Lake Poinsett/Oakwood Lakes Water Quality
Study Area Report

Prepared by the
South Dakota Department of Water and Natural Resources
Water Quality Management Section

October 1985

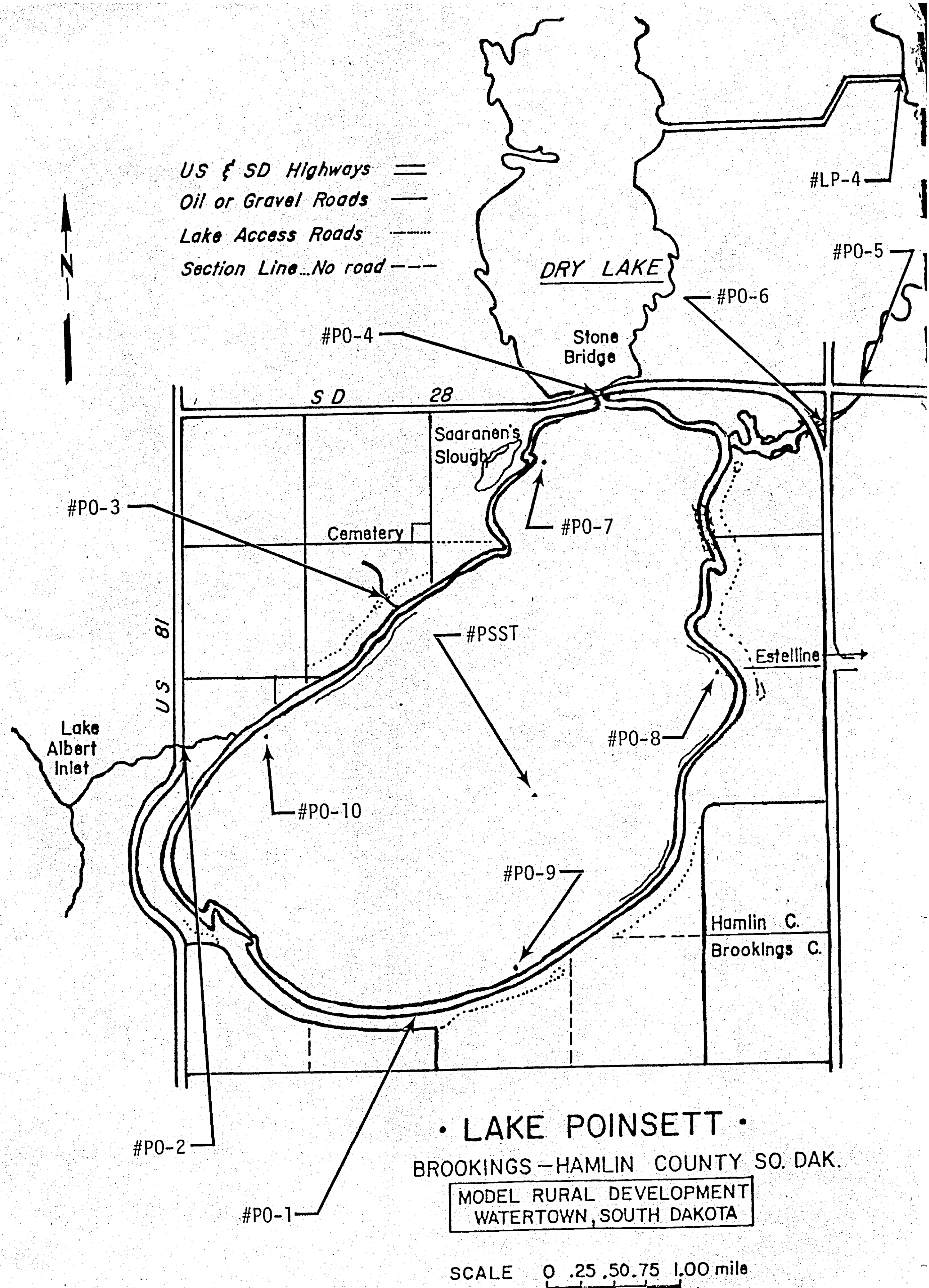

Figure 5. Sample site locations for Lake Poinsett and its tributaries.

Site	Description
46P001 (PO-1)	Latitude 44 Deg., 32 Min., 3 Sec., Longitude 97 Deg., 5 Min., 26 Sec., Township 112N, Range 52W, Section 5. SE1/4, NW1/4, NE1/4, SE1/4. This site is located on a southern creek to Lake Poinsett in the vicinity of Arlington Beach, 1.5 miles west and 4.5 miles south of site 4, on the north side of the road.
46P002 (PO-2)	Latitude 44 Deg., 33 Min., 47 Sec., Longitude 97 Deg., 7 Min., 40 Sec., Township 113N, Range 52W, Section 30. NE1/4, SE1/4, NE1/4, SE1/4. This site is located on a southwest creek which flows from Lake Albert into Lake Poinsett, 2.25 miles west and 2.5 miles south of site 4, on the east side of the road.
46P003 (PO-3)	Latitude 44 Deg., 34 Min., 44 Sec., Longitude 97 Deg., 5 Min., 39 Sec., Township 113N, Range 52W, Section 20. NW1/4, NE1/4, NW1/4, SE1/4. This site is located on the northwest inlet to the lake, 1.5 miles west and 1.5 miles south of Site 4.
46P004 (PO-4)	Latitude 44 Deg., 36 Min., 7 Sec., Longitude 97 Deg., 3 Min., 44 Sec., Township 113N, R52W, Section 10/15. Located at the north end of the lake at Stone Bridge, this site is located on the inlet from Dry Lake.
46P005 (PO-5)	Latitude 44 Deg., 36 Min., 6 Sec., Longitude 97 Deg., 0 Min., 47 Sec., Township 113N, Range 52W, Section 12. SW1/4, SE1/4, SW1/4, SE1/4. This is an outlet site located 2.5 miles east of Site 4 on the north side of the road.
46P006 (PO-6)	Latitude 44 Deg., 35 Min., 45 Sec., Longitude 97 Deg., 1 Min., 38 Sec., Township 113N, Range 52W, Section 14. NE1/4, SE1/4, SE1/4, NE1/4. This is an outlet site located 1.75 miles east and .5 mile south of Site 4 on the west side of the road.
46P007 (PO-7)	Latitude 44 Deg., 35 Min., 33 Sec., Longitude 97 Deg., 4 Min., 21 Sec., Township 113N, Range 52W, Section 16. SE1/4, NE1/4, NW1/4, SE1/4. This in-lake site is located off Saaraners Beach, .5 mile west and .5 mile south of Site 4.
46P008 (PO-8)	Latitude 44 Deg., 34 Min., 21 Sec., Longitude 97 Deg., 2 Min., 37 Sec., Township 113N, Range 52W, Section 26. NW1/4, NE1/4, NW1/4, NW1/4. This in-lake site is located off the east shore, 1 mile east and 2 miles south of Site 4.
46P009 (PO-9)	Latitude 44 Deg., 32 Min., 22 Sec., Longitude 97 Deg., 4 Min., 35 Sec., Township 112N, Range 52W, Section 4. SW1/4, SW1/4, NW1/4, NE1/4. This in-lake site is located off Poinsett Recreation Area, .75 mile west and 4.25 miles south of Site 4.
46P010 (PO-10)	Latitude 44 Deg., 33 Min., 52 Sec., Longitude 97 Deg., 7 Min., 12 Sec., Township 113N, Range 52W, Section 30. NE1/4, NW1/4, NE1/4, SW1/4. This is an in-lake site located off the west shore of the lake, 2.75 miles west and .5 miles south of Site 4.

Figure 5 (cont.). Sample site descriptions for Lake Poinsett and its tributaries.

46PSST (PSST) Latitude 44 Deg., 33 Min., 32 Sec., Longitude 97 Deg., 4 Min., 46 Sec., Township 113N, Range 52W, Section 28. SW1/4, SE1/4, SE1/4, SW1/4. This description represents a composite of three inlake sites; 1) the Arlington Beach State boat ramp, 2) the East side public access boat ramp, and 3) the Pier 81 resort boat ramp.

46LP4 (LP-4) Latitude 44 Deg., 38 Min., 43 Sec., Longitude 96 Deg., 59 Min., 28 Sec., Township 114N, Range 51W, Section 30. SE1/4, SE1/4, SW1/4, SE1/4. This site is located at Boswell Dam, 1 mile east and 3 miles north of Site 5 on the north side of the road.

Figure 5 (cont.). Sample site descriptions for Lake Poinsett and its tributaries.

South Dakota
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Dates that sampling took place:
1977 - 1985

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Lake Poinsett/Oakwood Lakes WQSA Summary

The Lake Poinsett Water Quality Study Area (WQSA) comprises an area of more than 350,000 acres which includes a chain of lakes northwest of Lake Poinsett. During flow diversion from the Big Sioux River, the Lake Poinsett watershed also includes the upper Big Sioux River drainage area (approximately 470,000 acres). The Big Sioux River can be a major source of surface water inflow to Lake Poinsett via a diversion ditch to Dry Lake which is hydraulically connected to Poinsett.

Lake Poinsett, located in Brookings and Hamlin Counties, is the largest natural lake in South Dakota. It is 5.6 miles long with a maximum width of 3 miles and a total surface area of approximately 7,868 acres. Lake Poinsett has an average depth of 9.5 feet and a maximum depth of 19.5 feet.

Aquatic weeds are lacking but dense blooms of blue-green algae occur annually during the summer months. Carp, largemouth buffalo, and yellow perch are the most abundant fish species. Winter and summer fish kills of varying severity are a frequent occurrence in Lake Poinsett. The lake is classified under the South Dakota State Water Quality Standards for the beneficial uses of warm water semipermanent fish life propagation, immersion recreation, limited contact recreation, wildlife propagation and stock watering.

Approximately 83% of the Lake Poinsett watershed is estimated to be cropland, 11% pasture, and 6% water/or wetland areas. About 63% of the watershed is devoted to the cultivation of small grains.

Residential development around the lake includes 467 dwellings most of which are used only during the May to September season. Commercial land use includes five resorts and several small grocery stores and restaurants associated with resort trade. In addition, there are four developed public access areas around the lake perimeter with camping, picnicking, and boating facilities maintained by the Department of Game, Fish and Parks.

The Oakwood Lakes WQSA comprises approximately 31,612 acres of farmland and grassland in east-central South Dakota. The Oakwood Lakes are a complex of small, shallow lakes in northwestern Brookings County about 6 miles south of Lake Poinsett. This interconnected group of 5 lakes known collectively as East Oakwood and West Oakwood Lake has a combined surface area of some 2,400 acres. Average depth is about 5 feet and maximum depth of approximately 10 feet with a combined shoreline of about 20 miles.

Aquatic weeds are limited to a few scattered areas but dense blooms of blue-green algae commonly occur during summer and fall. The most common fish species are carp, bigmouth buffalo, and black bullhead. Partial or complete fish kills occur on a yearly basis. The lakes are managed for walleye, northern pike, and panfish. Beneficial use classifications for the Oakwood Lakes are identical to those of Lake Poinsett except that the former are classified for warmwater marginal fish life propagation.

About 79% of the Oakwood Lakes watershed is cropland, 14% pasture, and 7% water and wetland. An estimated 60% of the total watershed is used for growing small grain crops.

Lakeside development includes Oakwood State Park, 2 resorts, and 110 private residences concentrated on the south shore of West Oakwood Lake. About 10% of the dwellings are permanent homes and 90% serve as summer homes and weekend cabins.

Lake Poinsett and the Oakwood Lakes have extensive public use as recreational areas. Considerable local interest in the lakes is evidenced by extensive public support of the Lake Poinsett/Oakwood Lakes WQSA Project.

To determine water quality characteristics and identify water quality problems within the Lake Poinsett/Oakwood Lakes watersheds, samples were taken at designated tributary and in-lake sites from 1977 to 1983. Samples were collected after rainfall events and during snowmelt runoff.

In-lake sampling indicated Lake Poinsett and the Oakwood Lakes to be highly eutrophic as evidenced by elevated concentrations of total phosphorus and organic nitrogen. Phosphorus levels in Lake Poinsett ranged from .08 to .15 mg/l while nitrogen concentrations ranged from 1.9 to 4.3 mg/l. Similar levels of phosphorus and nitrogen were recorded for the Oakwood Lakes. The main problem at these lakes appears to be dangerous nutrient loading from their respective watersheds. Tributary sampling indicated that areal nutrient loads to the lakes probably exceeded the permissible loading levels designated by Vollenweider (1968) for phosphorus and nitrogen. The Big Sioux River watershed contributed roughly half of total phosphorus and nitrogen loads to Lake Poinsett. Phosphorus and nitrogen concentrations in Poinsett tributaries ranged from .14 to 1.3 mg/l P and 1.4 to 4.3 mg/l N. The primary sources of nutrients to the Oakwood Lake complex were four tributary streams draining some 30,000 acres of fertilized cropland. Average concentrations for Oakwood tributaries ranged from .22 to .57 mg/l phosphorus, and from 2.1 to 2.5 mg/l nitrogen.

Total sediment deposited in Lake Poinsett amounted to 2,891 tons or 2.2 acre-feet per year. About 68% of this sediment was derived from cropland in the immediate watershed (3,000 acres) and 24% from lakeshore erosion. SCS also estimated the total sediment yield to Lake Poinsett for the entire (including

Big Sioux River) watershed drainage area (353,000 acres) at 17,740 tons or 13.5 acre-feet per year. Total sediment yield to the Oakwood Lakes was estimated at 12,570 tons or 9.6 acre-feet per year. About 63% was derived from lakeshore erosion and 35% from croplands in the watershed.

Lake Poinsett waters occasionally exceeded the immersion recreation standards for fecal coliforms. Particularly high coliform levels (1,300-2,200 per 100 ml) were reported on several sampling dates at three in-lake sites. In general, excessive fecal coliform levels were not a problem in the Oakwood Lakes as indicated by sampling at in-lake sites. One tributary sampling site did contain high fecal coliform levels, however, on a number of sampling dates.

Non-point sources of pollution from both watersheds as indicated in high nutrient/sediment loading and excessive fecal coliform levels are inadequate crop cover on agricultural land, lack of fertilizer management practices, the overgrazing of grassland, feedlots without pollution controls, and failing individual septic tank systems.

Recommendations

Nutrient loading to the lakes from their respective watersheds may be reduced by utilizing BMP's on the land including implementation of fertilizer management practices, proper grazing and conservation tillage. Proper grazing use and feedlot waste management systems will also help in the reduction of possible bacterial contamination to the lakes. Results of septic tank surveys should be reviewed to identify any problem areas, and technical assistance should be provided to control existing problems. Lake bank stabilization is recommended in any rapidly eroding areas. Sediment control structures should be constructed on intermittent tributaries to reduce siltation loads that are presently entering the Oakwood Lakes.

After watershed treatment measures have been implemented, a selective dredging program and/or chemical phosphorus flocculation may help to improve water quality and the overall recreational potential of Lake Poinsett and the Oakwood Lakes.

Implementation

Excessive nutrient and sediment inputs to Lake Poinsett from the Big Sioux River via the Big Sioux Diversion canal have been reduced since 1981 after the adoption of the Lake Poinsett Diversion Operation Procedures (LPDOP) which limited river water inflow to Lake Poinsett. Since the formulation of the LPDOP, water has been diverted into the lake once in 1982 and twice in 1984. Conservation practices were applied to some 3,000 acres in the Lake Poinsett watershed from 1979 to 1981. In Brookings County, tree planting was carried out on 480 acres, pasture seeding on 895 acres, terraces were constructed on 559 acres and dugouts were excavated serving 82 acres. In Kingsbury County, terraces were built on 270 acres, pasture seeding was conducted on 400 acres, trees were planted on 15 acres, and 25 dugouts were excavated within the county boundaries.

The Oakwoods/Poinsett Rural Clean Water Project (RCWP) encompasses 106,163 acres of the WQSA areas in Hamlin, Kingsbury, and Brookings Counties. Major conservation practices applied under RCWP from 1981 to 1984 included establishment of permanent cover on 597 acres, fertilizer management on 10,109 acres, and conservation tillage on 28,467 acres. In addition, 4,300 feet of terracing and 3,292 linear feet of waterways were constructed.

The overall goals of the RCWP are as follows:

1. Reduce the amount of soluble nitrogen and pesticides entering ground water and surface water by assisting with fertilizer and pesticide management on 70,000 and 65,000 acres, respectively.

2. Reduce the amount of sediment and related pollutants from entering waterways and lakes by maintaining BMPs on 65,000 acres.

3. Reduce the amount of animal waste entering waterways, lakes, and ground water by applying waste management systems on 10 livestock operations.

I. Lake Poinsett/Oakwood Lakes Watershed Description

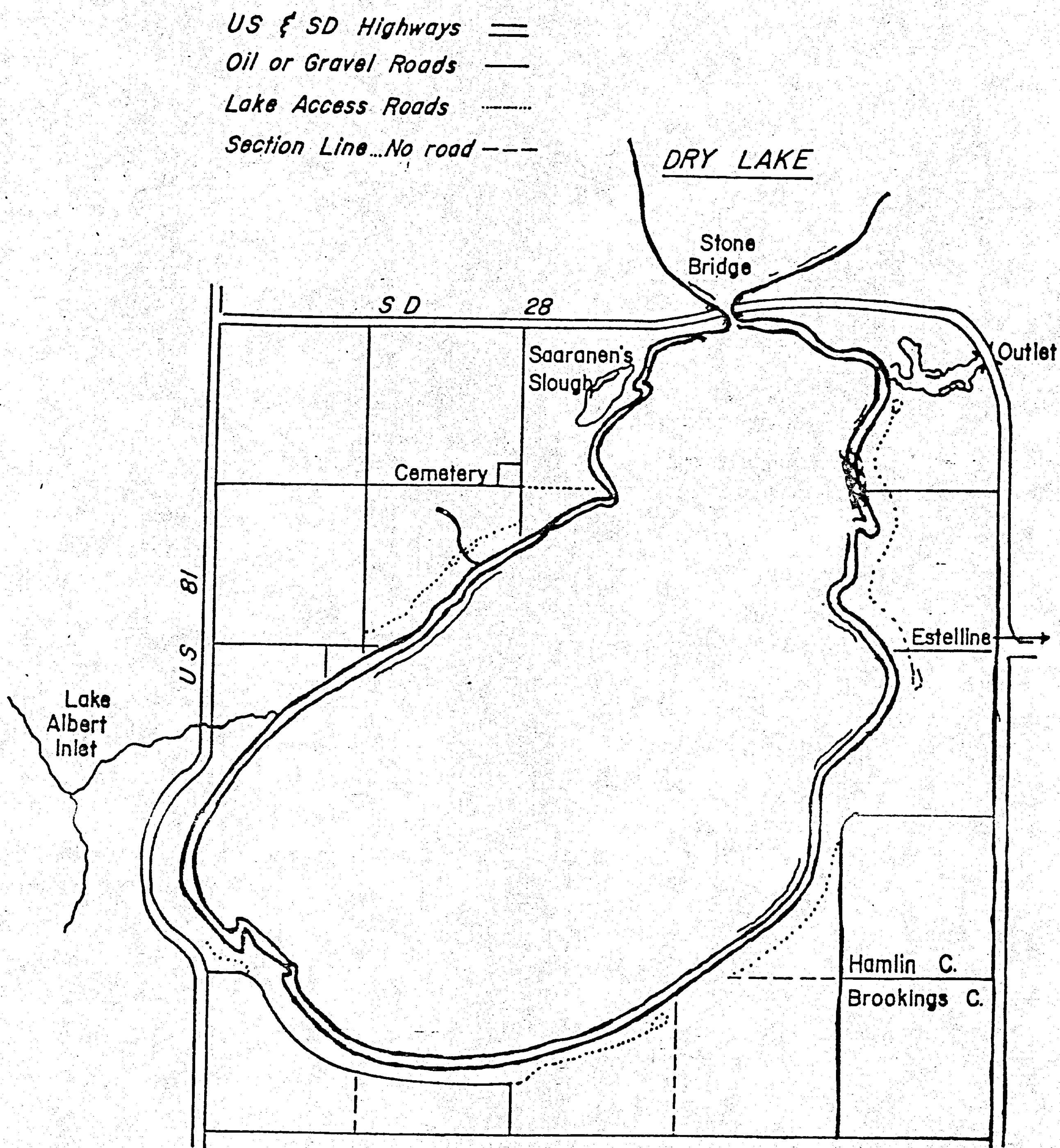
A. General Description

1. Lake Poinsett

Lake Poinsett, the state's largest natural lake, is located in Brookings and Hamlin counties in the cultivated plains of east-central South Dakota (Figure 1). The lake was formed by the partial blockage of a stream valley by glacial drift approximately 15,000 years ago during the Wisconsin ice age. Lake Poinsett is about 5.6 miles long with a maximum width of 3 miles and covers approximately 7,868 acres. It has a shoreline of about 20 miles, an average depth of 9.5 feet and a maximum depth of 19.5 feet. The bottom consists of shifting sand and gravel substrates in shoreline areas which intergrade with a muck (sapropel) substrate in the lake basin.

Higher aquatic vegetation is lacking but dense blooms of bluegreen algae frequently occur during the summer months. Carp, largemouth buffalo, and yellow perch are the most abundant fish species.

Lake Poinsett is highly eutrophic due to contributions of nutrient-rich water inflow from three surface sources: 1) a natural watershed enters the lake from the west and connects Lake Poinsett to Lakes Albert, St. John, Mary, Norden, Thisted, Badger, and Marsh (Figure 2); 2) a managed diversion channel constructed in 1929 to divert flood water from the Big Sioux River to Lake Poinsett via Dry Lake; and 3) three small intermittent tributaries entering the lake on the north, west,



• LAKE POINSETT •

BROOKINGS—HAMLIN COUNTY SO. DAK.

MODEL RURAL DEVELOPMENT
WATERTOWN, SOUTH DAKOTA

SCALE 0 .25 .50 .75 1.00 mile

Figure 1.

LAKE POINSETT WATER QUALITY STUDY AREA

Brookings County
Hamlen County
Kingsbury County
Codington County
Clark County

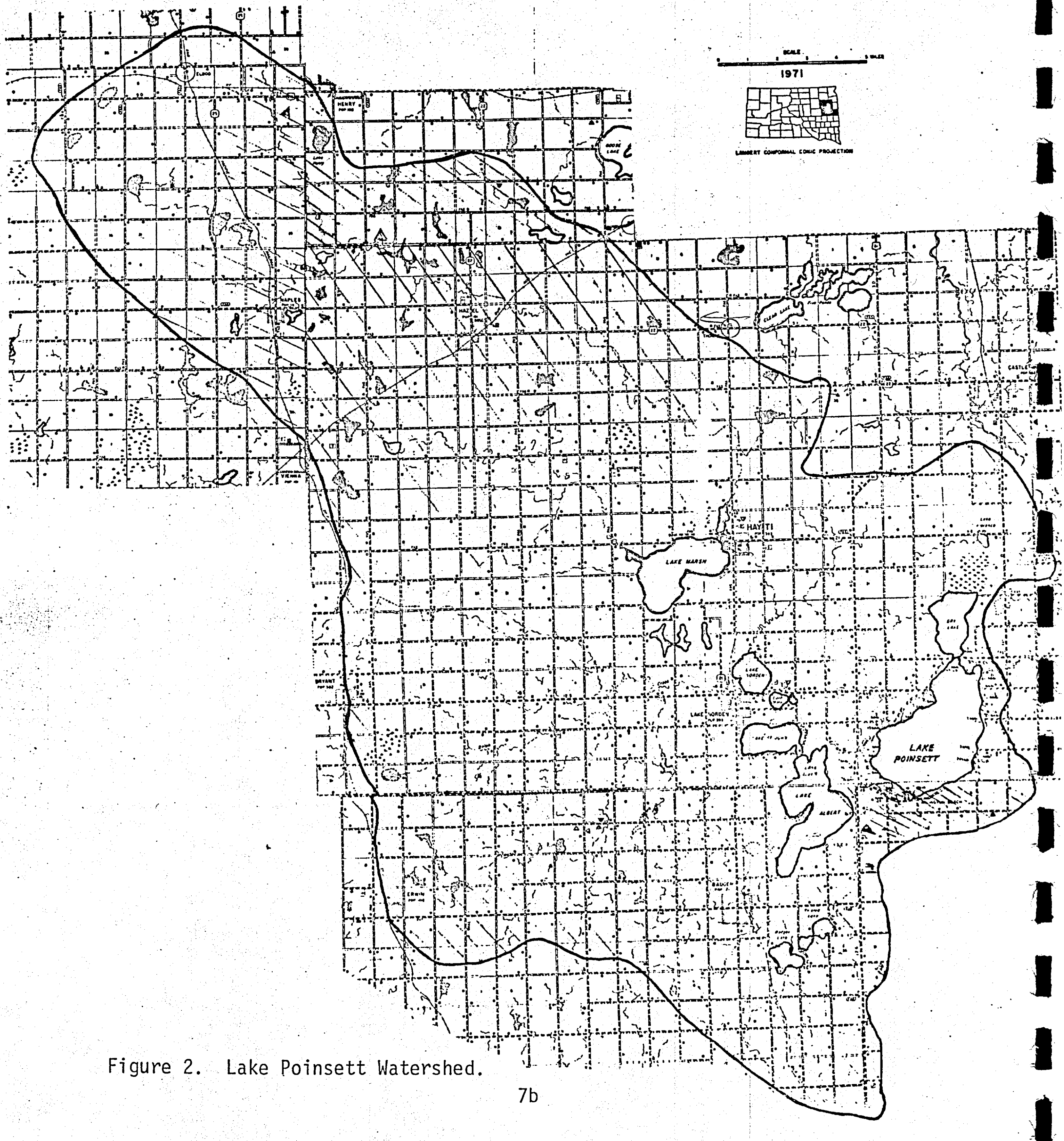


Figure 2. Lake Poinsett Watershed.

and south contributing runoff flow from the immediate lake watershed of some 3,000 acres.

The outlet of Lake Poinsett is located in the northeast section of the lake and is connected to the Big Sioux River (Figure 1). During extreme floods on the river, water may back up the outlet channel and enter the lake.

Lake Poinsett partially overlies glacial outwash and alluvial deposits of the Big Sioux aquifer. This aquifer hydraulically connects Lake Poinsett to Dry Lake, the Big Sioux River, and Lake Albert. Surface and ground water recharge and discharge are dependent upon precipitation. The change in the balance between recharge and discharge is reflected as fluctuations in the water level of Lake Poinsett (Barari, 1971). Lake water level is also subject to man-made variation through the Big Sioux Diversion channel when there is a flooding problem on the Big Sioux River or when lake water level falls below a specified minimum designated by the Lake Poinsett Diversion Operating Procedures (LPDOP).

2. Oakwood Lakes

The Oakwood Lakes are a cluster of popular recreational lakes in northwestern Brookings County about 15 miles northwest of the City of Brookings in east-central South Dakota. The Oakwood Lakes complex is comprised of Johnson, Turtle, and Tetonkaha Lakes which are collectively referred to as West Oakwood Lake, Round Lake, East Oakwood Lake, and Mortimer Slough (Figure 3).

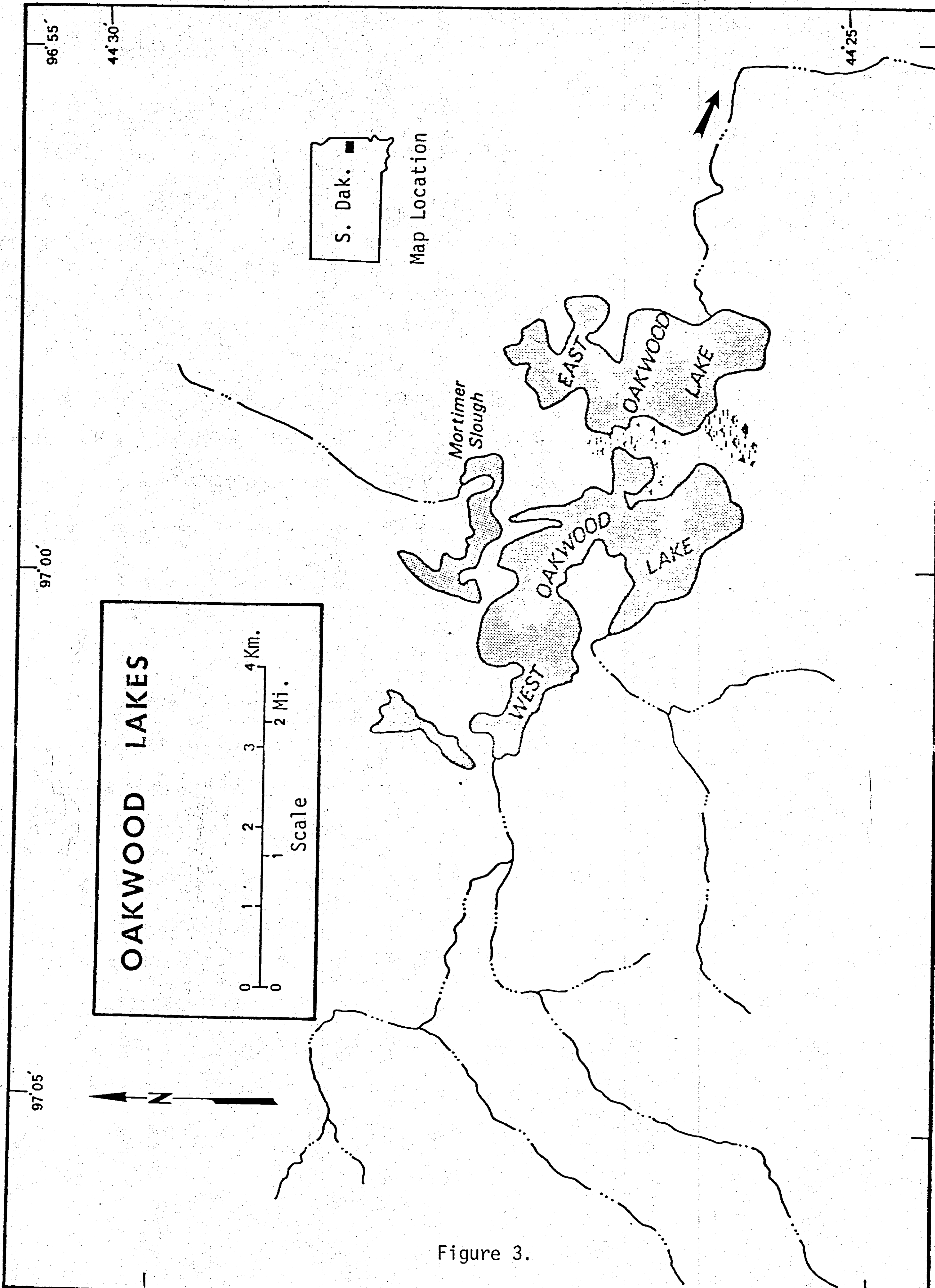

OAKWOOD LAKES
Scale
0 1 2 3 4 Km.
0 1 2 Mi.
N
S. Dak.
Map Location
EAST OAKWOOD LAKE
WEST OAKWOOD LAKE
OAKWOOD LAKE
Mortimer Slough
96°55'
44°30'
44°25'
97°00'
97°05'

Figure 3.

West Oakwood Lake is approximately 1,295 acres in size with an average depth of 5 feet and a maximum depth of 10.5 feet. East Oakwood Lake encompasses an area of about 1,000 acres with an average depth of 6 feet and a maximum depth of 11 feet. Round Lake has a surface area of 52 acres and a maximum depth of 4.6 feet. The shoreline of West Oakwood Lake is 14.4 miles, whereas that of East Oakwood Lake is only 6.2 miles.

The bottom sediments of the Oakwood Lakes are comprised mainly of silt and muck (sapropel) in the deeper areas, and sand, gravel, and rock in the shallows. Submerged and emergent aquatic plants are limited to a few scattered areas due to shifting substrates and limited light penetration. However, dense blooms of bluegreen algae commonly occur during the summer and fall. The most common fish species are carp, bigmouth buffalo, and black bullhead.

Surface water is supplied to the Oakwood Lakes primarily by four major intermittent tributaries draining into West Oakwood Lake and Mortimer Slough. The surface flow of water in this complex of lakes is from west to east (the lakes are connected with culverts) with the overflow from East Oakwood Lake emptying through a permanent concrete outlet structure at the southeast corner of the lake into a channel which drains into the Big Sioux River.

The Oakwood Lakes system overlies and is hydraulically connected to the shallow sand and gravel outwash deposits of the Big Sioux aquifer. The extent of the connection is unknown.

B. Beneficial Uses and Impairments

1. Lake Poinsett

Lake Poinsett is a highly developed lake that is heavily used for recreational and commercial purposes. The lake supports one commercial fishery and provides the recreational uses of fishing, swimming, boating, waterskiing, camping, picnicking, and water sports. Fishing is probably the most popular recreational activity.

The lake supports a warmwater sport fishery for walleye, northern pike, crappie, black bullhead, yellow perch, and white bass. A creel survey conducted by the South Dakota Department of Game, Fish and Parks (GF&P) from July 1, 1971, to June 30, 1972, indicated that anglers fished 70,966 hours (16,616 user days) during the study period. May through August accounted for 90% of total angler use. Fishing from boats comprised 46% of total hours fished. The study also indicated that non-resident anglers accounted for 40% of the total number of angler trips to the lake. State recreational area visitations, including campers, ranged from 151,864 in 1971 to 42,321 in 1975 for the 1971-1979 period of record. Annual visitations to all public access areas of the lake has averaged about 148,500 visitations per year from 1972 to 1981. The South Dakota Department of Game, Fish and Parks manages Lake Poinsett as a walleye-panfish lake with scheduled stockings of these species in addition to northern pike and channel catfish. At the present time, walleye are the most heavily stocked species. Every third year there is an extensive stocking effort followed by reduced stocking in the next two years, depending on need and availability. This schedule might change due to the recent (1983) completion of the new State Fish Hatchery.

Rough fish (carp and buffalo) have been removed annually by various commercial fishing operations since the 1920's, although intensive efforts to remove large numbers of rough fish were not initiated until 1956. Annual removal rates averaged 567,300 pounds from 1961 to 1973.

Winter and summer fish kills of varying severity play an important role in the dynamics of fish populations in Lake Poinsett. Severe kills in 1958-1959, 1968, and 1977-1978 with less severe kills in 1965, 1970, and 1972 have served to seriously alter the population structure of the lake. Rough fish have dominated the lake since the 1956 winter fish kills. The winter fish kill of 1977-1978 was estimated to have destroyed approximately 5,000 tons of fish consisting mainly of the dominant carp and buffalo.

Test netting conducted in the summer of 1978 by GF&P indicated that carp and buffalo remained dominant; but shoreline seining disclosed large numbers of yellow perch and walleye fingerlings. Yellow perch fingerlings comprised 74% of the total seine catch with walleye comprising 14%. Reproductive success of these two species was good and could signal an upturn in Lake Poinsett game fish populations.

According to the South Dakota Board of Water and Natural Resources' regulation, Chapter 74:03:02, "Surface Water Quality Standards", Lake Poinsett is classified as having the beneficial use designations of: warmwater semipermanent fish life propagation; immersion recreation; limited contact recreation; wildlife propagation; and stock watering. The water quality standards for these beneficial uses are presented in Table 1.

Excessive nutrient inputs from the Big Sioux River, the Lake Albert watershed and the three intermittent tributaries have been instrumental in creating hypereutrophic conditions in Lake Poinsett. The large area of the combined watersheds (>700,000 acres), which consists primarily of agricultural land, is probably the most important contributing factor to the high nutrient loads entering Lake Poinsett. During periods of severe flooding on the Big Sioux River, extremely large loads of nitrogen and phosphorus may enter Lake Poinsett in a relatively short time. However, total phosphorus loading to the lake from the diversion is limited by regulation to about 15,000 lbs., pending downward changes.

At least 18 feedlots in the watershed (1984 Annual RCWP Progress Report) and at least 29 failing individual septic tank systems on lakeside residential lots (EPA, 1980) may be additional sources of nutrients as well as fecal coliform contamination to Lake Poinsett. Additional water quality problems include sediment input from the Big Sioux River Diversion, shoreline erosion, and intermittent tributaries.

ARSD 74:03:02:30. Beneficial Uses of Public Waters Established

Parameters	Domestic water supply 1	Cold water permanent fish life propagation 2	Cold water marginal fish life propagation 3	Warm water permanent fish life propagation 4	Warm water semipermanent fish life propagation 5	Warm water marginal fish life propagation 6	Immersion recreation 7	Limited contact recreation 8	Wildlife propagation and stock watering 9	Irrigation waters (May 15 - Sept. 30) 10	Commerce and industry 11
Alkalinity, Total as $CaCO_3$ mg/l									750		
Arsenic mg/l	.05										
Barium mg/l	1.0										
Cadmium mg/l	.01										
Chloride mg/l	250	100									
Chlorine, Total Residual mg/l		.02	.02	.02	.02	.02					
Chromium mg/l	.05										
Coliform #/100 ml	5000										
Coliform Fecal #/100 ml							200	1000			
Conductivity Micromhos/cm @ 25° C									4000	2500	
Cyanide, Free mg/l		.005	.005	.005	.005	.005					
Cyanide, Total mg/l		.02	.02	.02	.02	.02					
Hydrogen Sulfide		.002	.002	.002	.002	.002					
Lead mg/l	.05										
Mercury mg/l	.002										
Nitrogen, Nitrates as N mg/l	10								50		
Nitrogen, Ammonia as N mg/l		.02	.02	.04	.04	.05					
Oxygen, Dissolved mg/l		6.0	5.0	5.0*	5.0	4.0	5.0	5.0			
Oxygen, Dissolved mg/l (spawning areas)		7.0		6.0*							
pH, Standard Units	6.5-9	6.6-8.6	6.5-8.5	6.5-9	6.3-9	6-9	6.5-8.3	6-9	6-9.5		6-9.5
Polychlorinated biphenyls		.000001	.000001	.000001	.000001	.000001					
Selenium mg/l	.01										
Sodium, absorption ratio										10	
Solids, suspended mg/l		30	90	90	90	150					
Solids, Total Dissolved mg/l	1000								2500		2000
Sulfate mg/l	500										
Temperature, Fahrenheit		65	75	80	90	90					
Silver mg/l	.05										
Fluoride mg/l	2.4										

* Greater than 6.0 in Big Stone and Traverse Lakes, May-April

Table 1.

Frequent blooms of bluegreen algae, reduced water clarity, and recurring fish kills are all symptomatic of large nutrient loads impacting Lake Poinsett and serve to produce possible health problems and impairments to fishing and swimming recreation as well as reducing the aesthetic quality of the lake.

2. Oakwood Lakes

The Oakwood Lakes are in the center of a heavily used recreational area providing for swimming, boating, fishing, picnicking, and camping activities. The GF&P developed, and now maintains, the popular Oakwood Lakes State Park which encompasses 808 acres, including a large portion of lake shoreline. Annual visitations to this recreational area were estimated at 250,000 people for the past several years.

The Oakwood Lakes support a marginal warmwater sport fishery for perch, crappie, northern pike, walleye, and bullhead. The GF&P manages the lakes for northern pike, walleye, and panfish with frequent stockings to maintain viable populations of these species. Due to the shallow depth, advanced eutrophy and accumulated organic matter in the Oakwood Lakes, partial or complete winter fish kills occur on a yearly basis.

According to the South Dakota Board of Water and Natural Resources' regulation, Chapter 74:03:02, "Surface Water Quality Standards", the Oakwood Lakes are classified as having the beneficial use designations of warmwater marginal fisheries, immersion recreation, limited contact recreation, stock watering, and wildlife propagation waters. The water quality standards for these beneficial uses are presented in Table 1.

Nutrient loading from the watershed has contributed to hypereutrophic conditions in the Oakwood Lakes. Particularly evident were extremely high levels of incoming phosphorus from the intermittent tributaries in the immediate watershed. Most of the nutrient load (phosphorus and nitrogen) probably originates in runoff from fertilized croplands which also contribute about 35% of the sediment load to the lakes. An undetermined percentage of nutrients is also derived from feedlots in the watershed and failing waste disposal systems around the periphery of the lakes. As a result, the nitrogen and phosphorus concentrations in the Oakwood Lakes are extremely high, well over the levels necessary to classify these lakes as hypereutrophic (Section IV). This condition is evidenced by reduced water clarity and prolonged nuisance algal blooms.

Sediment input from lakeshore erosion and watershed runoff has caused an appreciable loss of depth and storage capacity in these shallow lakes.

The high nutrient and sediment loads impacting the Oakwood Lakes for many years have decreased the value of the lakes for fishing, immersion recreation and in overall recreational value.

C. Land Use

1. Lake Poinsett

The South Dakota Planning Bureau estimated the total drainage area of the Lake Poinsett watersned to be 352,740 acres. Land use in the watershed as determined by Landsat Remote Sensing is predominantly agricultural. About 83% is estimated to be cropland, 11% pasture, and 6% water and/or wetland areas. About 63% of the watershed is devoted to the cultivation of small grains.

Residential development includes 467 dwellings around the perimeter of Lake Poinsett, most of which are used only during the May to September season. Commercial land use includes five resort areas around the lake and several small grocery stores and cafes associated with resort trade.

Park and recreational development located around the lake includes four public access areas maintained by GF&P. The public access on the south side of Lake Poinsett includes one mile of shoreline which has been developed as a State recreation site with boat ramps, toilets, garbage disposal facilities, fireplaces, tables, lights, docks, and a drinking water well. Three other access areas have also been developed, adding another mile of lakeshore for public use. All have boat launch facilities.

2. Oakwood Lakes

The total drainage area of the Oakwood Lakes watershed has been estimated to be 31,612 acres by the South Dakota Planning Bureau. About 79% of the watershed is cropland, 14% pasture, and 7% water and/or wetland. Approximately 60% of the total watershed is used for growing small grain crops (Figure 4).

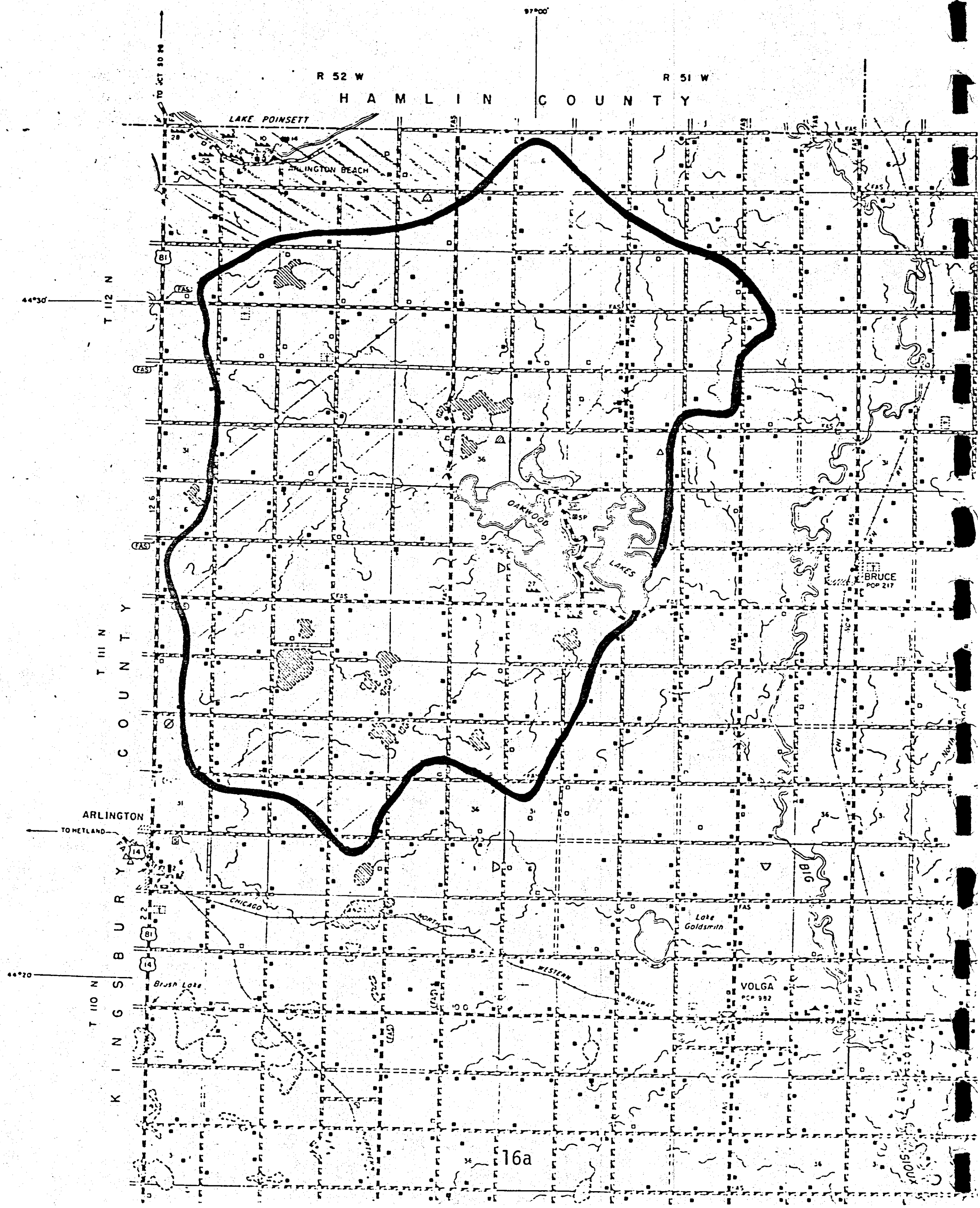
Lakeside development includes the Oakwood State Park, located on the north side of the lake complex, and two resorts.
One hundred ten (110) private residences are concentrated on the south shore of West Oakwood Lake. About 10% of the dwellings are permanent homes and 90% serve as summer homes and weekend cabins.

D. Climate, Geology, and Major Soils

1. Climate

The climate of east-central South Dakota is continental with cold, dry winters and relatively short springs marked by rapid weather changes. Over 40% of the annual precipitation falls during the three month period from April through June. Summer and autumn are characterized as warm to mild with an abundance of sunshine. The average daily temperature is 43.5°F. Average annual precipitation and lake evaporation amount to 21 and 34 inches, respectively.

Figure 4. Oakwood Lakes Watershed.



2. Geology

Glacial drift is the parent material of the soils in the Lake Poinsett and Oakwood Lakes watersheds. The drift consists of till and outwash deposits. The former is comprised of a heterogeneous mixture of boulders, pebbles, and sand in a matrix of clay directly deposited by the glacier. Outwash is a sorted deposit consisting mostly of sand and gravel with minor amounts of clay that was deposited by meltwater streams issuing from the ice. Geologically, the watersheds are typified by collapsed (stagnation) drift glacial morphology. Shallow sand and gravel aquifers are frequently formed by such processes. Such aquifers underlie much of the study area. The topography ranges from nearly level to severely undulating and is characterized by deep silty, loamy, well drained soils (Barari, 1971).

3. Major Soils

According to the Hamlin, Kingsbury, Codington, and Brookings Counties soil surveys conducted by the SCS, the following soil associations are found in the drainage area:

Poinsett-Buse: deep undulating to rolling, silty, and loamy soils on uplands.

Poinsett-Waubay: deep, nearly level to sloping, silty sides on uplands and in slight swales.

Renshaw-Fordville: loamy and sandy soils with gravelly and sandy subsoils.

Fordville-Estelline: loamy and silty soils with gravelly and sandy subsoils on terraces and uplands.

Vienna-Lismore: deep, nearly level to undulating silty soils or uplands and in shallow swales.

II. Lake Poinsett/Oakwood Lakes Water Quality Study Area Selection

In 1977, the First Planning and Development District Commission selected three Water Quality Study Areas (WQSAs): Lake Herman, Lake Poinsett, and Oakwood Lakes. The criteria used for establishing WQSAs were the State Lakes Preservation Committee criteria, the South Dakota Lake Significance Ranking criteria and the availability of soils data, plus water quality data. Public interest was also a major factor in the selection process.

III. Soil Erosion and Sediment Yield Summary

SCS conducted soil erosion and sediment yield studies or the immediate Lake Poinsett watershed (2,246 acres) and the Oakwood Lakes watersned (31,630 acres). The studies detailed the type and extent of erosion and sedimentation problems including the contribution from cropland, grassland, streambanks, gullies, and other sources. Results of these studies are tabulated in the 1979 Lake Poinsett WQSA Report.

SCS estimated erosion in the immediate Lake Poinsett watershed to be 8,468 tons per year with total sediment deposited in Lake Poinsett at 2,891 tons or 2.2 acre-feet per year. About 68% of this sediment is derived from cropland and 24% from lakeshore erosion. SCS also estimated total sediment yield to Lake Poinsett from the entire watershed drainage area (353,000 acres) at 17,740 tons or 13.5 acre-feet per year.

Erosion in the Oakwood Lakes watershed was estimated to transport 85,959 tons of soil per year with total sediment deposited in the Oakwood Lakes at 12,570 tons or 9.6 acre-feet per year. About 63% of this sediment yield was derived from lakeshore erosion (prior to bank stabilization in 1978) and 35% from cropland soils.

SCS selected Best Management Practices (BMPs) for both watersheds to reduce sediment yield and nutrients to Lake Poinsett and the Oakwood Lakes. Examples of needed conservation practices are crop residue management, conservation tillage, proper range management, feedlot waste management, and lakeshore stabilization.

IV. Water Quality Status Reports

A. Lake Poinsett

Lake Poinsett is located in Hamlin County at a latitude of 44 Deg., 33 Min., 42 Sec. N, and a longitude of 97 Deg., 4 Min., 42 Sec. W in Township 113 N, Range 52 W, Sections 14-16, 20-23, 26-33. Lake Poinsett's major inflow comes from Dry Lake which receives its major inflow from the Big Sioux River during periods of controlled diversion. The outflow of Lake Poinsett flows into the Big Sioux River. Morphometric characteristics of the lake are as follows:

° Area	7,868 acres (3184.1 hectares)
° Maximum Depth	19.5 feet (5.9 meters)
° Mean Depth	9.5 feet (2.9 meters)
° Volume	74,746 acre-feet (92,210,000 m^3)

The State of South Dakota has assigned the following beneficial uses to the lake: 1) warmwater semipermanent fish life propagation; 2) immersion recreation; 3) limited contact recreation; and 4) wildlife propagation and stock watering. Because of these assigned beneficial uses the following water quality standards apply to Lake Poinsett:

° "Un-ionized ammonia nitrogen shall not exceed 0.04 mg/l with a variation allowed under subdivision 74:03:02:32 (2)." (Note: No one sample may exceed 1.75 times the applicable criteria.)

° "Dissolved oxygen shall be greater than 5.0 mg/l......"

° "pH shall be greater than 6.5 units and less than 8.3 units......"

° "Fecal coliform organisms shall not exceed a concentration of 200 per 100 milliliters as a geometric mean based on a minimum of not less than five samples obtained during separate twenty-four hour periods for any thirty-day period from May 1 to September 30; nor shall they exceed this value in more than twenty percent of the samples examined in the above described thirty-day period; nor shall they exceed 400 per 100 milliliters in any one sample from May 1 to September 30."

° "Suspended solids shall not exceed 90 mg/l with a variation allowed under subdivision 74:03:02:32 (3)." (Note: No one grab sample can exceed 2.0 times the applicable criteria.)

° "Total dissolved solids shall not exceed 2500 mg/l with a variation allowed under subdivision 74:03:02:32 (2)." (Note: No one grab sample may exceed 1.75 times the applicable criteria.)

Samples were collected at Sites P001 through P010 in 1978 and 1979, except for P006 which was not sampled in 1978 (Figure 5). In addition, Sites P001, P004, P006, and PSST were sampled in 1982 and 1983, except Site P006 which was not sampled in 1982. Essentially, sampling was discontinued after 1978 and recontinued at selected sites in 1982 and 1983. Site PSST is a composite sample of waters collected from Arlington Beach State Boat Ramp (Site #7), the public access ramp on the east side (Site #9), and the Pier 81 Resort Boat Ramp on the southwest corner.

In the following sections, the water quality over the period of study will be discussed for dissolved oxygen, biological oxygen demand, pH, total solids, suspended solids, total dissolved solids, total phosphorus, nitrite, nitrate, ammonia, total Kjeldahl nitrogen, and fecal coliforms. The nutrient which will tend to be limiting and trophic state indices for phosphorus will be discussed. Tables and figures discussed in the following sections are contained in Appendix A.

Dissolved Oxygen

Based on the State of South Dakota's water quality standards, dissolved oxygen (D.O.) is to be greater than 5.0 mg/l at all times. The mean D.O. concentrations in the tributaries and the outlet ranged from 6.5 mg/l to 12.2 mg/l and the D.O. concentrations in the lake ranged from 7.3 mg/l to 12.2 mg/l (Tables IV-2 through V-25). Violations of the standards were observed in the tributary sites, P002 in 1978 and in tributary Site P003 in

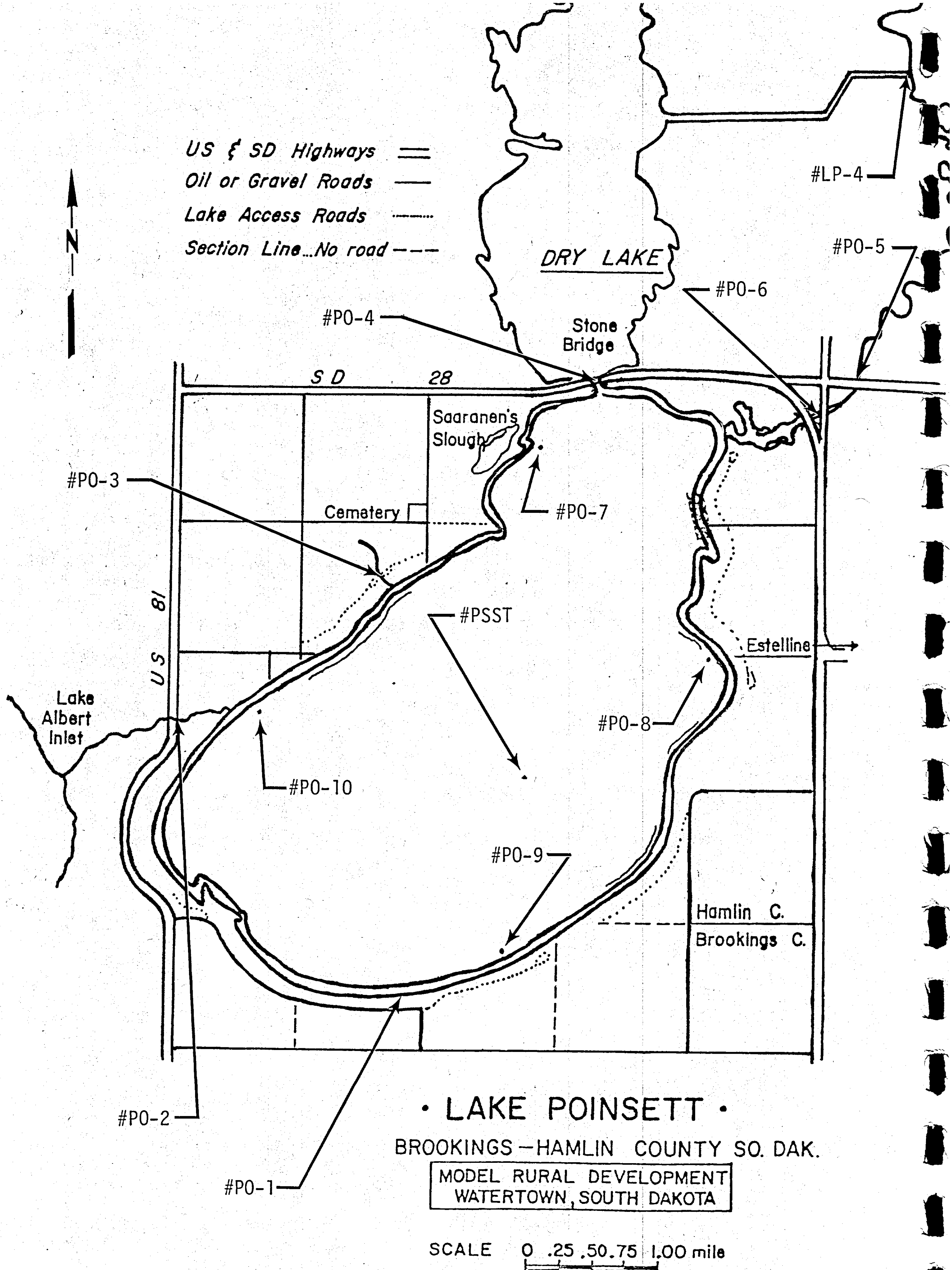


Figure 5. Sample site locations for Lake Poinsett and its tributaries.

Site	Description
46PO01 (PO-1)	Latitude 44 Deg., 32 Min., 3 Sec., Longitude 97 Deg., 5 Min., 26 Sec., Township 112N, Range 52W, Section 5. SE1/4, NW1/4, NE1/4, SE1/4. This site is located on a southern creek to Lake Poinsett in the vicinity of Arlington Beach, 1.5 miles west and 4.5 miles south of site 4, on the north side of the road.
46PO02 (PO-2)	Latitude 44 Deg., 33 Min., 47 Sec., Longitude 97 Deg., 7 Min., 40 Sec., Township 113N, Range 52W, Section 30. NE1/4, SE1/4, NE1/4, SE1/4. This site is located on a southwest creek which flows from Lake Albert into Lake Poinsett, 2.25 miles west and 2.5 miles south of site 4, on the east side of the road.
46PO03 (PO-3)	Latitude 44 Deg., 34 Min., 44 Sec., Longitude 97 Deg., 5 Min., 39 Sec., Township 113N, Range 52W, Section 20. NW1/4, NE1/4, NW1/4, SE1/4. This site is located on the northwest inlet to the lake, 1.5 miles west and 1.5 miles south of Site 4.
46PO04 (PO-4)	Latitude 44 Deg., 36 Min., 7 Sec., Longitude 97 Deg., 3 Min., 44 Sec., Township 113N, R52W, Section 10/15. Located at the north end of the lake at Stone Bridge, this site is located on the inlet from Dry Lake.
46PO05 (PO-5)	Latitude 44 Deg., 36 Min., 6 Sec., Longitude 97 Deg., 0 Min., 47 Sec., Township 113N, Range 52W, Section 12. SW1/4, SE1/4, SW1/4, SE1/4. This is an outlet site located 2.5 miles east of Site 4 on the north side of the road.
46PO06 (PO-6)	Latitude 44 Deg., 35 Min., 45 Sec., Longitude 97 Deg., 1 Min., 38 Sec., Township 113N, Range 52W, Section 14. NE1/4, SE1/4, SE1/4, NE1/4. This is an outlet site located 1.75 miles east and .5 mile south of Site 4 on the west side of the road.
46PO07 (PO-7)	Latitude 44 Deg., 35 Min., 33 Sec., Longitude 97 Deg., 4 Min., 21 Sec., Township 113N, Range 52W, Section 16. SE1/4, NE1/4, NW1/4, SE1/4. This in-lake site is located off Saaraners Beach, .5 mile west and .5 mile south of Site 4.
46PO08 (PO-8)	Latitude 44 Deg., 34 Min., 21 Sec., Longitude 97 Deg., 2 Min., 37 Sec., Township 113N, Range 52W, Section 26. NW1/4, NE1/4, NW1/4, NW1/4. This in-lake site is located off the east shore, 1 mile east and 2 miles south of Site 4.
46PO09 (PO-9)	Latitude 44 Deg., 32 Min., 22 Sec., Longitude 97 Deg., 4 Min., 35 Sec., Township 112N, Range 52W, Section 4. SW1/4, SW1/4, NW1/4, NE1/4. This in-lake site is located off Poinsett Recreation Area, .75 mile west and 4.25 miles south of Site 4.
46PO10 (PO-10)	Latitude 44 Deg., 33 Min., 52 Sec., Longitude 97 Deg., 7 Min., 12 Sec., Township 113N, Range 52W, Section 30. NE1/4, NW1/4, NE1/4, SW1/4. This is an in-lake site located off the west shore of the lake, 2.75 miles west and .5 miles south of Site 4.

Figure 5 (cont.). Sample site descriptions for Lake Poinsett and its tributaries.

46PSST (PSST)	Latitude 44 Deg., 33 Min., 32 Sec., Longitude 97 Deg., 4 Min., 46 Sec., Township 113N, Range 52W, Section 28. SW1/4, SE1/4, SE1/4, SW1/4. This description represents a composite of three inlake sites; 1) the Arlington Beach State boat ramp, 2) the East side public access boat ramp, and 3) the Pier 81 resort boat ramp.
46LP4 (LP-4)	Latitude 44 Deg., 38 Min., 43 Sec., Longitude 96 Deg., 59 Min., 28 Sec., Township 114N, Range 51W, Section 30. SE1/4, SE1/4, SW1/4, SE1/4. This site is located at Boswell Dam, 1 mile east and 3 miles north of Site 5 on the north side of the road.

Figure 5 (cont.). Sample site descriptions for Lake Poinsett and its tributaries.

1979 (i.e., 2.6 and 2.4 mg/l on October 31, 1977, at Site P003 and 3.3 mg/l on April 6, 1978, at Site P002; Tables IV-28 through IV-31). In addition, violations were observed at in-lake sites in January, February, and March of 1978 when the D.O. concentrations ranged from 0.4 mg/l to 3.4 mg/l (Tables IV-30 through IV-35). These low D.O. values are probably responsible for the fish kill observed in the lake in that year. With the exception of these values, the D.O. concentrations were generally greater than 5.0 mg/l (see Figures IV-1 through IV-4). Mean D.O. concentrations in-lake ranged from 7.3 mg/l to 12.1 mg/l over the period water samples were collected.

Biological Oxygen Demand

Biological oxygen demand (BOD) in the tributaries and the outlet ranged from 1.1 mg/l to 39.0 mg/l. The 39.0 mg/l is a high value and was observed in January of 1977 at Site P005 (the outlet). The majority of the values observed were less than 20.0 mg/l and the majority of the mean concentrations were less than 11.0 mg/l (Tables IV-2 through IV-25). In-lake, the BOD concentrations ranged from .09 mg/l to 20.5 mg/l and the mean concentrations were less than or equal to 9.1 mg/l. Figures IV-6 through IV-9 show the BOD concentrations observed in Sites P007 through P010.

pH

Based on the standards for South Dakota, pH should be greater than 6.5 but less than 8.3. The observed mean pH values ranged from 6.9 units at Sites P002 and P006 in 1977 to 8.8 at Site P007 (in-lake) in 1977. In the tributary sites, one violation was observed at Site P002, two at Site P003, and ten at Site P004. Nine violations were observed in-lake at Site P007, eight at Site P008, and nine at Site P010 and composite Site PSST (Tables IV-26 through IV-47). Figures IV-10 through IV-14 show that most of the high pH levels occurred during the summer months.

Alkalinity (Total)

Total alkalinity is a measure of the buffering capacity of the water which is important in maintaining conditions favorable for the aquatic biota. The State of South Dakota has assigned a maximum value of 750 mg $CaCO_3$/l.

Total alkalinity values in the tributaries ranged from 27 mg $CaCO_3$/l to 306 mg $CaCO_3$/l and in the outlet sites they ranged from 32 to 114 mg $CaCO_3$/l. Mean concentrations at both sets of sites ranged from 52 to 259 mg $CaCO_3$/l (Tables IV-2 through IV-25). Note that the tables express alkalinity as phenophthalein alkalinity instead of total. This original data was measured as total and miscoded into the STORET system. Therefore, all phenophthalein alkalinity values whether in the tables or figures are actually total alkalinity values.

In-lake total alkalinity values ranged from 74 mg $CaCO_3$/l to 342 mg $CaCO_3$/l and the mean values ranged from 222 mg $CaCO_3$/l to 268 mg $CaCO_3$/l. Based on the mean values, Lake Poinsett is a well buffered lake and no observations exceeded the water quality standard for total alkalinity. Generally, alkalinity values, in-lake, are increased during the winter and decreased during the spring and summer (Figure IV-15 through IV-196). The opposite trend was observed in the tributaries (Figures IV-19 through IV-25). By comparing Figures IV-10 through IV-14 for pH with Figures IV-15 through IV-18 for alkalinity, it appears that as alkalinity decreased, pH increased. This could be due to phytoplankton using the bicarbonates as a source of carbon. The exception to this trend occurred at Site PSST where alkalinity values increased over the summer.

Total, Suspended and Dissolved Solids (Total Residue, Dissolved Residue and Total Nonfilterable Residue)

In the tributary and the outlet sites, total solids ranged from 105 mg/l to 1,592 mg/l and the annual mean concentrations ranged from 177 mg/l to 708 mg/l. The total solids in the lake were greater than in the tributaries with annual mean concentrations ranging from 966 mg/l to 125 mg/l. The observed range of concentrations was 288 mg/l to 1,607 mg/l. Generally, the total solids in Lake Poinsett appeared to increase during spring runoff (i.e., March, April, and May) and then decrease in the early summer. This decrease was followed by an increase in mid-summer (Figures IV-26 through IV-31).

Carbonates, chlorides, sulfates, nitrates, sodium, potassium, calcium, and magnesium are the principal inorganic anions and cations that contribute to total dissolved solids. In addition, there is generally some organic matter and other dissolved materials (EPA, 1976). Based on the assigned beneficial uses of wildlife propagation and stock watering, the water quality standard for total dissolved solids in Lake Poinsett is 2,500 mg/l. This limit was not exceeded at any site (Table IV-26 through IV-47), even though annual mean in-lake concentrations ranged from 905 mg/l to 1,165 mg/l (Table IV-16 through IV-25).

The State of South Dakota's water quality standard for suspended solids (nonfilterable residue) is 90 mg/l. Excessive suspended solids can be detrimental to a lake's fishery. In 1965, the European Inland Fisheries Advisory Committee identified four means by which suspended solids can adversely affect fish and fish food populations: 1) fish can be killed directly; 2) their growth and resistance to disease can be reduced; 3) successful development of fish eggs and larvae can be reduced or eliminated; and 4) the abundance of food available to the fish can be affected (EPA, 1976). Additionally, the natural movements or migrations of fish can be modified.

In the tributary and outlet sites, suspended solids concentrations ranged from 1.0 mg/l to 882 mg/l and the annual mean concentrations ranged from 1.0 mg/l (one sample that year) to 255 mg/l. The excessive annual mean concentrations were observed at Sites P001, P004, and P005 in 1977. Although the mean concentrations did not exceed the water quality standard, excessive levels of suspended solids were observed at Site P003 in 1977 and Site P004 in 1983. Apparently, the discharge in 1977 was relatively high and may account for the higher suspended solids in 1977 when compared to 1978 (Inter-Department correspondence from Doug Hansen, March 3, 1978). Therefore, there is a potential for high suspended solids to occur in wet years and the contributary sources need to be identified. In particular, the relationship between suspended solids in Dry Lake and Lake Poinsett needs to be investigated, since most of the excessive levels occurred at the site between the two lakes (Figure IV-32).

Annual mean in-lake concentrations ranged from 1.0 mg/l (one sample) to 237 mg/l and the observed values ranged from 1.0 mg/l to 403 mg/l (Tables IV-2 through IV-25). Excessive levels of suspended solids in the lake occurred at Sites P007, P008, P009, and P010 (Table IV-38 through

IV-47). At Site P007, the excessive levels occurred in August and September of 1977 and June of 1978 (Table IV-39). At Site P008 they occurred in November and December of 1977 and January, May, and June of 1978 (Table IV-41). Only one excessive level was observed at P009 and it occurred in November of 1977 (Table IV-43). Three excessive levels occurred at Site P010 and they occurred in August, September, and November of 1977 (Table IV-45). Figures IV-33 through IV-37 show the observed data points. There appears to be a trend of high suspended solids in the summer and in the fall although it is not consistent. Based on the available data, it is not known if the high suspended solids observed in the lake reflect the loads from the tributaries, but it does not appear to. As stated above, the high suspended solids were observed in the summer and fall but the high levels in the tributaries appear to occur in the spring (Figures IV-38 through IV-42). Note that the sampling periods for the tributaries/outlets and the lake do not overlap.

Fecal Coliforms

Water samples to be analyzed for fecal coliforms were not collected with the purpose of determining violations. Therefore, the "violations" in Tables IV-26 through IV-27 cannot be considered as violations of South Dakota's water quality standards, but can be considered as indicators of problems. However, when the samples from the lake have fecal coliforms which exceed 400 per 100 ml between May 1 and September 30, they can be called violations.

Fecal coliforms ranged from <3 per 100 ml to 42,000 per 100 ml and the annual mean concentrations ranged from <3 to 27,667 per 100 ml in the tributary and outlets. There is not a specific fecal coliform standard that covers the tributaries and outlets; however, the 200 per 100 ml limit was applied to indicate problem areas. Sites P001, P002, P003, P004, P005, and P006 had fecal coliform levels greater than 200 per 100 ml (i.e., 43% of the samples collected from Site P001, 44% from Site P002, 63% from Site P003, 14% from Site P004, 25% from Site P005, and 38% from Site P006 were excessive). Most of these excessive levels occurred between March and June of 1977. The mean annual concentrations in 1977 were: 1) 27,667 per 100 ml at Site P001; 2) 2,056 per 100 ml at Site P002; 3) 5,630 at Site P005; and 4) 4,173 at Site P006. As with the suspended solids, the high fecal coliforms occurred during a dry year (1977). The sources of these excessive levels should be identified and eliminated or reduced.

In-lake fecal coliform levels were generally acceptable (i.e., <200 per 100 ml). The main problem occurred at Site P008, on the east shore, where three excessive levels were observed, two of which were greater than 400 per 100 ml (May 31, 1978, there were 450 per 100 ml and June 16, 1978, there were 2,200 per 100 ml). Other sites where excessive levels occurred include: 1) Site P009 (570 per 100 ml on October 13, 1977, and 300 per 100 ml on June 28, 1978); 2) Site P010 (1,300 per 100 ml on June 28, 1978); and 3) Site PSST (1,500 per 100 ml on August 10, 1983). The reason(s) for these high levels needs to be determined.

Total Kjeldahl Nitrogen, Ammonia, Nitrates, and Nitrites

Total Kjeldahl nitrogen concentrations ranged from 1.26 mg/l to 6.5 mg/l in the lake. The annual mean concentrations ranged from 2.23 mg/l to 4.89 mg/l (Tables IV-2 through IV-25). Figures IV-43 through IV-47 do not show a clearly discernible trend at all sites. However, Figures IV-44 through IV-46 indicate that total Kjeldahl nitrogen concentrations increase in the fall until they peak in January and February . This peak is followed by a decrease until mid-summer when they increase again.

In the tributaries total Kjeldahl nitrogen concentrations ranged from 1.0 mg/l Site P004 in 1978 to 9.58 mg/l at Site P004 in 19/7. At the outlet sites total Kjeldahl nitrogen concentrations ranged from 1.09 mg/l to 16.3 mg/l (both values observed at Site P006). Annual mean concentrations ranged from 1.43 mg/l at Site P002 in 1978 to 4.28 mg/l at Site P004 in 1977 in the tributary sites and from 2.87 mg/l to 5.88 mg/l in the outlet sites. Figure IV-48 shows that high concentrations or total Kjeldahl nitrogen concentrations occur at Site P004 during spring runoff. Other sites appeared to agree with this trend, but the trend is not as clear as that snown in Figure IV-48.

Ammonia as nitrogen concentrations ranged, in the lake, from less than .020 mg/l to 2.40 mg/l and the annual mean concentrations ranged from .313 mg/l to 1.226 mg/l. In the tributaries, ammonia as nitrogen ranged from less than .020 mg/l to 2.53 mg/l and the annual mean concentrations ranged from .261 mg/l to 2.88 mg/l. The annual mean concentrations at the outlet sites ranged from .73 mg/l to 3.33 mg/l and the values ranged from .031 mg/l to 9.30 mg/l. Why ammonia concentrations are higher in the outlet sites than the tributary or lake sites is not known, although one problem feedlot has been identified near the outlet.

Figures IV-9 through IV-52 show the data observed from the lake sites. Generally, ammonia appears to have two peaks; one in the winter and one in mid-summer. After the mid-summer peak, ammonia tends to steadily increase until January or February. The high concentrations of ammonia in the winter were probably the result of low dissolved oxygen concentrations

(Figures IV-1 and IV-2), reducing the bacterial nitrification rates and allowing ammonia to accumulate.

Un-ionized ammonia is that fraction of total ammonia considered to be toxic to fish and other aquatic life. Although the State of South Dakota does not have a standard for total ammonia, it does have a standard of 0.04 mg/l for un-ionized ammonia in a lake with the assigned beneficial use of a warmwater semipermanent fishery.

At Site P004, the inlet from Dry Lake, two excessive levels of un-ionized ammonia were observed (i.e., .33 mg/l on July 6, 1977, and .21 mg/l on July 7, 1977; Tables IV-32 and IV-33). No other excessive levels were observed in the other tributary or outlet sites.

Values of un-ionized ammonia exceeding .04 mg/l were observed at all in-lake sites. Over the period Lake Poinsett was sampled, 45% of the un-ionized ammonia values at Site P007 were excessive, 36% were excessive at Site P008, 36% at Site P009, 45% at Site P010, and 8% at Site PSST. These excessive levels ranged from .05 mg/l to .17 mg/l.

Nitrate-nitrogen concentrations normally range from 0 to 10 ppm in unpolluted fresh water (Wetzel, 1975). In the tributaries, nitrate concentrations ranged from <.10 mg/l to 1.70 mg/l and the annual mean concentrations ranged from .22 mg/l to 1.4 mg/l. The mean concentrations in the outlet sites ranged from .24 mg/l to .80 mg/l and the mean concentrations in the lake ranged from .10 mg/l to .22 mg/l. All in-lake and outlet observed nitrate values were less than 1.00 mg/l. Therefore, the nitrate-nitrogen were in the range considered normal for unpolluted fresh waters.

