluene	13-SEP-01 16:20	0.152	ND			1	5
cenaphthylene	13-SEP-01 16:20	0.0467	ND			1	5
-Nitroaniline	13-SEP-01 16:20	0.313	ND			1	5
cenaphthene	13-SEP-01 16:20	0.0680	ND			1	5
,4-Dinitrophenol	13-SEP-01 16:20	1.24	ND			1	25
-Nitrophenol	13-SEP-01 16:20	0.715	ND			1	25
ibenzofuran	13-SEP-01 16:20	0.0519	ND			1	5
,4-Dinitrotoluene	13-SEP-01 16:20	0.0981	ND			1	5
iethylphthalate	13-SEP-01 16:20	0.140	ND			1	5

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Date Printed.....: 14-SEP-01 15:03
Client Name.....: North Dakota State Water Commission

DCL Sample Name...: **01E01966**
DCL Report Group..: **01E-0300-04**

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
4-Chlorophenyl Phenyl Ether	13-SEP-01 16:20	0.0478	ND			1	5
Fluorene	13-SEP-01 16:20	0.0737	ND			1	5
4-Nitroaniline	13-SEP-01 16:20	0.341	ND			1	5
4,6-Dinitro-2-Methylphenol	13-SEP-01 16:20	1.48	ND			1	25
N-nitrosodiphenylamine	13-SEP-01 16:20	0.0865	ND			1	5
4-Bromophenyl Phenyl Ether	13-SEP-01 16:20	0.108	ND			1	5
Hexachlorobenzene	13-SEP-01 16:20	0.151	ND			1	5
Pentachlorophenol	13-SEP-01 16:20	1.03	ND			1	25
Phenanthrene	13-SEP-01 16:20	0.0582	ND			1	5
Anthracene	13-SEP-01 16:20	0.0880	ND			1	5
Carbazole	13-SEP-01 16:20	0.0726	ND			1	5
Di-n-butylphthalate	13-SEP-01 16:20	0.347	ND			1	5
Fluoranthene	13-SEP-01 16:20	0.0723	ND			1	5
Pyrene	13-SEP-01 16:20	0.0836	ND			1	5
Butylbenzylphthalate	13-SEP-01 16:20	0.204	ND			1	5
3,3'-Dichlorobenzidine	13-SEP-01 16:20	0.372	ND			1	5
Benzo(a)anthracene	13-SEP-01 16:20	0.0750	ND			1	5
Chrysene	13-SEP-01 16:20	0.0760	ND			1	5
Bis(2-ethylhexyl)phthalate	13-SEP-01 16:20	2.49	ND			1	5
Di-n-octylphthalate	13-SEP-01 16:20	0.126	ND			1	5
Benzo(b)fluoranthene	13-SEP-01 16:20	0.105	ND			1	5
Benzo(k)fluoranthene	13-SEP-01 16:20	0.132	ND			1	5
Benzo(a)pyrene	13-SEP-01 16:20	0.0772	ND			1	5
Indeno(1,2,3-c,d)pyrene	13-SEP-01 16:20	0.318	ND			1	5
Dibenz(a,h)Anthracene	13-SEP-01 16:20	0.287	ND			1	5
Benzo(g,h,i)perylene	13-SEP-01 16:20	0.276	ND			1	5

Tentatively Identified Compound Results

Analyte(Retention Time)	Date Analyzed	Result	Comment	Qual.	Dilution
Polycyclic hydrocarbon(18.36)	13-SEP-01 16:20	16.		JB	1

Surrogate Recoveries

Analyte	Result	Spiked Amount	Percent Recovery
2,4,6-Tribromophenol	54.8	50.0	110.
2-Fluorobiphenyl	45.1	50.0	90.3
2-Fluorophenol	25.8	50.0	51.7
Nitrobenzene-d5	46.5	50.0	93.0
Phenol-d5	22.8	50.0	45.6
Terphenyl-d14	48.6	50.0	97.3

DATA CHEM LABORATORIES
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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET


S01860CB

ate Printed.....: 14-SEP-01 15:03

lient Name.....: North Dakota State Water Commission
lient Ref Number....: Not Provided
ampling Site.....: Not Provided
elease Number.....: Not Provided

ate Received.....: 07-SEP-01 00:00

Client Sample Name: **DUP 1**
DCL Sample Name...: **01E01967**
DCL Report Group..: **01E-0300-04**

Matrix.....: WATER
Date Sampled.....: 04-SEP-01 00:00
Reporting Units...: ug/L
Report Basis.....: ☒ As Received ☐ Dried

CL Preparation Group: G018B007
ate Prepared.....: 11-SEP-01 00:00
reparation Method...: 3510B
liquot Weight/Volume: 1000 mL
et Weight/Volume....: Not Required

DCL Analysis Group: G018B007
Analysis Method...: 8270C
Instrument Type...: GC/MS SV
Instrument ID.....: 5972-Q
Column Type.....: DB5 30m x .32mm
☒ Primary
☐ Confirmation

nalytical Results

nalyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
yridine	13-SEP-01 17:51	0.315	ND			1	5
henol	13-SEP-01 17:51	0.0525	ND			1	5
is(2-chloroethyl)ether	13-SEP-01 17:51	0.262	ND			1	5
-Chlorophenol	13-SEP-01 17:51	0.0851	ND			1	5
,3-Dichlorobenzene	13-SEP-01 17:51	0.0369	ND			1	5
,4-Dichlorobenzene	13-SEP-01 17:51	0.0622	ND			1	5
enzyl Alcohol	13-SEP-01 17:51	0.0699	ND			1	5
,2-Dichlorobenzene	13-SEP-01 17:51	0.0638	ND			1	5
-Methylphenol	13-SEP-01 17:51	0.113	ND			1	5
is(2-chloroisopropyl)ether	13-SEP-01 17:51	0.0967	ND			1	5
-Methylphenol	13-SEP-01 17:51	0.0552	ND			1	5
-Nitrosodi-n-propyl amine	13-SEP-01 17:51	0.109	ND			1	5
exachloroethane	13-SEP-01 17:51	0.0773	ND			1	5
itrobenzene	13-SEP-01 17:51	0.0924	ND			1	5
sophorone	13-SEP-01 17:51	0.114	ND			1	5
-Nitrophenol	13-SEP-01 17:51	0.0830	ND			1	5
,4-Dimethylphenol	13-SEP-01 17:51	0.285	ND			1	5
enzoic acid	13-SEP-01 17:51	4.37	ND			1	25
is(2-Chloroethoxy)methane	13-SEP-01 17:51	0.0508	ND			1	5
,4-Dichlorophenol	13-SEP-01 17:51	0.144	ND			1	5
,2,4-Trichlorobenzene	13-SEP-01 17:51	0.0492	ND			1	5
aphthalene	13-SEP-01 17:51	0.0532	ND			1	5
-Chloroaniline	13-SEP-01 17:51	0.155	ND			1	5
exachlorobutadiene	13-SEP-01 17:51	0.112	ND			1	5
-Chloro-3-methylphenol	13-SEP-01 17:51	0.0794	ND			1	5
-Methylnaphthalene	13-SEP-01 17:51	0.0687	ND			1	5
exachlorocyclopentadiene	13-SEP-01 17:51	0.0864	ND			1	5
,4,6-Trichlorophenol	13-SEP-01 17:51	0.0925	ND			1	5
,4,5-Trichlorophenol	13-SEP-01 17:51	0.112	ND			1	5
-Chloronaphthalene	13-SEP-01 17:51	0.0769	ND			1	5
-Nitroaniline	13-SEP-01 17:51	0.140	ND			1	5
imethylphthalate	13-SEP-01 17:51	0.0766	ND			1	5
,6-Dinitrotoluene	13-SEP-01 17:51	0.152	ND			1	5
cenaphthylene	13-SEP-01 17:51	0.0467	ND			1	5
-Nitroaniline	13-SEP-01 17:51	0.313	ND			1	5
cenaphthene	13-SEP-01 17:51	0.0680	ND			1	5
,4-Dinitrophenol	13-SEP-01 17:51	1.24	ND			1	25
-Nitrophenol	13-SEP-01 17:51	0.715	ND			1	25
ibenzofuran	13-SEP-01 17:51	0.0519	ND			1	5
,4-Dinitrotoluene	13-SEP-01 17:51	0.0981	ND			1	5
iethylphthalate	13-SEP-01 17:51	0.140	ND			1	5

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Date Printed.....: 14-SEP-01 15:35
Client Name.....: North Dakota State Water Commission

DCL Sample Name...: **01E01967**
DCL Report Group..: **01E-0300-04**

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
4-Chlorophenyl Phenyl Ether	13-SEP-01 17:51	0.0478	ND			1	5
Fluorene	13-SEP-01 17:51	0.0737	ND			1	5
4-Nitroaniline	13-SEP-01 17:51	0.341	ND			1	5
4,6-Dinitro-2-Methylphenol	13-SEP-01 17:51	1.48	ND			1	25
N-nitrosodiphenylamine	13-SEP-01 17:51	0.0865	ND			1	5
4-Bromophenyl Phenyl Ether	13-SEP-01 17:51	0.108	ND			1	5
Hexachlorobenzene	13-SEP-01 17:51	0.151	ND			1	5
Pentachlorophenol	13-SEP-01 17:51	1.03	ND			1	25
Phenanthrene	13-SEP-01 17:51	0.0582	ND			1	5
Anthracene	13-SEP-01 17:51	0.0880	ND			1	5
Carbazole	13-SEP-01 17:51	0.0726	ND			1	5
Di-n-butylphthalate	13-SEP-01 17:51	0.347	ND			1	5
Fluoranthene	13-SEP-01 17:51	0.0723	ND			1	5
Pyrene	13-SEP-01 17:51	0.0836	ND			1	5
Butylbenzylphthalate	13-SEP-01 17:51	0.204	ND			1	5
3,3'-Dichlorobenzidine	13-SEP-01 17:51	0.372	ND			1	5
Benzo(a)anthracene	13-SEP-01 17:51	0.0750	ND			1	5
Chrysene	13-SEP-01 17:51	0.0760	ND			1	5
Bis(2-ethylhexyl)phthalate	13-SEP-01 17:51	2.49	ND			1	5
Di-n-octylphthalate	13-SEP-01 17:51	0.126	ND			1	5
Benzo(b)fluoranthene	13-SEP-01 17:51	0.105	ND			1	5
Benzo(k)fluoranthene	13-SEP-01 17:51	0.132	ND			1	5
Benzo(a)pyrene	13-SEP-01 17:51	0.0772	ND			1	5
Indeno(1,2,3-c,d)pyrene	13-SEP-01 17:51	0.318	ND			1	5
Dibenz(a,h)Anthracene	13-SEP-01 17:51	0.287	ND			1	5
Benzo(g,h,i)perylene	13-SEP-01 17:51	0.276	ND			1	5

Tentatively Identified Compound Results

Analyte(Retention Time)	Date Analyzed	Result	Comment	Qual.	Dilution
Unknown Acid(9.22)	13-SEP-01 17:51	5.6		J	
Cyclic Hydrocarbon(17.44)	13-SEP-01 17:51	8.2		J	1
Polycyclic hydrocarbon(18.36)	13-SEP-01 17:51	17.		JB	1

Surrogate Recoveries

Analyte	Result	Spiked Amount	Percent Recovery
2,4,6-Tribromophenol	57.4	50.0	115.
2-Fluorobiphenyl	43.0	50.0	86.1
2-Fluorophenol	24.7	50.0	49.3
Nitrobenzene-d5	42.8	50.0	85.6
Phenol-d5	19.5	50.0	38.9
Terphenyl-d14	44.8	50.0	89.5

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DATA CHEM LABORATORIES
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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S01860CC

ate Printed.....: 14-SEP-01 15:03

lient Name.....: North Dakota State Water Commission
lient Ref Number....: Not Provided
ampling Site.....: Not Provided
elease Number.....: Not Provided

ate Received.....: 07-SEP-01 00:00

Client Sample Name: 1-13103
DCL Sample Name...: 01E01968
DCL Report Group..: 01E-0300-04

Matrix.....: WATER
Date Sampled.....: 04-SEP-01 00:00
Reporting Units...: ug/L
Report Basis.....: ☒ As Received ☐ Dried

CL Preparation Group: G018B007
ate Prepared.....: 11-SEP-01 00:00
reparation Method...: 3510B
liquot Weight/Volume: 1000 mL
et Weight/Volume....: Not Required

DCL Analysis Group: G018B007
Analysis Method...: 8270C
Instrument Type...: GC/MS SV
Instrument ID.....: 5972-Q
Column Type.....: DB5 30m x .32mm
☒ Primary
☐ Confirmation

nalytical Results

nalyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
yridine	13-SEP-01 18:21	0.315	ND			1	5
henol	13-SEP-01 18:21	0.0525	ND			1	5
is(2-chloroethyl)ether	13-SEP-01 18:21	0.262	ND			1	5
-Chlorophenol	13-SEP-01 18:21	0.0851	ND			1	5
,3-Dichlorobenzene	13-SEP-01 18:21	0.0369	ND			1	5
,4-Dichlorobenzene	13-SEP-01 18:21	0.0622	ND			1	5
enzyl Alcohol	13-SEP-01 18:21	0.0699	ND			1	5
,2-Dichlorobenzene	13-SEP-01 18:21	0.0638	ND			1	5
-Methylphenol	13-SEP-01 18:21	0.113	ND			1	5
is(2-chloroisopropyl)ether	13-SEP-01 18:21	0.0967	ND			1	5
-Methylphenol	13-SEP-01 18:21	0.0552	ND			1	5
-Nitrosodi-n-propyl amine	13-SEP-01 18:21	0.109	ND			1	5
exachloroethane	13-SEP-01 18:21	0.0773	ND			1	5
itrobenzene	13-SEP-01 18:21	0.0924	ND			1	5
sophorone	13-SEP-01 18:21	0.114	ND			1	5
-Nitrophenol	13-SEP-01 18:21	0.0830	ND			1	5
,4-Dimethylphenol	13-SEP-01 18:21	0.285	ND			1	5
enzoic acid	13-SEP-01 18:21	4.37	ND			1	25
is(2-Chloroethoxy)methane	13-SEP-01 18:21	0.0508	ND			1	5
,4-Dichlorophenol	13-SEP-01 18:21	0.144	ND			1	5
,2,4-Trichlorobenzene	13-SEP-01 18:21	0.0492	ND			1	5
aphthalene	13-SEP-01 18:21	0.0532	ND			1	5
-Chloroaniline	13-SEP-01 18:21	0.155	ND			1	5
exachlorobutadiene	13-SEP-01 18:21	0.112	ND			1	5
-Chloro-3-methylphenol	13-SEP-01 18:21	0.0794	ND			1	5
-Methylnaphthalene	13-SEP-01 18:21	0.0687	ND			1	5
exachlorocyclopentadiene	13-SEP-01 18:21	0.0864	ND			1	5
,4,6-Trichlorophenol	13-SEP-01 18:21	0.0925	ND			1	5
,4,5-Trichlorophenol	13-SEP-01 18:21	0.112	ND			1	5
-Chloronaphthalene	13-SEP-01 18:21	0.0769	ND			1	5
-Nitroaniline	13-SEP-01 18:21	0.140	ND			1	5
imethylphthalate	13-SEP-01 18:21	0.0766	ND			1	5
,6-Dinitrotoluene	13-SEP-01 18:21	0.152	ND			1	5
cenaphthylene	13-SEP-01 18:21	0.0467	ND			1	5
-Nitroaniline	13-SEP-01 18:21	0.313	ND			1	5
cenaphthene	13-SEP-01 18:21	0.0680	ND			1	5
,4-Dinitrophenol	13-SEP-01 18:21	1.24	ND			1	25
-Nitrophenol	13-SEP-01 18:21	0.715	ND			1	25
ibenzofuran	13-SEP-01 18:21	0.0519	ND			1	5
,4-Dinitrotoluene	13-SEP-01 18:21	0.0981	ND			1	5
iethylphthalate	13-SEP-01 18:21	0.140	ND			1	5

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Date Printed.....: 14-SEP-01 15:03
Client Name.....: North Dakota State Water Commission

DCL Sample Name...: **01E01968**
DCL Report Group..: **01E-0300-04**

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
4-Chlorophenyl Phenyl Ether	13-SEP-01 18:21	0.0478	ND			1	5
Fluorene	13-SEP-01 18:21	0.0737	ND			1	5
4-Nitroaniline	13-SEP-01 18:21	0.341	ND			1	5
4,6-Dinitro-2-Methylphenol	13-SEP-01 18:21	1.48	ND			1	25
N-nitrosodiphenylamine	13-SEP-01 18:21	0.0865	ND			1	5
4-Bromophenyl Phenyl Ether	13-SEP-01 18:21	0.108	ND			1	5
Hexachlorobenzene	13-SEP-01 18:21	0.151	ND			1	5
Pentachlorophenol	13-SEP-01 18:21	1.03	ND			1	25
Phenanthrene	13-SEP-01 18:21	0.0582	ND			1	5
Anthracene	13-SEP-01 18:21	0.0880	ND			1	5
Carbazole	13-SEP-01 18:21	0.0726	ND			1	5
Di-n-butylphthalate	13-SEP-01 18:21	0.347	ND			1	5
Fluoranthene	13-SEP-01 18:21	0.0723	ND			1	5
Pyrene	13-SEP-01 18:21	0.0836	ND			1	5
Butylbenzylphthalate	13-SEP-01 18:21	0.204	ND			1	5
3,3'-Dichlorobenzidine	13-SEP-01 18:21	0.372	ND			1	5
Benzo(a)anthracene	13-SEP-01 18:21	0.0750	ND			1	5
Chrysene	13-SEP-01 18:21	0.0760	ND			1	5
Bis(2-ethylhexyl)phthalate	13-SEP-01 18:21	2.49	ND			1	5
Di-n-octylphthalate	13-SEP-01 18:21	0.126	ND			1	5
Benzo(b)fluoranthene	13-SEP-01 18:21	0.105	ND			1	5
Benzo(k)fluoranthene	13-SEP-01 18:21	0.132	ND			1	5
Benzo(a)pyrene	13-SEP-01 18:21	0.0772	ND			1	5
Indeno(1,2,3-c,d)pyrene	13-SEP-01 18:21	0.318	ND			1	5
Dibenz(a,h)Anthracene	13-SEP-01 18:21	0.287	ND			1	5
Benzo(g,h,i)perylene	13-SEP-01 18:21	0.276	ND			1	5

Tentatively Identified Compound Results

Analyte(Retention Time)	Date Analyzed	Result	Comment	Qual.	Dilution
Cyclic Hydrocarbon(17.45)	13-SEP-01 18:21	17.		J	1
Polycyclic hydrocarbon(18.36)	13-SEP-01 18:21	17.		JB	1

Surrogate Recoveries

Analyte	Result	Spiked Amount	Percent Recovery
2,4,6-Tribromophenol	46.5	50.0	92.9
2-Fluorobiphenyl	39.4	50.0	78.9
2-Fluorophenol	24.8	50.0	49.6
Nitrobenzene-d5	39.4	50.0	78.8
Phenol-d5	18.3	50.0	36.7
Terphenyl-d14	45.1	50.0	90.2

Date Printed.....: 14-SEP-01 15:03

Client Name.....: North Dakota State Water Commission
Client Ref Number....: Not Provided
Sampling Site.....: Not Provided
Release Number.....: Not Provided

Date Received.....: 07-SEP-01 00:00

Client Sample Name: **1-13104**
DCL Sample Name...: **01E01969**
DCL Report Group..: **01E-0300-04**

Matrix.....: WATER
Date Sampled.....: 04-SEP-01 00:00
Reporting Units...: ug/L
Report Basis.....: ☒ As Received ☐ Dried

DCL Preparation Group: G018B007
Date Prepared.....: 11-SEP-01 00:00
Preparation Method...: 3510B
Aliquot Weight/Volume: 1000 mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G018B007
Analysis Method...: 8270C
Instrument Type...: GC/MS SV
Instrument ID.....: 5972-Q
Column Type.....: DB5 30m x .32mm
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
Pyridine	13-SEP-01 18:52	0.315	ND			1	5
Phenol	13-SEP-01 18:52	0.0525	ND			1	5
Bis(2-chloroethyl)ether	13-SEP-01 18:52	0.262	ND			1	5
2-Chlorophenol	13-SEP-01 18:52	0.0851	ND			1	5
1,3-Dichlorobenzene	13-SEP-01 18:52	0.0369	ND			1	5
1,4-Dichlorobenzene	13-SEP-01 18:52	0.0622	ND			1	5
Benzyl Alcohol	13-SEP-01 18:52	0.0699	ND			1	5
1,2-Dichlorobenzene	13-SEP-01 18:52	0.0638	ND			1	5
2-Methylphenol	13-SEP-01 18:52	0.113	ND			1	5
Bis(2-chloroisopropyl)ether	13-SEP-01 18:52	0.0967	ND			1	5
4-Methylphenol	13-SEP-01 18:52	0.0552	ND			1	5
N-Nitrosodi-n-propyl amine	13-SEP-01 18:52	0.109	ND			1	5
Hexachloroethane	13-SEP-01 18:52	0.0773	ND			1	5
Nitrobenzene	13-SEP-01 18:52	0.0924	ND			1	5
Isophorone	13-SEP-01 18:52	0.114	ND			1	5
2-Nitrophenol	13-SEP-01 18:52	0.0830	ND			1	5
2,4-Dimethylphenol	13-SEP-01 18:52	0.285	ND			1	5
Benzoic acid	13-SEP-01 18:52	4.37	ND			1	25
bis(2-Chloroethoxy)methane	13-SEP-01 18:52	0.0508	ND			1	5
2,4-Dichlorophenol	13-SEP-01 18:52	0.144	ND			1	5
1,2,4-Trichlorobenzene	13-SEP-01 18:52	0.0492	ND			1	5
Naphthalene	13-SEP-01 18:52	0.0532	ND			1	5
4-Chloroaniline	13-SEP-01 18:52	0.155	ND			1	5
Hexachlorobutadiene	13-SEP-01 18:52	0.112	ND			1	5
4-Chloro-3-methylphenol	13-SEP-01 18:52	0.0794	ND			1	5
2-Methylnaphthalene	13-SEP-01 18:52	0.0687	ND			1	5
Hexachlorocyclopentadiene	13-SEP-01 18:52	0.0864	ND			1	5
2,4,6-Trichlorophenol	13-SEP-01 18:52	0.0925	ND			1	5
2,4,5-Trichlorophenol	13-SEP-01 18:52	0.112	ND			1	5
2-Chloronaphthalene	13-SEP-01 18:52	0.0769	ND			1	5
2-Nitroaniline	13-SEP-01 18:52	0.140	ND			1	5
Dimethylphthalate	13-SEP-01 18:52	0.0766	ND			1	5
2,6-Dinitrotoluene	13-SEP-01 18:52	0.152	ND			1	5
Acenaphthylene	13-SEP-01 18:52	0.0467	ND			1	5
3-Nitroaniline	13-SEP-01 18:52	0.313	ND			1	5
Acenaphthene	13-SEP-01 18:52	0.0680	ND			1	5
2,4-Dinitrophenol	13-SEP-01 18:52	1.24	ND			1	25
4-Nitrophenol	13-SEP-01 18:52	0.715	ND			1	25
Dibenzofuran	13-SEP-01 18:52	0.0519	ND			1	5
2,4-Dinitrotoluene	13-SEP-01 18:52	0.0981	ND			1	5
Diethylphthalate	13-SEP-01 18:52	0.140	ND			1	5

Date Printed.....: 14-SEP-01 15:03
Client Name.....: North Dakota State Water Commission

DCL Sample Name...: **01E01969**
DCL Report Group..: **01E-0300-04**

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
4-Chlorophenyl Phenyl Ether	13-SEP-01 18:52	0.0478	ND			1	5
Fluorene	13-SEP-01 18:52	0.0737	ND			1	5
4-Nitroaniline	13-SEP-01 18:52	0.341	ND			1	5
4,6-Dinitro-2-Methylphenol	13-SEP-01 18:52	1.48	ND			1	25
N-nitrosodiphenylamine	13-SEP-01 18:52	0.0865	ND			1	5
4-Bromophenyl Phenyl Ether	13-SEP-01 18:52	0.108	ND			1	5
Hexachlorobenzene	13-SEP-01 18:52	0.151	ND			1	5
Pentachlorophenol	13-SEP-01 18:52	1.03	ND			1	25
Phenanthrene	13-SEP-01 18:52	0.0582	ND			1	5
Anthracene	13-SEP-01 18:52	0.0880	ND			1	5
Carbazole	13-SEP-01 18:52	0.0726	ND			1	5
Di-n-butylphthalate	13-SEP-01 18:52	0.347	ND			1	5
Fluoranthene	13-SEP-01 18:52	0.0723	ND			1	5
Pyrene	13-SEP-01 18:52	0.0836	ND			1	5
Butylbenzylphthalate	13-SEP-01 18:52	0.204	ND			1	5
3,3'-Dichlorobenzidine	13-SEP-01 18:52	0.372	ND			1	5
Benzo(a)anthracene	13-SEP-01 18:52	0.0750	ND			1	5
Chrysene	13-SEP-01 18:52	0.0760	ND			1	5
Bis(2-ethylhexyl)phthalate	13-SEP-01 18:52	2.49	ND			1	5
Di-n-octylphthalate	13-SEP-01 18:52	0.126	ND			1	5
Benzo(b)fluoranthene	13-SEP-01 18:52	0.105	ND			1	5
Benzo(k)fluoranthene	13-SEP-01 18:52	0.132	ND			1	5
Benzo(a)pyrene	13-SEP-01 18:52	0.0772	ND			1	5
Indeno(1,2,3-c,d)pyrene	13-SEP-01 18:52	0.318	ND			1	5
Dibenz(a,h)Anthracene	13-SEP-01 18:52	0.287	ND			1	5
Benzo(g,h,i)perylene	13-SEP-01 18:52	0.276	ND			1	5

Tentatively Identified Compound Results

Analyte(Retention Time)	Date Analyzed	Result	Comment	Qual.	Dilution
Unknown Acid(9.22)	13-SEP-01 18:52	4.6		J	1
Hexadecanoic Acid(12.22)	13-SEP-01 18:52	7.2		J	1
Unknown Acid(13.50)	13-SEP-01 18:52	4.5		J	1
Unknown Oxyhydrocarbon(16.94)	13-SEP-01 18:52	9.8		J	1
Polycyclic hydrocarbon(18.36)	13-SEP-01 18:52	18.		JB	1

Surrogate Recoveries

Analyte	Result	Spiked Amount	Percent Recovery
2,4,6-Tribromophenol	53.8	50.0	108.
2-Fluorobiphenyl	46.5	50.0	93.1
2-Fluorophenol	27.5	50.0	55.0
Nitrobenzene-d5	43.1	50.0	86.3
Phenol-d5	19.9	50.0	39.9
Terphenyl-d14	44.5	50.0	89.0

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S01860CF

)ate Printed.....: 14-SEP-01 15:03

:lient Name.....: North Dakota State Water Commission
:lient Ref Number....: Not Provided
Sampling Site.....: Not Provided
Release Number.....: Not Provided

)ate Received.....: 07-SEP-01 00:00

Client Sample Name: **LAKE COE**
DCL Sample Name...: **01E01970**
DCL Report Group..: **01E-0300-04**

Matrix.....: WATER
Date Sampled.....: 04-SEP-01 00:00
Reporting Units...: ug/L
Report Basis.....: ☒ As Received ☐ Dried

)CL Preparation Group: G018B007
)ate Prepared.....: 11-SEP-01 00:00
)reparation Method...: 3510B
Aliquot Weight/Volume: 1000 mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G018B007
Analysis Method...: 8270C
Instrument Type...: GC/MS SV
Instrument ID.....: 5972-Q
Column Type.....: DB5 30m x .32mm
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
Pyridine	13-SEP-01 19:22	0.315	ND			1	5
Phenol	13-SEP-01 19:22	0.0525	ND			1	5
Bis(2-chloroethyl)ether	13-SEP-01 19:22	0.262	ND			1	5
2-Chlorophenol	13-SEP-01 19:22	0.0851	ND			1	5
1,3-Dichlorobenzene	13-SEP-01 19:22	0.0369	ND			1	5
1,4-Dichlorobenzene	13-SEP-01 19:22	0.0622	ND			1	5
Benzyl Alcohol	13-SEP-01 19:22	0.0699	ND			1	5
1,2-Dichlorobenzene	13-SEP-01 19:22	0.0638	ND			1	5
2-Methylphenol	13-SEP-01 19:22	0.113	ND			1	5
Bis(2-chloroisopropyl)ether	13-SEP-01 19:22	0.0967	ND			1	5
4-Methylphenol	13-SEP-01 19:22	0.0552	ND			1	5
N-Nitrosodi-n-propyl amine	13-SEP-01 19:22	0.109	ND			1	5
Hexachloroethane	13-SEP-01 19:22	0.0773	ND			1	5
Nitrobenzene	13-SEP-01 19:22	0.0924	ND			1	5
Isophorone	13-SEP-01 19:22	0.114	ND			1	5
2-Nitrophenol	13-SEP-01 19:22	0.0830	ND			1	5
2,4-Dimethylphenol	13-SEP-01 19:22	0.285	ND			1	5
Benzoic acid	13-SEP-01 19:22	4.37	7.2		JB	1	25
Bis(2-Chloroethoxy)methane	13-SEP-01 19:22	0.0508	ND			1	5
2,4-Dichlorophenol	13-SEP-01 19:22	0.144	ND			1	5
1,2,4-Trichlorobenzene	13-SEP-01 19:22	0.0492	ND			1	5
Naphthalene	13-SEP-01 19:22	0.0532	ND			1	5
4-Chloroaniline	13-SEP-01 19:22	0.155	ND			1	5
Hexachlorobutadiene	13-SEP-01 19:22	0.112	ND			1	5
4-Chloro-3-methylphenol	13-SEP-01 19:22	0.0794	ND			1	5
2-Methylnaphthalene	13-SEP-01 19:22	0.0687	ND			1	5
Hexachlorocyclopentadiene	13-SEP-01 19:22	0.0864	ND			1	5
2,4,6-Trichlorophenol	13-SEP-01 19:22	0.0925	ND			1	5
2,4,5-Trichlorophenol	13-SEP-01 19:22	0.112	ND			1	5
2-Chloronaphthalene	13-SEP-01 19:22	0.0769	ND			1	5
2-Nitroaniline	13-SEP-01 19:22	0.140	ND			1	5
Dimethylphthalate	13-SEP-01 19:22	0.0766	ND			1	5
2,6-Dinitrotoluene	13-SEP-01 19:22	0.152	ND			1	5
Acenaphthylene	13-SEP-01 19:22	0.0467	ND			1	5
3-Nitroaniline	13-SEP-01 19:22	0.313	ND			1	5
Acenaphthene	13-SEP-01 19:22	0.0680	ND			1	5
2,4-Dinitrophenol	13-SEP-01 19:22	1.24	ND			1	25
4-Nitrophenol	13-SEP-01 19:22	0.715	ND			1	25
Dibenzofuran	13-SEP-01 19:22	0.0519	ND			1	5
2,4-Dinitrotoluene	13-SEP-01 19:22	0.0981	ND			1	5
Diethylphthalate	13-SEP-01 19:22	0.140	ND			1	5

027

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Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

Date Printed.....: 14-SEP-01 15:03
Client Name.....: North Dakota State Water Commission

DCL Sample Name...: 01E01970
DCL Report Group..: 01E-0300-04

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
4-Chlorophenyl Phenyl Ether	13-SEP-01 19:22	0.0478	ND			1	5
Fluorene	13-SEP-01 19:22	0.0737	ND			1	5
4-Nitroaniline	13-SEP-01 19:22	0.341	ND			1	5
4,6-Dinitro-2-Methylphenol	13-SEP-01 19:22	1.48	ND			1	25
N-nitrosodiphenylamine	13-SEP-01 19:22	0.0865	ND			1	5
4-Bromophenyl Phenyl Ether	13-SEP-01 19:22	0.108	ND			1	5
Hexachlorobenzene	13-SEP-01 19:22	0.151	ND			1	5
Pentachlorophenol	13-SEP-01 19:22	1.03	ND			1	25
Phenanthrene	13-SEP-01 19:22	0.0582	ND			1	5
Anthracene	13-SEP-01 19:22	0.0880	ND			1	5
Carbazole	13-SEP-01 19:22	0.0726	ND			1	5
Di-n-butylphthalate	13-SEP-01 19:22	0.347	11.			1	5
Fluoranthene	13-SEP-01 19:22	0.0723	ND			1	5
Pyrene	13-SEP-01 19:22	0.0836	ND			1	5
Butylbenzylphthalate	13-SEP-01 19:22	0.204	ND			1	5
3,3'-Dichlorobenzidine	13-SEP-01 19:22	0.372	ND			1	5
Benzo(a)anthracene	13-SEP-01 19:22	0.0750	ND			1	5
Chrysene	13-SEP-01 19:22	0.0760	ND			1	5
Bis(2-ethylhexyl)phthalate	13-SEP-01 19:22	2.49	ND			1	5
Di-n-octylphthalate	13-SEP-01 19:22	0.126	ND			1	5
Benzo(b)fluoranthene	13-SEP-01 19:22	0.105	ND			1	5
Benzo(k)fluoranthene	13-SEP-01 19:22	0.132	ND			1	5
Benzo(a)pyrene	13-SEP-01 19:22	0.0772	ND			1	5
Indeno(1,2,3-c,d)pyrene	13-SEP-01 19:22	0.318	ND			1	5
Dibenz(a,h)Anthracene	13-SEP-01 19:22	0.287	ND			1	5
Benzo(g,h,i)perylene	13-SEP-01 19:22	0.276	ND			1	5