Nitrite-nitrogen levels are generally low in natural waters (0 to .01 mg/l; Wetzel, 1975). Tributary, outlet, and in-lake nitrate values were often greater than .01 mg/l (i.e., ranged from <.01 mg/l to 1.5 mg/l). Mean annual concentrations in the tributaries and the outlet sites ranged from <.01 mg/l at Site P004 in 1982 and 1983 to .21 mg/l at P004 in 19/7 and mean annual concentrations in the lake ranged from <.01 at Site PSST in 1982 to .06 mg/l at Site P007 in 1978. It is interesting to note that the nitrite values exceeded .01 mg/l in 1977 and 1978 but did not exceed this value in 1982 and 1983. The reason(s) for these high values in 1977 and 1978 is not known.

Nitrate-Nitrogen and Ammonia-Nitrogen Ratios

Wetzel (1975) stated that in regions draining calcareous sedimentary landforms, unpolluted lakes have nitrate-nitrogen to ammonia-nitrogen ratios of 25:1, and where slight to moderate sewage contamination or agricultural applications of nitrogen fertilizers are influencing the lake, ratios of 1:10 are common. The soils in the upper horizons (A and B) in Brookings County tend to be noncalcareous or weakly calcareous. In the lower C horizons, the soils tend to be strongly calcareous (USDA, 1959). Therefore, runoff waters from noncalcareous soils could probably have a nitrate-nitrogen ratio about 1:1 (Wetzel, 1975).

The nitrate-nitrogen to ammonia-nitrogen ratios observed in the lake ranged from .20 (standard deviation = .04) to 1.51 (standard deviation = 3.24). Ammonia-nitrogen to nitrate-nitrogen ratios ranged from 2.77 (standard deviation = 1.95) to 6.48 (standard deviation = 6.08). Using these ratios as an indicator, either nitrogen fertilizers or sewage may be impacting the lake. The implications of these ratios should be investigated further.

Inorganic and Organic Nitrogen

Inorganic nitrogen is the sum of ammonia, nitrate and nitrite-nitrogen concentrations and organic nitrogen is total Kjeldahl nitrogen less ammonia. Figures IV-53 through IV-56 show a trend in 1978 of increasing inorganic nitrogen values from January until March or early April, followed by a decline until May, and then another increase during the summer. A trend for organic nitrogen was not as clearly discernible (Figures IV-57 through IV-60).

Based upon the mean inorganic concentrations observed in Lake Poinsett, the lake would be classified as a eutrophic lake except for composite Site PSST which was meso-eutrophic in 1983 (Table 11-4; Wetzel, 1975). Mean concentrations ranged from 465 mg/m^3 to 1,465 mg/m^3. All the mean organic nitrogen concentrations would be considered indicative of hypereutrophic conditions and ranged from 1,905 mg/m^3 to 4,330 mg/m^3 (Table 11-4; Wetzel, 1975). In the other lakes monitored under the "208" program the inorganic nitrogen concentrations ranged from ultra-oligotrophic to meso-eutrophic and the organic nitrogen concentrations ranged generally from eutrophic to hypereutrophic. For some unknown reason Lake Poinsett has high concentrations of organic and inorganic nitrogen and these concentrations indicate some sort of nutrient pollution that needs to be identified and investigated.

Phosphorus

Total phosphorus is a common water quality parameter often used as an index of a lake's trophic state. Reckhow, et al. (1980) proposed that a lake with phosphorus concentrations greater than .05 mg/l should be classified as hypereutrophic. Lake Poinsett would be considered a hypereutrophic lake since in-lake phosphorus concentrations ranged from .051 to .330 mg/l. The annual mean concentrations ranged from .078 to .148 mg/l (Tables IV-16 through IV-25).

In the tributaries (Sites P001 through P004) total phosphorus concentrations ranged from .142 to 1.260 mg/l and at the two sites on the outlet, total phosphorus concentrations ranged from .281 to 2.240 mg/l (Tables IV-2 through IV-15). These high concentrations, fortunately, are not reflected in the lake, but should be of concern if future restoration activities are considered.

Figures IV-61 and IV-62 indicate increases of total phosphorus during the summer and Figures IV-63 through IV-67 demonstrate the values in the lake. Pulses of total phosphorus occurred in the summers of 1978 and 1983. The only exception was Site P010 in 1978 which does not show a pulse (Figure IV-66).

Limiting Nutrient

If an organism is to survive in a given environment, it must have the necessary materials to maintain itself and be able to reproduce. If an essential material approaches a critical minimum, this material will be the limiting one (Odum, 1971). In aquatic ecosystems phosphorus is often the nutrient that approaches the critical minimum. In order to determine the nutrient which will tend to be limiting, EPA (1980) has suggested the ratio of total nitrogen to total phosphorus of 15:1 to be the point of demarcation between phosphorus limitation and nitrogen limitation. If the ratio calculated from observed data is greater than 15:1, the lake is considered to be phosphorus limited and if the ratio is less than 15:1, the lake is considered to be nitrogen limited. The further the calculated ratios are from 15:1 the more confident the analyst is in his conclusion.

The mean annual ratios for Lake Poinsett ranged from 17.3 (95% confidence interval 11.00 to 23.5) for composite Site PSST in 1983 to 51.74 (95% confidence interval 18.03 to 84.45) for Site P008 in 1977. Particularly in 1977 and 1978, Lake Poinsett was phosphorus limited. However, in 1983 the ratios are closer to the 15:1 ratio (i.e., 17.25 in 1983 and 17.53 in 1984) indicating a possibility of a trend toward nitrogen limitation. Further monitoring should be conducted to determine whether there is an actual "trend" toward nitrogen limitation. Table IV-48 presents the total nitrogen to total phosphorus mean ratios for the in-lake sites in addition to the means, standard deviations, number of observations, and 95% confidence intervals.

Trophic State Index

In 1977, Carlson presented a numerical trophic state index (TSI) from 0 to 100. Each major division (10, 20, 30, etc.) represents a doubling in algal biomass. The numerical index can be calculated from Secchi disc readings, chlorophyll _a_ and total phosphorus concentrations. The results in Table IV-49 are the mean annual TSI's for the total phosphorus concentrations. The phosphorus TSI's are high and the annual means range from 63.35 to 76.67. These values indicate a lake that is eutrophic (and probably) maintains high levels of algal biomass.

In future analyses it would be useful to obtain data for chlorophyll a and Secchi disc, in addition to phosphorus, in order to compare TSI values between parameters. It is possible, that although phosphorus TSI's indicate high phytoplankton biomass, chlorophyll a TSI's may be lower indicating a limiting factor.

Nutrient Loads

The flow data necessary to calculate loads were inadequate to calculate nutrient loads to Lake Poinsett during the study. However, in 1971 Jack M. Skille investigated the nutrient transport into Lake Poinsett (Skille, 1971). He determined that the annual surface discharge (i.e., April, 1970, to April, 1971) to Lake Poinsett was $2.07 \times 10^6 m^3$ and that this discharge transported 1.66×10^4kg ($PO0_4$) phosphorus, 1.28×10^4kg nitrate-nitrogen, and 3.90×10^5kg organic carbon. Using a surface area of $31.8 \times 10^6 m^2$, the areal load for phosphorus was .52g/m^2/yr. The areal load for phosphorus exceeds Vollenweider's provisional dangerous load for a lake with a mean depth of 5 meters by a factor of 3.9 (Table 12-10; Wetzel, 1975). Lake Poinsett only has a mean depth of 2.9 meters. Nitrate-nitrogen areal loads are high but did not exceed Vollenweider's provisional permissable loading level. But, the organic nitrogen fraction, which is high and dominates the system, and the inorganic nitrogen fractions (with the exception of nitrate-nitrogen) were not considered. It is probable that total nitrogen loads are dangerous also.

Summary

Lake Poinsett, which is located in Hamlin County and northwest Brookings County, has been assigned the following beneficial uses: 1) warmwater semipermanent fish life propagation; 2) immersion recreation; 3) limited contact recreation; and 4) wildlife propagation and stock watering. Samples were collected in the lake's major tributaries, the outlet, and in the littoral zone of the lake. The following comments summarize the water quality observed in Lake Poinsett.

° Dissolved oxygen was very low in January, February, and March of 1978 and these low concentrations are probably the cause of the winter fish kill observed that year. Low dissolved oxygen concentrations were also observed in tributary Sites P003 and P004. Over the period of record mean dissolved oxygen concentrations ranged from 7.3 mg/l to 12.1 mg/l.

° Biological oxygen demand ranged from 1.1 mg/l to 39 mg/l. The high value of 39 mg/l was observed at the outlet Site P005. The majority of the mean concentrations were less than 11 mg/l.

° pH values exceeding the State's standard of 8.3 units commonly occurred during the summer months.

° Mean annual alkalinity values in the lake ranged from 222 mg $CaCO_3$/l to 268 mg $CaCO_3$/l and the observed values ranged from 74 mg $CaCO_3$/l to 342 mg $CaCO_3$/l. Lake Poinsett is a well buffered lake.

° The State's water quality standard for total dissolved solids (2,500 mg/l) was not exceeded even though annual mean in-lake concentrations ranged from 905 mg/l to 1,165 mg/l. The high mean concentration of 1,165 mg/l does warrant concern about total dissolved solids.

- Excessive (greater than 90 mg/l) annual mean concentrations of suspended solids were observed at Sites P001, P004, and P005 in 1977. Although the mean concentration did not exceed the water quality standard, excessive levels of suspended solids were observed at Sites P003 in 1977 and P004 in 1983. Excessive levels were also observed in the lake at Sites P007, P008, P009, and P010.

- Fecal coliform levels greater than 200 per 100 ml were observed at all tributary and outlet sites. Violations of the State's standard of 400 per 100 ml were observed at in-lake Sites P008, P009, P010, and PSST.

- Mean annual concentrations of total Kjeldahl nitrogen ranged from 1.43 mg/l at Site P002 in 1978 to 5.88 mg/l at the outlet site. In the lake the mean annual concentrations ranged from 2.33 mg/l to 4.89 mg/l.

- In the lake, annual mean ammonia concentrations ranged from .313 mg/l to 1.226 mg/l and in the tributaries and outlets the mean ammonia concentrations ranged from less than .02 mg/l to 3.33 mg/l. Two major peaks of ammonia were observed, one in the winter and another in mid-summer.

- Two excessive levels of un-ionized ammonia were observed at Site P004, the inlet from Dry Lake. In the lake 45%, 36%, 36%, 43%, and 8% of the observed samples had unacceptable levels of un-ionized ammonia at Sites P007, P008, P009, P010, and PSST, respectively.

- Nitrate-nitrogen concentrations were in the range considered normal for unpolluted waters.
- Nitrite-nitrogen values indicate levels of nitrites higher than those expected in natural waters (i.e., greater than .01 mg/l).

° Based on ammonia-nitrogen to nitrate-nitrogen ratios, nitrogen fertilizers and/or sewage may be impacting Lake Poinsett.

° Inorganic nitrogen values indicate Lake Poinsett is eutrophic and organic nitrogen concentrations indicate that it is hypereutrophic.

° Based on total phosphorus concentrations greater than 0.05 mg/l Lake Poinsett would be considered a hypereutrophic lake. Annual mean in-lake concentrations ranged from .078 to .148 mg/l and annual mean concentrations in the tributaries and outlets ranged from .142 to 1.260 mg/l.

° Until recently, Lake Poinsett could be considered a lake that is phosphorus limited, but based on the recent (1983 and 1984) total nitrogen to total phosphorus ratios it may be nitrogen limited.

° The trophic state indices for total phosphorus indicate a eutrophic lake.

° Available discharge data shows that Lake Poinsett is receiving a dangerous load of total phosphorus and is probably receiving a dangerous load of total nitrogen.

Conclusions and Recommendations

Lake Poinsett is a lake with a number of problems, low dissolved oxygen concentrations have resulted in the accumulation of ammonia, and they may be responsible for fish kills. Suspended solids are excessive and total dissolved solids appear to be approaching excessive levels. Toxic levels of un-ionized ammonia levels are a common occurrence in the lake. Indications are, the lake is polluted by nitrogen fertilizers and/or sewage, whether human or animal. Overall the lake is eutrophic.

The tributaries are contributing high levels of nutrients, fecal coliforms, and probably sediments based on the suspended solids numbers. For some presently unknown reason(s), the outlet has more problems than the lake and the tributaries, but this may be due to a feedlot located about one and one-half miles from the outlet. Based on these salient points, the following recommendations are made:

1. Conduct a limnological study of the lake that also encompasses the Big Sioux diversion and Dry Lake. Based on Skille's thesis, the Big Sioux-Dry Lake system contributes 63% of the phosphorus and 45% of the nitrate-nitrogen.

2. Collect samples in the limnetic regions of the lake instead of the littoral.

3. Obtain accurate flow data from all inputs and the outlet.

4. Determine what is causing the intensification of problems in the outlet waters as they will impact the Big Sioux River.

5. Identify nutrient, sediment, and fecal coliform sources. This will entail identifying management practices on the agricultural lands, other land uses, and feedlots.

6. Determine if there is a sewage problem because of the cabins around the lake.

7. Hydrological studies should be considered to determine the movement of water into, in and out of the lake.

8. Biological data should be collected in the lake. Particularly, dominant algal species, zooplankton, fish, and chlorophyll *a* should be identified.

9. A study of light availability should also be conducted. Light may be one of the most important limiting factors dictating the type of algae present.

The water quality in Lake Poinsett is not good and improvements to the lake will be difficult. It may not be technically feasible to control phosphorus inputs as 50% of the total phosphorus is in the soluble form (Skille, 1971). However, it is feasible to reduce sediments and the fecal coliform levels. Fecal coliforms must be controlled in order to protect human health. Sediments must be controlled to preserve the longevity of the lake. An important attribute to any future study should be to determine the feasibility of mitigating the existing water quality problems.

B. Oakwood Lakes

East Oakwood Lake is located in Brookings County, South Dakota, at a latitude of 44 Degrees, 26 Minutes, 12 Seconds; a longitude of 96 Degrees, 58 Minutes, 6 Seconds; in Township 111 N, Range 51 W, Sections 4, 5, 8, 9, 16, and 17. The morphometric characteristics of the lake are as follows:

Area	1,000 acres (22.2 ha)
Maximum depth	9 ft. (2.7 m)
Mean depth	5 ft. (1.5 m)
Volume	5,000 acre-feet ($6.168 \times 10^6 m^3$)

West Oakwood Lake is also located in Brookings County, South Dakota, at a latitude of 44 Degrees, 26 Minutes, 36 Seconds; a longitude of

96 Degrees, 59 Minutes, 30 Seconds; in Township 111/112 N, Range 51/52 W, Sections 1, 5, 6, 7, 8, 12, 31, 32, and 36. This lake has the following morphometric characteristics:

Area	300 acres (121.4 ha)
Maximum Depth	10 ft. (3.0m)
Mean Depth	6 ft. (1.8m)
Volume	1,800 acre-feet (2.220x$10^6$$m^3$

Both lakes have been assigned the following beneficial uses by the State of South Dakota:

° Warmwater marginal fish life propagation waters;

° Immersion recreation waters;

° Limited contact recreation waters; and

° Wildlife propagation and stock watering waters.

Based on these assigned beneficial uses:

° "Un-ionized ammonia nitrogen shall not exceed 0.05 mg/l (as N) with a variation allowed under subdivision 74:03:02:32 (2)." That is, this "criterion shall be maintained at all times based upon the results of a twenty-four hour representative composited sample, and also the numerical value of a parameter found in any one grab sample collected during the period shall not exceed 1.75 times the applicable criterion."

° "Dissolved oxygen shall be greater than 5.0 mg/l..."

- "pH shall be greater than 6.5 units and less than 8.3 units..."

- "Suspended solids shall not exceed 150 mg/l with a variation allowed under subdivision 74:03:02:32 (3)." That is, the "applicable criterion shall be maintained at all times based on the average of five consecutive twenty-four hour composited samples, and also the numerical value of a parameter found in any one grab sample collected during the period shall not exceed 2.0 times the applicable criterion."

- "Temperature shall not exceed 90 Degrees Fahrenheit..."

- "Fecal coliform organisms shall not exceed a concentration of 200 per 100 milliliters as a geometric mean based on a minimum of not less than five samples obtained during separate twenty-four hour periods for any thirty-day period from May 1 to September 30; nor shall they exceed this value in more than twenty percent of the samples examined in the above described thirty-day period; nor shall they exceed 400 per 100 milliliters in any one sample from May 1 to September 30."

- "Total dissolved solids shall not exceed 2,500 mg/l with a variation allowed under subdivision 74:03:02:32 (2)." The variation is the same as described above for un-ionized ammonia.

- "Nitrates shall not exceed 50 mg/l (as N) with a variation allowed under subdivision 74:03:02:32 (2)." The variation is the same as described above for un-ionized ammonia.

In the following report, the water quality of the Oakwood Lakes will be discussed for these parameters: dissolved oxygen, biological oxygen demand, temperature, total alkalinity, total dissolved solids, total solids, suspended solids, ammonia as nitrogen, nitrate as nitrogen, nitrite as nitrogen, total Kjeldahl nitrogen, fecal coliforms, and total phosphorus. In addition, the nutrient (i.e., phosphorus or nitrogen) that tends to be limiting will be identified and the trophic state index for phosphorus will be discussed. Oakwood Lakes sampling sites are described in Figure 6. Tables and figures discussed in the following sections are contained in Appendix B.

Dissolved Oxygen

Dissolved oxygen concentrations must be equal to or greater than 5.0 mg/l in order to meet the State's water quality standards. In East Oakwood Lake dissolved oxygen concentrations ranged from 0.3 mg/l to 18.6 mg/l and the annual mean concentration ranged from 7.8 mg/l to 11.5 mg/l. (Note that the mean of 13.6 mg/l reported in Table IV-10 is incorrect since one of the observed values was recorded as 94 mg/l. The actual value was 9.4 mg/l, and the annual mean recalculated as 8.56 mg/l).

In-lake values for West Oakwood ranged from 0 to 22.6 mg/l and the mean annual values ranged from 7.4 to 11.3 mg/l. Tributary values ranged from .3 to 14.5 mg/l and the mean annual values ranged from 2.4 at Site OA02 in 1977 to 11.2 at Site OA04 in 1979.
Figures IV-1 and IV-2 show the data collected for East Oakwood and Figures IV-3 through IV-5 show the in-lake data for West Oakwood.

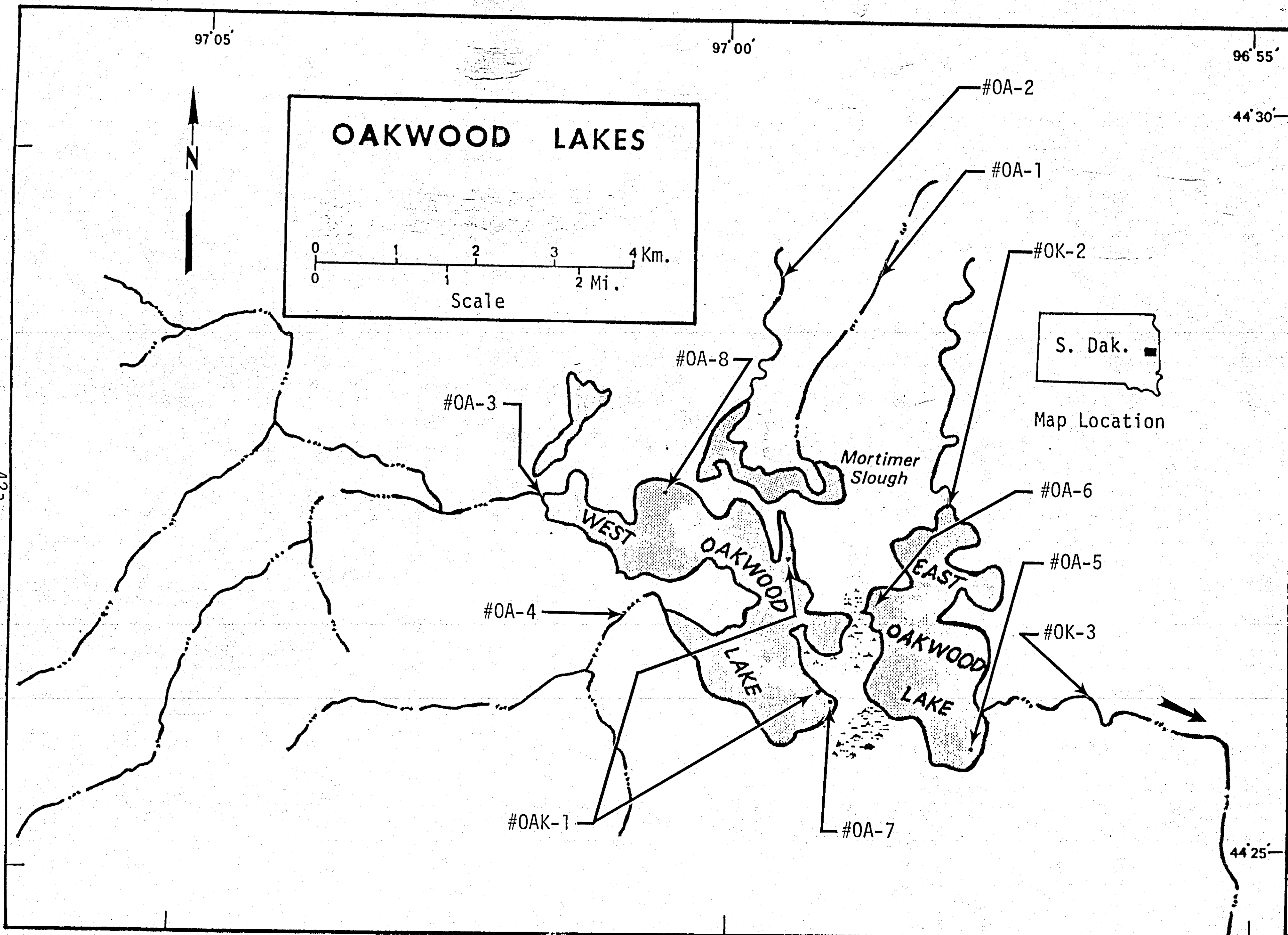


Figure 6. Sample sites for the Oakwood Lakes and their tributaries.

Site Number	Site Description
460A01 (OA-1)	Latitude 44 Deg., 28 Min., 12 Sec., longitude 96 Deg., 59 Min., 12 Sec., Township 112N, Range 51W, Section 32. NW1/4, NW1/4, NW1/4, NW1/4. This site is located .75 miles north on a tributary to Mortimer Slough, on the South side of the road.
460A02 (OA-2)	Latitude 44 Deg., 28 Min., 12 Sec., longitude 96 Deg., 59 Min., 43 Sec., Township 112N, Range 51W, Section 31. NE1/4, NW1/4, NW1/4, NE1/4. This site is located .5 miles north on another tributary to Mortimer Slough, on the south side of the road.
460A03 (OA-3)	Latitude 44 Deg., 27 Min., 23 Sec., longitude 97 Deg., 01 Min., 39 Sec., Township 112 N, Range 52W, Section 35. SE1/4, SE1/4, SE1/4, SE1/4. This is a tributary site located 2 miles west and 1 mile south of site 1, on the west side of West Oakwood Lake, on the west side of the road.
460A04 (OA-4)	Latitude 44 Deg., 26 Min., 30 Sec., longitude 97 Deg., 00 Min., 58 Sec., Township 111N, Range 52W, Section 1. SW1/4, SW1/4, SW1/4, SE1/4. This is a tributary site located 1.5 west and 2 miles south of site 1, on the west side of West Oakwood Lake, on the north side of the road.
460A07 (OA-7)	Latitude 44 Deg., 25 Min., 59 Sec., longitude 96 Deg., 58 Min., 59 Sec., Township 111N, Range 51W, Section 8. SE1/4, NE1/4, NW1/4, SW1/4. This is an in-lake site located .25 mile east and 2.5 miles south of site 1, in the southeast corner of West Oakwood lake.
460A08 (OA-8)	Latitude 44 Deg., 27 Min., 25 Sec., longitude 97 Deg., 00 Min., 26 Sec., Township 112N, Range 51W, Section 31. NW1/4, SW1/2, SW1/4, SW1/4. This is an in-lake site located 1 mile west and 1 mile south of site 1, off the West Oakwood Lake swimming beach.
460AK1 (OAK-1)	Latitude 44 Deg., 26 Min., 27 Sec., Longitude 96 Deg., 59 Min., 34 Sec., Township 111 N, Range 51W, Section 7, SE 1/4, NE 1/4, NW 1/4, NE 1/4. This description represents a composite of two inlake sites; 1) the boat ramp at the southeast edge of West Oakwood Lake, and 2) the boat ramp at the northeast edge of West Oakwood Lake.

Figure 6 (cont.). West Oakwood Lake site descriptions.

Site Number	Site Description
460A05 (0A-5)	Latitude 44 Deg., 25 Min., 36 Sec., longitude 96 Deg., 57 Min., 35 Sec., Township 111N, Range 51W, Section 16. NW1/4, NE1/4, NE1/4, NW1/4. This is an in-lake site located 1.5 miles east and 3 miles south of site 1, at the boat ramp in the southeast corner of East Oakwood Lake.
460A06 (0A-6)	Latitude 44 Deg., 26 Min., 38 Sec., longitude 96 Deg., 58 Min., 40 Sec., Township 111N, Range 51W, Section 5. NE1/4, SE1/4, SE1/4, SW1/4. This is an in-lake site located 5 mile east and 2 miles south of site 1, on the west side of East Oakwood Lake.
460K2 (0K-2)	Latitude 44 Deg., 27 Min., 21 Sec., longitude 96 Deg., 57 Min., 55 Sec., Township 112N, Range 51W, Section 33. SE1/4, SW1/4, SW1/4, SW1/4. This site is the inlet to East Oakwood Lake located 1 mile east and 1 mile south of site 1, on the north side of the road.
460K3 (0K-3)	Latitude 44 Deg., 26 Min., 02 Sec., longitude, 96 Deg., 56 Min., 50 Sec., Township 111N, Range 51W, Section 9. SE1/4, NE1/4, NE1/4, SE1/4. This site is the outlet from East Oakwood Lake located 2 miles east and 2.5 miles south of site 1, on the west side of the road.

Figure 6 (cont.). East Oakwood Lake site descriptions.

Based on the 1979 data, it appears that in-lake values are greater than 10 mg/l in the spring, decrease to values less than 10 mg/l over the summer, and increase to values greater than 10 in the fall (Figures IV-1 through IV-4). Winter values were not available.

In East Oakwood Lake only two violations were observed over the course of the study (0.3 mg/l at Site OA05 on December 28, 1977, and 2.5 mg/l at Site OA06 on June 12, 1979; Tables IV-34 through IV-35). Five violations were observed in West Oakwood Lake (1.7, 0.0, and 0.0 mg/l on December 28, 1977, February 16, 1978, and March 16, 1978, at Site OA07; 0.0 mg/l on February 16, 1978, at Site OA08; and 1.5 mg/l on January 5, 1982, at OAK1; Tables IV-41 through IV-43). The low dissolved oxygen values in the winter of 1977 and 1978 probably were responsible for the fish kill observed that year. There are indications that low dissolved oxygen values may be a chronic problem in the winter.

There is not a dissolved oxygen standard for the tributaries to West Oakwood. Therefore, the in-lake dissolved oxygen standard was used to determine if there were problem areas. All tributary sites, except OA04, had low dissolved oxygen concentrations (Tables IV-37 through IV-40a). Three low values were observed at Site OA01 (17% of the samples) and two low values at Site OA03 (15% of the samples).

Biological Oxygen Demand

The biological oxygen demand ranged from 1.1 to 29.1 mg/l in East Oakwood and ranged from 1.0 to 26.7 mg/l in West Oakwood. The annual mean biological oxygen demand ranged from 4.5 mg/l to 15.4 mg/l in

East Oakwood Lake and from 1.0 (one sample) to 16.6 mg/l in West Oakwood. In the tributaries to Mortimer Slough and West Oakwood the annual mean biological oxygen demand ranged from 2.0 to 13.4 mg/l and the observed value ranged from 1.0 to 38.0 mg/l. In 1977, the biological oxygen demand was high enough, at times, to warrent concern of organic pollution in both lakes and in tributary Sites OA02 and OA03. A possible explanation for the high values is the 1977 sampling season was a dry year preceded by several other dry years; organic matter accumulated and was reflected by the high biological oxygen demand concentrations. Table IV-33 summarizes the data.

Temperature

According to the State's water quality standard for temperature, the lakes should not exceed 90°F. Temperatures did not exceed 90°F in either lake or the monitored tributaries during the period water samples were collected.

Alkalinity (Total)

Total alkalinity is a measure of the buffering capacity of the water and is, therefore, important for the maintenance of conditions favorable for aquatic biota. The State of South Dakota has assigned a maximum value of 750 mg $CaCO_3$/l for surface waters used for wildlife propagation and stock watering.

Alkalinity values ranged from 114 to 406 mg $CaCO_3$/l in East Oakwood Lake and from 84 to 319 mg $CaCO_3$/l in West Oakwood Lake. In the tributaries to West Oakwood and Mortimer Slough, alkalinity values ranged from 31 to 236 mg $CaCO_3$/l (Tables IV-3 through IV-33).

Figures IV-6 through IV-9 demonstrate a peak in alkalinity in December of 1977 or January and February of 1978 depending on the site. This peak then declined probably as a result of increased water to the lakes following a series of dry years (see the section on solids). In general, both East and West Oakwood Lakes were well buffered.

<u>Total Solids, Suspended Solids and Total Dissolved Solids (i.e., Total Residue, Nonfilterable Residue, and Dissolved Residue)</u>

Total solids in East Oakwood ranged from 543 mg/l to 2,973 mg/l and the annual means ranged from 678 mg/l to 1,825 mg/l. In West Oakwood, the total solids in the lake ranged from 156 mg/l to 2,281 mg/l and the annual means ranged from 156 mg/l (one sample in 1982) to 1,112 mg/l. The tributaries to Mortimer Slough ranged from 156 mg/l to 2,026 mg/l; but in general, the majority of the observed values were less than 1,000 mg/l. Annual mean concentrations went from a low of 156 mg/l (one sample in 1982 as above) to 869 mg/l. Figures IV-10 through IV-13 illustrate the in-lake total solids data. Note the similarity between the peak total solids values in December of 1977, January of 1978, and February of 1978 at various in-lake sites and the peaks observed for total alkalinity at the same sites. Whatever contributed to the total solids peaks also contributed to total alkalinity.

The dissolved solid fraction follows the same trend as the total solids (Figures IV-14 through IV-17) and was probably the contributing factor to the peak of total dissolved solids and alkalinity. The term dissolved solids is generally associated with freshwater systems and consists of inorganic salts, small amounts of organic matter, and dissolved material (EPA, 1976). The principal inorganic anions dissolved in water include the carbonates, chlorides, sulfates, and nitrates and the principal cations are sodium, potassium, calcium, and magnesium.

Based on the State of South Dakota's water quality standard for dissolved solids, a value greater than 2,500 mg/l was considered to be undesirable. Both the Oakwood Lakes had acceptable total dissolved solids levels throughout the sampling period. Mean annual values for East Oakwood ranged from 677 mg/l at Site OA06 in 1983 to 1,719 at Site OA06 in 1977. In West Oakwood, the annual mean values ranged from 630 mg/l at Site OA07 in 1979 to 1,028 mg/l at Site OA08 in 1977.

As briefly discussed above, the alkalinity, total solids, and dissolved solids followed the same basic pattern with peaks in 1977 or 1978 depending on the site. Note that even prior to the peaks, alkalinity, total solids, and suspended solids were higher than throughout the rest of the study. The Oakwood Lakes were low in 1978 and early 1979 as the result of a series of dry years. What is being observed is the dilution of the solids and that fraction of the dissolved solids contributing to alkalinity resulting in a decrease of the observed values.

Suspended solids have been identified as having the potential to detrimentally affect a lake's fishery. In 1965, the European Inland Fisheries Advisory Committee identified four means by which suspended solids can adversely affect fish and fish food populations (EPA, 1976). Fish swimming in waters with high suspended solids can be killed directly, their growth rate reduced, or their resistance to disease reduced. Additionally, suspended solids can prevent the successful development of fish eggs and larvae, modify natural movements and migrations of fish, and reduce the abundance of food available to fish.

The annual mean concentrations for suspended solids in East Oakwood ranged from 12 mg/l at Site OA05 in 1982 to 121 mg/l at Site OA07 to 83.7 mg/l in 1977 at Site OA08. In the tributaries to West Oakwood and Mortimer Slough the annual mean concentrations ranged from 2.5 mg/l at Site OA02 in 1978 to 79 mg/l at Site OA03 in 1977.

From September 15, 1977, to March 16, 1978, the suspended solids in East Oakwood at both in-lake sites were greater than 150 mg/l. One other excessive level was observed on October 2, 1979, when the observed suspended solids concentration was 912 mg/l at Site OA06. These levels violate the State's standard of 150 mg/l and the allowable variation for analytical error. Figures IV-18 and IV-19 show the concentrations observed in East Oakwood.

West Oakwood did not demonstrate the high suspended solids observed in East Oakwood in 1978 and 1979. However, on October 2, 1979, Site OA07 had a concentration of 612 mg/l and Site OA08 had an observed concentration of 616 mg/l. Figures IV-20 and IV-21 illustrate the data.

The tributaries were not observed to have suspended solids concentrations as high as the lakes although excessive levels were observed. At Site OA02 on May 10, 1979, a concentration of 208 mg/l was noted; at Site OA03 on June 6, 1977, a concentration of 406 mg/l was noted; and at Site OA04 on June 16, 1977, and June 18, 1977, concentrations of 221, 202, and 194 mg/l were noted. Figures IV-21 and IV-22 show a rapid increase in suspended solids in 1977 during the spring runoff period and a rapid decline thereafter, until the tributaries apparently ceased flowing.

Fecal Coliforms

Fecal coliform levels observed in East Oakwood ranged from 3 to 21,000 per 100 ml and the annual mean concentrations ranged from 3 (one sample in 1982) to 2,650 per 100 ml. The mean concentration of 2,650 per 100 ml is driven by the single value of 21,000 per 100 ml observed on June 28, 1978. In West Oakwood Lake, the observed values ranged from 3 to 6,100 per 100 ml and the annual mean values ranged from 7 to 1,166 per 100 ml. The high mean value of 1,166 was observed in 1978 and is driven primarily by the observed value of 6,100 per 100 ml.

In the tributaries to Mortimer Slough and to West Oakwood the observed values ranged from 3 to 31,000 per 100 ml. The mean annual values ranged from 3 (one sample for 1982) to 3,706 per 100 ml. In general, the highest fecal coliform levels were observed in the tributaries.

Although the tributaries to the Oakwood Lakes do not have an assigned water quality standard, the in-lake standards were used to identify excessive levels. During the month of June, 1977, four samples contained levels of fecal coliforms greater than 400 per 100 ml at Site OA01 (Range 530 to 7,800 per 100 ml). Over the period of study, seven samples (29% of all samples) had fecal coliform levels greater than 400 per 100 ml at Site OA01. At Site OA02, five samples or 20% of all samples collected had levels greater than 400 per 100 ml. At Sites OA03 and OA04, 24% and 46%, respectively, of all samples were greater than 200 per 100 ml and 81% of these samples were greater than 400 per 100 ml. The sources(s) of these fecal coliform levels should be identified.

In the lakes, fecal coliform levels that exceeded 200 per 100 ml frequently occurred. At Sites OA05 and OA06 in East Oakwood, 11% and 8%, respectively, of the samples collected had fecal coliform levels greater than 200 per 100 ml and 71% of those were greater than 400 per 100 ml. Most of these occurred in the summer. In West Oakwood, 17% of the samples collected at Site OA07 were excessive and 8% of the samples collected at Site OA08 were excessive. Again, sources of fecal coliform contamination should be identified and mitigated.

Tables IV-3 through IV-32 summarize the fecal coliform data. Tables IV-34 through IV-43a present the number of values greater than 200 per 100 ml and the dates on which the excessive values occur.

pH

The State of South Dakota's water quality standard for pH, applicable to East and West Oakwood, "shall be greater than 6.5 units and less than 8.3 units...". In East Oakwood, the pH was greater than 8.3 in 53% of the samples collected at Site OA05 and in 61% of the samples collected at Site OA06 (Tables IV-34 through IV-35a). In West Oakwood, the pH was greater than 8.3 in 48% of the samples collected at Site OA07, 63% of the samples collected at Site OA08, and 40% of the samples collected at Site OAK1 (Tables IV-41 through IV-42a). Generally, the pH in the tributaries was acceptable with only 4% of the samples collected at Site OA03 being out of compliance.

In West Oakwood it appears that the pH values were greater then 8.3 during the growing season when algal productivity would be high (Figures IV-22 and IV-23). However, that trend does not always hold as is evident in 1979 in Figures IV-22 and IV-23. No apparent trends were evident in East Oakwood.

Nitrogen

Analyses were conducted for four fractions of nitrogen; total Kjeldahl nitrogen as nitrogen, ammonia as nitrogen, nitrite as nitrogen, and nitrate as nitrogen. In addition, inorganic and organic nitrogen determinations were made by either summing ammonia, nitrate, and nitrite values (inorganic nitrogen) or by subtracting ammonia concentrations from total Kjeldahl nitrogen. In this discussion, total Kjeldahl nitrogen will not be discussed as total Kjeldahl nitrogen but in terms of organic nitrogen.

Nitrate as nitrogen concentrations range from 0 to 10 mg/l in unpolluted freshwater (Wetzel, 1975) and it is a nutrient source readily assimulated by the phytoplankton. Mean total nitrate values ranged from less than .10 mg/l to .20 mg/l (Tables IV-3 through IV-11) in East Oakwood and ranged from .10 mg/l to .17 mg/l (Tables IV-26 through IV-33) in West Oakwood. The nitrate-nitrogen concentrations in the two lakes are well within the range for unpolluted freshwaters, and there were no discernable trends in the data.

In the tributaries to Mortimer Slough and West Oakwood, nitrate-nitrogen concentrations ranged from less than .10 mg/l to 3.40 mg/l (Tables IV-12 through IV-25). As in the lakes, these values are typical of unpolluted freshwaters but they are higher concentrations than those observed in the lakes. Although the data base is limited, it appears that in the tributaries the nitrates were the highest during the runoff period of March to early May (Figures IV-24 through IV-27).

Nitrite-nitrogen concentrations are generally low in natural waters (0 to .01 mg/l; Wetzel, 1975). The majority of the dissolved nitrite levels in the lake were less than .01 mg/l, but occasionally they were relatively high (Figures IV-28 through IV-31). The majority of the high values occurred in 1978 although there was a pulse apparent in all the lake sites in 1979. The reason for the pulses of nitrite-nitrogen concentrations is not known but should be investigated further.

The tributary sites had higher mean values than the in-lake sites. Mean annual values in the lake ranged from less than .01 to .053 mg/l (Tables IV-3 through IV-11 and Tables IV-30 through IV-33). Whereas, in the tributaries mean annual values ranged from less than .01 to .257 mg/l (Tables IV-12 through IV-25). Figures IV-32 through IV-35 show the nitrite-nitrogen data collected for the tributaries, and it appears that most of the high values occurred during the spring runoff. Those areas producing these relatively high concentrations of nitrites should be identified.

Mean annual concentrations of total ammonia as nitrogen ranged from .167 to 6.550 mg/l in East Oakwood and from .448 to 3.350 mg/l in West Oakwood (Tables IV-3 through IV-11 and Tables IV-26 through IV-33). Figures IV-36 through IV-37 show high concentrations of ammonia in the winter of 1978. These high concentrations are probably the result of low dissolved oxygen concentrations (Figures IV-1 through IV-4) allowing the accumulation of ammonia. In 1978 and particularly 1979, Figures IV-36 through IV-37 show pulses of ammonia in the mid-summer period. What caused this accumulation of ammonia in the summer is not known. It is possible there was an algal bloom die-off and a combination of lower dissolved oxygen values allowed the ammonia levels to accumulate, but this is speculation at this point.

Of primary concern is the un-ionized fraction of ammonia which is considered to be toxic to fish at various concentrations depending on pH and temperature. Over the course of the sampling period, 35% of the samples collected at Site OA05 and 36% of the samples collected at Site OA06 in East Oakwood were excessive (Tables IV-34 through IV-35a). Most of the excessive levels occurred from March through the summer. In West Oakwood, 5% of the samples collected from Site OA07 and 15% of the samples collected from Site OA08 were excessive (Tables IV-41 through IV-43a in East Oakwood). As in East Oakwood, most of the excessive levels occurred during the summer. It would be of interest to determine why East Oakwood had a higher frequency of excessive ammonia concentrations than West Oakwood.

The tributaries to Mortimer Slough and West Oakwood had mean annual values that ranged from .040 to .385 mg/l and the observed concentrations ranged from .020 to .750 mg/l. None of these values were determined to result in unacceptable high un-ionized ammonia levels (Tables IV-12 through IV-25).

Inorganic and organic nitrogen fractions can be used as indicators of lake productivity (see Wetzel, 1975; Table 11-4). In East Oakwood, the annual mean values of inorganic nitrogen ranged from .59 mg/l in 1979 to 3.51 mg/l in 1978 and the annual mean values of organic nitrogen ranged from .990 mg/l in 1982 to 7.54 mg/l in 1977 (Tables IV-44). Observed inorganic nitrogen values ranged from <.13 to 6.66 mg/l and organic nitrogen values ranged from .92 to 11.65 mg/l. In West Oakwood, the annual mean inorganic nitrogen values ranged from .58 mg/l in 1979 to 3.11 mg/l in 1978 and the annual mean organic nitrogen values ranged from 1.90 mg/l in 1979 to 7.24 mg/l in 1977 (Table IV-45). Observed inorganic nitrogen values ranged from <.13 to 8.67 mg/l and organic nitrogen ranged from 1.10 to 10.37 mg/l.

Based on Table 11-4, in Wetzel 1975, both lakes could have levels of productivity ranging from oligotrophic to hypereutrophic based on the inorganic nitrogen values. Based on the mean values (Tables IV-44 and IV-45) the lakes are eutrophic to hypereutrophic. This situation contrasts to many of the other lakes studied under the "208" program, where the inorganic nitrogen fraction indicated productivity levels ranging from ultra-oligotrophic to meso-eutrophic. A partial rationale for the Oakwood Lakes being different can be explained by the high mean values in 1977 and 1978. During these years, particularly over the winter of 1977 and 1978 when the dissolved oxygen concentrations were low, ammonia accumulated in the lake as bacterial nitrification decreased or was eliminated. Ammonia concentrations are responsible for the high levels of inorganic nitrogen observed in these lakes. Organic nitrogen annual mean concentrations, indicate that both Oakwood Lakes were hypereutrophic during the study (Tables IV-44 and IV-45). The one exception occurred in 1982 when the one value observed indicated a eutrophic condition. Most other lakes studied during the "208" program also had organic nitrogen levels that would be considered to indicate hypereutrophic conditions. Therefore, in regard to organic nitrogen, the Oakwood Lakes are similar to other eastern South Dakota lakes.

Phosphorus

Over the course of the study, four fractions of phosphorus were measured: total phosphorus, total orthophosphate, dissolved orthophosphate, and dissolved organic phosphorus. Total phosphorus was determined by digesting the sample and then analyzing it colorimetrically. In the tables, total phosphorus is called total phosphate. Total orthophosphate was determined by direct colorimetry. This parameter measures dissolved orthophosphate, colloidal phosphate, and organic phosphate. Additionally, the parameter up to 1983 consisted of some hydrolyzable phosphate because the waters to be analyzed were taken from samples preserved with 2 ml of sulfuric acid. Dissolved orthophosphate was determined by filtering a sample through a .45 micron filter and determining the phosphate concentration by direct colorimetry. Because waters to be analyzed for dissolved orthophosphate were taken from preserved samples, part of the concentration is probably hydrolyzable phosphorus. The last fraction measured was dissolved organic phosphorus. This fraction was determined by filtering the sample water through a .45 micron filter, digesting the sample and then analyzing colorimetrically. Again, because the samples were taken from a preserved bottle, the hydrolyzable phosphorus fraction was also measured. Because of the various fractions and the various phosphorus constituents measured, only total phosphorus will be discussed. Total phosphorus constitutes the majority of the data and is also the parameter most widely used to assess the trophic status of a lake.

At the two in-lake sites in East Oakwood, total phosphorus concentrations ranged from .034 mg/l to 1.570 mg/l (Site OA06, 1978 and 1983, respectively) and the annual mean concentrations ranged from .086 mg/l at Site OA05 in 1979 to 1.205 mg/l at Site OA06 in 1983. In the in-lake sites in West Oakwood, the observed concentrations ranged from .010 mg/l at Site OA07 in 1979 to .329 mg/l at Sites OA07 and OA08 in 1978 and 1979, respectively. The annual mean concentrations ranged from .040 mg/l (one sample in 1982 at Site OA08) to .227 mg/l (Site OA07, 1978).

A lake with a phosphorus concentration exceeding .05 mg/l is characterized as hypereutrophic (Reckhow, et al., 1980). Both of the Oakwood lakes would be considered hypereutrophic based on this standard.

The annual mean values in the tributaries to Mortimer Slough and West Oakwood ranged from .216 mg/l to .948 mg/l. In general, the tributaries to Mortimer Slough had higher concentrations of total phosphorus than those to the lake. However, all the concentrations observed from the tributary sites were well in the range considered hypereutrophic (Tables IV-12 through IV-25).

Trophic State Index

Based on the relationships between total phosphorus, chlorophyll *a* and Secchi disc, Carlson (1977) proposed equations to be used to calculate a Trophic State Index (TSI) given any one parameter. The calculations result in a numerical value that represents the biomass of algae present on that day. Furthermore, each increase of the index by 10 represented a doubling of the algae biomass.

Table IV-46 statistically summarized the TSI's based on phosphorus concentrations observed in East and West Oakwood Lakes. All TSI values are greater than 50 and indicate that the biomass of algae in the two lakes is probably quite high and indicative of eutrophic conditions. However, before the preceding statement can be assumed to be accurate, TSI's for chlorophyll *a* and Secchi disc values should also be calculated. These values were not available for inclusion in this section.

Limiting Nutrient

It has been suggested (EPA, 1980) that a ratio of 15:1 for total nitrogen to total phosphorus should be used as a division between lakes that be phosphorus limited and lakes that tend toward phosphorus limitation. If the calculated ratio is greater than 15:1, the lake is assumed to be phosphorus limited and if it is less than 15:1, the lake is assumed to be nitrogen limited. Based on the mean annual ratios calculated for the two lakes, these lakes are phosphorus limited (Table IV-47).

Summary and Recommendations

East and West Oakwood Lakes are shallow prairie lakes located in Brookings County, South Dakota. Both lakes have been assigned the following beneficial uses: 1) warmwater marginal fish life propagation waters; 2) immersion recreation waters; 3) limited contact recreation waters; and 4) wildlife propagation and stock watering waters. The following comments summarize the water quality observed in the lakes.

° Two low dissolved oxygen concentrations were observed in East Oakwood and five in West Oakwood. The majority of these low concentrations occurred during the 1977/1978 winter and were probably responsible for the observed fish kill.

° Biological Oxygen Demand concentrations ranged from 1.1 mg/l to 29.1 mg/l in East Oakwood and from 1.0 to 26.7 mg/l in West Oakwood. The upper values are high enough to warrent concern about organic pollution.

° Temperatures did not exceed the State's standard of 90°F.

° Both lakes are well buffered with alkalinity values ranging from 84 to 406 mg $CaCO_3$/l.

° East and West Oakwood Lakes had acceptable total dissolved solid concentrations over the sampling period (i.e., <2,500 mg/l).

° Between September 15, 1977, and March 16, 1978, the suspended solids in East Oakwood exceeded the State's standard of 150 mg/l. Suspended solids in West Oakwood were excessive on October 2, 1979.

- Fecal coliform levels often were high in the tributary sites to West Oakwood and Mortimer Slough (i.e., >200 per 100 ml). This was also true in the lakes with 8% to 17% of the samples collected demonstrating fecal coliform levels greater than 200 per 100 mg/l.

- pH values were greater than 8.3 in 53% and 61% of the samples collected in East Oakwood Lake and in 48% and 63% of the samples collected in West Oakwood Lake. Generally, pH values were acceptable in the tributaries.

- In the lakes, nitrate as nitrogen concentrations were well within the range considered normal for unpolluted waters.

- Generally, nitrite as nitrogen levels were less than .010 mg/l which is the upper level considered normal for natural waters. However, relatively high values occurred in 1978 and a pulse occurred in 1979. Mean nitrite as nitrogen values in the tributaries ranged from less than .01 to .257 mg/l. The majority of the high values (>.01 mg/l) occurred during the spring runoff.

- Because of low dissolved oxygen values in the 1977/1978 winter, total ammonia concentrations accumulated. In East Oakwood, 35% of the samples from Site OA05 and 36% of the samples from Site OA06 demonstrated excessive levels of un-ionized ammonia. In West Oakwood, only 5% of the samples from Site OA07 and 15% of the samples from Site OA08 had excessive un-ionized ammonia levels.

- In general, mean inorganic nitrogen levels suggest the Oakwood Lakes have productivity levels ranging from eutrophic to hypereutrophic and mean organic nitrogen levels suggest hypereutrophic conditions.

- Total phosphorus concentrations suggest hypereutrophic conditions in both lakes.

° The Trophic State Indices, based upon phosphorus, suggest East and West Oakwood are highly productive lakes in terms of algal biomass.

° Based on the total nitrogen to total phosphorus concentrations, the Oakwood Lakes will tend toward phosphorus limitation.

Based on the above results, a more thorough limnological and watershed study needs to be conducted. Specifically, there is a need to determine if low dissolved oxygen concentrations are a chronic problem during the winter. Possible sources of organic pollution, high suspended solids, fecal coliforms, and nitrites need to be identified. Apparently, the two lakes and Mortimer Slough are interconnected by culverts. A good hydraulic budget and nutrient budget study needs to be developed to assess the impacts of these lakes and the slough on each other. The lack of adequate flow data was a major weakness of this project and should be rectified in future work. Also, a future study should be conducted in the limnetic area of the lake rather than the littoral area.

V. Lake Poinsett Problems and Recommendations

A. Watershed Problems and Recommendations

1. Nutrient Loading from Cropland/Grassland Runoff

Problem:

Excessive nutrient and sediment loads from the Big Sioux River, the Lake Albert watershed, and the intermittent tributaries are responsible for the present hypereutrophic condition of Lake Poinsett. The lake is characterized by very high concentrations of soluble phosphorus and high nitrogen levels (Section IV), annual bluegreen algal blooms, and frequent summer and winter fish kills. These conditions are symptomatic of extreme nutrient enrichment. Concentrations of nutrients relative to the needs of aquatic plant and algae are in a state of super-saturation (Skille, 1971). Areal load was .52 g/m^2/yr for phosphorus and .40 g/m^2/yr for nitrate nitrogen from April, 1970 to April, 1971 (Ibid.).

The phosphorus value exceeds Vollenweider's (1968) provisional dangerous load for a shallow lake such as Lake Poinsett by at least a factor of four. Nitrate-nitrogen areal loads were high but did not exceed Vollenweider's provisional permissible loading level. However, if all nitrogen fractions were considered, including organic nitrogen, the dominant form in most eutrophic lakes, it is probable that nitrogen loads to Lake Poinsett would also exceed dangerous levels (Section IV).

Skille (1971) calculated nutrient input to Lake Poinsett from the two major sources of surface water inflow. The Big Sioux River/Dry Lake system was the source of 63% of the phosphorus load to Lake Poinsett of which 44% originated from the Big Sioux River watershed. The remaining 37% was derived from the Lake Albert system. About 55% of the yearly nitrate-nitrogen load of 12,800 kilograms was derived from the Lake Albert system and 45% from the Big Sioux River/Dry Lake system. Skille did not measure contributions of nutrients from several small intermittent tributaries. During the present study, flow data was not collected so that loadings could not be calculated. Since nutrient concentrations in these tributaries are known to be high, it is probable that they may contribute appreciably to the total phosphorus and nitrogen loads impacting Lake Poinsett. Total Kjeldahl nitrogen (organic nitrogen plus ammonia) ranged from 1.43 mg/l to 4.28 mg/l and total phosphorus from .142 mg/l to 1.26 mg/l at tributary sample sites (Section IV).

The high nutrient loads entering Lake Poinsett are ultimately attributable to the contribution of a large watershed comprised mostly of agricultural land. Runoff from fertilized croplands may be a major source of phosphorus and nitrogen to the lake. Contributions of nutrients may also be derived from runoff from at least 18 feedlots in the vicinity of Lake Poinsett (Figure 7) as evidenced by excessive fecal coliform levels observed at in-lake and tributary sampling sites (Section IV).

Activities to date:

Oakwood Lakes and Lake Poinsett were originally designated as two separate Water Quality Study Areas (WQSAs) by DWNR in 1976. As WQSA's, both areas were monitored to determine the extent of the surface water quality problems. Reports, including recommendations to alleviate the water quality degradation, were included in the original 208 Water Quality Management Plan.

Subsequent meetings with the local people to discuss the problems of the lakes and watersheds showed a considerable amount of public support for the initiation of a 208 Water Quality Project in the two watersheds. In response to this local support, DWNR

Oakwood Lakes - Poinsett Project
Rural Clean Water Program

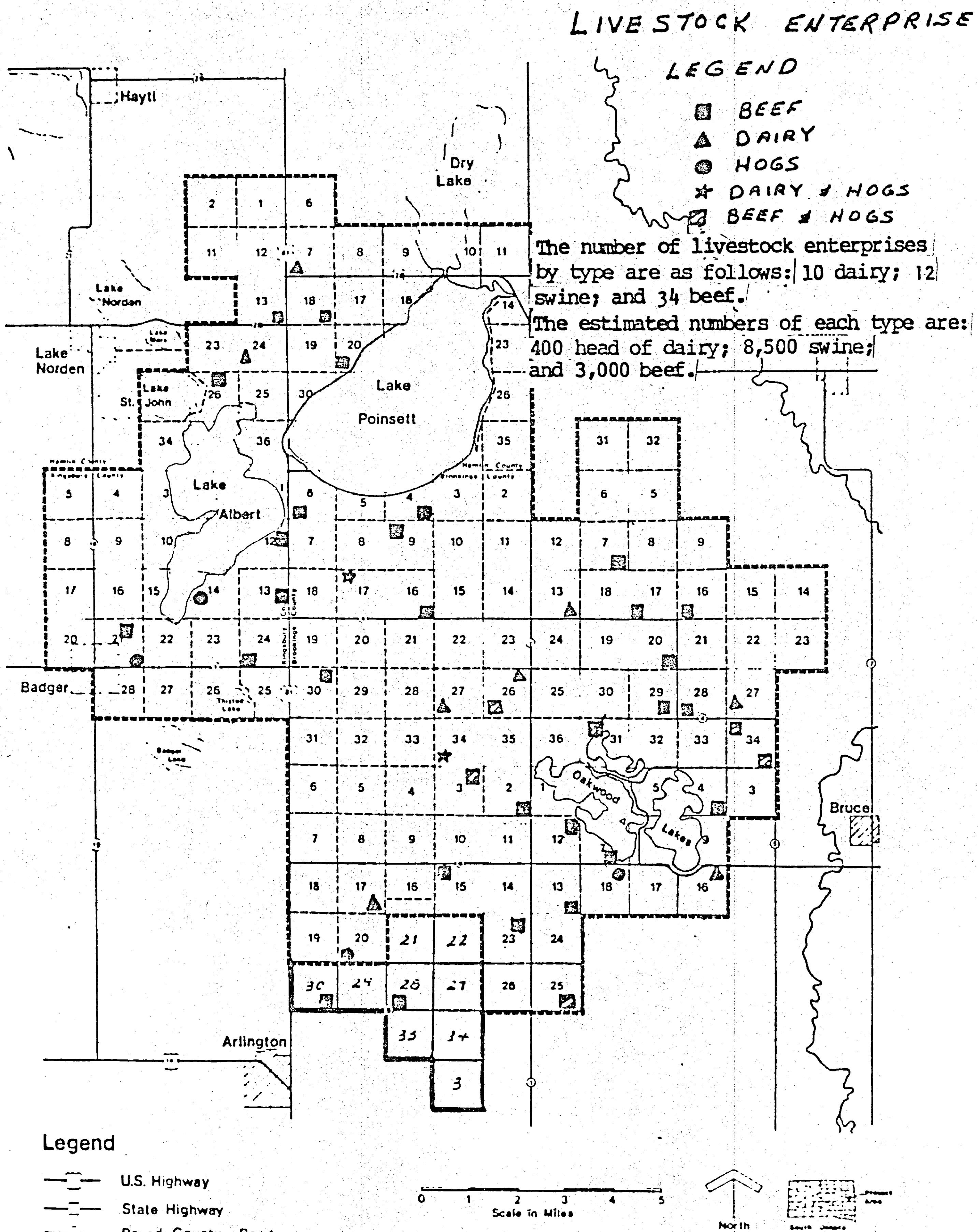


Figure 7. Livestock enterprises in the RCWP study area.

contracted with the Brookings, Kingsbury, and Hamlin County Conservation Districts to hire a project coordinator and begin an intensive effort to apply Best Management Practices (BMPs) in the two watersheds. This was to be accomplished through the use of special Agricultural Conservation Program (ACP) funds from the Agricultural Stabilization and Conservation Service (ASCS) of the U.S. Department of Agriculture (USDA). The contract was signed and the project coordinator was hired in October 1980.

As with the other 208 projects in South Dakota, the Oakwood Lakes/Poinsett Project was a combined effort among various Federal, State, and local agencies and groups. Included were: DWNR; Brookings, Kingsbury, and Hamlin County Conservation Districts; ASCS; SCS; Lake Poinsett and Oakwood Lakes Development Association; East Dakota Conservancy Sub-District (EDCSD); First Planning and Development District (FPDD); and various others. Additional evidence of the combined support for the Oakwood Lakes/Poinsett Project was its inclusion in the State Water Plan.

Conservation practices were applied to some 3,000 acres in the Lake Poinsett watershed from 1979 to 1981. Some of the major conservation measures applied during this time frame by county are:

Conservation Practice	Unit	County Brookings	 Kingsbury
Field/farmstead windbreaks	Acres benefited	480	15
Terraces	Acres benefited	559	270
Terraces	Lineal feet	98,208	47,520
Pasture planting	Acres	895	400
Farm ponds (dugouts)	No.	82	25

interest was developing among applicable State and Federal government agencies to submit an application for funding through the National Rural Clean Water Program (RCWP). On January 15, 1981, a State RCWP coordinating committee meeting was held by the ASCS to make a decision on which project to submit for the RCWP application. The Oakwood Lakes/Poinsett WQSA was selected as both ground and surface water quality problems were present. An application for approval for RCWP funding was submitted to the National Coordinating Committee (NCC) in February, 1981. The Oakwood Lakes/Poinsett WQSA was approved for RCWP funding in June, 1981, and the project plan of work was submitted to the NCC in October, 1981. In 1984, additional funding was received for BMPs to be concentrated close to the lakes and over shallow portions of the aquifer.

One of the major components of the RCWP is the physical monitoring and evaluation of the BMPs. The SCS has this responsibility according to the RCWP regulations. Lacking the expertise, the State SCS developed an agreement with DWNR to administer this phase of the RCWP.

Prior to the completion of a monitoring strategy for the RCWP, this project was recommended by the NCC as a candidate for additional funds to develop a Comprehensive Monitoring and Evaluation (CM&E) Plan.

The South Dakota ASCS office was notified in December 1981 that the Oakwood Lakes/Poinsett RCWP had been tentatively selected for CM&E funding and to submit a final CM&E plan of work. Funding for the CM&E was received after a cooperative agreement was signed between DWNR and ASCS with concurrence by SCS in October 1982.

The Oakwood Lakes/Poinsett RCWP encompasses 106,163 acres in Hamlin, Kingsbury, and Brookings Counties (Figure 7). Of the total acreage, 79,450 acres are cropland and grassland, 10,532 acres are water bodies, and the remaining acres are roads, wildlife areas, farmsteads, and State/Federal lands.

The RCWP goals are to control nutrients, pesticides, sediment, and animal waste with emphasis on lands over shallow aquifers and close to the lakes. It is the goal of the CM&E project to monitor the effects and evaluate the impact of selected Best Management Practices (BMPs) on surface and ground water quality. The ground water aspect of the project will be stressed because, although the selected BMPs are recommended for surface water quality preservation, the effects of these BMPs on ground water are largely unknown. To accomplish the project goals, BMPs: 9-conservation tillage; 15-fertilizer management, and 16-pesticide management will be emphasized.

Monitoring is conducted to evaluate the effects conservation tillage, fertilizer management, and pesticide management have had on the nutrient and water movement in the natural system. The monitoring is focused on nutrient and pesticide changes in the ground water and nutrient and pesticide delivery to the lakes. The monitoring is site specific on 10 field sites, 20-40 acres in size (Figure 8). Nine sites are farm fields and one site is

Oakwood Lakes – Poinsett Project
Rural Clean Water Program
Comprehensive Monitoring & Evaluation

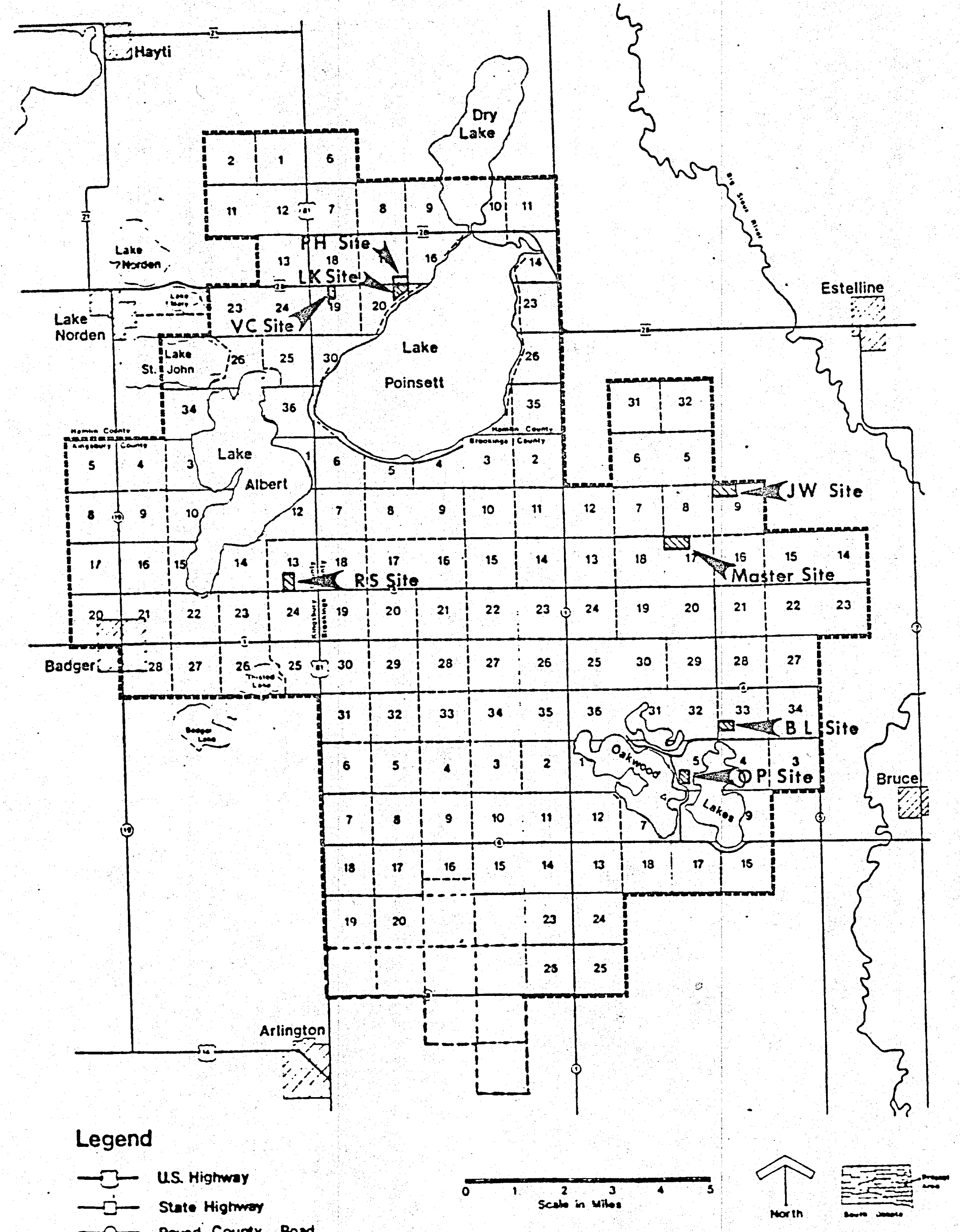


Figure 8. Ground water monitoring sites in the RCWP study area.

unfarmed. Of the farmed sites, two are control fields where BMPs have never been implemented. A master site is monitored where the conditions on 18 plots in a research farm is strictly controlled (Figure 8). Ground water, soil profile, runoff, climate, and land use are monitored. A nutrient budget study is also underway. The sites are to be examined in terms of trends in water quality due to BMP implementation. A paired watershed approach is planned to make comparisons between sites.

Because the monitoring emphasis in this project is on ground water effects, some inherent complications arise. Namely, the areal extent of the aquifer, the vertical interconnection of aquifers, and the potential for movement of water and contaminants through glacial till deposits to underlying aquifers are unknown. Therefore, the entire 79,450 acres is currently considered to be critical. The critical area is prioritized into three groups based on sediment delivery levels and the degree of potential influence of surface activities on ground water.

The emphasis of BMP implementation is on BMPs 9-conservation tillage, 15-fertilizer management, and 16-pesticide management. These three BMPs are thought to have the highest potential to reduce sediment, pesticides, and nutrients to the lakes as well as affecting the receiving ground waters. It is the intent to achieve 100% coverage on the critical acres and for BMPs 9, 15, and 16, these acreages consist of 65,000, 70,000, and 65,000, respectively. The remaining BMPs are applicable for the entire project area. More realistically 80% of these acres are targeted for BMP implementation. Following are the implementation accomplishments through September, 1984, for BMPs 9, 15, and 16 and the total project area:

BMP 9 - 45% under contract
32% applied

BMP 15 - 32% under contract
17% applied

BMP 16 - 47% under contract
27% applied

Total acres - 47% under contract
34% applied

These accomplishments are translated into dollar figures as follows:

Total Allocation - $742,387
Under Contract - $700,611
Paid Out - $248,631

Currently, 46 percent of the 64,510 cropland acres are under contract. Of the remaining cropland, 67% is in Priority 1, 18% is in Priority 2, and 15% is in Priority 3. Table 2 shows project goals and accomplishments through 1984.

BMP'S	TOTAL PROJECT GOALS: 80% of TARGETED AREA UNITS	C/S$	ACCOMPLISHED THROUGH 1984: UNITS UNDER CONTRACT	CS$	NCS$	APPLIED UNITS	CS$	NCS$	SOIL LOSS PREVENTED TONS	GOALS FOR 1985: UNITS	CS$
1 PERMANENT VEG COVER	1,200 acres	16200	664 acres	14,713	4,923	597 acres	10,108	4,735	3,055T	52 ac	1,209
2 ANIMAL WASTE SYSTEM	8 systems	60000	5 systems	9,327	2,534	3 systems	7,370	4,149	-	-	-
3 STRIP CROPPING	520 acres	3510	129 acres	871	290	76 acres	493	164	73T	-	-
4 TERRACE SYSTEM	8 miles	24000	4,300 ft	2,924	946	4,300 ft	1,800	600	80T	6,150 ft	4,152
5 DIVERSIONS	5,000ft	2812	-	-	-	-	-	-	-	1 unit	600
6 GRAZING LAND PROTECTION	8 systems	5760	5 systems	5,921	3,666	3 systems	2,037	1,343	-	1 unit	802
7 WATERWAYS	20 acres	8625	5,975 linear ft	3,944	1,346	3,292 linear ft	1,360	454	6T	670 linear ft	423
8-1 Green Manure	800 acres	3000								-	
8-2 SHELTERBELT	16 acres	2400	1,144 rod rows	1,815	604	948 rod rows	1,373	457	79T	-	-
9 CONSERVATION TILLAGE	52,000 acres	1170000	*23,365 acres	286,685	95,562	*16,774 acres	213,540	71,181	46,538T	40,000	300,000
11 PERMANENT VEG COVER ON CRITICAL AREA	10 acres	1125	170 rods	732	373	170 rods	821	274	-	-	-
12 EROSION CONTROL STRUCTURES	1 system	7500	-	-	-	-	-	-	-	-	-
15 FERTILIZER MANAGEMENT	56,000 acres	126000	*18,062 acres	16,628	6,121	* 9,756 acres	9,729	3,255	-	24,804	18,603
16 PESTICIDE MANAGEMENT	52,000 acres	-	*25,912	-	-	*13,940	-	-	-	50,000	-
TOTALS		1430932	-	343,560	116,365	-	248,631	86,612	-	-	325,789

*Units for BMP's 9, 15, & 16 are listed in terms of original acres under contract as opposed to cumulative totals. Cost-shares for BMP's 9 & 15 are on a cumulative basis.

Table 2. RCWP project goals and accomplishments.

Recommendations:

A proposal was recently submitted for additional monitoring work in the Oakwoods/Poinsett RCWP area. The work was divided into four objectives:

a. Estimate the reduction in sediment, phosphorus, and nitrogen loads from the project area as a result of BMP implementation using the AGNPS model.

b. Estimate the change in nitrogen stored in the root zone if BMPs are implemented to reduce runoff and to estimate the transport of nitrogen from the root zone to the aquifer for the project area using the NTRM model.

c. Produce annual and seasonal sediment, phosphorus, nitrogen, and hydrologic budgets for the Oakwood Lakes system.

d. Determine the relationships between nutrients, sediments, and the biological components of the lake under existing conditions.

It is strongly recommended by the CM&E technical group that these objectives be completed to not only characterize the Oakwood Lakes system, but also to obtain valuable information applicable to other shallow prairie lakes. The above studies could yield information on the extent to which the useful life of the lakes could be extended and their recreational value enhanced.

2. Lake Poinsett Diversion

Problem:

The Lake Poinsett diversion canal is a man-made waterway connecting the Big Sioux River and Dry Lake. The canal is used to divert water through regulatory gates from the Big Sioux River to Lake Poinsett via Dry Lake in times of low lake levels and during extreme flooding conditions (Figure 9).

This diversion of water from the Big Sioux River into Dry Lake and subsequently into Lake Poinsett has been a principal source of nutrients and sediments since its construction. The diversion system consists of the above mentioned canal, a concrete dam with operable gates across the Big Sioux River and a gate structure on the canal to control and/or limit flow to Dry Lake. At this point, the Big Sioux drains a watershed of more than 400,000 acres and there is the potential that a significant amount of runoff from this area will reach the lake.

Activities to Date:

In 1980, the Lake Poinsett Diversion Committee was organized to act as a controlling body for the diversion canal operation. The committee, consisting of two representatives of State government and three representatives of the lake association, formulated a document to serve as the Lake Poinsett Diversion Operation Procedures (LPDOP). This document contains membership criteria, diversion operations, procedures for diversion, water quality criteria, and water quality monitoring procedures. Since the

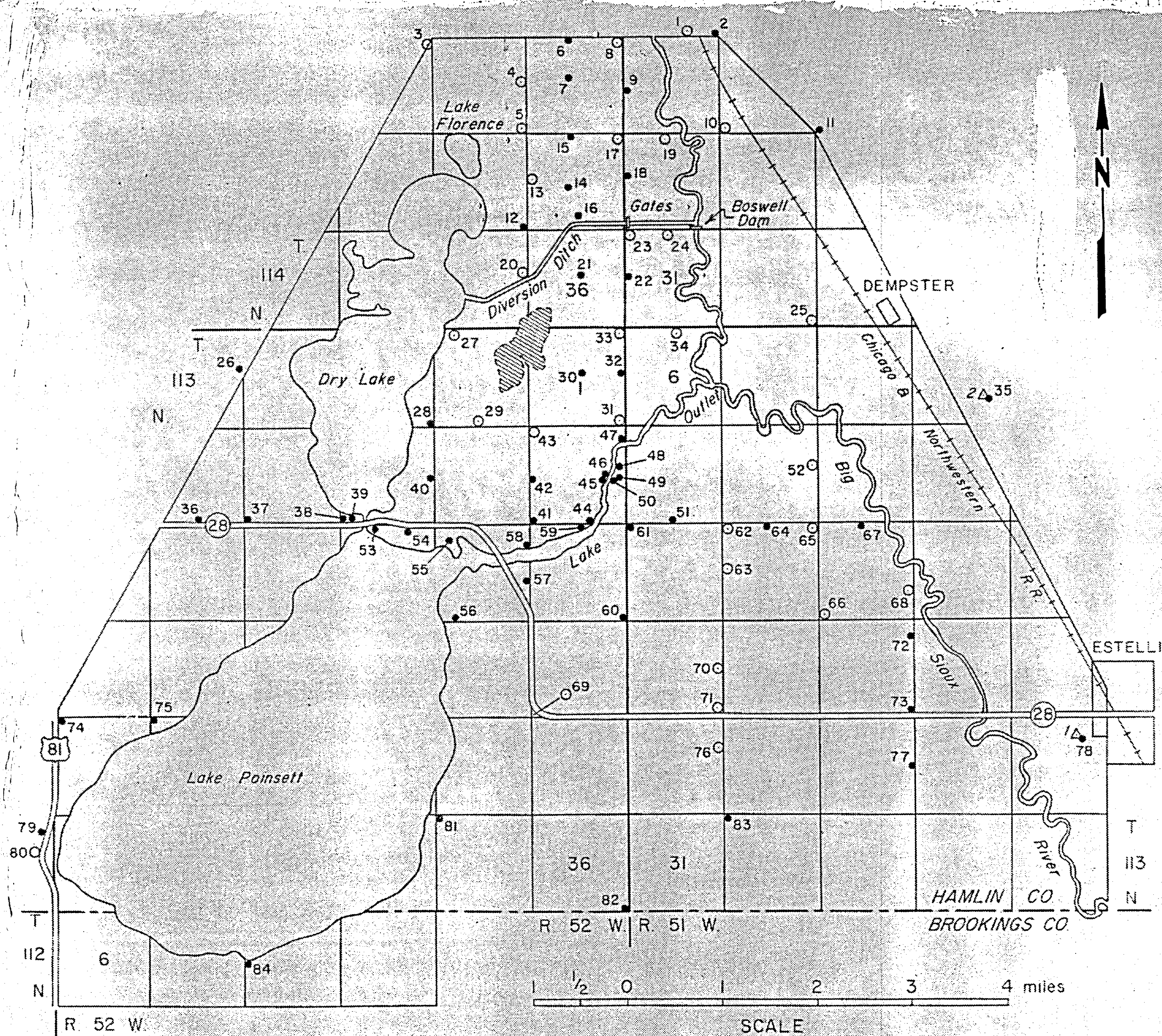


Figure 9. Lake Poinsett Diversion Ditch

formulation of the LPDOP, water has been diverted into Lake Poinsett once in 1982 and twice in 1984.