Tentatively Identified Compound Results

Analyte(Retention Time)	Date Analyzed	Result	Comment	Qual.	Dilution
Unknown ALkane(4.58)	13-SEP-01 19:22	7.6		J	1
Unknown Acid(13.51)	13-SEP-01 19:22	6.3		J	1
Unknown Amide(14.77)	13-SEP-01 19:22	5.5		J	1
Unknown Amide(16.75)	13-SEP-01 19:22	6.4		J	1
Cyclic Hydrocarbon(17.49)	13-SEP-01 19:22	44.		J	1
Cyclic Hydrocarbon(17.57)	13-SEP-01 19:22	6.0		J	1
Polycyclic hydrocarbon(18.37)	13-SEP-01 19:22	17.		JB	1

Surrogate Recoveries

Analyte	Result	Spiked Amount	Percent Recovery
2,4,6-Tribromophenol	34.8	50.0	69.6
2-Fluorobiphenyl	35.9	50.0	71.8
2-Fluorophenol	25.1	50.0	50.1
Nitrobenzene-d5	39.8	50.0	79.6
Phenol-d5	20.6	50.0	41.2
Terphenyl-d14	31.7	50.0	63.5

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S01860CG

Date Printed.....: 14-SEP-01 15:03

Client Name.....: North Dakota State Water Commission
Client Ref Number....: Not Provided
Sampling Site.....: Not Provided
Release Number.....: Not Provided

Date Received.....: 07-SEP-01 00:00

Client Sample Name: **2-13105**
DCL Sample Name...: **01E01971**
DCL Report Group..: **01E-0300-04**

Matrix.....: WATER
Date Sampled.....: 04-SEP-01 00:00
Reporting Units...: ug/L
Report Basis.....: ☒ As Received ☐ Dried

DCL Preparation Group: G018B007
Date Prepared.....: 11-SEP-01 00:00
Preparation Method...: 3510B
Aliquot Weight/Volume: 1000 mL
Wet Weight/Volume....: Not Required

DCL Analysis Group: G018B007
Analysis Method...: 8270C
Instrument Type...: GC/MS SV
Instrument ID.....: 5972-Q
Column Type.....: DB5 30m x .32mm
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
Pyridine	13-SEP-01 19:52	0.315	ND			1	5
Phenol	13-SEP-01 19:52	0.0525	ND			1	5
Bis(2-chloroethyl)ether	13-SEP-01 19:52	0.262	ND			1	5
2-Chlorophenol	13-SEP-01 19:52	0.0851	ND			1	5
1,3-Dichlorobenzene	13-SEP-01 19:52	0.0369	ND			1	5
1,4-Dichlorobenzene	13-SEP-01 19:52	0.0622	ND			1	5
Benzyl Alcohol	13-SEP-01 19:52	0.0699	ND			1	5
1,2-Dichlorobenzene	13-SEP-01 19:52	0.0638	ND			1	5
2-Methylphenol	13-SEP-01 19:52	0.113	ND			1	5
Bis(2-chloroisopropyl)ether	13-SEP-01 19:52	0.0967	ND			1	5
4-Methylphenol	13-SEP-01 19:52	0.0552	ND			1	5
N-Nitrosodi-n-propyl amine	13-SEP-01 19:52	0.109	ND			1	5
Hexachloroethane	13-SEP-01 19:52	0.0773	ND			1	5
Nitrobenzene	13-SEP-01 19:52	0.0924	ND			1	5
Isophorone	13-SEP-01 19:52	0.114	ND			1	5
2-Nitrophenol	13-SEP-01 19:52	0.0830	ND			1	5
2,4-Dimethylphenol	13-SEP-01 19:52	0.285	ND			1	5
Benzoic acid	13-SEP-01 19:52	4.37	ND			1	25
bis(2-Chloroethoxy)methane	13-SEP-01 19:52	0.0508	ND			1	5
2,4-Dichlorophenol	13-SEP-01 19:52	0.144	ND			1	5
1,2,4-Trichlorobenzene	13-SEP-01 19:52	0.0492	ND			1	5
Naphthalene	13-SEP-01 19:52	0.0532	ND			1	5
4-Chloroaniline	13-SEP-01 19:52	0.155	ND			1	5
Hexachlorobutadiene	13-SEP-01 19:52	0.112	ND			1	5
4-Chloro-3-methylphenol	13-SEP-01 19:52	0.0794	ND			1	5
2-Methylnaphthalene	13-SEP-01 19:52	0.0687	ND			1	5
Hexachlorocyclopentadiene	13-SEP-01 19:52	0.0864	ND			1	5
2,4,6-Trichlorophenol	13-SEP-01 19:52	0.0925	ND			1	5
2,4,5-Trichlorophenol	13-SEP-01 19:52	0.112	ND			1	5
2-Chloronaphthalene	13-SEP-01 19:52	0.0769	ND			1	5
2-Nitroaniline	13-SEP-01 19:52	0.140	ND			1	5
Dimethylphthalate	13-SEP-01 19:52	0.0766	ND			1	5
2,6-Dinitrotoluene	13-SEP-01 19:52	0.152	ND			1	5
Acenaphthylene	13-SEP-01 19:52	0.0467	ND			1	5
3-Nitroaniline	13-SEP-01 19:52	0.313	ND			1	5
Acenaphthene	13-SEP-01 19:52	0.0680	ND			1	5
2,4-Dinitrophenol	13-SEP-01 19:52	1.24	ND			1	25
4-Nitrophenol	13-SEP-01 19:52	0.715	ND			1	25
Dibenzofuran	13-SEP-01 19:52	0.0519	ND			1	5
2,4-Dinitrotoluene	13-SEP-01 19:52	0.0981	ND			1	5
Diethylphthalate	13-SEP-01 19:52	0.140	ND			1	5

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FAX (801) 268-9992 E-mail: lab@datachem.com

Date Printed.....: 14-SEP-01 15:03
Client Name.....: North Dakota State Water Commission

DCL Sample Name...: **01E01971**
DCL Report Group..: **01E-0300-04**

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
4-Chlorophenyl Phenyl Ether	13-SEP-01 19:52	0.0478	ND			1	5
Fluorene	13-SEP-01 19:52	0.0737	ND			1	5
4-Nitroaniline	13-SEP-01 19:52	0.341	ND			1	5
4,6-Dinitro-2-Methylphenol	13-SEP-01 19:52	1.48	ND			1	25
N-nitrosodiphenylamine	13-SEP-01 19:52	0.0865	ND			1	5
4-Bromophenyl Phenyl Ether	13-SEP-01 19:52	0.108	ND			1	5
Hexachlorobenzene	13-SEP-01 19:52	0.151	ND			1	5
Pentachlorophenol	13-SEP-01 19:52	1.03	ND			1	25
Phenanthrene	13-SEP-01 19:52	0.0582	ND			1	5
Anthracene	13-SEP-01 19:52	0.0880	ND			1	5
Carbazole	13-SEP-01 19:52	0.0726	ND			1	5
Di-n-butylphthalate	13-SEP-01 19:52	0.347	2.9		J	1	5
Fluoranthene	13-SEP-01 19:52	0.0723	ND			1	5
Pyrene	13-SEP-01 19:52	0.0836	ND			1	5
Butylbenzylphthalate	13-SEP-01 19:52	0.204	ND			1	5
3,3'-Dichlorobenzidine	13-SEP-01 19:52	0.372	ND			1	5
Benzo(a)anthracene	13-SEP-01 19:52	0.0750	ND			1	5
Chrysene	13-SEP-01 19:52	0.0760	ND			1	5
Bis(2-ethylhexyl)phthalate	13-SEP-01 19:52	2.49	ND			1	5
Di-n-octylphthalate	13-SEP-01 19:52	0.126	ND			1	5
Benzo(b)fluoranthene	13-SEP-01 19:52	0.105	ND			1	5
Benzo(k)fluoranthene	13-SEP-01 19:52	0.132	ND			1	5
Benzo(a)pyrene	13-SEP-01 19:52	0.0772	ND			1	5
Indeno(1,2,3-c,d)pyrene	13-SEP-01 19:52	0.318	ND			1	5
Dibenz(a,h)Anthracene	13-SEP-01 19:52	0.287	ND			1	5
Benzo(g,h,i)perylene	13-SEP-01 19:52	0.276	ND			1	5

Tentatively Identified Compound Results

Analyte(Retention Time)	Date Analyzed	Result	Comment	Qual.	Dilution
Cyclic Hydrocarbon(17.60)	13-SEP-01 19:52	97.		J	1
Polycyclic hydrocarbon(18.37)	13-SEP-01 19:52	14.		JB	1

Surrogate Recoveries

Analyte	Result	Spiked Amount	Percent Recovery
2,4,6-Tribromophenol	18.4	50.0	36.8
2-Fluorobiphenyl	42.0	50.0	84.0
2-Fluorophenol	23.3	50.0	46.6
Nitrobenzene-d5	42.6	50.0	85.2
Phenol-d5	17.6	50.0	35.1
Terphenyl-d14	40.4	50.0	80.9

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DATA CHEM LABORATORIES
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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S01860CH

)ate Printed.....: 14-SEP-01 15:03

:lient Name.....: North Dakota State Water Commission
:lient Ref Number....: Not Provided
:ampling Site.....: Not Provided
:elease Number.....: Not Provided

)ate Received.....: 07-SEP-01 00:00

Client Sample Name: **5-13197**
DCL Sample Name...: **01E01972**
DCL Report Group..: **01E-0300-04**

Matrix.....: WATER
Date Sampled.....: 04-SEP-01 00:00
Reporting Units...: ug/L
Report Basis.....: ☒ As Received ☐ Dried

)CL Preparation Group: G018E007
)ate Prepared.....: 11-SEP-01 00:00
'reparation Method...: 3510B
.iquot Weight/Volume: 1000 mL
'et Weight/Volume....: Not Required

DCL Analysis Group: G018B007
Analysis Method...: 8270C
Instrument Type...: GC/MS SV
Instrument ID.....: 5972-Q
Column Type.....: DB5 30m x .32mm
☒ Primary
☐ Confirmation

ıalytical Results

ıalyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
yridine	13-SEP-01 20:22	0.315	ND			1	5
henol	13-SEP-01 20:22	0.0525	ND			1	5
is(2-chloroethyl)ether	13-SEP-01 20:22	0.262	ND			1	5
-Chlorophenol	13-SEP-01 20:22	0.0851	ND			1	5
,3-Dichlorobenzene	13-SEP-01 20:22	0.0369	ND			1	5
,4-Dichlorobenzene	13-SEP-01 20:22	0.0622	ND			1	5
enzyl Alcohol	13-SEP-01 20:22	0.0699	ND			1	5
,2-Dichlorobenzene	13-SEP-01 20:22	0.0638	ND			1	5
-Methylphenol	13-SEP-01 20:22	0.113	ND			1	5
is(2-chloroisopropyl)ether	13-SEP-01 20:22	0.0967	ND			1	5
-Methylphenol	13-SEP-01 20:22	0.0552	ND			1	5
-Nitrosodi-n-propyl amine	13-SEP-01 20:22	0.109	ND			1	5
exachloroethane	13-SEP-01 20:22	0.0773	ND			1	5
itrobenzene	13-SEP-01 20:22	0.0924	ND			1	5
sophorone	13-SEP-01 20:22	0.114	ND			1	5
-Nitrophenol	13-SEP-01 20:22	0.0830	ND			1	5
,4-Dimethylphenol	13-SEP-01 20:22	0.285	ND			1	5
enzoic acid	13-SEP-01 20:22	4.37	ND			1	25
is(2-Chloroethoxy)methane	13-SEP-01 20:22	0.0508	ND			1	5
,4-Dichlorophenol	13-SEP-01 20:22	0.144	ND			1	5
,2,4-Trichlorobenzene	13-SEP-01 20:22	0.0492	ND			1	5
aphthalene	13-SEP-01 20:22	0.0532	ND			1	5
-Chloroaniline	13-SEP-01 20:22	0.155	ND			1	5
exachlorobutadiene	13-SEP-01 20:22	0.112	ND			1	5
-Chloro-3-methylphenol	13-SEP-01 20:22	0.0794	ND			1	5
-Methylnaphthalene	13-SEP-01 20:22	0.0687	ND			1	5
exachlorocyclopentadiene	13-SEP-01 20:22	0.0864	ND			1	5
,4,6-Trichlorophenol	13-SEP-01 20:22	0.0925	ND			1	5
,4,5-Trichlorophenol	13-SEP-01 20:22	0.112	ND			1	5
-Chloronaphthalene	13-SEP-01 20:22	0.0769	ND			1	5
-Nitroaniline	13-SEP-01 20:22	0.140	ND			1	5
imethylphthalate	13-SEP-01 20:22	0.0766	ND			1	5
,6-Dinitrotoluene	13-SEP-01 20:22	0.152	ND			1	5
cenaphthylene	13-SEP-01 20:22	0.0467	ND			1	5
-Nitroaniline	13-SEP-01 20:22	0.313	ND			1	5
cenaphthene	13-SEP-01 20:22	0.0680	ND			1	5
,4-Dinitrophenol	13-SEP-01 20:22	1.24	ND			1	25
-Nitrophenol	13-SEP-01 20:22	0.715	ND			1	25
ibenzofuran	13-SEP-01 20:22	0.0519	ND			1	5
,4-Dinitrotoluene	13-SEP-01 20:22	0.0981	ND			1	5
iethylphthalate	13-SEP-01 20:22	0.140	ND			1	5

Date Printed.....: 14-SEP-01 15:03
Client Name.....: North Dakota State Water Commission

DCL Sample Name...: **01E01972**
DCL Report Group..: **01E-0300-04**

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
4-Chlorophenyl Phenyl Ether	13-SEP-01 20:22	0.0478	ND			1	5
Fluorene	13-SEP-01 20:22	0.0737	ND			1	5
4-Nitroaniline	13-SEP-01 20:22	0.341	ND			1	5
4,6-Dinitro-2-Methylphenol	13-SEP-01 20:22	1.48	ND			1	25
N-nitrosodiphenylamine	13-SEP-01 20:22	0.0865	ND			1	5
4-Bromophenyl Phenyl Ether	13-SEP-01 20:22	0.108	ND			1	5
Hexachlorobenzene	13-SEP-01 20:22	0.151	ND			1	5
Pentachlorophenol	13-SEP-01 20:22	1.03	ND			1	25
Phenanthrene	13-SEP-01 20:22	0.0582	ND			1	5
Anthracene	13-SEP-01 20:22	0.0880	ND			1	5
Carbazole	13-SEP-01 20:22	0.0726	ND			1	5
Di-n-butylphthalate	13-SEP-01 20:22	0.347	ND			1	5
Fluoranthene	13-SEP-01 20:22	0.0723	ND			1	5
Pyrene	13-SEP-01 20:22	0.0836	ND			1	5
Butylbenzylphthalate	13-SEP-01 20:22	0.204	ND			1	5
3,3'-Dichlorobenzidine	13-SEP-01 20:22	0.372	ND			1	5
Benzo(a)anthracene	13-SEP-01 20:22	0.0750	ND			1	5
Chrysene	13-SEP-01 20:22	0.0760	ND			1	5
Bis(2-ethylhexyl)phthalate	13-SEP-01 20:22	2.49	ND			1	5
Di-n-octylphthalate	13-SEP-01 20:22	0.126	ND			1	5
Benzo(b)fluoranthene	13-SEP-01 20:22	0.105	ND			1	5
Benzo(k)fluoranthene	13-SEP-01 20:22	0.132	ND			1	5
Benzo(a)pyrene	13-SEP-01 20:22	0.0772	ND			1	5
Indeno(1,2,3-c,d)pyrene	13-SEP-01 20:22	0.318	ND			1	5
Dibenz(a,h)Anthracene	13-SEP-01 20:22	0.287	ND			1	5
Benzo(g,h,i)perylene	13-SEP-01 20:22	0.276	ND			1	5

Tentatively Identified Compound Results

Analyte(Retention Time)	Date Analyzed	Result	Comment	Qual.	Dilution
Unknown Acid(9.22)	13-SEP-01 20:22	22.		J	1
Phenol, 4,4'-butylidenebis[2-((16.21)	13-SEP-01 20:22	11.		J	1
Polycyclic hydrocarbon(18.36)	13-SEP-01 20:22	19.		JB	1

Surrogate Recoveries

Analyte	Result	Spiked Amount	Percent Recovery
2,4,6-Tribromophenol	40.1	50.0	80.1
2-Fluorobiphenyl	44.4	50.0	88.8
2-Fluorophenol	26.2	50.0	52.4
Nitrobenzene-d5	40.6	50.0	81.2
Phenol-d5	19.4	50.0	38.8
Terphenyl-d14	41.2	50.0	82.4

DATA CHEM LABORATORIES
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FORM F (TYPE I)
SINGLE METHOD ANALYSES

QUALITY CONTROL DATA SHEET
MATRIX SPIKE SAMPLE
MATRIX SPIKE DUPLICATE SAMPLE

S01860C8

ient Name.....: North Dakota State Water Commission
elease Number.....: Not Provided

atrix.....: WATERA
eporting Units.....: ug/L

L Preparation Group: G018B007
ate Prepared.....: 11-SEP-01 00:00
reparation Method...: 3510B

DCL Sample Name...: 01E01966MS
Date Printed.....: 14-SEP-01 15:03

DCL Analysis Group: G018B007
Analysis Method...: SW 8270
Instrument Type...: GC/MS SV
Instrument ID.....: 5972-Q
Column Type.....: DB5 30m x .32mm
☒ Primary
☐ Confirmation

QC Limit Type.....: Method

nalytical Results

nalyte	Date Analyzed	Sample Result	Spiked Result	Spike Added	Percent Recovery	QC Limits	QC Flag
,2,4-Trichlorobenzene	13-SEP-01 16:51	0.00	44.0	50.0	87.9	44.0/142.	
,2-Dichlorobenzene	13-SEP-01 16:51	0.00	41.7	50.0	83.5	42.0/155.	
,3-Dichlorobenzene	13-SEP-01 16:51	0.00	35.0	50.0	69.9	36.0/125.	
,4-Dichlorobenzene	13-SEP-01 16:51	0.00	36.8	50.0	73.6	36.0/125.	
,4,5-Trichlorophenol	13-SEP-01 16:51	0.00	50.6	50.0	101.	25.0/175.	
,4,6-Trichlorophenol	13-SEP-01 16:51	0.00	50.5	50.0	101.	39.0/128.	
,4-Dichlorophenol	13-SEP-01 16:51	0.00	48.1	50.0	96.3	46.0/125.	
,4-Dimethylphenol	13-SEP-01 16:51	0.00	38.2	50.0	76.3	45.0/139.	
,4-Dinitrophenol	13-SEP-01 16:51	0.00	58.6	50.0	117.	30.0/151.	
,4-Dinitrotoluene	13-SEP-01 16:51	0.00	52.3	50.0	105.	39.0/139.	
,6-Dinitrotoluene	13-SEP-01 16:51	0.00	51.8	50.0	104.	51.0/125.	
-Chloronaphthalene	13-SEP-01 16:51	0.00	44.9	50.0	89.9	60.0/125.	
-Chlorophenol	13-SEP-01 16:51	0.00	43.8	50.0	87.7	41.0/125.	
-Methylnaphthalene	13-SEP-01 16:51	0.00	47.3	50.0	94.6	41.0/125.	
-Methylphenol	13-SEP-01 16:51	0.00	34.4	50.0	68.9	25.0/125.	
-Nitroaniline	13-SEP-01 16:51	0.00	53.4	50.0	107.	50.0/125.	
-Nitrophenol	13-SEP-01 16:51	0.00	49.9	50.0	99.9	44.0/125.	
,3'-Dichlorobenzidine	13-SEP-01 16:51	0.00	48.4	50.0	96.9	29.0/175.	
-Nitroaniline	13-SEP-01 16:51	0.00	55.3	50.0	111.	51.0/125.	
,6-Dinitro-2-Methylphenol	13-SEP-01 16:51	0.00	54.9	50.0	110.	26.0/134.	
-Bromophenyl Phenyl Ether	13-SEP-01 16:51	0.00	48.0	50.0	96.1	53.0/127.	
-Chloro-3-methylphenol	13-SEP-01 16:51	0.00	52.8	50.0	106.	44.0/125.	
-Chloroaniline	13-SEP-01 16:51	0.00	45.7	50.0	91.4	45.0/136.	
-Chlorophenyl Phenyl Ether	13-SEP-01 16:51	0.00	52.8	50.0	106.	51.0/132.	
-Methylphenol	13-SEP-01 16:51	0.00	33.7	50.0	67.4	33.0/125.	
-Nitroaniline	13-SEP-01 16:51	0.00	42.7	50.0	85.3	40.0/143.	
-Nitrophenol	13-SEP-01 16:51	0.00	23.3	50.0	46.5	25.0/131.	
cenaphthene	13-SEP-01 16:51	0.00	54.1	50.0	108.	49.0/125.	
cenaphthylene	13-SEP-01 16:51	0.00	51.3	50.0	103.	47.0/125.	
nthracene	13-SEP-01 16:51	0.00	56.1	50.0	112.	45.0/165.	
enzo(a)anthracene	13-SEP-01 16:51	0.00	53.7	50.0	107.	51.0/133.	
enzo(a)pyrene	13-SEP-01 16:51	0.00	50.9	50.0	102.	41.0/125.	
enzo(b)fluoranthene	13-SEP-01 16:51	0.00	50.9	50.0	102.	37.0/125.	
enzo(g,h,i)perylene	13-SEP-01 16:51	0.00	53.6	50.0	107.	34.0/149.	
enzoic acid	13-SEP-01 16:51	3.44	23.0	50.0	39.2	25.0/162.	
enzyl alcohol	13-SEP-01 16:51	0.00	42.0	50.0	84.0	35.0/125.	
is(2-chloroethyl)ether	13-SEP-01 16:51	0.00	38.8	50.0	77.6	44.0/125.	
is(2-chloroisopropyl)ether	13-SEP-01 16:51	0.00	37.2	50.0	74.5	36.0/166.	
is(2-ethylhexyl)phthalate	13-SEP-01 16:51	1.28	62.5	50.0	122.	33.0/129.	
utylbenzylphthalate	13-SEP-01 16:51	0.00	54.9	50.0	110.	26.0/125.	
hrysene	13-SEP-01 16:51	0.00	59.0	50.0	118.	55.0/133.	
i-n-butylphthalate	13-SEP-01 16:51	0.00	54.3	50.0	109.	34.0/126.	
i-n-octylphthalate	13-SEP-01 16:51	0.00	53.3	50.0	107.	38.0/127.	
ibenz(a,h)Anthracene	13-SEP-01 16:51	0.00	51.3	50.0	103.	50.0/125.	
ibenzofuran	13-SEP-01 16:51	0.00	49.7	50.0	99.4	52.0/125.	
iethylphthalate	13-SEP-01 16:51	0.00	52.6	50.0	105.	37.0/125.	
imethylphthalate	13-SEP-01 16:51	0.00	52.1	50.0	104.	25.0/175.	

DATA CHEM LABORATORIES
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FORM F (TYPE I)
SINGLE METHOD ANALYSES

QUALITY CONTROL DATA SHEET
MATRIX SPIKE SAMPLE
MATRIX SPIKE DUPLICATE SAMPLE

S01860C8

DCL Sample Name...: 01E01966MS
Client Name.....: North Dakota State Water Commission
Date Printed.....: 14-SEP-01 15:03

Analytical Results

Analyte	Date Analyzed	Sample Result	Spiked Result	Spike Added	Percent Recovery	QC Limits	QC Flag
Fluoranthene	13-SEP-01 16:51	0.00	54.3	50.0	109.	47.0/125.	
Fluorene	13-SEP-01 16:51	0.00	54.0	50.0	108.	48.0/139.	
Hexachlorobenzene	13-SEP-01 16:51	0.00	53.1	50.0	106.	46.0/133.	
Hexachlorobutadiene	13-SEP-01 16:51	0.00	41.0	50.0	82.1	25.0/125.	
Hexachlorocyclopentadiene	13-SEP-01 16:51	0.00	33.4	50.0	66.7	41.0/125.	
Hexachloroethane	13-SEP-01 16:51	0.00	34.7	50.0	69.4	25.0/153.	
Indeno(1,2,3-c,d)pyrene	13-SEP-01 16:51	0.00	51.6	50.0	103.	27.0/160.	
Isophorone	13-SEP-01 16:51	0.00	45.1	50.0	90.2	26.0/175.	
N-Nitrosodi-n-propyl amine	13-SEP-01 16:51	0.00	43.3	50.0	86.7	37.0/135.	
N-Nitrosodiphenylamine	13-SEP-01 16:51	0.00	53.4	50.0	107.	27.0/125.	
Naphthalene	13-SEP-01 16:51	0.00	39.4	50.0	78.8	50.0/125.	
Nitrobenzene	13-SEP-01 16:51	0.00	43.9	50.0	87.8	46.0/133.	
Pentachlorophenol	13-SEP-01 16:51	0.00	66.7	50.0	133.	28.0/136.	
Phenanthrene	13-SEP-01 16:51	0.00	54.8	50.0	110.	54.0/125.	
Phenol	13-SEP-01 16:51	0.00	19.5	50.0	39.0	25.0/125.	
Pyrene	13-SEP-01 16:51	0.00	53.5	50.0	107.	47.0/136.	
bis(2-Chloroethoxy)methane	13-SEP-01 16:51	0.00	46.9	50.0	93.7	49.0/125.	

S01860C9

DCL Sample Name...: 01E01966MSD

Analytical Results

Analyte	Date Analyzed	Duplicate Result	Percent Recovery	Mean	Range	RPD	QC Limits	QC Flag
1,2,4-Trichlorobenzene	13-SEP-01 17:21	44.5	89.0	44.2	0.547	1.2	0.00/50.0	
1,2-Dichlorobenzene	13-SEP-01 17:21	42.6	85.2	42.2	0.865	2.1	0.00/50.0	
1,3-Dichlorobenzene	13-SEP-01 17:21	38.2	76.3	36.6	3.21	8.8	0.00/50.0	
1,4-Dichlorobenzene	13-SEP-01 17:21	39.1	78.2	38.0	2.34	6.2	0.00/50.0	
2,4,5-Trichlorophenol	13-SEP-01 17:21	48.6	97.2	49.6	1.97	4.0	0.00/50.0	
2,4,6-Trichlorophenol	13-SEP-01 17:21	47.8	95.7	49.2	2.71	5.5	0.00/50.0	
2,4-Dichlorophenol	13-SEP-01 17:21	47.2	94.4	47.7	0.932	2.0	0.00/50.0	
2,4-Dimethylphenol	13-SEP-01 17:21	43.1	86.2	40.6	4.92	12.	0.00/50.0	
2,4-Dinitrophenol	13-SEP-01 17:21	52.6	105.	55.6	5.99	11.	0.00/50.0	
2,4-Dinitrotoluene	13-SEP-01 17:21	54.3	109.	53.3	1.99	3.7	0.00/50.0	
2,6-Dinitrotoluene	13-SEP-01 17:21	53.7	107.	52.8	1.89	3.6	0.00/50.0	
2-Chloronaphthalene	13-SEP-01 17:21	47.0	94.0	46.0	2.04	4.4	0.00/50.0	
2-Chlorophenol	13-SEP-01 17:21	47.3	94.6	45.6	3.45	7.6	0.00/50.0	
2-Methylnaphthalene	13-SEP-01 17:21	48.8	97.5	48.0	1.46	3.0	0.00/50.0	
2-Methylphenol	13-SEP-01 17:21	36.1	72.2	35.3	1.67	4.7	0.00/50.0	
2-Nitroaniline	13-SEP-01 17:21	54.1	108.	53.8	0.726	1.4	0.00/50.0	
2-Nitrophenol	13-SEP-01 17:21	49.9	99.8	49.9	0.0270	0.054	0.00/50.0	
3,3'-Dichlorobenzidine	13-SEP-01 17:21	49.5	99.0	49.0	1.05	2.2	0.00/50.0	
3-Nitroaniline	13-SEP-01 17:21	56.2	112.	55.7	0.960	1.7	0.00/50.0	
4,6-Dinitro-2-Methylphenol	13-SEP-01 17:21	55.1	110.	55.0	0.231	0.42	0.00/50.0	
4-Bromophenyl Phenyl Ether	13-SEP-01 17:21	54.0	108.	51.0	5.97	12.	0.00/50.0	
4-Chloro-3-methylphenol	13-SEP-01 17:21	51.8	104.	52.3	0.991	1.9	0.00/50.0	
4-Chloroaniline	13-SEP-01 17:21	47.9	95.8	46.8	2.20	4.7	0.00/50.0	
4-Chlorophenyl Phenyl Ether	13-SEP-01 17:21	54.4	109.	53.6	1.54	2.9	0.00/50.0	
4-Methylphenol	13-SEP-01 17:21	33.5	67.0	33.6	0.216	0.64	0.00/50.0	
4-Nitroaniline	13-SEP-01 17:21	44.3	88.7	43.5	1.67	3.8	0.00/50.0	
4-Nitrophenol	13-SEP-01 17:21	22.6	45.3	22.9	0.641	2.8	0.00/50.0	
Acenaphthene	13-SEP-01 17:21	49.7	99.4	51.9	4.38	8.4	0.00/50.0	
Acenaphthylene	13-SEP-01 17:21	49.4	98.9	50.4	1.91	3.8	0.00/50.0	

DATA CHEM LABORATORIES
A Sorenson Company

FORM F (TYPE I)
SINGLE METHOD ANALYSES

QUALITY CONTROL DATA SHEET
MATRIX SPIKE SAMPLE
MATRIX SPIKE DUPLICATE SAMPLE

S01860C9

Client Name.....: North Dakota State Water Commission

DCL Sample Name...: 01E01966MSD
Date Printed.....: 14-SEP-01 15:03

Analytical Results

Analyte	Date Analyzed	Duplicate Result	Percent Recovery	Mean	Range	RPD	QC Limits	QC Flag
Anthracene	13-SEP-01 17:21	58.0	116.	57.0	1.92	3.4	0.00/50.0	
Benzo(a)anthracene	13-SEP-01 17:21	56.5	113.	55.1	2.83	5.1	0.00/50.0	
Benzo(a)pyrene	13-SEP-01 17:21	51.9	104.	51.4	1.09	2.1	0.00/50.0	
Benzo(b)fluoranthene	13-SEP-01 17:21	56.1	112.	53.5	5.18	9.7	0.00/50.0	
Benzo(g,h,i)perylene	13-SEP-01 17:21	50.3	101.	51.9	3.36	6.5	0.00/50.0	
Benzoic acid	13-SEP-01 17:21	22.8	38.8	22.9	0.190	0.83	0.00/50.0	
Benzyl alcohol	13-SEP-01 17:21	45.9	91.8	44.0	3.92	8.9	0.00/50.0	
Bis(2-chloroethyl)ether	13-SEP-01 17:21	40.9	81.7	39.8	2.07	5.2	0.00/50.0	
Bis(2-chloroisopropyl)ether	13-SEP-01 17:21	38.9	77.8	38.1	1.66	4.4	0.00/50.0	
Bis(2-ethylhexyl)phthalate	13-SEP-01 17:21	62.9	123.	62.7	0.423	0.67	0.00/50.0	
Butylbenzylphthalate	13-SEP-01 17:21	55.5	111.	55.2	0.590	1.1	0.00/50.0	
Chrysene	13-SEP-01 17:21	54.1	108.	56.5	4.88	8.6	0.00/50.0	
Di-n-butylphthalate	13-SEP-01 17:21	56.8	114.	55.5	2.57	4.6	0.00/50.0	
Di-n-octylphthalate	13-SEP-01 17:21	62.3	125.	57.8	9.02	16.	0.00/50.0	
Dibenz(a,h)Anthracene	13-SEP-01 17:21	49.9	99.9	50.6	1.38	2.7	0.00/50.0	
Dibenzofuran	13-SEP-01 17:21	50.8	102.	50.2	1.07	2.1	0.00/50.0	
Diethylphthalate	13-SEP-01 17:21	55.2	110.	53.9	2.56	4.7	0.00/50.0	
Dimethylphthalate	13-SEP-01 17:21	48.9	97.7	50.5	3.23	6.4	0.00/50.0	
Fluoranthene	13-SEP-01 17:21	58.5	117.	56.4	4.17	7.4	0.00/50.0	
Fluorene	13-SEP-01 17:21	53.0	106.	53.5	0.985	1.8	0.00/50.0	
Hexachlorobenzene	13-SEP-01 17:21	53.8	108.	53.4	0.710	1.3	0.00/50.0	
Hexachlorobutadiene	13-SEP-01 17:21	43.6	87.3	42.3	2.60	6.1	0.00/50.0	
Hexachlorocyclopentadiene	13-SEP-01 17:21	31.1	62.3	32.2	2.21	6.9	0.00/50.0	
Hexachloroethane	13-SEP-01 17:21	35.4	70.8	35.0	0.729	2.1	0.00/50.0	
Indeno(1,2,3-c,d)pyrene	13-SEP-01 17:21	50.2	100.	50.9	1.49	2.9	0.00/50.0	
Isophorone	13-SEP-01 17:21	46.3	92.7	45.7	1.21	2.6	0.00/50.0	
N-Nitrosodi-n-propyl amine	13-SEP-01 17:21	41.1	82.2	42.2	2.23	5.3	0.00/50.0	
N-Nitrosodiphenylamine	13-SEP-01 17:21	54.4	109.	53.9	1.03	1.9	0.00/50.0	
Naphthalene	13-SEP-01 17:21	41.1	82.2	40.2	1.73	4.3	0.00/50.0	
Nitrobenzene	13-SEP-01 17:21	44.0	88.0	44.0	0.0780	0.18	0.00/50.0	
Pentachlorophenol	13-SEP-01 17:21	64.6	129.	65.6	2.10	3.2	0.00/50.0	
Phenanthrene	13-SEP-01 17:21	57.4	115.	56.1	2.63	4.7	0.00/50.0	
Phenol	13-SEP-01 17:21	20.0	39.9	19.7	0.482	2.4	0.00/50.0	
Pyrene	13-SEP-01 17:21	55.5	111.	54.5	1.99	3.6	0.00/50.0	
Bis(2-Chloroethoxy)methane	13-SEP-01 17:21	47.3	94.6	47.1	0.426	0.91	0.00/50.0	

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DATA CHEM LABORATORIES
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FORM J (TYPE I)
SINGLE METHOD ANALYSES

QUALITY CONTROL DATA SHEET
LABORATORY CONTROL SAMPLE (LCS)
LABORATORY CONTROL DUPL (LCD)


S018903H

Client Name.....: North Dakota State Water Commission
Release Number.....: Not Provided

Matrix.....: WATERA
Reporting Units.....: ug/L

DCL Preparation Group: G018B007
Date Prepared.....: 11-SEP-01 00:00
Preparation Method...: 3510B

DCL Sample Name...: QC-188055-1
Date Printed.....: 14-SEP-01 15:03

DCL Analysis Group: G018B007
Analysis Method...: SW 8270
Instrument Type...: GC/MS SV
Instrument ID.....: 5972-Q
Column Type.....: DB5 30m x .32mm
☒ Primary
☐ Confirmation

QC Limit Type.....: Method

Analytical Results

Analyte	Date Analyzed	Target	Result	Percent Recovery	QC Limits	QC Flag
1,2,4-Trichlorobenzene	13-SEP-01 13:16	50.0	44.3	88.6	44.0/142.	
1,2-Dichlorobenzene	13-SEP-01 13:16	50.0	41.9	83.7	42.0/155.	
1,3-Dichlorobenzene	13-SEP-01 13:16	50.0	35.9	71.7	36.0/125.	
1,4-Dichlorobenzene	13-SEP-01 13:16	50.0	36.8	73.6	30.0/125.	
2,4,5-Trichlorophenol	13-SEP-01 13:16	50.0	47.3	94.7	25.0/175.	
2,4,6-Trichlorophenol	13-SEP-01 13:16	50.0	48.7	97.5	39.0/128.	
2,4-Dichlorophenol	13-SEP-01 13:16	50.0	49.1	98.2	46.0/125.	
2,4-Dimethylphenol	13-SEP-01 13:16	50.0	41.0	82.1	45.0/139.	
2,4-Dinitrophenol	13-SEP-01 13:16	50.0	53.5	107.	30.0/151.	
2,4-Dinitrotoluene	13-SEP-01 13:16	50.0	53.3	107.	39.0/139.	
2,6-Dinitrotoluene	13-SEP-01 13:16	50.0	54.4	109.	51.0/125.	
2-Chloronaphthalene	13-SEP-01 13:16	50.0	45.3	90.6	60.0/125.	
2-Chlorophenol	13-SEP-01 13:16	50.0	45.5	91.0	41.0/125.	
2-Methylnaphthalene	13-SEP-01 13:16	50.0	49.2	98.4	41.0/125.	
2-Methylphenol	13-SEP-01 13:16	50.0	33.6	67.1	25.0/125.	
2-Nitroaniline	13-SEP-01 13:16	50.0	54.0	108.	50.0/125.	
2-Nitrophenol	13-SEP-01 13:16	50.0	50.7	101.	44.0/125.	
3,3'-Dichlorobenzidine	13-SEP-01 13:16	50.0	48.3	96.7	29.0/175.	
3-Nitroaniline	13-SEP-01 13:16	50.0	59.9	120.	51.0/125.	
4,6-Dinitro-2-Methylphenol	13-SEP-01 13:16	50.0	55.3	111.	26.0/134.	
4-Bromophenyl Phenyl Ether	13-SEP-01 13:16	50.0	47.4	94.7	53.0/127.	
4-Chloro-3-methylphenol	13-SEP-01 13:16	50.0	56.5	113.	44.0/125.	
4-Chloroaniline	13-SEP-01 13:16	50.0	45.4	90.8	45.0/136.	
4-Chlorophenyl Phenyl Ether	13-SEP-01 13:16	50.0	53.9	108.	51.0/132.	
4-Methylphenol	13-SEP-01 13:16	50.0	33.3	66.6	33.0/125.	
4-Nitroaniline	13-SEP-01 13:16	50.0	46.4	92.7	40.0/143.	
4-Nitrophenol	13-SEP-01 13:16	50.0	23.2	46.5	25.0/131.	
Acenaphthene	13-SEP-01 13:16	50.0	50.1	100.	49.0/125.	
Acenaphthylene	13-SEP-01 13:16	50.0	47.4	94.9	47.0/125.	
Anthracene	13-SEP-01 13:16	50.0	55.0	110.	45.0/165.	
Benzo(a)anthracene	13-SEP-01 13:16	50.0	52.2	104.	51.0/133.	
Benzo(a)pyrene	13-SEP-01 13:16	50.0	52.8	106.	41.0/125.	
Benzo(b)fluoranthene	13-SEP-01 13:16	50.0	48.8	97.7	37.0/125.	
Benzo(g,h,i)perylene	13-SEP-01 13:16	50.0	53.4	107.	34.0/149.	
Benzoic acid	13-SEP-01 13:16	50.0	11.3	22.6	25.0/162.	*
Benzyl alcohol	13-SEP-01 13:16	50.0	43.8	87.5	35.0/125.	
Bis(2-chloroethyl)ether	13-SEP-01 13:16	50.0	37.7	75.4	44.0/125.	
Bis(2-chloroisopropyl)ether	13-SEP-01 13:16	50.0	39.1	78.2	36.0/166.	
Bis(2-ethylhexyl)phthalate	13-SEP-01 13:16	50.0	63.8	128.	33.0/129.	
Butylbenzylphthalate	13-SEP-01 13:16	50.0	57.8	116.	26.0/125.	
Chrysene	13-SEP-01 13:16	50.0	59.5	119.	55.0/133.	
Di-n-butylphthalate	13-SEP-01 13:16	50.0	54.2	108.	34.0/126.	
Di-n-octylphthalate	13-SEP-01 13:16	50.0	68.0	136.	38.0/127.	*
Dibenz(a,h)Anthracene	13-SEP-01 13:16	50.0	52.0	104.	50.0/125.	
Dibenzofuran	13-SEP-01 13:16	50.0	48.0	96.1	52.0/125.	
Diethylphthalate	13-SEP-01 13:16	50.0	54.7	109.	37.0/125.	
Dimethylphthalate	13-SEP-01 13:16	50.0	51.7	103.	25.0/175.	

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DATA CHEM LABORATORIES
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FORM J (TYPE I)
SINGLE METHOD ANALYSES

QUALITY CONTROL DATA SHEET
LABORATORY CONTROL SAMPLE (LCS)
LABORATORY CONTROL DUPL (LCD)


S018903H

ient Name.....: North Dakota State Water Commission

DCL Sample Name...: QC-188055-1
Date Printed.....: 14-SEP-01 15:03

nalytical Results

nalyte	Date Analyzed	Target	Result	Percent Recovery	QC Limits	QC Flag
luoranthene	13-SEP-01 13:16	50.0	54.6	109.	47.0/125.	
luorene	13-SEP-01 13:16	50.0	51.2	102.	48.0/139.	
exachlorobenzene	13-SEP-01 13:16	50.0	49.5	99.0	46.0/133.	
exachlorobutadiene	13-SEP-01 13:16	50.0	41.4	82.9	25.0/125.	
exachlorocyclopentadiene	13-SEP-01 13:16	50.0	32.6	65.2	41.0/125.	
exachloroethane	13-SEP-01 13:16	50.0	33.7	67.4	25.0/153.	
ndeno(1,2,3-c,d)pyrene	13-SEP-01 13:16	50.0	53.3	107.	27.0/160.	
sophorone	13-SEP-01 13:16	50.0	45.7	91.4	26.0/175.	
-Nitrosodi-n-propyl amine	13-SEP-01 13:16	50.0	40.4	80.8	37.0/125.	
-Nitrosodiphenylamine	13-SEP-01 13:16	50.0	51.9	104.	27.0/125.	
aphthalene	13-SEP-01 13:16	50.0	40.1	80.2	50.0/125.	
itrobenzene	13-SEP-01 13:16	50.0	44.8	89.5	46.0/133.	
entachlorophenol	13-SEP-01 13:16	50.0	60.7	121.	28.0/136.	
henanthrene	13-SEP-01 13:16	50.0	53.0	106.	54.0/125.	
henol	13-SEP-01 13:16	50.0	18.3	36.6	25.0/125.	
yrene	13-SEP-01 13:16	50.0	58.0	116.	47.0/136.	
is(2-Chloroethoxy)methane	13-SEP-01 13:16	50.0	46.5	93.0	49.0/125.	


S018903J

DCL Sample Name...: QD-188055-1

nalytical Results

nalyte	Date Analyzed	Duplicate Result	Percent Recovery	Mean	Range	RPD	QC Limits	QC Flag
,2,4-Trichlorobenzene	13-SEP-01 13:46	42.6	85.3	43.5	1.65	3.8	0.00/20.0	
,2-Dichlorobenzene	13-SEP-01 13:46	38.2	76.4	40.0	3.67	9.2	0.00/20.0	
,3-Dichlorobenzene	13-SEP-01 13:46	36.3	72.6	36.1	0.469	1.3	0.00/20.0	
,4-Dichlorobenzene	13-SEP-01 13:46	35.6	71.1	36.2	1.22	3.4	0.00/20.0	
,4,5-Trichlorophenol	13-SEP-01 13:46	45.9	91.7	46.6	1.49	3.2	0.00/20.0	
,4,6-Trichlorophenol	13-SEP-01 13:46	47.3	94.7	48.0	1.40	2.9	0.00/20.0	
,4-Dichlorophenol	13-SEP-01 13:46	49.7	99.4	49.4	0.583	1.2	0.00/20.0	
,4-Dimethylphenol	13-SEP-01 13:46	42.8	85.6	41.9	1.79	4.3	0.00/20.0	
,4-Dinitrophenol	13-SEP-01 13:46	53.5	107.	53.5	0.0300	0.056	0.00/20.0	
,4-Dinitrotoluene	13-SEP-01 13:46	54.7	109.	54.0	1.43	2.6	0.00/20.0	
,6-Dinitrotoluene	13-SEP-01 13:46	53.3	107.	53.8	1.12	2.1	0.00/20.0	
-Chloronaphthalene	13-SEP-01 13:46	46.2	92.5	45.8	0.919	2.0	0.00/20.0	
-Chlorophenol	13-SEP-01 13:46	42.3	84.6	43.9	3.19	7.3	0.00/20.0	
-Methylnaphthalene	13-SEP-01 13:46	48.4	96.9	48.8	0.756	1.5	0.00/20.0	
-Methylphenol	13-SEP-01 13:46	39.5	79.0	36.5	5.93	16.	0.00/20.0	
-Nitroaniline	13-SEP-01 13:46	53.3	107.	53.7	0.716	1.3	0.00/20.0	
-Nitrophenol	13-SEP-01 13:46	50.9	102.	50.8	0.208	0.41	0.00/20.0	
,3'-Dichlorobenzidine	13-SEP-01 13:46	51.3	103.	49.8	2.91	5.8	0.00/20.0	
-Nitroaniline	13-SEP-01 13:46	55.9	112.	57.9	3.97	6.9	0.00/20.0	
,6-Dinitro-2-Methylphenol	13-SEP-01 13:46	52.7	105.	54.0	2.63	4.9	0.00/20.0	
-Bromophenyl Phenyl Ether	13-SEP-01 13:46	48.2	96.3	47.8	0.786	1.6	0.00/20.0	
-Chloro-3-methylphenol	13-SEP-01 13:46	55.1	110.	55.8	1.35	2.4	0.00/20.0	
-Chloroaniline	13-SEP-01 13:46	47.9	95.7	46.6	2.48	5.3	0.00/20.0	
-Chlorophenyl Phenyl Ether	13-SEP-01 13:46	54.5	109.	54.2	0.601	1.1	0.00/20.0	
-Methylphenol	13-SEP-01 13:46	33.5	67.1	33.4	0.234	0.70	0.00/20.0	
-Nitroaniline	13-SEP-01 13:46	48.8	97.7	47.6	2.48	5.2	0.00/20.0	
-Nitrophenol	13-SEP-01 13:46	20.9	41.8	22.1	2.37	11.	0.00/20.0	
cenaphthene	13-SEP-01 13:46	49.4	98.7	49.7	0.687	1.4	0.00/20.0	
cenaphthylene	13-SEP-01 13:46	47.7	95.5	47.6	0.308	0.65	0.00/20.0	

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700
FAX (801) 268-9992
Web Page: www.datachem.com
E-mail: lab@datachem.com

Client Name.....: North Dakota State Water Commission

DCL Sample Name...: QD-188055-1
Date Printed.....: 14-SEP-01 15:03

Analytical Results

Analyte	Date Analyzed	Duplicate Result	Percent Recovery	Mean	Range	RPD	QC Limits	QC Flag
Anthracene	13-SEP-01 13:46	54.5	109.	54.8	0.547	1.0	0.00/20.0	
Benzo(a)anthracene	13-SEP-01 13:46	49.9	99.8	51.1	2.34	4.6	0.00/20.0	
Benzo(a)pyrene	13-SEP-01 13:46	53.0	106.	52.9	0.160	0.30	0.00/20.0	
Benzo(b)fluoranthene	13-SEP-01 13:46	49.1	98.3	49.0	0.293	0.60	0.00/20.0	
Benzo(g,h,i)perylene	13-SEP-01 13:46	54.3	109.	53.8	0.922	1.7	0.00/20.0	
Benzoic acid	13-SEP-01 13:46	11.5	22.9	11.4	0.165	1.5	0.00/20.0	
Benzyl alcohol	13-SEP-01 13:46	44.5	89.1	44.1	0.782	1.8	0.00/20.0	
Bis(2-chloroethyl)ether	13-SEP-01 13:46	43.3	86.5	40.5	5.60	14.	0.00/20.0	
Bis(2-chloroisopropyl)ether	13-SEP-01 13:46	38.2	76.4	38.6	0.882	2.3	0.00/20.0	
Bis(2-ethylhexyl)phthalate	13-SEP-01 13:46	56.8	114.	60.3	7.03	12.	0.00/20.0	
Butylbenzylphthalate	13-SEP-01 13:46	54.3	109.	56.0	3.52	6.3	0.00/20.0	
Chrysene	13-SEP-01 13:46	57.2	114.	58.4	2.29	3.9	0.00/20.0	
Di-n-butylphthalate	13-SEP-01 13:46	55.6	111.	54.9	1.36	2.5	0.00/20.0	
Di-n-octylphthalate	13-SEP-01 13:46	55.5	111.	61.8	12.6	20.	0.00/20.0	*
Dibenz(a,h)Anthracene	13-SEP-01 13:46	50.5	101.	51.2	1.45	2.8	0.00/20.0	
Dibenzofuran	13-SEP-01 13:46	50.2	100.	49.1	2.15	4.4	0.00/20.0	
Diethylphthalate	13-SEP-01 13:46	57.2	114.	55.9	2.52	4.5	0.00/20.0	
Dimethylphthalate	13-SEP-01 13:46	51.7	103.	51.7	0.0560	0.11	0.00/20.0	
Fluoranthene	13-SEP-01 13:46	54.1	108.	54.3	0.508	0.94	0.00/20.0	
Fluorene	13-SEP-01 13:46	55.3	111.	53.2	4.11	7.7	0.00/20.0	
Hexachlorobenzene	13-SEP-01 13:46	49.4	98.8	49.5	0.0800	0.16	0.00/20.0	
Hexachlorobutadiene	13-SEP-01 13:46	41.0	82.0	41.2	0.436	1.1	0.00/20.0	
Hexachlorocyclopentadiene	13-SEP-01 13:46	32.1	64.1	32.3	0.540	1.7	0.00/20.0	
Hexachloroethane	13-SEP-01 13:46	31.4	62.9	32.6	2.24	6.9	0.00/20.0	
Indeno(1,2,3-c,d)pyrene	13-SEP-01 13:46	51.8	104.	52.6	1.56	3.0	0.00/20.0	
Isophorone	13-SEP-01 13:46	49.6	99.1	47.6	3.84	8.1	0.00/20.0	
N-Nitrosodi-n-propyl amine	13-SEP-01 13:46	42.9	85.8	41.7	2.49	6.0	0.00/20.0	
N-Nitrosodiphenylamine	13-SEP-01 13:46	47.9	95.9	49.9	3.96	7.9	0.00/20.0	
Naphthalene	13-SEP-01 13:46	39.1	78.2	39.6	1.01	2.5	0.00/20.0	
Nitrobenzene	13-SEP-01 13:46	48.0	96.0	46.4	3.26	7.0	0.00/20.0	
Pentachlorophenol	13-SEP-01 13:46	59.4	119.	60.1	1.30	2.2	0.00/20.0	
Phenanthrene	13-SEP-01 13:46	53.6	107.	53.3	0.690	1.3	0.00/20.0	
Phenol	13-SEP-01 13:46	19.0	38.0	18.7	0.711	3.8	0.00/20.0	
Pyrene	13-SEP-01 13:46	53.3	107.	55.6	4.61	8.3	0.00/20.0	
bis(2-Chloroethoxy)methane	13-SEP-01 13:46	50.3	101.	48.4	3.79	7.8	0.00/20.0	

Client Name.....: North Dakota State Water Commission
Release Number.....: Not Provided

Matrix.....: WATERA
Reporting Units.....: ug/L

Date Printed.....: 14-SEP-01 15:03

DCL Analysis Group: G018B007
Analysis Method...: SW 8270

DCL Prep Group....: G018B007
Preparation Method: 3510B

QC Limit Type.....: Method

Surrogate Recoveries

Surr. ID	2,4,6-Tribromophenol				2-Fluorobiphenyl				2-Fluorophenol			
QC Limits	10.0/123.				43.0/116.				21.0/100.			
DCL Sample Number	Analyte Result	Spiked Amount	% Rec.	Q	Analyte Result	Spiked Amount	% Rec.	Q	Analyte Result	Spiked Amount	% Rec.	Q
1E01962	56.0	50.0	112.		44.0	50.0	88.1		26.4	50.0	52.8	
1E01963	49.3	50.0	98.7		40.0	50.0	80.0		21.6	50.0	43.1	
1E01964	60.6	50.0	121.		42.3	50.0	84.7		29.1	50.0	58.2	
1E01965	58.3	50.0	117.		45.8	50.0	91.5		24.6	50.0	49.2	
1E01966	54.8	50.0	110.		45.1	50.0	90.3		25.8	50.0	51.7	
1E01966MS	52.4	50.0	105.		42.6	50.0	85.3		23.4	50.0	46.8	
1E01966MSD	54.8	50.0	110.		43.5	50.0	87.0		24.4	50.0	48.8	
1E01967	57.4	50.0	115.		43.0	50.0	86.1		24.7	50.0	49.3	
1E01968	46.5	50.0	92.9		39.4	50.0	78.9		24.8	50.0	49.6	
1E01969	53.8	50.0	108.		46.5	50.0	93.1		27.5	50.0	55.0	
1E01970	34.8	50.0	69.6		35.9	50.0	71.8		25.1	50.0	50.1	
1E01971	18.4	50.0	36.8		42.0	50.0	84.0		23.3	50.0	46.6	
1E01972	40.1	50.0	80.1		44.4	50.0	88.8		26.2	50.0	52.4	
L-188055-1	49.0	50.0	98.0		41.6	50.0	83.3		26.1	50.0	52.1	
C-188055-1	59.1	50.0	118.		44.0	50.0	88.1		23.4	50.0	46.7	
D-188055-1	57.7	50.0	115.		45.3	50.0	90.6		24.2	50.0	48.4	

Surr. ID	Nitrobenzene-d5				Phenol-d5				Terphenyl-d14			
QC Limits	35.0/114.				10.0/94.0				33.0/141.			
DCL Sample Number	Analyte Result	Spiked Amount	% Rec.	Q	Analyte Result	Spiked Amount	% Rec.	Q	Analyte Result	Spiked Amount	% Rec.	Q
1E01962	44.2	50.0	88.4		21.0	50.0	42.1		51.9	50.0	104.	
1E01963	44.2	50.0	88.4		19.4	50.0	38.8		50.2	50.0	100.	
1E01964	43.6	50.0	87.2		21.2	50.0	42.3		41.2	50.0	82.4	
1E01965	40.8	50.0	81.6		19.2	50.0	38.4		43.4	50.0	86.8	
1E01966	46.5	50.0	93.0		22.8	50.0	45.6		48.6	50.0	97.3	
1E01966MS	43.6	50.0	87.2		17.2	50.0	34.3		51.0	50.0	102.	
1E01966MSD	44.8	50.0	89.6		18.1	50.0	36.1		47.8	50.0	95.7	
1E01967	42.8	50.0	85.6		19.5	50.0	38.9		44.8	50.0	89.5	
1E01968	39.4	50.0	78.8		18.3	50.0	36.7		45.1	50.0	90.2	
1E01969	43.1	50.0	86.3		19.9	50.0	39.9		44.5	50.0	89.0	
1E01970	39.8	50.0	79.6		20.6	50.0	41.2		31.7	50.0	63.5	
1E01971	42.6	50.0	85.2		17.6	50.0	35.1		40.4	50.0	80.9	
1E01972	40.6	50.0	81.2		19.4	50.0	38.8		41.2	50.0	82.4	
L-188055-1	43.3	50.0	86.7		19.2	50.0	38.3		47.1	50.0	94.2	
C-188055-1	43.3	50.0	86.6		16.8	50.0	33.6		58.4	50.0	117.	
D-188055-1	41.9	50.0	83.9		17.9	50.0	35.7		53.6	50.0	107.	

Earliest Sampling Date: 4-Sep-2001

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 28-Sep-2001

Project/Job/Task: P0186001	*Split:*	**Root Set ID:** 01E-0300 *	**Reporting Group**	04									#
Client: North Dakota State Water Commission		**Account:** 08001	**Analysis**	Semivols by 8270C									Bottles
Comments:													
Verified: PS 9/7/01													

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Customer ID 2															
5-Sep-2001	3-SPRING	01E01962			WATER						X										2
5-Sep-2001	4-RESERVOIR	01E01963			WATER						X										1
5-Sep-2001	6-13101	01E01964			WATER						X										2
5-Sep-2001	6-13102	01E01965			WATER						X										2
4-Sep-2001	5-13098	01E01966			WATER						X										2 1 JT
4-Sep-2001	5-13098	01E01966MS		MS	WATER						X										1
4-Sep-2001	5-13098	01E01966MSD		MSD	WATER						X										0
4-Sep-2001	DUP 1	01E01967			WATER						X										2 1 JT
4-Sep-2001	1-13103	01E01968			WATER						X										2
4-Sep-2001	1-13104	01E01969			WATER						X										1

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Walk-in/ ~~Room~~/ Shelf/ Fridge	9/7/01 1600	R-33-1 JP	Labeling/Shelving 13B/14B
R-33-1	9/11/01 1100	Walk-in/ Room/ Shelf/ Fridge	Storage: EVE

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

Check box if there is a continuation page ☐

Printed 9/7/2001 16:21

Form: COFC1.01-SWV2.30

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 28-Sep-2001

Project/Job/Task: P0186001 | *Split:* | **Root Set ID:** 01E-0300 * | **Reporting Group** 04

Client: North Dakota State Water Commission | **Account:** 08001

Comments:

Verified: RS 9/7/01

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Customer ID 2	Analysis: Semivols by 8270C	# Bottles
4-Sep-2001	LAKE COE	01E01970			WATER		X	1
4-Sep-2001	2-13105	01E01971			WATER		X	1
4-Sep-2001	5-13197	01E01972			WATER		X	1

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Walk-in/ Room/ Shelf/ Fridge SR	9/7/01 1600	R-33-1 →	Labeling/Shelving 13B/14B
R-33-1	9/11/01 1100	Walk-in/ Room/ Shelf/ Fridge	Storage: EXT

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

Check box if there is a continuation page ☐

OIE-0300

Samples To: DATA CHEM LABORATORIES
960 WEST LEVOY DRIVE
SALT LAKE CITY, UTAH 84123-2547
TEL. (801

North Dakota State Water Commission
900 East Boulevard
Bismarck, ND 58505
Dates Sampled: 9/5 9/7
Change of Custody: Date 9/7
Change of Custody: Date
Date Shipped: 9/6
Carrier FedEx

North Dakota State Water Commission
900 East Boulevard
Bismarck, ND 58505
By:
By:
By:
By:

Analysis Requested: 8260B 8270 8330 8332

No	Location	No. Bottles	Sample Date	Test For 8260 B	8270	8330	8332	Comments
1959 1	7- ~~DA~~ 130886	3 1L 3-40ml		3 40ml		1L	1L	1 x Tetra-C
2								
3								
60 4	7- 130861	2 1-L 3 40ml		$40		1L	1L	
5								
6								
61 7	Dup 2	2 1-L 3x 40ml		2 1-L 3 40ml		1L	1L	
8								
9								
10	Trip Blank							
11								
12								
13								
14								

Blank Temperature at time of shipping_____

01E-0300

Samples To: DATA CHEM LABORATORIES
960 WEST LEVOY DRIVE
SALT LAKE CITY, UTAH 84123-2547
TEL. (801

North Dakota State Water Commission
900 East Boulevard
Bismarck, ND 58505
Dates Sampled: 9/5
Change of Custody: Date 9/7
Change of Custody: Date
Date Shipped: 9/9
Carrier FED EX

North Dakota State Water Commission
900 East Boulevard
Bismarck, ND 58505
By:
By:
By:
By:

Analysis Requested: 8260B 8270 8330 8332

No	Location	No. Bottles	Sample Date	Test For				Comments
				8260 B	8270	8330	8332	
62 1	3 - Spring	3 1L	9/5	3	1	1	1	1 x Trip Blank
		3 40ml	9/5	3				
63 2	4 - Reservoir	4 1L	9/5		1	1	1	
		3 40ml	9/5	3				
3								
	#6 - 13101							12 extra Bottles
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								

Blank Temperature at time of shipping_____

OIE-0300

Samples To: DATA CHEM LABORATORIES
960 WEST LEVOY DRIVE
SALT LAKE CITY, UTAH 84123-2547
TEL. (801

North Dakota State Water Commission
900 East Boulevard
Bismarck, ND 58505
Dates Sampled: 9/5
Change of Custody: Date 9/5
Change of Custody: Date
Date Shipped: 9/6
Carrier FEDEX

North Dakota State Water Commission
900 East Boulevard
Bismarck, ND 58505
By:
By:
By:
By:

Analysis Requested: 8260B 8270 8330 8332

No	Location	No. Bottles	Sample Date	Test For				Comments
				8260 B	8270	8330	8332	
1964 1	6-13101	3/40mL	9/5		X	X	X	additional 1L Bottles shipped same cooler (13101
		3/40mL	9/5	X				
65 2	6-13102	1L	9/5		X	X	X	
	~~6-13~~	3/40mL	9/5	X				
3	Trip Blank	(1)40mL						
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								

Blank Temperature at time of shipping_____

01E-0300

Samples To: DATA CHEM LABORATORIES
960 WEST LEVOY DRIVE
SALT LAKE CITY, UTAH 84123-2547
TEL. (801

North Dakota State Water Commission
900 East Boulevard
Bismarck, ND 58505
Dates Sampled: 9/4
Change of Custody: Date 9/7
Change of Custody: Date
Date Shipped: 9/6
Carrier Fedex

North Dakota State Water Commission
900 East Boulevard
Bismarck, ND 58505
By:
By:
By:
By:

Analysis Requested: 8260B 8270 8330 8332

No	Location	No. Bottles	Sample Date	Test For				Comments
				8260 B	8270	8330	8332	
1	5-130946	3	9/4		1	1	1	
		3	9/4	1				
2		4oVOA						
3	5-130946 MS/MSD	1		0	1			82 more to the lab
4								
5	Dup1	3	9/4		1	1	1	
		3	9/4	3				
6								
7								
8								
9								
10								
11								
12								
13								
14								

Blank Temperature at time of shipping_____

01E-0300

Samples To: DATA CHEM LABORATORIES
960 WEST LEVOY DRIVE
SALT LAKE CITY, UTAH 84123-2547
TEL. (801

North Dakota State Water Commission
900 East Boulevard
Bismarck, ND 58505
Dates Sampled: 9/4
Change of Custody: Date 9/5
Change of Custody: Date
Date Shipped: 9/6 By:
Carrier

North Dakota State Water Commission
900 East Boulevard
Bismarck, ND 58505
By:
By:
By:
By:

Analysis Requested: 8260B 8270 8330 8332

No	Location	No. Bottles	Sample Date	Test For 8260 B	8270	8330	8332	Comments
1	5-13.98 MS/MSD	3	9/4		X	X	X	1L extra
2		3	9/4	X3				
3	~~1-13.99~~							
4	1-13103	2			X1L			1L extra
5								
6	~~1~~ 1-13104	2			X1L			1L extra
7								
8								
9								
10								
11								
12								
13								
14								

01966 MS/MSD

68

69

Blank Temperature at time of shipping

OIE-0300

Samples To: DATA CHEM LABORATORIES
960 WEST LEVOY DRIVE
SALT LAKE CITY, UTAH 84123-2547
TEL. (801

2-13105

5-13107 Lake Oe

North Dakota State Water Commission
900 East Boulevard
Bismarck, ND 58505

Dates Sampled: 9/4 9/5
Change of Custody: Date 9/5
Change of Custody: Date
Date Shipped: 9/6
Carrier Fedex

By:
By:
By:
By: MRD

North Dakota State Water Commission
900 East Boulevard
Bismarck, ND 58505

Analysis Requested: 8260B 8270 8330 8332

No	Location	No. Bottles	Sample Date	Test For				Comments
			9/5	8260 B	8270 C	8330	8332	
1	Lake Oe	3			1L	1L	1L	
		3	9/5	40mL				
2	~~2-F~~							
3	2-13105		9/4		1L			
4								
5	5-13107	3	9/4		1L	1L	1L	
		3	9/4	40mL				
6								
3	Trip Blank			40mL				
7								
8								
9								
10								
11								
12								
13								
14								

Blank Temperature at time of shipping_____

DATA CHEM LABORATORIES
A Sorenson Company
Federal ID Number 87-0440813

INVOICE
I01-5346

Form RLIMS40-V2.0
09170112275840

Invoice Date: 17-SEP-2001

Total Amount Due
$ 4,030.00
Due Date: 17-OCT-2001 Terms: Net 30

North Dakota State Water Commission
Attention: Accounts Payable
900 East Boulevard
Bismark, ND 58505

Billing ID: 10404
Group Name: 01E-0300-04
Account: 08001

Payor's Reference: Not Provided
Company Contact: William M. Schuh

Item Description	Sample Type	Method	No. of Units	Unit Price	Total
Semivols by 8270C	WATER	8270C	13	$ 310.00	$ 4,030.00

Total Amount Due $ 4,030.00

TERMS: A 1.5% per month finance charge will be made on the account if not paid by due date.
Customer agrees to pay all collection costs and reasonable attorney's fees.