Water quality sampling is done prior to water diversion into the lake and during the diversion. In 1984, the diversion was open from April 3 to May 1, 1984. Since total phosphorus concentrations and loadings are restrictive parameters during diversion (as set up by the LPDOP), sampling results for 1984 were reported as follows:

n = 9

T-PO_4 mean = .27 mg/l

Loading = 3,939 lbs. T-PO_4

Recommendations:

Although the diversion operational procedure has been in effect since 1980 there has been continued controversy over the appropriateness of the procedure. Therefore, the Diversion Committee held a meeting in December 1984 and recommended the following major changes: 1) change the committee membership to include one more member from the lake association and one more from the State; 2) change the procedure relative to the lake level; 3) add a sampling site in the outlet channel; 4) reduce the allowable total PO_4 load to 4.0×10^6 g; and 5) reduce the allowable total PO_4 concentration prior to diversion to .5 mg/l. At this writing, the operational procedure is subject to change and/or update.

3. Individual Septic Tanks/Drainfield Systems

Problem:

Lake Poinsett waters occasionally exceeded the immersion recreation standards for fecal coliforms. Particularly high coliform levels (1,300-2,200 per 100 ml) were reported on several sampling dates at in-lake sites P008, P010, and PSST (Section IV). These fecal coliform violations suggest that nearby on-site waste disposal systems may be contaminating the area. In May 1980, infrared photo imagery by EPA identified 29 residences on Lake Poinsett as having surface failing on-site waste disposal systems. Nineteen (19) of these failures were located on the east shore of the lake.

Since shoreline development on Lake Poinsett totals well over 450 dwellings, it is probable that a number of surface failures were not detected. Dense tree cover in some developed areas may have hampered aerial photography. Moreover, much of the lakeside area consists of shallow, coarse-textured soils of excessive permeability such as Sioux gravel loam, Dickey sandy loam, and Poinsett-Buse-Pierce soils. Septic tank effluent may move downward or laterally through such soils too quickly for sufficient decomposition to occur. This rapid movement could constitute disposal of untreated effluent to Lake Poinsett through the porous lakeshore soils. Subsurface failures cannot be readily detected by aerial photography or on-site visual inspection but require extensive sampling and laboratory analysis for positive identification.

Activities to Date:

During the spring of 1984, a sanitary survey of approximately 84% of lakeshore lots indicated that about half of the residences surveyed were in noncompliance of at least one aspect of current septic tank regulations (Allen Scott, DWNR, verbal communication).

In August, 1984, DWNR contracted with the Lake Poinsett Sanitary District to complete a 201 Facilities Plan. DWNR has contracted with the District for an amount not to exceed $20,000.00 for the above mentioned work. The District, in turn, contracted with Banner Associates, Inc., to do the technical engineering work involved with the preparation of the 201 Facilities Plan.

Some of the activities involve the door-to-door survey of the existing residences to determine exactly what wastewater disposal systems are at the lake. This survey will check and complete the missing residences responses from the spring mail survey conducted by the District. The consultant will prepare a layout map of the planning area and summarize the results of the door-to-door and mail surveys. The cost of fixing the substandard individual wastewater systems will be compared to the cost of several central wastewater collection and treatment systems. It is not expected that a central or cluster of central systems will be cost effective when compared to the cost of repairing the individual substandard systems.

The goal of the 201 study is to complete a master list of what systems are presently existing in the District and to prepare ordinances to allow the District to use enforcement, if necessary, to fix the substandard ones. The 201 Facilities Plan is scheduled to be completed by September 1, 1985.

B. In-Lake Problems and Recommendations

1. Eutrophication

Problem:

The major problem in Lake Poinsett is eutrophication as evidenced by high concentrations of phosphorus and nitrogen, annual blooms of bluegreen algae, frequent fish kills and reduced water clarity.

In-lake phosphorus and nitrogen concentrations are indicative of hypereutrophic conditions. Annual mean concentrations ranged from .078 to .148 mg/l for phosphorus and 1.90 to 4.33 mg/l for organic nitrogen (Section IV). Lake Poinsett waters were characterized by high levels of both organic and inorganic nitrogen when compared to other eastern South Dakota lakes. Mean inorganic nitrogen concentrations ranged from .465 to 1.46 mg/l. In most fresh waters, inorganic nitrogen concentrations are much lower (<.400 mg/l). Since this nitrogen fraction is more readily usable by plants, it, together with equally high in-lake phosphorus levels, represents a high potential for over-production of algae in Lake Poinsett.

Recommendations:

The watershed treatment activities should reduce the high nutrient loading to Lake Poinsett. However, due to the large size of the lake, and the fact that major nutrient loads have entered Poinsett from the Big Sioux River Diversion, the Lake Albert drainage and the intermittent tributaries, it will be difficult to effect any substantial improvements in lake water quality. The practice of diverting nutrient-laden flood waters into eastern South Dakota lakes is incompatible with maintaining good lake water quality. The following are possible considerations for in-lake treatment.

a. A sediment survey of the lake should be conducted and a feasibility study developed to determine areas of significant sediment accumulation and the cost effectiveness of a selective dredging program. Dredging will prolong the useful life of the lake and will remove some organic matter and sediment-associated nutrients. Should selective dredging be deemed a viable alternative, efforts should be made to secure funding.

b. The chemical precipitation of phosphorus should be investigated. This method involves the application of a chemical such as aluminum sulfate (alum) to: 1) change the form of phosphorus making it unavailable to plants; 2) remove phosphorus from the water column; and 3) seal the bottom sediments to prevent release or recycling of potentially available phosphorus. It should be noted that although this treatment has been effective in other parts of the country it may have a limited effectiveness in this area since Lake Poinsett is a relatively shallow lake. Wind-induced turbulence may resuspend the bottom sediments allowing release of phosphorus. The cost effectiveness of this treatment should also be determined before any action is taken. This method may have to be repeated every 1-3 years.

2. Shoreline Erosion

Problem:

Shoreline erosion contributes 694 tons or about 0.53 acre-feet of sediment to Lake Poinsett each year. This volume represents less than .001% of the lake water capacity and therefore can be considered a minor problem for the lake as a whole. The major impact of shoreline erosion is localized and confined to a few relatively small areas around the lake where sand beaches and the immediate shallows may be covered by silt rendering them unattractive to swimmers and fish. Shoreline erosion also results in the gradual loss of portions of private and public lakeshore land.

The most severe erosion of Lake Poinsett shoreline probably occurs in a 600-800-foot section of high banks located on the northeast side of the lake.

Activities to Date:

A grant has been awarded to the local conservation districts to riprap 650 feet of steep eroding shoreline cliffs averaging 20 feet high. The cost of the project is approximately $56,000 to be shared between the DWNR, the East Dakota Conservancy Sub-District, the Brookings, Hamlin, and Kingsbury Conservation Districts, and the Lake Poinsett Association. Although the original project was designed to reshape the high banks with riprap on the toe, unusually high lake water levels in the spring of 1985 prevented implementation of this project design. Project plans were changed to construct a rock berm with some back sloping behind the berm. Construction was completed in May, 1985. It is estimated that this shoreline stabilization will substantially reduce the sediment load (previously calculated at nearly 700 tons/year) to Lake Poinsett from lakeshore erosion.

VI. Oakwood Lakes Problems and Recommendations

A. Watershed Problems and Recommendations

1. Nutrient and Sediment Loading From Cropland/Grassland Runoff

Problem:

Nutrient and sediment loading from the watershed have helped create hypereutrophic conditions in the Oakwood Lakes. Input from four major intermittent tributaries has produced high in-lake phosphorus and nitrogen concentrations and has contributed to considerable sediment deposition. Average total phosphorus and nitrogen concentrations at four tributary sampling sites ranged from .216 to .566 mg/l P and 2.08 to 2.54 mg/l N during spring runoff in 1979. Although nutrient load calculations were not made due to lack of adequate flow data, these concentrations suggest excessive nutrient loading into the shallow Oakwood Lakes (Vollenweider, 1968). Runoff from fertilized cropland is probably a major source of nutrients and sediment to the lakes. In 1979, SCS estimated that at least half of the watershed was in need of land treatment.

Secondary sources of phosphorus and nitrogen input may be 30 livestock feedlots within the watershed. Seven of these feedlots are located within one mile of the lakes' shorelines (Figure 7). Possible feedlot contamination was indicated by high fecal coliform levels at most of the tributary sampling sites. During 1979, fecal coliform levels exceeded 200/100 ml on one occasion at tributary sites 1 and 2. However, at Site 4, excessive coliform concentrations (290-5,000/100 ml) were noted on 6 of 14 sampling dates during spring runoff. No fecal coliform problems were observed at tributary Site 3 during the same period.

Sheet and rill erosion from cropland accounts for 35% of the 12,570 tons (9.6 acre-feet) of sediment yield to the lakes. Two percent (2%) of this sediment yield comes from grassland in the watershed. In addition to carrying nutrients associated with suspended solids, incoming sediments reduce the water capacity of lakes and shorten their useful life span. Due to the shallow nature of the Oakwood Lakes, an additional one or two feet of sediment could create slough-like conditions in large areas of the lakes.

Recommendations:

See Section V - A(1) for recent mitigation activities and recommendations for Oakwood Lakes watershed problems. In addition, sediment retention dams may need to be constructed on the four major tributaries to minimize sediment and nutrient input into West Oakwood Lake. Buffer zones or sediment retention strips about 30 feet wide should be established on lands adjacent to Oakwood Lake tributaries that presently lack adequate vegetative cover. These zones should be seeded for diversified vegetative cover, restricted as to use, and kept free of fertilizers.

2. Individual Septic Tanks/Drainfield Systems

Problem:

Infrared photo imagery by EPA conducted in May 1980 of the developed south shore of West Oakwood Lake revealed no surface failing on-lot sewage disposal systems.

However, a sanitary survey of 60 residences on the south shore conducted by DWNR in 1978-1979 indicated that about 82% of the septic tank systems were located less than 100 feet from the lakeshore, contrary to current septic tank regulations governing placement of subsurface waste disposal systems near lakes and impoundments (ARSD Section 74:03:01:11).

The close proximity of most of the septic tank drainfields to the shoreline raises the probability of septic tank leachate being transmitted to West Oakwood Lake through subsurface movement of the effluent. The likelihood of septic tank effluent reaching the lake in this manner is further increased by lake shore topography and the characteristics of the soils on which the residences are situated. The lakeshore soils are primarily coarse-textured Pierce complexes and soils of the Poinsett-Buse-Pierce series. The local topography slopes, sometimes sharply, to the lakeshore. The sandy and gravelly soils are classified as excessively well drained and are considered poor filters that cause septic tank effluent to move too quickly for proper decomposition to occur. This rapid movement could constitute disposal of untreated effluent into the lake.

To date, no clear evidence has been obtained by water quality studies which would link the condition of West Oakwood Lake to contributions of pollutants from malfunctioning or failing lakeshore septic tank systems. To identify individual subsurface failures would require exhaustive and costly sampling and laboratory analysis procedures. However, past water quality samples taken near the developed south shore of West Oakwood Lake (Site 7), have indicated frequent violations of un-ionized ammonia standards as well as high BOD and COD values. These results may suggest possible contributions of ammonia from malfunctioning septic tank systems when compared to samples from undeveloped East Oakwood Lake where un-ionized ammonia violations were much less frequent (Report on Non-Point Source Pollution from Selected Watersheds throughout the State of South Dakota, 1978).

Recommendations:

A comprehensive septic tank survey should be conducted to establish more precisely the location of the systems, their age, construction, maintenance practices, and to identify problems or potential problem areas. In addition, it is recommended that the lake shore property owners form a sanitary district which could initiate procedures for correcting malfunctioning systems. The district should serve as the sponsoring agency in efforts to secure funds for planning and construction of facilities if deemed necessary.

Homeowner education should be promoted through public meetings, explaining operation/maintenance and promotion of efficient systems through seminars and brochures.

B. In-Lake Problems and Recommendations

1. Eutrophication

Problem:

The principal problem in the Oakwood Lakes is eutrophication as evidenced by high in-lake concentrations of total phosphorus and nitrogen, annual blooms of bluegreen algae, frequent fish kills, and reduced water clarity. In-lake phosphorus and nitrogen concentrations during 1979 were indicative of hypereutrophic conditions. Annual mean concentrations in East Oakwood Lake were .094 mg/l P and 2.52 mg/l N. Average total nitrogen concentration in West Oakwood was similar (2.48 mg/l N) but the average total phosphorus value (.141 mg/l P) exceeded that of East Oakwood by 50%.

Recommendations:

The watershed treatment recommended in the previous section is of primary importance if the large nutrient loads entering the Oakwood Lakes are to be substantially reduced. Following watershed stabilization, in-lake treatment including selective dredging and chemical phosphorus precipitation as outlined in Section V-B(1) may be considered.

2. Shoreline Erosion

Problem:

Shoreline erosion has contributed about 63% of the total sediment deposited in the Oakwood Lakes or about 7,919 tons (6 acre-feet) per year. SCS designated a total of 3,100 linear feet of shoreline on East and West Oakwood Lake as requiring stabilization. Six sections of the shoreline were so designated on East Oakwood and three on West Oakwood Lake.

Activities to Date:

By the end of 1978, the EDCSD had stabilized approximately 2,070 feet of shoreline through an EPA 314 Clean Lakes Grant which provided funds for 50% of the costs. Two sections (Areas 7 and

9) were eliminated from the project due to difficulties in securing easements on private lands. Indian artifacts were discovered at Area 1 which required an archeological evaluation of the site. After this study was completed, additional delays were incurred by rising construction costs and insufficient funding. Subsequent increases in funding enabled riprap construction at Area 1 to proceed to completion in May 1981.

The Oakwood Lakes shoreline protection project involved shaping existing slough banks to a flatter, stable slope by cut and/or fill, placing riprap on the new slope, and establishing grass on the exposed areas above the riprap. An estmimated 78% of the originally designated shoreline had been stabilized during the project period. Further stabilization projects on the remaining areas of shoreline erosion may be required in the future.

VII. Summary and Conclusions

The poor water quality in Lake Poinsett and the Oakwood Lakes is attributable to large and long-term nutrient and sediment contributions from agricultural and domestic sources. Snowmelt and stormwater runoff are principal sources of nitrogen and phosphorus to the lakes. Unless nutrient loads are substantially reduced these lakes will continue to experience dense nuisance bluegreen algal blooms and frequent fish kills.

Remedial measures to reduce nutrient and sediment input should be directed toward watershed stabilization such as conservation tillage, fertilizer management, and construction of agricultural waste management systems. Septic tank leachate should be eliminated by upgrading faulty individual tanks or by the construction of centralized waste collection systems. Proper implementation of the Oakwood Lakes/Poinsett Rural Clean Water Program (RCWP) should help alleviate some of the major problems that are presently impacting the water quality of these lakes.

However, it must be recognized that substantial improvements in lake water quality may be difficult due to the shallowness of the lakes and their exposure to strong winds. Wind and wave-generated mixing of shallow bottom sediments allows the release of nutrients on demand to the overlying water. Some benefits in improved water quality may be gained by at least a partial removal of bottom sediments (selective dredging) and chemical flocculation which serves to remove dissolved phosphorus from the water column. The latter method may be cost prohibitive, however, in Lake Poinsett owing to its large area.

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IX. Appendices

Appendix A

Lake Poinsett Water Quality Summary

Tables and Figures

Site	Description
46P001 (PO-1)	Latitude 44 Deg., 32 Min., 3 Sec., Longitude 97 Deg., 5 Min., 26 Sec., Township 112N, Range 52W, Section 5. SE1/4, NW1/4, NE1/4, SE1/4. This site is located on a southern creek to Lake Poinsett in the vicinity of Arlington Beach, 1.5 miles west and 4.5 miles south of site 4, on the north side of the road.
46P002 (PO-2)	Latitude 44 Deg., 33 Min., 47 Sec., Longitude 97 Deg., 7 Min., 40 Sec., Township 113N, Range 52W, Section 30. NE1/4, SE1/4, NE1/4, SE1/4. This site is located on a southwest creek which flows from Lake Albert into Lake Poinsett, 2.25 miles west and 2.5 miles south of site 4, on the east side of the road.
46P003 (PO-3)	Latitude 44 Deg., 34 Min., 44 Sec., Longitude 97 Deg., 5 Min., 39 Sec., Township 113N, Range 52W, Section 20. NW1/4, NE1/4, NW1/4, SE1/4. This site is located on the northwest inlet to the lake, 1.5 miles west and 1.5 miles south of Site 4.
46P004 (PO-4)	Latitude 44 Deg., 36 Min., 7 Sec., Longitude 97 Deg., 3 Min., 44 Sec., Township 113N, R52W, Section 10/15. Located at the north end of the lake at Stone Bridge, this site is located on the inlet from Dry Lake.
46P005 (PO-5)	Latitude 44 Deg., 36 Min., 6 Sec., Longitude 97 Deg., 0 Min., 47 Sec., Township 113N, Range 52W, Section 12. SW1/4, SE1/4, SW1/4, SE1/4. This is an outlet site located 2.5 miles east of Site 4 on the north side of the road.
46P006 (PO-6)	Latitude 44 Deg., 35 Min., 45 Sec., Longitude 97 Deg., 1 Min., 38 Sec., Township 113N, Range 52W, Section 14. NE1/4, SE1/4, SE1/4, NE1/4. This is an outlet site located 1.75 miles east and .5 mile south of Site 4 on the west side of the road.
46P007 (PO-7)	Latitude 44 Deg., 35 Min., 33 Sec., Longitude 97 Deg., 4 Min., 21 Sec., Township 113N, Range 52W, Section 16. SE1/4, NE1/4, NW1/4, SE1/4. This in-lake site is located off Saaraners Beach, .5 mile west and .5 mile south of Site 4.
46P008 (PO-8)	Latitude 44 Deg., 34 Min., 21 Sec., Longitude 97 Deg., 2 Min., 37 Sec., Township 113N, Range 52W, Section 26. NW1/4, NE1/4, NW1/4, NW1/4. This in-lake site is located off the east shore, 1 mile east and 2 miles south of Site 4.
46P009 (PO-9)	Latitude 44 Deg., 32 Min., 22 Sec., Longitude 97 Deg., 4 Min., 35 Sec., Township 112N, Range 52W, Section 4. SW1/4, SW1/4, NW1/4, NE1/4. This in-lake site is located off Poinsett Recreation Area, .75 mile west and 4.25 miles south of Site 4.
46P010 (PO-10)	Latitude 44 Deg., 33 Min., 52 Sec., Longitude 97 Deg., 7 Min., 12 Sec., Township 113N, Range 52W, Section 30. NE1/4, NW1/4, NE1/4, SW1/4. This is an in-lake site located off the west shore of the lake, 2.75 miles west and .5 miles south of Site 4.

Table IV-1. Sample site descriptions for Lake Poinsett and its tributaries.

46PSST (PSST)	Latitude 44 Deg., 33 Min., 32 Sec., Longitude 97 Deg., 4 Min., 46 Sec., Township 113N, Range 52W, Section 28. SW1/4, SE1/4, SE1/4, SW1/4. This description represents a composite of three inlake sites; 1) the Arlington Beach State boat ramp, 2) the East side public access boat ramp, and 3) the Pier 81 resort boat ramp.
46LP4 (LP-4)	Latitude 44 Deg., 38 Min., 43 Sec., Longitude 96 Deg., 59 Min., 28 Sec., Township 114N, Range 51W, Section 30. SE1/4, SE1/4, SW1/4, SE1/4. This site is located at Boswell Dam, 1 mile east and 3 miles north of Site 5 on the north side of the road.

Table IV-1. Sample site descriptions for Lake Poinsett and its tributaries.

STORET RETRIEVAL DATE 84/09/11 - INVENT - VERSION OF SEP. 1981

46P001
44 32 03.0 097 05 19.0 2
S TRIB CHURCH T112N R52W SEC 5
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810418
0000 CLASS-00-CSN-RSP-0589378-0554045

/TYPA/AMBNT/STREAM/RUNOFF

PARAMETER				RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010	WATER	TEMP	CENT		7	9.51428	142.021	11.9173	23.3000	.000000	77/03/11	77/06/16
00011	WATER	TEMP	FAHN		7	49.1428	461.145	21.4743	74.0000	32.0000	77/03/11	77/06/16
00020	AIR	TEMP	CENT		7	13.0971	148.106	12.1699	27.8000	2.22000	77/03/11	77/06/16
00021	AIR	TEMP	FAHN		7	55.5714	479.288	21.8927	82.0000	36.0000	77/03/11	77/06/16
00300	DO		MG/L		4	11.6750	.142659	.377703	12.0000	11.3000	77/03/11	77/03/12
00310	BOD	5 DAY	MG/L		2	5.00000	.180008	.424273	5.30000	4.70000	77/06/16	77/06/16
00335	COD	LOWLEVEL	MG/L		7	72.6428	4075.40	63.8388	180.000	16.0000	77/03/11	77/06/16
00403	LAB	PH	SU		7	7.11285	.318644	.564486	7.71000	6.50000	77/03/11	77/06/16
00415	PHEN-PH-	LFIN ALK	MG/L		7	52.0000	360.000	18.9737	78.0000	35.0000	77/03/11	77/06/16
00500	RESIDUE	TOTAL	MG/L		7	365.571	102017	319.401	966.000	128.000	77/03/11	77/06/16
00515	RESIDUE	DISS-105	C MG/L		7	109.857	527.823	22.9744	148.000	84.0000	77/03/11	77/06/16
00530	RESIDUE	TOT NFLT	MG/L		7	255.714	103308	321.416	882.000	33.0000	77/03/11	77/06/16
00608	NH3+NH4-	N DISS	MG/L		7	.695714	.093162	.305224	1.09000	.360000	77/03/11	77/06/16
00613	NO2-N	DISS	MG/L		7	.072857	.001690	.041115	.160000	.050000	77/03/11	77/06/16
00620	NO3-N	TOTAL	MG/L		7	.727142	.070324	.265187	.950000	.300000	77/03/11	77/06/16
00625	TOT KJEL	N	MG/L		7	3.09143	1.73393	1.31679	5.21000	1.65000	77/03/11	77/06/16
31616	FEC COLI	MFM-FCBR	/100ML		3	27666.7	.174E+09	13203.6	42000.0	16000.0	77/06/15	77/06/16
70505	T PO4	P-COL	MG/L		7	.416857	.005007	.070761	.556000	.327000	77/03/11	77/06/16
70507	PHOS-T	ORTHO	MG/L P		7	.306285	.001154	.033977	.377000	.275000	77/03/11	77/06/16

Table IV-2

STORET RETRIEVAL DATE 84/09/11 - INVENT - VERSION OF SEP. 1981

46P001
44 32 03.0 097 05 19.0 2
S TRIB CHURCH T112N R52W SEC 5
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
/TYPA/AMBNT/STREAM/RUNOFF
21SDLAKE 810418
0000 CLASS 00 CSN-RSP 0589378-0554045

PARAMETER				RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010	WATER	TEMP	CENT		4	4.16750	7.09573	2.66378	7.22000	1.67000	78/03/28	78/04/06
00011	WATER	TEMP	FAHN		4	39.5000	23.0000	4.79583	45.0000	35.0000	78/03/28	78/04/06
00020	AIR	TEMP	CENT		4	11.9350	6.63574	2.57599	14.4000	9.44000	78/03/28	78/04/06
00021	AIR	TEMP	FAHN		4	53.5000	21.6667	4.65475	58.0000	49.0000	78/03/28	78/04/06
00300	DO		MG/L		4	10.00000	.113444	.336814	10.2000	9.50000	78/03/28	78/04/06
00310	BOD	5 DAY	MG/L		4	3.30000	2.21819	1.48936	4.71000	1.68000	78/03/28	78/04/06
00335	COD	LOWLEVEL	MG/L		4	46.7500	202.250	14.2215	66.0000	36.0000	78/03/28	78/04/06
00403	LAB	PH	SU		4	7.80999	.045781	.213966	8.00000	7.62000	78/03/28	78/04/06
00415	PHEN-PH-	LFIN ALK	MG/L		4	120.000	4708.66	68.6197	189.000	60.0000	78/03/28	78/04/06
00500	RESIDUE	TOTAL	MG/L		4	315.500	38425.7	196.025	527.000	136.000	78/03/28	78/04/06
00515	RESIDUE	DISS-105	C MG/L		4	297.750	40014.9	200.037	506.000	126.000	78/03/28	78/04/06
00530	RESIDUE	TOT NFLT	MG/L		4	17.7500	194.250	13.9374	36.0000	5.00000	78/03/28	78/04/06
00610	NH3+NH4-	N TOTAL	MG/L		4	.750000	.010600	.102958	.830000	.600000	78/03/28	78/04/06
00613	NO2-N	DISS	MG/L		4	.077500	.000025	.005000	.080000	.070000	78/03/28	78/04/06
00620	NO3-N	TOTAL	MG/L		4	1.40000	.086666	.294390	1.70000	1.10000	78/03/28	78/04/06
00625	TOT KJEL	N	MG/L		4	2.09000	.053533	.231372	2.35000	1.80000	78/03/28	78/04/06
00671	PHOS-DIS	ORTHO	MG/L P		3	.358333	.000521	.022816	.383000	.338000	78/03/28	78/04/06
31616	FEC COLI	MFM-FCBR	/100ML		3	8.00000	3.00000	1.73205	10.0000	7.00000	78/03/28	78/04/06
				K	1	3.00000			3.00000	3.00000	78/03/28	78/03/28
				TOT	4	6.75000	8.25000	2.87228	10.0000	3.00000	78/03/28	78/04/06
70505	T PO4	P-COL	MG/L		4	.426750	.000088	.009358	.436000	.416000	78/03/28	78/04/06
70507	PHOS-T	ORTHO	MG/L P		1	.405000			.405000	.405000	78/04/04	78/04/04

Table IV-3

STORET RETRIEVAL DATE 84/09/11 - INVENT - VERSION OF SEP. 1981

46P002
44 33 47.0 097 07 41.0 2
INLET FROM ALBERT T113N R52153W SEC 30
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810418
0000 CLASS 00 CSN-RSP 0589379-0554046

/TYPA/AMBNT/STREAM/RUNOFF

PARAMETER				RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010	WATER	TEMP	CENT		10	9.05200	104.573	10.2261	22.2000	.000000	77/03/12	77/06/17
00011	WATER	TEMP	FAHN		10	47.5000	310.500	17.6210	72.0000	32.0000	77/03/12	77/06/17
00020	AIR	TEMP	CENT		10	12.8810	118.690	10.8945	28.3000	3.33000	77/03/12	77/06/17
00021	AIR	TEMP	FAHN		10	55.5000	379.166	19.4722	83.0000	38.0000	77/03/12	77/06/17
00300	DO		MG/L		6	9.78333	2.62168	1.61916	11.7000	8.00000	77/03/12	77/03/15
00310	BOD	5 DAY	MG/L		3	9.10000	2.91017	1.70592	11.0000	7.70000	77/03/15	77/06/16
00335	COD	LOWLEVEL	MG/L		9	69.2222	1404.76	37.4801	122.000	13.0000	77/03/12	77/06/17
				K	1	6.00000			6.00000	6.00000	77/03/15	77/03/15
				TOT	10	62.9000	1648.38	40.6002	122.000	6.00000	77/03/12	77/06/17
00403	LAB	PH	SU		10	6.93299	.205349	.453155	7.81000	6.40000	77/03/12	77/06/17
00415	PHEN-PH-	LFIN ALK	MG/L		10	61.6000	1044.94	32.3255	111.000	34.0000	77/03/12	77/06/17
00500	RESIDUE	TOTAL	MG/L		10	237.200	14730.4	121.369	409.000	115.000	77/03/12	77/06/17
00515	RESIDUE	DISS-105	C MG/L		10	217.100	14529.0	120.536	381.000	101.000	77/03/12	77/06/17
00530	RESIDUE	TOT NFLT	MG/L		10	20.1000	39.8782	6.31492	31.0000	12.0000	77/03/12	77/06/17
00608	NH3+NH4-	N DISS	MG/L		10	.422000	.022351	.149503	.600000	.180000	77/03/12	77/06/17
00613	NO2-N	DISS	MG/L		10	.046000	.000271	.016465	.070000	.020000	77/03/12	77/06/17
00620	NO3-N	TOTAL	MG/L		6	.569999	.089440	.299065	1.06000	.260000	77/03/12	77/03/15
				K	4	.100000	-.248E-08	.000000	.100000	.100000	77/06/16	77/06/17
				TOT	10	.382000	.108595	.329538	1.06000	.100000	77/03/12	77/06/17
00625	TOT KJEL	N	MG/L		10	2.08200	.167872	.409722	2.67000	1.61000	77/03/12	77/06/17
31616	FEC COLI	MFM-FCBR	/100ML		6	2056.17	3943292	1985.77	5000.00	67.0000	77/03/13	77/06/16
70505	T PO4	P-COL	MG/L		10	.557300	.044323	.210531	.948000	.337000	77/03/12	77/06/17
70507	PHOS-T	ORTHO	MG/L P		10	.425700	.019032	.137956	.676000	.302000	77/03/12	77/06/17

Table IV-4

STORET RETRIEVAL DATE 84/09/11 - INVENT - VERSION OF SEP. 1981

46P002
44 33 47.0 097 07 41.0 2
INLET FROM ALBERT T113N R52153W SEC 30
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810418
0000 CLASS 00 CSN-RSP 0589379-0554046

/TYPA/AMBNT/STREAM/RUNOFF

PARAMETER				RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010	WATER	TEMP	CENT		3	5.18333	11.5366	3.39656	8.89000	2.22000	78/03/28	78/04/06
00011	WATER	TEMP	FAHN		3	41.3333	37.3340	6.11015	48.0000	36.0000	78/03/28	78/04/06
00020	AIR	TEMP	CENT		3	9.45666	4.08252	2.02052	11.7000	7.78000	78/03/28	78/04/06
00021	AIR	TEMP	FAHN		3	49.0000	13.0000	3.60555	53.0000	46.0000	78/03/28	78/04/06
00300	DO		MG/L		3	6.46666	9.62346	3.10217	9.50000	3.30000	78/03/28	78/04/06
00310	BOD	5 DAY	MG/L		3	5.63000	.129944	.360477	6.00000	5.28000	78/03/28	78/04/06
00335	COD	LOWLEVEL	MG/L		3	47.3333	56.3359	7.50573	56.0000	43.0000	78/03/28	78/04/06
00403	LAB	PH	SU		3	7.62666	.021301	.145950	7.79000	7.51000	78/03/28	78/04/06
00415	PHEN-PH-	LFIN ALK	MG/L		3	84.0000	673.000	25.9422	105.000	55.0000	78/03/28	78/04/06
00500	RESIDUE	TOTAL	MG/L		3	212.667	9716.37	98.5717	309.000	112.000	78/03/28	78/04/06
00515	RESIDUE	DISS-105	C MG/L		3	206.667	8901.37	94.3471	296.000	108.000	78/03/28	78/04/06
00530	RESIDUE	TOT NFLT	MG/L		3	6.00000	39.0000	6.24500	13.0000	1.00000	78/03/28	78/04/06
00610	NH3+NH4-	N TOTAL	MG/L		3	.263333	.007233	.085049	.360000	.200000	78/03/28	78/04/06
00613	NO2-N	DISS	MG/L		3	.093333	.000533	.023094	.120000	.080000	78/03/28	78/04/06
00620	NO3-N	TOTAL	MG/L		2	.500000	.080000	.282843	.700000	.300000	78/03/28	78/04/04
				K	1	.100000			.100000	.100000	78/04/06	78/04/06
				TOT	3	.366666	.093334	.305506	.700000	.100000	78/03/28	78/04/06
00625	TOT KJEL	N	MG/L		3	1.42667	.011033	.105036	1.53000	1.32000	78/03/28	78/04/06
00671	PHOS-DIS	ORTHO	MG/L P		3	.509666	.096893	.311276	.800000	.181000	78/03/28	78/04/06
31616	FEC COLI	MFM-FCBR	/100ML		1	3.00000			3.00000	3.00000	78/04/04	78/04/04
				K	2	3.00000	.000000	.000000	3.00000	3.00000	78/03/28	78/04/06
				TOT	3	3.00000	.000000	.000000	3.00000	3.00000	78/03/28	78/04/06
70505	T PO4	P-COL	MG/L		1	.246000			.246000	.246000	78/03/28	78/03/28
70506	SOL PO4-	T P-COL	MG/L		2	.785000	.027379	.165466	.902000	.668000	78/04/04	78/04/06

Table IV-5

STORET RETRIEVAL DATE 84/09/11 - INVENT - VERSION OF SEP. 1981

46P003
44 34 44.0 097 05 39.0 2
NW INLET T113N R52W SEC 20
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810418
0000 CLASS 00 CSN-RSP 0589380-0554047

/TYPA/AMBNT/STREAM/RUNOFF

PARAMETER				RMK	NUMBER	MEAN	VARIANCE	STAN-DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010	WATER	TEMP	CENT		16	11.2837	86.8578	9.31975	24.4000	.000000	77/03/12	77/10/31
00011	WATER	TEMP	FAHN		16	52.3125	281.829	16.7878	76.0000	32.0000	77/03/12	77/10/31
00020	AIR	TEMP	CENT		15	15.5207	95.0124	9.74743	28.3000	3.33000	77/03/12	77/10/31
00021	AIR	TEMP	FAHN		15	59.9333	307.783	17.5437	83.0000	38.0000	77/03/12	77/10/31
00300	DO		MG/L		9	6.46666	12.1125	3.48030	11.6000	2.40000	77/03/12	77/10/31
00310	BOD	5 DAY	MG/L		6	9.74999	35.2111	5.93389	19.7000	4.10000	77/03/15	77/10/31
				L	2	15.5000	.500000	.707107	16.0000	15.0000	77/06/22	77/06/23
				TOT	8	11.1875	32.3070	5.68393	19.7000	4.10000	77/03/15	77/10/31
00335	COD	LOWLEVEL	MG/L		16	86.3437	1980.56	44.5035	170.000	28.0000	77/03/12	77/10/31
00403	LAB	PH	SU		16	7.15874	.157943	.397420	7.63000	6.48000	77/03/12	77/10/31
00415	PHEN-PH-	LFIN ALK	MG/L		16	100.500	5334.26	73.0361	238.000	27.0000	77/03/12	77/10/31
00500	RESIDUE	TOTAL	MG/L		16	262.562	16614.3	128.896	480.000	105.000	77/03/12	77/10/31
00515	RESIDUE	DISS-105	C MG/L		16	203.812	18134.2	134.663	456.000	69.0000	77/03/12	77/10/31
00530	RESIDUE	TOT NFLT	MG/L		16	58.7500	5318.20	72.9260	293.000	3.00000	77/03/12	77/10/31
00608	NH3+NH4-	N DISS	MG/L		16	.633125	.543062	.736928	2.43000	.060000	77/03/12	77/10/31
00613	NO2-N	DISS	MG/L		16	.055625	.005506	.074204	.300000	.010000	77/03/12	77/10/31
00618	NO3-N	DISS	MG/L		3	.433333	.063334	.251662	.700000	.200000	77/06/15	77/10/31
00620	NO3-N	TOTAL	MG/L		6	.408333	.033697	.183567	.650000	.240000	77/03/12	77/03/15
				K	7	.100000	.000000	.000000	.100000	.100000	77/06/16	77/06/23
				TOT	13	.242307	.039636	.199088	.650000	.100000	77/03/12	77/06/23
00625	TOT KJEL	N	MG/L		16	2.05124	.312348	.558881	3.22000	1.27000	77/03/12	77/10/31
00671	PHOS-DIS	ORTHO	MG/L P		4	.450500	.007078	.084132	.526000	.330000	77/03/15	77/10/31
31616	FEC COLI	MFM-FCBR	/100ML		12	5630.33	.155E+09	12462.0	41000.0	67.0000	77/03/13	77/10/31
70505	T PO4	P-COL	MG/I		13	.585384	.086088	.293408	1.26000	.350000	77/03/12	77/10/31
70507	PHOS-T	ORTHO	MG/L P		12	.463916	.071480	.267358	1.05000	.223000	77/03/12	77/10/31

Table IV-6

STORET RETRIEVAL DATE 84/09/11 - INVENT - VERSION OF SEP. 1981

46P003
44 34 44.0 097 05 39.0 2
NW INLET T113N R52W SEC 20
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810418
0000 CLASS 00 CSN-RSP 0589380-0554047

/TYPA/AMBNT/STREAM/RUNOFF

PARAMETER				RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010	WATER	TEMP	CENT		4	7.21000	30.4383	5.51709	14.4000	1.67000	78/03/08	78/04/25
00011	WATER	TEMP	FAHN		4	45.0000	99.3333	9.96661	58.0000	35.0000	78/03/08	78/04/25
00020	AIR	TEMP	CENT		4	11.3975	7.10335	2.66521	15.0000	8.89000	78/03/08	78/04/25
00021	AIR	TEMP	FAHN		4	52.5000	23.0000	4.79583	59.0000	48.0000	78/03/08	78/04/25
00300	DO		MG/L		4	11.0750	44.9826	6.70691	20.2000	5.00000	78/03/08	78/04/25
00310	BOD	5 DAY	MG/L		4	2.62500	4.94070	2.22277	5.91000	1.08000	78/03/08	78/04/25
00335	COD	LOWLEVEL	MG/L		4	42.5000	100.333	10.0167	55.0000	33.0000	78/03/08	78/04/25
00403	LAB	PH	SU		4	8.00250	.134440	.366661	8.53000	7.68000	78/03/08	78/04/25
00410	T ALK	CACO3	MG/L		1	51.6000			51.6000	51.6000	78/03/08	78/03/08
00415	PHEN-PH-	LFIN ALK	MG/L		4	198.000	11240.0	106.019	306.000	52.0000	78/03/28	78/04/25
00500	RESIDUE	TOTAL	MG/L		4	493.250	93798.8	306.266	864.000	119.000	78/03/08	78/04/25
00515	RESIDUE	DISS-105	C MG/L		4	483.750	93386.8	305.593	860.000	115.000	78/03/08	78/04/25
00530	RESIDUE	TOT NFLT	MG/L		4	9.50000	83.0000	9.11043	23.0000	4.00000	78/03/08	78/04/25
00610	NH3+NH4-	N TOTAL	MG/L		3	.430000	.057601	.240001	.670000	.190000	78/03/08	78/04/06
				K	1	.020000			.020000	.020000	78/04/25	78/04/25
				TOT	4	.327500	.080425	.283593	.670000	.020000	78/03/08	78/04/25
00613	NO2-N	DISS	MG/L		4	.040000	.000467	.021603	.060000	.010000	78/03/08	78/04/25
00620	NO3-N	TOTAL	MG/L,		3	.733333	.023335	.152756	.900000	.600000	78/03/08	78/04/06
				K	1	.100000			.100000	.100000	78/04/25	78/04/25
				TOT	4	.575000	.115834	.340344	.900000	.100000	78/03/08	78/04/25
00625	TOT KJEL	N	MG/L		4	1.62250	.095825	.309556	1.87000	1.19000	78/03/08	78/04/25
00671	PHOS-DIS	ORTHO	MG/L P		2	.208000	.000512	.022628	.224000	.192000	78/03/08	78/04/06
31616	FEC COLI	MFM-FCBR	/100ML	K	4	3.00000	.000000	.000000	3.00000	3.00000	78/03/08	78/04/25
70505	T PO4	P-COL	MG/L		3	.217000	.004401	.066340	.268000	.142000	78/04/04	78/04/25
70506	SOL PO4-	T P-COL	MG/L		1	.277000			.277000	.277000	78/03/08	78/03/08
70507	PHOS-T	ORTHO	MG/L P		2	.154000	.010368	.101823	.226000	.082000	78/04/04	78/04/25

Table IV-7

STORET RETRIEVAL DATE 84/09/11 - INVENT - VERSION OF SEP. 1981

46P004
44 36 07.0 097 03 14.0 2
STONE BRIDGE T113N R52W SEC 10/15
46057 SOUTH DAKOTA HAMLIN
9MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810418
0000 CLASS 00 CSN-RSP 0589381-0554048

/TYPA/AMBNT/STREAM/RUNOFF

PARAMETER				RMK	NUMBER	MEAN	VARIANCE	STAN-DEV	MAXIMUM	MINIMUM	BEG-DATE	END-DATE
00010 WATER	TEMP		CENT		18	15.0011	132.531	11.5122	28.9000	.000000	77/03/30	77/07/11
00011 WATER	TEMP		FAHN		18	59.0000	429.294	20.7194	84.0000	32.0000	77/03/30	77/07/11
00020 AIR	TEMP		CENT		21	17.5414	89.7262	9.47239	35.0000	.560000	77/03/30	77/07/11
00021 AIR	TEMP		FAHN		21	63.4762	286.766	16.9342	95.0000	33.0000	77/03/30	77/07/11
00300 DO			MG/L		8	10.7125	.815569	.903089	11.9000	9.50000	77/03/30	77/07/06
00310 BOD	5 DAY		MG/L		13	11.0846	19.8031	4.45007	19.2000	5.60000	77/03/30	77/07/07
00335 COD	LOWLEVEL		MG/L		18	106.500	1314.26	36.2528	197.000	50.0000	77/03/30	77/07/11
00403 LAB	PH		SU		21	8.29999	.387329	.622358	9.51000	7.10000	77/03/30	77/07/11
00415 PHEN-PH-	LFIN ALK		MG/L		21	171.857	3780.23	61.4836	254.000	83.0000	77/03/30	77/07/11
00500 RESIDUE	TOTAL		MG/L		21	832.524	134613	366.896	1592.00	363.000	77/03/30	77/07/11
00515 RESIDUE	DISS-105	C	MG/L		21	714.000	72351.7	268.983	1045.00	323.000	77/03/30	77/07/11
00530 RESIDUE	TOT NFLT		MG/L		21	118.524	24889.0	157.762	547.000	3.00000	77/03/30	77/07/11
00608 NH3+NH4-	N DISS		MG/L		18	1.46277	1.86745	1.36655	4.63000	.020000	77/03/30	77/07/11
00610 NH3+NH4-	N TOTAL		MG/L		3	1.52333	.049634	.222788	1.78000	1.38000	77/03/31	77/07/07
00613 NO2-N	DISS		MG/L		21	.209047	.120179	.346668	1.50000	.010000	77/03/30	77/07/11
00618 NO3-N	DISS		MG/L		7	1.44286	.486188	.697272	2.50000	.900000	77/07/06	77/07/11
00620 NO3-N	TOTAL		MG/L		8	.303750	.051513	.226964	.800000	.150000	77/03/30	77/06/22
				K	6	.100000	-.223E-08	.000000	.100000	.100000	77/04/01	77/05/03
				TOT	14	.216428	.038686	.196688	.800000	.100000	77/03/30	77/06/22
00625 TOT KJEL	N		MG/L		21	4.28094	2.89689	1.70202	9.58000	2.49000	77/03/30	77/07/11
00671 PHOS-DIS	ORTHO		MG/L P		4	.640500	.003413	.058420	.692000	.562000	77/07/06	77/07/07
31616 FEC COLI	MFM-FCBR		/100ML		12	193.250	131800	363.042	1300.00	3.00000	77/03/30	77/07/11
				K	6	6.50000	14.7000	3.83406	10.0000	3.00000	77/03/31	77/05/03
				TOT	18	131.000	93492.4	305.765	1300.00	3.00000	77/03/30	77/07/11
70505 T PO4	P-COL		MG/L		21	.482000	.056873	.238480	.852000	.183000	77/03/30	77/07/11
70507 PHOS-T	ORTHO		MG/L P		17	.287353	.046469	.215567	.686000	.026000	77/03/30	77/07/11

Table IV-8

STORET RETRIEVAL DATE 84/09/11 - INVENT - VERSION OF SEP. 1981

46P004
44 36 07.0 097 03 14.0 2
STONE BRIDGE T113N R52W SEC 10/15
46057 SOUTH DAKOTA HAMLIN
9MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810418
0000 CLASS 00 CSN-RSP 0589381-0554048

/TYPA/AMBNT/STREAM/RUNOFF

PARAMETER				RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010	WATER	TEMP	CENT		5	3.44400	6.55016	2.55933	7.78000	1.11000	78/04/04	78/04/25
00011	WATER	TEMP	FAHN		5	38.2000	21.2012	4.60447	46.0000	34.0000	78/04/04	78/04/25
00020	AIR	TEMP	CENT		5	11.3320	10.9730	3.31255	15.0000	7.22000	78/04/04	78/04/25
00021	AIR	TEMP	FAHN		5	52.4000	35.8037	5.98362	59.0000	45.0000	78/04/04	78/04/25
00300	DO		MG/L		5	10.5200	4.95209	2.22533	14.5000	9.50000	78/04/04	78/04/25
00310	BOD	5 DAY	MG/L		5	2.69400	1.01268	1.00632	4.41000	1.98000	78/04/04	78/04/25
00335	COD	LOWLEVEL	MG/L		5	35.4000	50.3008	7.09230	43.0000	26.0000	78/04/04	78/04/25
00403	LAB	PH	SU		5	8.23199	.819458	.905239	9.84000	7.72000	78/04/04	78/04/25
00415	PHEN-PH-	LFIN ALK	MG/L		5	93.6000	3379.81	58.1361	197.000	59.0000	78/04/04	78/04/25
00500	RESIDUE	TOTAL	MG/L		5	249.800	18509.2	136.049	490.000	168.000	78/04/04	78/04/25
00515	RESIDUE	DISS-105	C MG/L		5	235.200	18414.2	135.699	475.000	153.000	78/04/04	78/04/25
00530	RESIDUE	TOT NFLT	MG/L		5	14.6000	3.30011	1.81662	17.0000	12.0000	78/04/04	78/04/25
00610	NH3+NH4-	N TOTAL	MG/L		5	.506000	.071280	.266984	.650000	.030000	78/04/04	78/04/25
00613	NO2-N	DISS	MG/L		5	.040000	.000150	.012248	.050000	.020000	78/04/04	78/04/25
00620	NO3-N	TOTAL	MG/L		5	.600000	.010000	.100002	.700000	.500000	78/04/04	78/04/25
00625	TOT KJEL	N	MG/L		5	1.46600	.081281	.285098	1.78000	1.00000	78/04/04	78/04/25
00671	PHOS-DIS	ORTHO	MG/L P		5	.147600	.000076	.008734	.161000	.137000	78/04/04	78/04/25
31616	FEC COLI	MFM-FCBR	/100ML		2	8.00000	50.0000	7.07107	13.0000	3.00000	78/04/04	78/04/25
				K	3	3.00000	.000000	.000000	3.00000	3.00000	78/04/04	78/04/06
				TOT	5	5.00000	20.0000	4.47214	13.0000	3.00000	78/04/04	78/04/25
70505	T PO4	P-COL	MG/L		5	.221600	.000241	.015520	.237000	.201000	78/04/04	78/04/25

Table IV-9

STORET RETRIEVAL DATE 84/09/11 - INVENT - VERSION OF SEP. 1981

46P004
44 36 07.0 097 03 14.0 2
STONE BRIDGE T113N R52W SEC 10/15
46057 SOUTH DAKOTA HAMLIN
9MISSOURI RIVER 090700
BIG-SIOUX-RIVER
21SDLAKE 810418
0000 CLASS 00 CSN-RSP 0589381-0554048

/TYPA/AMBNT/STREAM/RUNOFF

PARAMETER				RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010 WATER	TEMP	CENT			1	.000000			.000000	.000000	82/12/15	82/12/15
00011 WATER	TEMP	FAHN			1	32.0000			32.0000	32.0000	82/12/15	82/12/15
00020 AIR	TEMP	CENT			1	-.110E+01			-.110E+01	-.110E+01	82/12/15	82/12/15
00021 AIR	TEMP	FAHN			1	30.0000			30.0000	30.0000	82/12/15	82/12/15
00400 PH		SU			1	7.40000			7.40000	7.40000	82/12/15	82/12/15
00403 LAB	PH	SU			1	7.84000			7.84000	7.84000	82/12/15	82/12/15
00500 RESIDUE	TOTAL	MG/L			1	862.000			862.000	862.000	82/12/15	82/12/15
00530 RESIDUE	TOT NFLT	MG/L			1	1.00000			1.00000	1.00000	82/12/15	82/12/15
00610 NH3+NH4-	N TOTAL	MG/L			1	2.88000			2.88000	2.88000	82/12/15	82/12/15
00613 NO2-N	DISS	MG/L		K	1	.010000			.010000	.010000	82/12/15	82/12/15
00620 NO3-N	TOTAL	MG/L			1	.400000			.400000	.400000	82/12/15	82/12/15
00625 TOT KJEL	N	MG/L			1	4.40000			4.40000	4.40000	82/12/15	82/12/15
00940 CHLORIDE	TOTAL	MG/L			1	46.4000			46.4000	46.4000	82/12/15	82/12/15
00945 SULFATE	SO4-TOT	MG/L			1	282.000			282.000	282.000	82/12/15	82/12/15
31616 FEC COLI	MFM-FCBR	/100ML		K	1	3.00000			3.00000	3.00000	82/12/15	82/12/15
70300 RESIDUE	DISS-180	C	MG/L		1	861.000			861.000	861.000	82/12/15	82/12/15
70506 SOL PO4-	T P-COL	MG/L			1	.664000			.664000	.664000	82/12/15	82/12/15
70507 PHOS-T	ORTHO	MG/L P			1	.636000			.636000	.636000	82/12/15	82/12/15

Table IV-10

STORET RETRIEVAL DATE 84/09/11 - INVENT - VERSION OF SEP. 1981

46P004
44 36 07.0 097 03 14.0 2
STONE BRIDGE T113N R52W SEC 10/15
46057 SOUTH DAKOTA HAMLIN
9MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810418
0000 CLASS 00 CSN-RSP 0589381-0554048

/TYPA/AMBNT/STREAM/RUNOFF

PARAMETER				RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010	WATER	TEMP	CENT		5	8.77800	75.2139	8.67260	18.9000	.000000	83/02/15	83/06/15
00011	WATER	TEMP	FAHN		5	47.8000	243.702	15.6110	66.0000	32.0000	83/02/15	83/06/15
00020	AIR	TEMP	CENT		4	6.53000	84.9761	9.21825	15.6000	-.221E+01	83/02/15	83/05/12
00021	AIR	TEMP	FAHN		4	43.7500	274.916	16.5806	60.0000	28.0000	83/02/15	83/05/12
00095	CNDUCTVY	AT 25C	MICROMHO		1	979.000			979.000	979.000	83/06/15	83/06/15
00310	BOD	5 DAY	MG/L		3	4.66667	9.33334	3.05505	8.00000	2.00000	83/03/15	83/05/12
00400	PH		SU		5	8.11999	.222107	.471282	8.50000	7.30000	83/02/15	83/06/15
00403	LAB	PH	SU		2	8.02499	.296631	.544638	8.41000	7.64000	83/02/15	83/06/15
00410	T ALK	CACO3	MG/L		1	259.000			259.000	259.000	83/06/15	83/06/15
00415	PHEN-PH-	LFIN ALK	MG/L		1	6.00000			6.00000	6.00000	83/06/15	83/06/15
00500	RESIDUE	TOTAL	MG/L		5	847.200	40547.7	201.365	1136.00	622.000	83/02/15	83/06/15
00530	RESIDUE	TOT NFLT	MG/L		5	68.8000	8849.20	94.0702	228.000	2.00000	83/02/15	83/06/15
00610	NH3+NH4-	N TOTAL	MG/L		5	.753999	.995030	.997512	2.53000	.220000	83/02/15	83/06/15
00613	NO2-N	DISS	MG/L	K	5	.010000	-.582E-10	.000000	.010000	.010000	83/02/15	83/06/15
00620	NO3-N	TOTAL	MG/L		5	.460000	.028000	.167333	.600000	.200000	83/02/15	83/06/15
00625	TOT KJEL	N	MG/L		5	2.86600	3.14732	1.77407	5.60000	1.54000	83/02/15	83/06/15
00671	PHOS-DIS	ORTHO	MG/L P		1	.064000			.064000	.064000	83/06/15	83/06/15
31616	FEC COLI	MFM-FCBR	/100ML		2	265.000	130050	360.625	520.000	10.0000	83/05/12	83/06/15
				K	3	7.66667	16.3334	4.04146	10.0000	3.00000	83/02/15	83/04/20
				TOT	5	110.600	52386.8	228.882	520.000	3.00000	83/02/15	83/06/15
70300	RESIDUE	DISS-180	C MG/L		5	778.400	43255.5	207.980	1134.00	586.000	83/02/15	83/06/15
70505	T PO4	P-COL	MG/L		4	.419500	.038014	.194973	.705000	.285000	83/03/15	83/06/15
70506	SOL PO4-	T P-COL	MG/L		1	.882000			.882000	.882000	83/02/15	83/02/15
70507	PHOS-T	ORTHO	MG/L P		4	.387749	.113360	.336690	.878000	.151000	83/02/15	83/05/12

Tablr IV-11

STORET RETRIEVAL DATE 84/09/11 - INVENT - VERSION OF SEP. 1981

46P005
44 36 06.0 097 00 47.0 2
OUTLET ROAD FAR T113N R52W SEC 12/13
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER 090700
BIG SIOUX RIVER
/TYPA/AMBNT/STREAM/RUNOFF 21SDLAKE 810418
0000 CLASS 00 CSN-RSP 0589382-0554049

PARAMETER				RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010	WATER	TEMP	CENT		3	7.42000	153.017	12.3700	21.7000	.000000	77/03/10	77/06/20
00011	WATER	TEMP	FAHN		3	45.3333	494.336	22.2337	71.0000	32.0000	77/03/10	77/06/20
00020	AIR	TEMP	CENT		3	12.0400	106.727	10.3309	23.9000	5.00000	77/03/10	77/06/20
00021	AIR	TEMP	FAHN		3	53.6667	345.336	18.5832	75.0000	41.0000	77/03/10	77/06/20
00300	DO		MG/L		2	12.2500	.125000	.353553	12.5000	12.0000	77/03/10	77/03/10
00310	BOD	5 DAY	MG/L		1	39.0000			39.0000	39.0000	77/03/10	77/03/10
00335	COD	LOWLEVEL	MG/L		1	80.0000			80.0000	80.0000	77/06/20	77/06/20
00403	LAB	PH	SU		3	7.25666	.013557	.116436	7.39000	7.18000	77/03/10	77/06/20
00415	PHEN-PH-	LFIN ALK	MG/L		3	62.0000	1764.00	42.0000	110.000	32.0000	77/03/10	77/06/20
00500	RESIDUE	TOTAL	MG/L		3	442.333	2760.47	52.5402	502.000	403.000	77/03/10	77/06/20
00515	RESIDUE	DISS-105	C MG/L		3	205.667	20197.4	142.117	367.000	99.0000	77/03/10	77/06/20
00530	RESIDUE	TOT NFLT	MG/L		3	236.667	34556.4	185.893	403.000	36.0000	77/03/10	77/06/20
00608	NH3+NH4-	N DISS	MG/L		3	.726666	.283734	.532667	1.18000	.140000	77/03/10	77/06/20
00613	NO2-N	DISS	MG/L		3	.033333	.000233	.015275	.050000	.020000	77/03/10	77/06/20
00620	NO3-N	TOTAL	MG/L		1	.550000			.550000	.550000	77/03/10	77/03/10
				K	2	.100000	-.372E-08	.000000	.100000	.100000	77/03/10	77/06/20
				TOT	3	.250000	.067500	.259808	.550000	.100000	77/03/10	77/06/20
00625	TOT KJEL	N	MG/L		3	3.50000	1.07731	1.03794	4.58000	2.51000	77/03/10	77/06/20
31616	FEC COLI	MFM-FCBR	/100ML		3	2070.00	.115E+08	3403.51	6000.00	90.0000	77/03/10	77/06/20
70505	T PO4	P-COL	MG/L		3	.330000	.087364	.295574	.668000	.120000	77/03/10	77/06/20
70507	PHOS-T	ORTHO	MG/L P		3	.176000	.057213	.239192	.452000	.029000	77/03/10	77/06/20

Table IV-12

STORET RETRIEVAL DATE 84/09/11 - INVENT - VERSION OF SEP. 1981

46P005
44 36 06.0 097 00 47.0 2
OUTLET ROAD FAR T113N R52W SEC 12/13
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810418
0000 CLASS 00 CSN-RSP 0589382-0554049

/TYPA/AMBNT/STREAM/RUNOFF

PARAMETER				RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010 WATER	TEMP		CENT		1	1.67000			1.67000	1.67000	78/03/28	78/03/28
00011 WATER	TEMP		FAHN		1	35.0000			35.0000	35.0000	78/03/28	78/03/28
00020 AIR	TEMP		CENT		1	10.0000			10.0000	10.0000	78/03/28	78/03/28
00021 AIR	TEMP		FAHN		1	50.0000			50.0000	50.0000	78/03/28	78/03/28
00300 DO			MG/L		1	9.90000			9.90000	9.90000	78/03/28	78/03/28
00310 BOD	5 DAY		MG/L		1	6.21000			6.21000	6.21000	78/03/28	78/03/28
00335 COD	LOWLEVEL		MG/L		1	53.0000			53.0000	53.0000	78/03/28	78/03/28
00403 LAB	PH		SU		1	7.74000			7.74000	7.74000	78/03/28	78/03/28
00415 PHEN-PH-	LFIN ALK		MG/L		1	64.0000			64.0000	64.0000	78/03/28	78/03/28
00500 RESIDUE	TOTAL		MG/L		1	177.000			177.000	177.000	78/03/28	78/03/28
00515 RESIDUE	DISS-105	C	MG/L		1	125.000			125.000	125.000	78/03/28	78/03/28
00530 RESIDUE	TOT NFLT		MG/L		1	52.0000			52.0000	52.0000	78/03/28	78/03/28
00608 NH3+NH4-	N DISS		MG/L		1	.950000			.950000	.950000	78/03/28	78/03/28
00613 NO2-N	DISS		MG/L		1	.060000			.060000	.060000	78/03/28	78/03/28
00620 NO3-N	TOTAL		MG/L		1	.800000			.800000	.800000	78/03/28	78/03/28
00625 TOT KJEL	N		MG/L		1	2.87000			2.87000	2.87000	78/03/28	78/03/28
00671 PHOS-DIS	ORTHO		MG/L P		1	.277000			.277000	.277000	78/03/28	78/03/28
31616 FEC COLI	MFM-FCBR		/100ML		1	17.0000			17.0000	17.0000	78/03/28	78/03/28
70505 T PO4	P-COL		MG/L		1	.389000			.389000	.389000	78/03/28	78/03/28

Table IV-13

STORET RETRIEVAL DATE 84/09/11 - INVENT - VERSION OF SEP. 1981

46P006
44 35 45.0 097 01 38.0 2
OUTLET ROAD CLOSE T113N R52W SEC 13
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810418
0000 CLASS 00 CSN-RSP 0589383-0554050

/TYPA/AMBNT/STREAM/RUNOFF

PARAMETER				RMK	NUMBER	MEAN	VARIANCE	STAN-DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010	WATER	TEMP	CENT		9	2.96222	42.9006	6.54986	20.0000	.000000	77/03/11	77/06/15
00011	WATER	TEMP	FAHN		9	37.3333	139.001	11.7899	68.0000	32.0000	77/03/11	77/06/15
00020	AIR	TEMP	CENT		8	4.51124	1.36077	1.16652	7.22000	3.33000	77/03/11	77/03/15
00021	AIR	TEMP	FAHN		8	40.1250	4.41071	2.10017	45.0000	38.0000	77/03/11	77/03/15
00300	DO		MG/L		9	10.1667	5.40759	2.32542	11.5000	4.20000	77/03/11	77/06/15
00310	BOD	5 DAY	MG/L		1	8.50000			8.50000	8.50000	77/03/15	77/03/15
00335	COD	LOWLEVEL	MG/L		9	115.222	8782.70	93.7161	262.000	25.0000	77/03/11	77/06/15
00403	LAB	PH	SU		9	6.90999	.055206	.234960	7.38000	6.68000	77/03/11	77/06/15
00415	PHEN-PH-	LFIN ALK	MG/L		9	66.3333	892.002	29.8664	114.000	40.0000	77/03/11	77/06/15
00500	RESIDUE	TOTAL	MG/L		9	365.778	36825.1	191.899	723.000	138.000	77/03/11	77/06/15
00515	RESIDUE	DISS-105	C MG/L		9	275.222	14867.7	121.933	481.000	114.000	77/03/11	77/06/15
00530	RESIDUE	TOT NFLT	MG/L		9	90.5555	5487.29	74.0762	242.000	23.0000	77/03/11	77/06/15
00608	NH3+NH4-	N DISS	MG/L		9	3.33333	13.1017	3.61963	9.30000	.780000	77/03/11	77/06/15
00613	NO2-N	DISS	MG/L		9	.035556	.000478	.021858	.070000	.010000	77/03/11	77/06/15
00618	NO3-N	DISS	MG/L		1	.700000			.700000	.700000	77/06/15	77/06/15
00620	NO3-N	TOTAL	MG/L		5	.328000	.002020	.044948	.360000	.250000	77/03/11	77/03/15
				K	3	.100000	-.186E-08	.000000	.100000	.100000	77/03/11	77/03/12
				TOT	8	.242500	.015079	.122795	.360000	.100000	77/03/11	77/03/15
00625	TOT KJEL	N	MG/L		9	5.88222	32.4632	5.69765	16.3000	1.09000	77/03/11	77/06/15
00671	PHOS-DIS	ORTHO	MG/L P		1	.206000			.206000	.206000	77/06/15	77/06/15
31616	FEC COLI	MFM-FCBR	/100ML		5	4173.40	.689E+08	8300.84	19000.0	33.0000	77/03/13	77/06/15
70505	T PO4	P-COL	MG/L		9	.926666	.612480	.782611	2.24000	.332000	77/03/11	77/06/15
70507	PHOS-T	ORTHO	MG/L P		8	.855625	.498553	.706083	1.95000	.301000	77/03/11	77/03/15

Table IV-14

STORET RETRIEVAL DATE 84/09/11 - INVENT - VERSION OF SEP. 1981

46P006
44 35 45.0 097 01 38.0 2
OUTLET ROAD CLOSE T113N R52W SEC 13
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810418
0000 CLASS 00 CSN-RSP 0589383-0554050

/TYPA/AMBNT/STREAM/RUNOFF

PARAMETER				RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010	WATER	TEMP	CENT		3	8.53333	57.1670	7.56089	15.6000	.560000	83/03/15	83/05/12
00011	WATER	TEMP	FAHN		3	47.3333	184.336	13.5770	60.0000	33.0000	83/03/15	83/05/12
00020	AIR	TEMP	CENT		3	8.14333	76.0287	8.71944	15.0000	-.166E+01	83/03/15	83/05/12
00021	AIR	TEMP	FAHN		3	46.6667	246.336	15.6951	59.0000	29.0000	83/03/15	83/05/12
00310	BOD	5 DAY	MG/L		3	8.00000	3.00000	1.73205	10.0000	7.00000	83/03/15	83/05/12
00400	PH		SU		3	8.19999	.120247	.346766	8.40000	7.80000	83/03/15	83/05/12
00500	RESIDUE	TOTAL	MG/L		3	708.333	20091.0	141.743	872.000	626.000	83/03/15	83/05/12
00530	RESIDUE	TOT NFLT	MG/L		3	51.3333	1705.34	41.2957	80.0000	4.00000	83/03/15	83/05/12
00610	NH3+NH4-	N TOTAL	MG/L		3	.053333	.000433	.020817	.070000	.030000	83/03/15	83/05/12
00613	NO2-N	DISS	MG/L	K	3	.010000	.000000	.000000	.010000	.010000	83/03/15	83/05/12
00620	NO3-N	TOTAL	MG/L	K	3	.100000	-.186E-08	.000000	.100000	.100000	83/03/15	83/05/12
00625	TOT KJEL	N	MG/L		3	1.81000	.663099	.814309	2.72000	1.15000	83/03/15	83/05/12
31616	FEC COLI	MFM-FCBR	/100ML		1	10.0000			10.0000	10.0000	83/05/12	83/05/12
				K	2	10.0000	.000000	.000000	10.0000	10.0000	83/03/15	83/04/20
				TOT	3	10.0000	.000000	.000000	10.0000	10.0000	83/03/15	83/05/12
70300	RESIDUE	DISS-180	C MG/L		3	657.000	17251.0	131.343	802.000	546.000	83/03/15	83/05/12
70505	T PO4	P-COL	MG/L		3	.386333	.008683	.093181	.458000	.281000	83/03/15	83/05/12
70507	PHOS-T	ORTHO	MG/L P		3	.106333	.011017	.104964	.221000	.015000	83/03/15	83/05/12

Table IV-15

STORET RETRIEVAL DATE 84/09/11 - INVENT - VERSION OF SEP. 1981

46P007
44 35 33.0 097 04 21.0 2
SAARANERS BEACH T113N R52W SEC 16
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810530
0000 CLASS 00 CSN-RSP 0595684-0622497

/TYPA/AMBNT/LAKE

PARAMETER				RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010	WATER	TEMP	CENT		4	11.7925	114.269	10.6897	24.4000	.000000	77/08/03	77/12/14
00011	WATER	TEMP	FAHN		4	53.2500	371.583	19.2765	76.0000	32.0000	77/08/03	77/12/14
00020	AIR	TEMP	CENT		4	16.4000	127.313	11.2833	25.6000	.000000	77/08/03	77/12/14
00021	AIR	TEMP	FAHN		4	61.5000	411.666	20.2896	78.0000	32.0000	77/08/03	77/12/14
00061	STREAM	FLOW,	INST-CFS		1	.000000			.000000	.000000	77/11/15	77/11/15
00095	CNDUCTVY	AT 25C	MICROMHO		1	1480.00			1480.00	1480.00	77/10/13	77/10/13
00300	DO		MG/L		4	12.1000	2.58008	1.60626	13.5000	10.0000	77/08/03	77/12/14
00310	BOD	5 DAY	MG/L		2	7.90000	23.1200	4.80833	11.3000	4.50000	77/08/03	77/10/13
				K	1	.200000			.200000	.200000	77/12/14	77/12/14
				L	1	20.5000			20.5000	20.5000	77/09/20	77/09/20
				TOT	4	9.12500	78.3892	8.85377	20.5000	.200000	77/08/03	77/12/14
00335	COD	LOWLEVEL	MG/L		4	130.750	1114.25	33.3804	160.000	90.0000	77/08/03	77/12/14
00403	LAB	PH	SU		4	8.77999	.085775	.292873	9.02000	8.40000	77/08/03	77/12/14
00415	PHEN-PH-	LFIN ALK	MG/L		4	265.500	329.666	18.1567	289.000	248.000	77/08/03	77/12/14
00500	RESIDUE	TOTAL	MG/L		4	1256.75	6456.33	80.3513	1339.00	1181.00	77/08/03	77/12/14
00515	RESIDUE	DISS-105	C MG/L		4	1165.50	5428.33	73.6772	1270.00	1097.00	77/08/03	77/12/14
00530	RESIDUE	TOT NFLT	MG/L		4	88.7500	2342.92	48.4037	151.000	37.0000	77/08/03	77/12/14
00608	NH3+NH4-	N DISS	MG/L		2	.750000	.793798	.890954	1.38000	.120000	77/09/20	77/12/14
00610	NH3+NH4-	N TOTAL	MG/L		1	.730000			.730000	.730000	77/10/13	77/10/13
				K	1	.020000			.020000	.020000	77/08/03	77/08/03
				TOT	2	.375000	.252050	.502046	.730000	.020000	77/08/03	77/10/13
00613	NO2-N	DISS	MG/L		3	.013333	.000033	.005773	.020000	.010000	77/09/20	77/12/14
				K	1	.010000			.010000	.010000	77/08/03	77/08/03
				TOT	4	.012500	.000025	.005000	.020000	.010000	77/08/03	77/12/14
00618	NO3-N	DISS	MG/L	K	1	.100000			.100000	.100000	77/09/20	77/09/20
00620	NO3-N	TOTAL	MG/L	K	3	.100000	-.186E-08	.000000	.100000	.100000	77/08/03	77/12/14
00625	TOT KJEL	N	MG/L		4	4.89500	1.49720	1.22360	6.50000	3.74000	77/08/03	77/12/14
00671	PHOS-DIS	ORTHO	MG/L P		1	.022000			.022000	.022000	77/08/03	77/08/03
31616	FEC COLI	MFM-FCBR	/100ML		2	12.5000	.500000	.707107	13.0000	12.0000	77/08/03	77/09/20
				K	2	3.00000	.000000	.000000	3.00000	3.00000	77/10/13	77/12/14
				TOT	4	7.75000	30.2500	5.50000	13.0000	3.00000	77/08/03	77/12/14
70505	T PO4	P-COL	MG/L		4	.127000	.001082	.032894	.159000	.082000	77/08/03	77/12/14
70507	PHOS-T	ORTHO	MG/L P		3	.060333	.003740	.061158	.128000	.009000	77/09/20	77/12/14

Table IV-16

STORET RETRIEVAL DATE 84/09/11 - INVENT - VERSION OF SEP. 1981

46P007
44 35 33.0 097 04 21.0 2
SAARANERS BEACH T113N R52W SEC 16
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810530
0000 CLASS 00 CSN-RSP 0595684-0622497

/TYPA/AMBNT/LAKE

PARAMETER				RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010	WATER	TEMP	CENT		9	13.3267	90.9753	9.53810	23.9000	.000000	78/02/16	78/07/12
00011	WATER	TEMP	FAHN		9	56.0000	294.500	17.1610	75.0000	32.0000	78/02/16	78/07/12
00020	AIR	TEMP	CENT		9	13.0367	211.318	14.5368	25.6000	-.160E+02	78/02/16	78/07/12
00021	AIR	TEMP	FAHN		9	56.1111	711.364	26.6714	78.0000	3.00000	78/02/16	78/07/12
00061	STREAM	FLOW,	INST-CFS		1	.000000			.000000	.000000	78/01/11	78/01/11
00300	DO		MG/L		9	9.09999	11.2201	3.34964	12.2000	.700000	78/02/16	78/07/12
00310	BOD	5 DAY	MG/L		8	4.49125	11.3406	3.36758	10.0000	.990000	78/02/16	78/07/12
00335	COD	LOWLEVEL	MG/L		9	82.8889	323.114	17.9754	105.000	56.0000	78/02/16	78/07/12
00400	PH		SU		2	7.68500	2.06044	1.43542	8.70000	6.67000	78/02/16	78/05/11
00403	LAB	PH	SU		9	8.45000	.143249	.378483	9.01000	7.97000	78/02/16	78/07/12
00415	PHEN-PH-	LFIN ALK	MG/L		9	237.222	3012.96	54.8904	342.000	199.000	78/02/16	78/07/12
00500	RESIDUE	TOTAL	MG/L		9	1029.56	83783.2	289.453	1607.00	804.000	78/02/16	78/07/12
00515	RESIDUE	DISS-105	C MG/L		9	967.000	86062.7	293.364	1555.00	761.000	78/02/16	78/07/12
00530	RESIDUE	TOT NFLT	MG/L		9	62.5555	1324.03	36.3872	156.000	38.0000	78/02/16	78/07/12
00610	NH3+NH4-	N TOTAL	MG/L		8	.823750	.419398	.647609	2.01000	.030000	78/02/16	78/07/12
				K	1	.020000			.020000	.020000	78/05/11	78/05/11
				TOT	9	.734444	.438753	.662384	2.01000	.020000	78/02/16	78/07/12
00613	NO2-N	DISS	MG/L		9	.056667	.004800	.069282	.220000	.010000	78/02/16	78/07/12
00620	NO3-N	TOTAL	MG/L		6	.283333	.045667	.213698	.700000	.100000	78/02/16	78/07/12
				K	3	.100000	-.186E-08	.000000	.100000	.100000	78/05/17	78/06/28
				TOT	9	.222222	.036945	.192210	.700000	.100000	78/02/16	78/07/12
00625	TOT KJEL	N	MG/L		9	3.23777	.716682	.846571	4.82000	2.30000	78/02/16	78/07/12
00671	PHOS-DIS	ORTHO	MG/L P		3	.065667	.002257	.047511	.097000	.011000	78/04/13	78/07/12
31616	FEC COLI	MFM-FCBR	/100ML		3	107.667	5406.35	73.5279	180.000	33.0000	78/06/14	78/07/12
				K	6	3.00000	.000000	.000000	3.00000	3.00000	78/02/16	78/05/31
				TOT	9	37.8889	4090.36	63.9559	180.000	3.00000	78/02/16	78/07/12
70505	T PO4	P-COL	MG/L		9	.148000	.007793	.088278	.330000	.064000	78/02/16	78/07/12
70507	PHOS-T	ORTHO	MG/L P		6	.075833	.002240	.047326	.137000	.024000	78/02/16	78/06/28