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 FAX (801) 268-9992

Appendix B-3, EPA Method 8330

DATA CHEM
LABORATORIES, INC.
A SORENSON COMPANY

October 4, 2001

Mr. William Schuh
North Dakota State Water Commission
900 East Boulevard
Bismarck, ND 58505

Dear Mr. Schuh:

Enclosed is a copy of the analytical report for DCL Set Id #: 01E-0300-01.

Should you have any questions about the enclosed data package, please feel free to contact Mr. Kevin Griffiths, Project Manager, at (801) 266-7700. We would welcome any suggestions that you believe would help us serve you better.

Sincerely,

Heather Taysom
Document Control

CINCINNATI LABORATORY
4388 Glendale-Milford Road
Cincinnati, Ohio 45242-3706
513-733-5336, Fax 513-733-5347

CORPORATE OFFICE
SALT LAKE CITY LABORATORY
960 West LeVoy Drive
Salt Lake City, Utah 84123-2547
801-266-7700, Fax 801-268-9992
www.datachem.com

NOVATO OFFICE
11 Santa Yorma Court
Novato, California 94945-1123
415-897-9471, Fax 415-893-9469

DATA CHEM
LABORATORIES, INC.
A SORENSON COMPANY

Case Narrative

Method: 8330
Analysis: Explosives
Preparation SOP #: OL-SW-8330
Analysis SOP#: OL-SW-8330
DCL Set ID's: 01E-0300-02

Client: North Dakota State Water Comm.
Account: 8001
Matrix: Water

General Set Information: This lot contained eleven field water samples, a method blank, a laboratory control sample (LCS), an LCS duplicate and a matrix spike (MS).

Method Summary: The samples were extracted using the double salting out procedure prescribed in EPA method 8330. An aliquot of 770 mL of each sample was saturated with salt and extracted twice with acetonitrile by stirring at timed intervals. The acetonitrile extracts were combined and re-extracted with fresh salt water. The final volume of the extract was adjusted to 5 mL for each sample and filtered through a 0.45 um PTFE filter. One part acetonitrile extract was mixed with one part of a 1% calcium chloride solution, then injected into an HP1050 HPLC equipped with UV detection and a Phenomenex Ultracarb ODS(20) C18 column. The instrument was adjusted to the proper operating parameters and allowed to equilibrate until a stable baseline was established. Initial calibration standards were analyzed and linear calibration curves were generated from the data. A continuing calibration standard was analyzed in triplicate at the beginning of sample analysis and singly after each ten samples and at the end of the analysis. The response of the continuing calibration standard must be within method limits when compared to the initial calibration curve.

Samples and QCs were analyzed under identical conditions as those used for initial and continuing calibration. Quantitation was based on calibration curves using the initial calibration standards. Results were reported in units of µg/L.

Sample Preparation: No anomalies were observed during the preparation of the sample set.

Holding Times: The samples were prepared and analyzed within method holding times.

Dilution(s): No dilutions were required for the analysis of this batch.

Quality Control Data:

Blank: No confirmed method analytes were detected in the method blank sample above the CRDL.

This report contains
30 pages

Laboratory Control Sample: All LCS analyte recoveries were within acceptable limits, with the following exceptions. QD-188053-1 had a low recovery for tetryl and a high recovery for 4-amino-2,6-dinitrotoluene.

MS/MSD: Matrix spiking was not performed on this set.

Surrogate recovery: Surrogate recovery was acceptable for all samples from this set.

Instrument QC: All initial instrumental and continuing calibrations samples met method criteria.

Flagging Codes: None.

NC/CAR : NC/CAR #450 was submitted for this set.

Miscellaneous Comments: None.

Confirmation Analyses: Any sample with a positive result was qualitatively analyzed for confirmation on a second column. Only confirmed analytes were reported. For samples requiring confirmation, one part acetonitrile extract was mixed with one part of a 1% calcium chloride solution, then injected into an HP1050 HPLC equipped with UV detection and Waters NovaPak C8 and CN cartridge columns run in series. The instrument was adjusted to the proper operating parameters and allowed to equilibrate until a stable baseline was established. A CCV standard was run to establish retention times and a standard at a level near the reporting limits was run to verify low level sensitivity. The second column analyses were used for qualitative confirmation of analytes based on retention time. If a positive result is confirmed, the quantitative result from the primary column is reported.

Terry P. Vayo 10/6/01

Terry P. Vayo Date

DATA CHEM
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Datapackage Table of Contents

Information pertaining to this datapackage is divided into the four categories listed below. A Case Narrative immediately precedes this Table of Contents and contains pertinent information about this datapackage.

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Analytical Results

DATA CHEM LABORATORIES
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COVER PAGE

ANALYTICAL REPORT FOR
North Dakota State Water Commission

Phone(701) 328-2739 Fax(701) 328-3696

Form COVER-V1.3
10060117481816

G018601D

DCL Report Group..: 01E-0300-02

Date Printed.....: 06-OCT-01 17:48

Project Protocol #: P0186001
Client Ref Number.: Not Provided
Release Number....: Not Provided

Analysis Method(s): 8330

North Dakota State Water Commission
Attention: William M. Schuh
900 East Boulevard
Bismark, ND 58505

Client Sample Name	Laboratory Sample Name	Date Sampled	Date Received
Method Blank	BL-188053-1	NA	NA
LCS	QC-188053-1	NA	NA
LCS Dup	QD-188053-1	NA	NA
7-13086	01E01959	05-SEP-01	07-SEP-01
7-13087	01E01960	05-SEP-01	07-SEP-01
DUP 2	01E01961	05-SEP-01	07-SEP-01
3-SPRING	01E01962	05-SEP-01	07-SEP-01
4-RESERVOIR	01E01963	05-SEP-01	07-SEP-01
6-13101	01E01964	05-SEP-01	07-SEP-01
6-13102	01E01965	05-SEP-01	07-SEP-01
5-13098	01E01966	04-SEP-01	07-SEP-01
5-13098	01E01966MS	04-SEP-01	07-SEP-01
DUP 1	01E01967	04-SEP-01	07-SEP-01
LAKE COE	01E01970	04-SEP-01	07-SEP-01
5-13197	01E01972	04-SEP-01	07-SEP-01

Analyst: Terry P. Vay 10/6/01 Date

Reviewer: Brent Fullmer 10/8/01 Date

Lab Supervisor: Richard W. Wade 10/8/01 Date

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
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DCL Report Group..: 01E-0300-02
Date Printed.....: 06-OCT-01 17:48

Client Name...: North Dakota State Water Commission

Release Number....: Not Provided

Sample Group Comments

See narrative for comments.

General Information

The DCL QC Database maintains all numerical figures which are input from the pertinent data source. These data have not been rounded to significant figures nor have they been moisture corrected. Reports generated from the system, however, list data which have been rounded to the number of significant figures requested by the client or deemed appropriate for the method. This may create minor discrepancies between data which appear on the QC Summary Forms (Forms B-G) and those that would be calculated from rounded analytical results. Additionally, if a moisture correction is performed, differences will be observed between the QC data and the surrogate data reported on Form A (or other report forms) and corresponding data reported on QC Summary Forms. In these cases, the Form A will indicate the "Report Basis" as well as the moisture value used for making the correction.
Report generation options: X

Result Symbol Definitions

ND - Not Detected above the MDL or IDL (LLD or MDC for radiochemistry).
** - No result could be reported, see sample comments for details.

Qualifier Symbol Definitions

U - Not Detected above the MDL or IDL (LLD or MDC for radiochemistry).
For radiochemistry the nuclide was not identified by the Canberra Nuclear NID program, activity values reported are calculated using the Canberra Nuclear MINACT program.

B - For organic analysis the qualifier indicates that this analyte was found in the method blank.
For inorganic analysis the qualifier signifies the value is between the IDL and PQL.

J - The qualifier indicates that the value is between the MDL and the PQL. It is also used for indicating an estimated value for tentatively identified compounds in mass spectrometry where a 1:1 response is assumed.

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S018904X

Date Printed.....: 06-OCT-01 17:48

Client Name.....: North Dakota State Water Commission
Client Ref Number....: Not Provided
Sampling Site.....: Not Applicable
Release Number.....: Not Provided

Date Received.....: Not Applicable

Client Sample Name: BL-188053-1
DCL Sample Name...: BL-188053-1
DCL Report Group..: 01E-0300-02

Matrix.....: WATER
Date Sampled.....: Not Applicable
Reporting Units...: ug/L

DCL Preparation Group: G018902Q
Date Prepared.....: 10-SEP-01 00:00
Preparation Method...: 8330
Aliquot Weight/Volume: 770.mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G018902Q
Analysis Method...: 8330
Instrument Type...: HPLC
Instrument ID.....: LC-8
Column Type.....: Ultracarb ODS
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
1,3,5-Trinitrobenzene	25-SEP-01 12:25	0.0758	ND			1	0.013
1,3-Dinitrobenzene	25-SEP-01 12:25	0.0256	ND			1	0.013
2,4,6-Trinitrotoluene	25-SEP-01 12:25	0.0769	ND			1	0.26
2,4-Dinitrotoluene	25-SEP-01 12:25	0.0681	ND			1	0.13
2,6-Dinitrotoluene	25-SEP-01 12:25	0.0154	ND			1	0.26
2-Amino-4,6-Dinitrotoluene	25-SEP-01 12:25	0.0582	ND			1	0.26
2-Nitrotoluene	25-SEP-01 12:25	0.0129	ND			1	0.52
3-Nitrotoluene	25-SEP-01 12:25	0.196	ND			1	0.52
4-Amino-2,6-Dinitrotoluene	25-SEP-01 12:25	0.153	ND			1	0.26
4-Nitrotoluene	25-SEP-01 12:25	0.123	ND			1	0.52
HMX	25-SEP-01 12:25	0.0445	ND			1	0.26
Nitrobenzene	25-SEP-01 12:25	0.0696	ND			1	0.26
RDX	25-SEP-01 12:25	0.0539	ND			1	0.26
Tetryl	25-SEP-01 12:25	0.0853	ND			1	0.26

Surrogate Recoveries

Analyte	Result	Spiked Amount	Percent Recovery
3,4-Dinitrotoluene	12.1	13.0	93.0

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S018904Y

Date Printed.....: 06-OCT-01 17:48

Client Name.....: North Dakota State Water Commission
Client Ref Number....: Not Provided
Sampling Site.....: Not Applicable
Release Number.....: Not Provided

Date Received.....: Not Applicable

Client Sample Name: QC-188053-1
DCL Sample Name...: QC-188053-1
DCL Report Group..: 01E-0300-02

Matrix.....: WATER
Date Sampled.....: Not Applicable
Reporting Units...: ug/L

DCL Preparation Group: G018902Q
Date Prepared.....: 10-SEP-01 00:00
Preparation Method...: 8330
Aliquot Weight/Volume: 770.mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G018902Q
Analysis Method...: 8330
Instrument Type...: HPLC
Instrument ID.....: LC-8
Column Type.....: Ultracarb ODS
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
1,3,5-Trinitrobenzene	25-SEP-01 12:56	0.0758	3.05			1	0.013
1,3-Dinitrobenzene	25-SEP-01 12:56	0.0256	2.60			1	0.013
2,4,6-Trinitrotoluene	25-SEP-01 12:56	0.0769	5.12			1	0.26
2,4-Dinitrotoluene	25-SEP-01 12:56	0.0681	2.64			1	0.13
2,6-Dinitrotoluene	25-SEP-01 12:56	0.0154	5.38			1	0.26
2-Amino-4,6-Dinitrotoluene	25-SEP-01 12:56	0.0582	5.77			1	0.26
2-Nitrotoluene	25-SEP-01 12:56	0.0129	11.1			1	0.52
3-Nitrotoluene	25-SEP-01 12:56	0.196	11.3			1	0.52
4-Amino-2,6-Dinitrotoluene	25-SEP-01 12:56	0.153	6.59			1	0.26
4-Nitrotoluene	25-SEP-01 12:56	0.123	11.3			1	0.52
HMX	25-SEP-01 12:56	0.0445	5.85			1	0.26
Nitrobenzene	25-SEP-01 12:56	0.0696	5.14			1	0.26
RDX	25-SEP-01 12:56	0.0539	5.91			1	0.26
Tetryl	25-SEP-01 12:56	0.0853	5.00			1	0.26

Surrogate Recoveries

Analyte	Result	Spiked Amount	Percent Recovery
3,4-Dinitrotoluene	12.1	13.0	93.4

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S01890CN

Date Printed.....: 06-OCT-01 17:48

Client Name.....: North Dakota State Water Commission
Client Ref Number....: Not Provided
Sampling Site.....: Not Applicable
Release Number.....: Not Provided

Date Received.....: Not Applicable

Client Sample Name: QD-188053-1
DCL Sample Name...: QD-188053-1
DCL Report Group..: 01E-0300-02

Matrix.....: WATER
Date Sampled.....: Not Applicable
Reporting Units...: ug/L

DCL Preparation Group: G018902Q
Date Prepared.....: 10-SEP-01 00:00
Preparation Method...: 8330
Aliquot Weight/Volume: 770.mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G018902Q
Analysis Method...: 8330
Instrument Type...: HPLC
Instrument ID.....: LC-8
Column Type.....: Ultracarb ODS
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
1,3,5-Trinitrobenzene	25-SEP-01 13:27	0.0758	2.74			1	0.013
1,3-Dinitrobenzene	25-SEP-01 13:27	0.0256	3.00			1	0.013
2,4,6-Trinitrotoluene	25-SEP-01 13:27	0.0769	4.08			1	0.26
2,4-Dinitrotoluene	25-SEP-01 13:27	0.0681	3.06			1	0.13
2,6-Dinitrotoluene	25-SEP-01 13:27	0.0154	6.29			1	0.26
2-Amino-4,6-Dinitrotoluene	25-SEP-01 13:27	0.0582	6.36			1	0.26
2-Nitrotoluene	25-SEP-01 13:27	0.0129	12.7			1	0.52
3-Nitrotoluene	25-SEP-01 13:27	0.196	12.5			1	0.52
4-Amino-2,6-Dinitrotoluene	25-SEP-01 13:27	0.153	9.01			1	0.26
4-Nitrotoluene	25-SEP-01 13:27	0.123	12.7			1	0.52
HMX	25-SEP-01 13:27	0.0445	6.06			1	0.26
Nitrobenzene	25-SEP-01 13:27	0.0696	6.15			1	0.26
RDX	25-SEP-01 13:27	0.0539	6.31			1	0.26
Tetryl	25-SEP-01 13:27	0.0853	2.98			1	0.26

Surrogate Recoveries

Analyte	Result	Spiked Amount	Percent Recovery
3,4-Dinitrotoluene	13.5	13.0	104.

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S01860B9

ate Printed.....: 06-OCT-01 17:48

lient Name.....: North Dakota State Water Commission
lient Ref Number....: Not Provided
ampling Site.....: Not Provided
elease Number.....: Not Provided

ate Received.....: 07-SEP-01 00:00

Client Sample Name: 7-13086
DCL Sample Name...: 01E01959
DCL Report Group..: 01E-0300-02

Matrix.....: WATER
Date Sampled.....: 05-SEP-01 00:00
Reporting Units...: ug/L
Report Basis.....: [X] As Received [ ] Dried

CL Preparation Group: G018902Q
ate Prepared.....: 10-SEP-01 00:00
reparation Method...: 8330
liquot Weight/Volume: 770.mL
et Weight/Volume....: Not Required

DCL Analysis Group: G018902Q
Analysis Method...: 8330
Instrument Type...: HPLC
Instrument ID.....: LC-8
Column Type.....: Ultracarb ODS
[X] Primary
[ ] Confirmation

nalytical Results

nalyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
,3,5-Trinitrobenzene	25-SEP-01 13:57	0.0758	ND			1	0.013
,3-Dinitrobenzene	25-SEP-01 13:57	0.0256	ND			1	0.013
,4,6-Trinitrotoluene	25-SEP-01 13:57	0.0769	ND			1	0.26
,4-Dinitrotoluene	25-SEP-01 13:57	0.0681	ND			1	0.13
,6-Dinitrotoluene	25-SEP-01 13:57	0.0154	ND			1	0.26
-Amino-4,6-Dinitrotoluene	25-SEP-01 13:57	0.0582	ND			1	0.26
-Nitrotoluene	25-SEP-01 13:57	0.0129	ND			1	0.52
-Nitrotoluene	25-SEP-01 13:57	0.196	ND			1	0.52
-Amino-2,6-Dinitrotoluene	25-SEP-01 13:57	0.153	ND			1	0.26
-Nitrotoluene	25-SEP-01 13:57	0.123	ND			1	0.52
MX	25-SEP-01 13:57	0.0445	ND			1	0.26
itrobenzene	25-SEP-01 13:57	0.0696	ND			1	0.26
DX	25-SEP-01 13:57	0.0539	ND			1	0.26
etryl	25-SEP-01 13:57	0.0853	ND			1	0.26

urrogate Recoveries

nalyte	Result	Spiked Amount	Percent Recovery
,4-Dinitrotoluene	12.8	13.0	98.8

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S01860BB

Date Printed.....: 06-OCT-01 17:48

Client Name.....: North Dakota State Water Commission
Client Ref Number....: Not Provided
Sampling Site.....: Not Provided
Release Number.....: Not Provided

Date Received.....: 07-SEP-01 00:00

DCL Preparation Group: G018902Q
Date Prepared.....: 10-SEP-01 00:00
Preparation Method...: 8330
Aliquot Weight/Volume: 770.mL
Net Weight/Volume....: Not Required

Client Sample Name: 7-13087
DCL Sample Name...: 01E01960
DCL Report Group..: 01E-0300-02

Matrix.....: WATER
Date Sampled.....: 05-SEP-01 00:00
Reporting Units...: ug/L
Report Basis.....: [X] As Received [ ] Dried

DCL Analysis Group: G018902Q
Analysis Method...: 8330
Instrument Type...: HPLC
Instrument ID.....: LC-8
Column Type.....: Ultracarb ODS
[X] Primary
[ ] Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
1,3,5-Trinitrobenzene	25-SEP-01 14:28	0.0758	ND			1	0.013
1,3-Dinitrobenzene	25-SEP-01 14:28	0.0256	ND			1	0.013
2,4,6-Trinitrotoluene	25-SEP-01 14:28	0.0769	ND			1	0.26
2,4-Dinitrotoluene	25-SEP-01 14:28	0.0681	ND			1	0.13
2,6-Dinitrotoluene	25-SEP-01 14:28	0.0154	ND			1	0.26
2-Amino-4,6-Dinitrotoluene	25-SEP-01 14:28	0.0582	ND			1	0.26
2-Nitrotoluene	25-SEP-01 14:28	0.0129	ND			1	0.52
3-Nitrotoluene	25-SEP-01 14:28	0.196	ND			1	0.52
4-Amino-2,6-Dinitrotoluene	25-SEP-01 14:28	0.153	ND			1	0.26
4-Nitrotoluene	25-SEP-01 14:28	0.123	ND			1	0.52
HMX	25-SEP-01 14:28	0.0445	ND			1	0.26
Nitrobenzene	25-SEP-01 14:28	0.0696	ND			1	0.26
RDX	25-SEP-01 14:28	0.0539	ND			1	0.26
Tetryl	25-SEP-01 14:28	0.0853	ND			1	0.26

Surrogate Recoveries

Analyte	Result	Spiked Amount	Percent Recovery
3,4-Dinitrotoluene	12.1	13.0	92.9

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S01860BC

Date Printed.....: 06-OCT-01 17:48

Client Name.....: North Dakota State Water Commission
Client Ref Number....: Not Provided
Sampling Site.....: Not Provided
Release Number.....: Not Provided

Date Received.....: 07-SEP-01 00:00

Client Sample Name: DUP 2
DCL Sample Name...: 01E01961
DCL Report Group..: 01E-0300-02

Matrix.....: WATER
Date Sampled.....: 05-SEP-01 00:00
Reporting Units...: ug/L
Report Basis.....: ☒ As Received ☐ Dried

DCL Preparation Group: G018902Q
Date Prepared.....: 10-SEP-01 00:00
Preparation Method...: 8330
Aliquot Weight/Volume: 770.mL
Wet Weight/Volume....: Not Required

DCL Analysis Group: G018902Q
Analysis Method...: 8330
Instrument Type...: HPLC
Instrument ID.....: LC-8
Column Type.....: Ultracarb ODS
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
1,3,5-Trinitrobenzene	25-SEP-01 16:12	0.0758	ND			1	0.013
1,3-Dinitrobenzene	25-SEP-01 16:12	0.0256	ND			1	0.013
2,4,6-Trinitrotoluene	25-SEP-01 16:12	0.0769	ND			1	0.26
2,4-Dinitrotoluene	25-SEP-01 16:12	0.0681	ND			1	0.13
2,6-Dinitrotoluene	25-SEP-01 16:12	0.0154	ND			1	0.26
2-Amino-4,6-Dinitrotoluene	25-SEP-01 16:12	0.0582	ND			1	0.26
2-Nitrotoluene	25-SEP-01 16:12	0.0129	ND			1	0.52
3-Nitrotoluene	25-SEP-01 16:12	0.196	ND			1	0.52
4-Amino-2,6-Dinitrotoluene	25-SEP-01 16:12	0.153	ND			1	0.26
4-Nitrotoluene	25-SEP-01 16:12	0.123	ND			1	0.52
HMX	25-SEP-01 16:12	0.0445	ND			1	0.26
Nitrobenzene	25-SEP-01 16:12	0.0696	ND			1	0.26
RDX	25-SEP-01 16:12	0.0539	ND			1	0.26
Tetryl	25-SEP-01 16:12	0.0853	ND			1	0.26

Surrogate Recoveries

Analyte	Result	Spiked Amount	Percent Recovery
3,4-Dinitrotoluene	12.8	13.0	98.4

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SAMPLE ANALYSIS DATA SHEET

Date Printed.....: 06-OCT-01 17:48

Client Name.....: North Dakota State Water Commission
Client Ref Number....: Not Provided
Sampling Site.....: Not Provided
Release Number.....: Not Provided

Date Received.....: 07-SEP-01 00:00

Client Sample Name: 3-SPRING
DCL Sample Name...: 01E01962
DCL Report Group..: 01E-0300-02

Matrix.....: WATER
Date Sampled.....: 05-SEP-01 00:00
Reporting Units...: ug/L
Report Basis.....: [X] As Received [ ] Dried

DCL Preparation Group: G018902Q
Date Prepared.....: 10-SEP-01 00:00
Preparation Method...: 8330
Aliquot Weight/Volume: 770.mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G018902Q
Analysis Method...: 8330
Instrument Type...: HPLC
Instrument ID.....: LC-8
Column Type.....: Ultracarb ODS
[X] Primary
[ ] Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
1,3,5-Trinitrobenzene	25-SEP-01 16:43	0.0758	ND			1	0.013
1,3-Dinitrobenzene	25-SEP-01 16:43	0.0256	ND			1	0.013
2,4,6-Trinitrotoluene	25-SEP-01 16:43	0.0769	ND			1	0.26
2,4-Dinitrotoluene	25-SEP-01 16:43	0.0681	ND			1	0.13
2,6-Dinitrotoluene	25-SEP-01 16:43	0.0154	ND			1	0.26
2-Amino-4,6-Dinitrotoluene	25-SEP-01 16:43	0.0582	ND			1	0.26
2-Nitrotoluene	25-SEP-01 16:43	0.0129	ND			1	0.52
3-Nitrotoluene	25-SEP-01 16:43	0.196	ND			1	0.52
4-Amino-2,6-Dinitrotoluene	25-SEP-01 16:43	0.153	ND			1	0.26
4-Nitrotoluene	25-SEP-01 16:43	0.123	ND			1	0.52
HMX	25-SEP-01 16:43	0.0445	ND			1	0.26
Nitrobenzene	25-SEP-01 16:43	0.0696	ND			1	0.26
RDX	25-SEP-01 16:43	0.0539	ND			1	0.26
Tetryl	25-SEP-01 16:43	0.0853	ND			1	0.26

Surrogate Recoveries

Analyte	Result	Spiked Amount	Percent Recovery
3,4-Dinitrotoluene	11.8	13.0	91.0

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S01860BF

ıte Printed.....: 06-OCT-01 17:48

lient Name.....: North Dakota State Water Commission
lient Ref Number....: Not Provided
ampling Site.....: Not Provided
elease Number.....: Not Provided

ate Received.....: 07-SEP-01 00:00

Client Sample Name: **4-RESERVOIR**
DCL Sample Name...: **01E01963**
DCL Report Group..: **01E-0300-02**

Matrix.....: WATER
Date Sampled.....: 05-SEP-01 00:00
Reporting Units...: ug/L
Report Basis.....: ☒ As Received ☐ Dried

CL Preparation Group: G018902Q
ate Prepared.....: 10-SEP-01 00:00
reparation Method...: 8330
liquot Weight/Volume: 770.mL
et Weight/Volume....: Not Required

DCL Analysis Group: G018902Q
Analysis Method...: 8330
Instrument Type...: HPLC
Instrument ID.....: LC-8
Column Type.....: Ultracarb ODS
☒ Primary
☐ Confirmation

nalytical Results

nalyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
,3,5-Trinitrobenzene	25-SEP-01 17:14	0.0758	ND			1	0.013
,3-Dinitrobenzene	25-SEP-01 17:14	0.0256	ND			1	0.013
,4,6-Trinitrotoluene	25-SEP-01 17:14	0.0769	ND			1	0.26
,4-Dinitrotoluene	25-SEP-01 17:14	0.0681	ND			1	0.13
,6-Dinitrotoluene	25-SEP-01 17:14	0.0154	ND			1	0.26
-Amino-4,6-Dinitrotoluene	25-SEP-01 17:14	0.0582	ND			1	0.26
-Nitrotoluene	25-SEP-01 17:14	0.0129	ND			1	0.52
-Nitrotoluene	25-SEP-01 17:14	0.196	ND			1	0.52
-Amino-2,6-Dinitrotoluene	25-SEP-01 17:14	0.153	ND			1	0.26
-Nitrotoluene	25-SEP-01 17:14	0.123	ND			1	0.52
MX	25-SEP-01 17:14	0.0445	ND			1	0.26
itrobenzene	25-SEP-01 17:14	0.0696	ND			1	0.26
DX	25-SEP-01 17:14	0.0539	ND			1	0.26
etryl	25-SEP-01 17:14	0.0853	ND			1	0.26

urrogate Recoveries

nalyte	Result	Spiked Amount	Percent Recovery
,4-Dinitrotoluene	12.2	13.0	94.1

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S01860BG

Date Printed.....: 06-OCT-01 17:48

Client Name.....: North Dakota State Water Commission
Client Ref Number....: Not Provided
Sampling Site.....: Not Provided
Release Number.....: Not Provided

Date Received.....: 07-SEP-01 00:00

Client Sample Name: **6-13101**
DCL Sample Name...: **01E01964**
DCL Report Group..: **01E-0300-02**

Matrix.....: WATER
Date Sampled.....: 05-SEP-01 00:00
Reporting Units...: ug/L
Report Basis.....: ☒ As Received ☐ Dried

DCL Preparation Group: G018902Q
Date Prepared.....: 10-SEP-01 00:00
Preparation Method...: 8330
Aliquot Weight/Volume: 770.mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G018902Q
Analysis Method...: 8330
Instrument Type...: HPLC
Instrument ID.....: LC-8
Column Type.....: Ultracarb ODS
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
1,3,5-Trinitrobenzene	25-SEP-01 18:15	0.0758	ND			1	0.013
1,3-Dinitrobenzene	25-SEP-01 18:15	0.0256	ND			1	0.013
2,4,6-Trinitrotoluene	25-SEP-01 18:15	0.0769	ND			1	0.26
2,4-Dinitrotoluene	25-SEP-01 18:15	0.0681	ND			1	0.13
2,6-Dinitrotoluene	25-SEP-01 18:15	0.0154	ND			1	0.26
2-Amino-4,6-Dinitrotoluene	25-SEP-01 18:15	0.0582	ND			1	0.26
2-Nitrotoluene	25-SEP-01 18:15	0.0129	ND			1	0.52
3-Nitrotoluene	25-SEP-01 18:15	0.196	ND			1	0.52
4-Amino-2,6-Dinitrotoluene	25-SEP-01 18:15	0.153	ND			1	0.26
4-Nitrotoluene	25-SEP-01 18:15	0.123	ND			1	0.52
HMX	25-SEP-01 18:15	0.0445	ND			1	0.26
Nitrobenzene	25-SEP-01 18:15	0.0696	ND			1	0.26
RDX	25-SEP-01 18:15	0.0539	ND			1	0.26
Tetryl	25-SEP-01 18:15	0.0853	ND			1	0.26

Surrogate Recoveries

Analyte	Result	Spiked Amount	Percent Recovery
3,4-Dinitrotoluene	13.0	13.0	99.7

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S01860BH

ate Printed.....: 06-OCT-01 17:48

lient Name.....: North Dakota State Water Commission
lient Ref Number....: Not Provided
ampling Site.....: Not Provided
elease Number.....: Not Provided

ate Received.....: 07-SEP-01 00:00

Client Sample Name: 6-13102
DCL Sample Name...: 01E01965
DCL Report Group..: 01E-0300-02

Matrix.....: WATER
Date Sampled.....: 05-SEP-01 00:00
Reporting Units...: ug/L
Report Basis.....: [X] As Received [ ] Dried

CL Preparation Group: G018902Q
ate Prepared.....: 10-SEP-01 00:00
reparation Method...: 8330
liquot Weight/Volume: 770.mL
et Weight/Volume....: Not Required

DCL Analysis Group: G018902Q
Analysis Method...: 8330
Instrument Type...: HPLC
Instrument ID.....: LC-8
Column Type.....: Ultracarb ODS
[X] Primary
[ ] Confirmation

nalytical Results

nalyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
,3,5-Trinitrobenzene	25-SEP-01 18:46	0.0758	ND			1	0.013
,3-Dinitrobenzene	25-SEP-01 18:46	0.0256	ND			1	0.013
,4,6-Trinitrotoluene	25-SEP-01 18:46	0.0769	ND			1	0.26
,4-Dinitrotoluene	25-SEP-01 18:46	0.0681	ND			1	0.13
,6-Dinitrotoluene	25-SEP-01 18:46	0.0154	ND			1	0.26
-Amino-4,6-Dinitrotoluene	25-SEP-01 18:46	0.0582	ND			1	0.26
-Nitrotoluene	25-SEP-01 18:46	0.0129	ND			1	0.52
-Nitrotoluene	25-SEP-01 18:46	0.196	ND			1	0.52
-Amino-2,6-Dinitrotoluene	25-SEP-01 18:46	0.153	ND			1	0.26
-Nitrotoluene	25-SEP-01 18:46	0.123	ND			1	0.52
MX	25-SEP-01 18:46	0.0445	ND			1	0.26
itrobenzene	25-SEP-01 18:46	0.0696	ND			1	0.26
DX	25-SEP-01 18:46	0.0539	ND			1	0.26
etryl	25-SEP-01 18:46	0.0853	ND			1	0.26

urrogate Recoveries

nalyte	Result	Spiked Amount	Percent Recovery
,4-Dinitrotoluene	12.6	13.0	96.6

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SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S01860BJ

Date Printed.....: 06-OCT-01 17:48

Client Name.....: North Dakota State Water Commission
Client Ref Number....: Not Provided
Sampling Site.....: Not Provided
Release Number.....: Not Provided

Date Received.....: 07-SEP-01 00:00

Client Sample Name: 5-13098
DCL Sample Name...: 01E01966
DCL Report Group..: 01E-0300-02

Matrix.....: WATER
Date Sampled.....: 04-SEP-01 00:00
Reporting Units...: ug/L
Report Basis.....: [X] As Received [ ] Dried

DCL Preparation Group: G018902Q
Date Prepared.....: 10-SEP-01 00:00
Preparation Method...: 8330
Aliquot Weight/Volume: 770.mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G018902Q
Analysis Method...: 8330
Instrument Type...: HPLC
Instrument ID.....: LC-8
Column Type.....: Ultracarb ODS
[X] Primary
[ ] Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
1,3,5-Trinitrobenzene	25-SEP-01 19:17	0.0758	ND			1	0.013
1,3-Dinitrobenzene	25-SEP-01 19:17	0.0256	ND			1	0.013
2,4,6-Trinitrotoluene	25-SEP-01 19:17	0.0769	ND			1	0.26
2,4-Dinitrotoluene	25-SEP-01 19:17	0.0681	ND			1	0.13
2,6-Dinitrotoluene	25-SEP-01 19:17	0.0154	ND			1	0.26
2-Amino-4,6-Dinitrotoluene	25-SEP-01 19:17	0.0582	ND			1	0.26
2-Nitrotoluene	25-SEP-01 19:17	0.0129	ND			1	0.52
3-Nitrotoluene	25-SEP-01 19:17	0.196	ND			1	0.52
4-Amino-2,6-Dinitrotoluene	25-SEP-01 19:17	0.153	ND			1	0.26
4-Nitrotoluene	25-SEP-01 19:17	0.123	ND			1	0.52
HMX	25-SEP-01 19:17	0.0445	ND			1	0.26
Nitrobenzene	25-SEP-01 19:17	0.0696	ND			1	0.26
RDX	25-SEP-01 19:17	0.0539	ND			1	0.26
Tetryl	25-SEP-01 19:17	0.0853	ND			1	0.26

Surrogate Recoveries

Analyte	Result	Spiked Amount	Percent Recovery
3,4-Dinitrotoluene	13.0	13.0	100.

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S01860BM

Date Printed.....: 06-OCT-01 17:48

Client Name.....: North Dakota State Water Commission
Client Ref Number....: Not Provided
Sampling Site.....: Not Provided
Release Number.....: Not Provided

Date Received.....: 07-SEP-01 00:00

Client Sample Name: **DUP 1**
DCL Sample Name...: **01E01967**
DCL Report Group..: **01E-0300-02**

Matrix.....: WATER
Date Sampled.....: 04-SEP-01 00:00
Reporting Units...: ug/L
Report Basis.....: ☒ As Received ☐ Dried

DCL Preparation Group: G018902Q
Date Prepared.....: 10-SEP-01 00:00
Preparation Method...: 8330
Aliquot Weight/Volume: 770.mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G018902Q
Analysis Method...: 8330
Instrument Type...: HPLC
Instrument ID.....: LC-8
Column Type.....: Ultracarb ODS
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
1,3,5-Trinitrobenzene	25-SEP-01 20:18	0.0758	ND			1	0.013
1,3-Dinitrobenzene	25-SEP-01 20:18	0.0256	ND			1	0.013
2,4,6-Trinitrotoluene	25-SEP-01 20:18	0.0769	ND			1	0.26
2,4-Dinitrotoluene	25-SEP-01 20:18	0.0681	ND			1	0.13
2,6-Dinitrotoluene	25-SEP-01 20:18	0.0154	ND			1	0.26
2-Amino-4,6-Dinitrotoluene	25-SEP-01 20:18	0.0582	ND			1	0.26
2-Nitrotoluene	25-SEP-01 20:18	0.0129	ND			1	0.52
3-Nitrotoluene	25-SEP-01 20:18	0.196	ND			1	0.52
4-Amino-2,6-Dinitrotoluene	25-SEP-01 20:18	0.153	ND			1	0.26
4-Nitrotoluene	25-SEP-01 20:18	0.123	ND			1	0.52
HMX	25-SEP-01 20:18	0.0445	ND			1	0.26
Nitrobenzene	25-SEP-01 20:18	0.0696	ND			1	0.26
RDX	25-SEP-01 20:18	0.0539	ND			1	0.26
Tetryl	25-SEP-01 20:18	0.0853	ND			1	0.26

Surrogate Recoveries

Analyte	Result	Spiked Amount	Percent Recovery
3,4-Dinitrotoluene	12.0	13.0	92.3

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S01860BN

Date Printed.....: 06-OCT-01 17:48

Client Name.....: North Dakota State Water Commission
Client Ref Number....: Not Provided
Sampling Site.....: Not Provided
Release Number.....: Not Provided

Date Received.....: 07-SEP-01 00:00

Client Sample Name: **LAKE COE**
DCL Sample Name...: **01E01970**
DCL Report Group..: **01E-0300-02**

Matrix.....: WATER
Date Sampled.....: 04-SEP-01 00:00
Reporting Units...: ug/L
Report Basis.....: ☒ As Received ☐ Dried

DCL Preparation Group: G018902Q
Date Prepared.....: 10-SEP-01 00:00
Preparation Method...: 8330
Aliquot Weight/Volume: 770.mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G018902Q
Analysis Method...: 8330
Instrument Type...: HPLC
Instrument ID.....: LC-8
Column Type.....: Ultracarb ODS
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
1,3,5-Trinitrobenzene	25-SEP-01 20:49	0.0758	ND			1	0.013
1,3-Dinitrobenzene	25-SEP-01 20:49	0.0256	ND			1	0.013
2,4,6-Trinitrotoluene	25-SEP-01 20:49	0.0769	ND			1	0.26
2,4-Dinitrotoluene	25-SEP-01 20:49	0.0681	ND			1	0.13
2,6-Dinitrotoluene	25-SEP-01 20:49	0.0154	ND			1	0.26
2-Amino-4,6-Dinitrotoluene	25-SEP-01 20:49	0.0582	ND			1	0.26
2-Nitrotoluene	25-SEP-01 20:49	0.0129	ND			1	0.52
3-Nitrotoluene	25-SEP-01 20:49	0.196	ND			1	0.52
4-Amino-2,6-Dinitrotoluene	25-SEP-01 20:49	0.153	ND			1	0.26
4-Nitrotoluene	25-SEP-01 20:49	0.123	ND			1	0.52
HMX	25-SEP-01 20:49	0.0445	ND			1	0.26
Nitrobenzene	25-SEP-01 20:49	0.0696	ND			1	0.26
RDX	25-SEP-01 20:49	0.0539	ND			1	0.26
Tetryl	25-SEP-01 20:49	0.0853	ND			1	0.26

Surrogate Recoveries

Analyte	Result	Spiked Amount	Percent Recovery
3,4-Dinitrotoluene	13.3	13.0	102.

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S01860BP

Date Printed.....: 06-OCT-01 17:48

Client Name.....: North Dakota State Water Commission
Client Ref Number....: Not Provided
Sampling Site.....: Not Provided
Release Number.....: Not Provided

Date Received.....: 07-SEP-01 00:00

Client Sample Name: 5-13197
DCL Sample Name...: 01E01972
DCL Report Group..: 01E-0300-02

Matrix.....: WATER
Date Sampled.....: 04-SEP-01 00:00
Reporting Units...: ug/L
Report Basis.....: [X] As Received [ ] Dried

DCL Preparation Group: G018902Q
Date Prepared.....: 10-SEP-01 00:00
Preparation Method...: 8330
Aliquot Weight/Volume: 770.mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G018902Q
Analysis Method...: 8330
Instrument Type...: HPLC
Instrument ID.....: LC-8
Column Type.....: Ultracarb ODS
[X] Primary
[ ] Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
1,3,5-Trinitrobenzene	25-SEP-01 21:19	0.0758	ND			1	0.013
1,3-Dinitrobenzene	25-SEP-01 21:19	0.0256	ND			1	0.013
2,4,6-Trinitrotoluene	25-SEP-01 21:19	0.0769	ND			1	0.26
2,4-Dinitrotoluene	25-SEP-01 21:19	0.0681	ND			1	0.13
2,6-Dinitrotoluene	25-SEP-01 21:19	0.0154	ND			1	0.26
2-Amino-4,6-Dinitrotoluene	25-SEP-01 21:19	0.0582	ND			1	0.26
2-Nitrotoluene	25-SEP-01 21:19	0.0129	ND			1	0.52
3-Nitrotoluene	25-SEP-01 21:19	0.196	ND			1	0.52
4-Amino-2,6-Dinitrotoluene	25-SEP-01 21:19	0.153	ND			1	0.26
4-Nitrotoluene	25-SEP-01 21:19	0.123	ND			1	0.52
HMX	25-SEP-01 21:19	0.0445	ND			1	0.26
Nitrobenzene	25-SEP-01 21:19	0.0696	ND			1	0.26
RDX	25-SEP-01 21:19	0.0539	ND			1	0.26
Tetryl	25-SEP-01 21:19	0.0853	ND			1	0.26

Surrogate Recoveries

Analyte	Result	Spiked Amount	Percent Recovery
3,4-Dinitrotoluene	12.7	13.0	97.7

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DATA CHEM LABORATORIES
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FORM D (TYPE I)
SINGLE METHOD ANALYSES

QUALITY CONTROL DATA SHEET
MATRIX SPIKE SAMPLE

Client Name.....: North Dakota State Water Commission
Release Number.....: Not Provided

Matrix.....: WATER
Reporting Units.....: ug/L

DCL Preparation Group: G018902Q
Date Prepared.....: 10-SEP-01 00:00
Preparation Method...: 8330

DCL Sample Name...: **01E01966MS**
Date Printed.....: 06-OCT-01 17:48

DCL Analysis Group: G018902Q
Analysis Method...: SW8330-14
Instrument Type...: HPLC
Instrument ID.....: LC-8
Column Type.....: Ultracarb ODS
☒ Primary
☐ Confirmation

QC Limit Type.....: Method

Analytical Results

Analyte	Date Analyzed	Sample Result	Spiked Result	Spike Added	Percent Recovery	QC Limits	QC Flag
1,3,5-Trinitrobenzene	25-SEP-01 19:47	0.00	3.17	3.25	97.5	50.0/125.	
1,3-Dinitrobenzene	25-SEP-01 19:47	0.00	2.73	3.25	84.1	50.0/125.	
2,4,6-Trinitrotoluene	25-SEP-01 19:47	0.00	5.21	6.49	80.3	50.0/125.	
2,4-Dinitrotoluene	25-SEP-01 19:47	0.00	2.84	3.25	87.2	50.0/125.	
2,6-Dinitrotoluene	25-SEP-01 19:47	0.00	5.75	6.49	88.6	50.0/125.	
2-Amino-4,6-dinitrotoluene	25-SEP-01 19:47	0.00	5.90	6.49	90.9	50.0/125.	
2-Nitrotoluene	25-SEP-01 19:47	0.00	11.6	13.0	89.1	50.0/125.	
3-Nitrotoluene	25-SEP-01 19:47	0.00	11.6	13.0	89.1	50.0/125.	
4-Amino-2,6-dinitrotoluene	25-SEP-01 19:47	0.00	6.72	6.49	104.	50.0/125.	
4-Nitrotoluene	25-SEP-01 19:47	0.00	11.5	13.0	88.9	50.0/125.	
HMX	25-SEP-01 19:47	0.00	5.55	6.49	85.6	50.0/125.	
Nitrobenzene	25-SEP-01 19:47	0.00	5.52	6.49	85.1	50.0/125.	
RDX	25-SEP-01 19:47	0.00	5.78	6.49	89.0	50.0/125.	
Tetryl	25-SEP-01 19:47	0.00	4.75	6.49	73.2	50.0/125.	

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DATA CHEM LABORATORIES
A Sorenson Company

FORM J (TYPE I)
SINGLE METHOD ANALYSES

QUALITY CONTROL DATA SHEET
LABORATORY CONTROL SAMPLE (LCS)
LABORATORY CONTROL DUPL (LCD)


S018904Y

lient Name.....: North Dakota State Water Commission
elease Number.....: Not Provided

atrix.....: WATER
eporting Units.....: ug/L

CL Preparation Group: G018902Q
ate Prepared.....: 10-SEP-01 00:00
reparation Method...: 8330

DCL Sample Name...: QC-188053-1
Date Printed.....: 06-OCT-01 17:48

DCL Analysis Group: G018902Q
Analysis Method...: SW8330-14
Instrument Type...: HPLC
Instrument ID.....: LC-8
Column Type.....: Ultracarb ODS
[X] Primary
[ ] Confirmation

QC Limit Type.....: Method

nalytical Results

nalyte	Date Analyzed	Target	Result	Percent Recovery	QC Limits	QC Flag
,3,5-Trinitrobenzene	25-SEP-01 12:56	3.25	3.05	93.7	50.0/125.	
,3-Dinitrobenzene	25-SEP-01 12:56	3.25	2.60	79.9	50.0/125.	
,4,6-Trinitrotoluene	25-SEP-01 12:56	6.49	5.12	78.8	50.0/125.	
,4-Dinitrotoluene	25-SEP-01 12:56	3.25	2.64	81.2	50.0/125.	
,6-Dinitrotoluene	25-SEP-01 12:56	6.49	5.38	82.9	50.0/125.	
-Amino-4,6-dinitrotoluene	25-SEP-01 12:56	6.49	5.77	89.0	50.0/125.	
-Nitrotoluene	25-SEP-01 12:56	13.0	11.1	85.7	50.0/125.	
-Nitrotoluene	25-SEP-01 12:56	13.0	11.3	86.7	50.0/125.	
-Amino-2,6-dinitrotoluene	25-SEP-01 12:56	6.49	6.59	102.	50.0/125.	
-Nitrotoluene	25-SEP-01 12:56	13.0	11.3	87.3	50.0/125.	
MX	25-SEP-01 12:56	6.49	5.85	90.1	50.0/125.	
itrobenzene	25-SEP-01 12:56	6.49	5.14	79.1	50.0/125.	
DX	25-SEP-01 12:56	6.49	5.91	91.1	50.0/125.	
etryl	25-SEP-01 12:56	6.49	5.00	77.1	50.0/125.	


S01890CN

DCL Sample Name...: QD-188053-1

nalytical Results

nalyte	Date Analyzed	Duplicate Result	Percent Recovery	Mean	Range	RPD	QC Limits	QC Flag
,3,5-Trinitrobenzene	25-SEP-01 13:27	2.74	84.2	2.89	0.312	11.	0.00/25.0	
,3-Dinitrobenzene	25-SEP-01 13:27	3.00	92.2	2.80	0.400	14.	0.00/25.0	
,4,6-Trinitrotoluene	25-SEP-01 13:27	4.08	62.9	4.60	1.03	22.	0.00/25.0	
,4-Dinitrotoluene	25-SEP-01 13:27	3.06	94.2	2.85	0.423	15.	0.00/25.0	
,6-Dinitrotoluene	25-SEP-01 13:27	6.29	96.9	5.83	0.910	16.	0.00/25.0	
-Amino-4,6-dinitrotoluene	25-SEP-01 13:27	6.36	97.9	6.07	0.583	9.6	0.00/25.0	
-Nitrotoluene	25-SEP-01 13:27	12.7	97.8	11.9	1.58	13.	0.00/25.0	
-Nitrotoluene	25-SEP-01 13:27	12.5	96.1	11.9	1.25	11.	0.00/25.0	
-Amino-2,6-dinitrotoluene	25-SEP-01 13:27	9.01	139.	7.80	2.42	31.	0.00/25.0	*
-Nitrotoluene	25-SEP-01 13:27	12.7	97.7	12.0	1.37	11.	0.00/25.0	
MX	25-SEP-01 13:27	6.06	93.3	5.95	0.208	3.5	0.00/25.0	
itrobenzene	25-SEP-01 13:27	6.15	94.7	5.64	1.01	18.	0.00/25.0	
DX	25-SEP-01 13:27	6.31	97.3	6.11	0.398	6.5	0.00/25.0	
etryl	25-SEP-01 13:27	2.98	45.9	3.99	2.03	51.	0.00/25.0	*

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Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

Date Printed.....: 06-OCT-01 17:48

Client Name.....: North Dakota State Water Commission
Release Number.....: Not Provided

Matrix.....: WATER
Reporting Units.....: ug/L

DCL Analysis Group: G018902Q
Analysis Method...: SW8330-14

DCL Prep Group....: G018902Q
Preparation Method: 8330

QC Limit Type.....: Method

Surrogate Recoveries

Surr. ID	3,4-Dinitrotoluene											
QC Limits	50.0/125.											
DCL Sample Number	Analyte Result	Spiked Amount	% Rec.	Q	Analyte Result	Spiked Amount	% Rec.	Q	Analyte Result	Spiked Amount	% Rec.	Q
01E01959	12.8	13.0	98.8									
01E01960	12.1	13.0	92.9									
01E01961	12.8	13.0	98.4									
01E01962	11.8	13.0	91.0									
01E01963	12.2	13.0	94.1									
01E01964	13.0	13.0	99.7									
01E01965	12.6	13.0	96.6									
01E01966	13.0	13.0	100.									
01E01966MS	12.2	13.0	93.7									
01E01967	12.0	13.0	92.3									
01E01970	13.3	13.0	102.									
01E01972	12.7	13.0	97.7									
BL-188053-1	12.1	13.0	93.0									
QC-188053-1	12.1	13.0	93.4									
QD-188053-1	13.5	13.0	104.									

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arliest Sampling Date: 4-Sep-2001

CHAIN-OF-CUSTODY

Results due by: 28-Sep-2001

Project/Job/Task: P0186001 | Split: | Root Set ID: 01E-0300 * | Reporting Group: 02

Account: 08001

Client: North Dakota State Water Commission

Comments:

Verified: PS 9/7/01

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Customer ID 2	Analysis: 8330-Explosives	# Bottles
5-Sep-2001	7-13086	01E01959			WATER		X	1
5-Sep-2001	7-13087	01E01960			WATER		X	1
5-Sep-2001	DUP 2	01E01961			WATER		X	1
5-Sep-2001	3-SPRING	01E01962			WATER		X	1
5-Sep-2001	4-RESERVOIR	01E01963			WATER		X	1
5-Sep-2001	6-13101	01E01964			WATER		X	1
5-Sep-2001	6-13102	01E01965			WATER		X	1
4-Sep-2001	5-13098	01E01966			WATER		X	1
4-Sep-2001	5-13098	01E01966MS		MS	WATER		X	1
4-Sep-2001	5-13098	01E01966MSD		MSD	WATER		X	0

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Walk-in/ Room/ Shelf/ Fridge	9/7/01 1600	R-33-1 JR	Labeling/Shelving: ISD
R33-1 mm	09-10-01 14 30	Walk-in/ Room/ Shelf/ Fridge	Storage: 8330

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

Printed 9/7/2001 16:06

Check box if there is a continuation page ☐

Form: COFC1.01-SWV2.30

Earliest Sampling Date: 4-Sep-2001

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 28-Sep-2001

Project/Job/Task: P0186001 | *Split:* | **Root Set ID:** 01E-0300 * | **Reporting Group** 02

Client: North Dakota State Water Commission | **Account:** 08001

Comments:

Verified: PS 9/7/01

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Customer ID 2	Analysis: 8330-Explosives	# Bottles
4-Sep-2001	DUP 1	01E01967			WATER		X	1
4-Sep-2001	LAKE COE	01E01970			WATER		X	1
4-Sep-2001	5-13197	01E01972			WATER		X	1

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Walk-in/ Room/ Shelf/ Fridge	9/7/01 1606	R-33-1 JP	Labeling/Shelving 151
R334 11.0v2	09-10-01 1436	Walk-in/ Room/ Shelf/ Fridge	Storage: 833

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

Printed 9/7/2001 16:06

Check box if there is a continuation page ☐

Form: COFC1.01-SWV2.30

OIE-0300

Samples To: DATA CHEM LABORATORIES
960 WEST LEVOY DRIVE
SALT LAKE CITY, UTAH 84123-2547
TEL. (801

North Dakota State Water Commission
900 East Boulevard
Bismarck, ND 58505
Dates Sampled: 9/5 9/7
Change of Custody: Date 9/7
Change of Custody: Date
Date Shipped: 9/6
Carrier Fedex

North Dakota State Water Commission
900 East Boulevard
Bismarck, ND 58505
By:
By:
By:
By:

Analysis Requested: 8260B 8270 8330 8332

No	Location	No. Bottles	Sample Date	Test For				Comments
				8260 B	8270	8330	8332	
1	7-130866	3 1L 3-40ml		3 40ml		1L	1L	1 x fosa r-C
2								
3								
4	7-130861	2 1-L 3 40ml		3 40		1L	1L	
5								
6								
7	Dup 2	2 1-L 3x 40ml.		2 1-L 3/40ml		1L	1L	
8								
9								
10	Trip Blank							
11								
12								
13								
14								

Blank Temperature at time of shipping

01E-0300

Samples To: DATA CHEM LABORATORIES
960 WEST LEVOY DRIVE
SALT LAKE CITY, UTAH 84123-2547
TEL. (801

North Dakota State Water Commission
900 East Boulevard
Bismarck, ND 58505
Dates Sampled: 9/5
Change of Custody: Date 9/7
Change of Custody: Date
Date Shipped: 9/6
Carrier ~~UPS~~ DEX

North Dakota State Water Commission
900 East Boulevard
Bismarck, ND 58505
By:
By:
By:
By:

Analysis Requested: 8260B 8270 8330 8332

No	Location	No. Bottles	Sample Date	Test For 8260 B	8270	8330	8332	Comments
1962 1	3 - Spring	~~3~~ 3 1L	9/5	~~3~~ 2	1	1	1	1 x extra 1L bottle
		3 40ml	9/5	3				
63 2	4 - Reservoir	~~4~~ 4 1L	9/5		1	1	1	
		3 40ml	9/5	~~3~~ 3				
3	#6 - 13101							1L extra Bottle
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								

Blank Temperature at time of shipping

OIE-0300

Samples To: DATA CHEM LABORATORIES
960 WEST LEVOY DRIVE
SALT LAKE CITY, UTAH 84123-2547
TEL. (801

North Dakota State Water Commission
900 East Boulevard
Bismarck, ND 58505
Dates Sampled: 9/5
Change of Custody: Date 9/5
Change of Custody: Date
Date Shipped: 9/6
Carrier FEDEX

North Dakota State Water Commission
900 East Boulevard
Bismarck, ND 58505
By:
By:
By:
By:

Analysis Requested: 8260B 8270 8330 8332

No	Location	No. Bottles	Sample Date	Test For				Comments
				8260 B	8270	8330	8332	
4 1	6-13101	3 40ml	9/5		X	X	X	additional 1L Bottle shipped in main cooler (13101
		3/40ml	9/5	X				
5 2	6-13102	1L	9/5		X	X	X	
	~~6-13~~	3/40ml	9/5	X				
3	Trip Blank	(1) 40ml						
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								

Blank Temperature at time of shipping

OIE-0300

Samples To: DATA CHEM LABORATORIES
960 WEST LEVOY DRIVE
SALT LAKE CITY, UTAH 84123-2547
TEL. (801

North Dakota State Water Commission
900 East Boulevard
Bismarck, ND 58505
Dates Sampled: 9/4
Change of Custody: Date 9/7
Change of Custody: Date 9/6
Date Shipped: 9/6
Carrier Federal

North Dakota State Water Commission
900 East Boulevard
Bismarck, ND 58505
By:
By:
By:
By:

Analysis Requested: 8260B 8270 8330 8332

No	Location	No. Bottles	Sample Date	Test For 8260 B	8270	8330	8332	Comments
1	5-130956	3	9/4		1	1	1	
1		3	9/4	1				
2		4 vials						
3	5-130956 MS/MSD	1		1	1			2 more bottles each
4								
5	Dup 1	3	9/4		1	1	1	
5		3	9/4	3				
6								
7								
8								
9								
10								
11								
12								
13								
14								

Blank Temperature at time of shipping

OIE-0300

Samples To: DATA CHEM LABORATORIES
960 WEST LEVOY DRIVE
SALT LAKE CITY, UTAH 84123-2547
TEL. (801

North Dakota State Water Commission
900 East Boulevard
Bismarck, ND 58505
Dates Sampled: 9/4
Change of Custody: Date 9/5
Change of Custody: Date
Date Shipped: 9/6
Carrier

North Dakota State Water Commission
900 East Boulevard
Bismarck, ND 58505
By:
By:
By:
By:

Analysis Requested: 8260B 8270 8330 8332

No	Location	No. Bottles	Sample Date	Test For				Comments
				8260 B	8270	8330	8332	
1	5-13.98 MS/MSD	3	9/4		2	x	x	1L extra for other codes
2		3	9/4	13				
3	~~1-13.99~~							
4	1-13.03	2			x1L			1L extra
5								
6	~~6~~ 1-13.04	2			x1L			1L extra
7								
8								
9								
10								
11								
12								
13								
14								

Blank Temperature at time of shipping

OIE-0300

Samples To: DATA CHEM LABORATORIES
960 WEST LEVOY DRIVE
SALT LAKE CITY, UTAH 84123-2547
TEL. (801

2-13105

North Dakota State Water Commission
900 East Boulevard
Bismarck, ND 58505

Dates Sampled: 9/4 9/5 By:
Change of Custody: Date 9/7 By:
Change of Custody: Date By:
Date Shipped: 9/6 By:
Carrier

North Dakota State Water Commission
900 East Boulevard
Bismarck, ND 58505

Analysis Requested: 8260B 8270 8330 8332

No	Location	No. Bottles	Sample Date	Test For				Comments
			9/5	8260 B	8270 C	8330	8332	
170 1	Lake Oe	3			1L	1L	1L	
		3	9/5	40ml				
2	~~2-F~~							
71 3	2-13105		9/4		1L			
4								
72 5	5-13107	3	9/4		1L	1L	1L	
		3	9/4	40ml				
6								
73	Trip Blank			40ml				
7								
8								
9								
10								
11								
12								
13								
14								

Blank Temperature at time of shipping_____

Appendix B-4, EPA Method 8332

DATA CHEM
LABORATORIES, INC.
A SORENSON COMPANY

October 8, 2001

Mr. William Schuh
North Dakota State Water Commission
900 East Boulevard
Bismarck, ND 58505

Dear Mr. Schuh:

Enclosed is a copy of the analytical report for DCL Set Id #: 01E-0300-03.

Should you have any questions about the enclosed data package, please feel free to contact Mr. Kevin Griffiths, Project Manager, at (801) 266-7700. We would welcome any suggestions that you believe would help us serve you better.

Sincerely,

Heather Taysom
Document Control

CINCINNATI LABORATORY
4388 Glendale-Milford Road
Cincinnati, Ohio 45242-3706
513-733-5336, Fax 513-733-5347

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SALT LAKE CITY LABORATORY
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www.datachem.com

NOVATO OFFICE
11 Santa Yorma Court
Novato, California 94945-1123
415-897-9471, Fax 415-893-9469

DATA CHEM
LABORATORIES, INC.
A SORENSON COMPANY

Case Narrative

Method: SW-846 8332
Analysis: Nitroglycerin, PETN
Account: 08101
Preparation SOP #: OL-SW-8332
Analysis SOP#: OL-SW-8332
Matrix: Water
DCL Set ID's: 01E-0300-03

Client: North Dakota State Water Commission

General Set Information: This set consisted of ten water samples which were prepared and analyzed according to EPA method SW-846 8332.

Method Summary: The samples were extracted using the double salting out procedure prescribed in EPA method 8330. An aliquot of 770 mL of each sample was saturated with salt and extracted twice with acetonitrile by stirring at timed intervals. The acetonitrile extracts were combined and re-extracted with fresh salt water. The final volume of the extract was adjusted to 5 mL for each sample and filtered through a 0.45 um PTFE filter. One part acetonitrile extract was mixed with one part of a 1% calcium chloride solution, and then injected into an HP1050 HPLC equipped with UV detection and a Phenomenex Ultracarb ODS column. The instrument was adjusted to the proper operating parameters and allowed to equilibrate until a stable baseline was established. Initial Calibration standards were analyzed and linear calibration curves were generated from the data. A continuing calibration standard was analyzed in triplicate at the beginning of sample analysis and singly after each ten samples and at the end of the analysis. The response of the continuing calibration standard must be within method limits when compared to the initial calibration curve.

Samples and QCs were analyzed under identical conditions as those used for initial and continuing calibration. Quantitation was based on calibration curves using the initial calibration standards. Results were reported in units of µg/L.

Sample Preparation: No anomalies were observed during the preparation of the samples.

Holding Times: The sample were prepared and analyzed within method required hold times.

Dilution(s): No dilutions were required for the analysis.

This report contains 40 pages

Quality Control Data:

Blank: No confirmed method analytes were detected in the method blank above the CRDL.

Laboratory Control Samples: All recoveries met the method criteria.

Surrogate Recovery: Surrogate recoveries were acceptable with the following exception. Sample 01E01963 (4-RESERVOIR) had a slightly low recovery.

MS/MSD: Matrix spiking was performed on sample 01E01966. All recoveries met the method criteria.

Instrument QC: All initial and continuing calibration verification samples met method criteria.

Flagging Codes: None.

NC/CAR: NC/CAR #502 was issued with this set.

Miscellaneous Comments: None.

Confirmation Analyses: Any sample with a positive result was qualitatively analyzed for confirmation on a second column. Only confirmed analytes were reported. For samples requiring confirmation, one part acetonitrile extract was mixed with one part of a 1% calcium chloride solution, then injected into an HP1050 HPLC equipped with UV detection and Waters NovaPak C8 and CN cartridge columns run in series. The instrument was adjusted to the proper operating parameters and allowed to equilibrate until a stable baseline was established. A CCV standard was run to establish retention times and a standard at a level near the reporting limits was run to verify low level sensitivity. The second column analyses were used for qualitative confirmation of analytes based on retention time. If a positive result is confirmed, the quantitative result from the primary column is reported.

Terry P. Vayo Date

DATA CHEM
LABORATORIES, INC.
A SORENSON COMPANY

Datapackage Table of Contents

Information pertaining to this datapackage is divided into the four categories listed below. A Case Narrative immediately precedes this Table of Contents and contains pertinent information about this datapackage.

♦ ♦ ♦ ♦ ♦ ♦ ♦ ♦ ♦ ♦

Analytical Results

DATA CHEM LABORATORIES
A Sorenson Company

COVER PAGE

ANALYTICAL REPORT FOR
North Dakota State Water Commission

Phone(701) 328-2739 Fax(701) 328-3696

Form COVER-V1.3
1004011015233

G018601F

DCL Report Group..: 01E-0300-03

Date Printed.....: 04-OCT-01 10:15

Project Protocol #: P0186001
Client Ref Number.: Not Provided
Release Number....: Not Provided

Analysis Method(s): 8332

North Dakota State Water Commission
Attention: William M. Schuh
900 East Boulevard
Bismark, ND 58505

Client Sample Name	Laboratory Sample Name	Date Sampled	Date Received
Method Blank	BL-188054-1	NA	NA
LCS	QC-188054-1	NA	NA
7-13086	01E01959	05-SEP-01	07-SEP-01
7-13087	01E01960	05-SEP-01	07-SEP-01
3-SPRING	01E01962	05-SEP-01	07-SEP-01
4-RESERVOIR	01E01963	05-SEP-01	07-SEP-01
6-13101	01E01964	05-SEP-01	07-SEP-01
6-13102	01E01965	05-SEP-01	07-SEP-01
5-13098	01E01966	04-SEP-01	07-SEP-01
5-13098	01E01966MS	04-SEP-01	07-SEP-01
5-13098	01E01966MSD	04-SEP-01	07-SEP-01
DUP 1	01E01967	04-SEP-01	07-SEP-01
LAKE COE	01E01970	04-SEP-01	07-SEP-01
5-13197	01E01972	04-SEP-01	07-SEP-01

Analyst: Kerry P. Vayo — Date 10/4/01

Reviewer: Brent Fullmer — Date 10/4/01

Lab Supervisor: Richard W. Wade — Date 10/5/01

004

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

DCL Report Group..: 01E-0300-03
Date Printed.....: 04-OCT-01 10:15

Client Name...: North Dakota State Water Commission

Release Number....: Not Provided

Sample Group Comments

See narrative for comments.

General Information

The DCL QC Database maintains all numerical figures which are input from the pertinent data source. These data have not been rounded to significant figures nor have they been moisture corrected. Reports generated from the system, however, list data which have been rounded to the number of significant figures requested by the client or deemed appropriate for the method. This may create minor discrepancies between data which appear on the QC Summary Forms (Forms B-G) and those that would be calculated from rounded analytical results. Additionally, if a moisture correction is performed, differences will be observed between the QC data and the surrogate data reported on Form A (or other report forms) and corresponding data reported on QC Summary Forms. In these cases, the Form A will indicate the "Report Basis" as well as the moisture value used for making the correction.
Report generation options: X

Result Symbol Definitions

ND - Not Detected above the MDL or IDL (LLD or MDC for radiochemistry).
** - No result could be reported, see sample comments for details.