Table IV-17

STORET RETRIEVAL DATE 84/09/11 - INVENT - VERSION OF SEP. 1981

46P008
44 34 21.0 097 02 37.0 2
WEST ESTELLINE T113N R52W SECTION 23
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810530
0000 CLASS 00 CSN-RSP 0595685-0622498

/TYPA/AMBNT/LAKE

PARAMETER				RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010 WATER	TEMP	CENT			4	6.11000	56.9077	7.54372	16.1000	.000000	77/09/20	77/12/14
00011 WATER	TEMP	FAHN			4	43.0000	184.667	13.5892	61.0000	32.0000	77/09/20	77/12/14
00020 AIR	TEMP	CENT			4	10.5575	105.843	10.2880	20.0000	1.11000	77/09/20	77/12/14
00021 AIR	TEMP	FAHN			4	51.0000	342.666	18.5113	68.0000	34.0000	77/09/20	77/12/14
00095 CNDUCTVY	AT 25C	MICROMHO			2	1440.00	3200.00	56.5685	1480.00	1400.00	77/10/13	77/11/15
00300 DO		MG/L			4	12.1500	1.13672	1.06617	13.0000	10.7000	77/09/20	77/12/14
00310 BOD	5 DAY	MG/L			4	7.02749	35.7198	5.97660	15.7000	2.61000	77/09/20	77/12/14
00335 COD	LOWLEVEL	MG/L			4	103.250	396.916	19.9228	122.000	78.0000	77/09/20	77/12/14
00400 PH		SU			1	7.80000			7.80000	7.80000	77/11/15	77/11/15
00403 LAB	PH	SU			4	8.65999	.091960	.303248	9.08000	8.41000	77/09/20	77/12/14
00415 PHEN-PH-	LFIN ALK	MG/L			4	268.250	538.250	23.2002	298.000	247.000	77/09/20	77/12/14
00500 RESIDUE	TOTAL	MG/L			4	1236.25	9971.00	99.8549	1381.00	1160.00	77/09/20	77/12/14
00515 RESIDUE	DISS-105	C MG/L			4	1130.75	14534.3	120.558	1280.00	986.000	77/09/20	77/12/14
00530 RESIDUE	TOT NFLT	MG/L			4	105.500	4173.66	64.6039	196.000	45.0000	77/09/20	77/12/14
00608 NH3+NH4-	N DISS	MG/L			2	1.14000	.125001	.353555	1.39000	.890000	77/11/15	77/12/14
00610 NH3+NH4-	N TOTAL	MG/L			2	.345000	.198450	.445477	.660000	.030000	77/09/20	77/10/13
00613 NO2-N	DISS	MG/L			4	.017500	.000092	.009574	.030000	.010000	77/09/20	77/12/14
00620 NO3-N	TOTAL	MG/L		K	4	.100000	-.248E-08	.000000	.100000	.100000	77/09/20	77/12/14
00625 TOT KJEL	N	MG/L			4	4.39500	.021988	.148283	4.60000	4.26000	77/09/20	77/12/14
00671 PHOS-DIS	ORTHO	MG/L P			2	.020000	.000162	.012728	.029000	.011000	77/11/15	77/12/14
31616 FEC COLI	MFM-FCBR	/100ML			2	3.00000	.000000	.000000	3.00000	3.00000	77/09/20	77/10/13
				K	2	6.50000	24.5000	4.94975	10.0000	3.00000	77/11/15	77/12/14
				TOT	4	4.75000	12.2500	3.50000	10.0000	3.00000	77/09/20	77/12/14
70505 T PO4	P-COL	MG/L			4	.100750	.001334	.036528	.141000	.060000	77/09/20	77/12/14
70507 PHOS-T	ORTHO	MG/L P			2	.062000	.003528	.059397	.104000	.020000	77/09/20	77/10/13

Table IV-18

STORET RETRIEVAL DATE 84/09/11 - INVENT - VERSION OF SEP. 1981

46P008
44 34 21.0 097 02 37.0 2
WEST ESTELLINE T113N R52W SECTION 23
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810530
0000 CLASS 00 CSN-RSP 0595685-0622498

/TYPA/AMBNT/LAKE

PARAMETER				RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010	WATER	TEMP	CENT		10	11.4960	103.564	10.1766	23.3000	.000000	78/01/11	78/08/12
00011	WATER	TEMP	FAHN		10	52.7000	336.013	18.3307	74.0000	32.0000	78/01/11	78/08/12
00020	AIR	TEMP	CENT		10	9.33900	288.724	16.9919	25.0000	-.232E+02	78/01/11	78/08/12
00021	AIR	TEMP	FAHN		10	49.4000	968.491	31.1206	77.0000	-.100E+02	78/01/11	78/08/12
00095	CNDUCTVY	AT 25C	MICROMHO		1	1720.00			1720.00	1720.00	78/01/11	78/01/11
00300	DO		MG/L		10	7.26999	18.4957	4.30066	12.7000	.500000	78/01/11	78/08/12
00310	BOD	5 DAY	MG/L		8	4.59750	23.8755	4.88626	14.0000	.090000	78/02/16	78/08/12
00335	COD	LOWLEVEL	MG/L		10	88.6000	1200.05	34.6417	150.000	31.0000	78/01/11	78/08/12
00400	PH		SU		2	7.69000	2.04019	1.42835	8.70000	6.68000	78/02/16	78/05/11
00403	LAB	PH	SU		10	8.31499	.149305	.386401	9.02000	7.81000	78/01/11	78/08/12
00415	PHEN-PH-	LFIN ALK	MG/L		10	226.600	5060.72	71.1387	323.000	90.0000	78/01/11	78/08/12
00500	RESIDUE	TOTAL	MG/L		10	966.300	145439	381.365	1478.00	228.000	78/01/11	78/08/12
00515	RESIDUE	DISS-105	C MG/L		10	902.200	129015	359.187	1396.00	225.000	78/01/11	78/08/12
00530	RESIDUE	TOT NFLT	MG/L		10	64.1000	1814.55	42.5975	120.000	1.00000	78/01/11	78/08/12
00608	NH3+NH4-	N DISS	MG/L		1	.420000			.420000	.420000	78/05/31	78/05/31
00610	NH3+NH4-	N TOTAL	MG/L		9	1.22555	.865702	.930431	2.40000	.040000	78/01/11	78/08/12
00613	NO2-N	DISS	MG/L		10	.040000	.001778	.042164	.130000	.010000	78/01/11	78/08/12
00620	NO3-N	TOTAL	MG/L		5	.459999	.133000	.364691	1.10000	.200000	78/03/16	78/08/12
				K	5	.100000	-.279E-08	.000000	.100000	.100000	78/01/11	78/06/28
				TOT	10	.280000	.095111	.308400	1.10000	.100000	78/01/11	78/08/12
00625	TOT KJEL	N	MG/L		10	3.57499	1.96181	1.40065	5.47000	1.56000	78/01/11	78/08/12
00671	PHOS-DIS	ORTHO	MG/L P		5	.048600	.001265	.035571	.099000	.007000	78/01/11	78/08/12
31616	FEC COLI	MFM-FCBR	/100ML		5	606.800	824062	907.779	2200.00	17.0000	78/04/13	78/08/12
				K	5	3.00000	.000000	.000000	3.00000	3.00000	78/01/11	78/05/17
				TOT	10	304.900	467520	683.755	2200.00	3.00000	73/01/11	78/08/12
70505	T PO4	P-COL	MG/L		10	.187500	.030859	.175666	.679000	.080000	78/01/11	78/08/12
70507	PHOS-T	ORTHO	MG/L P		5	.145200	.013936	.118050	.352000	.055000	78/02/16	78/06/28

Table IV-19

STORET RETRIEVAL DATE 84/09/11 - INVENT - VERSION OF SEP. 1981

46P009
44 32 22.0 097 04 07.0 2
POINSETT REC AREA T112N R52W SEC 4
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810530
0000 CLASS 00 CSN-RSP 0595686-0622499

/TYPA/AMBNT/LAKE

PARAMETER				RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010	WATER	TEMP	CENT		5	9.54600	110.935	10.5326	24.4000	.000000	77/08/03	77/12/14
00011	WATER	TEMP	FAHN		5	49.2000	360.701	18.9921	76.0000	32.0000	77/08/03	77/12/14
00020	AIR	TEMP	CENT		5	14.2280	125.772	11.2148	25.6000	2.22000	77/08/03	77/12/14
00021	AIR	TEMP	FAHN		5	57.6000	406.805	20.1694	78.0000	36.0000	77/08/03	77/12/14
00095	CNDUCTVY	AT 25C	MICROMHO		2	1420.00	7200.00	84.8528	1480.00	1360.00	77/10/13	77/11/15
00300	DO		MG/L		5	12.0400	1.60815	1.26813	13.2000	10.6000	77/08/03	77/12/14
00310	BOD	5 DAY	MG/L		5	5.13199	5.90694	2.43042	7.35000	1.11000	77/08/03	77/12/14
00335	COD	LOWLEVEL	MG/L		5	108.800	1042.71	32.2910	135.000	56.0000	77/08/03	77/12/14
00400	PH		SU		1	7.80000			7.80000	7.80000	77/11/15	77/11/15
00403	LAB	PH	SU		5	8.64999	.111755	.334298	9.01000	8.20000	77/08/03	77/12/14
00415	PHEN-PH-	LFIN ALK	MG/L		5	260.000	588.500	24.2590	302.000	243.000	77/08/03	77/12/14
00500	RESIDUE	TOTAL	MG/L		5	1131.80	34854.2	186.693	1265.00	803.000	77/08/03	77/12/14
00515	RESIDUE	DISS-105	C MG/L		5	1019.00	32556.0	180.433	1158.00	725.000	77/08/03	77/12/14
00530	RESIDUE	TOT NFLT	MG/L		5	112.800	10855.7	104.191	297.000	43.0000	77/08/03	77/12/14
00608	NH3+NH4-	N DISS	MG/L		1	.970000			.970000	.970000	77/11/15	77/11/15
00610	NH3+NH4-	N TOTAL	MG/L		3	.410000	.037300	.193132	.580000	.200000	77/09/20	77/12/14
				K	1	.020000			.020000	.020000	77/08/03	77/08/03
00613	NO2-N	DISS	MG/L	TOT	4	.312500	.062892	.250782	.580000	.020000	77/08/03	77/12/14
					4	.035000	.000300	.017321	.050000	.010000	77/09/20	77/12/14
				K	1	.010000			.010000	.010000	77/08/03	77/08/03
00620	NO3-N	TOTAL	MG/L	TOT	5	.030000	.000350	.018708	.050000	.010000	77/08/03	77/12/14
					3	.166667	.003333	.057735	.200000	.100000	77/08/03	77/12/14
				K	2	.100000	-.372E-08	.000000	.100000	.100000	77/09/20	77/10/13
00625	TOT KJEL	N	MG/L	TOT	5	.140000	.003000	.054772	.200000	.100000	77/08/03	77/12/14
00671	PHOS-DIS	ORTHO	MG/L P		5	3.80799	1.24791	1.11710	4.71000	1.90000	77/08/03	77/12/14
31616	FEC COLI	MFM-FCBR	/100ML		3	.028333	.000401	.020033	.049000	.009000	77/08/03	77/12/14
					3	193.333	106412	326.209	570.000	3.00000	77/08/03	77/12/14
				K	2	6.50000	24.5000	4.94975	10.0000	3.00000	77/09/20	77/11/15
				TOT	5	118.600	63684.3	252.358	570.000	3.00000	77/08/03	77/12/14
70505	T PO4	P-COL	MG/L		5	.101800	.001673	.040905	.153000	.051000	77/08/03	77/12/14
70507	PHOS-T	ORTHO	MG/L P		2	.031000	.000098	.009900	.038000	.024000	77/09/20	77/10/13

Table IV-20

STORET RETRIEVAL DATE 84/09/11 - INVENT - VERSION OF SEP. 1981

46P009
44 32 22.0 097 04 07.0 2
POINSETT REC AREA T112N R52W SEC 4
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810530
0000 CLASS 00 CSN-RSP 0595686-0622499

/TYPA/AMBNT/LAKE

PARAMETER				RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010	WATER	TEMP	CENT		10	11.7160	109.503	10.4644	23.9000	.000000	78/01/11	78/07/12
00011	WATER	TEMP	FAHN		10	53.1000	354.769	18.8353	75.0000	32.0000	78/01/11	78/07/12
00020	AIR	TEMP	CENT		10	9.89300	336.549	18.3453	25.6000	-.232E+02	78/01/11	78/07/12
00021	AIR	TEMP	FAHN		10	49.8000	1089.96	33.0145	78.0000	-.100E+02	78/01/11	78/07/12
00095	CNDUCTVY	AT 25C	MICROMHO		1	1650.00			1650.00	1650.00	78/01/11	78/01/11
00300	DO		MG/L		10	7.50000	17.0556	4.12984	11.3000	.400000	78/01/11	78/07/12
00310	BOD	5 DAY	MG/L		7	4.93143	17.3319	4.16316	13.0000	.690000	78/02/16	78/07/12
				K	1	.100000			.100000	.100000	78/04/13	78/04/13
				TOT	8	4.32750	17.7737	4.21589	13.0000	.100000	78/02/16	78/07/12
00335	COD	LOWLEVEL	MG/L		10	78.5000	496.944	22.2922	101.000	34.0000	78/01/11	78/07/12
00400	PH		SU		2	7.68500	2.06044	1.43542	8.70000	6.67000	78/02/16	78/05/11
00403	LAB	PH	SU		10	8.32499	.181478	.426002	9.02000	7.90000	78/01/11	78/07/12
00415	PHFN-PH-	LFIN ALK	MG/L		10	222.100	5224.11	72.2780	321.000	74.0000	78/01/11	78/07/12
00500	RESIDUE	TOTAL	MG/L		10	961.000	126818	356.114	1442.00	264.000	78/01/11	78/07/12
00515	RESIDUE	DISS-105	C MG/L		10	905.900	116060	340.675	1386.00	259.000	78/01/11	78/07/12
00530	RESIDUE	TOT NFLT	MG/L		10	55.1000	491.213	22.1633	81.0000	5.00000	78/01/11	78/07/12
00610	NH3+NH4-	N TOTAL	MG/L		8	1.13125	.561870	.749580	2.39000	.420000	78/01/11	78/07/12
				K	2	.020000	-.232E-09	.000000	.020000	.020000	78/05/11	78/05/17
				TOT	10	.909000	.656543	.810273	2.39000	.020000	78/01/11	78/07/12
00613	NO2-N	DISS	MG/L		10	.042000	.002129	.046140	.140000	.010000	78/01/11	78/07/12
00618	NO3-N	DISS	MG/L		1	.300000			.300000	.300000	78/05/17	78/05/17
00620	NO3-N	TOTAL	MG/L		4	.250000	.016667	.129099	.400000	.100000	78/01/11	78/06/28
				K	4	.100000	-.248E-08	.000000	.100000	.100000	78/02/16	78/06/14
				TOT	8	.175000	.013571	.116496	.400000	.100000	78/01/11	78/06/28
00625	TOT KJEL	N	MG/L		9	3.36666	1.47589	1.21486	5.19000	2.07000	78/01/11	78/06/28
00671	PHOS-DIS	ORTHO	MG/L P		1	.018000			.018000	.018000	78/05/11	78/05/11
31616	FEC COLI	MFM-FCBR	/100ML		4	113.250	19468.9	139.531	300.000	3.00000	78/01/11	78/06/28
				K	5	3.00000	.000000	.000000	3.00000	3.00000	78/02/16	78/05/17
				TOT	9	52.0000	10677.2	103.331	300.000	3.00000	78/01/11	78/06/28
70505	T PO4	P-COL	MG/L		9	.144555	.004298	.065558	.287000	.077000	78/01/11	78/06/28
70507	PHOS-T	ORTHO	MG/L P		8	.084250	.001761	.041962	.146000	.026000	78/01/11	78/06/28

Table IV-21

STORET RETRIEVAL DATE 84/09/11 - INVENT - VERSION OF SEP. 1981

46P010
44 33 18.0 097 07 12.0 2
SORENSON T113N R52W SECTION 20
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER 090700
/TYPA/AMBNT/LAKE
BIG SIOUX RIVER
21SDLAKE 810530
0000 CLASS 00 CSN-RSP 0595687-0622500

PARAMETER				RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010 WATER	TEMP	CENT			5	9.10600	95.5640	9.77568	22.2000	.000000	77/08/03	77/12/14
00011 WATER	TEMP	FAHN			5	48.4000	310.301	17.6154	72.0000	32.0000	77/08/03	77/12/14
00020 AIR	TEMP	CENT			5	14.1280	122.894	11.0857	25.6000	2.22000	77/08/03	77/12/14
00021 AIR	TEMP	FAHN			5	57.4000	396.805	19.9199	78.0000	36.0000	77/08/03	77/12/14
00095 CNDUCTVY	AT 25C	MICROMHO			2	1450.00	1800.00	42.4264	1480.00	1420.00	77/10/13	77/11/15
00300 DO		MG/L			5	12.1200	4.16705	2.04134	14.2000	9.60000	77/08/03	77/12/14
00310 BOD	5 DAY	MG/L			5	6.94199	25.8064	5.08000	15.4000	2.61000	77/08/03	77/12/14
00335 COD	LOWLEVEL	MG/L			5	105.800	780.209	27.9322	153.000	84.0000	77/08/03	77/12/14
00400 PH		SU			1	7.80000			7.80000	7.80000	77/11/15	77/11/15
00403 LAB	PH	SU			5	8.72999	.085876	.293047	9.05000	8.38000	77/08/03	77/12/14
00415 PHEN-PH-	LFIN ALK	MG/L			5	261.800	446.328	21.1265	297.000	242.000	77/08/03	77/12/14
00500 RESIDUE	TOTAL	MG/L			5	1221.40	8256.25	90.8639	1368.00	1146.00	77/08/03	77/12/14
00515 RESIDUE	DISS-105	C MG/L			5	1130.60	11319.7	106.394	1295.00	1004.00	77/08/03	77/12/14
00530 RESIDUE	TOT NFLT	MG/L			5	90.8000	1339.71	36.6020	142.000	43.0000	77/08/03	77/12/14
00608 NH3+NH4-	N DISS	MG/L			1	.910000			.910000	.910000	77/11/15	77/11/15
00610 NH3+NH4-	N TOTAL	MG/L			3	.743333	.536933	.732757	1.51000	.050000	77/09/20	77/12/14
				K	1	.020000			.020000	.020000	77/08/03	77/08/03
				TOT	4	.562500	.488758	.699112	1.51000	.020000	77/08/03	77/12/14
00613 NO2-N	DISS	MG/L			4	.015000	.000033	.005773	.020000	.010000	77/09/20	77/12/14
				K	1	.010000			.010000	.010000	77/08/03	77/08/03
				TOT	5	.014000	.000030	.005477	.020000	.010000	77/08/03	77/12/14
00620 NO3-N	TOTAL	MG/L		K	5	.100000	-.279E-08	.000000	.100000	.100000	77/08/03	77/12/14
00625 TOT KJEL	N	MG/L			5	4.01800	.289829	.538358	4.46000	3.08000	77/08/03	77/12/14
00671 PHOS-DIS	ORTHO	MG/L P			1	.040000			.040000	.040000	77/08/03	77/08/03
31616 FEC COLI	MFM-FCBR	/100ML			3	7.66667	16.3334	4.04146	10.0000	3.00000	77/08/03	77/11/15
				K	2	3.00000	.000000	.000000	3.00000	3.00000	77/10/13	77/12/14
				TOT	5	5.80000	14.7000	3.83406	10.0000	3.00000	77/08/03	77/12/14
70505 T PO4	P-COL	MG/L			5	.114800	.000751	.027408	.144000	.078000	77/08/03	77/12/14
70507 PHOS-T	ORTHO	MG/L P			4	.034000	.000702	.026495	.064000	.005000	77/09/20	77/12/14

Table IV-22

STORET RETRIEVAL DATE 84/09/11 - INVENT - VERSION OF SEP. 1981

46P010
44 33 18.0 097 07 12.0 2
SORENSON T113N R52W SECTION 20
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810530
0000 CLASS 00 CSN-RSP 0595687-0622500

/TYPA/AMBNT/LAKE

PARAMETER				RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010	WATER	TEMP	CENT		10	11.8300	94.2112	9.70625	23.3000	.000000	78/01/11	78/07/12
00011	WATER	TEMP	FAHN		10	53.3000	305.125	17.4678	74.0000	32.0000	78/01/11	78/07/12
00020	AIR	TEMP	CENT		10	10.4510	313.211	17.6978	26.7000	-.232E+02	78/01/11	78/07/12
00021	AIR	TEMP	FAHN		10	50.8000	1015.29	31.8636	80.0000	-.100E+02	78/01/11	78/07/12
00095	CNDUCTVY	AT 25C	MICROMHO		1	1800.00			1800.00	1800.00	78/01/11	78/01/11
00300	DO		MG/L		10	8.09000	19.3299	4.39658	15.2000	.600000	78/01/11	78/07/12
00310	BOD	5 DAY	MG/L		8	3.92125	18.3068	4.27864	13.0000	.700000	78/02/16	78/07/12
00335	COD	LOWLEVEL	MG/L		10	95.8000	2862.63	53.5036	236.000	53.0000	78/01/11	78/07/12
00400	PH		SU		2	7.70000	1.99998	1.41421	8.70000	6.70000	78/02/16	78/05/11
00403	LAB	PH	SU		10	8.30999	.130751	.361595	9.00000	7.98000	78/01/11	78/07/12
00415	PHEN-PH-	LFIN ALK	MG/L		10	244.900	3503.22	59.1880	339.000	200.000	78/01/11	78/07/12
00500	RESIDUE	TOTAL	MG/L		10	1067.70	99305.6	315.128	1541.00	797.000	78/01/11	78/07/12
00515	RESIDUE	DISS-105	C MG/L		10	1011.70	91009.4	301.678	1458.00	759.000	78/01/11	78/07/12
00530	RESIDUE	TOT NFLT	MG/L		10	56.0000	546.000	23.3666	86.0000	13.0000	78/01/11	78/07/12
00610	NH3+NH4-	N TOTAL	MG/L		10	1.07800	.502151	.708626	2.23000	.040000	78/01/11	78/07/12
00613	NO2-N	DISS	MG/L		10	.047000	.003334	.057745	.170000	.010000	78/01/11	78/07/12
00620	NO3-N	TOTAL	MG/L		6	.200000	.357E-07	.000189	.200000	.200000	78/01/11	78/07/12
				K	4	.100000	-.248E-08	.000000	.100000	.100000	78/05/17	78/06/28
				TOT	10	.160000	.002667	.051640	.200000	.100000	78/01/11	78/07/12
00625	TOT KJEL	N	MG/L		10	4.05700	.875770	.935826	5.43000	2.73000	78/01/11	78/07/12
00671	PHOS-DIS	ORTHO	MG/L P		3	.089000	.001575	.039686	.119000	.044000	78/02/16	78/07/12
31616	FEC COLI	MFM-FCBR	/100ML		4	383.250	375935	613.136	1300.00	20.0000	78/05/17	78/07/12
				K	6	3.00000	.000000	.000000	3.00000	3.00000	78/01/11	78/06/14
				TOT	10	155.100	163869	404.808	1300.00	3.00000	78/01/11	78/07/12
70505	T PO4	P-COL	MG/L		10	.132600	.000843	.029037	.172000	.084000	78/01/11	78/07/12
70507	PHOS-T	ORTHO	MG/L P		7	.078857	.001494	.038650	.139000	.027000	78/01/11	78/06/28

Table IV-23

STORET RETRIEVAL DATE 84/09/11 - INVENT - VERSION OF SEP. 1981

46PSST
44 50 23.0 097 03 05.0 2
COMPOSITE SAMPLE T113N-R52W-S28 CDCA
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER BASIN 090700
BIG SIOUX RIVER BASIN
21SDLAKE 840824
0000 CLASS 00 CSN-RSP 0741946-0744337

/TYPA/AMBNT/LAKE

PARAMETER				RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010	WATER	TEMP	CENT		2	.000000	.000000	.000000	.000000	.000000	82/01/05	82/12/15
00011	WATER	TEMP	FAHN		2	32.0000	.000000	.000000	32.0000	32.0000	82/01/05	82/12/15
00020	AIR	TEMP	CENT		2	-.750E+01	81.7920	9.04389	-.110E+01	-.138E+02	82/01/05	82/12/15
00021	AIR	TEMP	FAHN		2	18.5000	264.500	16.2635	30.0000	7.00000	82/01/05	82/12/15
00095	CNDUCTVY	AT 25C	MICROMHO		1	1569.00			1569.00	1569.00	82/01/05	82/01/05
00300	DO		MG/L		2	11.3500	.125000	.353553	11.6000	11.1000	82/01/05	82/12/15
00400	PH		SU		2	7.55000	1.12498	1.06065	8.30000	6.80000	82/01/05	82/12/15
00403	LAB	PH	SU		2	8.34000	.020096	.141760	8.44000	8.24000	82/01/05	82/12/15
00500	RESIDUE	TOTAL	MG/L		1	1013.00			1013.00	1013.00	82/12/15	82/12/15
00515	RESIDUE	DISS-105	C MG/L		1	1151.00			1151.00	1151.00	82/01/05	82/01/05
00530	RESIDUE	TOT NFLT	MG/L		1	1.00000			1.00000	1.00000	82/12/15	82/12/15
				K	1	1.00000			1.00000	1.00000	82/01/05	82/01/05
				TOT	2	1.00000	.000000	.000000	1.00000	1.00000	82/01/05	82/12/15
00610	NH3+NH4-	N TOTAL	MG/L		2	.530000	.009800	.098997	.600000	.460000	82/01/05	82/12/15
00613	NO2-N	DISS	MG/L	K	2	.010000	-.145E-10	.000000	.010000	.010000	82/01/05	82/12/15
00620	NO3-N	TOTAL	MG/L	K	2	.100000	-.372E-08	.000000	.100000	.100000	82/01/05	82/12/15
00625	TOT KJEL	N	MG/L		1	2.50000			2.50000	2.50000	82/12/15	82/12/15
00940	CHLORIDE	TOTAL	MG/L		1	45.4000			45.4000	45.4000	82/12/15	82/12/15
00945	SULFATE	SO4-TOT	MG/L		1	466.000			466.000	466.000	82/12/15	82/12/15
31616	FEC COLI	MFM-FCBR	/100ML	K	1	3.00000			3.00000	3.00000	82/12/15	82/12/15
70300	RESIDUE	DISS-180	C MG/L		1	1012.00			1012.00	1012.00	82/12/15	82/12/15
70505	T PO4	P-COL	MG/L		1	.078000			.078000	.078000	82/01/05	82/01/05
70506	SOL PO4-	T P-COL	MG/L		1	.047000			.047000	.047000	82/12/15	82/12/15
70507	PHOS-T	ORTHO	MG/L P		2	.029500	.000145	.012021	.038000	.021000	82/01/05	82/12/15

Table IV-24

STORET RETRIEVAL DATE 84/09/11 - INVENT - VERSION OF SEP. 1981

46PSST
44 50 23.0 097 03 05.0 2
COMPOSITE SAMPLE T113N-R52W-S28 CDCA
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER BASIN 090700
BIG SIOUX RIVER BASIN
21SDLAKE 840824
0000 CLASS 00 CSN-RSP 0741946-0744337

/TYPA/AMBNT/LAKE

PARAMETER				RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010	WATER	TEMP	CENT		10	10.5590	110.899	10.5308	26.7000	.000000	83/01/12	83/12/13
00011	WATER	TEMP	FAHN		10	51.0000	358.889	18.9443	80.0000	32.0000	83/01/12	83/12/13
00020	AIR	TEMP	CENT		11	8.88545	169.312	13.0120	28.9000	-.777E+01	83/01/12	83/12/13
00021	AIR	TEMP	FAHN		11	48.0000	548.800	23.4265	84.0000	18.0000	83/01/12	83/12/13
00095	CNDUCTVY	AT 25C	MICROMHO		10	1303.70	31091.6	176.328	1560.00	877.000	83/03/15	83/12/13
00300	DO		MG/L		12	10.4417	4.77541	2.18527	13.3000	6.00000	83/01/12	83/12/13
00400	PH		SU		10	8.48000	.064046	.253073	8.90000	8.20000	83/01/12	83/12/13
00403	LAB	PH	SU		12	8.39416	.185525	.430726	8.85000	7.29000	83/01/12	83/12/13
00410	T ALK	CACO3	MG/L		10	235.700	1149.80	33.9087	279.000	155.000	83/03/15	83/12/13
00415	PHEN-PH-	LFIN ALK	MG/L		8	14.2500	34.1800	5.84637	23.6000	8.80000	83/04/20	83/11/17
00500	RESIDUE	TOTAL	MG/L		12	997.166	26575.1	163.019	1189.00	537.000	83/01/12	83/12/13
00530	RESIDUE	TOT NFLT	MG/L		12	14.4167	190.992	13.8200	47.0000	1.00000	83/01/12	83/12/13
00610	NH3+NH4-	N TOTAL	MG/L		12	.321666	.058142	.241128	.710000	.020000	83/01/12	83/12/13
00613	NO2-N	DISS	MG/L		1	.010000			.010000	.010000	83/11/17	83/11/17
				K	11	.010000	.465E-10	.000007	.010000	.010000	83/01/12	83/12/13
				TOT	12	.010000	.634E-10	.000008	.010000	.010000	83/01/12	83/12/13
00620	NO3-N	TOTAL	MG/L		6	.166667	.002667	.051640	.200000	.100000	83/02/15	83/12/13
				K	6	.100000	-.223E-08	.000000	.100000	.100000	83/01/12	83/10/11
				TOT	12	.133333	.002424	.049237	.200000	.100000	83/01/12	83/12/13
00625	TOT KJEL	N	MG/L		12	2.22666	.439654	.663064	3.42000	1.26000	83/01/12	83/12/13
00940	CHLORIDE	TOTAL	MG/L		12	44.8166	52.2624	7.22928	59.0000	27.1000	83/01/12	83/12/13
00945	SULFATE	SO4-TOT	MG/L		12	417.416	7874.18	88.7366	500.000	204.000	83/01/12	83/12/13
31616	FEC COLI	MFM-FCBR	/100ML		5	328.000	430320	655.988	1500.00	10.0000	83/05/12	83/09/08
				K	7	8.00000	11.6667	3.41565	10.0000	3.00000	83/01/12	83/12/13
				TOT	12	141.333	183638	428.530	1500.00	3.00000	83/01/12	83/12/13
70300	RESIDUE	DISS-180	C MG/L		12	982.750	25892.5	160.911	1185.00	533.000	83/01/12	83/12/13
70505	T PO4	P-COL	MG/L		10	.158400	.005115	.071519	.312000	.068000	83/03/15	83/12/13
70506	SOL PO4-	T P-COL	MG/L		2	.057500	.000084	.009192	.064000	.051000	83/01/12	83/02/15
70507	PHOS-T	ORTHO	MG/L P		12	.034333	.000689	.026245	.090000	.006000	83/01/12	83/12/13

Table IV-25

STORET RETRIEVAL DATE 84/09/11 - STAND - VERSION OF APR. 1983 STN 1.SUMMARY.1

46P001
44 32 03.0 097 05 19.0 2
S TRIB CHURCH T112N R52W SEC 5
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810418
0000 FEET DEPTH CLASS 00 CSN-RSP 0589378-0554045

/TYPA/AMBNT/STREAM/RUNOFF

SUMMARY OF VIOLATIONS ON SAMPLES COLLECTED FROM 77/03/11 TO 78/04/06

	00300 DO MG/L	00403 LAB PH SU	31616 FEC COLI MFM-FCBR /100ML	70300 RESIDUE DISS-180 C MG/L	00530 RESIDUE TOT NFLT MG/L	00610 NH3+NH4- N TOTAL MG/L	00619 UN-IONZD NH3-NH3 MG/L	00620 NO3-N TOTAL MG/L	00011 WATER TEMP FAHN	00415 PHEN-PH- LFIN ALK MG/L
NO OF VALUES	8	11	7	0	11	4	4	11	11	11
MEAN	10.837	7.366	11861.0	0.	169.18	0.75	0.0078	0.97	45.64	76.7
MEDIAN	10.750	7.630	10.0	*********	36.00	0.78	0.0066	0.95	36.00	62.0
NO OF VIOLS	0	0	3	0	3	0	0	0	0	0
PERCENT VIOL	0.	0.	43.	0.	27.	0.	0.	0.	0.	0.
MINIMUM VIOL	0.0	0.0	16000.0	0.	309.00	0.0	0.0	0.0	0.0	0.0
MEAN VIOL	0.0	0.0	27666.7	0.	545.33	0.0	0.0	0.0	0.0	0.0
MAXIMUM VIOL	0.0	0.0	42000.0	0.	882.00	0.0	0.0	0.0	0.0	0.0
MIN CRITERIA	4.000	6.500	*********	*********	*********	*********	*********	*********	*********	*********
MAX CRITERIA	*********	8.300	200.0	2500.	90.00	*********	0.0400	50.00	90.00	750.0

Table IV-26

STORET RETRIEVAL DATE 84/09/11 - STAND - VERSION OF APR. 1983
VIOLATIONS ONLY

STN 1 PAGE 1.1

46P001
44 32 03.0 097 05 19.0 2
S TRIB CHURCH T112N R52W SEC 5
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810418
0000 FEET DEPTH CLASS 00 CSN-RSP 0589378-0554045

/TYPA/AMBNT/STREAM/RUNOFF

DATE	TIME	00300 DO MG/L	00403 LAB PH SU	31616 FEC COLI MFM-FCBR /100ML	70300 RESIDUE DISS-180 C MG/L	00530 RESIDUE TOT NFLT MG/L	00610 NH3+NH4- N TOTAL MG/L	00619 UN-IONZD NH3-NH3 MG/L	00620 NO3-N TOTAL MG/L	00011 WATER TEMP FAHN	00415 PHEN-PH- LFIN ALK MG/L
77/06/15	1300			42000.0*		882.00*					
77/06/16	1200			25000.0*		445.00*					
77/06/16	1540			16000.0*		309.00*					

Table IV-27

STORET RETRIEVAL DATE 84/09/11 - STAND - VERSION OF APR. 1983 STN 2.SUMMARY.1

46P002
44 33 47.0 097 07 41.0 2
INLET FROM ALBERT T113N R52153W SEC 30
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER 090700
BIG SIOUX RIVER
/TYPA/AMBNT/STREAM/RUNOFF
21SDLAKE 810418
0000 FEET DEPTH CLASS 00 CSN-RSP 0589379-0554046

SUMMARY-OF-VIOLATIONS-ON-SAMPLES-COLLECTED-FROM-77/03/12-TO-78/04/06

	00300 DO MG/L	00403 LAB PH SU	31616 FEC COLI MFM-FCBR /100ML	70300 RESIDUE DISS-180 C MG/L	00530 RESIDUE TOT NFLT MG/L	00610 NH3+NH4- N TOTAL MG/L	00619 UN-IONZD NH3-NH3 MG/L	00620 NO3-N TOTAL MG/L	00011 WATER TEMP FAHN	00415 PHEN-PH- LFIN ALK MG/L
NO OF VALUES	9	13	9	0	13	3	3	13	13	13
MEAN	8.678	7.093	1371.8	0.	16.85	0.263	0.0017	0.38	46.08	66.8
MEDIAN	9.500	7.000	170.0	*********	17.00	0.230	0.0018	0.30	38.00	55.0
NO OF VIOLS	1	1	4	0	0	0	0	0	0	0
PERCENT VIOL	11.	8.	44.	0.	0.	0.	0.	0.	0.	0.
MINIMUM VIOL	3.300	6.400	900.0	0.	0.0	0.0	0.0	0.0	0.0	0.0
MEAN VIOL	3.300	6.400	3025.0	0.	0.0	0.0	0.0	0.0	0.0	0.0
MAXIMUM VIOL	3.300	6.400	5000.0	0.	0.0	0.0	0.0	0.0	0.0	0.0
MIN CRITERIA	4.000	6.500	*********	*********	*********	*********	*********	*********	*********	*********
MAX CRITERIA	*********	8.300	200.0	2500.	90.00	*********	0.0400	50.00	90.00	750.0

Table IV-28

STORET RETRIEVAL DATE 84/09/11 - STAND - VERSION OF APR. 1983 STN 2 PAGE 1.1
VIOLATIONS ONLY

46P002
44 33 47.0 097 07 41.0 2
INLET FROM ALBERT T113N R52153W SEC 30
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810418
0000 FEET DEPTH CLASS 00 CSN-RSP 0589379-0554046

/TYPA/AMBNT/STREAM/RUNOFF

DATE	TIME	00300 DO MG/L	00403 LAB PH SU	31616 FEC COLI MFM-FCBR /100ML	70300 RESIDUE DISS-180 C MG/L	00530 RESIDUE TOT NFLT MG/L	00610 NH3+NH4- N TOTAL MG/L	00619 UN-IONZD NH3-NH3 MG/L	00620 NO3-N TOTAL MG/L	00011 WATER TEMP FAHN	00415 PHEN-PH- LFIN ALK MG/L
77/03/13	1330			3200.0*							
77/03/13	1500			900.0*							
77/03/15	1530		6.400*								
77/06/16	1425			3000.0*							
77/06/16	1600			5000.0*							
78/04/06	1130	3.300*									

Table IV-29

STORET RETRIEVAL DATE 84/09/11 - STAND - VERSION OF APR. 1983 STN 3.SUMMARY.1

46P003
44 34 44.0 097 05 39.0 2
NW INLET T113N R52W SEC 20
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810418
/TYPA/AMBNT/STREAM/RUNOFF 0000 FEET DEPTH CLASS 00 CSN-RSP 0589380-0554047

SUMMARY OF VIOLATIONS ON SAMPLES COLLECTED FROM 77/03/12 TO 78/04/25

	00300 DO MG/L	00403 LAB PH SU	31616 FEC COLI MFM-FCBR /100ML	70300 RESIDUE DISS-180 C MG/L	00530 RESIDUE TOT NFLT MG/L	00610 NH3+NH4- N TOTAL MG/L	00619 UN-IONZD NH3-NH3 MG/L	00620 NO3-N TOTAL MG/L	00011 WATER TEMP FAHN	00415 PHEN-PH- LFIN ALK MG/L
NO OF VALUES	13	20	16	0	20	4	4	17	20	21
MEAN	7.885	7.327	4223.5	0.	48.90	0.3275	0.0034	0.32	50.85	116.7
MEDIAN	7.300	7.405	285.0	*********	26.50	0.3100	0.0033	0.24	46.50	68.0
NO OF VIOLS	2	2	10	0	3	0	0	0	0	0
PERCENT VIOL	15.	10.	63.	0.	15.	0.	0.	0.	0.	0.
MINIMUM VIOL	2.400	6.480	260.0	0.	117.00	0.0	0.0	0.0	0.0	0.0
MEAN VIOL	2.500	7.505	6743.0	0.	182.67	0.0	0.0	0.0	0.0	0.0
MAXIMUM VIOL	2.600	8.530	41000.0	0.	293.00	0.0	0.0	0.0	0.0	0.0
MIN CRITERIA	4.000	6.500	*********	*********	*********	*********	*********	*********	*********	*********
MAX CRITERIA	*********	8.300	200.0	2500.	90.00	*********	0.0400	50.00	90.00	750.0

Table IV-30

STORET RETRIEVAL DATE 84/09/11 - STAND - VERSION OF APR. 1983 STN 3 PAGE 1.1
VIOLATIONS ONLY

46P003
44 34 44.0 097 05 39.0 2
NW INLET T113N R52W SEC 20
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810418
0000 FEET DEPTH CLASS 00 CSN-RSP 0589380-0554047

/TYPA/AMBNT/STREAM/RUNOFF

DATE	TIME	00300 DO MG/L	00403 LAB PH SU	31616 FEC COLI MFM-FCBR /100ML	70300 RESIDUE DISS-180 C MG/L	00530 RESIDUE TOT NFLT MG/L	00610 NH3+NH4- N TOTAL MG/L	00619 UN-IONZD NH3-NH3 MG/L	00620 NO3-N TOTAL MG/L	00011 WATER TEMP FAHN	00415 PHEN-PH- LFIN ALK MG/L
77/03/12	1430		6.480*								
77/03/13	1300			1500.0*							
77/03/13	1500			300.0*							
77/06/15	1520			41000.0*		293.00*					
77/06/16	1415			20000.0*		138.00*					
77/06/16	1615			1000.0*		117.00*					
77/06/22	1100			260.0*							
77/06/22	1545			370.0*							
77/06/23	1200			270.0*							
77/10/31	1000	2.600*		1800.0*							
77/10/31	1130	2.400*		930.0*							
78/04/25	1510		8.530*								

Table IV-31

STORET RETRIEVAL DATE 84/09/11 - STAND - VERSION OF APR. 1983 STN 4.SUMMARY.1

46P004
44 36 07.0 097 03 14.0 2
STONE BRIDGE T113N R52W SEC 10/15
46057 SOUTH DAKOTA HAMLIN
9MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810418
0000 FEET DEPTH CLASS 00 CSN-RSP 0589381-0554048

/TYPA/AMBNT/STREAM/RUNOFF

SUMMARY OF VIOLATIONS ON SAMPLES COLLECTED FROM 77/03/30 TO 83/06/15

	00300 DO MG/L	00403 LAB PH SU	31616 FEC COLI MFM-FCBR /100ML	70300 RESIDUE DISS-180 C MG/L	00530 RESIDUE TOT NFLT MG/L	00610 NH3+NH4- N TOTAL MG/L	00619 UN-IONZD NH3-NH3 MG/L	00620 NO3-N TOTAL MG/L	00011 WATER TEMP FAHN	00415 PHEN-PH- LFIN ALK MG/L
NO OF VALUES	13	29	29	6	32	14	11	25	29	27
MEAN	10.638	8.253	101.3	792.	90.84	0.982	0.0578	0.35	52.55	151.2
MEDIAN	10.500	8.180	10.0	731.	23.00	0.630	0.0110	0.40	46.00	145.0
NO OF VIOLS	0	10	4	0	8	0	2	0	0	0
PERCENT VIOL	0.	34.	14.	0.	25.	0.	18.	0.	0.	0.
MINIMUM VIOL	0.0	8.320	230.0	0.	91.00	0.0	0.2132	0.0	0.0	0.0
MEAN VIOL	0.0	8.939	600.0	0.	287.00	0.0	0.2699	0.0	0.0	0.0
MAXIMUM VIOL	0.0	9.840	1300.0	0.	547.00	0.0	0.3266	0.0	0.0	0.0
MIN CRITERIA	4.000	6.500	*********	*********	*********	*********	*********	*********	*********	*********
MAX CRITERIA	*********	8.300	200.0	2500.	90.00	*********	0.0400	50.00	90.00	750.0

Table IV-32

STORET RETRIEVAL DATE 84/09/11 - STAND - VERSION OF APR. 1983 STN 4 PAGE 1.1
VIOLATIONS ONLY

46P004
44 36 07.0 097 03 14.0 2
STONE BRIDGE T113N R52W SEC 10/15
46057 SOUTH DAKOTA HAMLIN
9MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810418
0000 FEET DEPTH CLASS 00 CSN-RSP 0589381-0554048

/TYPA/AMBNT/STREAM/RUNOFF

DATE	TIME	00300 DO MG/L	00403 LAB PH SU	31616 FEC COLI MFM-FCBR /100ML	70300 RESIDUE DISS-180 C MG/L	00530 RESIDUE TOT NFLT MG/L	00610 NH3+NH4- N TOTAL MG/L	00619 UN-IONZD NH3-NH3 MG/L	00620 NO3-N TOTAL MG/L	00011 WATER TEMP FAHN	00415 PHEN-PH- LFIN ALK MG/L
77/04/21	1030		9.380*			270.00*					
77/04/21	1500		9.510*			210.00*					
77/05/03	0900		9.120*								
77/05/03	1500		9.340*								
77/06/20	1300					348.00*					
77/06/22	1600			1300.0*							
77/07/06	1500		8.570*			91.00*					
77/07/06	1600		8.500*					0.3266*			
77/07/07	1000							0.2132*			
77/07/08	1100					547.00*					
77/07/11	1000		8.320*	350.0*		150.00*					
77/07/11	1100		8.400*	230.0*		452.00*					
78/04/25	1610		9.840*								
83/06/15	1550		8.410*	520.0*		228.00*					

Table IV-33

STORET RETRIEVAL DATE 84/09/11 - STAND - VERSION OF APR. 1983 STN 5.SUMMARY.1

46P005
44 36 06.0 097 00 47.0 2
OUTLET ROAD FAR T113N R52W SEC 12/13
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810418
0000 FEET DEPTH CLASS 00 CSN-RSP 0589382-0554049

/TYPA/AMBNT/STREAM/RUNOFF

SUMMARY OF VIOLATIONS ON SAMPLES COLLECTED FROM 77/03/10 TO 78/03/28

	00300 DO MG/L	00403 LAB PH SU	31616 FEC COLI MFM-FCBR /100ML	70300 RESIDUE DISS-180 C MG/L	00530 RESIDUE TOT NFLT MG/L	00610 NH3+NH4- N TOTAL MG/L	00619 UN-IONZD NH3-NH3 MG/L	00620 NO3-N TOTAL MG/L	00011 WATER TEMP FAHN	00415 PHEN-PH- LFIN ALK MG/L
NO OF VALUES	3	4	4	0	4	0	0	4	4	4
MEAN	11.467	7.377	1556.7	0.	190.50	0.0	0.0	0.39	42.75	62.5
MEDIAN	12.000	7.295	105.0	*********	161.50	*********	*********	0.32	34.00	54.0
NO OF VIOLS	0	0	1	0	2	0	0	0	0	0
PERCENT VIOL	0.	0.	25.	0.	50.	0.	0.	0.	0.	0.
MINIMUM VIOL	0.0	0.0	6000.0	0.	271.00	0.0	0.0	0.0	0.0	0.0
MEAN VIOL	0.0	0.0	6000.0	0.	337.00	0.0	0.0	0.0	0.0	0.0
MAXIMUM VIOL	0.0	0.0	6000.0	0.	403.00	0.0	0.0	0.0	0.0	0.0
MIN CRITERIA	4.000	6.500	*********	*********	*********	*********	*********	*********	*********	*********
MAX CRITERIA	*********	8.300	200.0	2500.	90.00	*********	0.0400	50.00	90.00	750.0

Table IV-34

STORET RETRIEVAL DATE 84/09/11 - STAND - VERSION OF APR. 1983 STN 5 PAGE 1.1
VIOLATIONS ONLY

46P005
44 36 06.0 097 00 47.0 2
OUTLET ROAD FAR T113N R52W SEC 12/13
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810418
0000 FEET DEPTH CLASS 00 CSN-RSP 0589382-0554049

/TYPA/AMBNT/STREAM/RUNOFF

DATE	TIME	00300 DO MG/L	00403 LAB PH SU	31616 FEC COLI MFM-FCBR /100ML	70300 RESIDUE DISS-180 C MG/L	00530 RESIDUE TOT NFLT MG/L	00610 NH3+NH4- N TOTAL MG/L	00619 UN-IONZD NH3-NH3 MG/L	00620 NO3-N TOTAL MG/L	00011 WATER TEMP FAHN	00415 PHEN-PH- LFIN ALK MG/L
77/03/10	1130					271.00*					
77/03/10	1400					403.00*					
77/06/20	1315			6000.0*							

Table IV-35

STORET RETRIEVAL DATE 84/09/11 - STAND - VERSION OF APR. 1983 STN 6.SUMMARY.1

46P006
44 35 45.0 097 01 38.0 2
OUTLET ROAD CLOSE T113N R52W SEC 13
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810418
0000 FEET DEPTH CLASS 00 CSN-RSP 0589383-0554050

/TYPA/AMBNT/STREAM/RUNOFF

SUMMARY OF VIOLATIONS ON SAMPLES COLLECTED FROM 77/03/11 TO 83/05/12

	00300 DO MG/L	00403 LAB PH SU	31616 FEC COLI MFM-FCBR /100ML	70300 RESIDUE DISS-180 C MG/L	00530 RESIDUE TOT NFLT MG/L	00610 NH3+NH4- N TOTAL MG/L	00619 UN-IONZD NH3-NH3 MG/L	00620 NO3-N TOTAL MG/L	00011 WATER TEMP FAHN	00415 PHEN-PH- LFIN ALK MG/L
NO OF VALUES	9	9	8	3	12	3	0	11	12	9
MEAN	10.167	6.910	2612.1	657.	80.75	0.05	0.0	0.20	39.83	66.3
MEDIAN	11.000	6.800	33.5	623.	75.00	0.06	*********	0.10	32.50	53.0
NO OF VIOLS	0	0	3	0	4	0	0	0	0	0
PERCENT VIOL	0.	0.	38.	0.	33.	0.	0.	0.	0.	0.
MINIMUM VIOL	0.0	0.0	700.0	0.	109.00	0.0	0.0	0.0	0.0	0.0
MEAN VIOL	0.0	0.0	6933.3	0.	155.50	0.0	0.0	0.0	0.C	0.0
MAXIMUM VIOL	0.0	0.0	19000.0	0.	242.00	0.0	0.0	0.0	0.0	0.0
MIN CRITERIA	4.000	6.500	*********	*********	*********	*********	*********	*********	*********	*********
MAX CRITERIA	*********	8.300	200.0	2500.	90.00	*********	0.0400	50.00	90.00	750.0

Table IV-36

STORET RETRIEVAL DATE 84/09/11 - STAND - VERSION OF APR. 1983 STN 6 PAGE 1.1
VIOLATIONS ONLY

46P006
44 35 45.0 097 01 38.0 2
OUTLET ROAD CLOSE T113N R52W SEC 13
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER 090700
BIG SIOUX RIVER
/TYPA/AMBNT/STREAM/RUNOFF
21SDLAKE 810418
0000 FEET DEPTH CLASS 00 CSN-RSP 0589383-0554050

DATE	TIME	00300 DO MG/L	00403 LAB PH SU	31616 FEC COLI MFM-FCBR /100ML	70300 RESIDUE DISS-180 C MG/L	00530 RESIDUE TOT NFLT MG/L	00610 NH3+NH4- N TOTAL MG/L	00619 UN-IONZD NH3-NH3 MG/L	00620 NO3-N TOTAL MG/L	00011 WATER TEMP FAHN	00415 PHEN-PH- LFIN ALK MG/L
77/03/11	1200					109.00*					
77/03/12	1200					137.00*					
77/03/12	1420					134.00*					
77/03/13	1200			1100.0*							
77/03/13	1400			700.0*							
77/06/15	1438			19000.0*		242.00*					

Table IV-37

STORET RETRIEVAL DATE 84/09/11 - STAND - VERSION OF APR. 1983 STN 7.SUMMARY.1

46P007
44 35 33.0 097 04 21.0 2
SAARANERS BEACH T113N R52W SEC 16
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810530
0000 FEET DEPTH CLASS 00 CSN-RSP 0595684-0622497

/TYPA/AMBNT/LAKE

SUMMARY OF VIOLATIONS ON SAMPLES COLLECTED FROM 77/08/03 TO 78/07/12

	00300 DO MG/L	00403 LAB PH SU	31616 FEC COLI MFM-FCBR /100ML	70300 RESIDUE DISS-180 C MG/L	00530 RESIDUE TOT NFLT MG/L	00610 NH3+NH4- N TOTAL MG/L	00619 UN-IONZD NH3-NH3 MG/L	00620 NO3-N TOTAL MG/L	00011 WATER TEMP FAHN	00415 PHEN-PH- LFIN ALK MG/L
NO OF VALUES	13	13	13	0	13	11	11	12	13	13
MEAN	10.023	8.552	28.6	0.	70.62	0.669	0.0439	0.19	55.15	245.9
MEDIAN	10.600	8.500	3.0	*********	58.00	0.700	0.0282	0.10	58.00	238.0
NO OF VIOLS	1	9	0	0	3	0	5	0	0	0
PERCENT VIOL	8.	69.	0.	0.	23.	0.	45.	0.	0.	0.
MINIMUM VIOL	0.700	8.310	0.0	0.	98.00	0.0	0.0592	0.0	0.0	0.0
MEAN VIOL	0.700	8.738	0.0	0.	135.00	0.0	0.0818	0.0	0.0	0.0
MAXIMUM VIOL	0.700	9.020	0.0	0.	156.00	0.0	0.1211	0.0	0.0	0.0
MIN CRITERIA	4.000	6.500	*********	*********	*********	*********	*********	*********	*********	*********
MAX CRITERIA	*********	8.300	200.0	2500.	90.00	*********	0.0400	50.00	90.00	750.0

Table IV-38

STORET RETRIEVAL DATE 84/09/11 - STAND - VERSION OF APR. 1983 STN 7 PAGE 1.1
VIOLATIONS ONLY

46P007
44 35 33.0 097 04 21.0 2
SAARANERS BEACH T113N R52W SEC 16
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER 090700
BIG SIOUX RIVER
/TYPA/AMBNT/LAKE 21SDLAKE 810530
0000 FEET DEPTH CLASS 00 CSN-RSP 0595684-0622497

DATE	TIME	00300 DO MG/L	00403 LAB PH SU	31616 FEC COLI MFM-FCBR /100ML	70300 RESIDUE DISS-180 C MG/L	00530 RESIDUE TOT NFLT MG/L	00610 NH3+NH4- N TOTAL MG/L	00619 UN-IONZD NH3-NH3 MG/L	00620 NO3-N TOTAL MG/L	00011 WATER TEMP FAHN	00415 PHEN-PH- LFIN ALK MG/L
77/08/03	1500		9.000*								
77/09/20	1620		9.020*			151.00*					
77/10/13	1345		8.700*			98.00*		0.0592*			
77/12/14	1030		8.400*								
78/02/16	1115	0.700*									
78/05/11	1400		9.000*								
78/05/17	1055		9.010*								
78/05/31	1200		8.700*					0.0817*			
78/06/14	1050		8.310*			156.00*		0.0699*			
78/06/28	1120							0.0770*			
78/07/12	1100		8.500*					0.1211*			

Table IV-39

STORET RETRIEVAL DATE 84/09/11 - STAND - VERSION OF APR. 1983 STN 8.SUMMARY.1

46P008
44 34 21.0 097 02 37.0 2
WEST ESTELLINE T113N R52W SECTION 23
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER . 090700
BIG SIOUX RIVER
21SDLAKE 810530
0000 FEET DEPTH CLASS 00 CSN-RSP 0595685-0622498

/TYPA/AMBNT/LAKE

SUMMARY OF VIOLATIONS ON SAMPLES COLLECTED FROM 77/09/20 TO 78/08/12

	00300 DO MG/L	00403 LAB PH SU	31616 FEC COLI MFM-FCBR /100ML	70300 RESIDUE DISS-180 C MG/L	00530 RESIDUE TOT NFLT MG/L	00610 NH3+NH4- N TOTAL MG/L	00619 UN-IONZD NH3-NH3 MG/L	00620 NO3-N TOTAL MG/L	00011 WATER TEMP FAHN	00415 PHEN-PH- LFIN ALK MG/L
NO OF VALUES	14	14	14	0	14	11	11	14	14	14
MEAN	8.664	8.414	219.1	0.	75.93	1.065	0.0467	0.23	49.93	238.5
MEDIAN	9.450	8.360	3.0	*********	81.00	0.830	0.0198	0.10	52.00	229.0
NO OF VIOLS	3	8	3	0	5	0	4	0	0	0
PERCENT VIOL	21.	57.	21.	0.	36.	0.	36.	0.	0.	0.
MINIMUM VIOL	0.500	8.310	300.0	0.	91.00	0.0	0.0557	0.0	0.0	0.0
MEAN VIOL	1.600	8.676	983.3	0.	124.20	0.0	0.1030	0.0	0.0	0.0
MAXIMUM VIOL	3.400	9.080	2200.0	0.	196.00	0.0	0.1724	0.0	0.0	0.0
MIN CRITERIA	4.000	6.500	*********	*********	*********	*********	*********	*********	*********	*********
MAX CRITERIA	*********	8.300	200.0	2500.	90.00	*********	0.0400	50.00	90.00	750.0

Table IV-40

STORET RETRIEVAL DATE 84/09/11 - STAND - VERSION OF APR. 1983

VIOLATIONS ONLY

STN 8 PAGE 1.1

46P008
44 34 21.0 097 02 37.0 2
WEST ESTELLINE T113N R52W SECTION 23
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810530
0000 FEET DEPTH CLASS 00 CSN-RSP 0595685-0622498

/TYPA/AMBNT/LAKE

DATE	TIME	00300 DO MG/L	00403 LAB PH SU	31616 FEC COLI MFM-FCBR /100ML	70300 RESIDUE DISS-180 C MG/L	00530 RESIDUE TOT NFLT MG/L	00610 NH3+NH4- N TOTAL MG/L	00619 UN-IONZD NH3-NH3 MG/L	00620 NO3-N TOTAL MG/L	00011 WATER TEMP FAHN	00415 PHEN-PH- LFIN ALK MG/L
77/09/20	1530		9.080*								
77/10/13	1300		8.680*					0.0557*			
77/11/15	1515		8.470*			196.00*					
77/12/14	1100		8.410*			101.00*					
78/01/11	1010	3.400*				91.00*					
78/02/16	1000	0.900*									
78/03/16	1100	0.500*									
78/05/11	1520		8.820*								
78/05/17	1145		9.020*								
78/05/31	1115		8.620*	450.0*		113.00*					
78/06/16	1000			2200.0*		120.00*		0.1724*			
78/06/28	1030			300.0*				0.0897*			
78/08/12	1030		8.310*					0.0942*			

Table IV-41

STORET RETRIEVAL DATE 84/09/11 - STAND - VERSION OF APR. 1983 STN 9.SUMMARY.1

46P009
44 32 22.0 097 04 07.0 2
POINSETT REC AREA T112N R52W SEC 4
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810530
0000 FEET DEPTH CLASS 00 CSN-RSP 0595686-0622499

/TYPA/AMBNT/LAKE

SUMMARY OF VIOLATIONS ON SAMPLES COLLECTED FROM 77/08/03 TO 78/07/12

	00300 DO MG/L	00403 LAB PH SU	31616 FEC COLI MFM-FCBR /100ML	70300 RESIDUE DISS-180 C MG/L	00530 RESIDUE TOT NFLT MG/L	00610 NH3+NH4- N TOTAL MG/L	00619 UN-IONZD NH3-NH3 MG/L	00620 NO3-N TOTAL MG/L	00011 WATER TEMP FAHN	00415 PHEN-PH- LFIN ALK MG/L
NO OF VALUES	15	15	14	0	15	14	14	13	15	15
MEAN	9.013	8.433	75.8	0.	74.33	0.739	0.0321	0.16	51.80	234.7
MEDIAN	10.200	8.400	3.0	*********	66.00	0.580	0.0253	0.10	58.00	243.0
NO OF VIOLS	2	8	2	0	1	0	5	0	0	0
PERCENT VIOL	13.	53.	14.	0.	7.	0.	36.	0.	0.	0.
MINIMUM VIOL	0.400	8.400	300.0	0.	297.00	0.0	0.0464	0.0	0.0	0.0
MEAN VIOL	0.600	8.760	435.0	0.	297.00	0.0	0.0631	0.0	0.0	0.0
MAXIMUM VIOL	0.800	9.020	570.0	0.	297.00	0.0	0.0821	0.0	0.0	0.0
MIN CRITERIA	4.000	6.500	*********	*********	*********	*********	*********	*********	*********	*********
MAX CRITERIA	*********	8.300	200.0	2500.	90.00	*********	0.0400	50.00	90.00	750.0

Table IV-42

STORET RETRIEVAL DATE 84/09/11 - STAND - VERSION OF APR. 1983 STN 9 PAGE 1.1
VIOLATIONS ONLY

46P009
44 32 22.0 097 04 07.0 2
POINSETT REC AREA T112N R52W SEC 4
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
/TYPA/AMBNT/LAKE 21SDLAKE 810530
0000 FEET DEPTH CLASS 00 CSN-RSP 0595686-0622499

DATE	TIME	00300 DO MG/L	00403 LAB PH SU	31616 FEC COLI MFM-FCBR /100ML	70300 RESIDUE DISS-180 C MG/L	00530 RESIDUE TOT NFLT MG/L	00610 NH3+NH4- N TOTAL MG/L	00619 UN-IONZD NH3-NH3 MG/L	00620 NO3-N TOTAL MG/L	00011 WATER TEMP FAHN	00415 PHEN-PH- LFIN ALK MG/L
77/08/03	1445		9.010*								
77/09/20	1645		8.900*					0.0464*			
77/10/13	1415		8.710*	570.0*				0.0481*			
77/11/15	1445		8.430*			297.00*					
78/02/16	0940	0.800*									
78/03/16	1030	0.400*									
78/05/11	1430		9.020*								
78/05/17	1030		9.000*								
78/05/31	1230		8.610*					0.0685*			
78/06/14	1130							0.0703*			
78/06/28	1155			300.0*							
78/07/12	1145		8.400*					0.0821*			

Table IV-43

STORET RETRIEVAL DATE 84/09/11 - STAND - VERSION OF APR. 1983 STN 10.SUMMARY.1

46P010
44 33 18.0 097 07 12.0 2
SORENSON T113N R52W SECTION 20
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810530
0000 FEET DEPTH CLASS 00 CSN-RSP 0595687-0622500

/TYPA/AMBNT/LAKE

SUMMARY OF VIOLATIONS ON SAMPLES COLLECTED FROM 77/08/03 TO 78/07/12

	00300 DO MG/L	00403 LAB PH SU	31616 FEC COLI MFM-FCBR /100ML	70300 RESIDUE DISS-180 C MG/L	00530 RESIDUE TOT NFLT MG/L	00610 NH3+NH4- N TOTAL MG/L	00619 UN-IONZD NH3-NH3 MG/L	00620 NO3-N TOTAL MG/L	00011 WATER TEMP FAHN	00415 PHEN-PH- LFIN ALK MG/L
NO OF VALUES	15	15	15	0	15	14	14	15	15	15
MEAN	9.433	8.450	105.3	0.	67.60	0.931	0.0402	0.14	51.67	250.5
MEDIAN	10.000	8.380	3.0	*********	69.00	0.875	0.0320	0.10	56.00	244.0
NO OF VIOLS	2	9	1	0	3	0	6	0	0	0
PERCENT VIOL	13.	60.	7.	0.	20.	0.	43.	0.	0.	0.
MINIMUM VIOL	0.600	8.340	1300.0	0.	94.00	0.0	0.0538	0.0	0.0	0.0
MEAN VIOL	0.800	8.708	1300.0	0.	112.67	0.0	0.0677	0.0	0.0	0.0
MAXIMUM VIOL	1.000	9.050	1300.0	0.	142.00	0.0	0.1026	0.0	0.0	0.0
MIN CRITERIA	4.000	6.500	*********	*********	*********	*********	*********	*********	*********	*********
MAX CRITERIA	*********	8.300	200.0	2500.	90.00	*********	0.0400	50.00	90.00	750.0

Table IV-44

STORET RETRIEVAL DATE 84/09/11 - STAND - VERSION OF APR. 1983 STN 10 PAGE 1.1
VIOLATIONS ONLY

46P010
44 33 18.0 097 07 12.0 2
SORENSON T113N R52W SECTION 20
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810530
0000 FEET DEPTH CLASS 00 CSN-RSP 0595687-0622500

/TYPA/AMBNT/LAKE

DATE	TIME	00300 DO MG/L	00403 LAB PH SU	31616 FEC COLI MFM-FCBR /100ML	70300 RESIDUE DISS-180 C MG/L	00530 RESIDUE TOT NFLT MG/L	00610 NH3+NH4- N TOTAL MG/L	00619 UN-IONZD NH3-NH3 MG/L	00620 NO3-N TOTAL MG/L	00011 WATER TEMP FAHN	00415 PHEN-PH- LFIN ALK MG/L
77/08/03	1430		9.050*			94.00*					
77/09/20	1600		9.000*			102.00*					
77/10/13	1320		8.700*					0.0543*			
77/11/15	1600		8.520*			142.00*					
77/12/14	1330		8.380*								
78/02/16	1050	1.000*									
78/03/16	1130	0.600*									
78/05/11	1500		9.000*								
78/05/17	1120		8.780*					0.0729*			
78/05/31	1135		8.600*					0.0580*			
78/06/14	1025							0.0643*			
78/06/28	1100			1300.0*				0.0538*			
78/07/12	1200		8.340*					0.1026*			

Table IV-45

STORET RETRIEVAL DATE 84/09/11 - STAND - VERSION OF APR. 1983 STN 12.SUMMARY.1

46PSST
44 50 23.0 097 03 05.0 2
COMPOSITE SAMPLE T113N-R52W-S28 CDCA
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER BASIN 090700
BIG SIOUX RIVER BASIN
/TYPA/AMBNT/LAKE 21SDLAKE 840824
0000 FEET DEPTH CLASS 00 CSN-RSP 0741946-0744337

SUMMARY OF VIOLATIONS ON SAMPLES COLLECTED FROM 82/01/05 TO 83/12/13

	00300 DO MG/L	00403 LAB PH SU	31616 FEC COLI MFM-FCBR /100ML	70300 RESIDUE DISS-180 C MG/L	00530 RESIDUE TOT NFLT MG/L	00610 NH3+NH4- N TOTAL MG/L	00619 UN-IONZD NH3-NH3 MG/L	00620 NO3-N TOTAL MG/L	00011 WATER TEMP FAHN	00415 PHEN-PH- LFIN ALK MG/L
NO OF VALUES	14	14	13	13	14	14	12	14	12	10
MEAN	10.571	8.386	130.7	985.	12.50	0.351	0.0156	0.13	47.83	54.8
MEDIAN	11.250	8.470	10.0	1014.	6.00	0.350	0.0111	0.10	40.00	15.9
NO OF VIOLS	0	9	1	0	0	0	1	0	0	0
PERCENT VIOL	0.	64.	8.	0.	0.	0.	8.	0.	0.	0.
MINIMUM VIOL	0.0	8.370	1500.0	0.	0.0	0.0	0.0560	0.0	0.0	0.0
MEAN VIOL	0.0	8.604	1500.0	0.	0.0	0.0	0.0560	0.0	0.0	0.0
MAXIMUM VIOL	0.0	8.850	1500.0	0.	0.0	0.0	0.0560	0.0	0.0	0.0
MIN CRITERIA	4.000	6.500	*********	*********	*********	*********	*********	*********	*********	*********
MAX CRITERIA	*********	8.300	200.0	2500.	90.00	*********	0.0400	50.00	90.00	750.0

Table IV-46

STORET RETRIEVAL DATE 84/09/11 - STAND - VERSION OF APR. 1983 STN 12 PAGE 1.1
VIOLATIONS ONLY

46PSST
44 50 23.0 097 03 05.0 2
COMPOSITE SAMPLE T113N-R52W-S28 CDCA
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER BASIN 090700
BIG SIOUX RIVER BASIN
/TYFA/AMBNT/LAKE 21SDLAKE 840824
0000 FEET DEPTH CLASS 00 CSN-RSP 0741946-0744337

DATE	TIME	00300 DO MG/L	00403 LAB PH SU	31616 FEC COLI MFM-FCBR /100ML	70300 RESIDUE DISS-180 C MG/L	00530 RESIDUE TOT NFLT MG/L	00610 NH3+NH4- N TOTAL MG/L	00619 UN-IONZD NH3-NH3 MG/L	00620 NO3-N TOTAL MG/L	00011 WATER TEMP FAHN	00415 PHEN-PH- LFIN ALK MG/L
82/12/15	1445		8.440*								
83/04/20	1040		8.500*								
83/05/12	1600		8.560*								
83/06/15	1515		8.370*								
83/07/13	1200		8.600*					0.0560*			
83/08/10	1500		8.750*	1500.0*							
83/09/08	1545		8.810*								
83/10/11	1245		8.850*								
83/11/17	1400		8.560*								

Table IV-47

Site (Year)	PO07 (1977)	PO07 (1978)	PO08 (1977)	PO08 (1978)	PO09 (1977)	PO09 (1978)
Mean	40.48	30.42	51.74	27.25	42.36	27.60
Standard Deviations	9.11	15.33	21.19	12.83	14.73	12.38
# of Observations	4	9	4	10	5	10
95% Confidence Interval	25.99-54.97	18.48-42.36	18.03-84.45	18.07-36.43	24.07-60.65	18.74-36.46

Site (Year)	PO10 (1977)	PO10 (1978)	PSST (1983)	PSST (1984)
Mean	37.95	33.70	17.25	17.53
Standard Deviations	10.74	10.66	8.74	7.98
# of Observation	5	10	10	8
95% Confidence Interval	24.62-51.28	26.07-41.33	11.00-23.5	10.86-24.20

Tables IV-48. Annual total nitrogen: total phosphorus ratios in Lake Poinsett.

Site (Year)	PO07 (1977)	PO07 (1978)	PO08 (1977)	PO08 (1978)	PO09 (1977)	PO09 (1978)
Mean	73.62	74.20	69.46	76.67	69.81	74.80
Standard Deviation	4.16	7.88	5.95	8.34	6.30	5.76
# of Observations	4	9	4	10	5	10
95% Confidence Interval	67.0-80.2	68.1-80.3	60.0-78.9	70.7-82.64	62.0-77.6	70.7-78.9

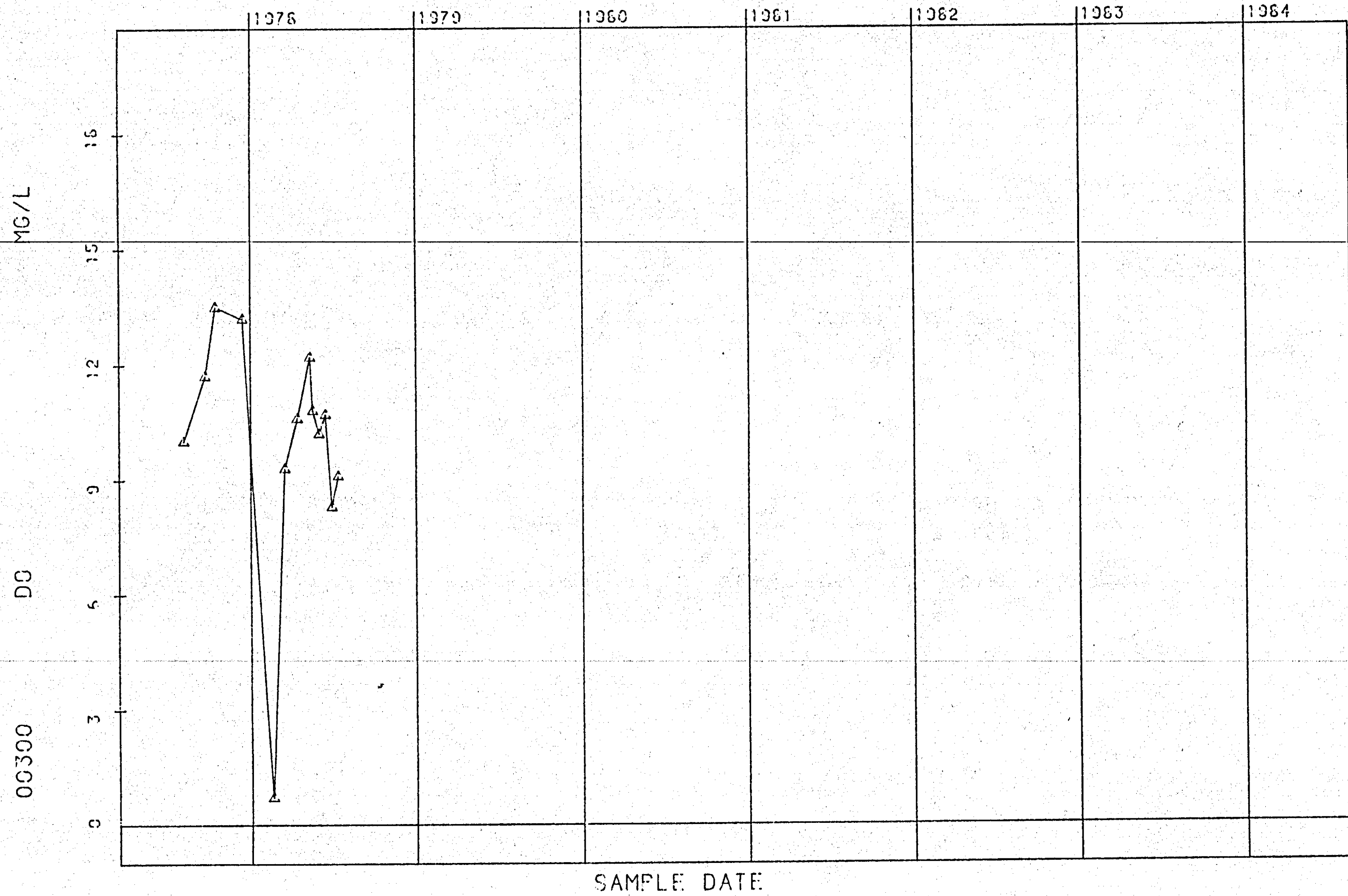
Site (Year)	PO10 (1977)	PO10 (1978)	PSST (1982)	PSST (1983)
Mean	72.12	74.27	63.35	75.96
Standard Deviation	3.50	3.32	5.16	6.39
# of Observation	5	10	2	10
Confidence Interval	67.8-76.5	71.9-76.6	16.99-109.71	71.4-80.5

Table IV-49. Trophic State Indices calculated from total phosphorus concentrations.

do3101fp.wq

Figure IV-1

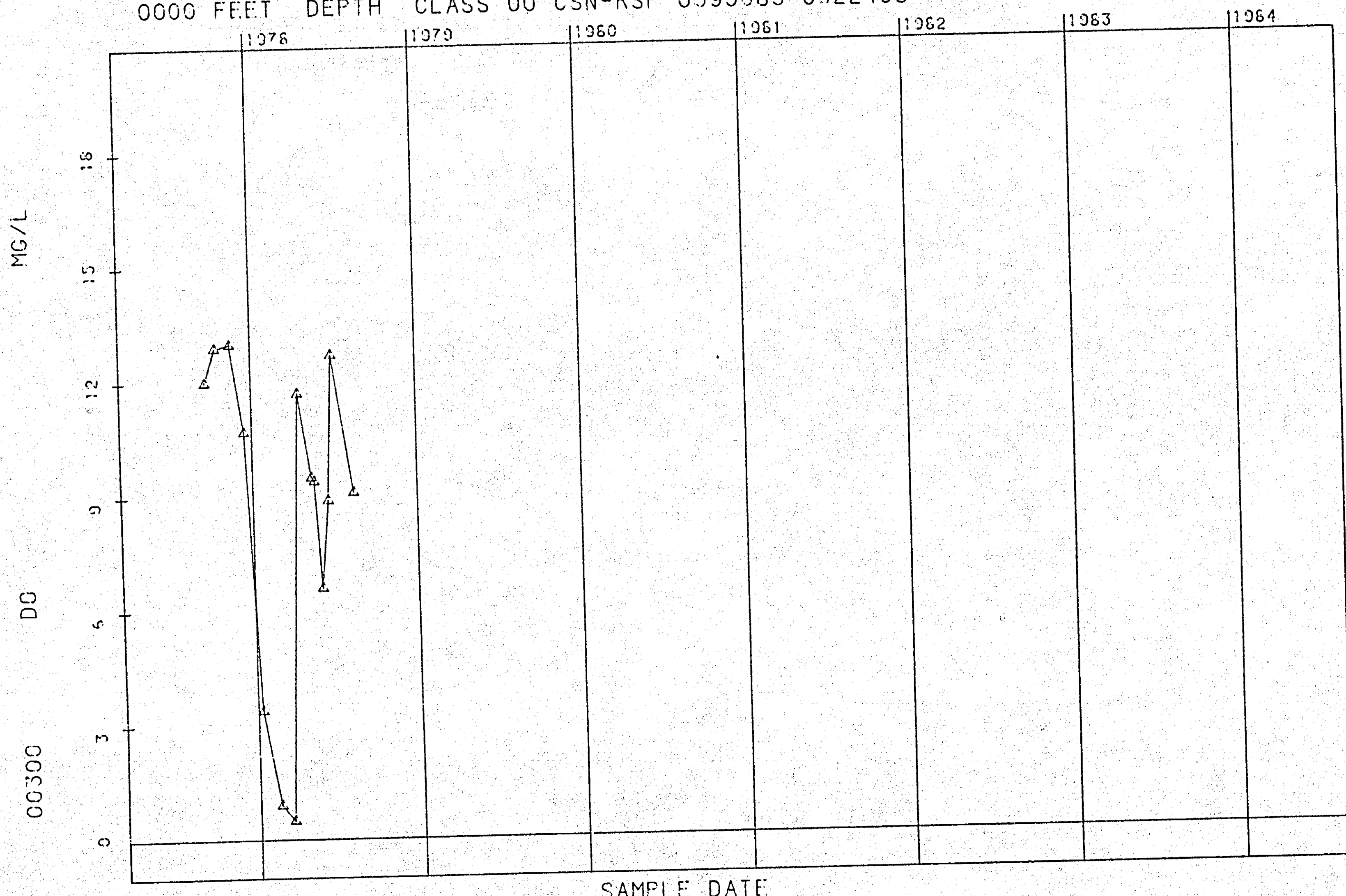
46P007
44 35 33.0 097 04 21.0 2
SAARANERS BEACH T113N R52W SEC 16
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810530
0000 FEET DEPTH CLASS 00 CSN-RSP 0595684-0622497



STARTING DATE 77/3 /10

Figure IV-2

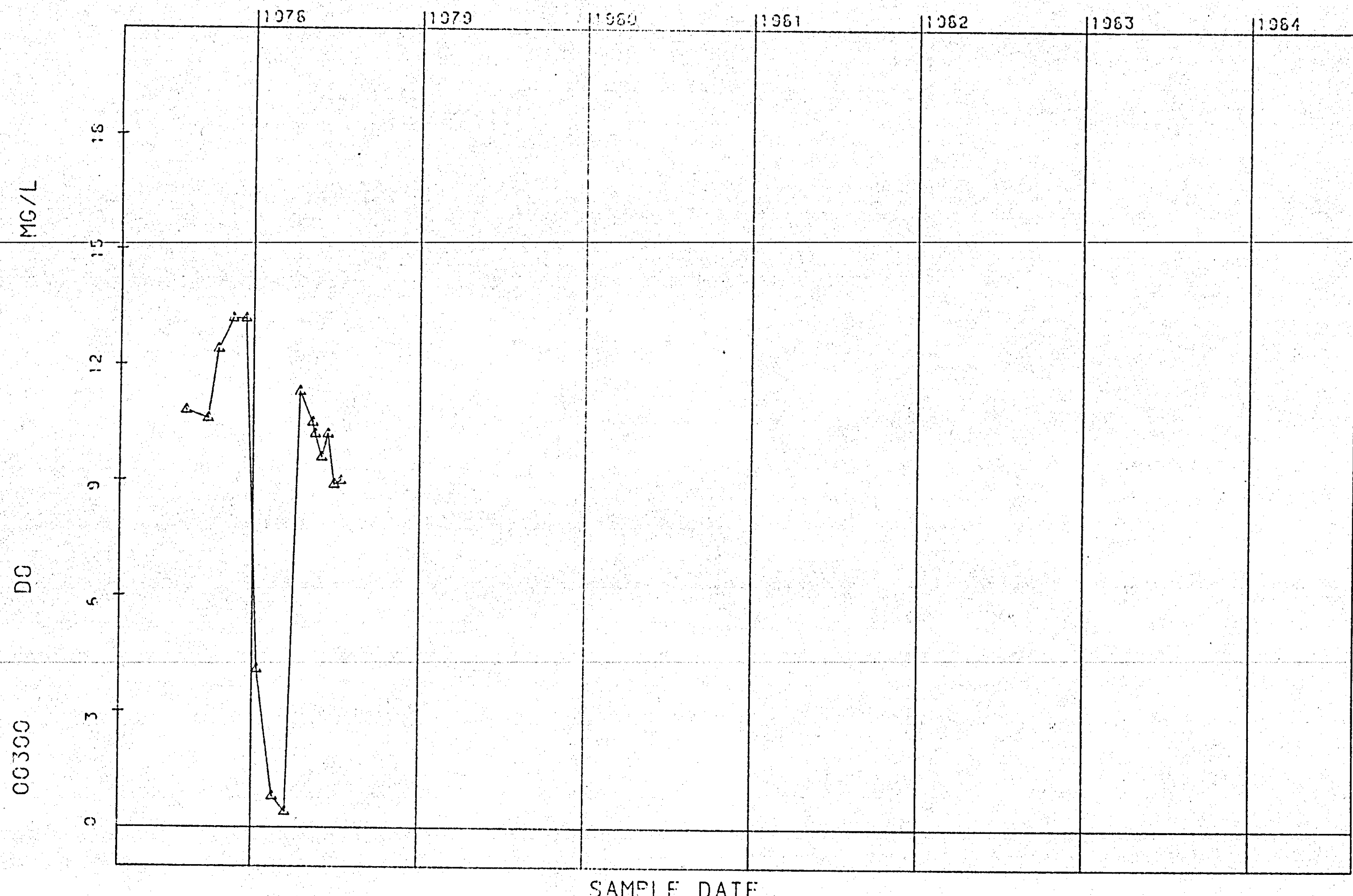
46P008
44 34 21.0 097 02 37.0 2
WEST ESTELLINE T113N R52W SECTION 23
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810530
0000 FEET DEPTH CLASS 00 CSN-RSP 0595685-0622498



STARTING DATE 77/3 /10

Figure IV-3

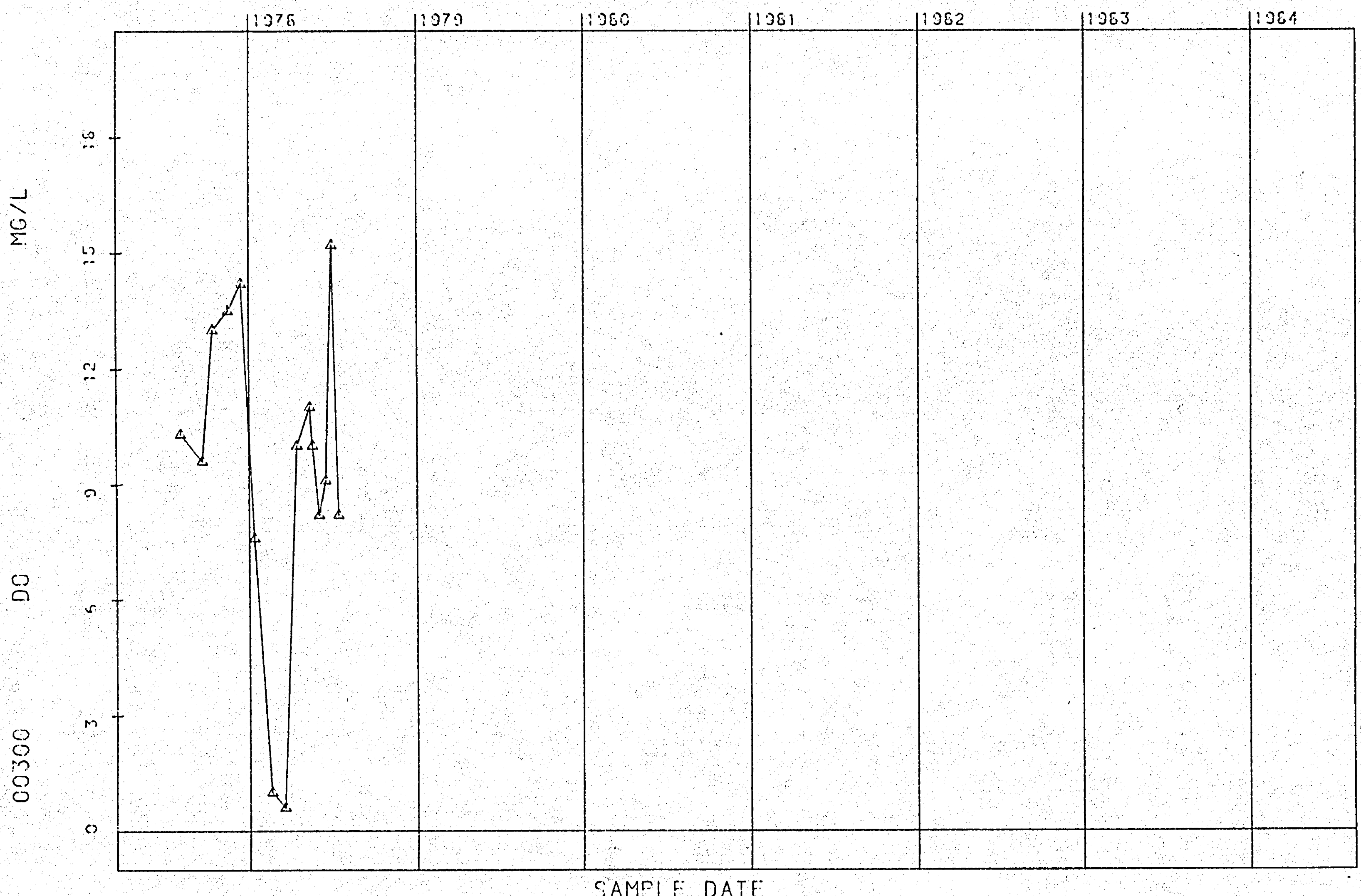
46P009
44 32 22.0 097 04 07.0 2
POINSETT REC AREA T112N R52W SEC 4
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810530
0000 FEET DEPTH CLASS 00 CSN-RSP 0595686-0622499



STARTING DATE 77/3 /10

Figure IV-4

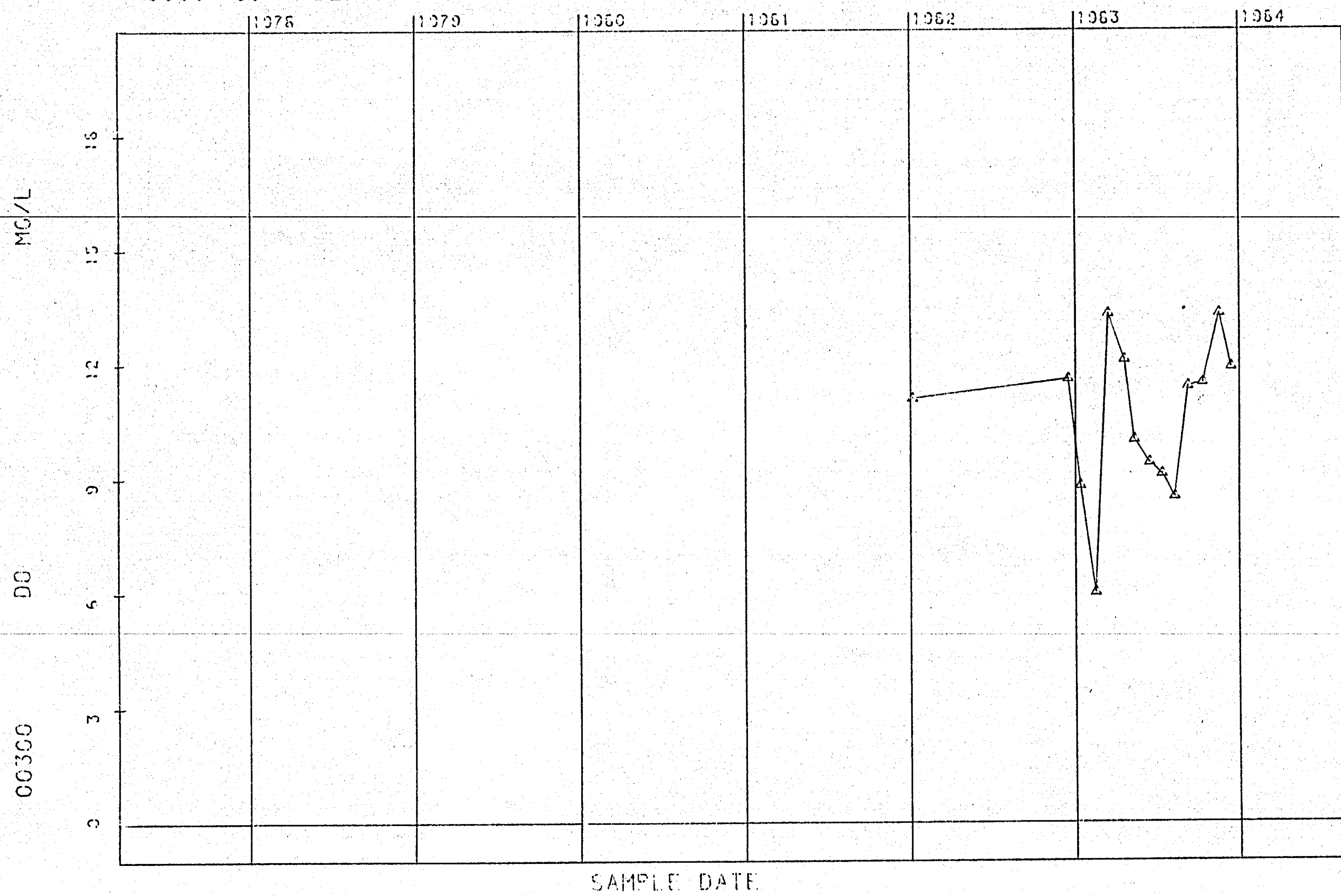
46P010
44 33 18.0 097 07 12.0 2
SORENSON T113N R52W SECTION 20
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810530
0000 FEET DEPTH CLASS 00 CSN-RSP 0595687-0622500



STARTING DATE 77/3 /10

Figure IV-5

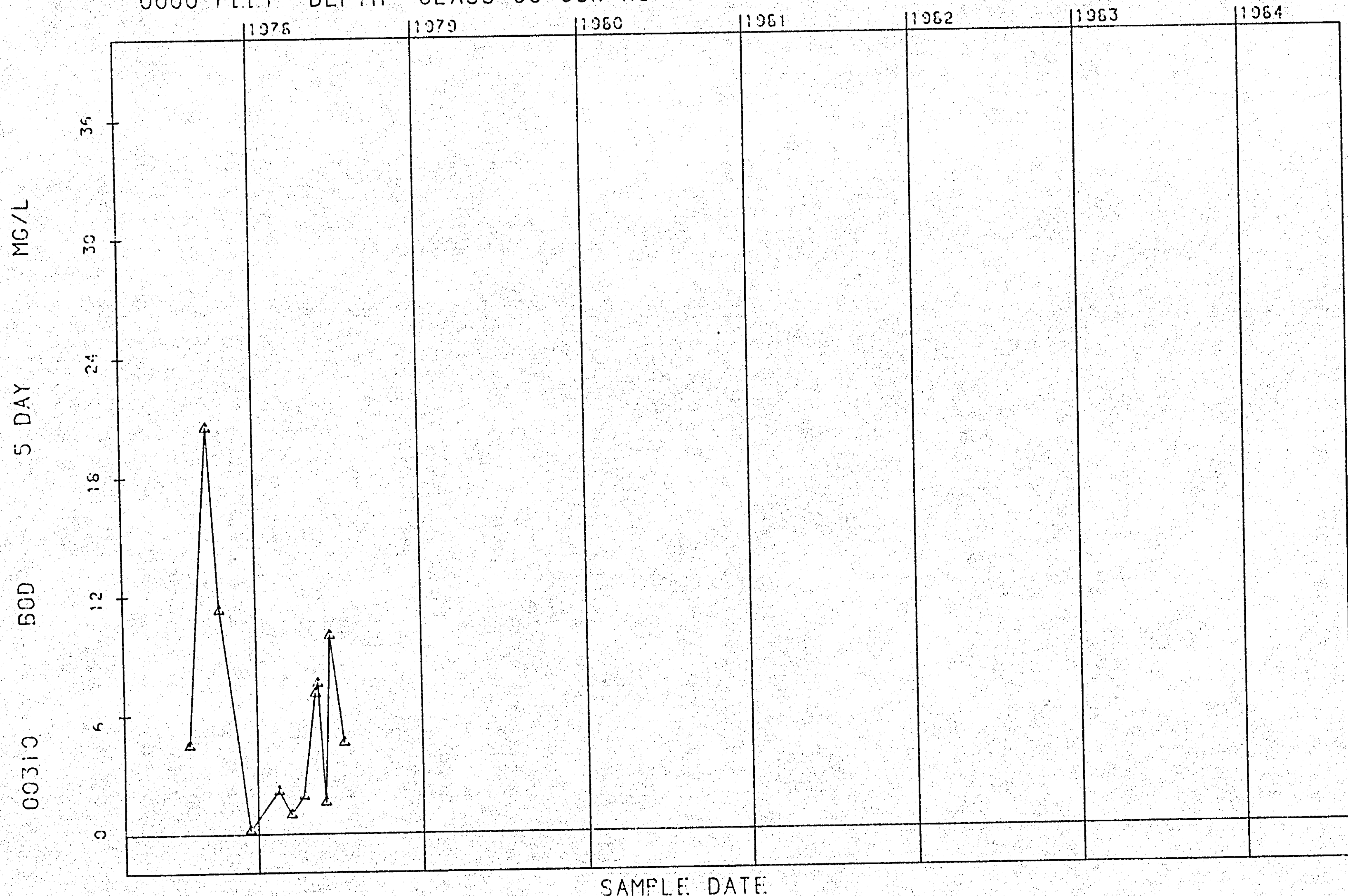
46PSST
44 50 23.0 097 03 05.0 2
COMPOSITE SAMPLE T113N-R52W-S28 CDCA
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER BASIN 090700
BIG SIOUX RIVER BASIN
21SDLAKE 840824
0000 FEET DEPTH CLASS 00 CSN-RSP 0741946-0744337



STARTING DATE 77/3 /10

Figure IV-6

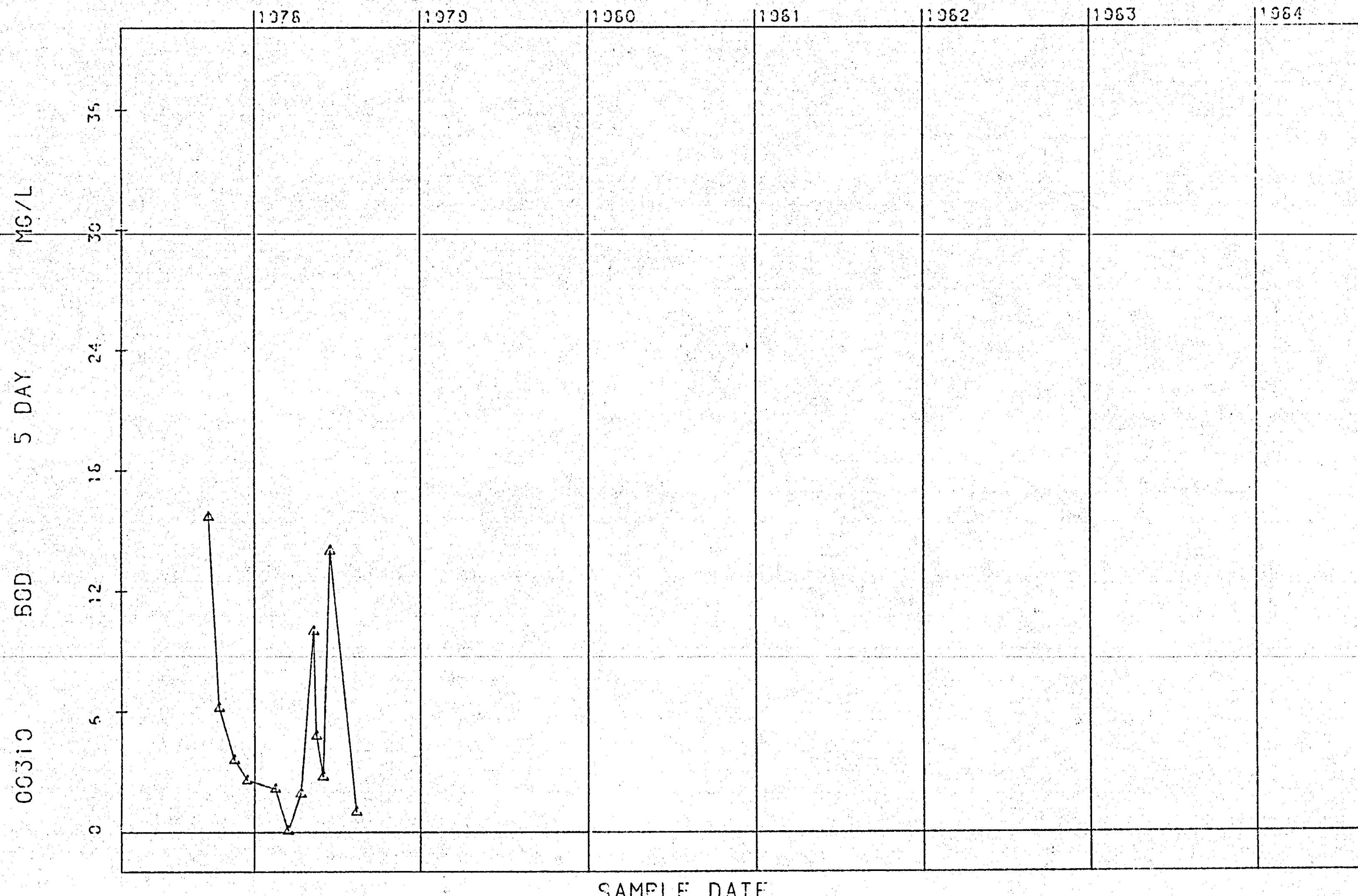
46P007
44 35 33.0 097 04 21.0 2
SAARANERS BEACH T113N R52W SEC 16
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810530
0000 FEET DEPTH CLASS 00 CSN-RSP 0595684-0622497



STARTING DATE 77/3 /10

Figure IV-7

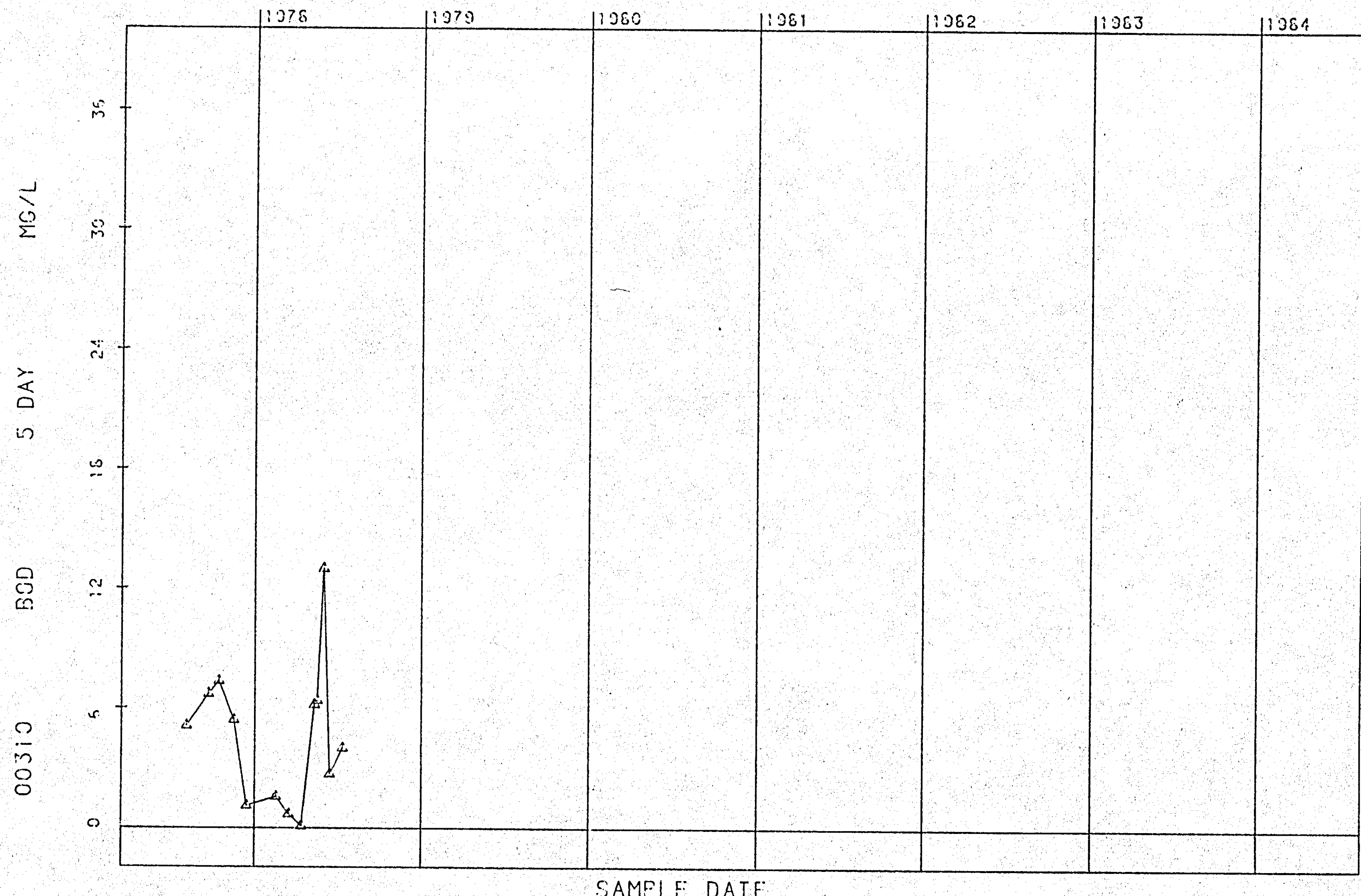
46P008
44 34 21.0 097 02 37.0 2
WEST ESTELLINE T113N R52W SECTION 23
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810530
0000 FEET DEPTH CLASS 00 CSN-RSP 0595685-0622498



STARTING DATE 77/3 /10

Figure IV-8

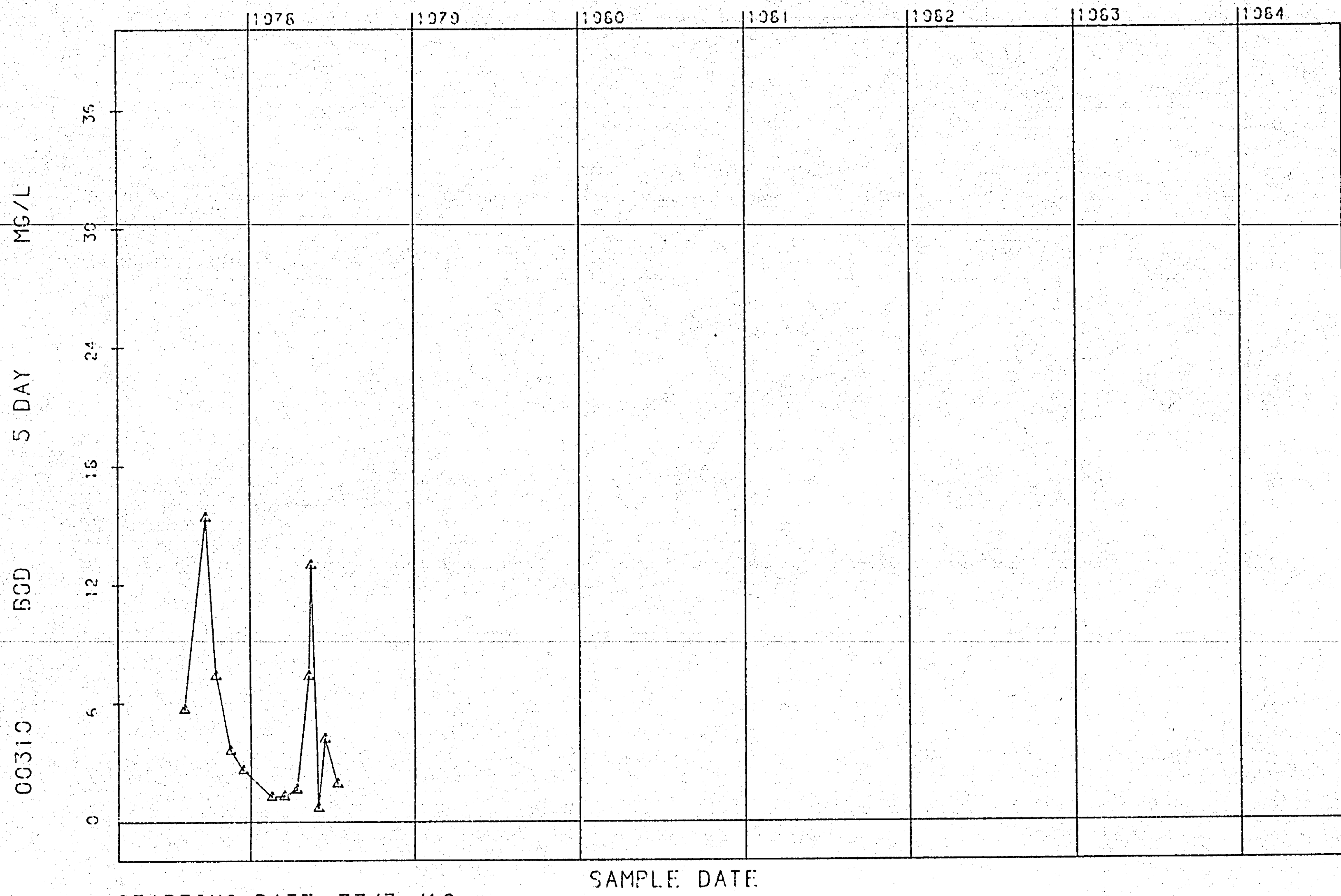
46P009
44 32 22.0 097 04 07.0 2
POINSETT REC AREA T112N R52W SEC 4
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810530
0000 FEET DEPTH CLASS 00 CSN-RSP 0595686-0622499



STARTING DATE 77/3 /10

Figure IV-9

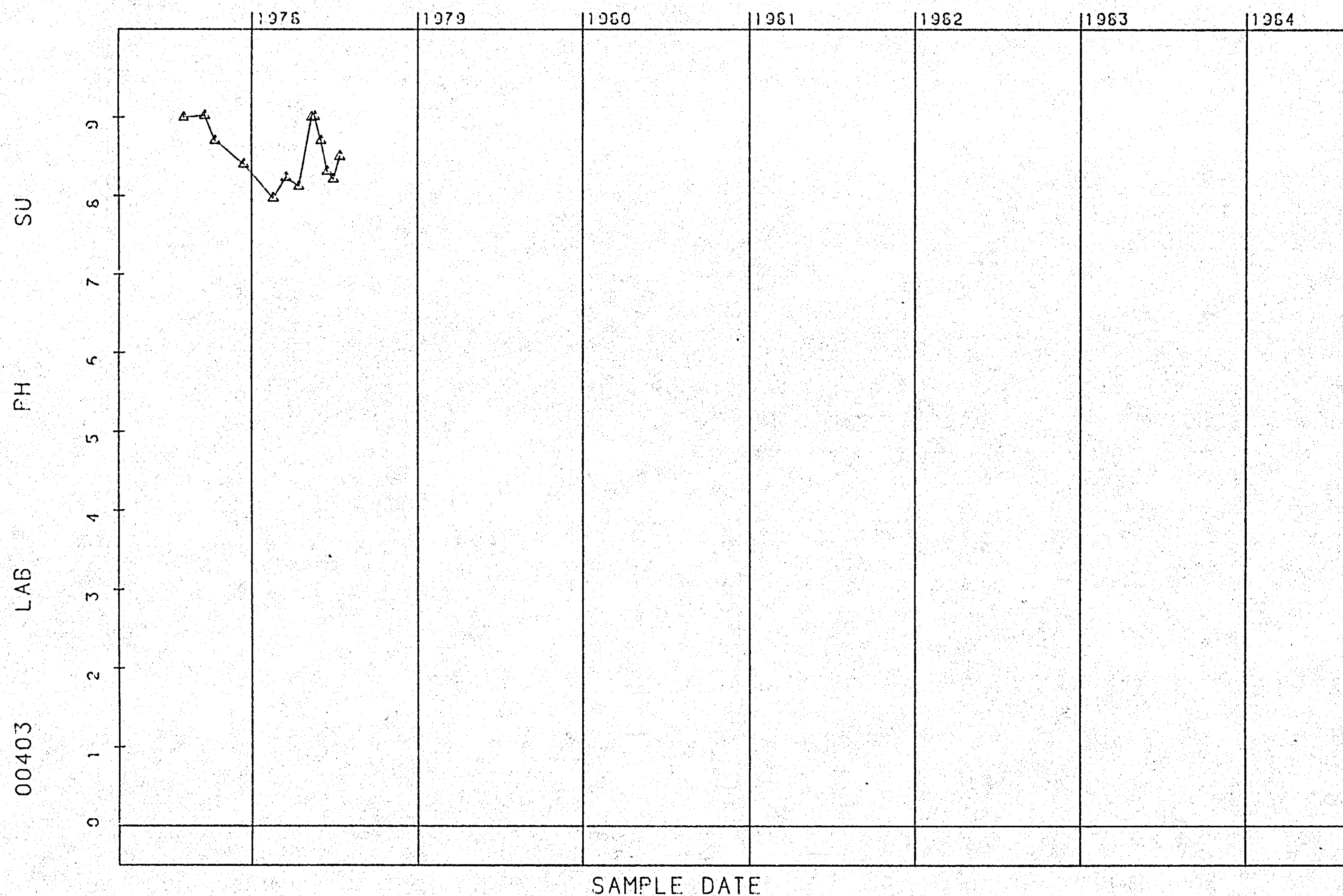
46P010
44 33 18.0 097 07 12.0 2
SORENSON T113N R52W SECTION 20
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810530
0000 FEET DEPTH CLASS 00 CSN-RSP 0595687-0622500



STARTING DATE 77/3 /10

46P007
44 35 33.0 097 04 21.0 2
SAARANERS BEACH T113N R52W SEC 16
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810530
0000 FEET DEPTH CLASS 00 CSN-RSP 0595684-0622497

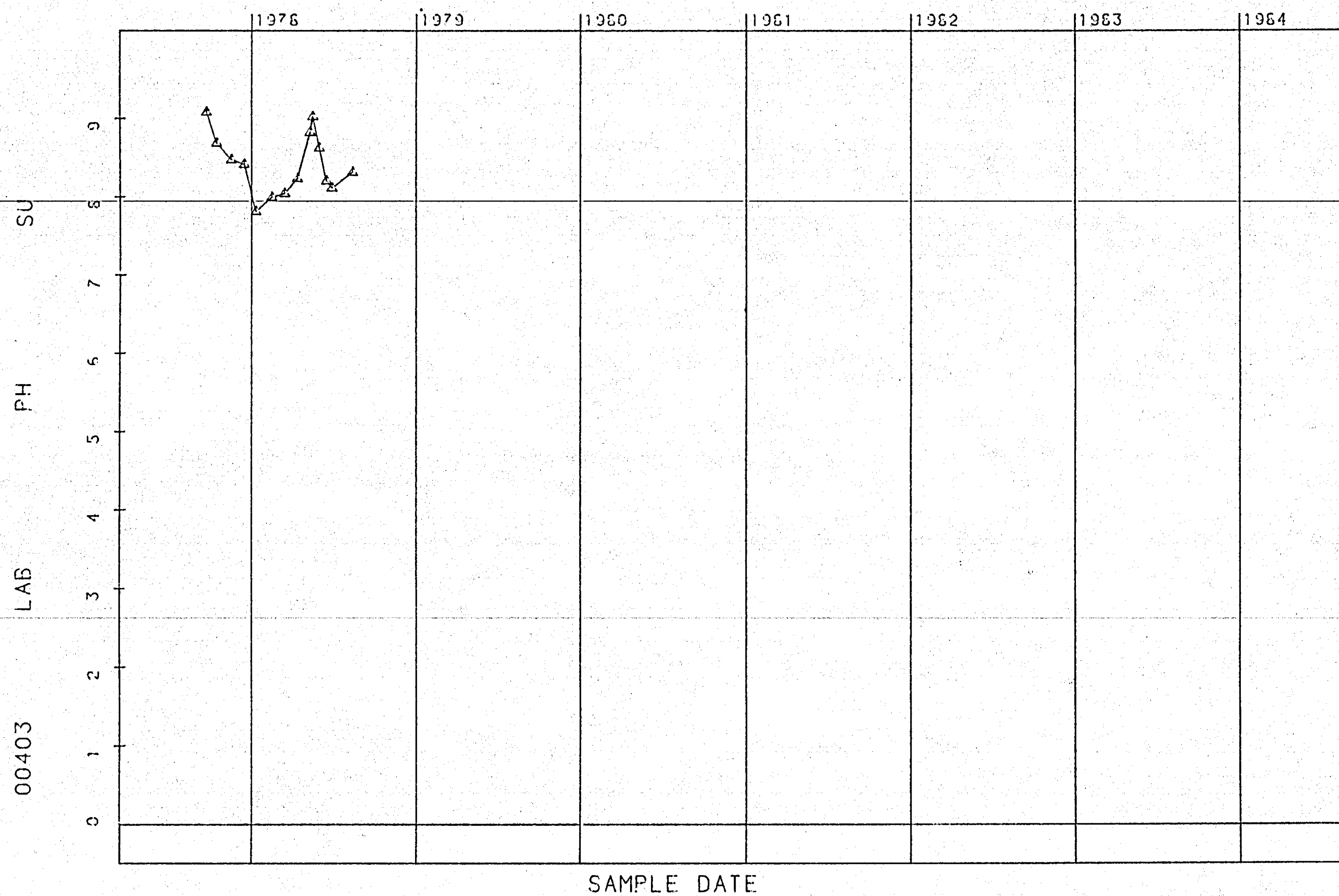
Figure IV-10



STARTING DATE 77/3 /10

Figure IV-11

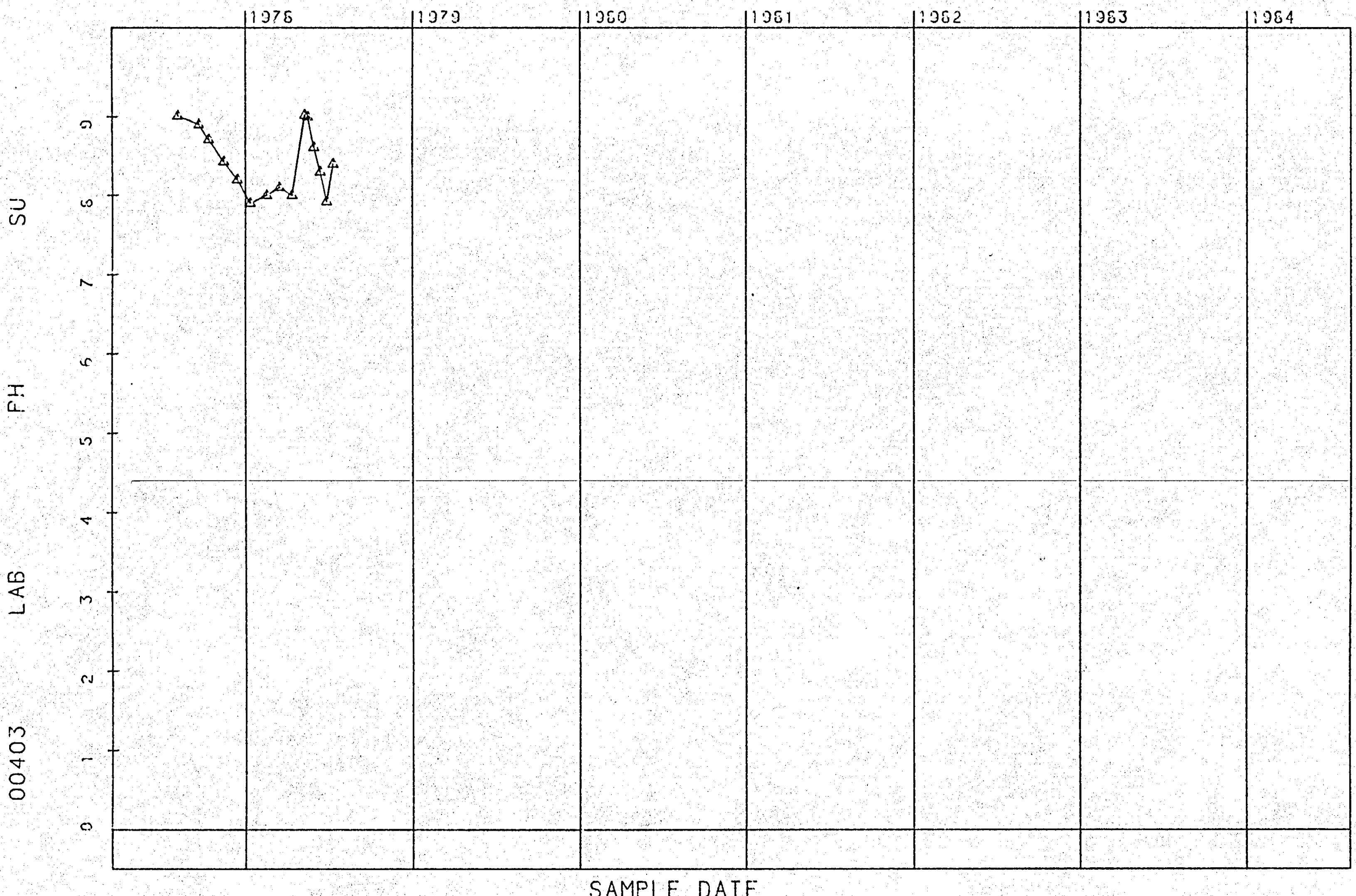
46P008
44 34 21.0 097 02 37.0 2
WEST ESTELLINE T113N R52W SECTION 23
46057   SOUTH DAKOTA   HAMLIN
MISSOURI RIVER   090700
BIG SIOUX RIVER
21SDLAKE 810530
0000 FEET DEPTH CLASS 00 CSN-RSP 0595685-0622498



STARTING DATE 77/3 /10

Figure IV-12

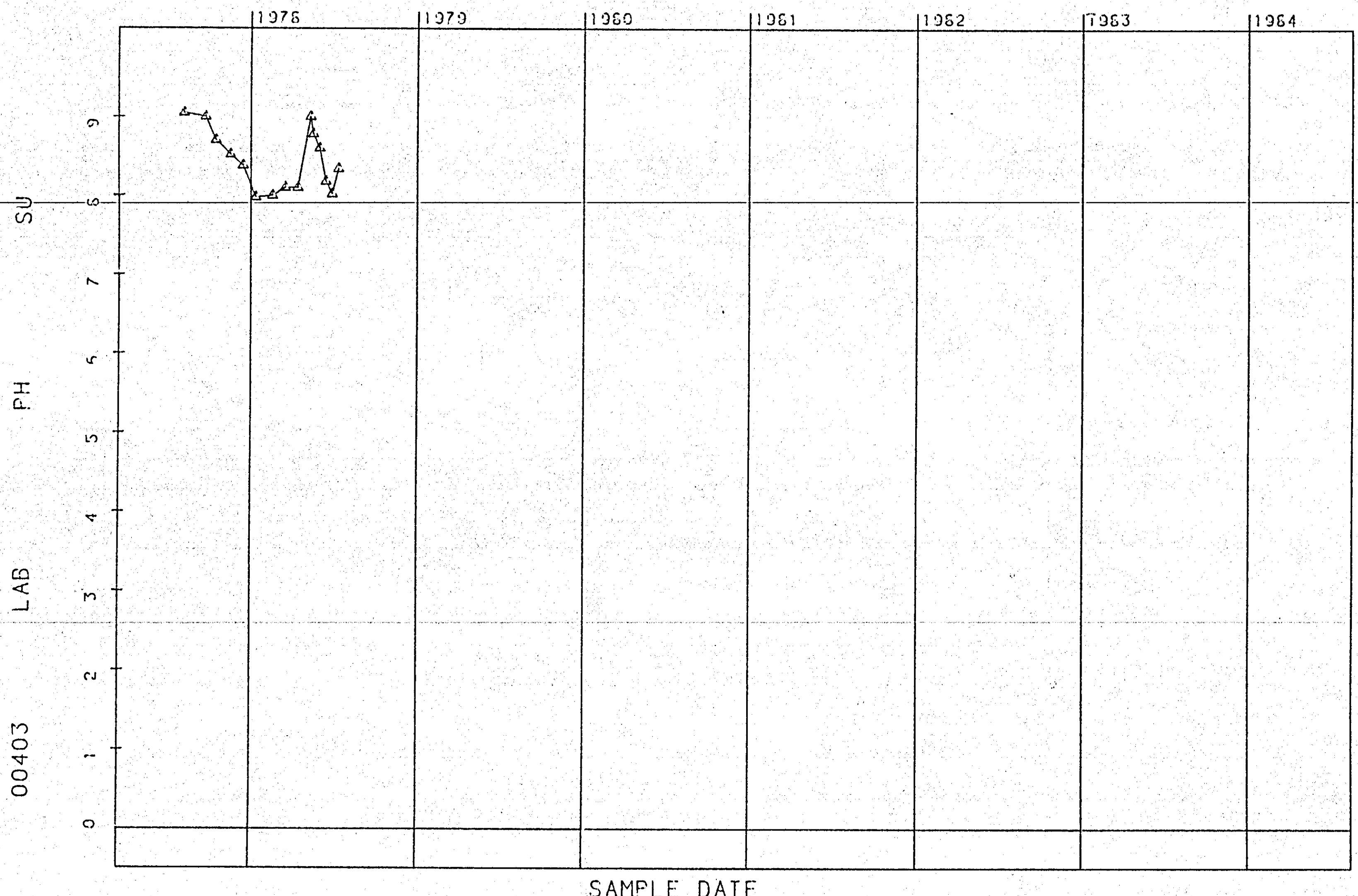
46P009
44 32 22.0 097 04 07.0 2
POINSETT REC AREA T112N R52W SEC 4
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810530
0000 FEET DEPTH CLASS 00 CSN-RSP 0595686-0622499



STARTING DATE 77/3 /10

Figure IV-13

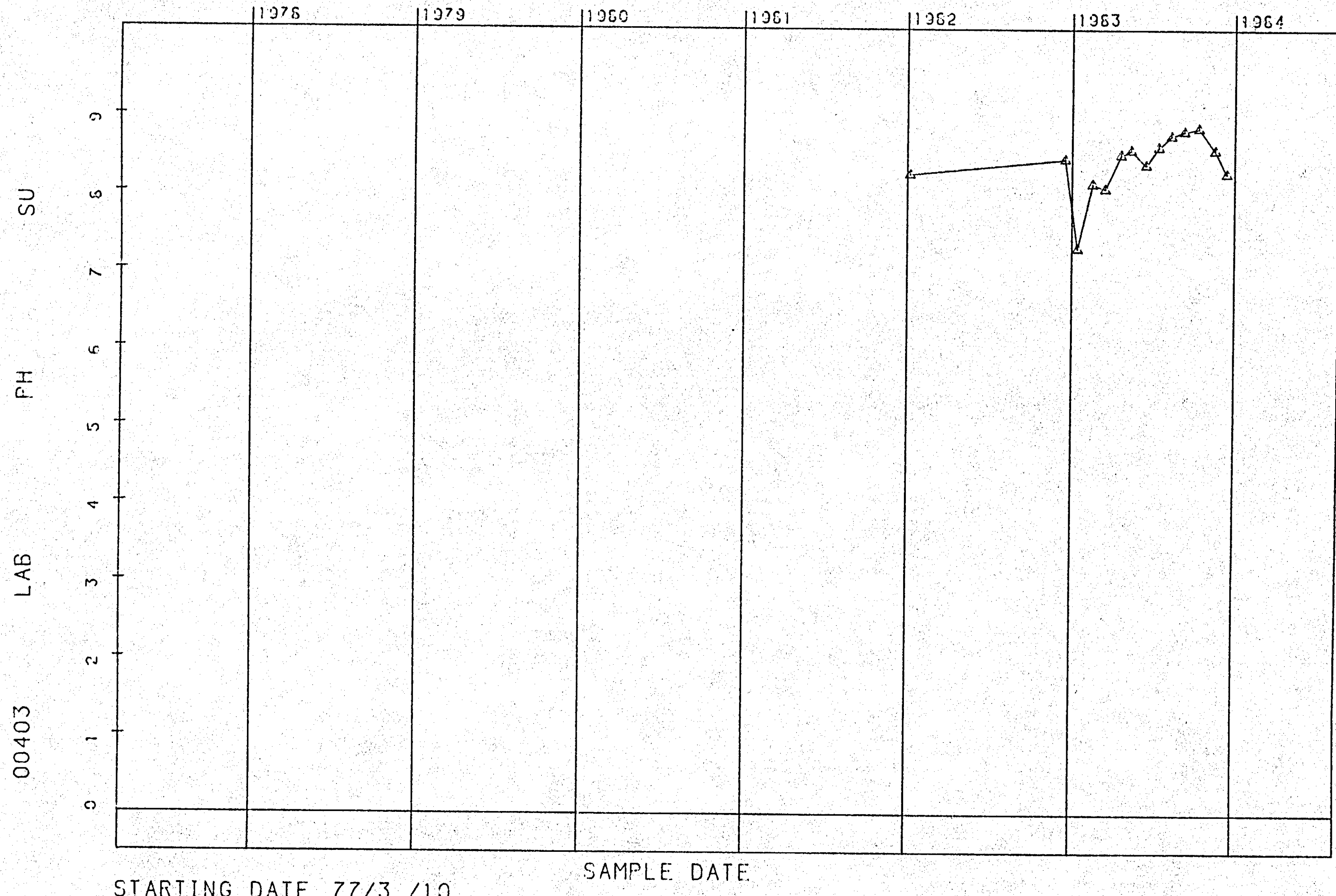
46P010
44 33 18.0 097 07 12.0 2
SORENSON T113N R52W SECTION 20
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810530
0000 FEET DEPTH CLASS 00 CSN-RSP 0595687-0622500



STARTING DATE 77/3 /10

Figure IV-14

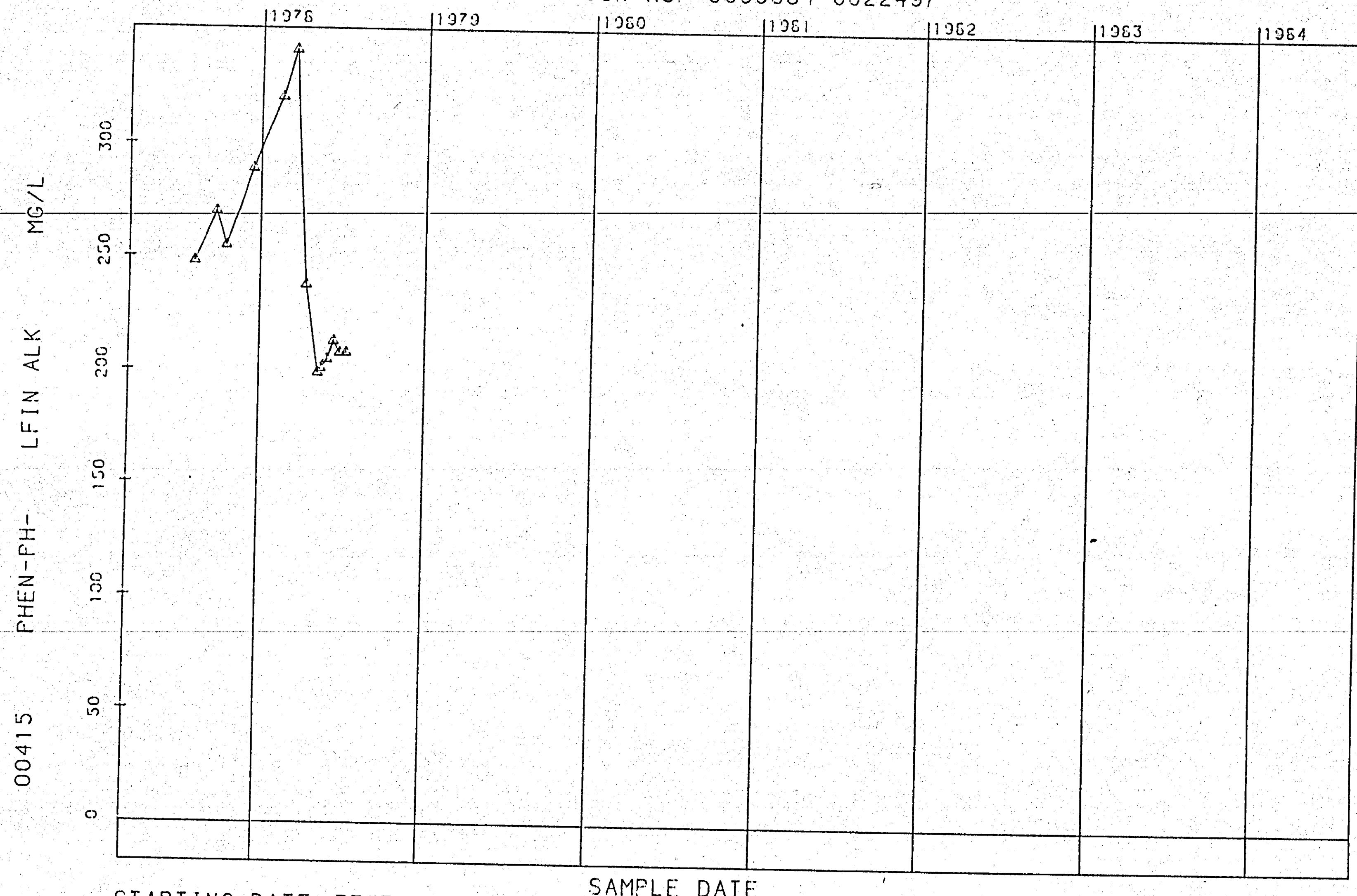
46PSST
44 50 23.0 097 03 05.0 2
COMPOSITE SAMPLE T113N-R52W-S28 CDCA
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER BASIN 090700
BIG SIOUX RIVER BASIN
21SDLAKE 840824
0000 FEET DEPTH CLASS 00 CSN-RSP 0741946-0744337



STARTING DATE 77/3 /10

Figure IV-15

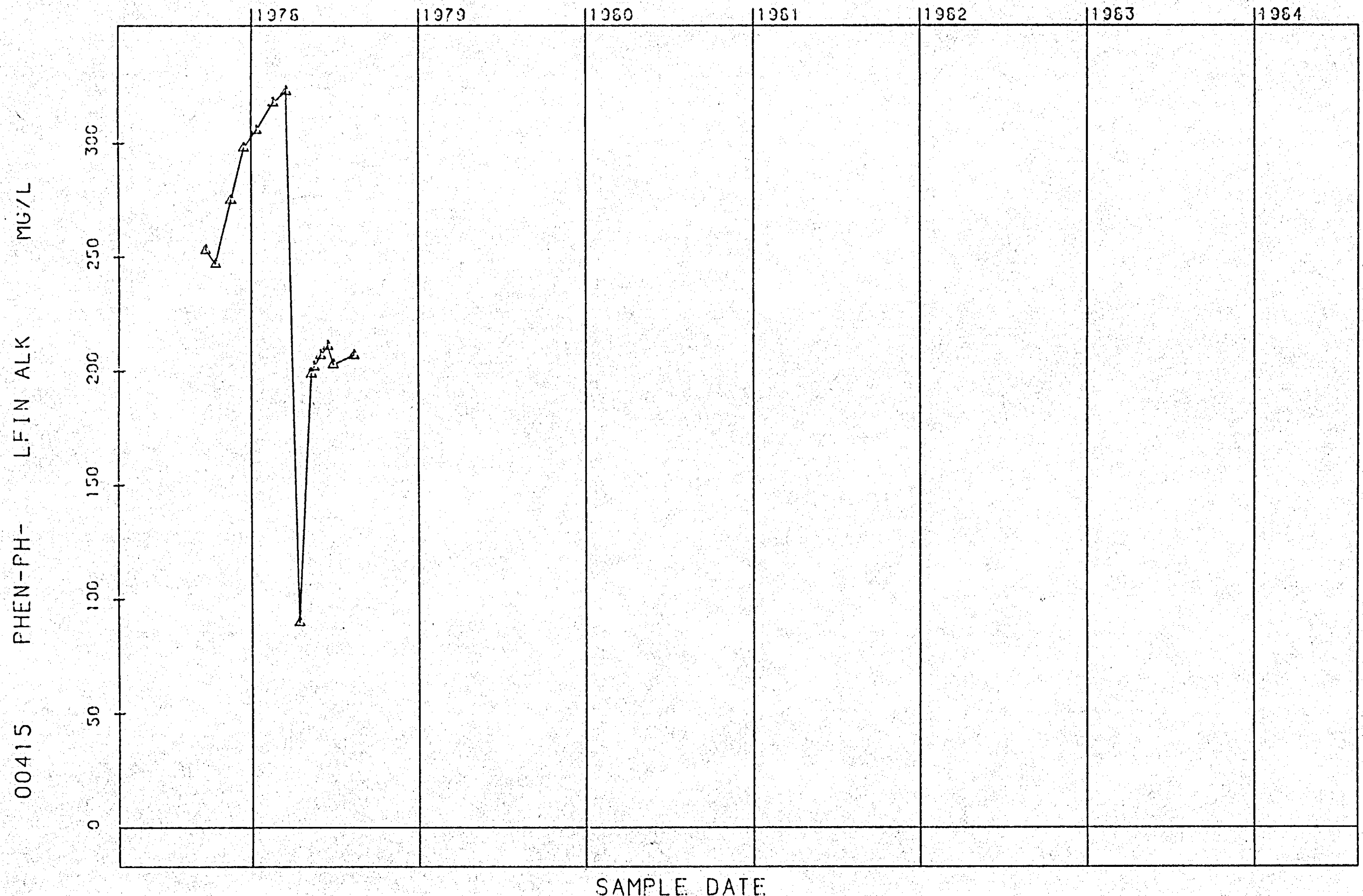
46P007
44 35 33.0 097 04 21.0 2
SAARANERS BEACH T113N R52W SEC 16
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810530
0000 FEET DEPTH CLASS 00 CSN-RSP 0595684-0622497



STARTING DATE 77/3 /10

Figure IV-16

46P008
44 34 21.0 097 02 37.0 2
WEST ESTELLINE T113N R52W SECTION 23
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810530
0000 FEET DEPTH CLASS 00 CSN-RSP 0595685-0622498



STARTING DATE 77/3 /10

Figure IV-17

46P009
44 32 22.0 097 04 07.0 2
POINSETT REC AREA T112N R52W SEC 4
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810530
0000 FEET DEPTH CLASS 00 CSN-RSP 0595686-0622499

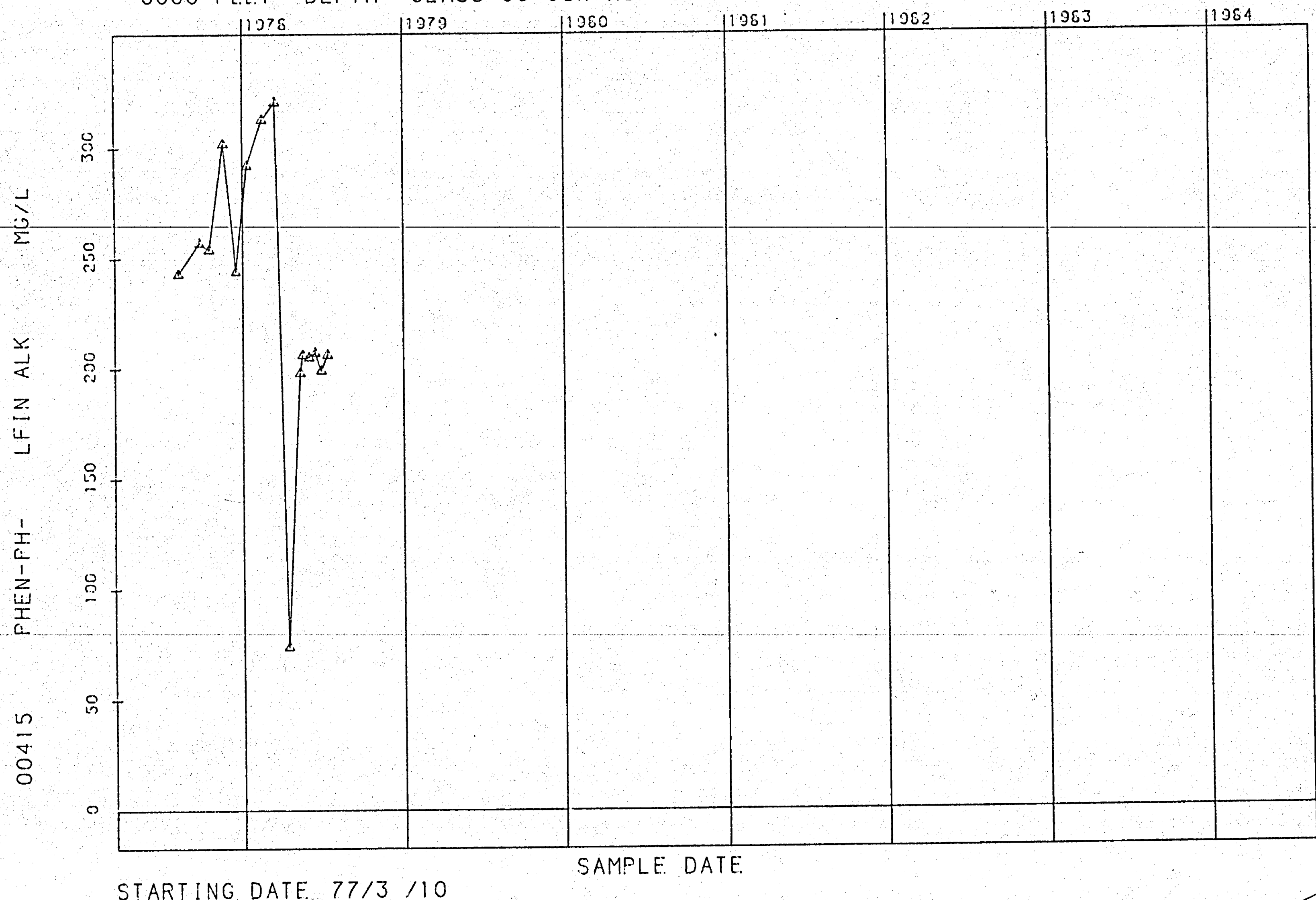
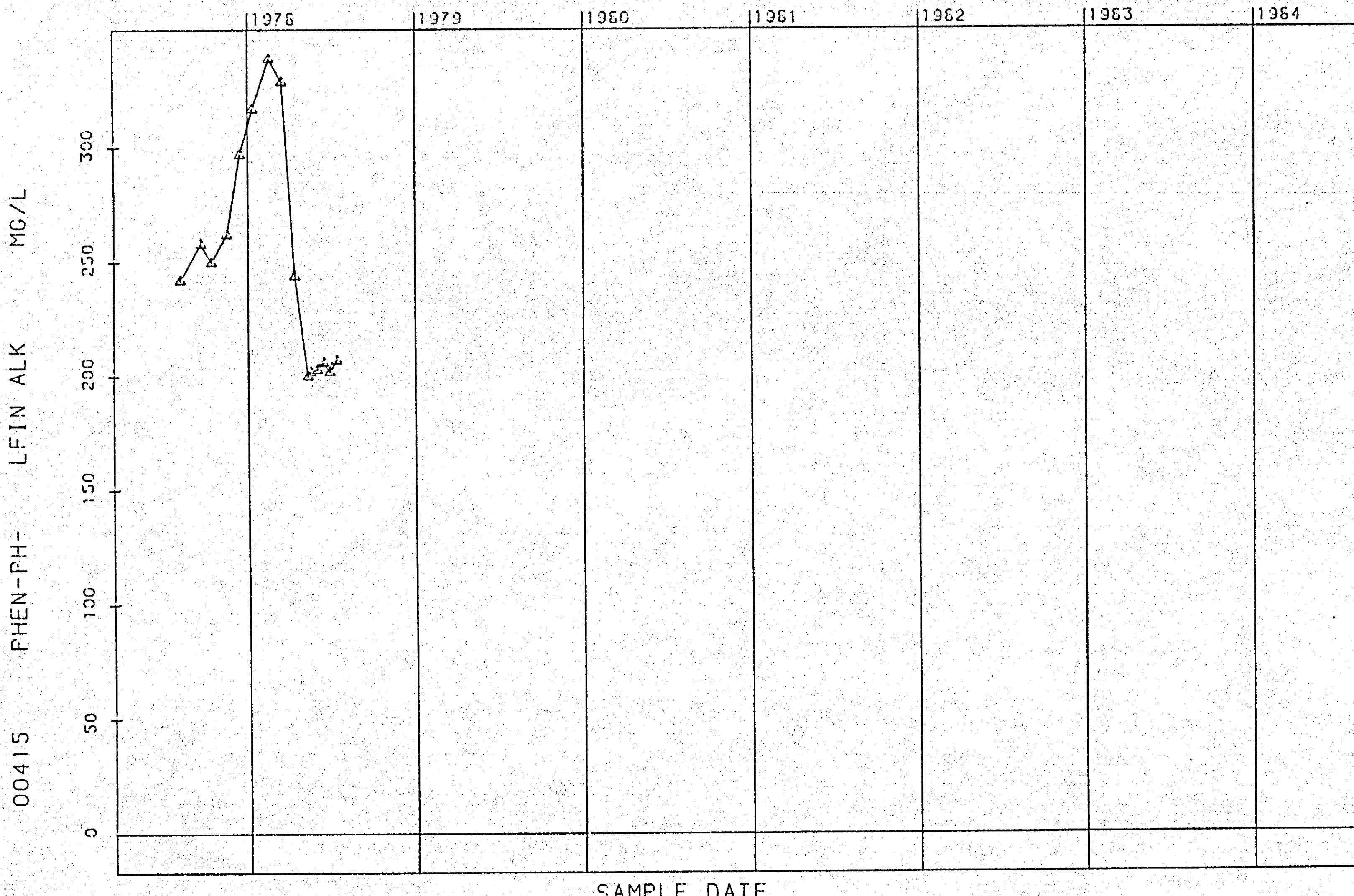


Figure IV-18

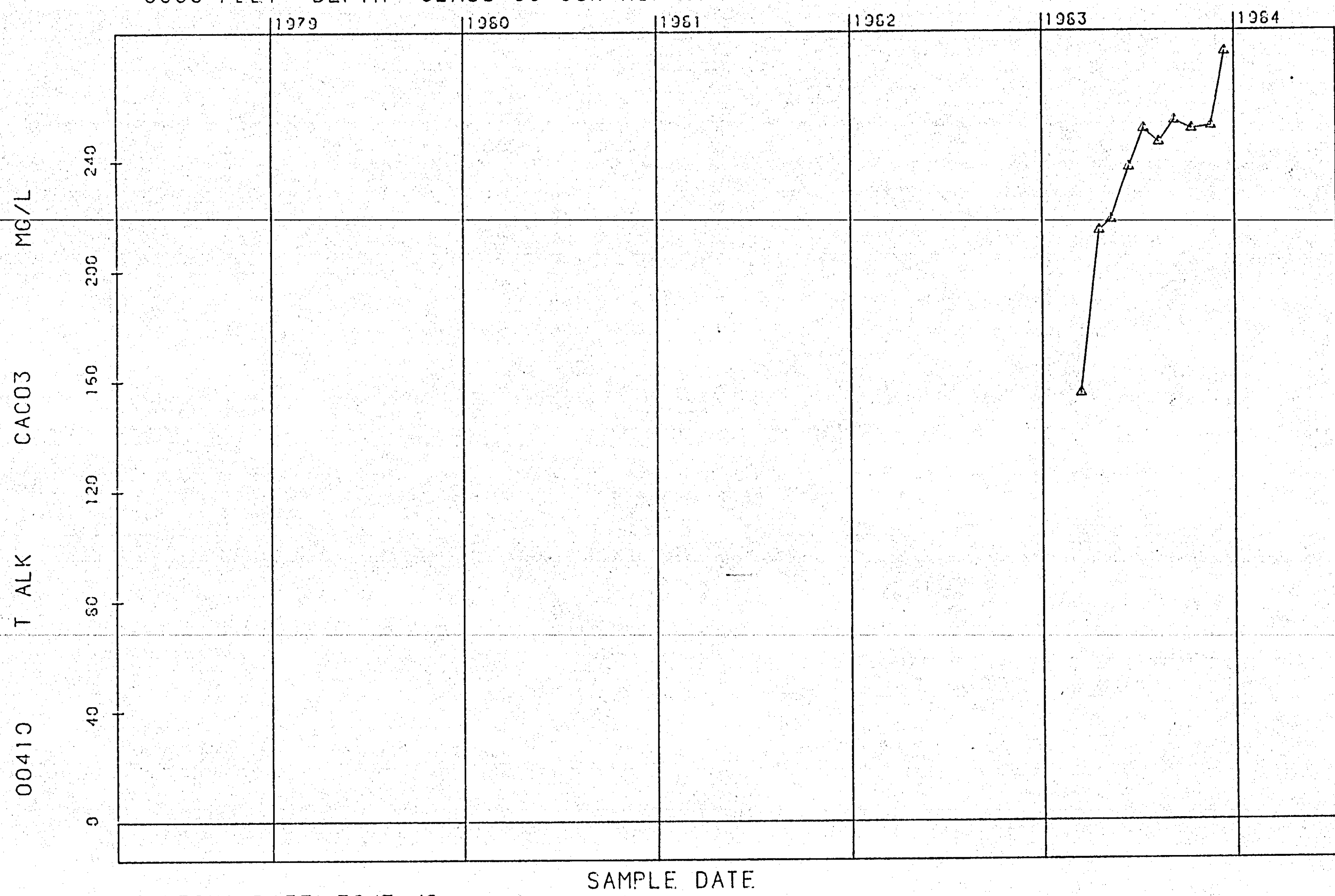
46P010
44 33 18.0 097 07 12.0 2
SORENSON T113N R52W SECTION 20
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810530
0000 FEET DEPTH CLASS 00 CSN-RSP 0595687-0622500