Qualifier Symbol Definitions

U - Not Detected above the MDL or IDL (LLD or MDC for radiochemistry).
For radiochemistry the nuclide was not identified by the Canberra Nuclear NID program, activity values reported are calculated using the Canberra Nuclear MINACT program.

B - For organic analysis the qualifier indicates that this analyte was found in the method blank.
For inorganic analysis the qualifier signifies the value is between the IDL and PQL.

J - The qualifier indicates that the value is between the MDL and the PQL. It is also used for indicating an estimated value for tentatively identified compounds in mass spectrometry where a 1:1 response is assumed.

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Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S018B04L

Date Printed.....: 04-OCT-01 10:15

Client Name.....: North Dakota State Water Commission
Client Ref Number....: Not Provided
Sampling Site.....: Not Applicable
Release Number.....: Not Provided

Date Received.....: Not Applicable

Client Sample Name: BL-188054-1
DCL Sample Name...: BL-188054-1
DCL Report Group..: 01E-0300-03

Matrix.....: WATER
Date Sampled.....: Not Applicable
Reporting Units...: ug/L

DCL Preparation Group: G018B01B
Date Prepared.....: 11-SEP-01 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 770.mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G019200D
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC-3
Column Type.....: Ultracarb ODS
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	01-OCT-01 22:42	0.354	ND			1	0.970
Nitroglycerin	01-OCT-01 22:42	0.376	ND			1	0.970

Surrogate Recoveries

Analyte	Result	Spiked Amount	Percent Recovery
1-Nitronaphthalene	9.48	13.0	73.0

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S018B04M

Date Printed.....: 04-OCT-01 10:15

Client Name.....: North Dakota State Water Commission
Client Ref Number....: Not Provided
Sampling Site.....: Not Applicable
Release Number.....: Not Provided

Date Received.....: Not Applicable

Client Sample Name: QC-188054-1
DCL Sample Name...: QC-188054-1
DCL Report Group..: 01E-0300-03

Matrix.....: WATER
Date Sampled.....: Not Applicable
Reporting Units...: ug/L

DCL Preparation Group: G018B01B
Date Prepared.....: 11-SEP-01 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 770.mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G019200D
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC-3
Column Type.....: Ultracarb ODS
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	01-OCT-01 23:02	0.354	24.0			1	0.970
Nitroglycerin	01-OCT-01 23:02	0.376	21.4			1	0.970

Surrogate Recoveries

Analyte	Result	Spiked Amount	Percent Recovery
1-Nitronaphthalene	9.56	13.0	73.6

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A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S01860BQ

Date Printed.....: 04-OCT-01 10:15

Client Name.....: North Dakota State Water Commission
Client Ref Number....: Not Provided
Sampling Site.....: Not Provided
Release Number.....: Not Provided

Date Received.....: 07-SEP-01 00:00

Client Sample Name: **7-13086**
DCL Sample Name...: **01E01959**
DCL Report Group..: **01E-0300-03**

Matrix.....: WATER
Date Sampled.....: 05-SEP-01 00:00
Reporting Units...: ug/L
Report Basis.....: ☒ As Received ☐ Dried

DCL Preparation Group: G018B01B
Date Prepared.....: 11-SEP-01 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 770.mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G019200D
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC-3
Column Type.....: Ultracarb ODS
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	01-OCT-01 23:23	0.354	ND			1	0.970
Nitroglycerin	01-OCT-01 23:23	0.376	ND			1	0.970

Surrogate Recoveries

Analyte	Result	Spiked Amount	Percent Recovery
1-Nitronaphthalene	11.0	13.0	84.8

008

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S01860BR

ate Printed.....: 04-OCT-01 10:15

lient Name.....: North Dakota State Water Commission
lient Ref Number....: Not Provided
ampling Site.....: Not Provided
elease Number.....: Not Provided

ate Received.....: 07-SEP-01 00:00

CL Preparation Group: G018B01B
ate Prepared.....: 11-SEP-01 00:00
reparation Method...: 8332
liquot Weight/Volume: 770.mL
et Weight/Volume....: Not Required

Client Sample Name: 7-13087
DCL Sample Name...: 01E01960
DCL Report Group..: 01E-0300-03

Matrix.....: WATER
Date Sampled.....: 05-SEP-01 00:00
Reporting Units...: ug/L
Report Basis.....: ☒ As Received ☐ Dried

DCL Analysis Group: G019200D
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC-3
Column Type.....: Ultracarb ODS
☒ Primary
☐ Confirmation

nalytical Results

nalyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
ETN	01-OCT-01 23:44	0.354	ND			1	0.970
itroglycerin	01-OCT-01 23:44	0.376	ND			1	0.970

urrogate Recoveries

nalyte	Result	Spiked Amount	Percent Recovery
-Nitronaphthalene	11.1	13.0	85.9

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S01860BS

Date Printed.....: 04-OCT-01 10:15

Client Name.....: North Dakota State Water Commission
Client Ref Number....: Not Provided
Sampling Site.....: Not Provided
Release Number.....: Not Provided

Date Received.....: 07-SEP-01 00:00

Client Sample Name: 3-SPRING
DCL Sample Name...: 01E01962
DCL Report Group..: 01E-0300-03

Matrix.....: WATER
Date Sampled.....: 05-SEP-01 00:00
Reporting Units...: ug/L
Report Basis.....: ☒ As Received ☐ Dried

DCL Preparation Group: G018B01B
Date Prepared.....: 11-SEP-01 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 770.mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G019200D
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC-3
Column Type.....: Ultracarb ODS
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	02-OCT-01 00:05	0.354	ND			1	0.970
Nitroglycerin	02-OCT-01 00:05	0.376	ND			1	0.970

Surrogate Recoveries

Analyte	Result	Spiked Amount	Percent Recovery
1-Nitronaphthalene	10.1	13.0	77.9

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S01860BT

Date Printed.....: 04-OCT-01 10:15

Client Name.....: North Dakota State Water Commission
Client Ref Number....: Not Provided
Sampling Site.....: Not Provided
Release Number.....: Not Provided

Date Received.....: 07-SEP-01 00:00

Client Sample Name: **4-RESERVOIR**
DCL Sample Name...: **01E01963**
DCL Report Group..: **01E-0300-03**

Matrix.....: WATER
Date Sampled.....: 05-SEP-01 00:00
Reporting Units...: ug/L
Report Basis.....: [X] As Received [ ] Dried

DCL Preparation Group: G018B01B
Date Prepared.....: 11-SEP-01 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 770.mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G019200D
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC-3
Column Type.....: Ultracarb ODS
[X] Primary
[ ] Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	02-OCT-01 00:26	0.354	ND			1	0.970
Nitroglycerin	02-OCT-01 00:26	0.376	ND			1	0.970

Surrogate Recoveries

Analyte	Result	Spiked Amount	Percent Recovery
1-Nitronaphthalene	8.31	13.0	64.0

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Date Printed.....: 04-OCT-01 10:15

Client Name.....: North Dakota State Water Commission
Client Ref Number....: Not Provided
Sampling Site.....: Not Provided
Release Number.....: Not Provided

Date Received.....: 07-SEP-01 00:00

Client Sample Name: 6-13101
DCL Sample Name...: 01E01964
DCL Report Group..: 01E-0300-03

Matrix.....: WATER
Date Sampled.....: 05-SEP-01 00:00
Reporting Units...: ug/L
Report Basis.....: ☒ As Received ☐ Dried

DCL Preparation Group: G018B01B
Date Prepared.....: 11-SEP-01 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 770.mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G019200D
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC-3
Column Type.....: Ultracarb ODS
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	02-OCT-01 00:48	0.354	ND			1	0.970
Nitroglycerin	02-OCT-01 00:48	0.376	ND			1	0.970

Surrogate Recoveries

Analyte	Result	Spiked Amount	Percent Recovery
1-Nitronaphthalene	9.83	13.0	75.8

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S01860BW

)ate Printed.....: 04-OCT-01 10:15

:lient Name.....: North Dakota State Water Commission
:lient Ref Number....: Not Provided
Sampling Site.....: Not Provided
Release Number.....: Not Provided

)ate Received.....: 07-SEP-01 00:00

Client Sample Name: 6-13102
DCL Sample Name...: 01E01965
DCL Report Group..: 01E-0300-03

Matrix.....: WATER
Date Sampled.....: 05-SEP-01 00:00
Reporting Units...: ug/L
Report Basis.....: ☒ As Received ☐ Dried

)CL Preparation Group: G018B01B
)ate Prepared.....: 11-SEP-01 00:00
'reparation Method...: 8332
Aliquot Weight/Volume: 770.mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G019200D
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC-3
Column Type.....: Ultracarb ODS
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	02-OCT-01 01:09	0.354	ND			1	0.970
Nitroglycerin	02-OCT-01 01:09	0.376	ND			1	0.970

Surrogate Recoveries

Analyte	Result	Spiked Amount	Percent Recovery
1,3-Dinitronaphthalene	10.7	13.0	82.3

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A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S01860BX

Date Printed.....: 04-OCT-01 10:15

Client Name.....: North Dakota State Water Commission
Client Ref Number....: Not Provided
Sampling Site.....: Not Provided
Release Number.....: Not Provided

Date Received.....: 07-SEP-01 00:00

Client Sample Name: **5-13098**
DCL Sample Name...: **01E01966**
DCL Report Group..: **01E-0300-03**

Matrix.....: WATER
Date Sampled.....: 04-SEP-01 00:00
Reporting Units...: ug/L
Report Basis.....: ☒ As Received ☐ Dried

DCL Preparation Group: G018B01B
Date Prepared.....: 11-SEP-01 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 770.mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G019200D
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC-3
Column Type.....: Ultracarb ODS
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	02-OCT-01 01:31	0.354	ND			1	0.970
Nitroglycerin	02-OCT-01 01:31	0.376	ND			1	0.970

Surrogate Recoveries

Analyte	Result	Spiked Amount	Percent Recovery
1-Nitronaphthalene	11.4	13.0	88.1

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DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S01860C0

Date Printed.....: 04-OCT-01 10:15

Client Name.....: North Dakota State Water Commission
Client Ref Number....: Not Provided
Sampling Site.....: Not Provided
Release Number.....: Not Provided

Date Received.....: 07-SEP-01 00:00

Client Sample Name: **DUP 1**
DCL Sample Name...: **01E01967**
DCL Report Group..: **01E-0300-03**

Matrix.....: WATER
Date Sampled.....: 04-SEP-01 00:00
Reporting Units...: ug/L
Report Basis.....: ☒ As Received ☐ Dried

DCL Preparation Group: G018B01B
Date Prepared.....: 11-SEP-01 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 770.mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G019200D
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC-3
Column Type.....: Ultracarb ODS
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	02-OCT-01 02:56	0.354	ND			1	0.970
Nitroglycerin	02-OCT-01 02:56	0.376	ND			1	0.970

Surrogate Recoveries

Analyte	Result	Spiked Amount	Percent Recovery
1-Nitronaphthalene	9.62	13.0	74.1

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DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S01860C1

Date Printed.....: 04-OCT-01 10:15

Client Name.....: North Dakota State Water Commission
Client Ref Number....: Not Provided
Sampling Site.....: Not Provided
Release Number.....: Not Provided

Date Received.....: 07-SEP-01 00:00

Client Sample Name: **LAKE COE**
DCL Sample Name...: **01E01970**
DCL Report Group..: **01E-0300-03**

Matrix.....: WATER
Date Sampled.....: 04-SEP-01 00:00
Reporting Units...: ug/L
Report Basis.....: ☒ As Received ☐ Dried

DCL Preparation Group: G018B01B
Date Prepared.....: 11-SEP-01 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 770.mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G019200D
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC-3
Column Type.....: Ultracarb ODS
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	02-OCT-01 03:18	0.354	ND			1	0.970
Nitroglycerin	02-OCT-01 03:18	0.376	ND			1	0.970

Surrogate Recoveries

Analyte	Result	Spiked Amount	Percent Recovery
1-Nitronaphthalene	9.95	13.0	76.6

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DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S01860C2

Date Printed.....: 04-OCT-01 10:15

Client Name.....: North Dakota State Water Commission
Client Ref Number....: Not Provided
Sampling Site.....: Not Provided
Release Number.....: Not Provided

Date Received.....: 07-SEP-01 00:00

Client Sample Name: 5-13197
DCL Sample Name...: 01E01972
DCL Report Group..: 01E-0300-03

Matrix.....: WATER
Date Sampled.....: 04-SEP-01 00:00
Reporting Units...: ug/L
Report Basis.....: ☒ As Received ☐ Dried

DCL Preparation Group: G018B01B
Date Prepared.....: 11-SEP-01 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 770.mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G019200D
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC-3
Column Type.....: Ultracarb ODS
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	02-OCT-01 03:39	0.354	ND			1	0.970
Nitroglycerin	02-OCT-01 03:39	0.376	ND			1	0.970

Surrogate Recoveries

Analyte	Result	Spiked Amount	Percent Recovery
1-Nitronaphthalene	11.0	13.0	84.7

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DATA CHEM LABORATORIES
A Sorenson Company

FORM B (TYPE I)
SINGLE METHOD ANALYSES

QUALITY CONTROL DATA SHEET
LABORATORY CONTROL SAMPLE (LCS)

S018B04M

Client Name.....: North Dakota State Water Commission
Release Number.....: Not Provided

Matrix.....: WATER
Reporting Units.....: ug/L

DCL Preparation Group: G018B01B
Date Prepared.....: 11-SEP-01 00:00
Preparation Method...: 8332

DCL Sample Name...: QC-188054-1
Date Printed.....: 04-OCT-01 10:15

DCL Analysis Group: G019200D
Analysis Method...: OL-SW-8332
Instrument Type...: HPLC
Instrument ID.....: LC-3
Column Type.....: Ultracarb ODS
☒ Primary
☐ Confirmation

QC Limit Type.....: Method

Analytical Results

Analyte	Date Analyzed	Target	Result	Percent Recovery	QC Limits	QC Flag
Nitroglycerin	01-OCT-01 23:02	26.0	21.4	82.4	65.0/125.	
PETN	01-OCT-01 23:02	26.0	24.0	92.3	65.0/125.	

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DATA CHEM LABORATORIES
A Sorenson Company

FORM F (TYPE I)
SINGLE METHOD ANALYSES

QUALITY CONTROL DATA SHEET
MATRIX SPIKE SAMPLE
MATRIX SPIKE DUPLICATE SAMPLE


S01860BY

Client Name.....: North Dakota State Water Commission
Release Number.....: Not Provided

Matrix.....: WATER
Reporting Units.....: ug/L

DCL Preparation Group: G018B01B
Date Prepared.....: 11-SEP-01 00:00
Preparation Method...: 8332

DCL Sample Name...: 01E01966MS
Date Printed.....: 05-OCT-01 07:55

DCL Analysis Group: G019200D
Analysis Method...: OL-SW-8332
Instrument Type...: HPLC
Instrument ID.....: LC-3
Column Type.....: Ultracarb ODS
☒ Primary
☐ Confirmation

QC Limit Type.....: Method

Analytical Results

Analyte	Date Analyzed	Sample Result	Spiked Result	Spike Added	Percent Recovery	QC Limits	QC Flag
Nitroglycerin	02-OCT-01 01:52	0.00	22.4	26.0	83.9	65.0/125.	
PETN	02-OCT-01 01:52	0.00	24.0	26.0	92.5	65.0/125.	


S01860BZ

DCL Sample Name...: 01E01966MSD

Analytical Results

Analyte	Date Analyzed	Duplicate Result	Percent Recovery	Mean	Range	RPD	QC Limits	QC Flag
Nitroglycerin	02-OCT-01 02:35	24.5	94.2	23.4	2.10	9.0	0.00/35.0	
PETN	02-OCT-01 02:35	23.5	90.4	23.8	0.536	2.3	0.00/35.0	

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Date Printed.....: 04-OCT-01 10:15

Client Name.....: North Dakota State Water Commission
Release Number.....: Not Provided

Matrix.....: WATER
Reporting Units.....: ug/L

DCL Analysis Group: G019200D
Analysis Method...: OL-SW-8332

DCL Prep Group....: G018B01B
Preparation Method: 8332

QC Limit Type.....: Method

Surrogate Recoveries

Surr. ID	1-Nitronaphthalene											
QC Limits	65.0/125.											
DCL Sample Number	Analyte Result	Spiked Amount	% Rec.	Q	Analyte Result	Spiked Amount	% Rec.	Q	Analyte Result	Spiked Amount	% Rec.	Q
01E01959	11.0	13.0	84.8									
01E01960	11.1	13.0	85.9									
01E01962	10.1	13.0	77.9									
01E01963	8.31	13.0	64.0	*								
01E01964	9.83	13.0	75.8									
01E01965	10.7	13.0	82.3									
01E01966	11.4	13.0	88.1									
01E01966MS	10.6	13.0	81.5									
01E01966MSD	11.2	13.0	86.0									
01E01967	9.62	13.0	74.1									
01E01970	9.95	13.0	76.6									
01E01972	11.0	13.0	84.7									
BL-188054-1	9.48	13.0	73.0									
QC-188054-1	9.56	13.0	73.6									

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8332

D5 Deliverable Package

72 Hr RT Windows
Analytical Sequence
Curve Summaries
ICV Summary
CCV Summaries

Cal ID: 100101LC3

Method 8332

RT Windows For Analytical Sequence From 72 Hr RT Study

Sequence: **1001LC3** Sample Info: **219WS43675**

	RT Low	**RT High**	**CCV RT**	0 Hr RT	Mid Hr RT	72 Hr RT	3xStDv
Datafile:			**31001-27.D**	31001-16	31001-20	31001-44	
Analyte							
Nitroglycerin	**6.229**	**6.492**	6.361	6.394	6.361	6.307	0.132
PETN	**11.224**	**12.052**	11.638	11.772	11.638	11.496	0.414
1-Nitronaphthalene	**14.734**	**15.941**	15.337	15.544	15.337	15.142	0.603

Default Minimum Window=+/- 0.030 minutes

DataChem Laboratories
LIMS - Sample Master System
Analysis Group Report

ate: 3-OCT-2001 10:32
ser: VAYO

nalysis Run Name: G019200D

Group ID: G019200D

amples: 14

os	Laboratory Sample Name	Field Sample Name 1	Field Sample Name 2	Laboratory Sample ID	Laboratory Group Name	Accnt. Number
1	BL-188054-1	BL-188054-1		S018B04L	01E-0300-03	08001
2	QC-188054-1	QC-188054-1		S018B04M	01E-0300-03	08001
3	01E01959	7-13086		S01860BQ	01E-0300-03	08001
4	01E01960	7-13087		S01860BR	01E-0300-03	08001
5	01E01962	3-SPRING		S01860BS	01E-0300-03	08001
6	01E01963	4-RESERVOIR		S01860BT	01E-0300-03	08001
7	01E01964	6-13101		S01860BV	01E-0300-03	08001
8	01E01965	6-13102		S01860BW	01E-0300-03	08001
9	01E01966	5-13098		S01860BX	01E-0300-03	08001
10	01E01966MS	5-13098		S01860BY	01E-0300-03	08001
11	01E01966MSD	5-13098		S01860BZ	01E-0300-03	08001
12	01E01967	DUP 1		S01860C0	01E-0300-03	08001
13	01E01970	LAKE COE		S01860C1	01E-0300-03	08001
14	01E01972	5-13197		S01860C2	01E-0300-03	08001

----- END OF LISTING ------

Calibration Table

SW8332 FOR NG & PETN

Calib. Data Modified : 10/3/01 9:10:21 AM

Calculate : External Standard
Based on : Peak Area

Rel. Reference Window : 5.000 %
Abs. Reference Window : 0.000 min
Rel. Non-ref. Window : 11.000 %
Abs. Non-ref. Window : 0.000 min
Uncalibrated Peaks : not reported
Partial Calibration : Yes, identified peaks are recalibrated
Correct All Ret. Times: No, only for identified peaks

Curve Type : Linear
Origin : Ignored
Weight : Equal

Recalibration Settings:
Average Response : Average all calibrations
Average Retention Time: Floating Average New 75%

Calibration Report Options :
Printout of recalibrations within a sequence:
Calibration Table after Recalibration
Normal Report after Recalibration
If the sequence is done with bracketing:
Results of first cycle (ending previous bracket)

Signal 1: VWD1 A, Wavelength=214 nm

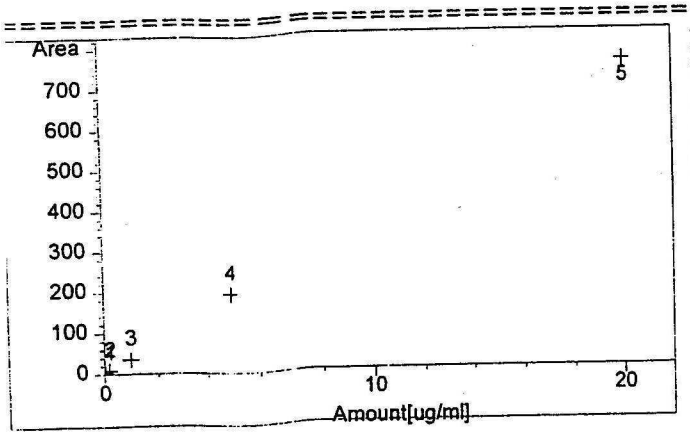
RetTime [min]	Sig	Lvl	Amount [ug/ml]	Area	Amt/Area	Ref	Grp	Name
6.383	1	1	5.00000e-2	8.57728e-1	5.82936e-2			Nitroglycerin
		2	2.00000e-1	7.51861	2.66007e-2			
		3	1.00000	34.82499	2.87150e-2			
		4	5.00000	193.03348	2.59022e-2			
		5	20.00000	753.46344	2.65441e-2			
11.829	1	1	5.00000e-2	1.93993	2.57742e-2			PETN
		2	2.00000e-1	8.55474	2.33788e-2			
		3	1.00000	36.47713	2.74144e-2			
		4	5.00000	207.62694	2.40817e-2			
		5	20.00000	804.61414	2.48566e-2			
15.515	1	1	5.00000e-2	27.30221	1.83135e-3			1-Nitronaphthalene
		2	2.00000e-1	104.47498	1.91433e-3			
		3	1.00000	474.37860	2.10802e-3			
		4	5.00000	2593.93872	1.92757e-3			
		5	20.00000	1.01168e4	1.97691e-3			

Peak Sum Table

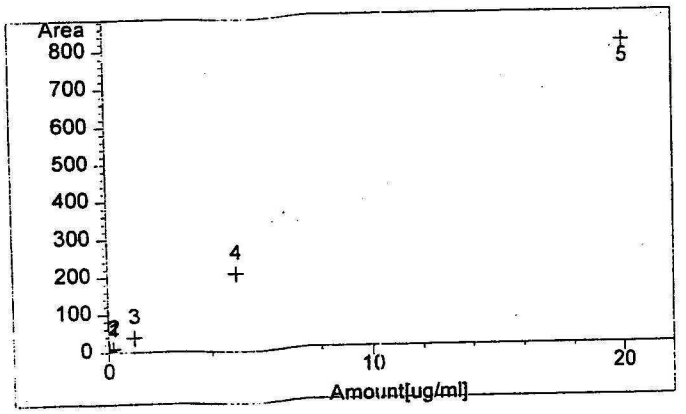
No Entries in table

024

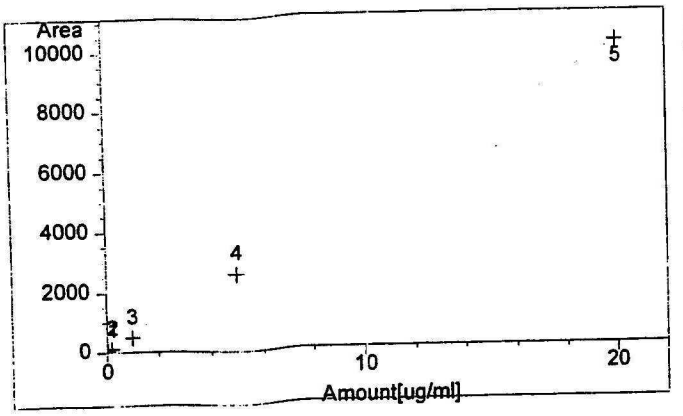
Calibration Curves



Nitroglycerin at exp. RT: 6.383
VWD1 A, Wavelength=214 nm
Correlation: 0.99996
Residual Std. Dev.: 3.15715
Formula: y = mx + b
m: 37.72991
b: -1.42380e-1
x: Amount[ug/ml]
y: Area



PETN at exp. RT: 11.829
VWD1 A, Wavelength=214 nm
Correlation: 0.99994
Residual Std. Dev.: 4.23296
Formula: y = mx + b
m: 40.27282
b: 4.10269e-1
x: Amount[ug/ml]
y: Area



1-Nitronaphthalene at exp. RT: 15.515
VWD1 A, Wavelength=214 nm
Correlation: 0.99997
Residual Std. Dev.: 40.28691
Formula: y = mx + b
m: 506.15468
b: 6.07126
x: Amount[ug/ml]
y: Area

DCL EO/HPLC 8332 ICV Summary

Datafile: **31001-18.D**

Analyte	RT Low	RT High	ICV RT	Amount	Target	%Rec	RT?	Rec?
Nitroglycerin	6.229	6.492	6.375	19.6668	20.000	98.3	pass	pass
PETN	11.224	12.052	11.702	21.1487	20.000	105.7	pass	pass
1-Nitronaphthalene	14.734	15.941	15.458	19.5027	20.000	97.5	pass	pass

ICV Recovery Criteria is +/- 25.%

ICV RT Criteria is within 72 RT window from Mid Point Std.

DCL EO/HPLC 8332 CCV Summary

CCV1 Datafile: **31001-20.D**

Analyte	RT Low	RT High	CCV RT	Amount	Target	%Rec	RT?	Rec?
Nitroglycerin	**6.229**	**6.492**	6.361	20.124	20.000	100.6	pass	pass
PETN	**11.224**	**12.052**	11.638	20.205	20.000	101.0	pass	pass
1-Nitronaphthalene	**14.734**	**15.941**	15.337	20.149	20.000	100.7	pass	pass

CCV Recovery Criteria is +/- 15.%

Advisory CCV RT Criteria is within 72 RT window centered on CCV1

DCL EO/HPLC 8332 CCV Summary

CCV1 Datafile: **31001-21.D**

Analyte	RT Low	RT High	CCV RT	Amount	Target	%Rec	RT?	Rec?
Nitroglycerin	**6.229**	**6.492**	6.352	20.593	20.000	103.0	pass	pass
PETN	**11.224**	**12.052**	11.621	20.358	20.000	101.8	pass	pass
1-Nitronaphthalene	**14.734**	**15.941**	15.315	20.342	20.000	101.7	pass	pass

CCV Recovery Criteria is +/- 15.%

Advisory CCV RT Criteria is within 72 RT window centered on CCV1

DCL EO/HPLC 8332 CCV Summary

CCV1 Datafile: **31001-22.D**

Analyte	RT Low	RT High	CCV RT	Amount	Target	%Rec	RT?	Rec?
Nitroglycerin	**6.229**	**6.492**	6.313	20.433	20.000	102.2	pass	pass
PETN	**11.224**	**12.052**	11.575	20.620	20.000	103.1	pass	pass
1-Nitronaphthalene	**14.734**	**15.941**	15.285	20.429	20.000	102.1	pass	pass

CCV Recovery Criteria is +/- 15.%

Advisory CCV RT Criteria is within 72 RT window centered on CCV1

DCL EO/HPLC 8332 CCV Summary

CCV2 Datafile: **31001-28.D**

Analyte	RT Low	RT High	CCV RT	Amount	Target	%Rec	RT?	Rec?
Nitroglycerin	**6.229**	**6.492**	6.318	20.506	20.000	102.5	pass	pass
PETN	**11.224**	**12.052**	11.572	20.901	20.000	104.5	pass	pass
1-Nitronaphthalene	**14.734**	**15.941**	15.257	20.491	20.000	102.5	pass	pass

CCV Recovery Criteria is +/- 15.%

Advisory CCV RT Criteria is within 72 RT window centered on CCV1

DCL EO/HPLC 8332 CCV Summary

CCV3 Datafile: **31001-39.D**

Analyte	RT Low	RT High	CCV RT	Amount	Target	%Rec	RT?	Rec?
Nitroglycerin	**6.229**	**6.492**	6.288	20.504	20.000	102.5	pass	pass
PETN	**11.224**	**12.052**	11.449	20.999	20.000	105.0	pass	pass
1-Nitronaphthalene	**14.734**	**15.941**	15.098	20.475	20.000	102.4	pass	pass

CCV Recovery Criteria is +/- 15.%

Advisory CCV RT Criteria is within 72 RT window centered on CCV1

DCL EO/HPLC 8332 CCV Summary

CCV4 Datafile: **31001-44.D**

Analyte	RT Low	RT High	CCV RT	Amount	Target	%Rec	RT?	Rec?
Nitroglycerin	**6.229**	**6.492**	6.307	20.501	20.000	102.5	pass	pass
PETN	**11.224**	**12.052**	11.496	20.587	20.000	102.9	pass	pass
1-Nitronaphthalene	**14.734**	**15.941**	15.142	20.508	20.000	102.5	pass	pass

CCV Recovery Criteria is +/- 15.%

Advisory CCV RT Criteria is within 72 RT window centered on CCV1

Earliest Sampling Date: 4-Sep-2001

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 28-Sep-2001

Project/Job/Task: P0186001 | *Split:* | **Root Set ID:** 01E-0300 * | **Reporting Group** 03

Client: North Dakota State Water Commission | **Account:** 08001

Comments:

Verified: PS 9/7/01

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Customer ID 2	Analysis: PETN/NG in Water by EPA 8332	# Bottles
5-Sep-2001	7-13086	01E01959			WATER		X	2
5-Sep-2001	7-13087	01E01960			WATER		X	1
5-Sep-2001	3-SPRING	01E01962			WATER		X	1
5-Sep-2001	4-RESERVOIR	01E01963			WATER		X	1
5-Sep-2001	6-13101	01E01964			WATER		X	1
5-Sep-2001	6-13102	01E01965			WATER		X	1
4-Sep-2001	5-13098	01E01966			WATER		X	1
4-Sep-2001	5-13098	01E01966MS		MS	WATER		X	1
4-Sep-2001	5-13098	01E01966MSD		MSD	WATER		X	1
4-Sep-2001	DUP 1	01E01967			WATER		X	1

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Walk-in/ Room/ Shelf/ Fridge	9/7/01 1600	R-33-1 JK	Labeling/Shelving 3C
R-33-1 [illegible]	09-11-01	Walk-in/ Room/ Shelf/ Fridge	Storage: 8332

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

Printed 9/7/2001 16:07

Check box if there is a continuation page ☐

Form: COFC1.01-SWV2.30

Earliest Sampling Date: 4-Sep-2001

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 28-Sep-2001

Project/Job/Task: P0186001	Split:	Root Set ID: 01E-0300 *	Reporting Group	03
Client: North Dakota State Water Commission		Account: 08001	Analysis	PETN/NG in Water by EPA 8332

Comments:

Verified: PS 9/7/01

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Customer ID 2	PETN/NG in Water by EPA 8332	# Bottles
4-Sep-2001	LAKE COE	01E01970			WATER		X	1
4-Sep-2001	5-13197	01E01972			WATER		X	1

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Walk-in/ Room/ Shelf/ Fridge [signature]	9/7/01 1600	R-33-1 [initials]	Labeling/Shelving 3C
R33-1 [signature]	09-11-01	Walk-in/ Room/ Shelf/ Fridge [signature]	Storage: 2[illegible] 8332

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: ______ Lab Notebook No.: ______

Prepared/Analyzed by: ______ Date/Time: ______

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

Check box if there is a continuation page ☐

Printed 9/7/2001 16:07

Form: COFC1.01-SWV2.30

01E-0300

Samples To: DATA CHEM LABORATORIES
960 WEST LEVOY DRIVE
SALT LAKE CITY, UTAH 84123-2547
TEL. (801

North Dakota State Water Commission
900 East Boulevard
Bismarck, ND 58505
Dates Sampled: 9/5
Change of Custody: Date 9/7
Change of Custody: Date
Date Shipped: 9/6
Carrier Fedex

North Dakota State Water Commission
900 East Boulevard
Bismarck, ND 58505
By:
By:
By:
By:

Analysis Requested: 8260B 8270 8330 8332

No	Location	No. Bottles	Sample Date	Test For 8260 B	8270	8330	8332	Comments
1	TB 130846	3 1L 3-40ml		3 40ml		1L	1L	1 x Fuel-C
2								
3								
4	130861	2 1-L 3 40ml		3 40		1L	1L	
5								
6								
7	Dup 2	2 1-L 3 x 40ml		2 1-L 3 40ml		1L	1L	
8								
9								
10	Trip Blank							
11								
12								
13								
14								