STARTING DATE 77/3 /10

Figure IV-19a

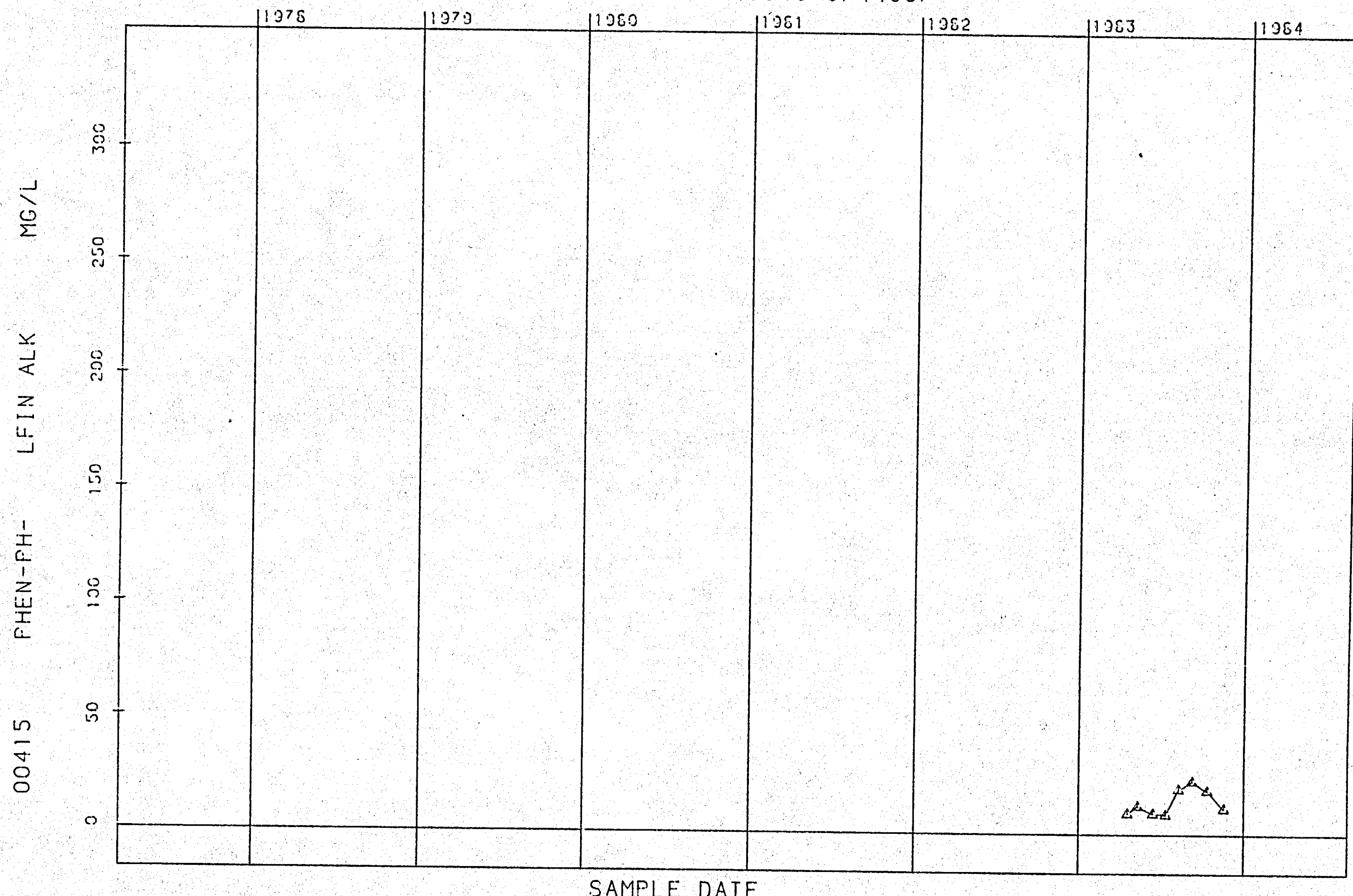
46PSST
44 50 23.0 097 03 05.0 2
COMPOSITE SAMPLE T113N-R52W-S28 CDCA
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER BASIN 090700
BIG SIOUX RIVER BASIN
21SDLAKE 840824
0000 FEET DEPTH CLASS 00 CSN-RSP 0741946-0744337



STARTING DATE 78/3 /8

Figure IV-19b

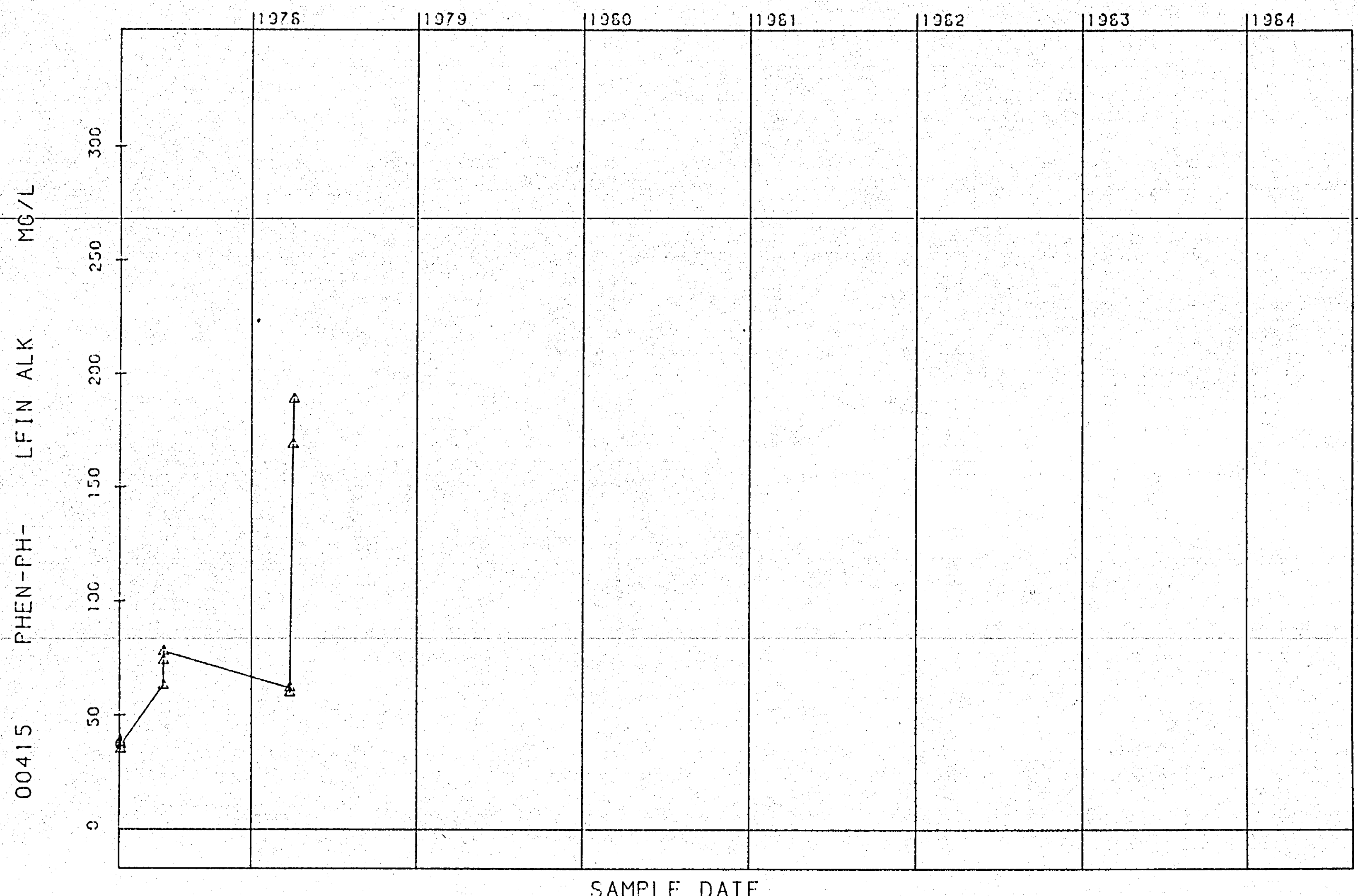
46PSST
44 50 23.0 097 03 05.0 2
COMPOSITE SAMPLE T113N-R52W-S28 CDCA
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER BASIN 090700
BIG SIOUX RIVER BASIN
21SDLAKE 840824
0000 FEET DEPTH CLASS 00 CSN-RSP 0741946-0744337



STARTING DATE 77/3 /10

Figure IV-20

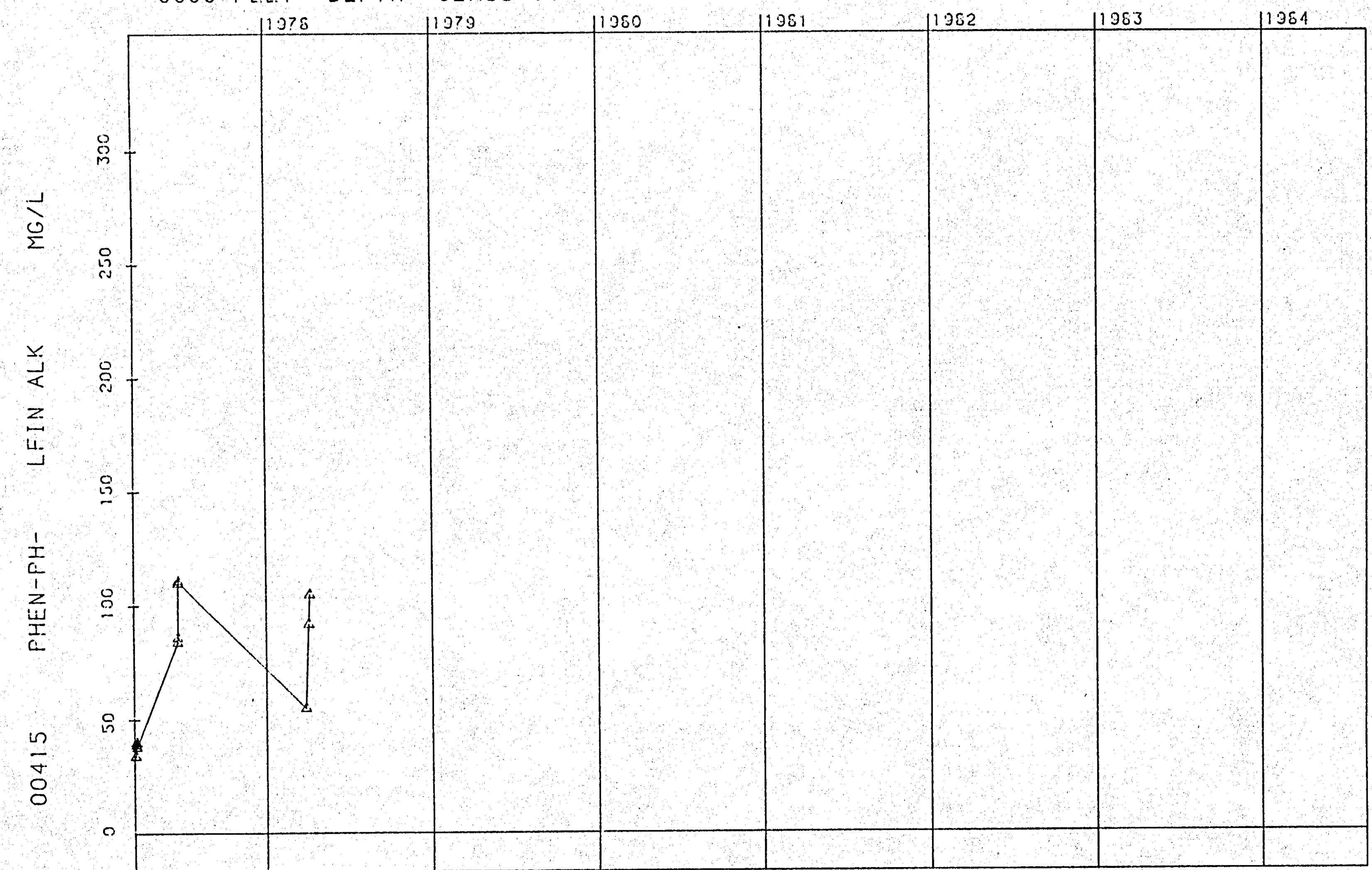
46P001
44 32 03.0 097 05 19.0 2
S TRIB CHURCH T112N R52W SEC 5
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810418
0000 FEET DEPTH CLASS 00 CSN-RSP 0589378-0554045



STARTING DATE 77/3 /10

46P002
44 33 47.0 097 07 41.0 2
INLET FROM ALBERT T113N R52153W SEC 30
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810418
0000 FEET DEPTH CLASS 00 CSN-RSP 0589379-0554046

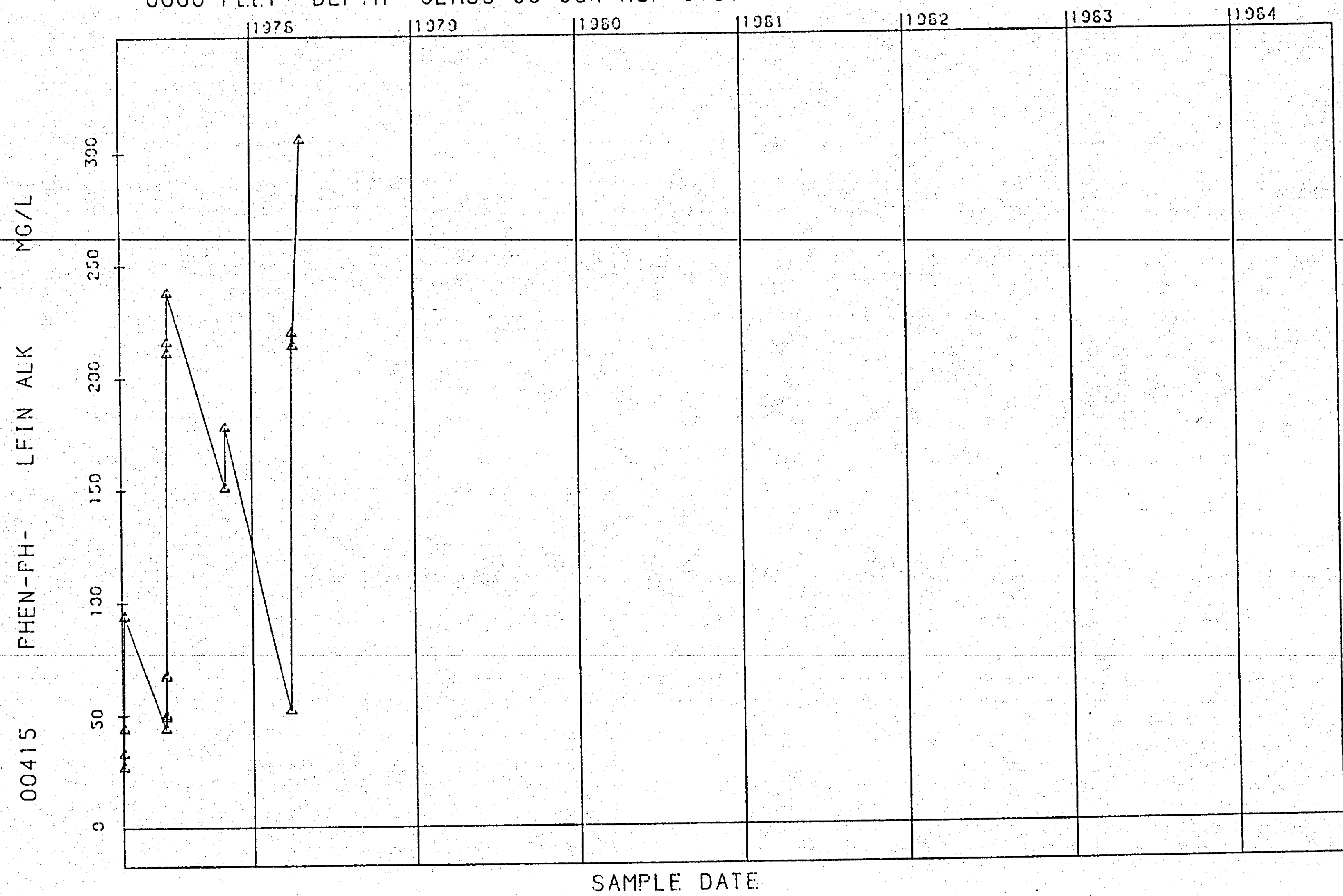
Figure IV-21



STARTING DATE 77/3 /10

Figure IV-22

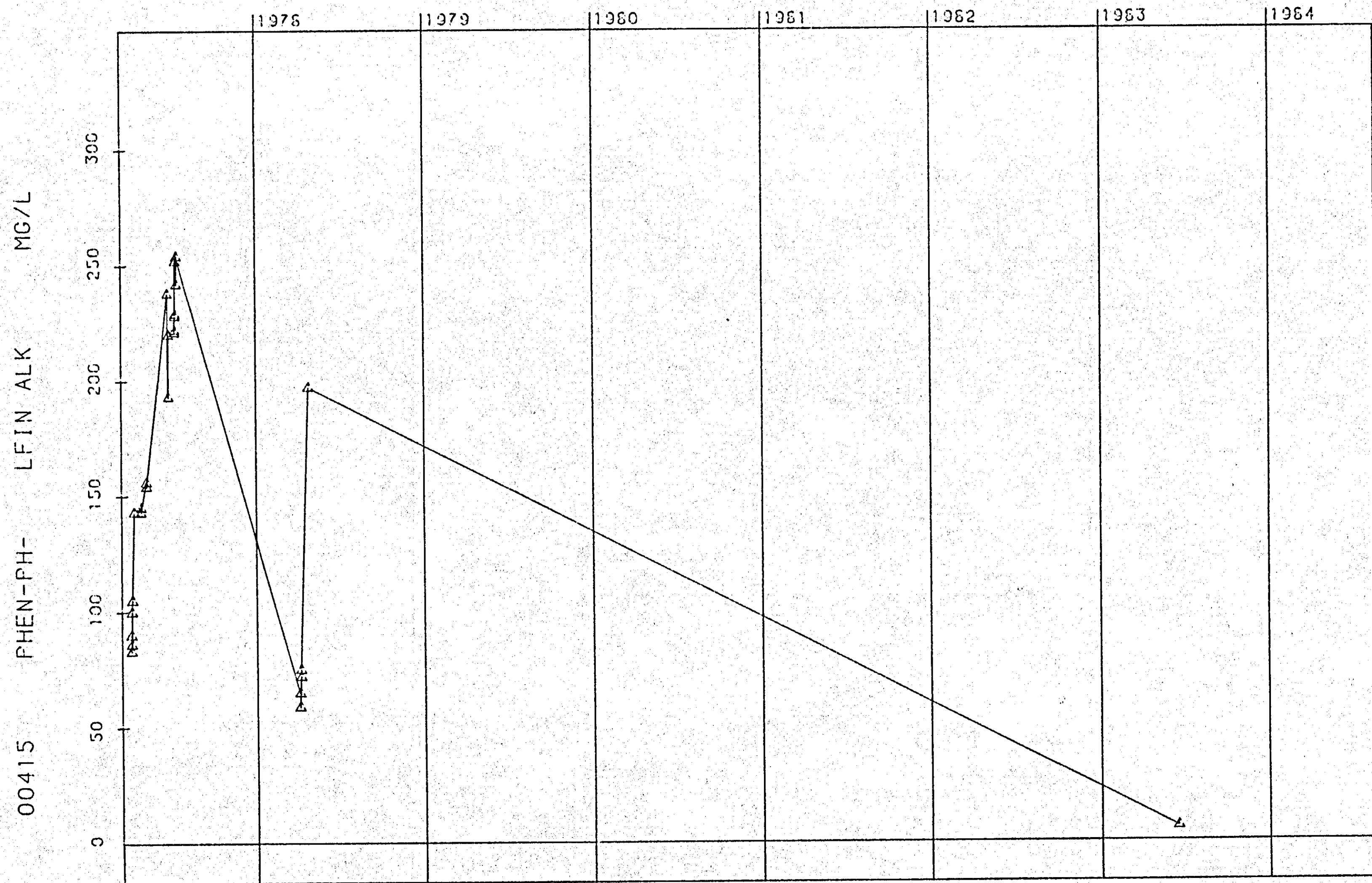
46P003
44 34 44.0 097 05 39.0 2
NW INLET T113N R52W SEC 20
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810418
0000 FEET DEPTH CLASS 00 CSN-RSP 0589380-0554047



STARTING DATE 77/3 /10

Figure IV-23

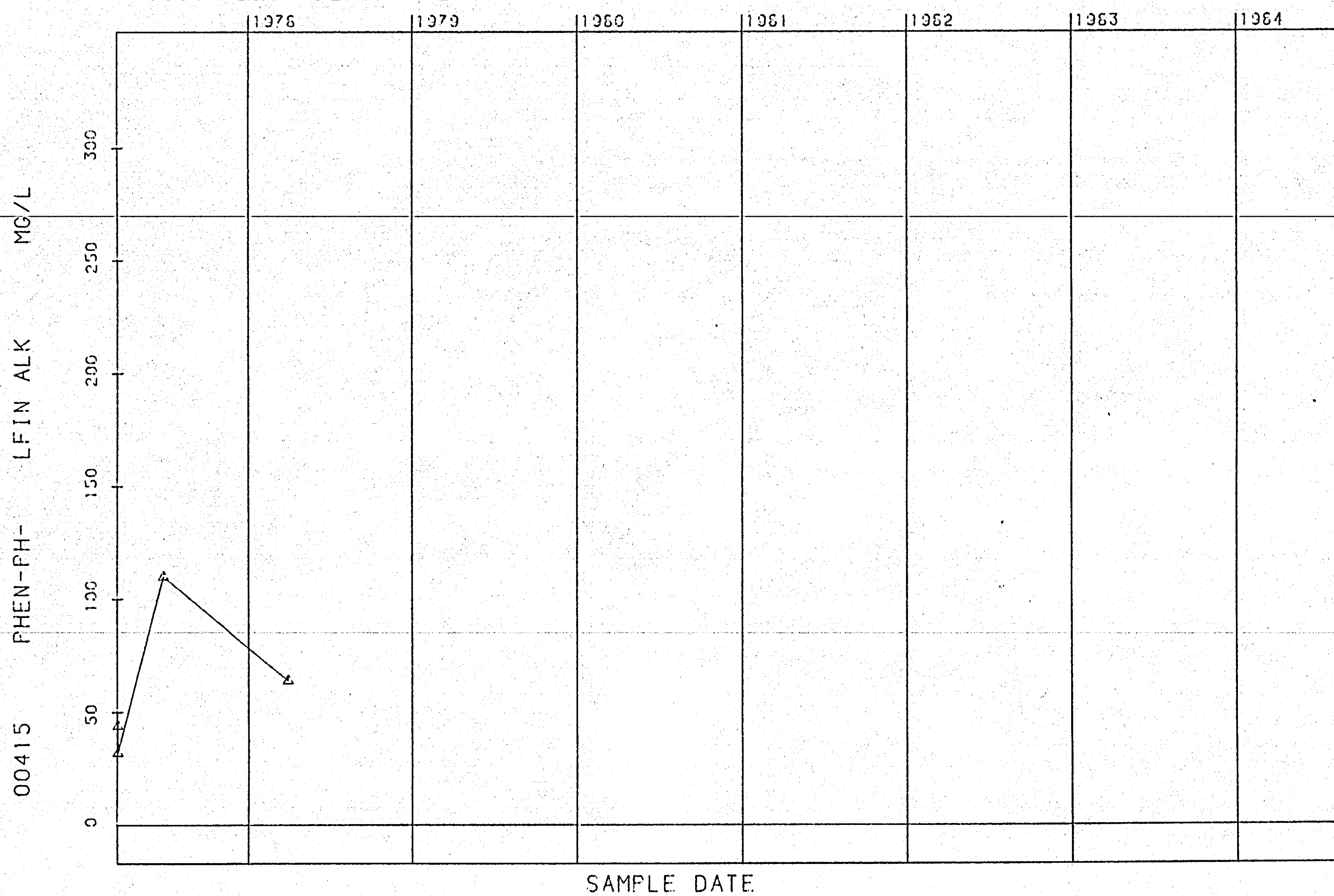
46P004
44 36 07.0 097 03 14.0 2
STONE BRIDGE T113N R52W SEC 10/15
46057   SOUTH DAKOTA   HAMLIN
9MISSOURI RIVER   090700
BIG SIOUX RIVER
21SDLAKE 810418
0000 FEET DEPTH CLASS 00 CSN-RSP 0589381-0554048



STARTING DATE 77/3 /10

Figure IV-24

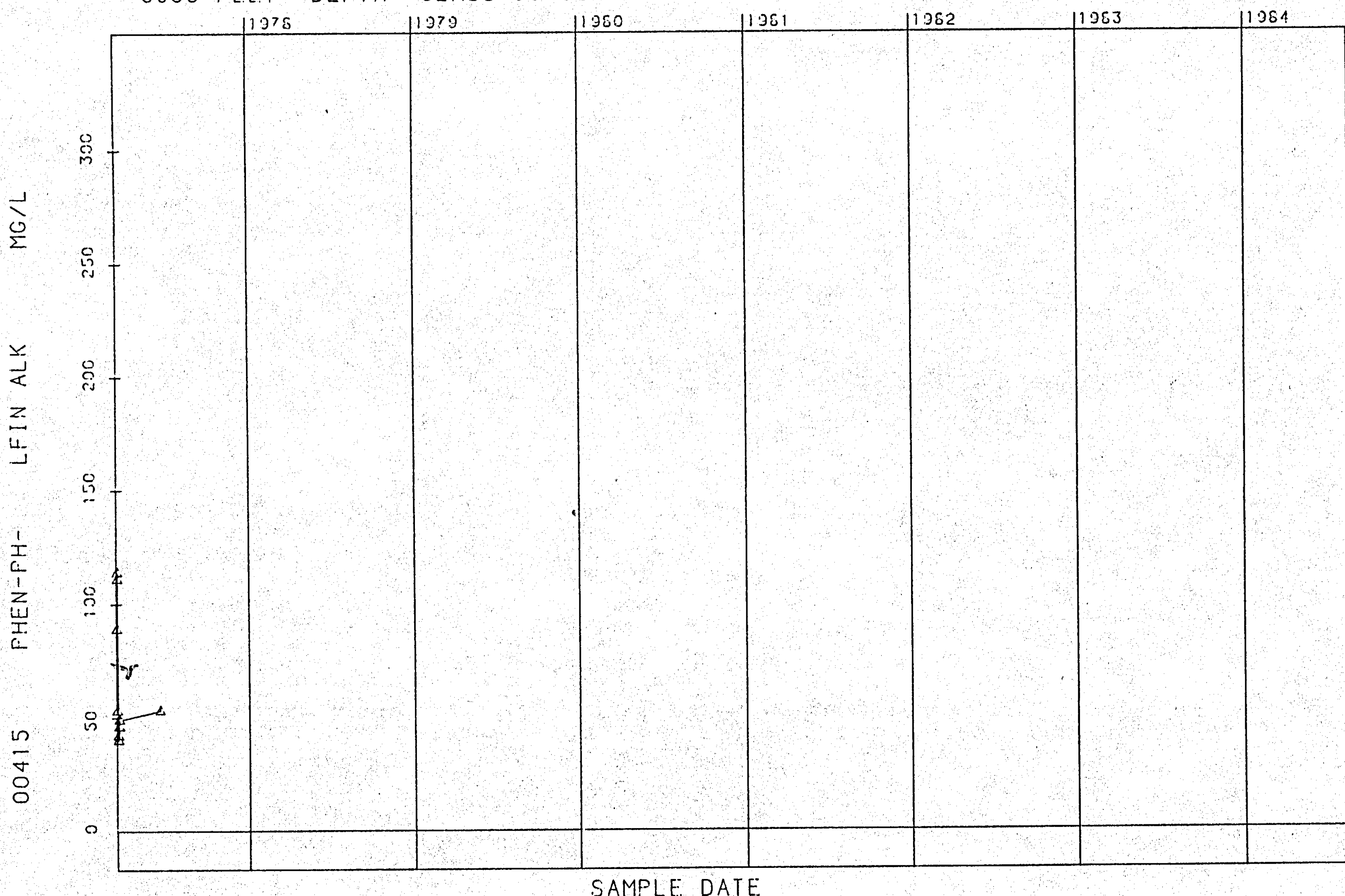
46P005
44 36 06.0 097 00 47.0 2
OUTLET ROAD FAR T113N R52W SEC 12/13
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810418
0000 FEET DEPTH CLASS 00 CSN-RSP 0589382-0554049



STARTING DATE 77/3 /10

Figure IV-25

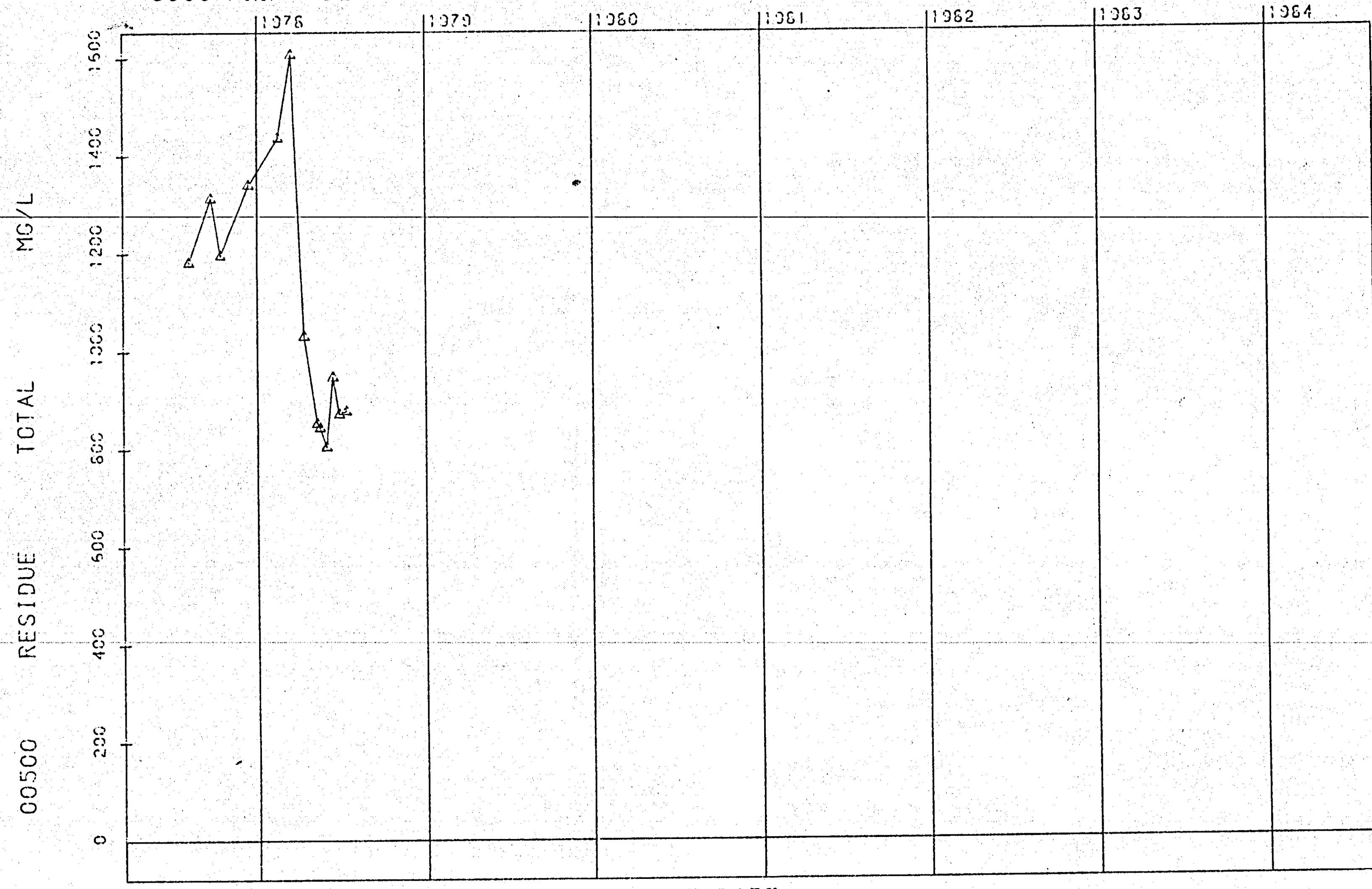
46P006
44 35 45.0 097 01 38.0 2
OUTLET ROAD CLOSE T113N R52W SEC 13
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810418
0000 FEET DEPTH CLASS 00 CSN-RSP 0589383-0554050



STARTING DATE 77/3 /10

Figure IV-26

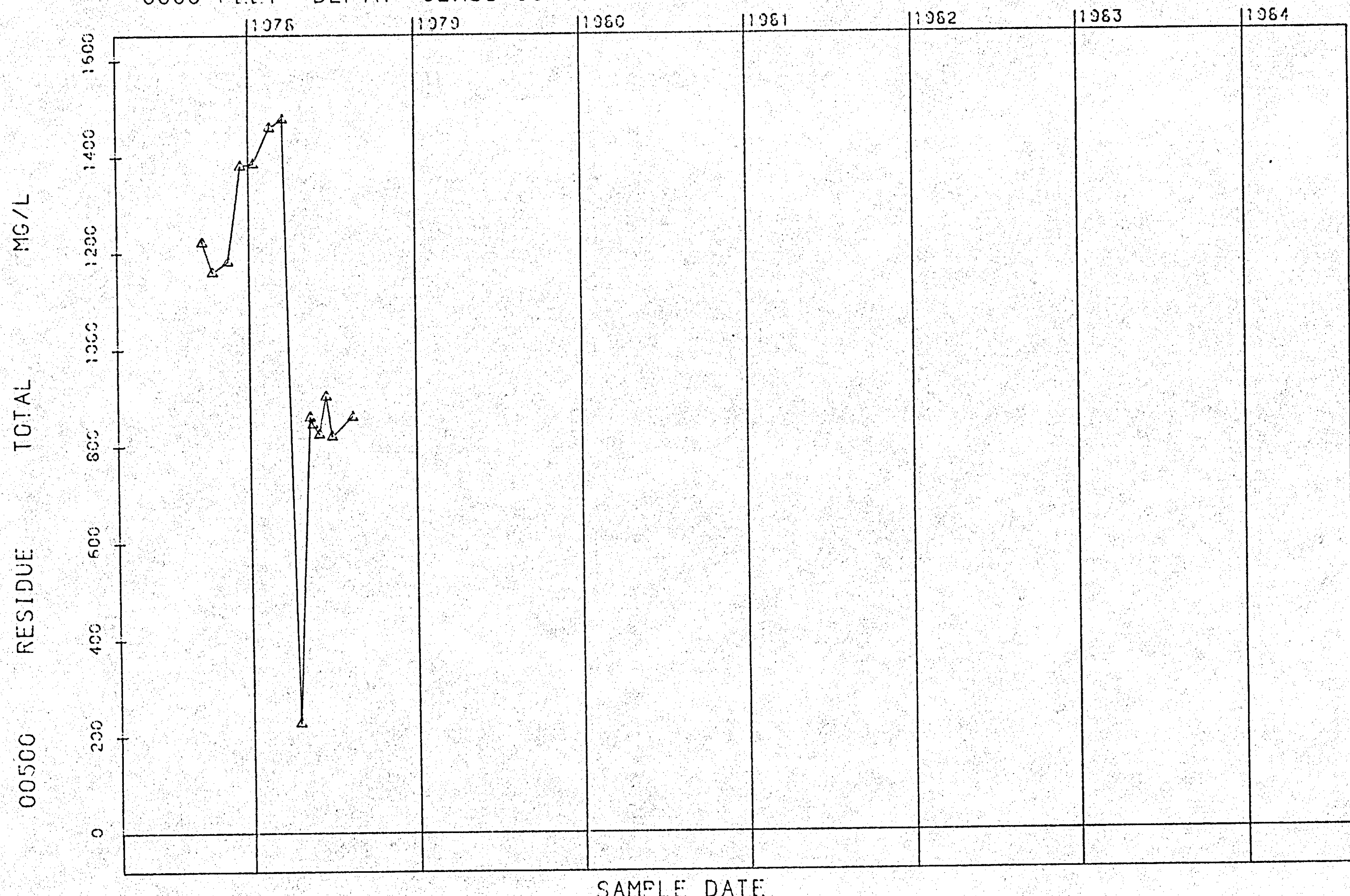
46P007
44 35 33.0 097 04 21.0 2
SAARANERS BEACH T113N R52W SEC 16
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810530
0000 FEET DEPTH CLASS 00 CSN-RSP 0595684-0622497



STARTING DATE 77/3 /10

Figure IV-27

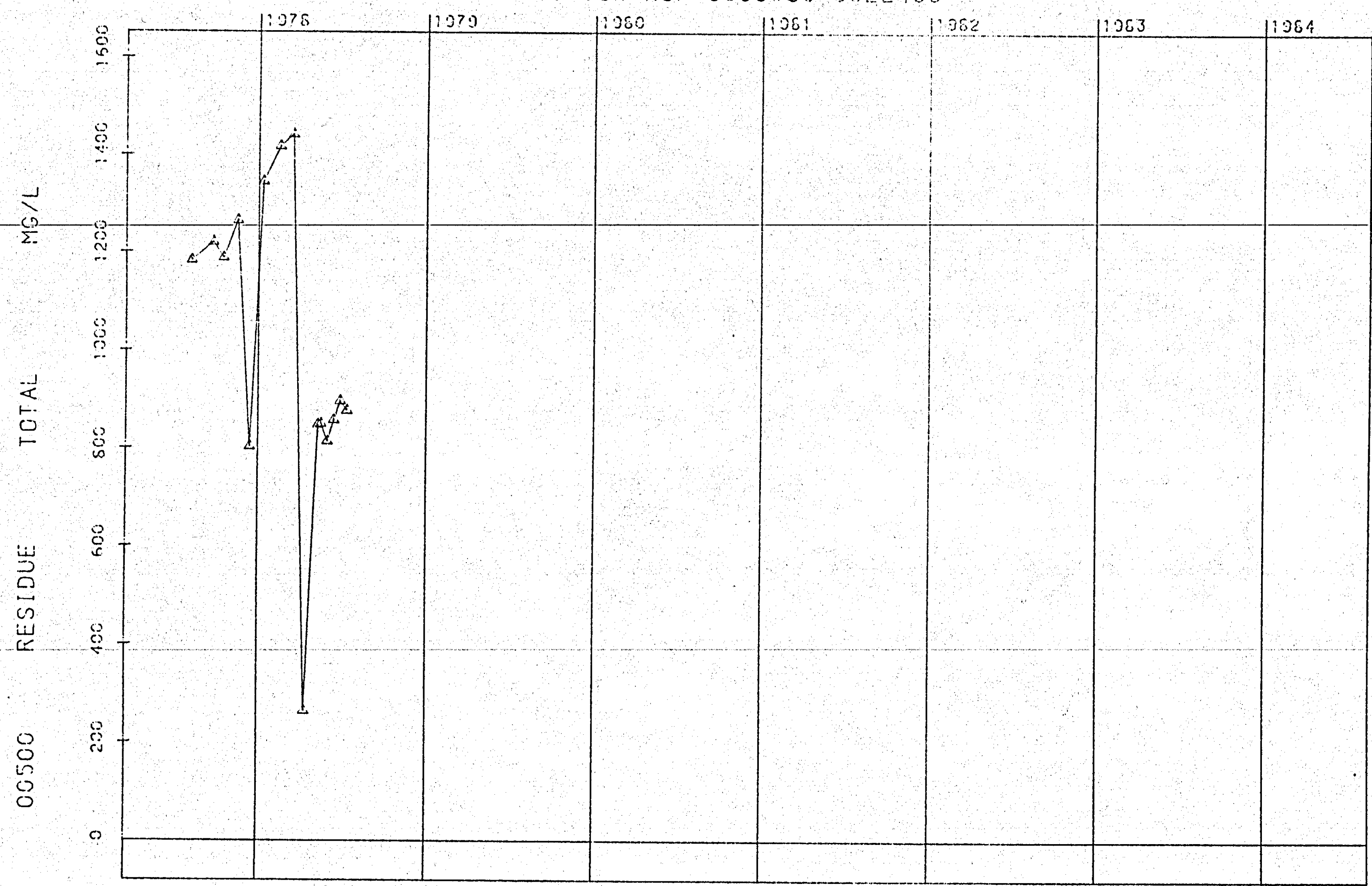
46P008
44 34 21.0 097 02 37.0 2
WEST ESTELLINE T113N R52W SECTION 23
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810530
0000 FEET DEPTH CLASS 00 CSN-RSP 0595685-0622498



STARTING DATE 77/3 /10

Figure IV-28

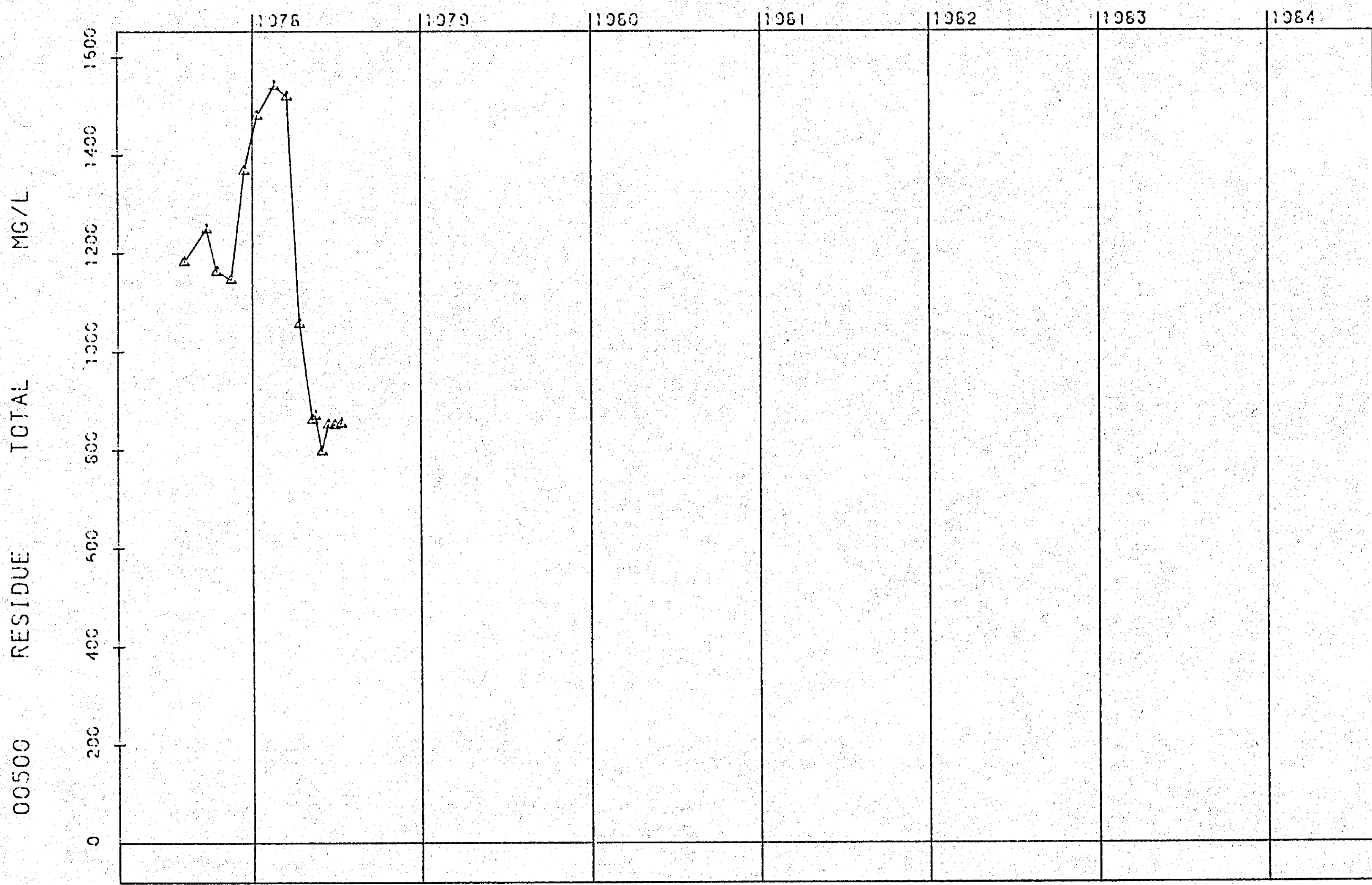
46P009
44 32 22.0 097 04 07.0 2
POINSETT REC AREA T112N R52W SEC 4
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810530
0000 FEET DEPTH CLASS 00 CSN-RSP 0595686-0622490



STARTING DATE 77/3 /10

Figure IV-29

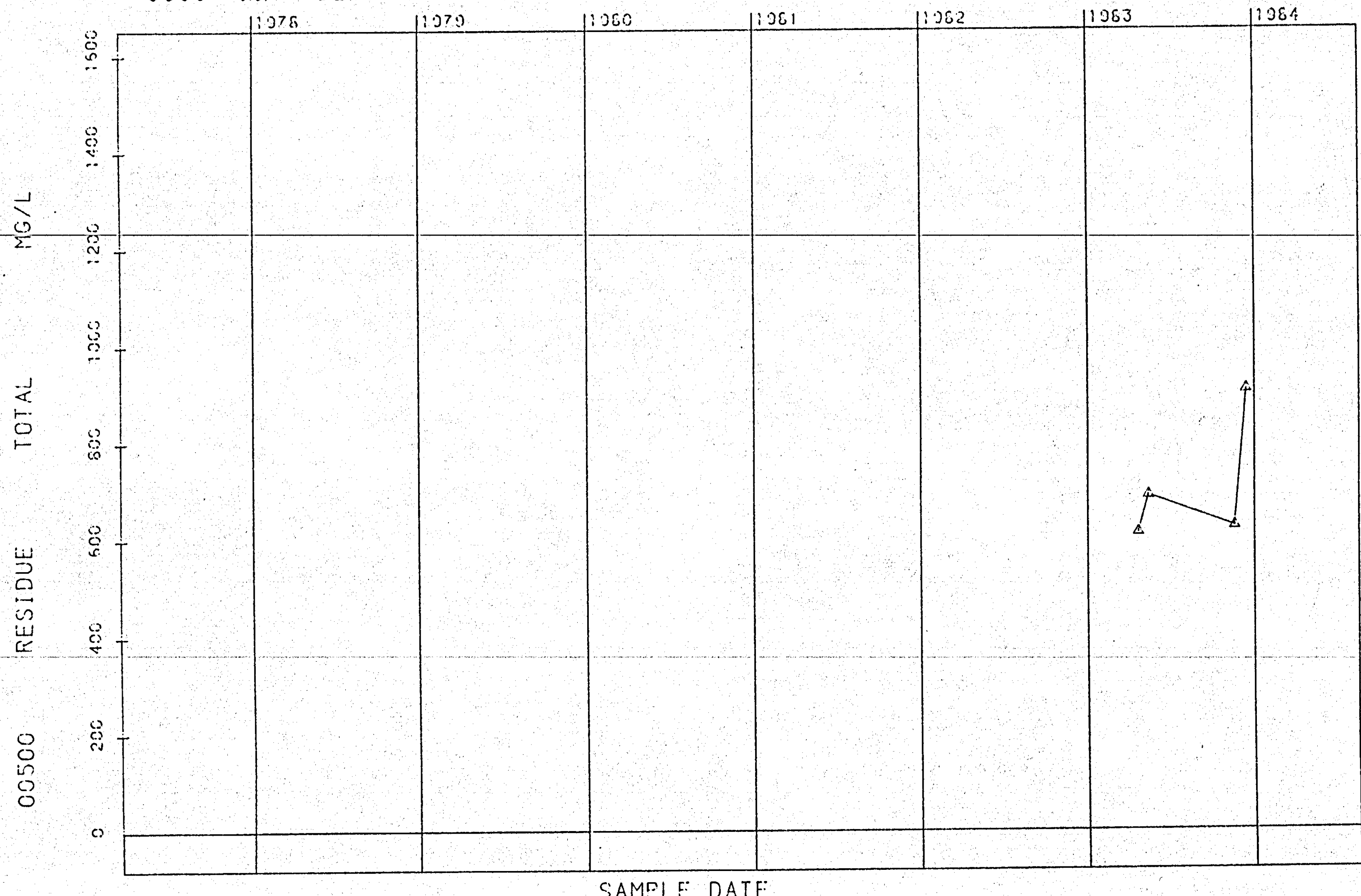
46P010
44 33 18.0 097 07 12.0 2
SORENSON T113N R52W SECTION 20
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810530
0000 FEET DEPTH CLASS 00 CSN-RSP 0595687-0622500



STARTING DATE 77/3 /10

46LP4
44 44 36.0 096 51 55.0 2
AT BOSWELL DAM T114N-R51W-S30 DCDD
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER BASIN 090700
BIG SIOUX RIVER BASIN
21SDLAKE 840824
0000 FEET DEPTH CLASS 00 CSN-RSP 0741944-0744335

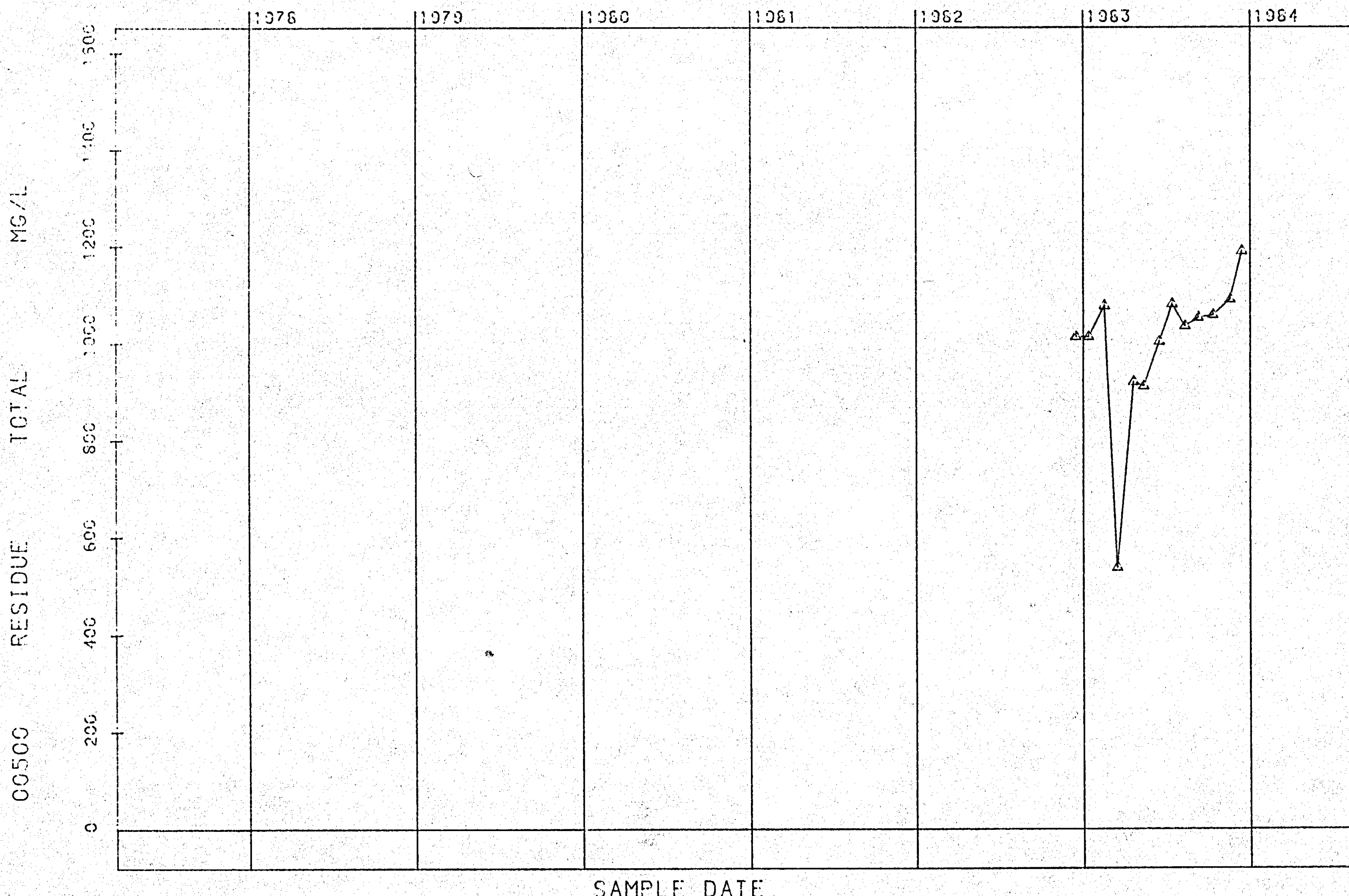
Figure IV-30



STARTING DATE 77/3 /10

46PSST
41 50 23.0 097 03 05.0 2
COMPOSITE SAMPLE T113N-R52W-S28 CDCA
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER BASIN 090700
BIG SIOUX RIVER BASIN
21SDLAKE 840824
0000 FEET DEPTH CLASS 00 CSN-RSP 0741946-0744337

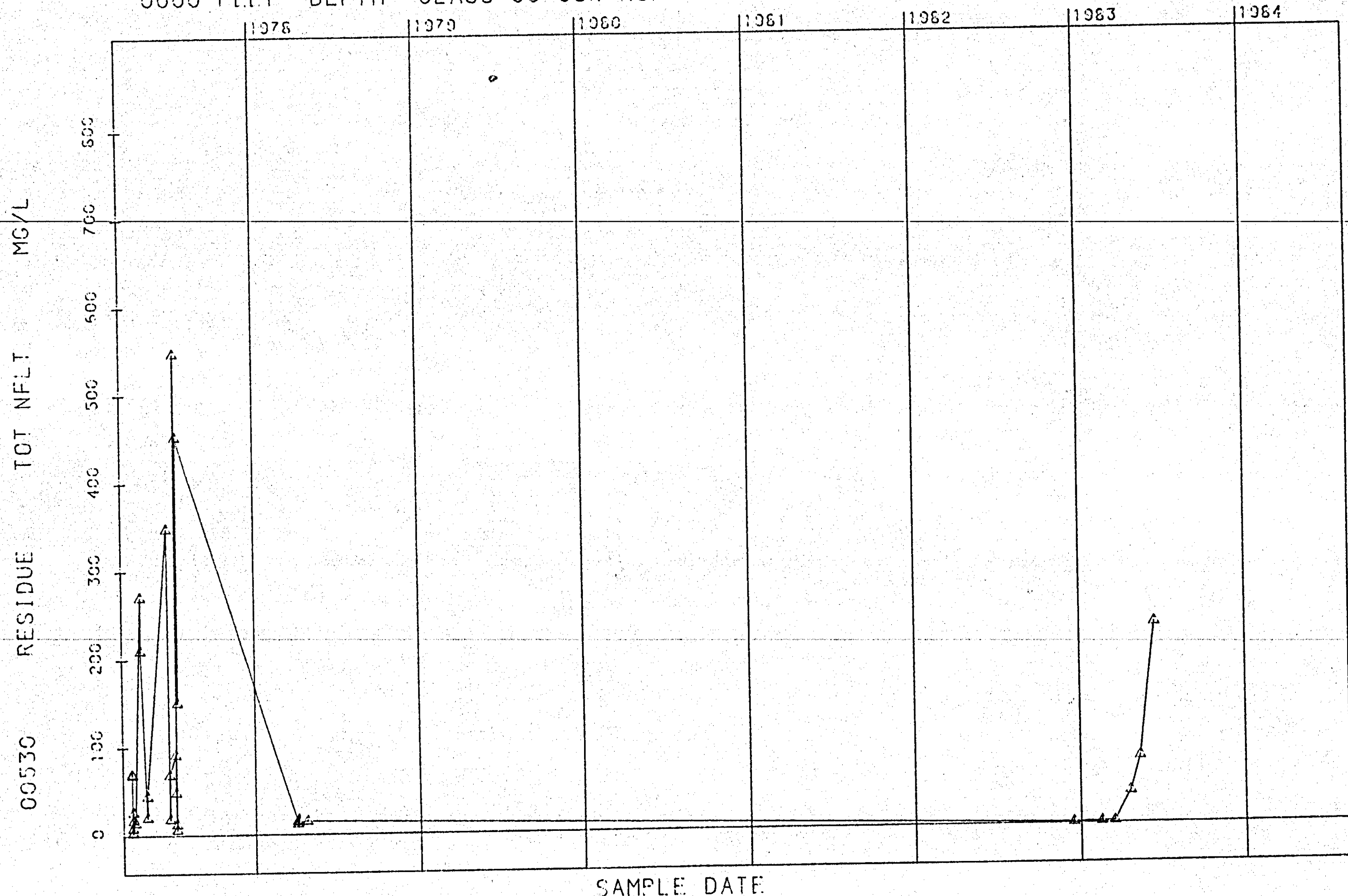
Figure IV-31



STARTING DATE 77/3 /10

Figure IV-32

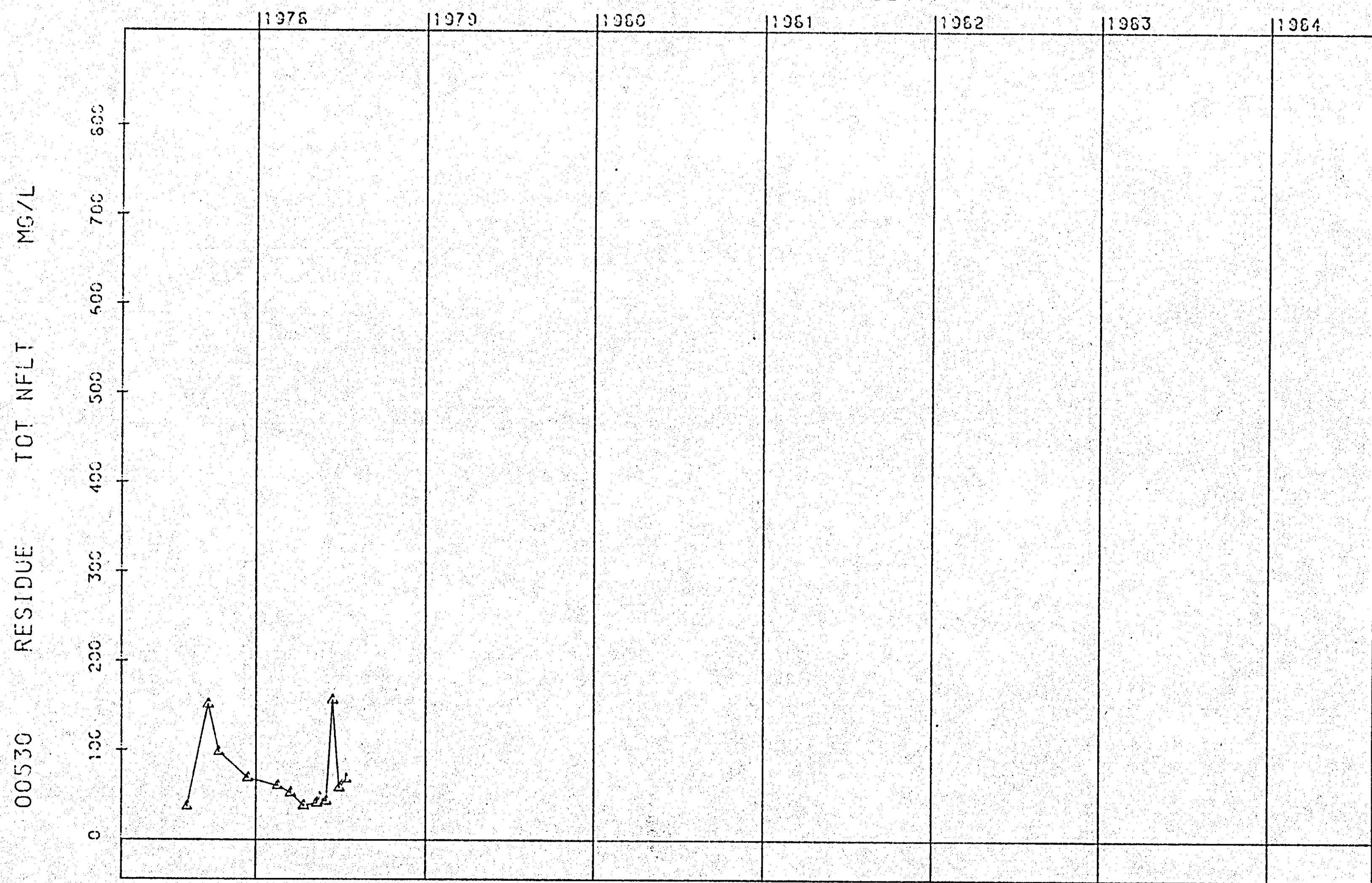
46P004
44 36 07.0 097 03 14.0 2
STONE BRIDGE T113N R52W SEC 10/15
46057 SOUTH DAKOTA HAMLIN
9MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810418
0000 FEET DEPTH CLASS 00 CSN-RSP 0589381-0554048



STARTING DATE 77/3 /10

46P007
44 35 33.0 097 04 21.0 2
SAARANERS BEACH T113N R52W SEC 16
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810530
0000 FEET DEPTH CLASS 00 CSN-RSP 0595684-0622497

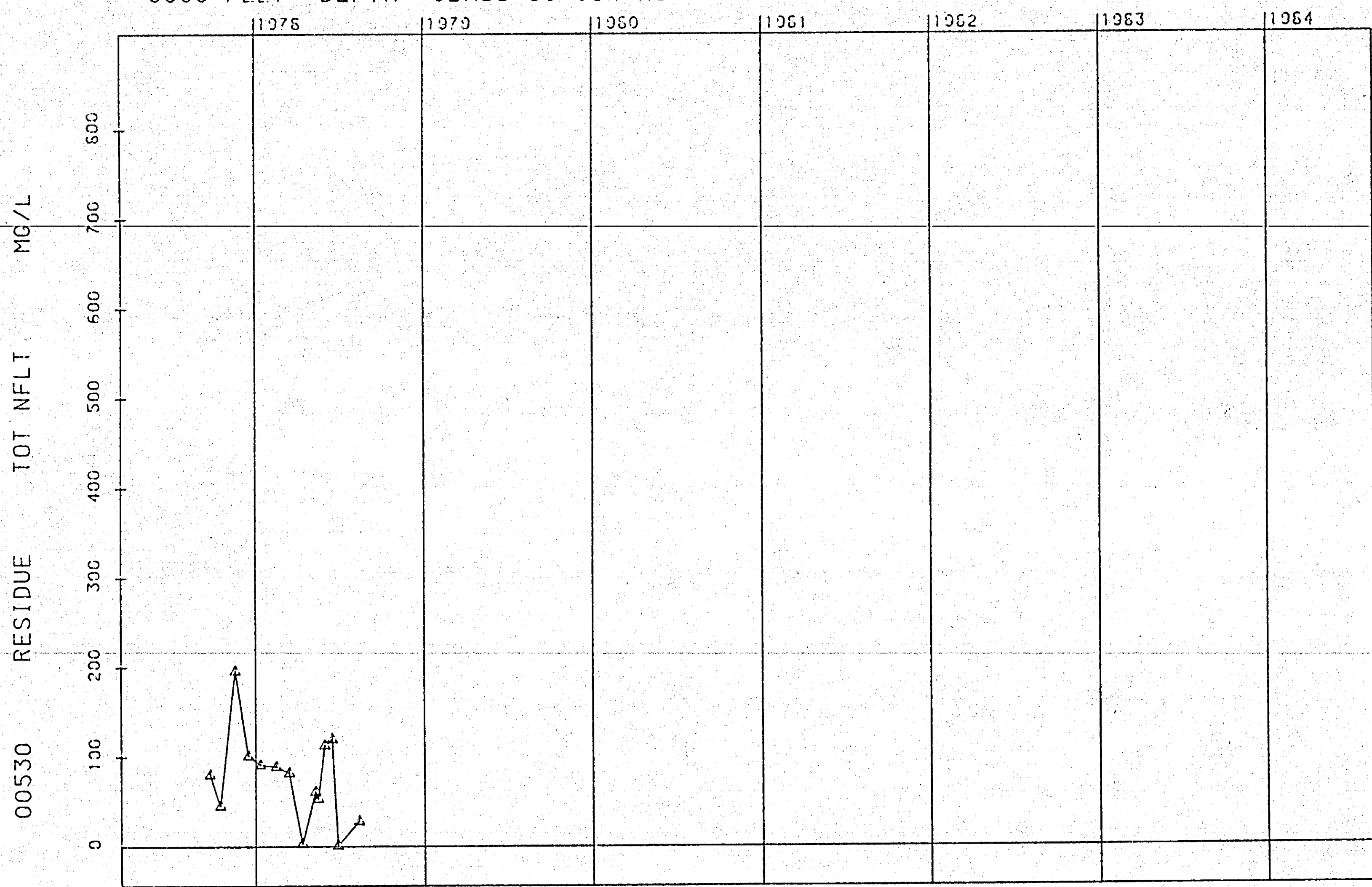
Figure IV-33



STARTING DATE 77/3 /10

Figure IV-34

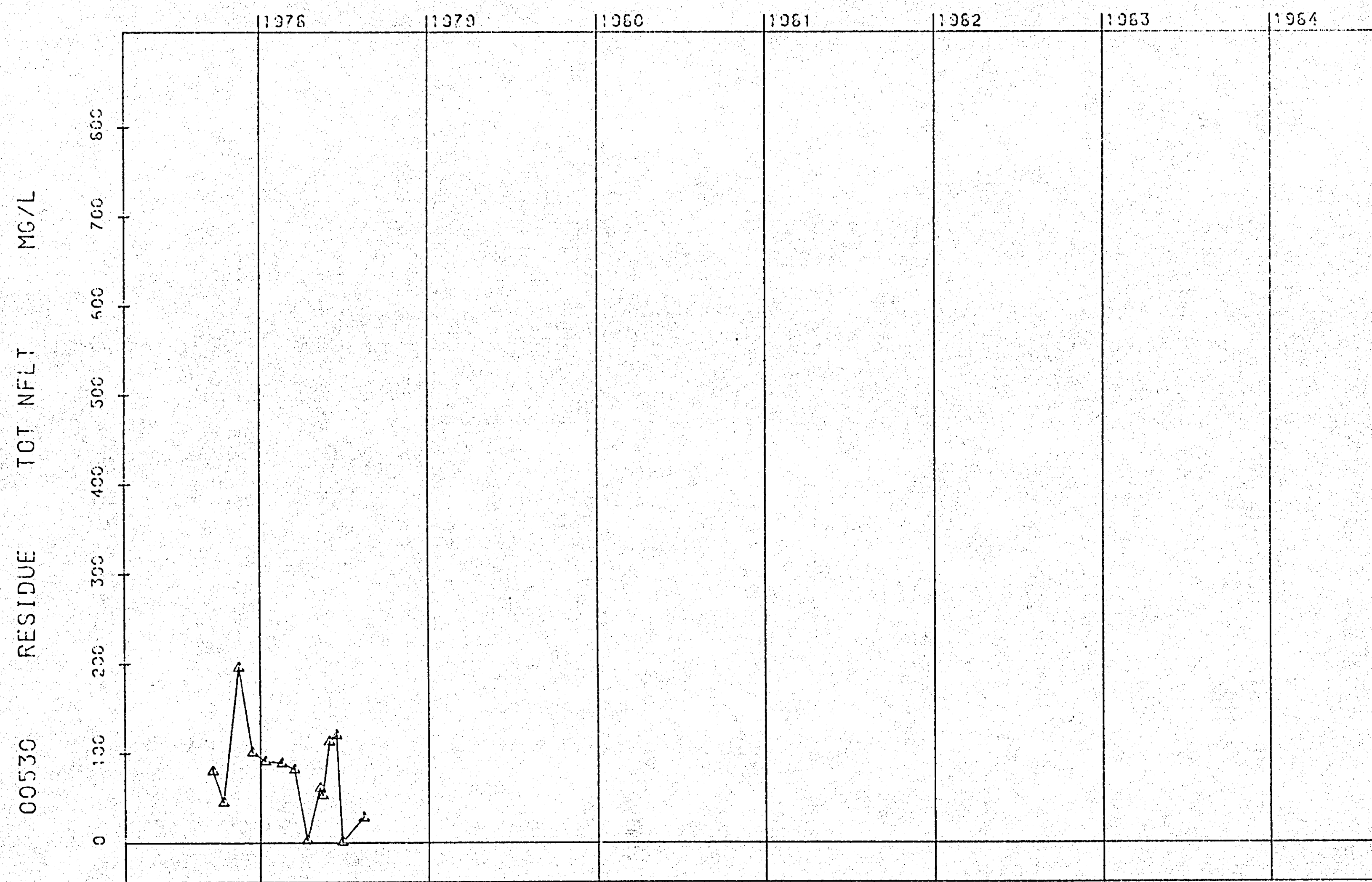
46P008
44 34 21.0 097 02 37.0 2
WEST ESTELLINE T113N R52W SECTION 23
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810530
0000 FEET DEPTH CLASS 00 CSN-RSP 0595685-0622498



STARTING DATE 77/3 /10

Figure IV-35

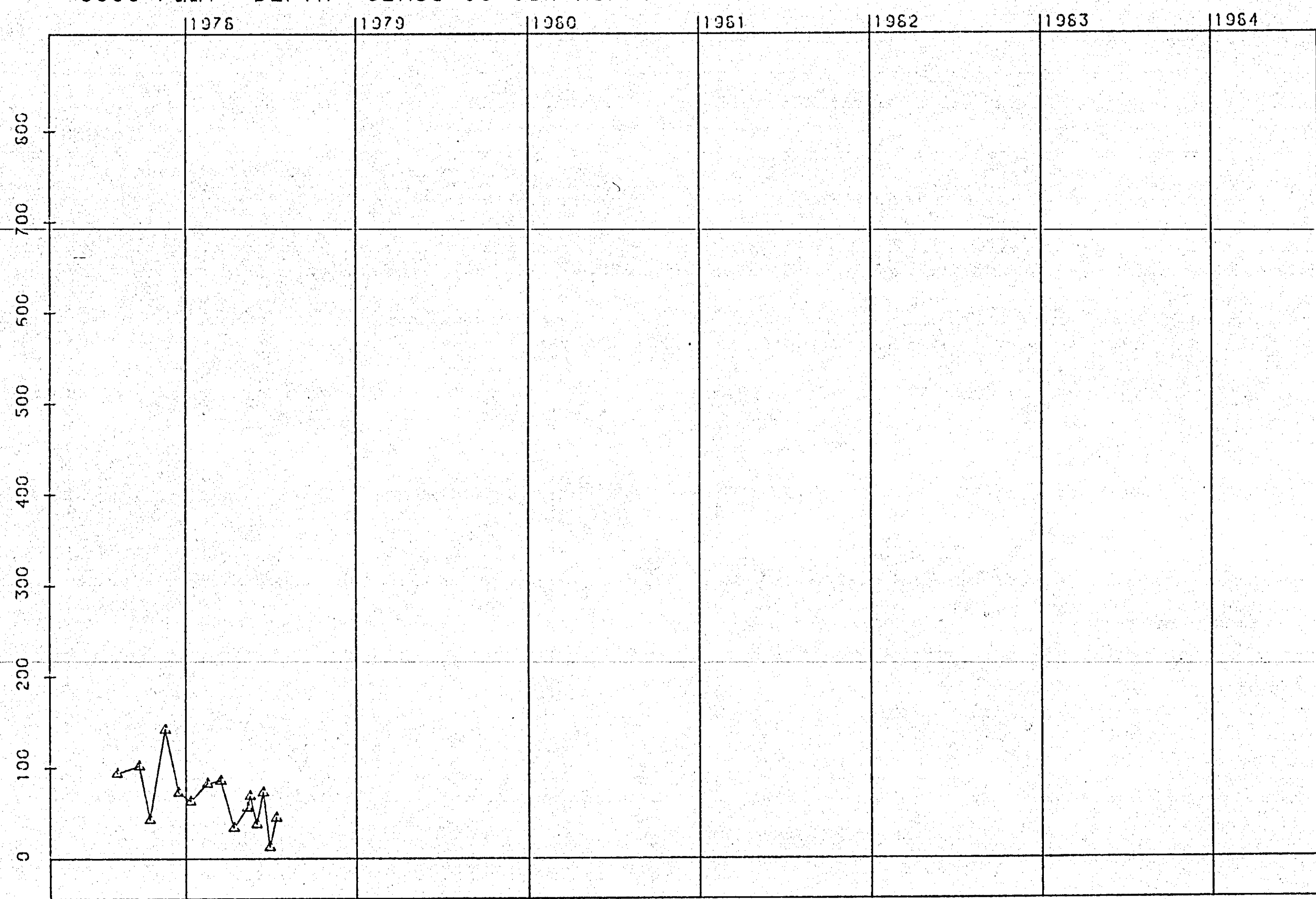
46P008
44 34 21.0 097 02 37.0 2
WEST ESTELLINE T113N R52W SECTION 23
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810530
0000 FEET DEPTH CLASS 00 CSN-RSP 0595685-0622498



STARTING DATE 77/3 /10

Figure IV-36

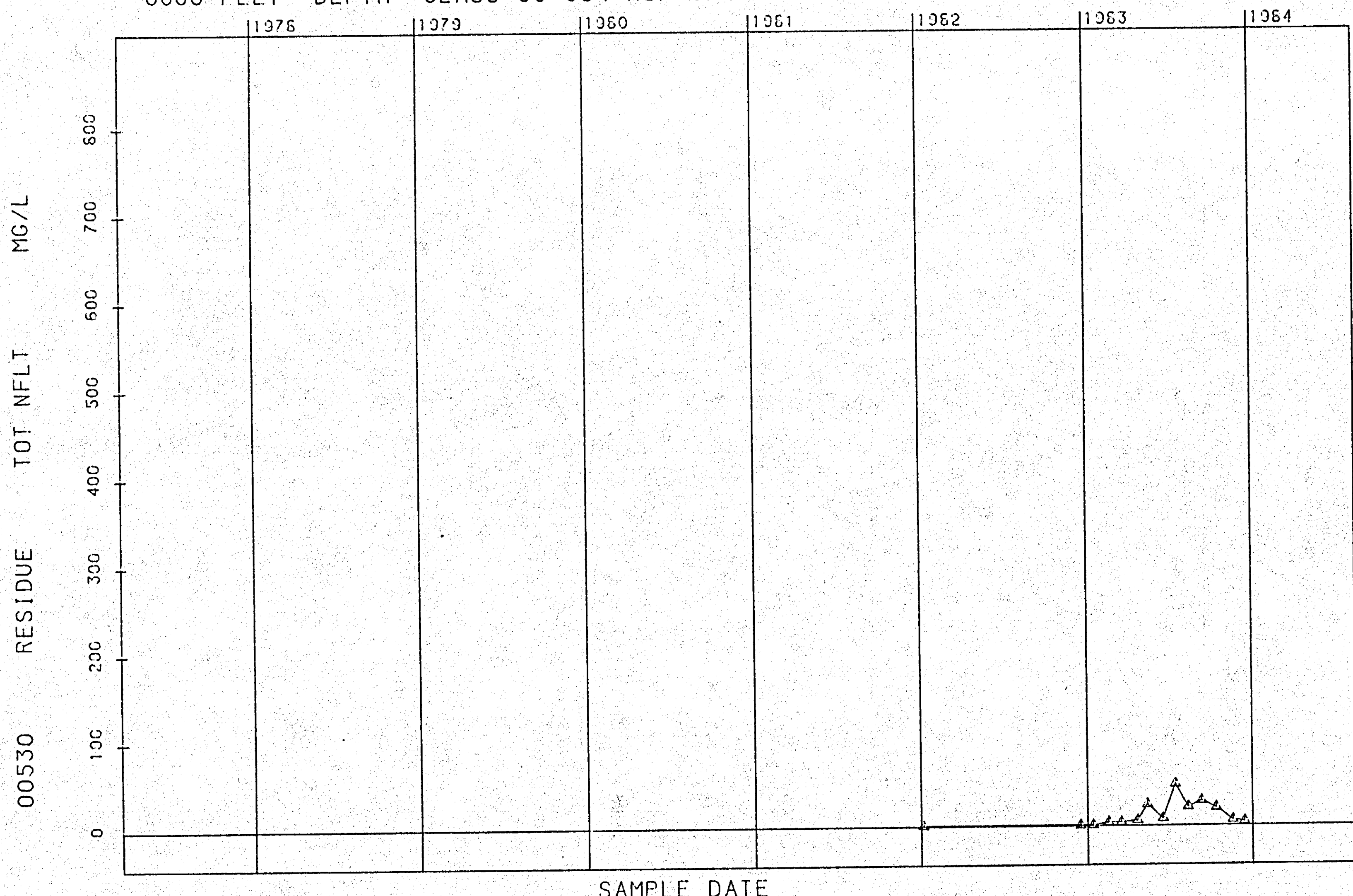
46P010
44 33 18.0 097 07 12.0 2
SORENSON T113N R52W SECTION 20
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810530
0000 FEET DEPTH CLASS 00 CSN-RSP 0595687-0622500



STARTING DATE 77/3 /10

Figure IV-37

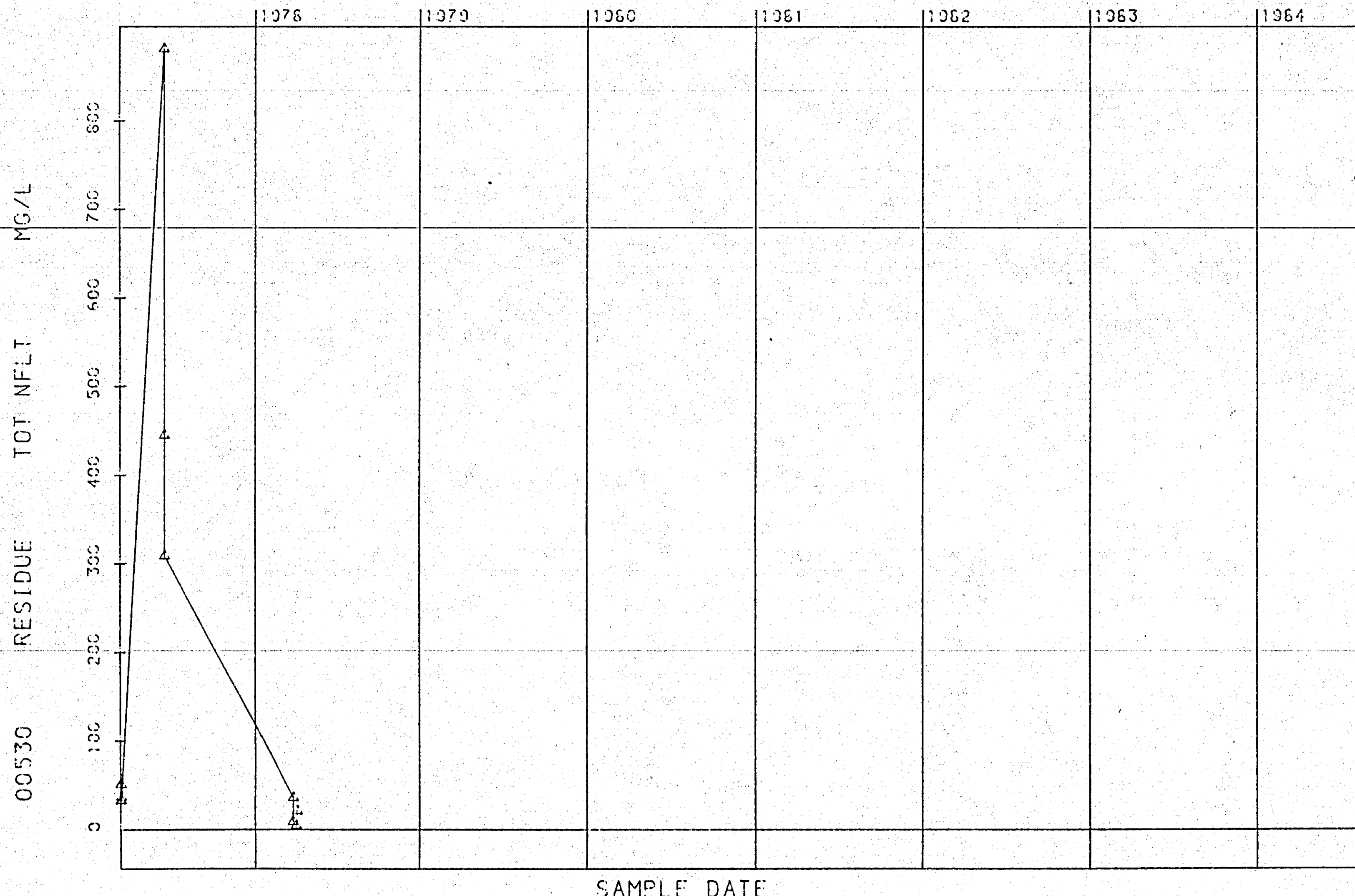
46PSST
44 50 23.0 097 03 05.0 2
COMPOSITE SAMPLE T113N-R52W-S28 CDCA
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER BASIN 090700
BIG SIOUX RIVER BASIN
21SDLAKE 840824
0000 FEET DEPTH CLASS 00 CSN-RSP 0741946-0744337



STARTING DATE 77/3 /10

Figure IV-38

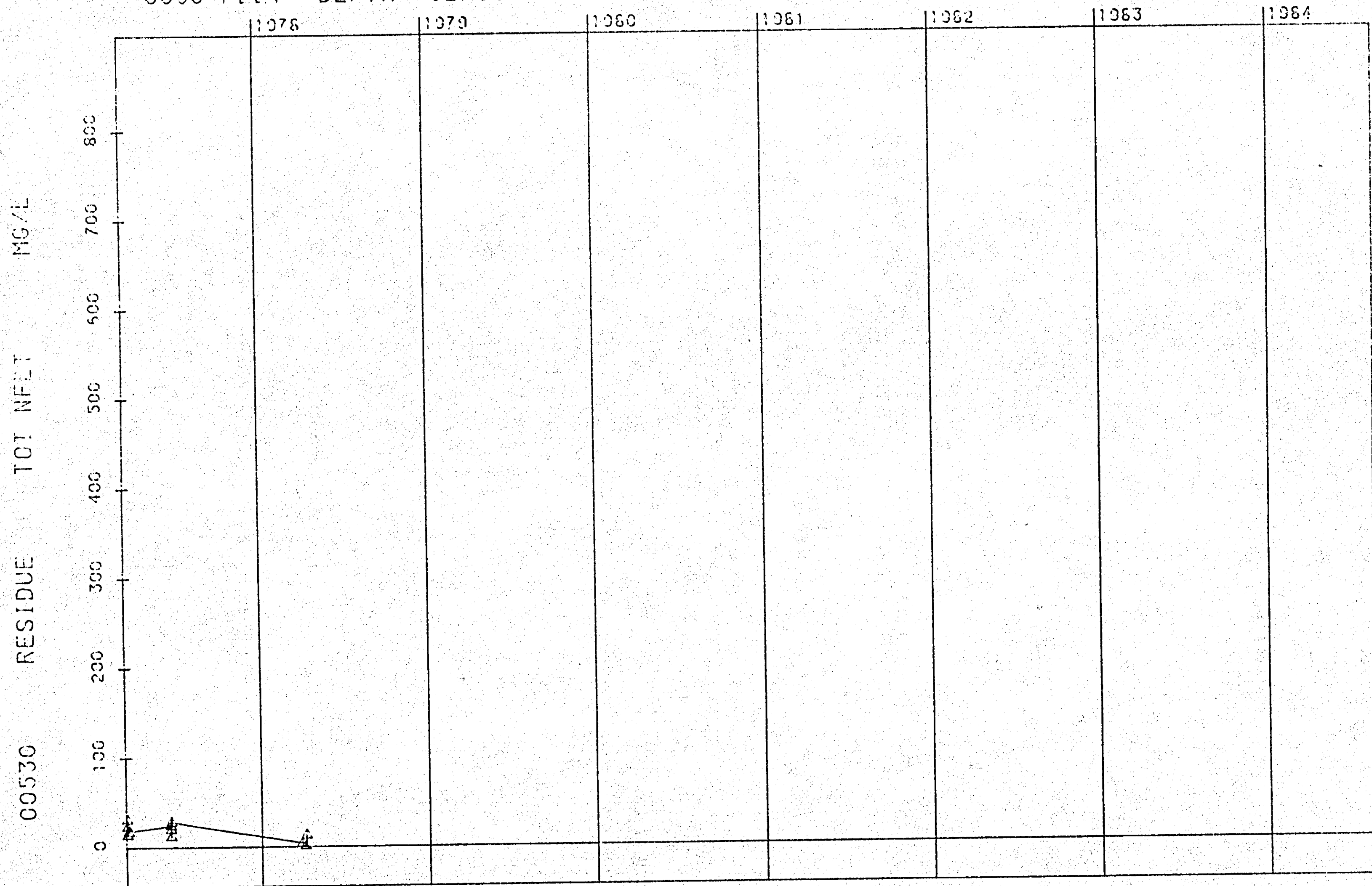
46P001
44 32 03.0 097 05 19.0 2
S TRIB CHURCH T112N R52W SEC 5
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810418
0000 FEET DEPTH CLASS 00 CSN-RSP 0589378-0554045



STARTING DATE 77/3 /10

Figure IV-39

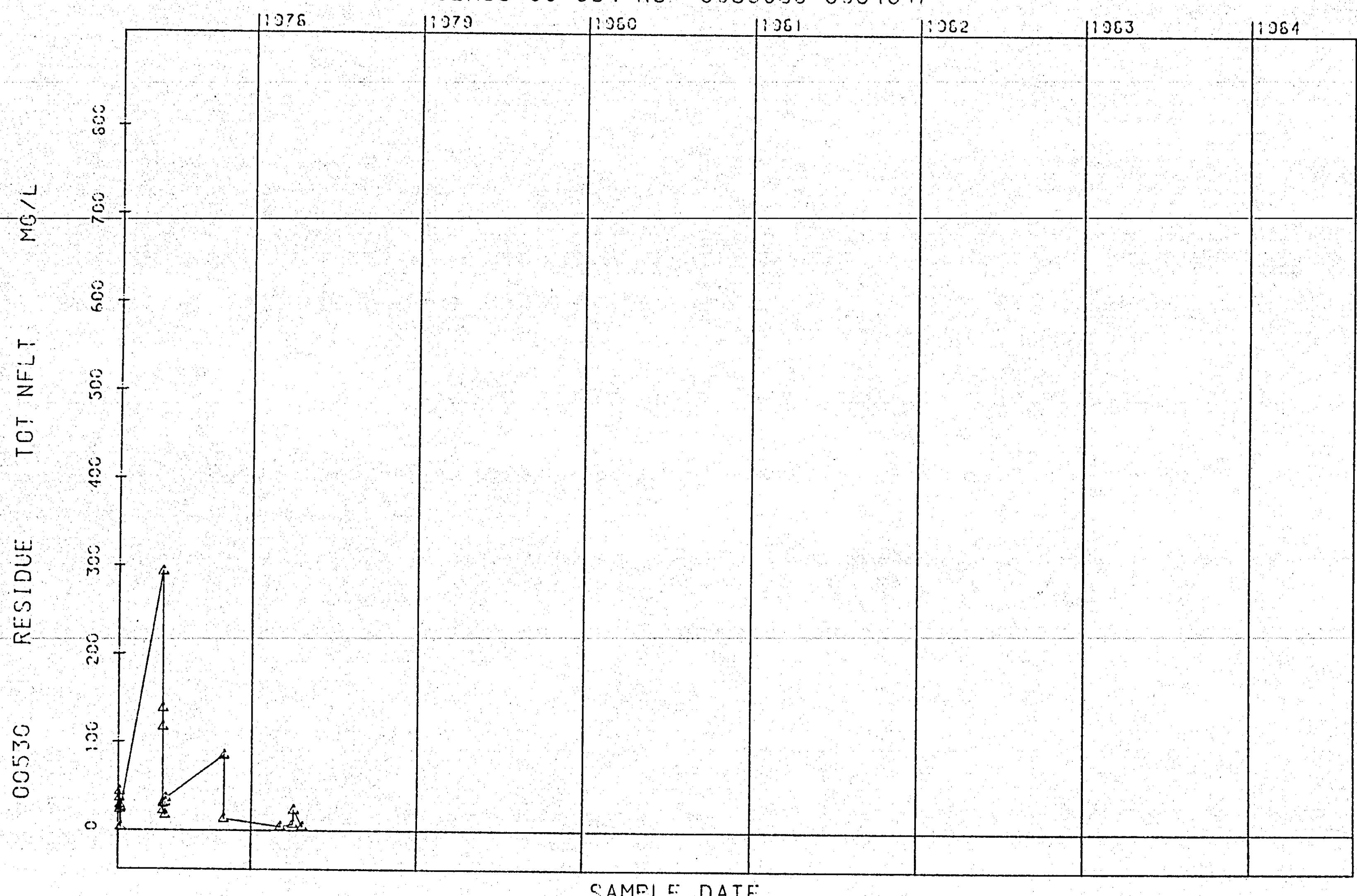
46P002
44 33 47.0 097 07 41.0 2
INLET FROM ALBERT T113N R52153W SEC 30
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810418
0000 FEET DEPTH CLASS 00 CSN-RSP 0589379-0554046



STARTING DATE 77/3 /10

Figure IV-40

46P003
44 34 44.0 097 05 39.0 2
NW INLET T113N R52W SEC 20
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810418
0000 FEET DEPTH CLASS 00 CSN-RSF 0589380-0554047



STARTING DATE 77/3 /10

46P005
44 36 06.0 097 00 47.0 2
OUTLET ROAD FAR T113N R52W SEC 12/13
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810418
0000 FEET DEPTH CLASS 00 CSN-RSP 0589382-0554049

Figure IV-41

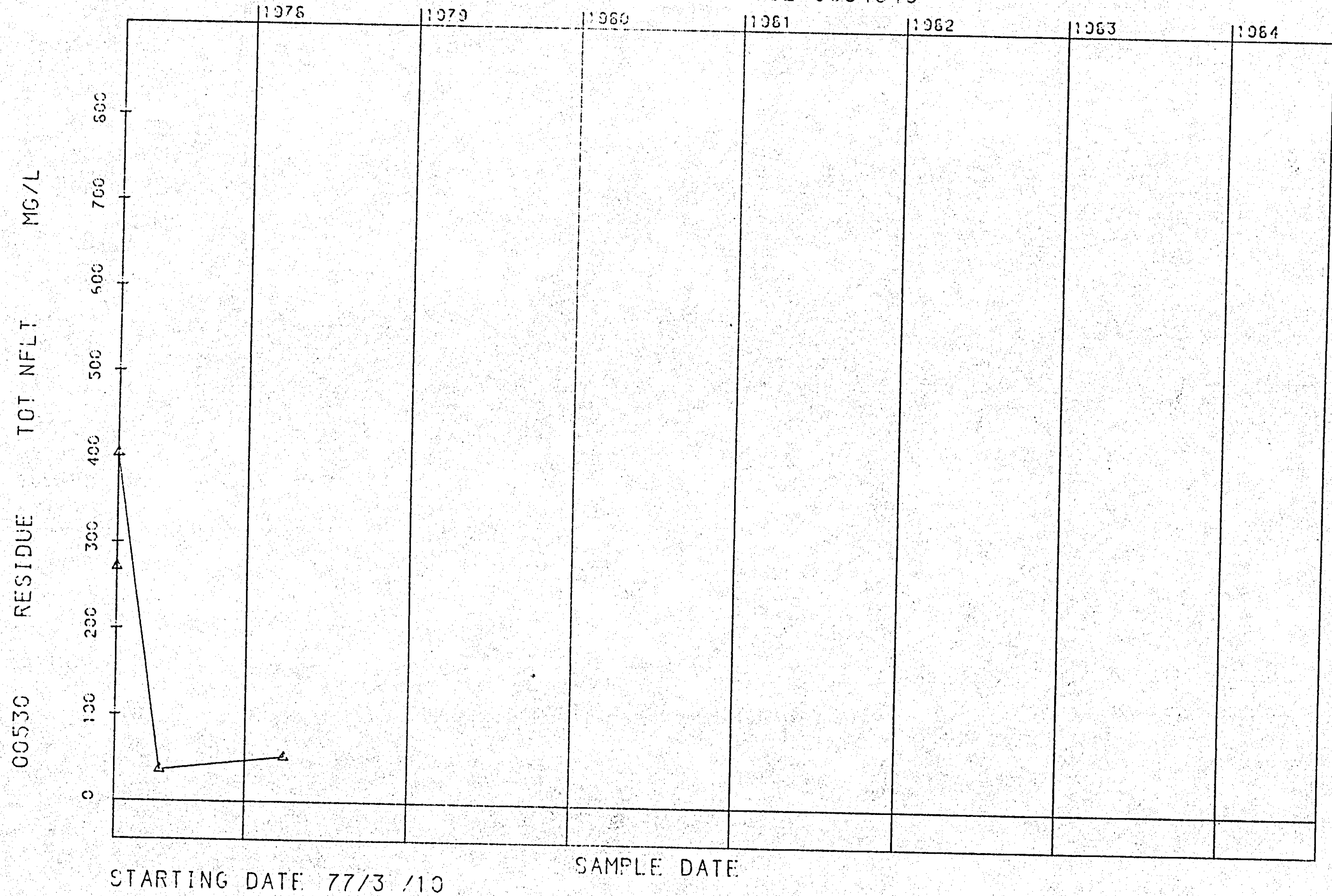
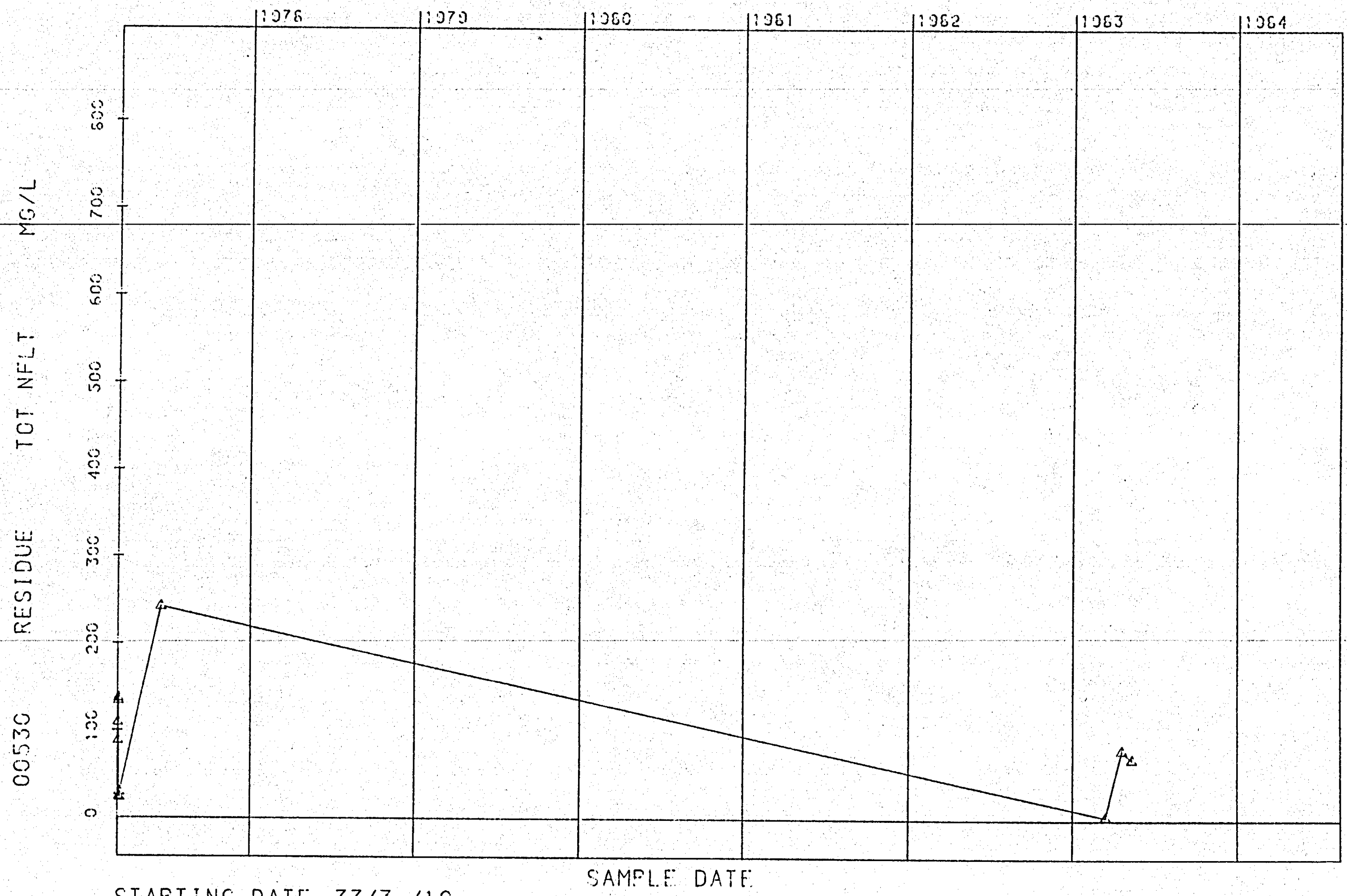


Figure IV-42

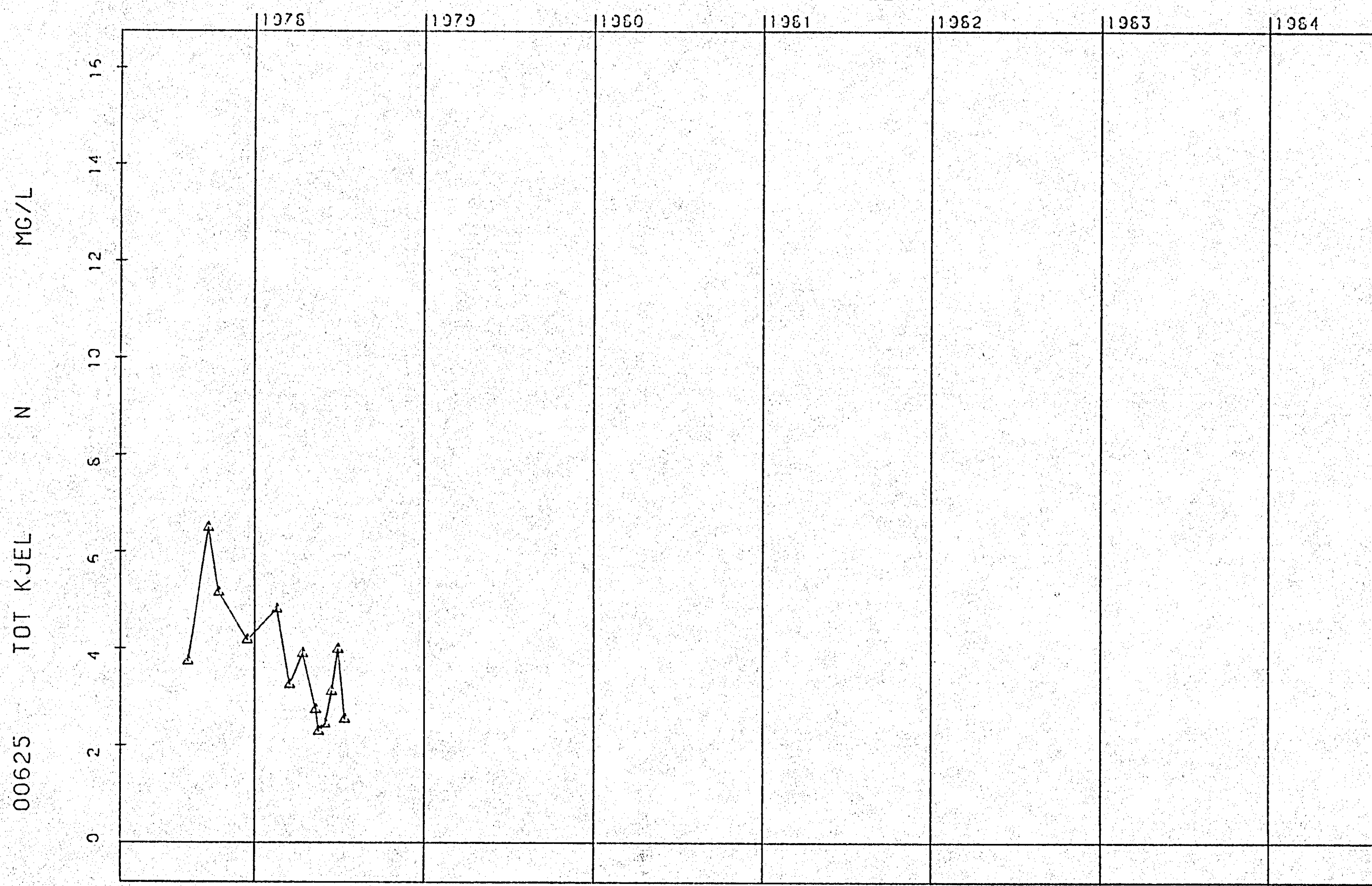
46P006
44 35 45.0 097 01 38.0 2
OUTLET ROAD CLOSE T113N R52W SEC 13
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810418
0000 FEET DEPTH CLASS 00 CSN-RSP 0589383-0554050



STARTING DATE 77/3 /10

Figure IV-43

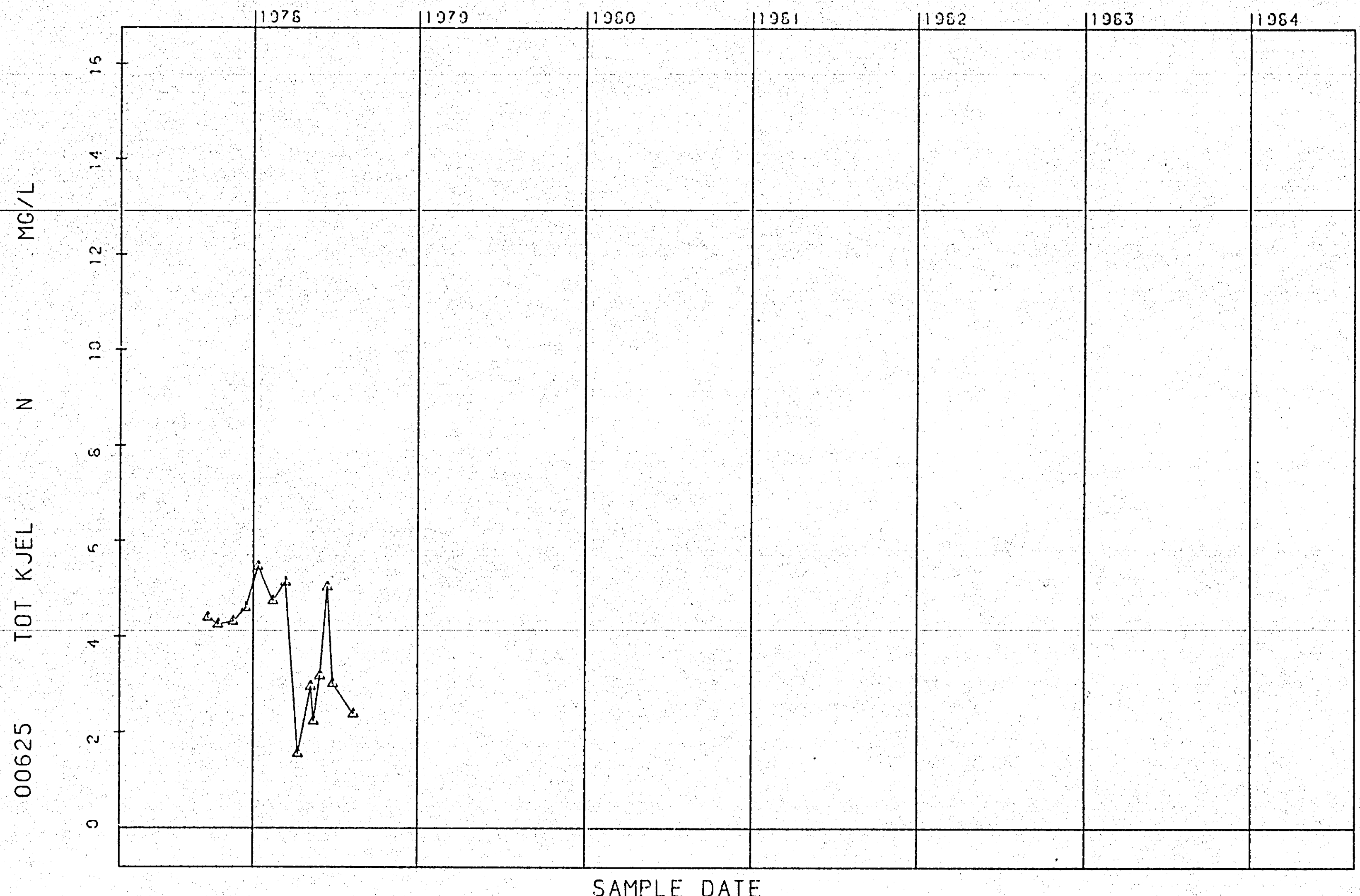
46P007
44 35 33.0 097 04 21.0 2
SAARANERS BEACH T113N R52W SEC 16
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810530
0000 FEET DEPTH CLASS 00 CSN-RSP 0595684-0622497



STARTING DATE 77/3 /10

Figure IV-44

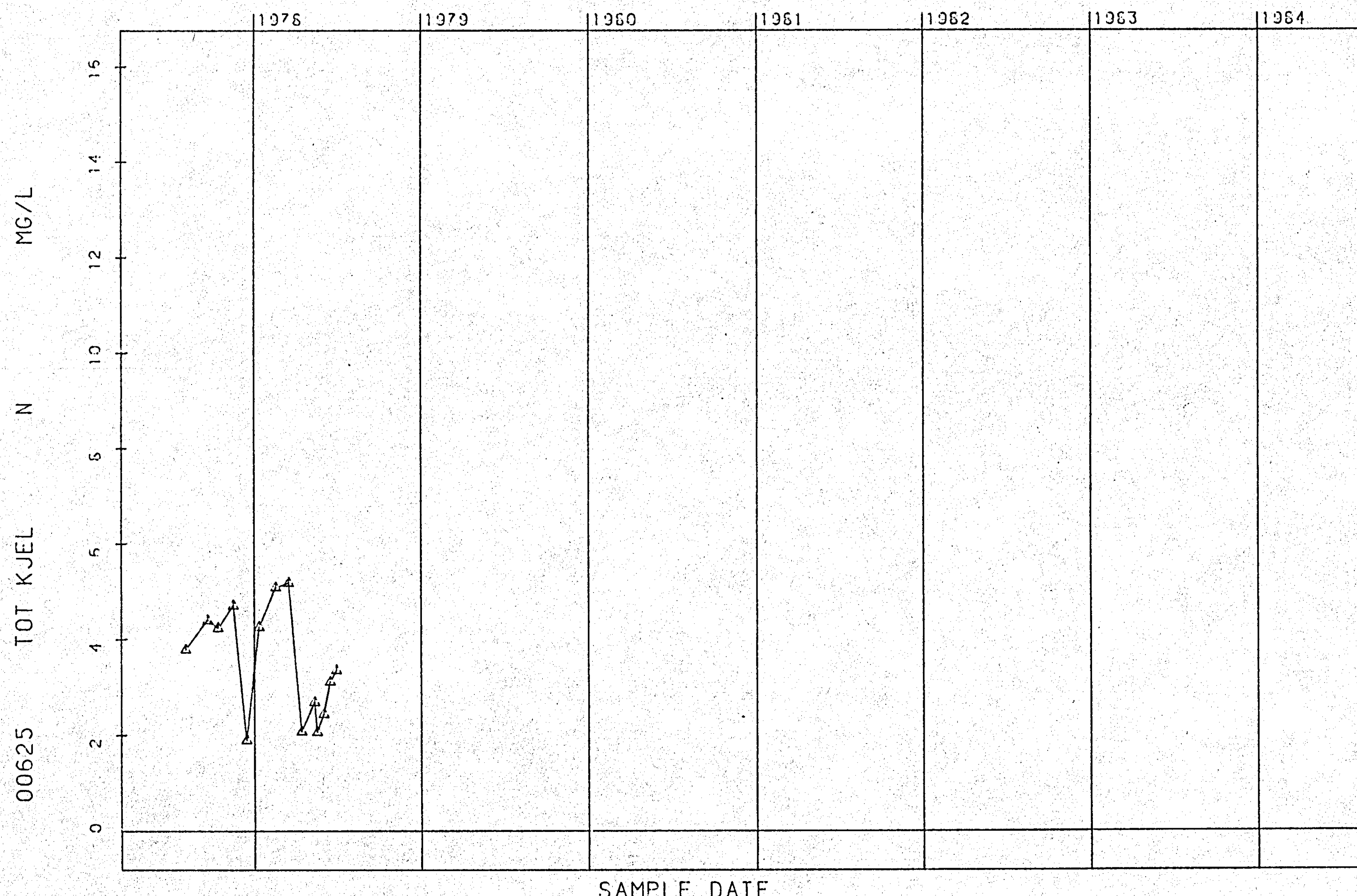
46P008
44 34 21.0 097 02 37.0 2
WEST ESTELLINE T113N R52W SECTION 23
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810530
0000 FEET DEPTH CLASS 00 CSN-RSP 0595685-0622498



STARTING DATE 77/3 /10

Figure IV-45

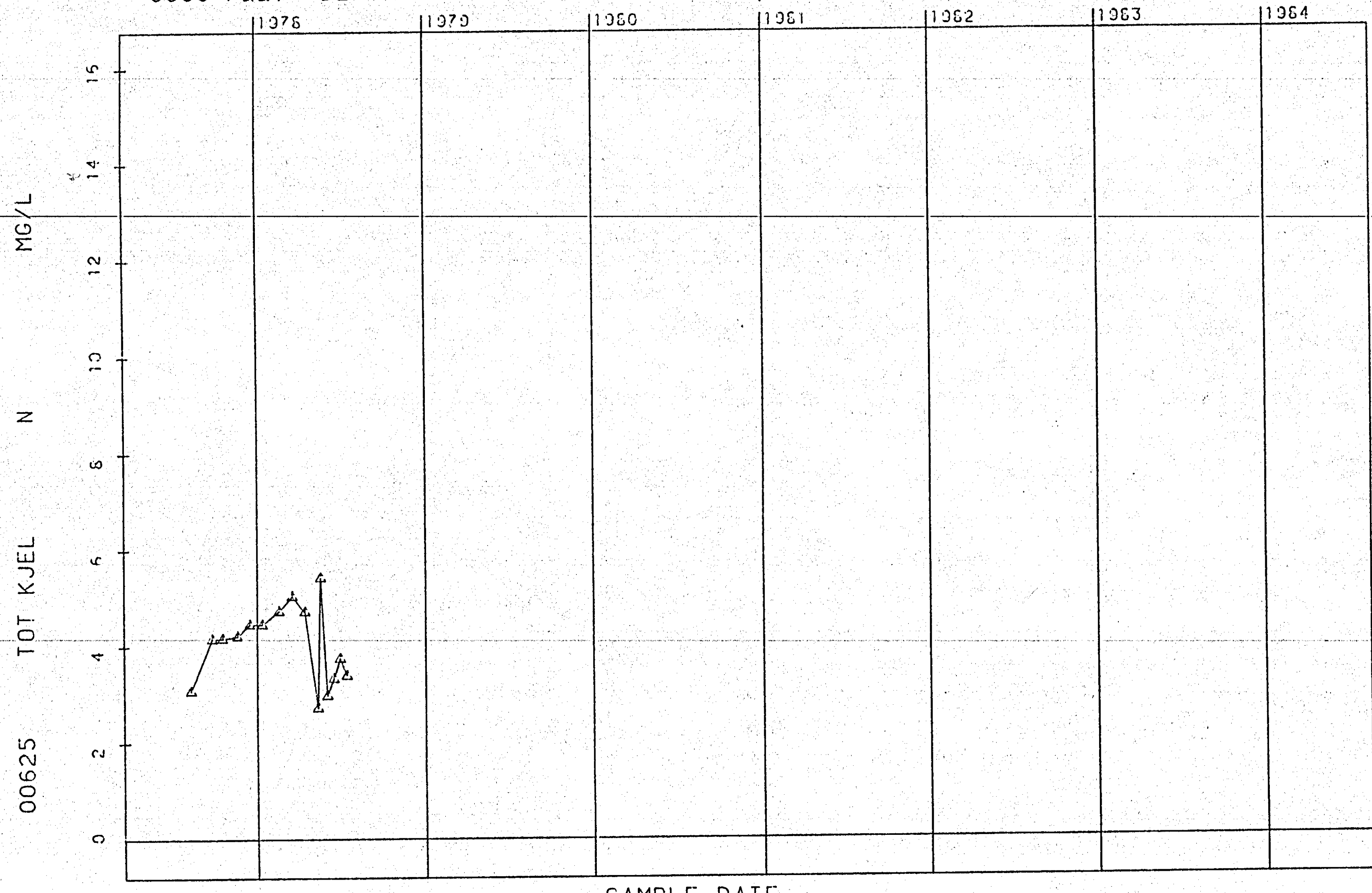
46P009
44 32 22.0 097 04 07.0 2
POINSETT REC AREA T112N R52W SEC 4
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810530
0000 FEET DEPTH CLASS 00 CSN-RSP 0595686-0622499



STARTING DATE 77/3 /10

Figure IV-46

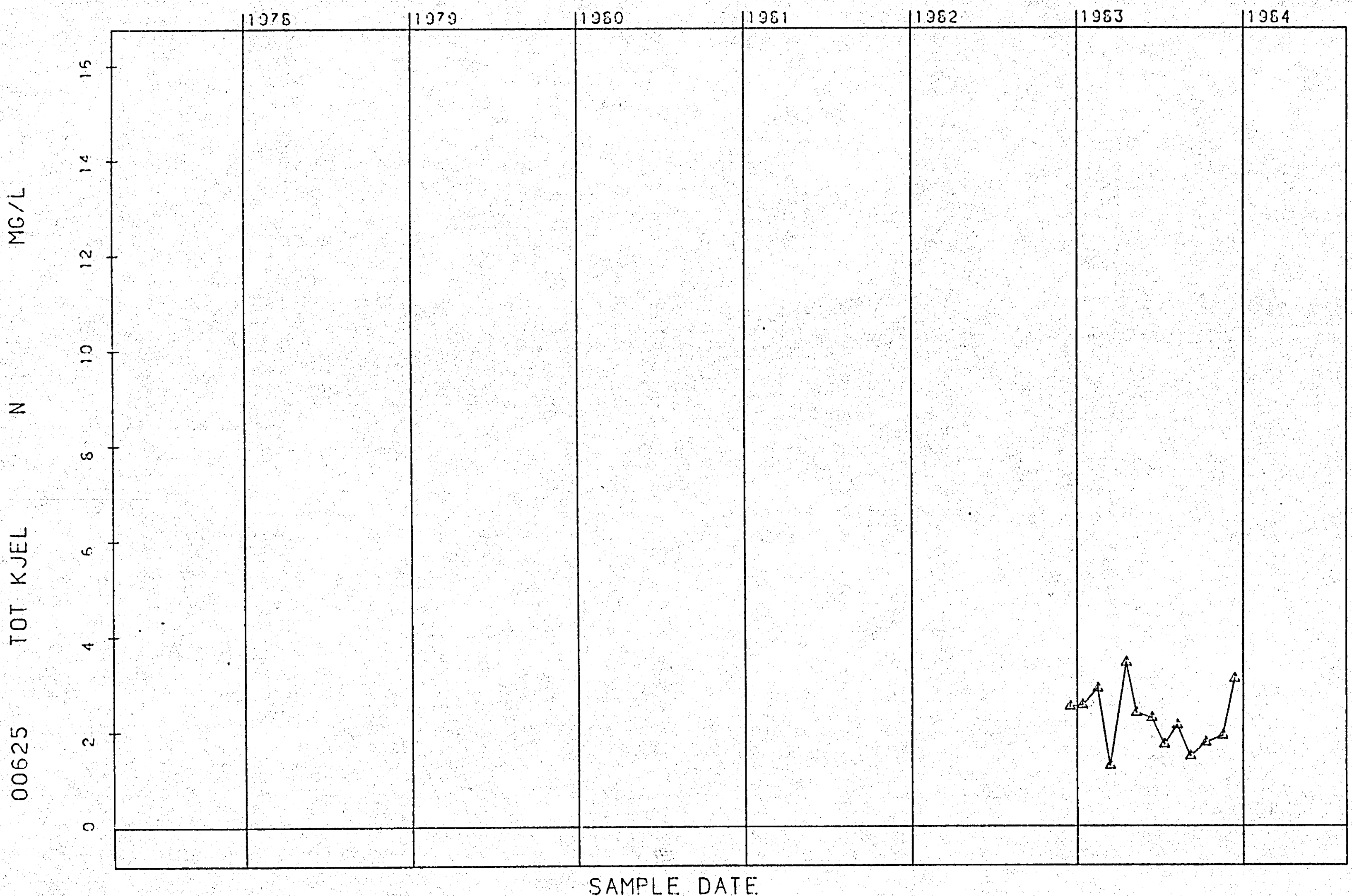
46P010
44 33 18.0 097 07 12.0 2
SORENSON T113N R52W SECTION 20
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810530
0000 FEET DEPTH CLASS 00 CSN-RSP 0595687-0622500



STARTING DATE 77/3 /10

46F551
44 50 23.0 097 03 05.0 2
COMPOSITE SAMPLE T113N-R52W-S28 CDCA
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER BASIN 090700
BIG SIOUX RIVER BASIN
21SDLAKE 840824
0000 FEET DEPTH CLASS 00 CSN-RSP 0741946-0744337

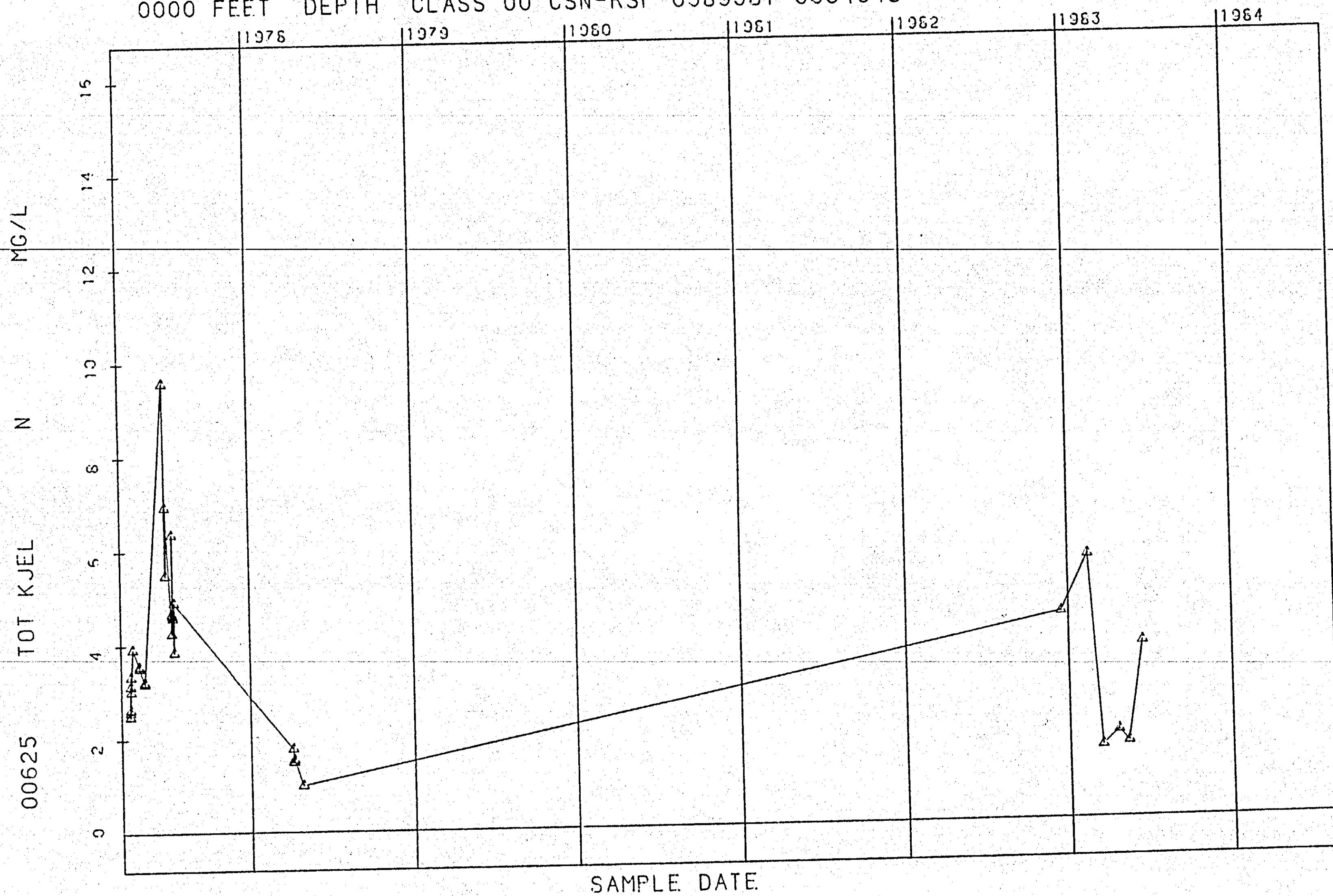
Figure IV-47



STARTING DATE 77/3 /10

Figure IV-48

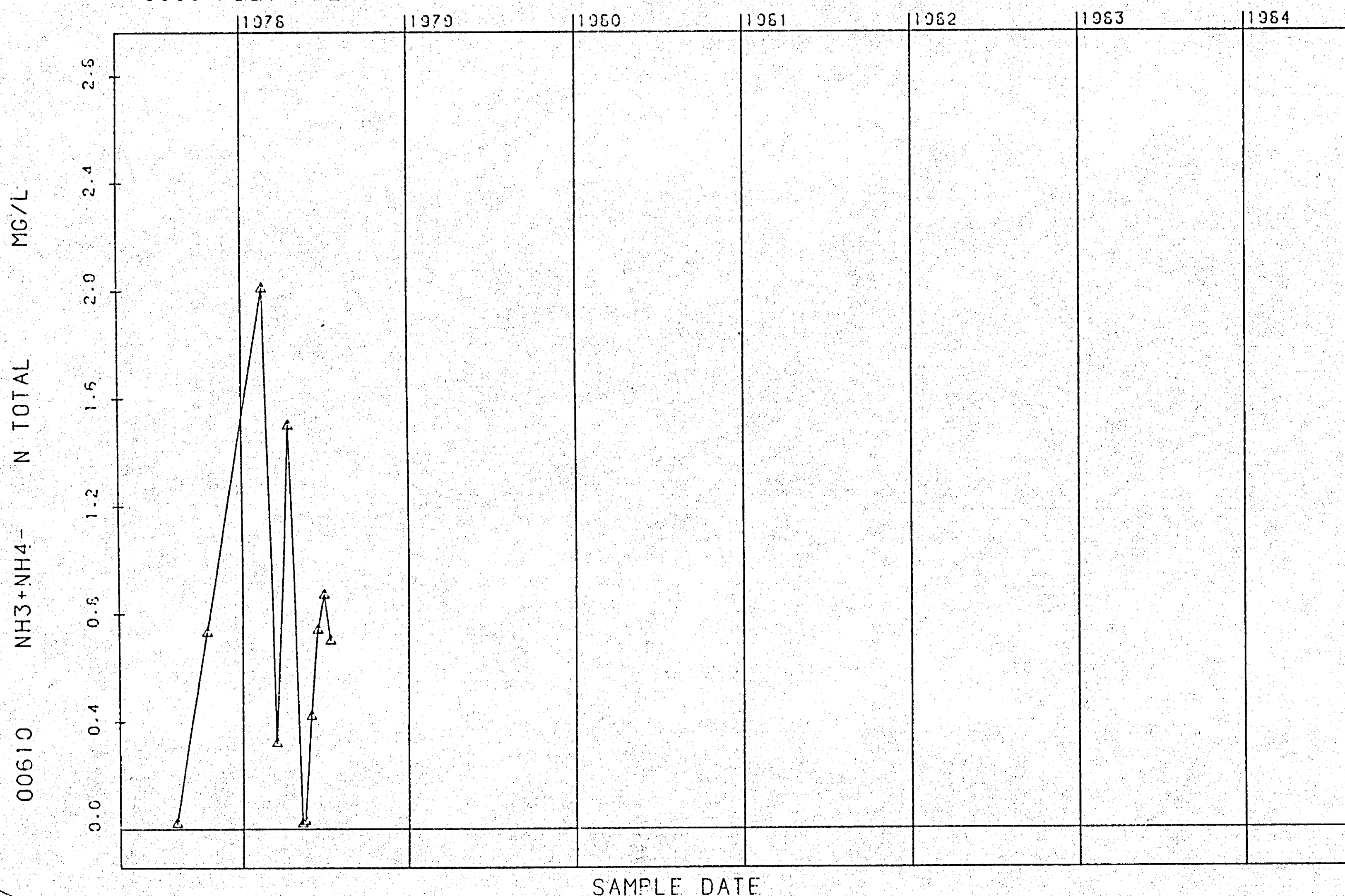
46P004
44 36 07.0 097 03 14.0 2
STONE BRIDGE T113N R52W SEC 10/15
46057 SOUTH DAKOTA HAMLIN
9MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810418
0000 FEET DEPTH CLASS 00 CSN-RSP 0589381-0554048



STARTING DATE 77/3 /10

46P007
44 35 33.0 097 04 21.0 2
SAARANERS BEACH T113N R52W SEC 16
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810530
0000 FEET DEPTH CLASS 00 CSN-RSP 0595684-0622497

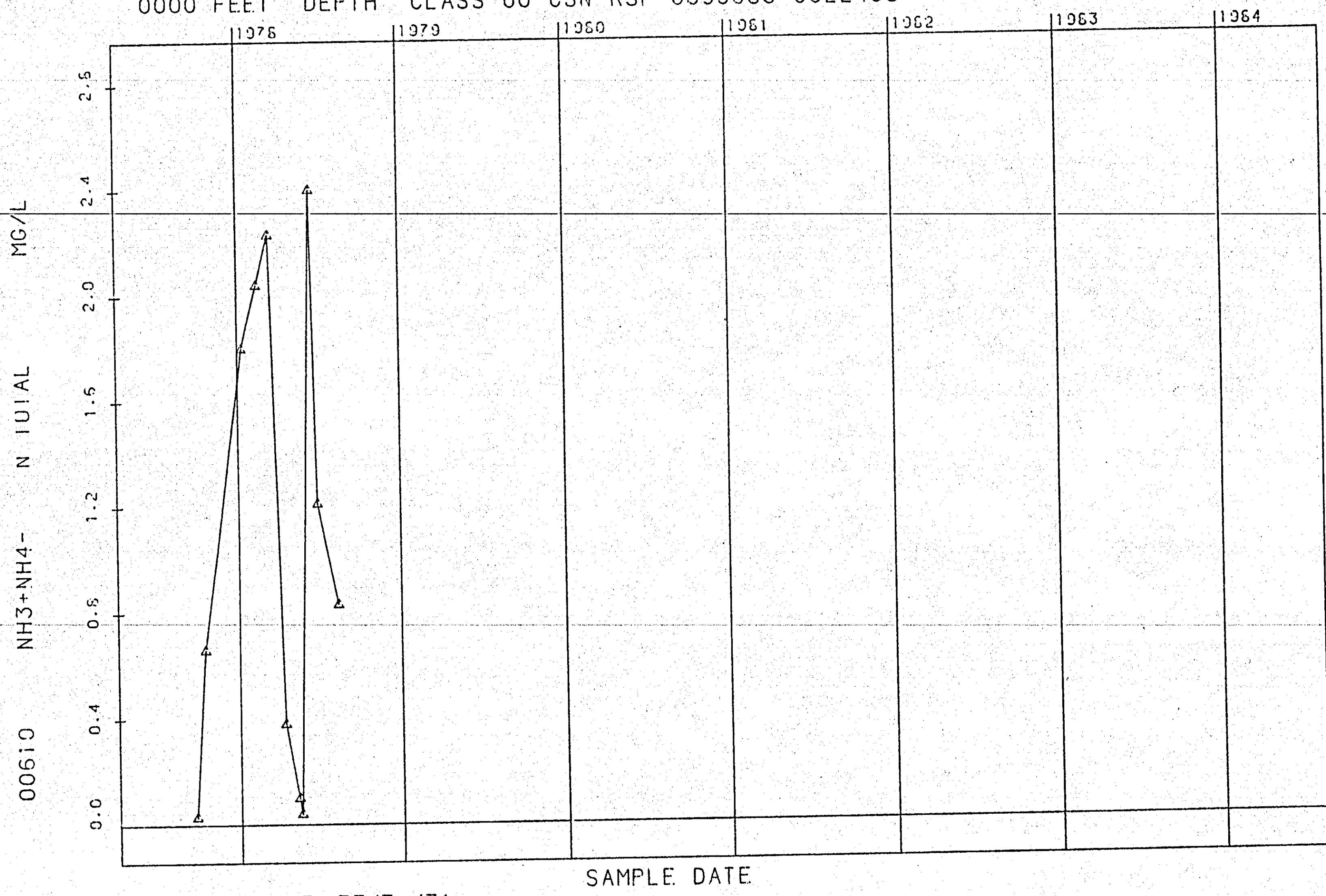
Figure IV-49a



STARTING DATE 77/3 /31

Figure IV-49b

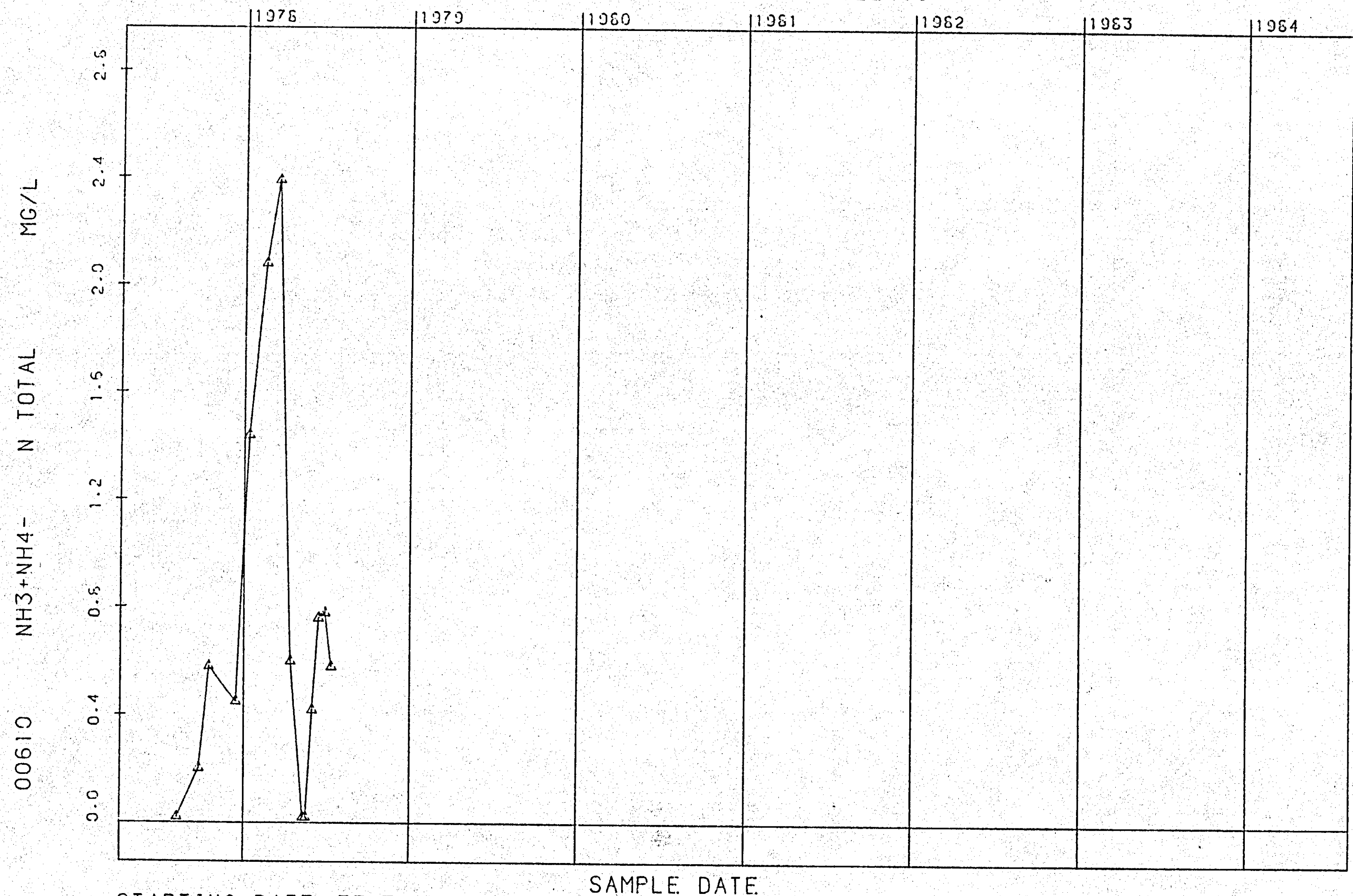
46P008
44 34 21.0 097 02 37.0 2
WEST ESTELLINE T113N R52W SECTION 23
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810530
0000 FEET DEPTH CLASS 00 CSN-RSP 0595685-0622498



STARTING DATE 77/3 /31

Figure IV-50

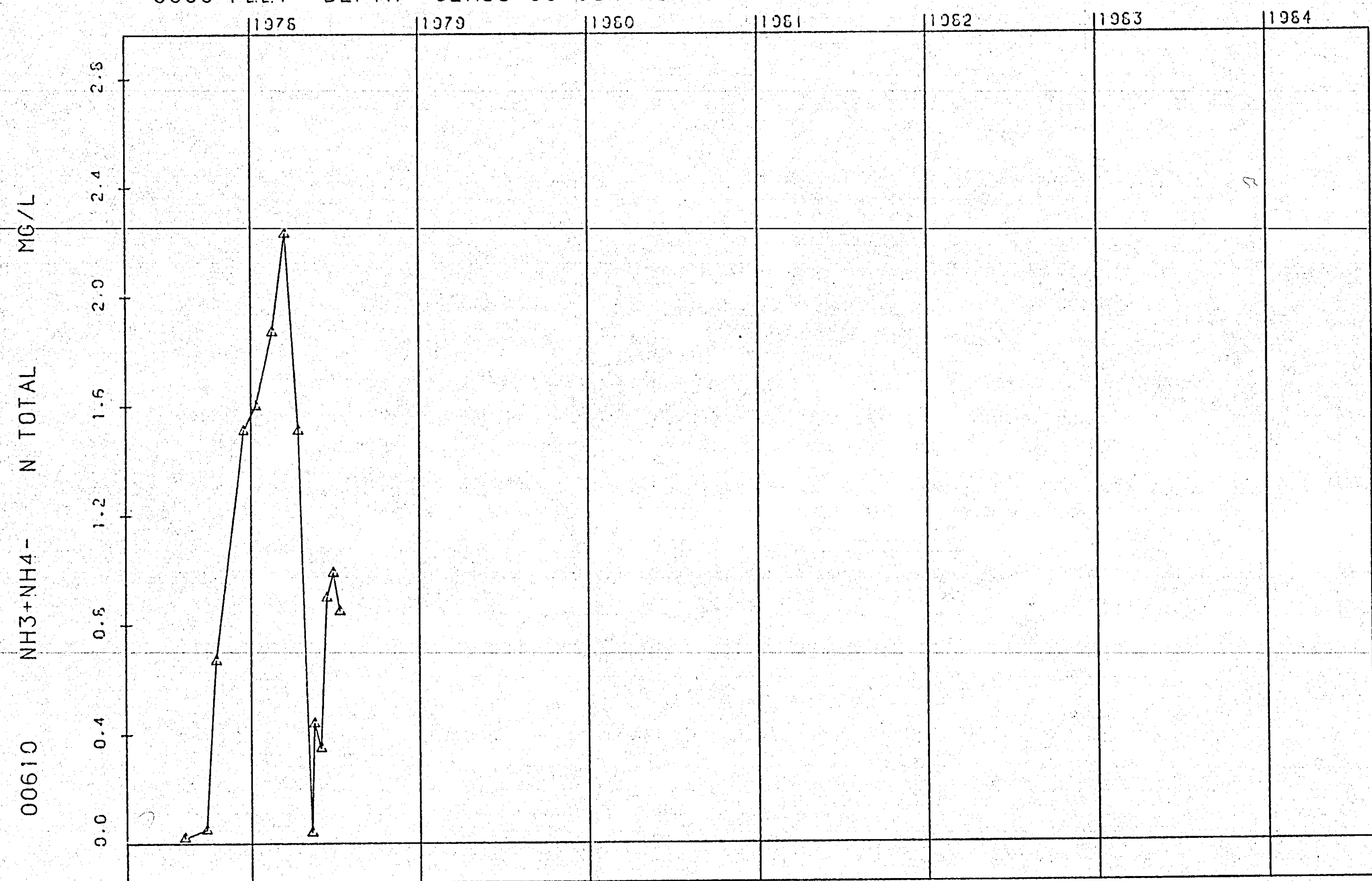
46P009
44 32 22.0 097 04 07.0 2
POINSETT REC AREA T112N R52W SEC 4
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810530
0000 FEET DEPTH CLASS 00 CSN-RSP 0595686-0622499



STARTING DATE 77/3 /31

Figure IV-51

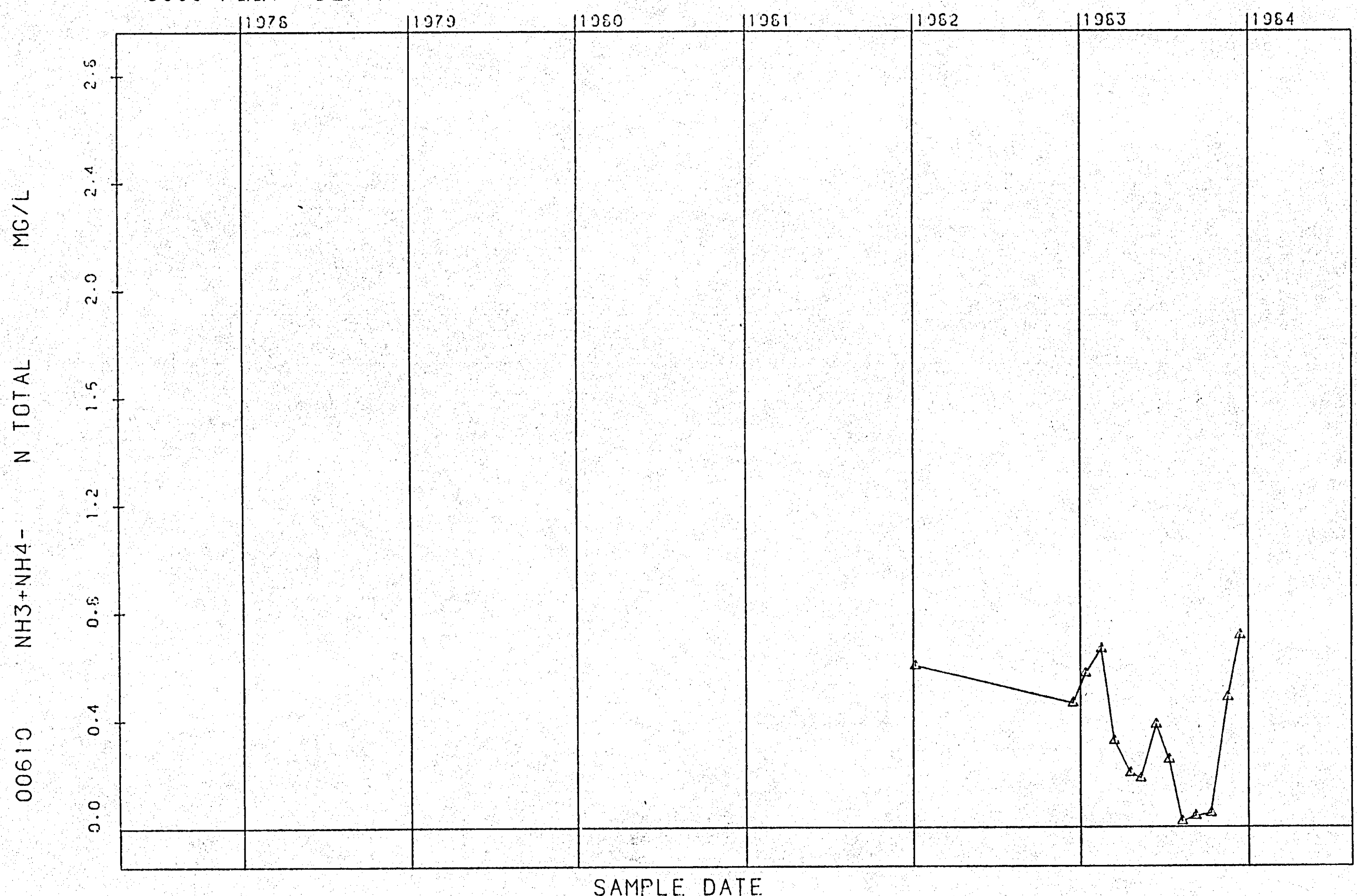
46P010
44 33 18.0 097 07 12.0 2
SORENSON T113N R52W SECTION 20
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810530
0000 FEET DEPTH CLASS 00 CSN-RSP 0595687-0622500



STARTING DATE 77/3 /31

Figure IV-52

46PSST
44 50 23.0 097 03 05.0 2
COMPOSITE SAMPLE T113N-R52W-S28 CDCA
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER BASIN 090700
BIG SIOUX RIVER BASIN
21SDLAKE 840824
0000 FEET DEPTH CLASS 00 CSN-RSP 0741946-0744337



STARTING DATE 77/3 /31

INORGANIC NITROGEN (MG/L)-POINSET 24 Figure IV-53
22:08 TUESDAY, SEPTEMBER 11, 1984
STATION=21SDLAKE 46P007

PLOT OF INORGN*DATE LEGEND: A = 1 OBS, B = 2 OBS, ETC.

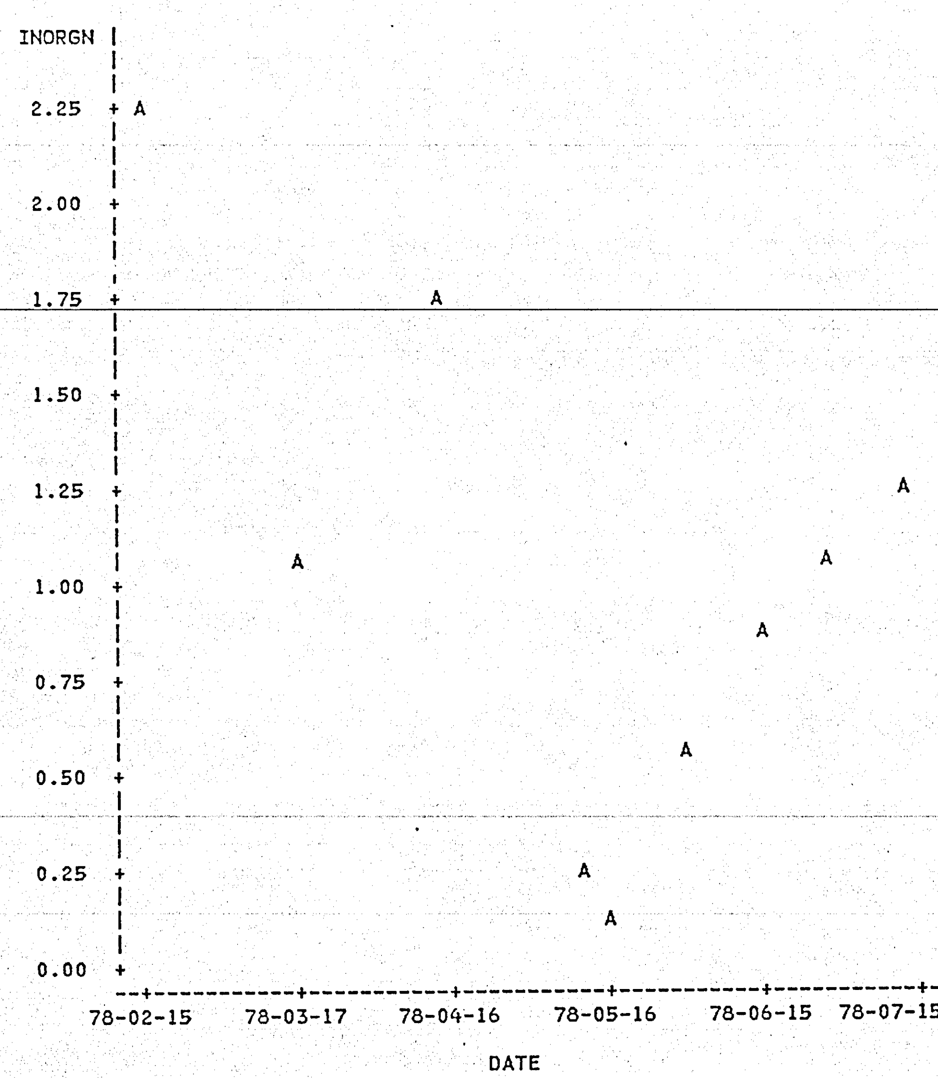


Figure IV-54

INORGANIC NITROGEN (MG/L)-POINSET 26
22:08 TUESDAY, SEPTEMBER 11, 1984
STATION=21SDLAKE 46P008

PLOT OF INORGN*DATE LEGEND: A = 1 OBS, B = 2 OBS, ETC.

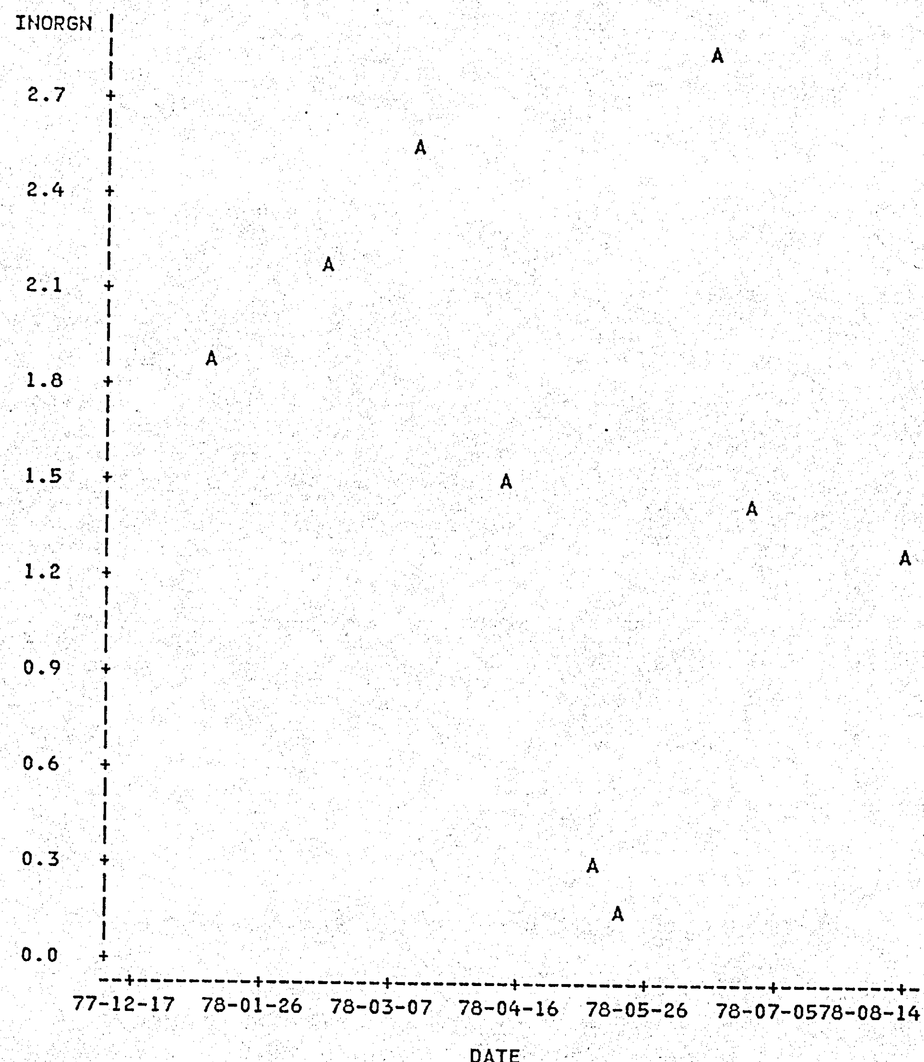


Figure IV-55

INORGANIC NITROGEN (MG/L)-POINSET 28
22:08 TUESDAY, SEPTEMBER 11, 1984
STATION=21SDLAKE 46P009

PLOT OF INORGN*DATE LEGEND: A = 1 OBS, B = 2 OBS, ETC.