Blank Temperature at time of shipping_____

01E-0300

Samples To: DATA CHEM LABORATORIES
960 WEST LEVOY DRIVE
SALT LAKE CITY, UTAH 84123-2547
TEL. (801

North Dakota State Water Commission
900 East Boulevard
Bismarck, ND 58505
Dates Sampled: 9/5
Change of Custody: Date 9/7
Change of Custody: Date
Date Shipped: 9/6
Carrier ~~UPS~~ DEX

North Dakota State Water Commission
900 East Boulevard
Bismarck, ND 58505
By:
By:
By:
By:

Analysis Requested: 8260B 8270 8330 8332

No	Location	No. Bottles	Sample Date	Test For				Comments
				8260 B	8270	8330	8332	
01962 1	3 - Spring	3 1L	9/5	3	1	1	1	1 x Trip Blank
		3 40ml	9/5	3				
63 2	4 - Reservoir	4 1L	9/5		1	1	1	
		3 40ml	9/5	3				
3								
	06 - 1301							12 extra Bottles
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								

Blank Temperature at time of shipping_____

OIE-0300

Samples To: DATA CHEM LABORATORIES
960 WEST LEVOY DRIVE
SALT LAKE CITY, UTAH 84123-2547
TEL. (801

North Dakota State Water Commission
900 East Boulevard
Bismarck, ND 58505
Dates Sampled: 9/5
Change of Custody: Date 9/5
Change of Custody: Date
Date Shipped: 9/6
Carrier FEDEX

North Dakota State Water Commission
900 East Boulevard
Bismarck, ND 58505
By: SR
By: [illegible]
By: [illegible]
By:

Analysis Requested: 8260B 8270 8330 8332

No	Location	No. Bottles	Sample Date	Test For 8260 B	8270	8330	8332	Comments
4 1	6-13101	3 40ml	9/5		X	X	X	additional 1L Bottle shipped in main cooler (13101
		3/40ml	9/5	X				
5 2	6-13102	2L	9/5		X	X	X	
	~~6-13~~	3/40ml	9/5	X				
3	Trip Blank	(1) 40ml						
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								

Blank Temperature at time of shipping_____

OIE-0300

Samples To: DATA CHEM LABORATORIES
960 WEST LEVOY DRIVE
SALT LAKE CITY, UTAH 84123-2547
TEL. (801

North Dakota State Water Commission
900 East Boulevard
Bismarck, ND 58505
Dates Sampled: 9/4
Change of Custody: Date 9/7
Change of Custody: Date
Date Shipped: 9/6
Carrier Feder

North Dakota State Water Commission
900 East Boulevard
Bismarck, ND 58505
By:
By:
By:
By:

Analysis Requested: 8260B 8270 8330 8332

No	Location	No. Bottles	Sample Date	Test For 8260 B	8270	8330	8332	Comments
966 1	5-130946	3	9/4		1	1	1	
		3	9/4	1				
2		4oz vial						
66 3	5-130946 MS/MSD	1		⊗	1			⊗ 2 more for other code
4								
67 68 JP 5	Dup 1	3	9/4		1	1	1	
		3	9/4	3				
6								
7								
8								
9								
10								
11								
12								
13								
14								

Blank Temperature at time of shipping

01E-0300

Samples To: DATA CHEM LABORATORIES
960 WEST LEVOY DRIVE
SALT LAKE CITY, UTAH 84123-2547
TEL. (801

North Dakota State Water Commission
900 East Boulevard
Bismarck, ND 58505
Dates Sampled: 9/4
Change of Custody: Date 9/7
Change of Custody: Date
Date Shipped: 9/6
Carrier

North Dakota State Water Commission
900 East Boulevard
Bismarck, ND 58505
By:
By:
By:
By:

Analysis Requested: 8260B 8270 8330 8332

No	Location	No. Bottles	Sample Date	Test For				Comments
				8260 B	8270	8330	8332	
1	5-13.95 MS/MSD	3	9/4		X	X	X	1L extra
2		3	9/4	X3				
3	1-13[illegible]							
4	1-13103	2			X1L			1L extra
5								
6	1-13104	2			X1L			1L extra
7								
8								
9								
10								
11								
12								
13								
14								

Blank Temperature at time of shipping

OIE-0300

Samples To: DATA CHEM LABORATORIES
960 WEST LEVOY DRIVE
SALT LAKE CITY, UTAH 84123-2547
TEL. (801

2-13105

5-13097 Lake Oe

North Dakota State Water Commission
900 East Boulevard
Bismarck, ND 58505

Dates Sampled: 9/4 9/5 By:
Change of Custody: Date 9/7 By:
Change of Custody: Date By:
Date Shipped: 9/6 By:
Carrier

North Dakota State Water Commission
900 East Boulevard
Bismarck, ND 58505

Analysis Requested: 8260B 8270 8330 8332

No	Location	No. Bottles	Sample Date	Test For 8260B	8270C	8330	8332	Comments
			9/5					
970 1	Lake Oe	3			1L	1L	1L	
		3	9/5	40mL				
2	~~2-~~							
71 3	2-13105		9/4		1L			
4								
72 5	5-13097	3	9/4		1L	1L	1L	
		3	9/4	40mL				
6								
73	Trip Blank			40mL				
7								
8								
9								
10								
11								
12								
13								
14								

Blank Temperature at time of shipping

APPENDIX C: RESIDUES OF HERBICIDES, PESTICIDES, AND PETROLEUM

Laboratory results, and quality control report.

Includes:

Herbicides - picloram, prometon, 2,4-D

Insectide - malathion

Petroleum Residues

- DRO (Diesel Range Organics)
- GRO (Gasoline Range Organics)

MINNESOTA VALLEY TESTING LABORATORIES, INC.

1126 N. Front St. - New Ulm, MN 56073 - 800-782-3557 - Fax 507-359-2890
1411 S. 12th St. - Bismarck, ND 58502 - 800-279-6885 - Fax 701-258-9724
710 S. 14th St. - Grand Forks, ND 58201 - 800-272-7645 - Fax 701-772-0028
35 W. Lincoln Way - Nevada, IA 50201 - 800-362-0855 - Fax 515-382-3885

MEMBER ACIL

BILL SCHUH
NORTH DAKOTA STATE WATER COMMISSION
900 EAST BOULEVARD
BISMARCK ND 58505

Report Date: 3 Oct 01
Lab Number: 01-A26321
Work Order #:22-0368
Account #: 002033
Sample Matrix: GROUNDWATER
Date Sampled: 4 Sep 01
Date Received: 7 Sep 01

Sample Description: SITE 1 - WELL 13103

Temperature at Receipt: ON ICE

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Date Ext / KDA List I					13 Sep 01	SP
Date Ext / Org-P					13 Sep 01	SP
EPA DRO Extraction					10 Sep 01	JF
GRO (TPH)	< 0.2	mg/l	0.200	8015B/OA1	13 Sep 01	KE
DRO (TEH)	< 0.3	mg/l	0.30	8015B/OA2	26 Sep 01	KDW
Malathion	< 0.5	ppb	0.5	3510	13 Sep 01	RB
Prometon (Pramitol)	< 0.5	ug/l	0.5	3510/8270 Mod	18 Sep 01	RB

BTEX/GRO Sample pH < 2
BTEX/GRO SURROGATE RECOVERY: 108 %
BTEX/GRO SURROGATE2 RECOVERY: 95 %
DRO SURROGATE RECOVERY: 90 %

Approved by:
Dan O'Connell, Organic
Laboratory Manager New Ulm, MN

RL = Reporting Limit

Elevated "Less Than Result" (<): @ = Due to sample matrix # = Due to sample concentration
! = Due to sample quantity + = Due to extract volume

CERTIFICATION: MN LAB # 027-015-125 WI LAB # 999447680 ND MICRO # 1013-M ND WW/DW # R-040 IA LAB #: 132

MINNESOTA VALLEY TESTING LABORATORIES, INC.

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1411 S. 12th St. - Bismarck, ND 58502 - 800-279-6885 - Fax 701-258-9724
710 S. 14th St. - Grand Forks, ND 58201 - 800-272-7645 - Fax 701-772-0028
35 W. Lincoln Way - Nevada, IA 50201 - 800-362-0855 - Fax 515-382-3885

MEMBER ACIL

Report Date: 3 Oct 01
Lab Number: 01-A26322
Work Order #:22-0368
Account #: 002033
Sample Matrix: GROUNDWATER
Date Sampled: 4 Sep 01
Date Received: 7 Sep 01

BILL SCHUH
NORTH DAKOTA STATE WATER COMMISSION
900 EAST BOULEVARD
BISMARCK ND 58505

Sample Description: SITE 1 - WELL 13104

Temperature at Receipt: ON ICE

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Date Ext / MDA List I					13 Sep 01	SP
Date Ext / Org-P					13 Sep 01	SP
EPA DRO Extraction					10 Sep 01	JF
GRO (TPH)	< 0.2	mg/l	0.200	8015B/OA1	13 Sep 01	KE
DRO (TEH)	< 0.3	mg/l	0.30	8015B/OA2	26 Sep 01	MDW
Malathion	< 0.5	ppb	0.5	3510	13 Sep 01	RB
Prometon (Pramitol)	< 0.5	ug/l	0.5	3510/8270 Mod	18 Sep 01	RB

BTEX/GRO Sample pH < 2
BTEX/GRO SURROGATE RECOVERY: 107 %
BTEX/GRO SURROGATE2 RECOVERY: 95 %
DRO SURROGATE RECOVERY: 92 %

Approved by:
Dan O'Connell, Organic
Laboratory Manager New Ulm, MN

RL = Reporting Limit

Elevated "Less Than Result" (<): @ = Due to sample matrix # = Due to sample concentration
! = Due to sample quantity + = Due to extract volume

CERTIFICATION: MN LAB #: 027-015-125 WI LAB #: 999447680 ND MICRO #: 1013-K ND WW/DW #: R-040 IA LAB #: 132

MINNESOTA VALLEY TESTING LABORATORIES, INC.

1126 N. Front St. - New Ulm, MN 56073 - 800-782-3557 - Fax 507-359-2890
1411 S. 12th St. - Bismarck, ND 58502 - 800-279-6885 - Fax 701-258-9724
710 S. 14th St. - Grand Forks, ND 58201 - 800-272-7645 - Fax 701-772-0028
35 W. Lincoln Way - Nevada, IA 50201 - 800-362-0855 - Fax 515-382-3885

MEMBER ACIL

BILL SCHUH
NORTH DAKOTA STATE WATER COMMISSION
900 EAST BOULEVARD
BISMARCK ND 58505

Report Date: 3 Oct 01
Lab Number: 01-A26323
Work Order #:22-0368
Account #: 002033
Sample Matrix: GROUNDWATER
Date Sampled: 5 Sep 01
Date Received: 7 Sep 01

Sample Description: SITE 4 - WELL-RESERVOIR

Temperature at Receipt: ON ICE

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Date Ext / MDA List I					13 Sep 01	SP
Date Ext / Org-P					13 Sep 01	SP
EPA DRO Extraction					10 Sep 01	JF
GRO (TPH)	< 0.2	mg/l	0.200	8015B/OA1	13 Sep 01	KE
DRO (TEH)	< 0.3	mg/l	0.30	8015B/OA2	26 Sep 01	MDH
Malathion	< 0.5	ppb	0.5	3510	13 Sep 01	RB
Prometon (Pramitol)	< 0.5	ug/l	0.5	3510/8270 Mod	18 Sep 01	RB

BTEX/GRO Sample pH < 2
BTEX/GRO SURROGATE RECOVERY: 105 %
BTEX/GRO SURROGATE2 RECOVERY: 95 %
DRO SURROGATE RECOVERY: 95 %

Approved by:
Dan O'Connell, Organic
Laboratory Manager New Ulm, MN

RL = Reporting Limit

Elevated "Less Than Result" (<): @ = Due to sample matrix # = Due to sample concentration
! = Due to sample quantity + = Due to extract volume

CERTIFICATION: MN LAB #: 027-015-125 WI LAB #: 999447680 ND MICRO #: 1013-M ND WW/DW #: R-040 IA LAB #: 132

MVTL

MINNESOTA VALLEY TESTING LABORATORIES, INC.

1126 N. Front St. ~ New Ulm, MN 56073 ~ 800-782-3557 ~ Fax 507-359-2890
1411 S. 12th St. ~ Bismarck, ND 58502 ~ 800-279-6885 ~ Fax 701-258-9724
710 S. 14th St. ~ Grand Forks, ND 58201 ~ 800-272-7645 ~ Fax 701-772-0028
35 W. Lincoln Way ~ Nevada, IA 50201 ~ 800-362-0855 ~ Fax 515-382-3885

MEMBER ACIL

BILL SCHUH
NORTH DAKOTA STATE WATER COMMISSION
900 EAST BOULEVARD
BISMARCK ND 58505

Report Date: 3 Oct 01
Lab Number: 01-A26324
Work Order #:22-0368
Account #: 002033
Sample Matrix: GROUNDWATER
Date Sampled: 4 Sep 01
Date Received: 7 Sep 01

Sample Description: SITE 5 - WELL 13097

Temperature at Receipt: ON ICE

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Date Ext / NDA List I					13 Sep 01	SP
Date Ext / Org-P					13 Sep 01	SP
Malathion	< 0.5	ppb	0.5	3510	13 Sep 01	RB
Prometon (Pramitol)	< 0.5	ug/l	0.5	3510/8270 Mod	18 Sep 01	RB

Approved by:
Dan O'Connell, Organic
Laboratory Manager New Ulm, MN

RL = Reporting Limit

Elevated "Less Than Result" (<): @ = Due to sample matrix
= Due to sample concentration
! = Due to sample quantity
+ = Due to extract volume

CERTIFICATION: MN LAB # 027-015-125 WI LAB # 999447680 ND MICRO # 1013-M ND WW/DW # R-040 IA LAB #: 132

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MEMBER ACIL

BILL SCHUH
NORTH DAKOTA STATE WATER COMMISSION
900 EAST BOULEVARD
BISMARCK ND 58505

Report Date: 3 Oct 01
Lab Number: 01-A26325
Work Order #:22-0368
Account #: 002033
Sample Matrix: GROUNDWATER
Date Sampled: 4 Sep 01
Date Received: 7 Sep 01

Sample Description: SITE 5 - WELL 13098

Temperature at Receipt: ON ICE

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Date Ext / MDA List I					13 Sep 01	SP
Date Ext / Org-P					13 Sep 01	SP
EPA DRO Extraction					10 Sep 01	JF
GRO (TPH)	< 0.2	mg/l	0.200	8015B/OA1	13 Sep 01	KE
DRO (TEH)	< 0.3	mg/l	0.30	8015B/OA2	26 Sep 01	MDW
Malathion	< 0.5	ppb	0.5	3510	13 Sep 01	RB
Prometon (Pramitol)	< 0.5	ug/l	0.5	3510/8270 Mod	18 Sep 01	RB

BTEX/GRO Sample pH < 2
BTEX/GRO SURROGATE RECOVERY: 106 %
BTEX/GRO SURROGATE2 RECOVERY: 93 %
DRO SURROGATE RECOVERY: 89 %

Approved by:
Dan O'Connell, Organic
Laboratory Manager New Ulm, MN

RL = Reporting Limit

Elevated "Less Than Result" (<): @ = Due to sample matrix # = Due to sample concentration
! = Due to sample quantity + = Due to extract volume

CERTIFICATION: MN LAB #: 027-015-125 WI LAB #: 999447680 ND MICRO #: 1013-M ND WW/DW #: R-040 IA LAB #: 132

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BILL SCHUH
NORTH DAKOTA STATE WATER COMMISSION
900 EAST BOULEVARD
BISMARCK ND 58505

Report Date: 3 Oct 01
Lab Number: 01-A26326
Work Order #:22-0368
Account #: 002033
Sample Matrix: GROUNDWATER
Date Sampled: 4 Sep 01
Date Received: 7 Sep 01

Sample Description: DUP 1

Temperature at Receipt: ON ICE

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Date Ext / MDA List I					13 Sep 01	SP
Date Ext / Org-P					13 Sep 01	SP
EPA DRO Extraction					10 Sep 01	JF
GRO (TPH)	< 0.2	mg/l	0.200	8015B/OA1	13 Sep 01	KE
DRO (TEH)	< 0.6	mg/l	0.30	8015B/OA2	26 Sep 01	MDW
Malathion	< 0.5	ppb	0.5	3510	13 Sep 01	RB
Prometon (Pramitol)	< 0.5	ug/l	0.5	3510/8270 Mod	18 Sep 01	RB

BTEX/GRO Sample pH < 2
BTEX/GRO SURROGATE RECOVERY: 106 %
BTEX/GRO SURROGATE2 RECOVERY: 94 %
DRO SURROGATE RECOVERY: 84 %

Approved by:
Dan O'Connell, Organic
Laboratory Manager New Ulm, MN

RL = Reporting Limit

Elevated "Less Than Result" (<): @ = Due to sample matrix # = Due to sample concentration
! = Due to sample quantity + = Due to extract volume

CERTIFICATION: MN LAB # 027-015-125 WI LAB # 999447680 ND MICRO # 1013-M ND WW/DW # R-040 IA LAB #: 132

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NORTH DAKOTA STATE WATER COMMISSION
900 EAST BOULEVARD
BISMARCK ND 58505

Report Date: 3 Oct 01
Lab Number: 01-A26327
Work Order #:22-0368
Account #: 002033
Sample Matrix: GROUNDWATER
Date Sampled: 4 Sep 01
Date Received: 7 Sep 01

Sample Description: MS-MSD

Temperature at Receipt: ON ICE

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Date Ext / MDA List I					13 Sep 01	SP
Date Ext / Org-P					13 Sep 01	SP
EPA DRO Extraction					10 Sep 01	JF
GRO (TPH)	< 0.2	mg/l	0.200	8015B/DA1	13 Sep 01	KE
DRO (TEH)	< 0.99	mg/L	0.30	8015B/DA2	26 Sep 01	MDW
Malathion	< 0.5	ppb	0.5	3510	13 Sep 01	RB
Prometon (Pramitol)	< 0.5	ug/l	0.5	3510/8270 Mod	18 Sep 01	RB

BTEX/GRO Sample pH < 2
BTEX/GRO SURROGATE RECOVERY: 106 %
BTEX/GRO SURROGATE2 RECOVERY: 95 %
DRO SURROGATE RECOVERY: 87 %

Approved by:
Dan O'Connell, Organic
Laboratory Manager New Ulm, MN

RL = Reporting Limit

Elevated "Less Than Result" (<): @ = Due to sample matrix # = Due to sample concentration
! = Due to sample quantity + = Due to extract volume

CERTIFICATION: MN LAB #: 027-015-125 WI LAB #: 999447680 ND MICRO #: 1013-M ND WW/DW #: R-040 IA LAB #: 132

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900 EAST BOULEVARD
BISMARCK ND 58505

Report Date: 3 Oct 01
Lab Number: 01-A26328
Work Order #:22-0368
Account #: 002033
Sample Matrix: GROUNDWATER
Date Sampled: 5 Sep 01
Date Received: 7 Sep 01

Sample Description: SITE 6 - WELL 13102

Temperature at Receipt: ON ICE

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Date Ext / NDA List II					14 Sep 01	SP
2,4-D	< 0.5	ug/l	0.5	SW8151-Mod I	21 Sep 01	RB
Picloram	< 0.1	ug/l	0.1	SW8151-Mod I	21 Sep 01	RB

Approved by:
Dan O'Connell, Organic
Laboratory Manager New Ulm, MN

RL = Reporting Limit

Elevated "Less Than Result" (<): @ = Due to sample matrix # = Due to sample concentration
! = Due to sample quantity + = Due to extract volume

CERTIFICATION: MN LAB # 027-015-125 WI LAB # 999447680 ND MICRO # 1013-M ND WW/DW # R-040 IA LAB #: 132

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900 EAST BOULEVARD
BISMARCK ND 58505

Report Date: 3 Oct 01
Lab Number: 01-A26329
Work Order #:22-0368
Account #: 002033
Sample Matrix: GROUNDWATER
Date Sampled: 4 Sep 01
Date Received: 7 Sep 01

Sample Description: SITE 7 - WELL 13087

Temperature at Receipt: ON ICE

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Date Ext / NDA List II					14 Sep 01	SP
EPA DRO Extraction					10 Sep 01	JF
GRO (TPH)	< 0.2	mg/l	0.200	8015B/OA1	13 Sep 01	KE
DRO (TEH)	< 0.3	mg/l	0.30	8015B/OA2	26 Sep 01	MDW
2,4-D	< 0.5	ug/l	0.5	SW8151-Mod I	21 Sep 01	RB
Picloram	< 0.1	ug/l	0.1	SW8151-Mod I	21 Sep 01	RB

BTEX/GRO Sample pH < 2
BTEX/GRO SURROGATE RECOVERY: 105 %
BTEX/GRO SURROGATE2 RECOVERY: 94 %
DRO SURROGATE RECOVERY: 91 %

Approved by:
Dan O'Connell, Organic
Laboratory Manager New Ulm, MN

RL = Reporting Limit

Elevated "Less Than Result" (<): @ = Due to sample matrix # = Due to sample concentration
! = Due to sample quantity + = Due to extract volume

CERTIFICATION: MN LAB # 027-015-125 WI LAB # 999447680 ND MICRO # 1013-M ND WW/DW # R-040 IA LAB #: 132

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BISMARCK ND 58505

Report Date: 3 Oct 01
Lab Number: 01-A27036
Work Order #:22-0368
Account #: 002033
Sample Matrix: GROUNDWATER
Date Sampled: 11 Sep 01
Date Received: 14 Sep 01

Sample Description: SITE 8 - 13106

Temperature at Receipt: ON ICE

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Date Ext / MDA List I					19 Sep 01	SP
Date Ext / MDA List II					20 Sep 01	SP
Date Ext / Org-P					19 Sep 01	SP
DRO Extraction					17 Sep 01	ARH
Sample Concentration For GRO	< 0.03	ppm	0.03	GRO WILUST	17 Sep 01	KE
Sample Concentration For DRO	0.041	ppm	0.035	DRO WILUST	26 Sep 01	MDW
Malathion	< 0.5	ppb	0.5	3510	19 Sep 01	RB
2,4-D	< 0.5	ug/l	0.5	SW8151-Mod I	27 Sep 01	RB
Picloram	< 0.1	ug/l	0.1	SW8151-Mod I	27 Sep 01	RB
Prometon (Pramitol)	< 0.5	ug/l	0.5	3510/8270 Mod	24 Sep 01	RB

BTEX/GRO Sample pH < 2
DRO Sample pH < 2
BTEX/GRO SURROGATE RECOVERY: 100 %

Approved by:
Dan O'Connell, Organic
Laboratory Manager New Ulm, MN

RL = Reporting Limit

Elevated "Less Than Result" (<): @ = Due to sample matrix # = Due to sample concentration
! = Due to sample quantity + = Due to extract volume

CERTIFICATION: MN LAB # 027-015-125 WI LAB # 999447680 ND MICRO # 1013-M ND WW/DW # R-040 IA LAB #: 132

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Report Date: 3 Oct 01
Lab Number: 01-A27037
Work Order #:22-0368
Account #: 002033
Sample Matrix: GROUNDWATER
Date Sampled: 11 Sep 01
Date Received: 14 Sep 01

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BISMARCK ND 58505

Sample Description: SITE 9 - 13089

Temperature at Receipt: ON ICE

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Date Ext / MDA List I					19 Sep 01	SP
Date Ext / MDA List II					20 Sep 01	SP
Date Ext / Org-P					19 Sep 01	SP
DRO Extraction					17 Sep 01	ARH
Sample Concentration For GRO	< 0.03	ppm	0.03	GRO WILUST	17 Sep 01	KE
Sample Concentration For DRO	0.048	ppm	0.035	DRO WILUST	26 Sep 01	MDW
Malathion	< 0.5	ppb	0.5	3510	19 Sep 01	RB
2,4-D	< 0.5	ug/l	0.5	SW8151-Mod I	27 Sep 01	RB
Picloram	< 0.1	ug/l	0.1	SW8151-Mod I	27 Sep 01	RB
Prometon (Pramitol)	< 0.5	ug/l	0.5	3510/8270 Mod	24 Sep 01	RB

BTEX/GRO Sample pH < 2
DRO Sample pH < 2
BTEX/GRO SURROGATE RECOVERY: 100 %

Approved by:
Dan O'Connell, Organic
Laboratory Manager New Ulm, MN

RL = Reporting Limit

Elevated "Less Than Result" (<): @ = Due to sample matrix # = Due to sample concentration
! = Due to sample quantity + = Due to extract volume

CERTIFICATION: MN LAB #: 027-015-125 WI LAB #: 999447680 ND MICRO #: 1013-M ND WW/DW #: R-040 IA LAB #: 132

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900 EAST BOULEVARD
BISMARCK ND 58505

Report Date: 3 Oct 01
Lab Number: 01-A27038
Work Order #:22-0368
Account #: 002033
Sample Matrix: GROUNDWATER
Date Sampled: 11 Sep 01
Date Received: 14 Sep 01

Sample Description: SITE 10 - 13093

Temperature at Receipt: ON ICE

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Date Ext / MDA List II					20 Sep 01	SP
DRO Extraction					17 Sep 01	ARH
Sample Concentration For GRO	< 0.03	ppm	0.03	GRO WILUST	17 Sep 01	KE
Sample Concentration For DRO	0.070	ppm	0.035	DRO WILUST	26 Sep 01	MDW
2,4-D	< 0.5	ug/l	0.5	SW8151-Mod I	27 Sep 01	RB
Picloram	< 0.1	ug/l	0.1	SW8151-Mod I	27 Sep 01	RB

BTEX/GRO Sample pH < 2
DRO Sample pH < 2
BTEX/GRO SURROGATE RECOVERY: 99 %

Approved by:
Dan O'Connell, Organic
Laboratory Manager New Ulm, MN

RL = Reporting Limit

Elevated "Less Than Result" (<): @ = Due to sample matrix # = Due to sample concentration
! = Due to sample quantity + = Due to extract volume

CERTIFICATION: MN LAB # 027-015-125 WI LAB # 999447680 ND MICRO # 1013-M ND WW/DW # R-040 IA LAB #: 132

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900 EAST BOULEVARD
BISMARCK ND 58505

Report Date: 3 Oct 01
Lab Number: 01-A27039
Work Order #:22-0368
Account #: 002033
Sample Matrix: GROUNDWATER
Date Sampled: 12 Sep 01
Date Received: 14 Sep 01

Sample Description: SITE 11 - SW LAKE

Temperature at Receipt: ON ICE

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Date Ext / MDA List I					19 Sep 01	SP
Date Ext / MDA List II					20 Sep 01	SP
Date Ext / Org-P					19 Sep 01	SP
DRO Extraction					17 Sep 01	ARH
Sample Concentration For GRO	< 0.03	ppm	0.03	GRO WILUST	17 Sep 01	KE
Sample Concentration For DRO	< 0.035 !	ppm	0.035	DRO WILUST	26 Sep 01	MDW
Malathion	< 0.5	ppb	0.5	3510	19 Sep 01	RB
2,4-D	< 0.5	ug/l	0.5	SW8151-Mod I	27 Sep 01	RB
Picloram	< 0.1	ug/l	0.1	SW8151-Mod I	27 Sep 01	RB
Prometon (Pramitol)	< 0.5	ug/l	0.5	3510/8270 Mod	24 Sep 01	RB

BTEX/GRO Sample pH < 2
DRO Sample pH < 2
BTEX/GRO SURROGATE RECOVERY: 98 %

Approved by:
Dan O'Connell, Organic
Laboratory Manager New Ulm, MN

RL = Reporting Limit

Elevated "Less Than Result" (<): @ = Due to sample matrix # = Due to sample concentration
! = Due to sample quantity + = Due to extract volume

CERTIFICATION: MN LAB # 027-015-125 WI LAB # 999447680 ND MICRO # 1013-M ND WW/DW # R-040 IA LAB #: 132

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900 EAST BOULEVARD
BISMARCK ND 58505

Report Date: 3 Oct 01
Lab Number: 01-A27040
Work Order #:22-0368
Account #: 002033
Sample Matrix: GROUNDWATER
Date Sampled: 12 Sep 01
Date Received: 14 Sep 01

Sample Description: SITE 12 - 13085

Temperature at Receipt: ON ICE

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Date Ext / MDA List II					20 Sep 01	SP
2,4-D	< 0.5	ug/l	0.5	SW8151-Mod I	27 Sep 01	RB
Picloram	< 0.1	ug/l	0.1	SW8151-Mod I	27 Sep 01	RB

Approved by:
Dan O'Connell, Organic
Laboratory Manager New Ulm, MN

RL = Reporting Limit

Elevated "Less Than Result" (<): @ = Due to sample matrix # = Due to sample concentration
! = Due to sample quantity + = Due to extract volume

CERTIFICATION: MN LAB #: 027-015-125 WI LAB #: 999447680 ND MICRO #: 1013-M ND WW/DW #: R-040 IA LAB #: 132

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900 EAST BOULEVARD
BISMARCK ND 58505

Report Date: 3 Oct 01
Lab Number: 01-A27041
Work Order #:22-0368
Account #: 002033
Sample Matrix: GROUNDWATER
Date Sampled: 12 Sep 01
Date Received: 14 Sep 01

Sample Description: SITE 13 - 13100

Temperature at Receipt: ON ICE

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Date Ext / NDA List I					19 Sep 01	SP
Date Ext / NDA List II					20 Sep 01	SP
Date Ext / Org-P					19 Sep 01	SP
Malathion	< 0.5	ppb	0.5	3510	19 Sep 01	RB
2,4-D	< 0.5	ug/l	0.5	SW8151-Mod I	27 Sep 01	RB
Picloram	< 0.1	ug/l	0.1	SW8151-Mod I	27 Sep 01	RB
Prometon (Pramitol)	< 0.5	ug/l	0.5	3510/8270 Mod	24 Sep 01	RB

Approved by:
Dan O'Connell, Organic
Laboratory Manager New Ulm, MN

RL = Reporting Limit

Elevated "Less Than Result" (<): @ = Due to sample matrix # = Due to sample concentration
! = Due to sample quantity + = Due to extract volume

CERTIFICATION: MN LAB #: 027-015-125 WI LAB #: 999447680 ND MICRO #: 1013-M ND WW/DW #: R-040 IA LAB #: 132

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Report Date: 3 Oct 01
Lab Number: 01-A26330
Work Order #:22-0368
Account #: 002033
Sample Matrix: GROUNDWATER
Date Sampled: 5 Sep 01
Date Received: 7 Sep 01

BILL SCHUH
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900 EAST BOULEVARD
BISMARCK ND 58505

Sample Description: SITE 15 - WELL -LAKE COE

Temperature at Receipt: ON ICE

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Date Ext / NDA List II					14 Sep 01	SP
EPA DRO Extraction					10 Sep 01	JF
GRO (TPH)	< 0.2	mg/l	0.200	8015B/OA1	13 Sep 01	KE
DRO (TEH)	< 0.3	mg/l	0.30	8015B/OA2	26 Sep 01	MDW
2,4-D	< 0.5	ug/l	0.5	SW8151-Mod I	21 Sep 01	RB
Picloram	< 0.1	ug/l	0.1	SW8151-Mod I	21 Sep 01	RB

BTEX/GRO Sample pH < 2
BTEX/GRO SURROGATE RECOVERY: 105 %
BTEX/GRO SURROGATE2 RECOVERY: 95 %
DRO SURROGATE RECOVERY: 80 %

Approved by:
Dan O'Connell, Organic
Laboratory Manager New Ulm, MN

RL = Reporting Limit

Elevated "Less Than Result" (<): @ = Due to sample matrix # = Due to sample concentration
! = Due to sample quantity + = Due to extract volume

CERTIFICATION: MN LAB # 027-015-125 WI LAB # 999447680 ND MICRO # 1013-M ND WW/DW # R-040 IA LAB #: 132

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BISMARCK ND 58505

Report Date: 3 Oct 01
Lab Number: 01-A27042
Work Order #:22-0368
Account #: 002033
Sample Matrix: GROUNDWATER
Date Sampled: 11 Sep 01
Date Received: 14 Sep 01

Sample Description: SITE 16 - N. SPRING

Temperature at Receipt: ON ICE

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Date Ext / MDA List II					20 Sep 01	SP
DRO Extraction					17 Sep 01	ARH
Sample Concentration For GRO	< 0.03	ppm	0.03	GRO WILUST	17 Sep 01	KE
Sample Concentration For DRO	< 0.038 !	ppm	0.035	DRO WILUST	26 Sep 01	MDW
2,4-D	< 0.5	ug/l	0.5	SW8151-Mod I	27 Sep 01	RB
Picloram	< 0.1	ug/l	0.1	SW8151-Mod I	27 Sep 01	RB

BTEX/GRO Sample pH < 2
DRO Sample pH < 2
BTEX/GRO SURROGATE RECOVERY: 99 %

Approved by:
Dan O'Connell, Organic
Laboratory Manager New Ulm, MN

RL = Reporting Limit

Elevated "Less Than Result" (<): @ = Due to sample matrix # = Due to sample concentration
! = Due to sample quantity + = Due to extract volume

CERTIFICATION: MN LAB # 027-015-125 WI LAB # 999447680 ND MICRO # 1013-M ND WW/DW # R-040 IA LAB #: 132

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MEMBER ACIL

BILL SCHUH
NORTH DAKOTA STATE WATER COMMISSION
900 EAST BOULEVARD
BISMARCK ND 58505

Report Date: 3 Oct 01
Lab Number: 01-A27043
Work Order #:22-0368
Account #: 002033
Sample Matrix: GROUNDWATER
Date Sampled: 11 Sep 01
Date Received: 14 Sep 01

Sample Description: SITE 20 - 13094

Temperature at Receipt: ON ICE

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Date Ext / MDA List I					19 Sep 01	SP
Date Ext / MDA List II					20 Sep 01	SP
Date Ext / Org-P					19 Sep 01	SP
Malathion	< 0.5	ppb	0.5	3510	19 Sep 01	RB
2,4-D	< 0.5	ug/L	0.5	SW8151-Mod I	27 Sep 01	RB
Picloram	< 0.1	ug/L	0.1	SW8151-Mod I	27 Sep 01	RB
Prometon (Pramitol)	< 0.5	ug/L	0.5	3510/8270 Mod	24 Sep 01	RB

Approved by:
Dan O'Connell, Organic
Laboratory Manager New Ulm, MN

RL = Reporting Limit

Elevated "Less Than Result" (<): @ = Due to sample matrix # = Due to sample concentration
! = Due to sample quantity + = Due to extract volume

CERTIFICATION: MN LAB # 027-015-125 WI LAB # 999447680 ND MICRO # 1013-M ND WW/DW # R-040 IA LAB #: 132

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MEMBER ACIL

BILL SCHUH
NORTH DAKOTA STATE WATER COMMISSION
900 EAST BOULEVARD
BISMARCK ND 58505

Report Date: 3 Oct 01
Lab Number: 01-A26331
Work Order #:22-0368
Account #: 002033
Sample Matrix: GROUNDWATER
Date Sampled: 5 Sep 01
Date Received: 7 Sep 01

Sample Description: TRIP BLANK

Temperature at Receipt: ON ICE

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
GRO (TPH)	< 0.2	mg/L	0.200	8015B/OA1	13 Sep 01	KE

BTEX/GRO Sample pH < 2
BTEX/GRO SURROGATE RECOVERY: 104 %
BTEX/GRO SURROGATE2 RECOVERY: 95 %

Approved by:
Dan O'Connell, Organic
Laboratory Manager New Ulm, MN

RL = Reporting Limit

Elevated "Less Than Result" (<): @ = Due to sample matrix # = Due to sample concentration
! = Due to sample quantity + = Due to extract volume

CERTIFICATION: MN LAB #: 027-015-125 WI LAB #: 999447680 ND MICRO #: 1013-M ND WW/DW #: R-040 IA LAB #: 132

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MEMBER ACIL

BILL SCHUH
NORTH DAKOTA STATE WATER COMMISSION
900 EAST BOULEVARD
BISMARCK ND 58505

Report Date: 3 Oct 01
Lab Number: 01-A27044
Work Order #:22-0368
Account #: 002033
Sample Matrix: GROUNDWATER
Date Sampled: 11 Sep 01
Date Received: 14 Sep 01

Sample Description: DUP 3

Temperature at Receipt: ON ICE

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Date Ext / MDA List I					19 Sep 01	SP
Date Ext / MDA List II					20 Sep 01	SP
Date Ext / Org-P					19 Sep 01	SP
DRO Extraction					17 Sep 01	ARH
Sample Concentration For GRO	< 0.03	ppm	0.03	GRO WILUST	17 Sep 01	KE
Sample Concentration For DRO	< 0.035 !	ppm	0.035	DRO WILUST	26 Sep 01	MDW
Malathion	< 0.5	ppb	0.5	3510	19 Sep 01	RB
2,4-D	< 0.5	ug/l	0.5	SW8151-Mod I	27 Sep 01	RB
Picloram	< 0.1	ug/l	0.1	SW8151-Mod I	27 Sep 01	RB
Prometon (Pramitol)	< 0.5	ug/l	0.5	3510/8270 Mod	24 Sep 01	RB

BTEX/GRO Sample pH < 2
DRO Sample pH < 2
BTEX/GRO SURROGATE RECOVERY: 99 %

Approved by:
Dan O'Connell, Organic
Laboratory Manager New Ulm, MN

RL = Reporting Limit

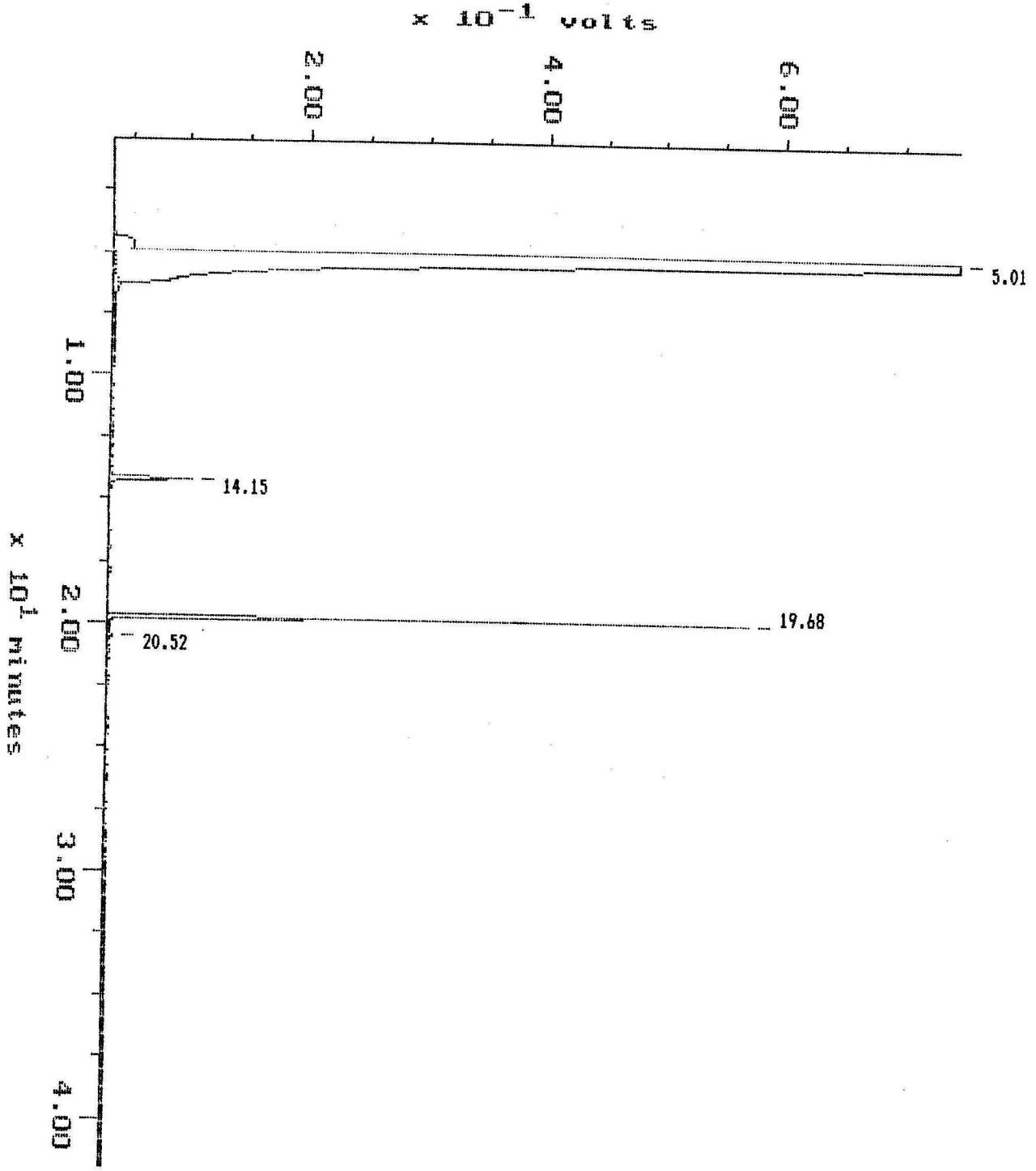
Elevated "Less Than Result" (<): @ = Due to sample matrix # = Due to sample concentration
! = Due to sample quantity + = Due to extract volume

CERTIFICATION: MN LAB # 027-015-125 WI LAB # 999447680 ND MICRO # 1013-M ND WW/DW # R-040 IA LAB #: 132

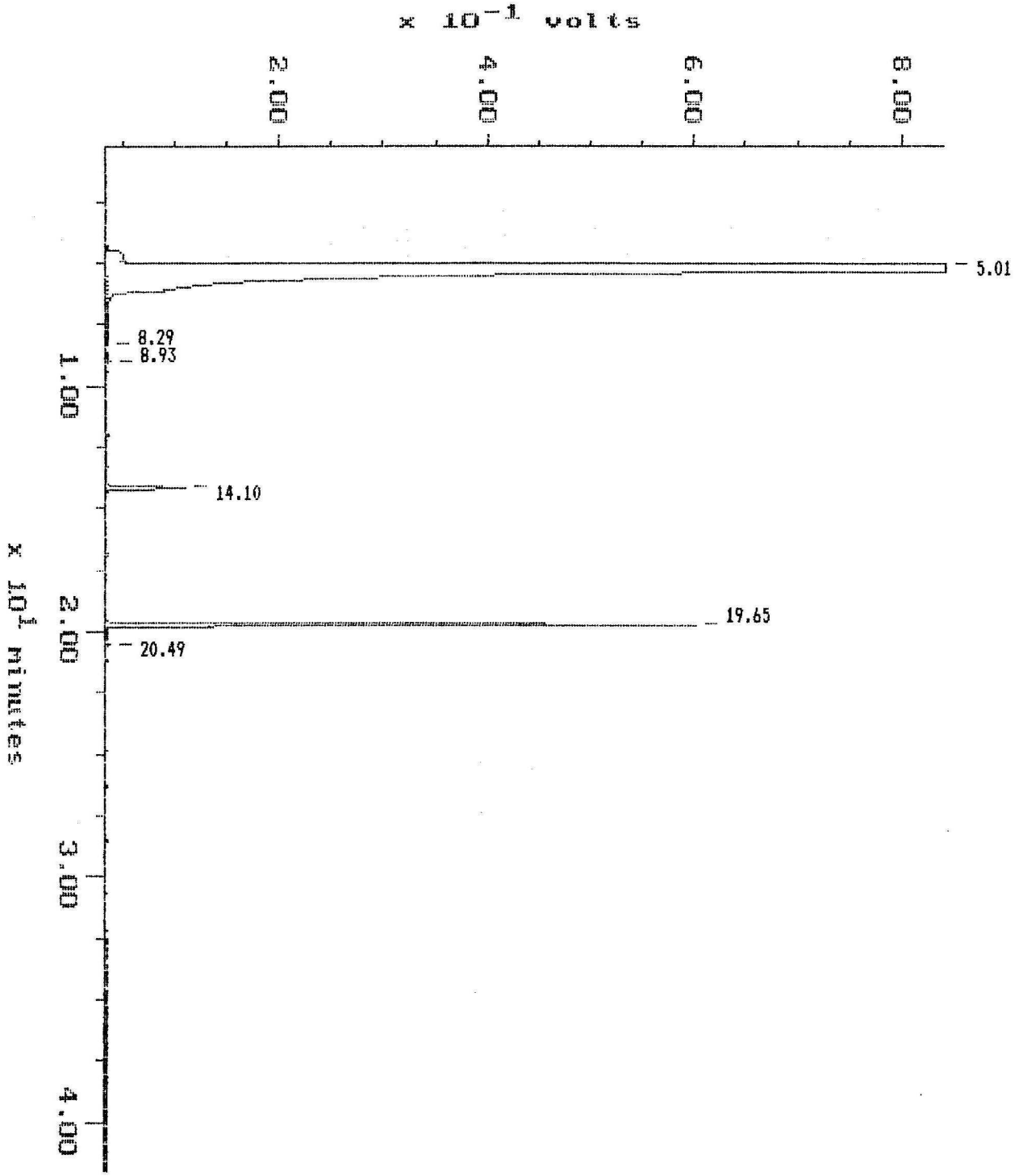
Sample: A27036B
Acquired: 17-SEP-101 16:40

Channel: FID
Method: C:\MAX\DATA3\AWGR17AU

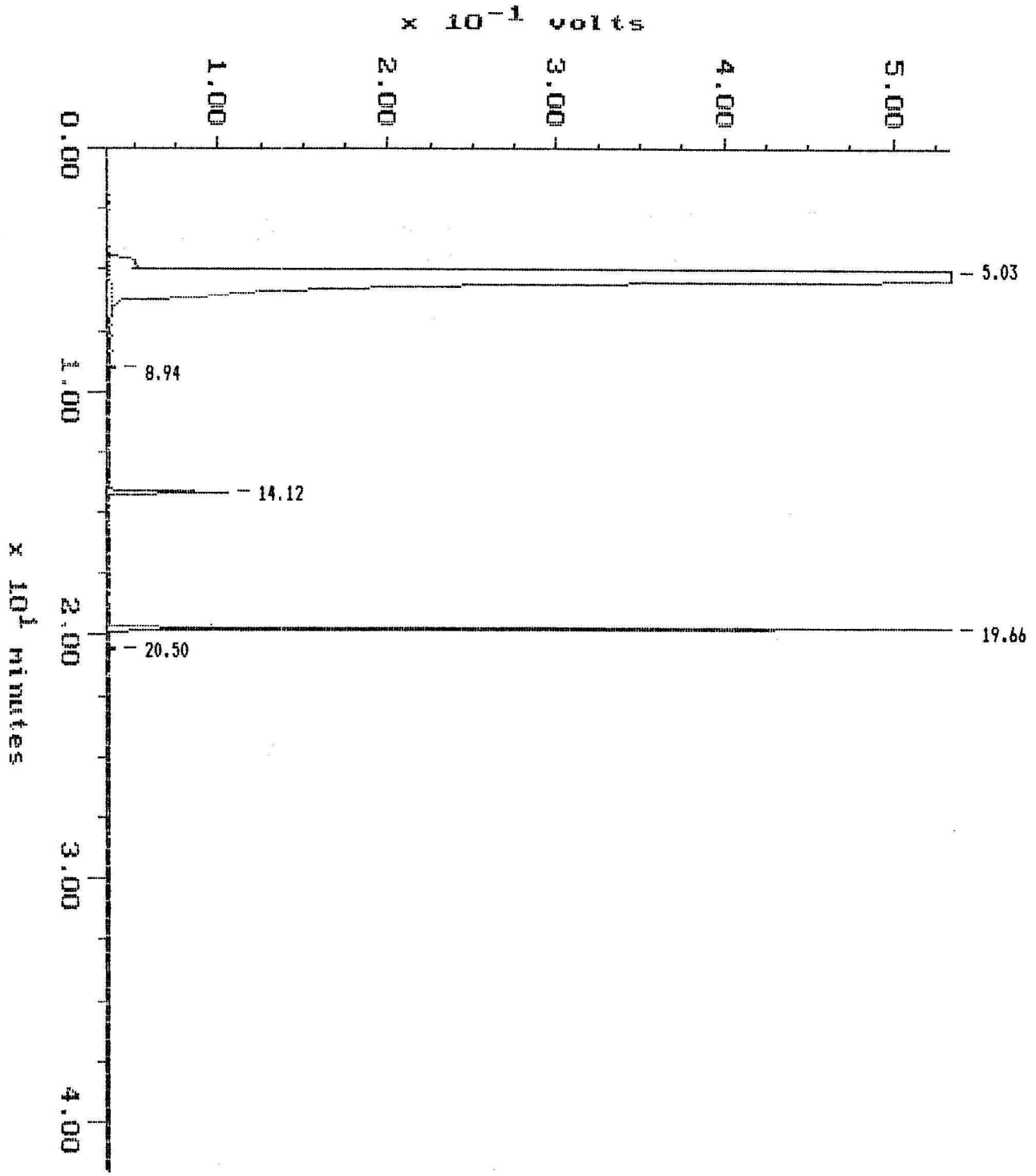
Filename: A27036B
Operator:



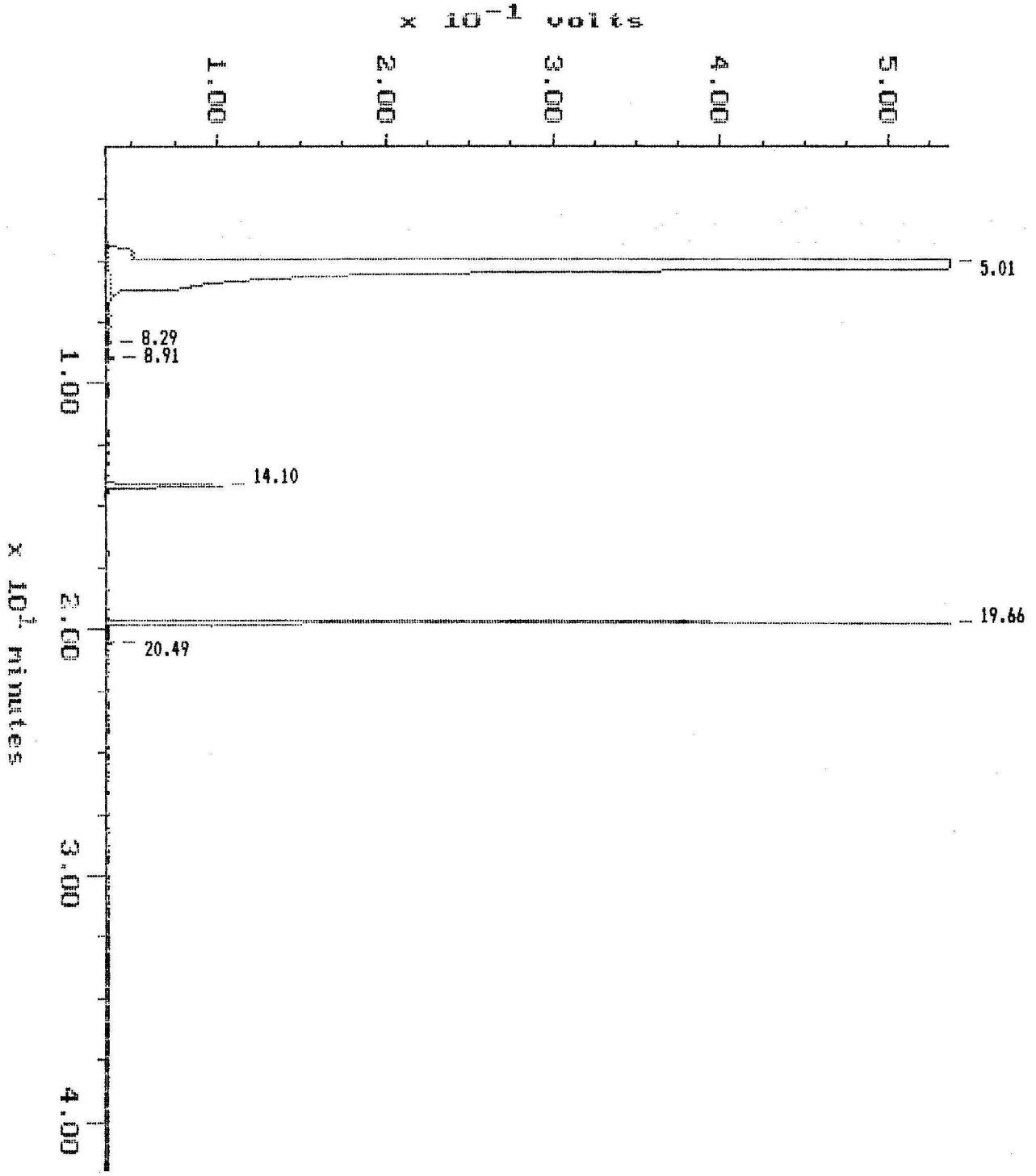
Sample: A27037B Channel: FID Filename: A27037B
Acquired: 17-SEP-101 17:36 Method: C:\MAX\DATA3\AWGR17AU Operator:



Sample: A27038B
Acquired: 17-SEP-101 18:37
Channel: FID
Method: C:\MAX\DATA3\AWGR17AU
Filename: A27038B
Operator:



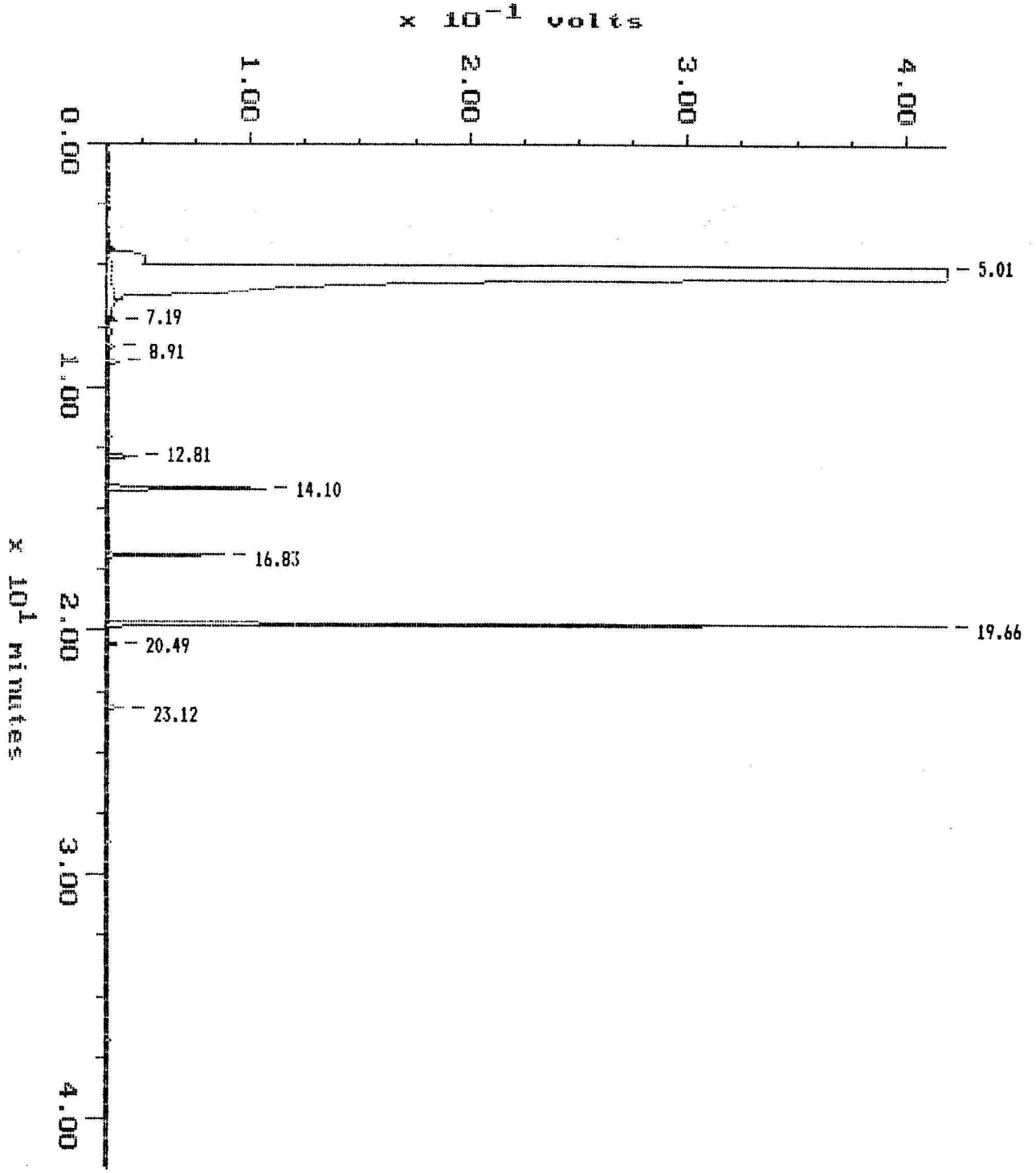
Sample: A27039B Channel: FID Filename: A27039B
Acquired: 17-SEP-101 22:21 Method: C:\MAX\DATA3\BWGR17AU Operator:



Sample: A27042B
Acquired: 17-SEP-101 19:32

Channel: FID
Method: C:\MAX\DATA3\AWGR17AU

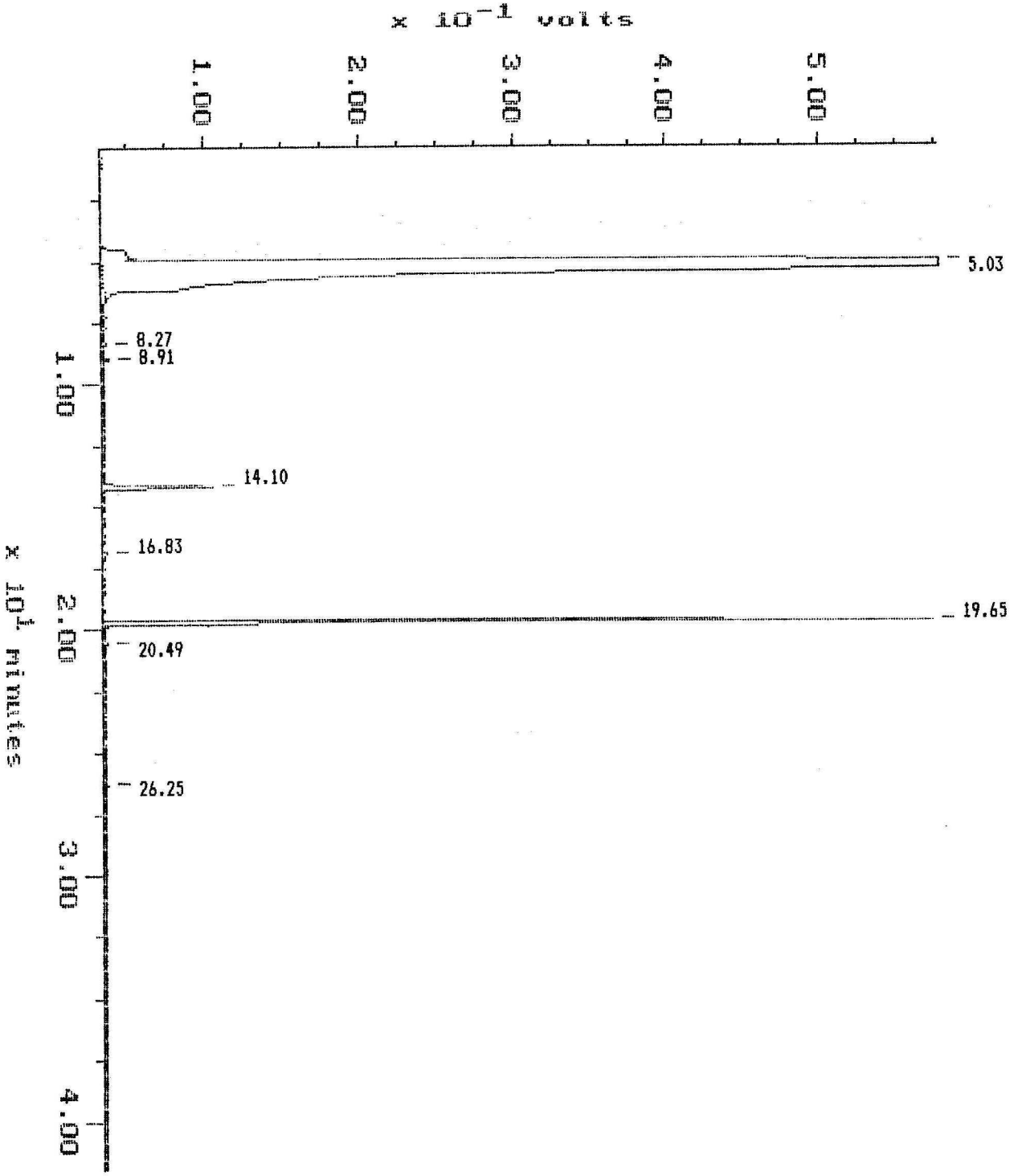
Filename: A27042B
Operator:



Sample: A27044B
Acquired: 17-SEP-101 20:26

Channel: FID
Method: C:\MAX\DATA3\AWGR17AU

Filename: A27044B
Operator:



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MVTL

QUALITY CONTROL REPORT

Work Order #: 200122-0368
Lab #: 01-A26321 through 01-A26327
Date Reported: 24 September 2001

Analyte	Spike (ppb)	Recovered (ppb)	% Recovery	QC Blank Analyte Concentrations
Pramitol	1.00	1.00	100	ND

ND = None Detected

MVTL METHOD I.D.	REVISION	REFERENCE METHOD
B15323	1.8	US EPA SW 846-8081 8141A-3510

Quality control data reviewed and approved by R. Dan O'Connell, Organics Laboratory Manager
By and for Minnesota Valley Testing Laboratories, Inc.

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MEMBER ACIL

MVTL

QUALITY CONTROL REPORT

Work Order #: 200122-0368
Lab #: 01-A2736 through 01-A27044
Date Reported: 01 October 2001

Analyte	Spike (ppb)	Recovered (ppb)	% Recovery	QC Blank Analyte Concentrations
Pramitol	1.00	1.04	104	ND

ND = None Detected

MVTL METHOD I.D.	REVISION	REFERENCE METHOD
B15323	1.8	US EPA SW-846-8081-8141A-3510

Quality control data reviewed and approved by R. Dan O'Connell, Organics Laboratory Manager
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MEMBER ACIL

MVTL

QUALITY CONTROL REPORT

Work Order #: 200122-0368
Lab #: 01-A27036 through 01-A27044
Date Reported: 01 October 2001

Analyte	Spike (ppb)	Recovered (ppb)	% Recovery	QC Blank Analyte Concentrations
2,4-D	1.00	1.08	108	ND
Picloram	1.00	0.77	77	ND

ND = None Detected

MVTL METHOD I.D.	REVISION	REFERENCE METHOD
T00523	2.0	US EPA SW-846, Method 8151 (Modified)

Quality control data reviewed and approved by R. Dan O'Connell, Organics Laboratory Manager
By and for Minnesota Valley Testing Laboratories, Inc.

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MVTL

QUALITY CONTROL REPORT

Work Order #: 200122-0368
Lab #: 01-A26321 through 01-A26327
Date Reported: 24 September 2001

Analyte	Spike (ppb)	Recovered (ppb)	% Recovery	QC Blank Analyte Concentrations
Malathion	1.00	1.15	115	ND

ND = None Detected

MVTL METHOD I.D.	REVISION	REFERENCE METHOD
P11523	1.4	EPA SW-846 Methods 3510, 8141, and 8081

Quality control data reviewed and approved by R. Dan O'Connell, Organics Laboratory Manager
By and for Minnesota Valley Testing Laboratories, Inc.

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MVTL

QUALITY CONTROL REPORT

Work Order #: 200122-0368
Lab #: 01-A26328 through 01-A26330
Date Reported: 24 September 2001

Analyte	Spike (ppb)	Recovered (ppb)	% Recovery	QC Blank Analyte Concentrations
2,4-D	1.00	1.15	115	ND
Picloram	1.00	0.87	87	ND

ND = None Detected

MVTL METHOD I.D.	REVISION	REFERENCE METHOD
T00523	2.0	US EPA SW-846, Method 8151 (Modified)

Quality control data reviewed and approved by R. Dan O'Connell, Organics Laboratory Manager
By and for Minnesota Valley Testing Laboratories, Inc.

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MVTL

QUALITY CONTROL REPORT

Work Order #: 200122-0368
Lab #: 01-A27036 through 01-A27044
Date Reported: 01 October 2001

Analyte	Spike (ppb)	Recovered (ppb)	% Recovery	QC Blank Analyte Concentrations
Malathion	1.08	1.00	93	ND

ND = None Detected

MVTL METHOD I.D.	REVISION	REFERENCE METHOD
P11523	1.4	EPA SW-846 Methods 3510, 8141, and 8081

Quality control data reviewed and approved by R. Dan O'Connell, Organics Laboratory Manager
By and for Minnesota Valley Testing Laboratories, Inc.