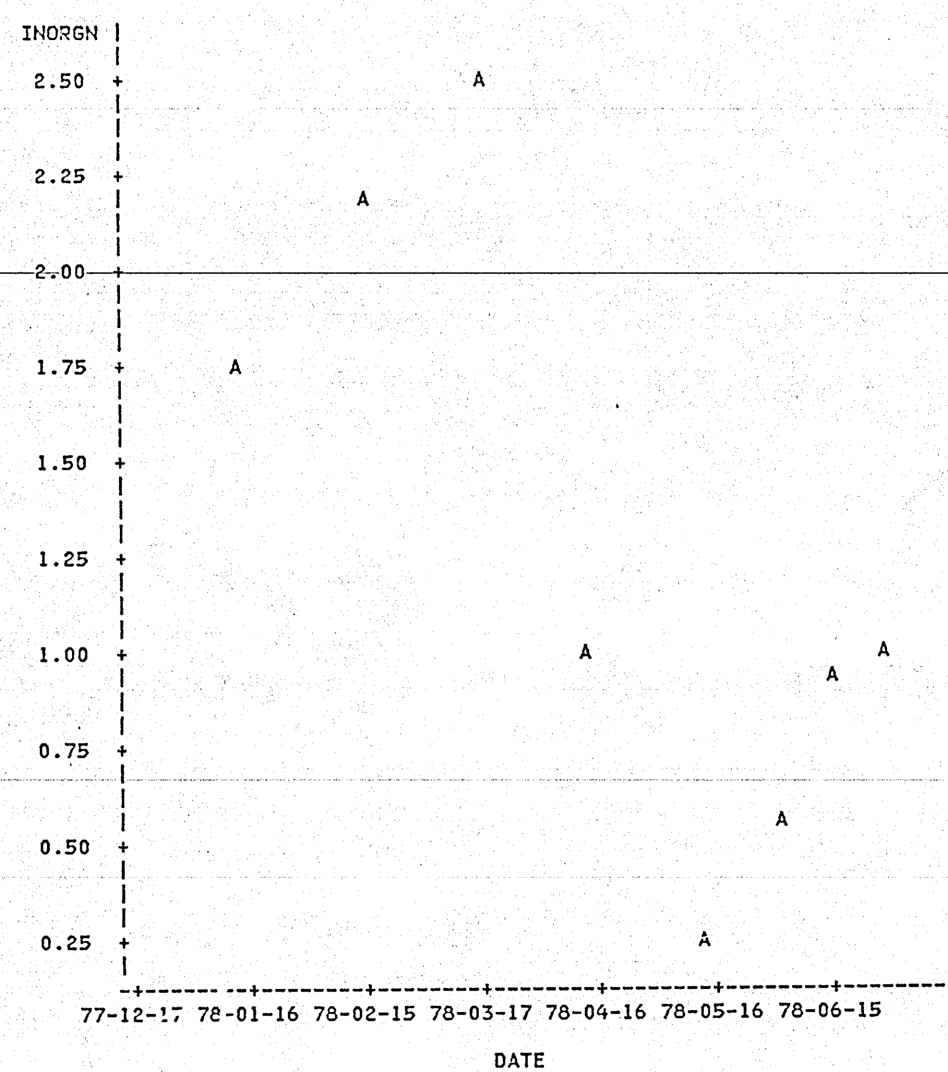


Figure IV-56

INORGANIC NITROGEN (MG/L)-POINSET 30
22:08 TUESDAY, SEPTEMBER 11, 1984
STATION=21SDLAKE 46P010

PLOT OF INORGN*DATE LEGEND: A = 1 OBS, B = 2 OBS, ETC.

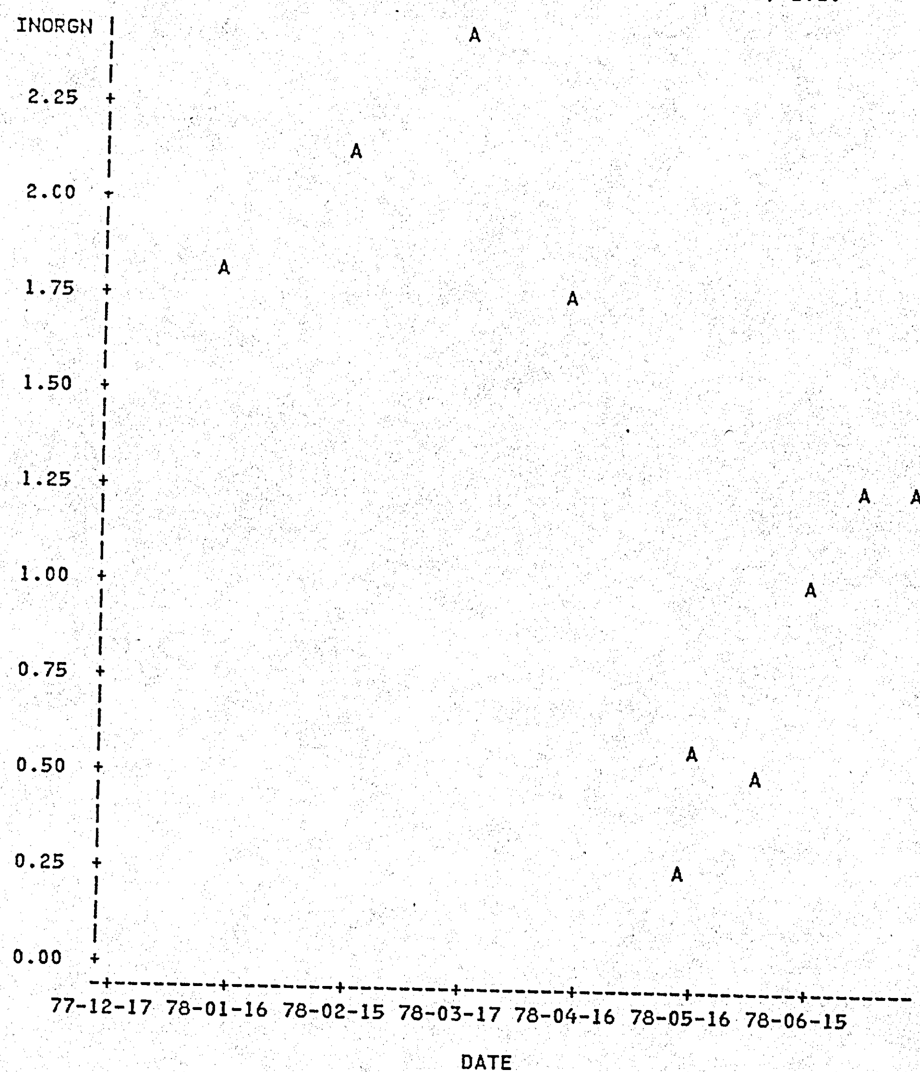


Figure IV-57

INORGANIC NITROGEN (MG/L)-POINSET 23
22:08 TUESDAY, SEPTEMBER 11, 1984
STATION=21SDLAKE 46P007

PLOT OF ORGN*DATE LEGEND: A = 1 OBS, B = 2 OBS, ETC.

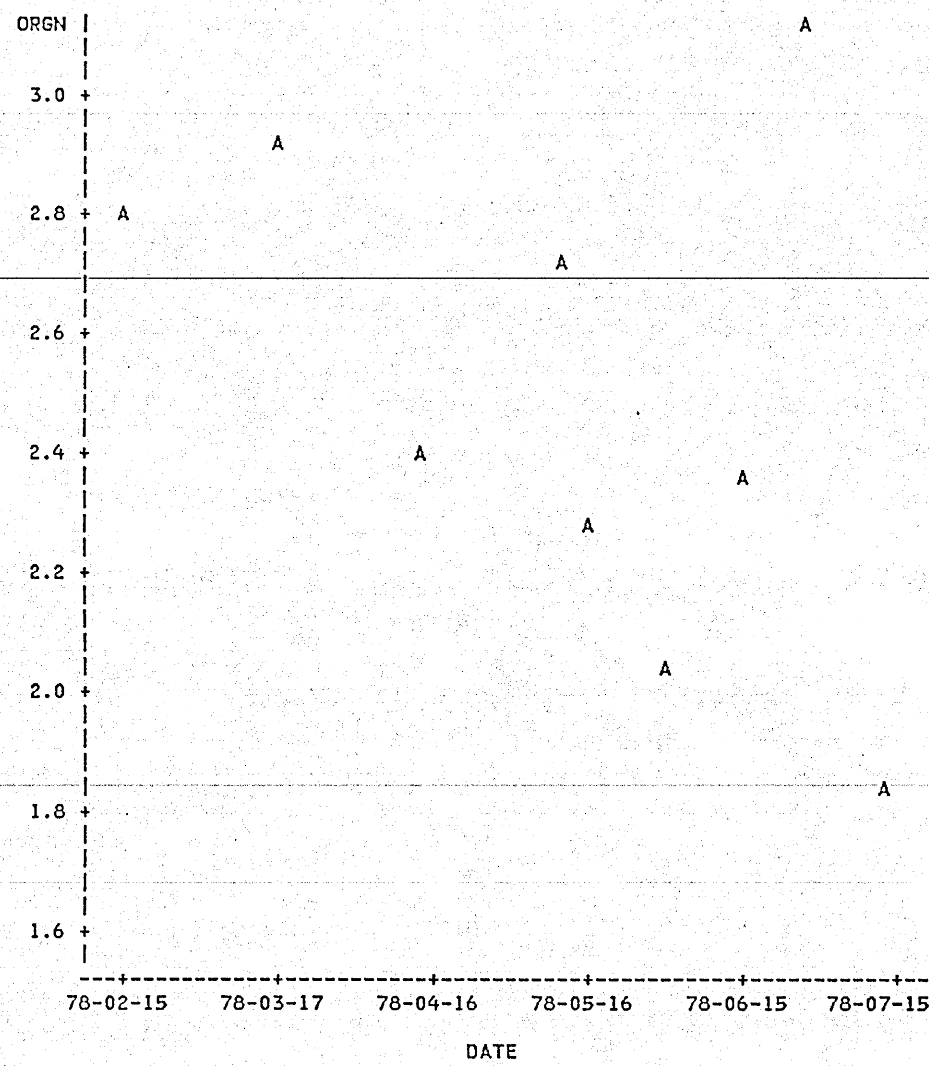
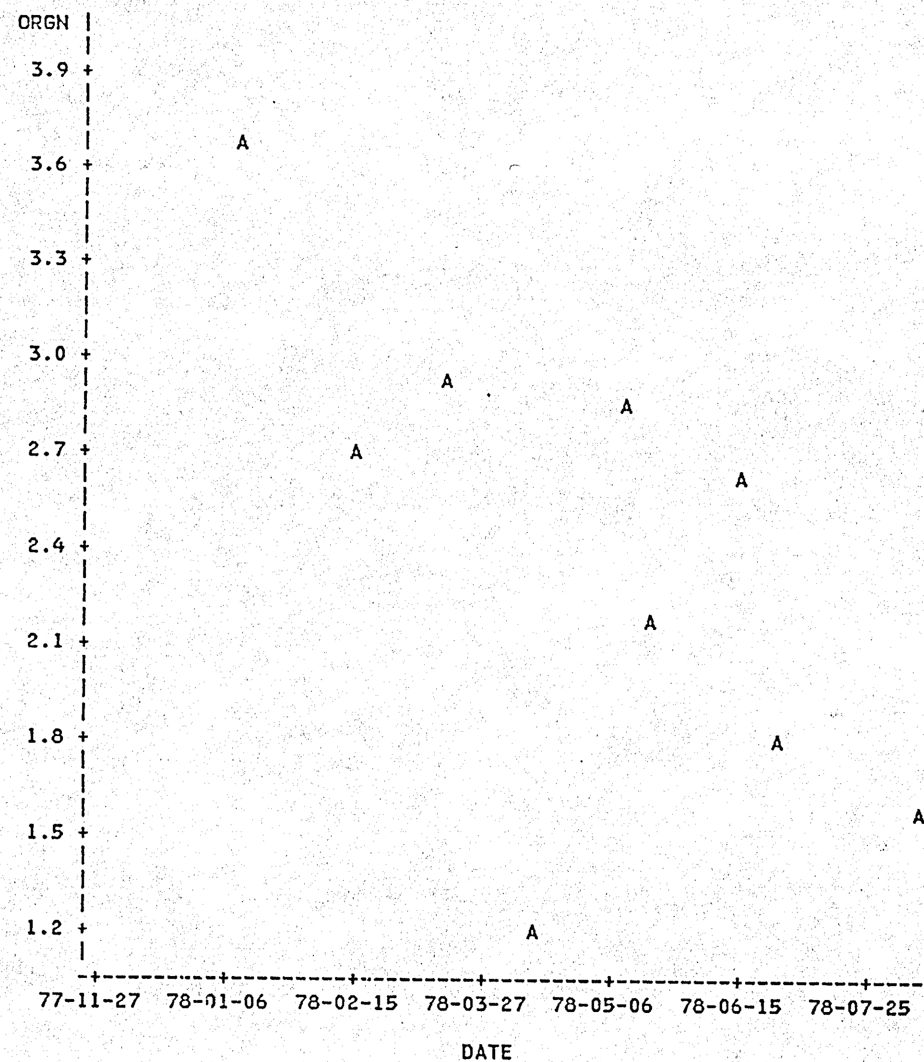


Figure IV-58

INORGANIC NITROGEN (MG/L)-POINSET 25
22:08 TUESDAY, SEPTEMBER 11, 1984
STATION=21SDLAKE 46P008

PLOT OF ORGN*DATE LEGEND: A = 1 OBS, B = 2 OBS, ETC.



INORGANIC NITROGEN (MG/L)-POINSET 27
22:08 TUESDAY, SEPTEMBER 11, 1984
STATION=21SDLAKE 46P009

Figure IV-59

PLOT OF ORGN*DATE LEGEND: A = 1 OBS, B = 2 OBS, ETC.

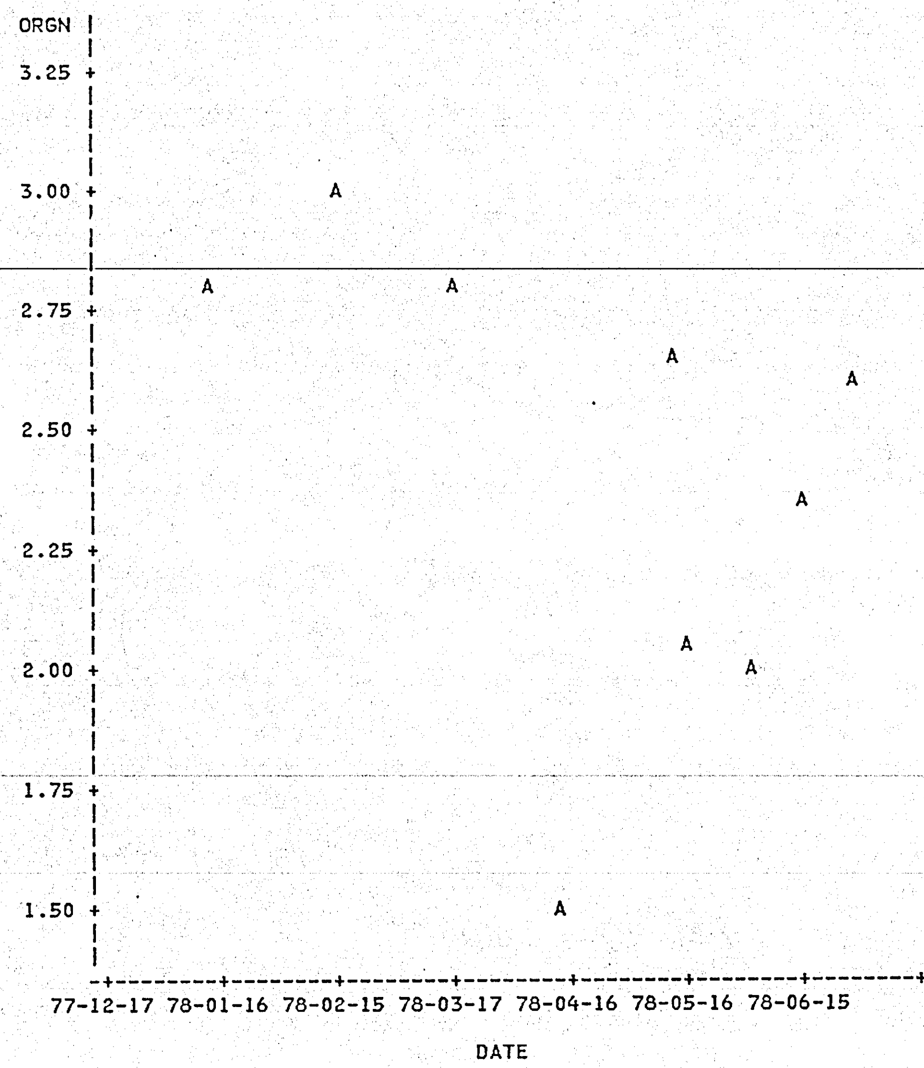


Figure IV-60

INORGANIC NITROGEN (MG/L)-POINSET 29
22:08 TUESDAY, SEPTEMBER 11, 1984
STATION=21SDLAKE 46P010

PLOT OF ORGN*DATE LEGEND: A = 1 OBS, B = 2 OBS, ETC.

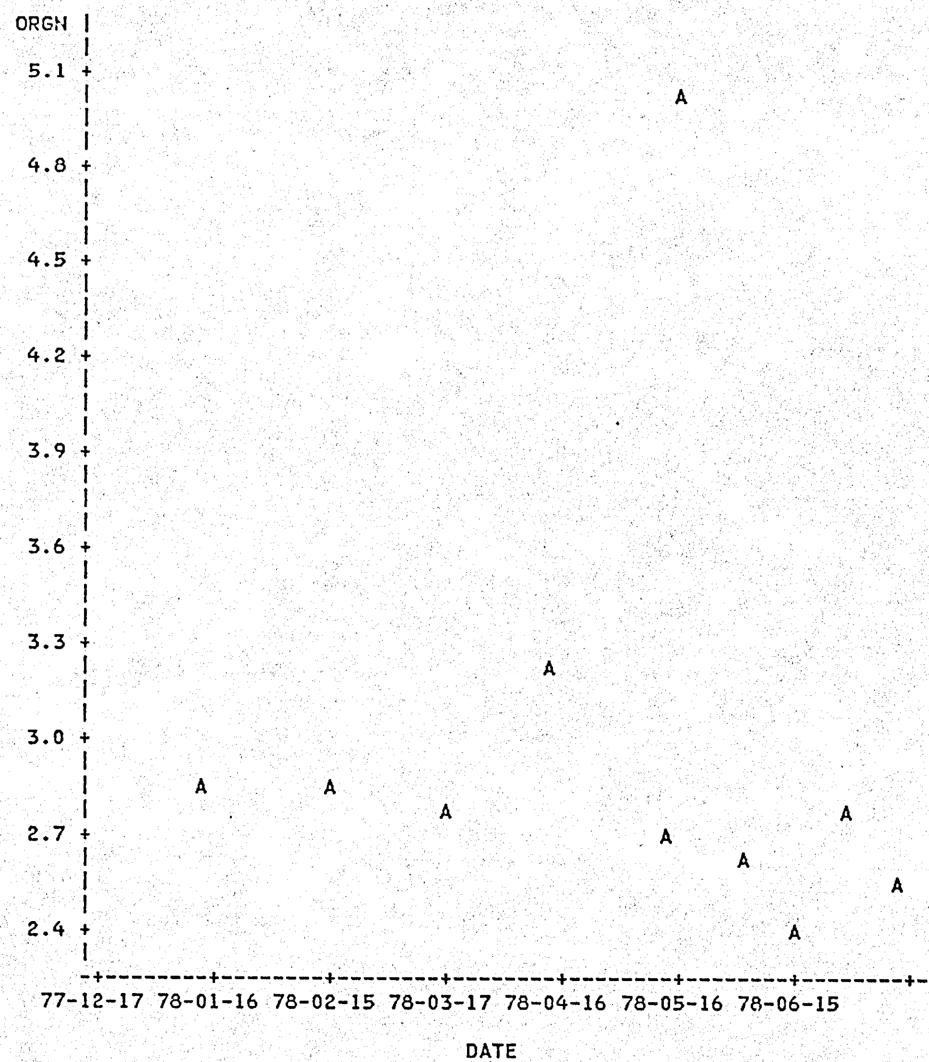
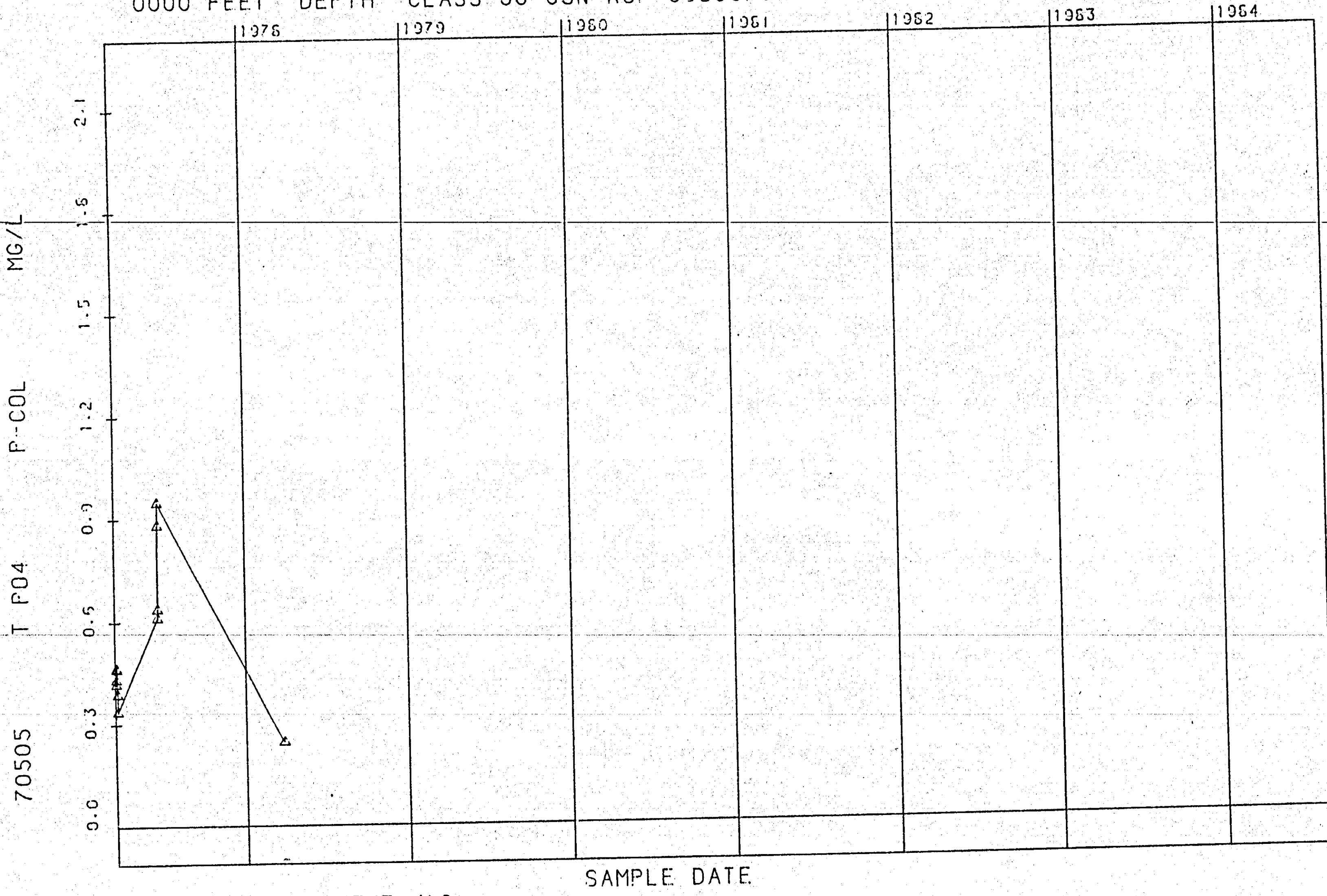


Figure IV-61

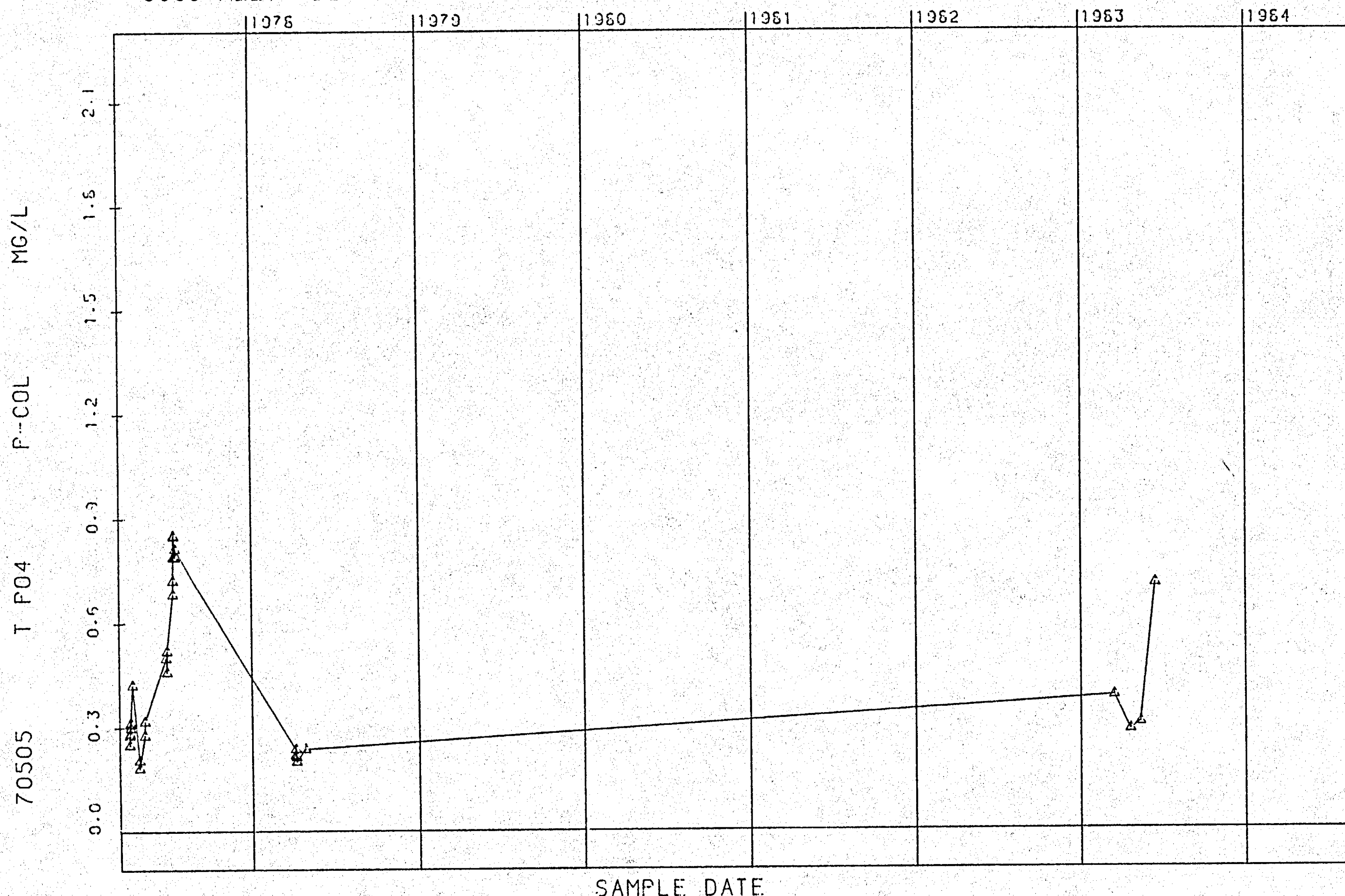
46P002
44 33 47.0 097 07 41.0 2
INLET FROM ALBERT T113N R52153W SEC 30
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810418
0000 FEET DEPTH CLASS 00 CSN-RSP 0589379-0554046



STARTING DATE 77/3 /10

Figure IV-62

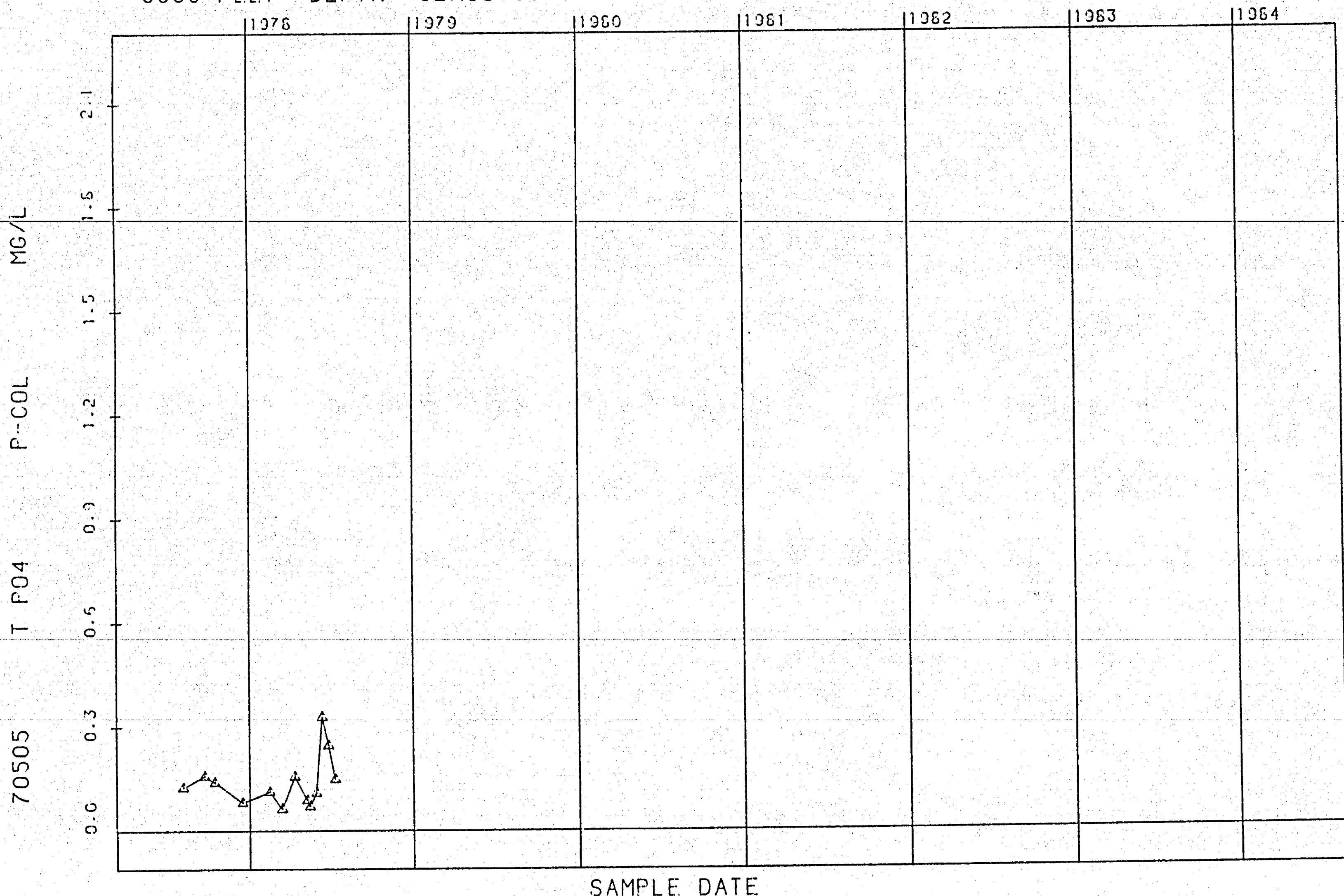
46P004
44 36 07.0 097 03 14.0 2
STONE BRIDGE T113N R52W SEC 10/15
46057 SOUTH DAKOTA HAMLIN
9MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810418
0000 FEET DEPTH CLASS 00 CSN-RSP 0589381-0554048



STARTING DATE 77/3 /10

Figure IV-63

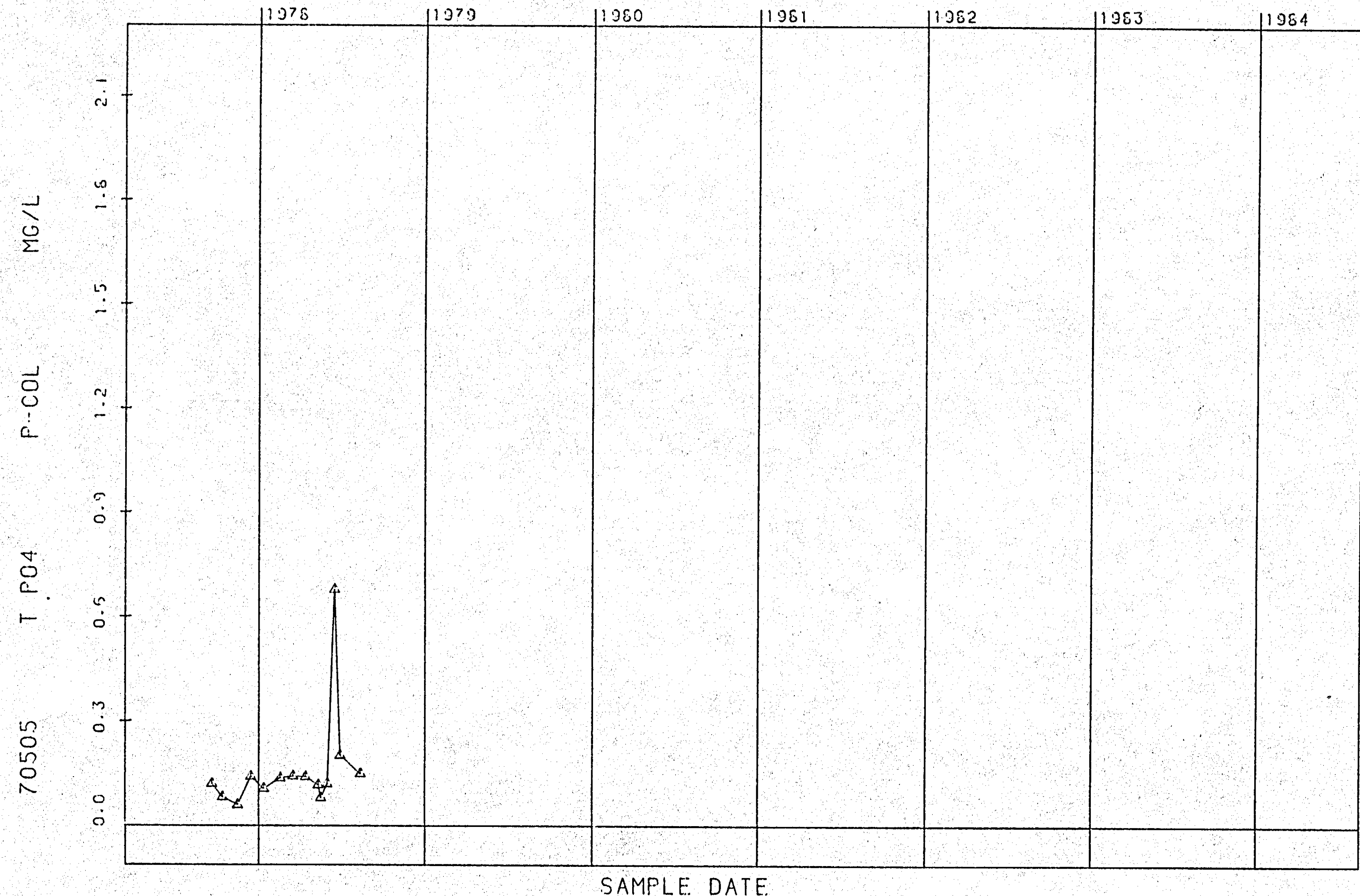
46P007
44 35 33.0 097 04 21.0 2
SAARANERS BEACH T113N R52W SEC 16
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810530
0000 FEET DEPTH CLASS 00 CSN-RSP 0595684-0622497



STARTING DATE 77/3 /10

46P008
44 34 21.0 097 02 37.0 2
WEST ESTELLINE T113N R52W SECTION 23
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810530
0000 FEET DEPTH CLASS 00 CSN-RSP 0595685-0622498

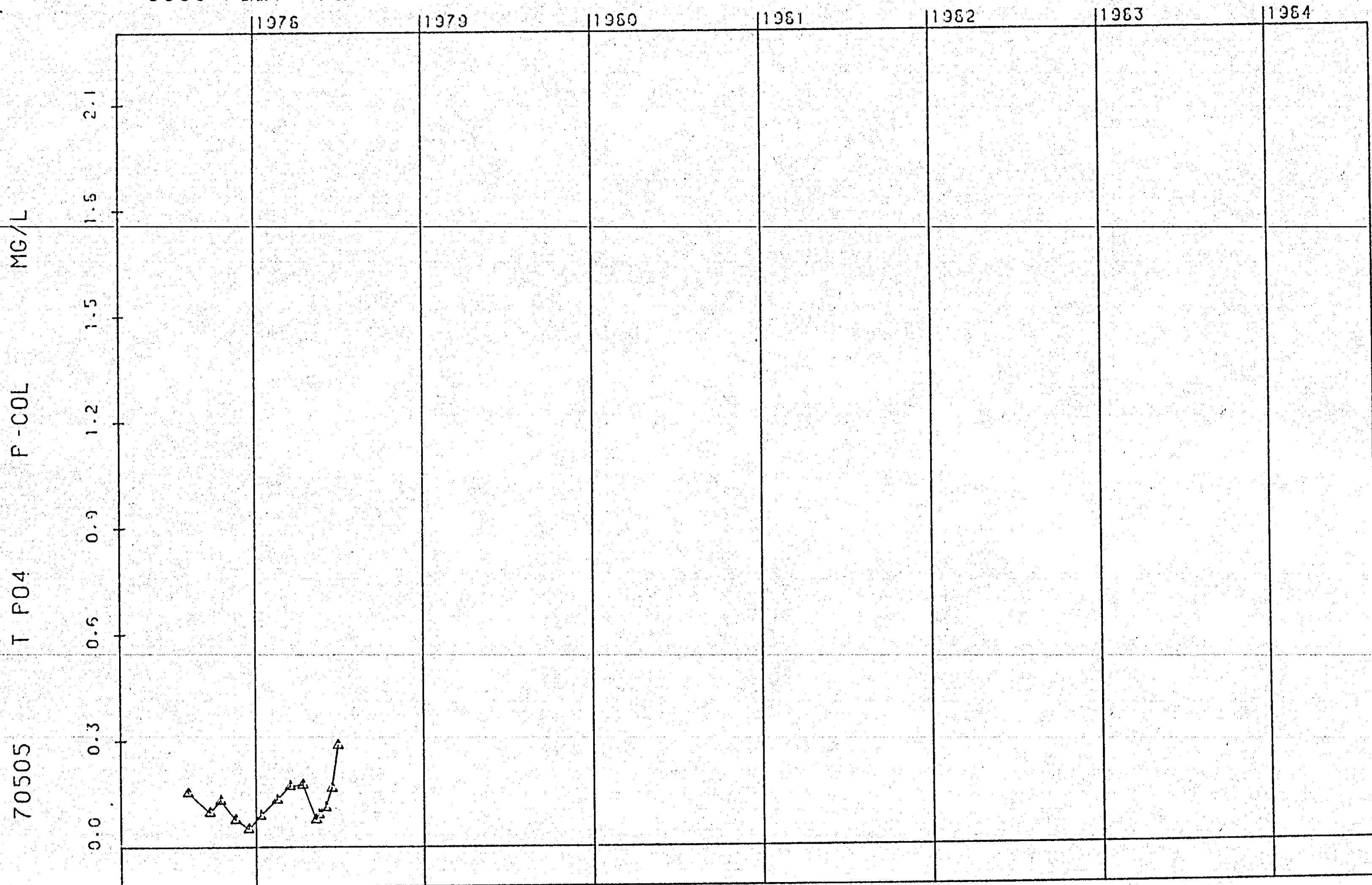
Figure IV-64



STARTING DATE 77/3 /10

Figure IV-65

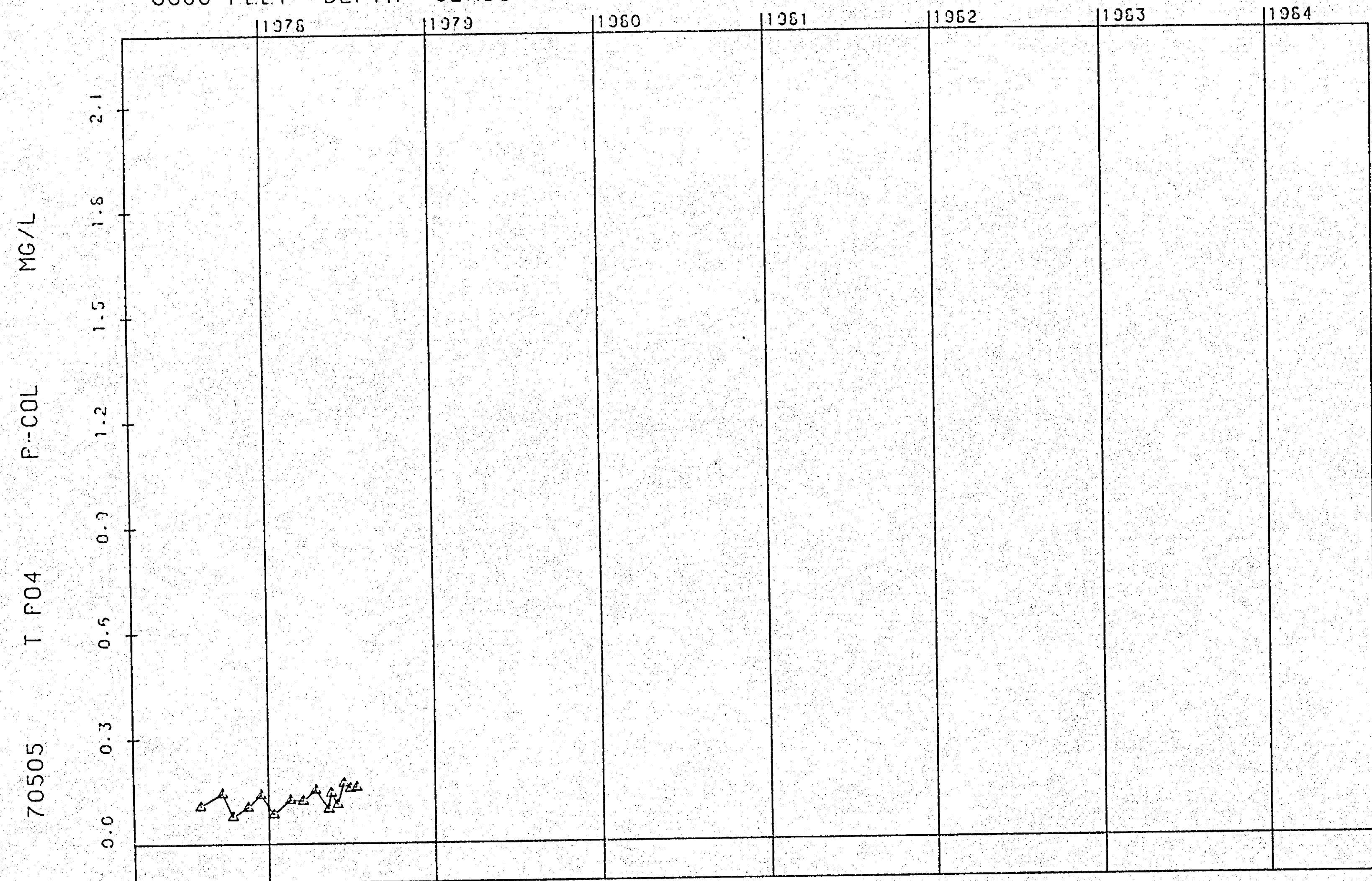
46P009
44 32 22.0 097 04 07.0 2
POINSETT REC AREA T112N R52W SEC 4
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810530
0000 FEET DEPTH CLASS 00 CSN-RSP 0595686-0622499



STARTING DATE 77/3 /10

Figure IV-66

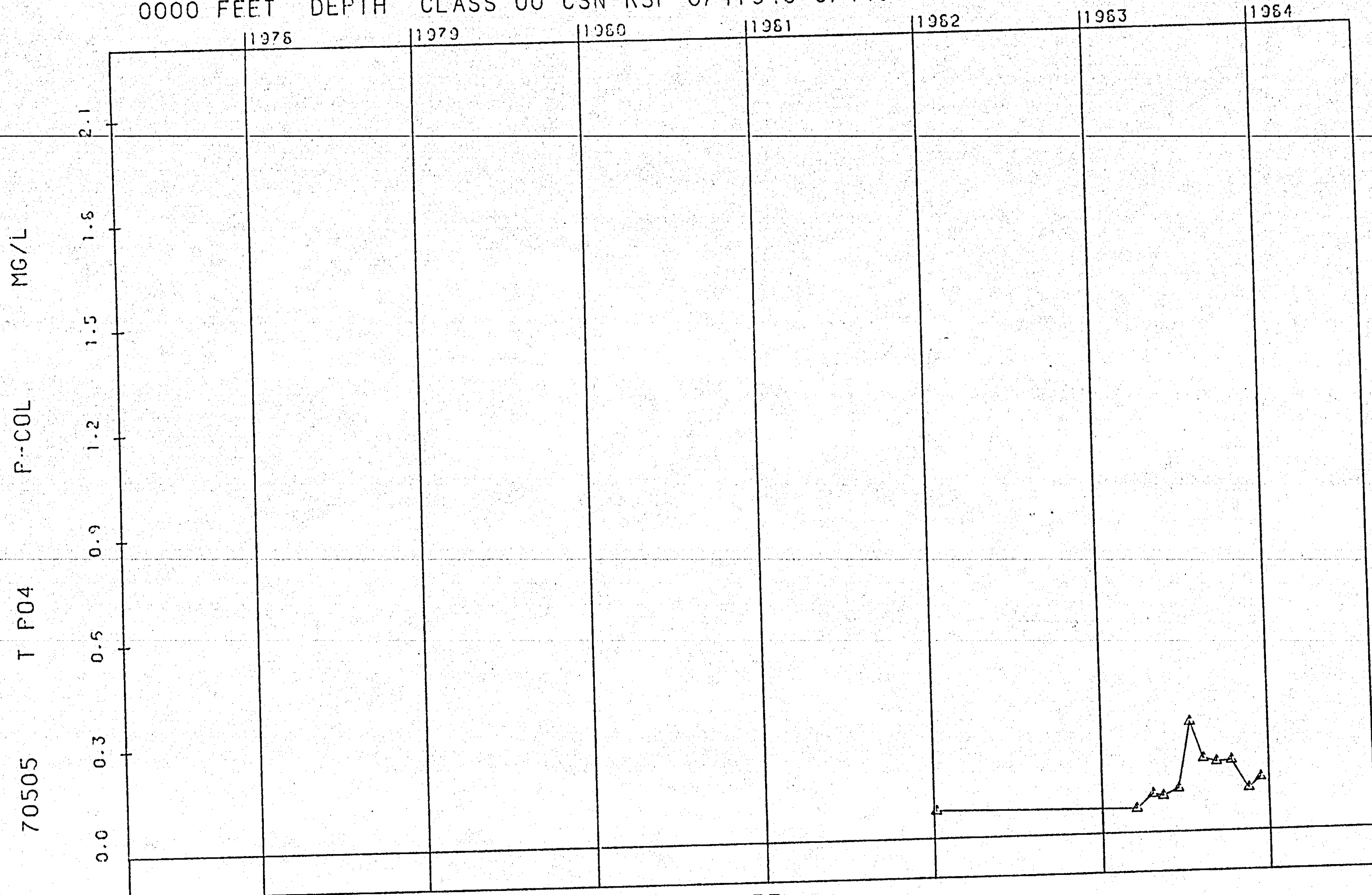
46P010
44 33 18.0 097 07 12.0 2
SORENSON T113N R52W SECTION 20
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810530
0000 FEET DEPTH CLASS 00 CSN-RSP 0595687-0622500



STARTING DATE 77/3 /10

Figure IV-67

46PSST
44 50 23.0 097 03 05.0 2
COMPOSITE SAMPLE T113N-R52W-S28 CDCA
46057 SOUTH DAKOTA HAMLIN
MISSOURI RIVER BASIN 090700
BIG SIOUX RIVER BASIN
21SDLAKE 840824
0000 FEET DEPTH CLASS 00 CSN-RSP 0741946-0744337



Appendix B

Oakwood Lakes Water Quality Summary

Tables and Figures

Site Number	Site Description
460A01 (OA-1)	Latitude 44 Deg., 28 Min., 12 Sec., longitude 96 Deg., 59 Min., 12 Sec., Township 112N, Range 51W, Section 32. NW1/4, NW1/4, NW1/4, NW1/4. This site is located .75 miles north on a tributary to Mortimer Slough, on the South side of the road.
460A02 (OA-2)	Latitude 44 Deg., 28 Min., 12 Sec., longitude 96 Deg., 59 Min., 43 Sec., Township 112N, Range 51W, Section 31. NE1/4, NW1/4, NW1/4, NE1/4. This site is located .5 miles north on another tributary to Mortimer Slough, on the south side of the road.
460A03 (OA-3)	Latitude 44 Deg., 27 Min., 23 Sec., longitude 97 Deg., 01 Min., 39 Sec., Township 112 N, Range 52W, Section 35. SE1/4, SE1/4, SE1/4, SE1/4. This is a tributary site located 2 miles west and 1 mile south of site 1, on the west side of West Oakwood Lake, on the west side of the road.
460A04 (OA-4)	Latitude 44 Deg., 26 Min., 30 Sec., longitude 97 Deg., 00 Min., 58 Sec., Township 111N, Range 52W, Section 1. SW1/4, SW1/4, SW1/4, SE1/4. This is a tributary site located 1.5 west and 2 miles south of site 1, on the west side of West Oakwood Lake, on the north side of the road.
460A07 (OA-7)	Latitude 44 Deg., 25 Min., 59 Sec., longitude 96 Deg., 58 Min., 59 Sec., Township 111N, Range 51W, Section 8. SE1/4, NE1/4, NW1/4, SW1/4. This is an in-lake site located .25 mile east and 2.5 miles south of site 1, in the southeast corner of West Oakwood lake.
460A08 (OA-8)	Latitude 44 Deg., 27 Min., 25 Sec., longitude 97 Deg., 00 Min., 26 Sec., Township 112N, Range 51W, Section 31. NW1/4, SW1/2, SW1/4, SW1/4. This is an in-lake site located 1 mile west and 1 mile south of site 1, off the West Oakwood Lake swimming beach.
460AK1 (OAK-1)	Latitude 44 Deg., 26 Min., 27 Sec., Longitude 96 Deg., 59 Min., 34 Sec., Township 111 N, Range 51W, Section 7, SE 1/4, NE 1/4, NW 1/4, NE 1/4. This description represents a composite of two inlake sites; 1) the boat ramp at the southeast edge of West Oakwood Lake, and 2) the boat ramp at the northeast edge of West Oakwood Lake.

Table IV-1. West Oakwood Lake site descriptions.

Site Number	Site Description
460A05 (OA-5)	Latitude 44 Deg., 25 Min., 36 Sec., longitude 96 Deg., 57 Min., 35 Sec., Township 111N, Range 51W, Section 16. NW1/4, NE1/4, NE1/4, NW1/4. This is an in-lake site located 1.5 miles east and 3 miles south of site 1, at the boat ramp in the southeast corner of East Oakwood Lake.
460A06 (OA-6)	Latitude 44 Deg., 26 Min., 38 Sec., longitude 96 Deg., 58 Min., 40 Sec., Township 111N, Range 51W, Section 5. NE1/4, SE1/4, SE1/4, SW1/4. This is an in-lake site located 5 mile east and 2 miles south of site 1, on the west side of East Oakwood Lake.
460K2 (OK-2)	Latitude 44 Deg., 27 Min., 21 Sec., longitude 96 Deg., 57 Min., 55 Sec., Township 112N, Range 51W, Section 33. SE1/4, SW1/4, SW1/4, SW1/4. This site is the inlet to East Oakwood Lake located 1 mile east and 1 mile south of site 1, on the north side of the road.
460K3 (OK-3)	Latitude 44 Deg., 26 Min., 02 Sec., longitude, 96 Deg., 56 Min., 50 Sec., Township 111N, Range 51W, Section 9. SE1/4, NE1/4, NE1/4, SE1/4. This site is the outlet from East Oakwood Lake located 2 miles east and 2.5 miles south of site 1, on the west side of the road.

Table IV-2. East Oakwood Lake site descriptions.

STORET RETRIEVAL DATE 84/09/11 - INVENT - VERSION OF SEP. 1981

460A05
44 25 36.0 096 57 35.0 2
E OAKWOOD AT S BOAT RAMP T111N R51W SEC 16
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810516
0000 CLASS 00 CSN-RSP 0591789-0620067

/TYPA/AMBNT/LAKE

PARAMETER				RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010	WATER	TEMP	CENT		5	9.87600	111.432	10.5561	24.4000	.000000	77/08/04	77/12/28
00011	WATER	TEMP	FAHN		5	49.8000	362.202	19.0316	76.0000	32.0000	77/08/04	77/12/28
00020	AIR	TEMP	CENT		5	8.55000	190.028	13.7850	28.9000	-.610E+01	77/08/04	77/12/28
00021	AIR	TEMP	FAHN		5	47.4000	615.801	24.8153	84.0000	21.0000	77/08/04	77/12/28
00095	CNDUCTVY	AT 25C	MICROMHO		2	1800.00	.000000	.000000	1800.00	1800.00	77/10/27	77/11/31
00300	DO		MG/L		3	7.76666	43.0235	6.55923	12.6000	.300000	77/08/04	77/12/28
00310	BOD	5 DAY	MG/L		3	14.8000	17.2903	4.15816	19.3000	11.1000	77/09/15	77/11/31
				K	2	9.99999	192.079	13.8593	19.8000	.200000	77/08/04	77/12/28
				TOT	5	12.8800	63.5770	7.97352	19.8000	.200000	77/08/04	77/12/28
00335	COD	LOWLEVEL	MG/L		5	195.200	2254.72	47.4839	261.000	142.000	77/08/04	77/12/28
00403	LAB	PH	SU		5	8.38599	.694885	.833598	9.61000	7.44000	77/08/04	77/12/28
00410	T ALK	CACO3	MG/L		5	176.200	2550.22	50.4997	230.000	120.000	77/08/04	77/12/28
00500	RESIDUE	TOTAL	MG/L		5	1806.20	11556.7	107.502	1941.00	1682.00	77/08/04	77/12/28
00515	RESIDUE	DISS-105	C MG/L		5	1685.60	2725.50	52.2063	1754.00	1625.00	77/08/04	77/12/28
00530	RESIDUE	TOT NFLT	MG/L		5	120.600	5173.31	71.9257	187.000	20.0000	77/08/04	77/12/28
00608	NH3+NH4-	N DISS	MG/L		4	1.76250	3.72276	1.92945	3.76000	.050000	77/08/04	77/11/31
00610	NH3+NH4-	N TOTAL	MG/L		1	6.55000			6.55000	6.55000	77/12/28	77/12/28
00613	NO2-N	DISS	MG/L		4	.012500	.000025	.005000	.020000	.010000	77/08/04	77/11/31
				K	1	.010000			.010000	.010000	77/12/28	77/12/28
				TOT	5	.012000	.000020	.004472	.020000	.010000	77/08/04	77/12/28
00618	NO3-N	DISS	MG/L		1	.100000			.100000	.100000	77/12/28	77/12/28
				K	2	.100000	-.372E-08	.000000	.100000	.100000	77/08/04	77/09/15
				TOT	3	.100000	-.186E-08	.000000	.100000	.100000	77/08/04	77/12/28
00620	NO3-N	TOTAL	MG/L		1	.200000			.200000	.200000	77/11/31	77/11/31
				K	1	.100000			.100000	.100000	77/10/27	77/10/27
				TOT	2	.150000	.005000	.070711	.200000	.100000	77/10/27	77/11/31
00625	TOT KJEL	N	MG/L		5	10.3580	2.92603	1.71056	11.7000	7.60000	77/08/04	77/12/28
00671	PHOS-DIS	ORTHO	MG/L P		5	.019600	.000330	.018160	.051000	.005000	77/08/04	77/12/28
31616	FEC COLI	MFM-FCBR	/100ML		4	27.2500	758.250	27.5363	60.0000	3.00000	77/08/04	77/11/31
				K	1	10.0000			10.0000	10.0000	77/12/28	77/12/28
				TOT	5	23.8000	628.201	25.0639	60.0000	3.00000	77/08/04	77/12/28
70505	T PO4	P-COL	MG/L		4	.156500	.002993	.054708	.228000	.108000	77/08/04	77/12/28
70506	SOL PO4-	T P-COL	MG/L		1	.052000			.052000	.052000	77/09/15	77/09/15

Table IV-3.

STORET RETRIEVAL DATE 84/09/11 - INVENT - VERSION OF SEP. 1981

460A05
44 25 36.0 096 57 35.0 2
E OAKWOOD AT S BOAT RAMP T111N R51W SEC 16
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810516
0000 CLASS 00 CSN-RSP 0591789-0620067

/TYPA/AMBNT/LAKE

PARAMETER				RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010	WATER	TEMP	CENT		8	11.8762	96.5370	9.82533	22.2000	.000000	78/02/16	78/07/12
00011	WATER	TEMP	FAHN		8	53.3750	312.839	17.6873	72.0000	32.0000	78/02/16	78/07/12
00020	AIR	TEMP	CENT		8	10.6250	167.905	12.9578	23.3000	-.160E+02	78/02/16	78/07/12
00021	AIR	TEMP	FAHN		8	51.1250	544.696	23.3387	74.0000	3.00000	78/02/16	78/07/12
00300	DO		MG/L		6	9.53333	10.3828	3.22223	15.0000	5.40000	78/04/13	78/07/12
00310	BOD	5 DAY	MG/L		7	8.67857	12.9716	3.60162	15.0000	4.62000	78/02/16	78/07/12
00335	COD	LOWLEVEL	MG/L		8	128.000	2038.00	45.1442	206.000	74.0000	78/02/16	78/07/12
00403	LAB	PH	SU		8	8.27749	.459054	.677535	9.32000	7.60000	78/02/16	78/07/12
00410	T ALK	CACO3	MG/L		8	195.625	13908.3	117.933	406.000	114.000	78/02/16	78/07/12
00500	RESIDUE	TOTAL	MG/L		8	1432.75	783163	884.965	2973.00	899.000	78/02/16	78/07/12
00515	RESIDUE	DISS-105	C MG/L		8	1356.37	642735	801.707	2707.00	832.000	78/02/16	78/07/12
00530	RESIDUE	TOT NFLT	MG/L		8	76.3750	8415.98	91.7386	266.000	1.00000	78/02/16	78/07/12
00608	NH3+NH4-	N DISS	MG/L		4	5.47250	17.8910	4.22977	9.45000	.430000	78/02/16	78/05/17
00610	NH3+NH4-	N TOTAL	MG/L		3	1.48333	.804035	.896680	2.41000	.620000	78/06/14	78/07/12
				K	1	.020000			.020000	.020000	78/05/31	78/05/31
				TOT	4	1.11750	1.07136	1.03506	2.41000	.020000	78/05/31	78/07/12
00613	NO2-N	DISS	MG/L		7	.018571	.000114	.010690	.040000	.010000	78/03/16	78/07/12
				K	1	.010000			.010000	.010000	78/02/16	78/02/16
				TOT	8	.017500	.000107	.010351	.040000	.010000	78/02/16	78/07/12
00618	NO3-N	DISS	MG/L		1	.100000			.100000	.100000	78/07/12	78/07/12
				K	3	.100000	-.186E-08	.000000	.100000	.100000	78/05/17	78/06/28
				TOT	4	.100000	-.248E-08	.000000	.100000	.100000	78/05/17	78/07/12
00620	NO3-N	TOTAL	MG/L		1	.200000			.200000	.200000	78/04/13	78/04/13
				K	3	.100000	-.186E-08	.000000	.100000	.100000	78/02/16	78/05/31
				TOT	4	.125000	.002500	.050000	.200000	.100000	78/02/16	78/05/31
00625	TOT KJEL	N	MG/L		8	7.87624	36.2601	6.02164	18.6000	3.98000	78/02/16	78/07/12
00671	PHOS-DIS	ORTHO	MG/L P		4	.014000	.000045	.006733	.018000	.004000	78/02/16	78/05/31
				K	1	.004000			.004000	.004000	78/07/12	78/07/12
				TOT	5	.012000	.000054	.007348	.018000	.004000	78/02/16	78/07/12
31616	FEC COLI	MFM-FCBR	/100ML		4	5296.00	.109E+09	10469.6	21000.0	7.00000	78/04/13	78/07/12
				K	4	4.75000	12.2500	3.50000	10.0000	3.00000	78/02/16	78/06/14
				TOT	8	2650.37	.549E+08	7414.58	21000.0	3.00000	78/02/16	78/07/12
70505	T PO4	P-COL	MG/L		7	.125857	.002938	.054202	.219000	.077000	78/02/16	78/06/28
70507	PHOS-T	ORTHO	MG/L P		4	.030750	.001211	.034798	.082000	.005000	78/03/16	78/07/12

Table IV-4.

STORET RETRIEVAL DATE 84/09/11 - INVENT - VERSION OF SEP. 1981

460A05
44 25 36.0 096 57 35.0 2
E OAKWOOD AT S BOAT RAMP T111N R51W SEC 16
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810516
0000 CLASS 00 CSN-RSP 0591789-0620067

/TYPA/AMBNT/LAKE

PARAMETER				RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010	WATER	TEMP	CENT		17	13.0171	78.4461	8.85698	25.6000	.560000	79/04/24	79/12/18
00011	WATER	TEMP	FAHN		17	52.4118	403.259	20.0813	78.0000	5.00000	79/04/24	79/12/18
00020	AIR	TEMP	CENT		17	12.2876	79.2510	8.90230	29.4000	-.559E+00	79/04/24	79/12/18
00021	AIR	TEMP	FAHN		17	54.1176	256.986	16.0308	85.0000	31.0000	79/04/24	79/12/18
00300	DO		MG/L		17	9.45882	7.52010	2.74228	14.4000	5.50000	79/04/24	79/12/18
00310	BOD	5 DAY	MG/L		5	5.49999	18.5889	4.31148	11.0000	1.08000	79/04/24	79/09/04
00400	PH		SU		11	7.65909	.793433	.890748	8.70000	6.15000	79/07/10	79/12/18
00403	LAB	PH	SU		11	8.49908	.150317	.387708	8.92000	7.85000	79/04/24	79/09/04
00410	T ALK	CACO3	MG/L		10	171.600	134.278	11.5878	186.000	148.000	79/04/24	79/09/04
00500	RESIDUE	TOTAL	MG/L		17	980.294	2635.06	51.3329	1103.00	913.000	79/04/24	79/12/18
00515	RESIDUE	DISS-105	C MG/L		17	955.353	3859.44	62.1244	1095.00	854.000	79/04/24	79/12/18
00530	RESIDUE	TOT NFLT	MG/L		17	24.9412	355.685	18.8596	68.0000	1.00000	79/04/24	79/12/18
00608	NH3+NH4-	N DISS	MG/L		3	.156667	.000233	.015276	.170000	.140000	79/07/24	79/10/02
00610	NH3+NH4-	N TOTAL	MG/L		13	.614615	.228577	.478097	1.49000	.030000	79/04/24	79/12/18
				K	1	.020000			.020000	.020000	;/09/04	79/09/04
				TOT	14	.572142	.236249	.486054	1.49000	.020000	79/04/24	79/12/18
00613	NO2-N	DISS	MG/L		4	.020000	.000200	.014142	.040000	.010000	79/05/08	79/07/10
				K	13	.010000	.582E-10	.000008	.010000	.010000	79/04/24	79/12/18
				TOT	17	.012353	.000057	.007524	.040000	.010000	79/04/24	79/12/18
00620	NO3-N	TOTAL	MG/L		7	.171428	.002381	.048795	.200000	.100000	79/04/24	79/12/18
				K	10	.100000	.000000	.000000	.100000	.100000	79/05/08	79/11/20
				TOT	17	.129412	.002206	.046967	.200000	.100000	79/04/24	79/12/18
00625	TOT KJEL	N	MG/L		17	2.40647	.365952	.604940	3.39000	1.59000	79/04/24	79/12/18
00671	PHOS-DIS	ORTHO	MG/L P		3	.081333	.009145	.095631	.190000	.010000	79/07/24	79/10/02
31616	FEC COLI	MFM-FCBR	/100ML		11	62.8182	7630.16	87.3508	300.000	2.00000	79/06/12	79/11/20
				K	6	3.00000	.000000	.000000	3.00000	3.00000	79/04/24	79/12/18
				TOT	17	41.7059	5637.09	75.0806	300.000	2.00000	79/04/24	79/12/18
70505	T PO4	P-COL	MG/L		16	.085750	.001768	.042053	.214000	.037000	79/04/24	79/12/18
70506	SOL PO4-	T P-COL	MG/L		1	.061000			.061000	.061000	79/09/04	79/09/04
70507	PHOS-T	ORTHO	MG/L P		13	.033692	.001624	.040304	.161000	.006000	79/04/24	79/12/18
				K	1	.005000			.005000	.005000	79/12/04	79/12/04
				TOT	14	.031643	.001558	.039475	.161000	.005000	79/04/24	79/12/18

Table IV-5.

STORET RETRIEVAL DATE 84/09/11 - INVENT - VERSION OF SEP. 1981

460A05
44 25 36.0 096 57 35.0 2
E OAKWOOD AT S BOAT RAMP T111N R51W SEC 16
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810516
0000 CLASS 00 CSN-RSP 0591789-0620067

/TYPA/AMBNT/LAKE

PARAMETER				RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010	WATER	TEMP	CENT		1	.000000			.000000	.000000	82/12/15	82/12/15
00011	WATER	TEMP	FAHN		1	32.0000			32.0000	32.0000	82/12/15	82/12/15
00020	AIR	TEMP	CENT		1	-.221E+01			-.221E+01	-.221E+01	82/12/15	82/12/15
00021	AIR	TEMP	FAHN		1	28.0000			28.0000	28.0000	82/12/15	82/12/15
00300	DO		MG/L		1	15.4000			15.4000	15.4000	82/12/15	82/12/15
00400	PH		SU		1	8.10000			8.10000	8.10000	82/12/15	82/12/15
00403	LAB	PH	SU		1	8.26000			8.26000	8.26000	82/12/15	82/12/15
00500	RESIDUE	TOTAL	MG/L		1	1317.00			1317.00	1317.00	82/12/15	82/12/15
00530	RESIDUE	TOT NFLT	MG/L		1	12.0000			12.0000	12.0000	82/12/15	82/12/15
00610	NH3+NH4-	N TOTAL	MG/L		1	1.90000			1.90000	1.90000	82/12/15	82/12/15
00613	NO2-N	DISS	MG/L	K	1	.010000			.010000	.010000	82/12/15	82/12/15
00620	NO3-N	TOTAL	MG/L	K	1	.100000			.100000	.100000	82/12/15	82/12/15
00625	TOT KJEL	N	MG/I		1	2.89000			2.89000	2.89000	82/12/15	82/12/15
00940	CHLORIDE	TOTAL	MG/L		1	20.3000			20.3000	20.3000	82/12/15	82/12/15
00945	SULFATE	SO4-TOT	MG/L		1	675.000			675.000	675.000	82/12/15	82/12/15
31616	FEC COLI	MFM-FCBR	/100ML	K	1	3.00000			3.00000	3.00000	82/12/15	82/12/15
70300	RESIDUE	DISS-180	C MG/L		1	1305.00			1305.00	1305.00	82/12/15	82/12/15
70506	SOL PO4-	T P-COL	MG/L		1	.058000			.058000	.058000	82/12/15	82/12/15
70507	PHOS-T	ORTHO	MG/L P		1	.012000			.012000	.012000	82/12/15	82/12/15

Table IV-6.

STORET RETRIEVAL DATE 84/09/11 - INVENT - VERSION OF SEP. 1981

460A05
44 25 36.0 096 57 35.0 2
E OAKWOOD AT S BOAT RAMP T111N R51W SEC 16
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810516
0000 CLASS 00 CSN-RSP 0591789-0620067

/TYPA/AMBNT/LAKE

PARAMETER				RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010	WATER	TEMP	CENT		8	11.3887	127.166	11.2768	26.7000	.000000	83/01/12	83/08/10
00011	WATER	TEMP	FAHN		8	52.5000	412.000	20.2978	80.0000	32.0000	83/01/12	83/08/10
00020	AIR	TEMP	CENT		8	11.9450	137.059	11.7072	28.3000	.560000	83/01/12	83/08/10
00021	AIR	TEMP	FAHN		8	52.7500	480.500	21.9203	83.0000	31.0000	83/01/12	83/08/10
00095	CNDUCTVY	AT 25C	MICROMHO		6	1314.17	1490.80	38.6109	1361.00	1265.00	83/03/15	83/08/10
00300	DO		MG/L		7	10.1714	4.33919	2.08307	13.6000	7.50000	83/02/15	83/08/10
00400	PH		SU		7	8.45714	.139567	.373587	9.00000	8.00000	83/02/15	83/08/10
00403	LAB	PH	SU		7	8.31857	.220500	.469574	9.15000	7.65000	83/02/15	83/08/10
00410	T ALK	CACO3	MG/L		6	168.500	307.100	17.5243	187.000	139.000	83/03/15	83/08/10
00415	PHEN-PH-	LFIN ALK	MG/L		3	29.4000	1106.68	33.2668	66.0000	1.00000	83/05/12	83/08/10
00500	RESIDUE	TOTAL	MG/L		7	1149.29	18471.2	135.909	1419.00	1017.00	83/02/15	83/08/10
00530	RESIDUE	TOT NFLT	MG/L		7	38.2857	1033.91	32.1544	88.0000	6.00000	83/02/15	83/08/10
00610	NH3+NH4-	N TOTAL	MG/L		6	.519999	.384079	.619741	1.63000	.060000	83/02/15	83/07/13
				K	1	.020000			.020000	.020000	83/08/10	83/08/10
				TOT	7	.448571	.355781	.596473	1.63000	.020000	83/02/15	83/08/10
00613	NO2-N	DISS	MG/L	K	7	.010000	.776E-10	.000009	.010000	.010000	83/02/15	83/08/10
00620	NO3-N	TOTAL	MG/L		3	.166667	.003333	.057735	.200000	.100000	83/02/15	83/04/20
				K	4	.100000	-.248E-08	.000000	.100000	.100000	83/05/12	83/08/10
				TOT	7	.128571	.002381	.048795	.200000	.100000	83/02/15	83/08/10
00625	TOT KJEL	N	MG/L		7	3.28571	3.58928	1.89454	7.04000	1.76000	83/02/15	83/08/10
00671	PHOS-DIS	ORTHO	MG/L P		1	.011000			.011000	.011000	83/02/15	83/02/15
00940	CHLORIDE	TOTAL	MG/L		7	17.7000	4.52714	2.12771	20.9000	14.9000	83/02/15	83/08/10
00945	SULFATE	SO4-TOT	MG/L		7	590.857	5228.50	72.3084	750.000	544.000	83/02/15	83/08/10
31616	FEC COLI	MFM-FCBR	/100ML		4	607.500	996892	998.445	2100.00	20.0000	83/05/12	83/08/10
				K	3	7.66667	16.3334	4.04146	10.0000	3.00000	83/02/15	83/04/20
				TOT	7	350.428	601251	775.404	2100.00	3.00000	83/02/15	83/08/10
70300	RESIDUE	DISS-180	C MG/L		7	1111.00	20601.7	143.533	1413.00	967.000	83/02/15	83/08/10
70505	T PO4	P-COL	MG/L		6	.153167	.001319	.036323	.210000	.108000	83/03/15	83/08/10
70506	SOL PO4-	T P-COL	MG/L		1	.044000			.044000	.044000	83/02/15	83/02/15
70507	PHOS-T	ORTHO	MG/L P		3	.011333	.000057	.007572	.020000	.006000	83/03/15	83/05/12
				K	1	.005000			.005000	.005000	83/06/15	83/06/15
				TOT	4	.009750	.000048	.006946	.020000	.005000	83/03/15	83/06/15

Table IV-7.

STORET RETRIEVAL DATE 84/09/11 - INVENT - VERSION OF SEP. 1981

460A06
44 26 38.0 096 58 41.0 2
E OAKWOOD W SHORE T111N R51W SEC 5
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810516
0000 CLASS 00 CSN-RSP 0591790-0620068

/TYPA/AMBNT/LAKE

PARAMETER				RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010	WATER	TEMP	CENT		5	10.5380	148.876	12.2015	29.4000	.000000	77/07/05	77/12/28
00011	WATER	TEMP	FAHN		5	51.0000	484.000	22.0000	85.0000	32.0000	77/07/05	77/12/28
00020	AIR	TEMP	CENT		5	8.99999	211.242	14.5342	30.6000	-.666E+01	77/07/05	77/12/28
00021	AIR	TEMP	FAHN		5	48.2000	683.201	26.1381	87.0000	20.0000	77/07/05	77/12/28
00095	CNDUCTVY	AT 25C	MICROMHO		2	1850.00	200.000	14.1421	1860.00	1840.00	77/10/27	77/11/31
00300	DO		MG/L		4	9.87500	25.9425	5.09338	14.8000	4.00000	77/07/05	77/12/28
00310	BOD	5 DAY	MG/L		4	12.5975	138.705	11.7773	29.1000	3.54000	77/07/05	77/12/28
				K	1	20.0000			20.0000	20.0000	77/09/15	77/09/15
				TOT	5	14.0780	114.988	10.7233	29.1000	3.54000	77/07/05	77/12/28
00335	COD	LOWLEVEL	MG/L		5	188.400	2520.83	50.2079	264.000	150.000	77/07/05	77/12/28
00400	PH		SU		1	9.20000			9.20000	9.20000	77/07/05	77/07/05
00403	LAB	PH	SU		5	8.39000	.279236	.528428	9.02000	7.85000	77/07/05	77/12/28
00410	T ALK	CACO3	MG/L		5	186.400	3008.33	54.8482	277.000	140.000	77/07/05	77/12/28
00500	RESIDUE	TOTAL	MG/L		5	1825.40	44827.7	211.726	2132.00	1630.00	77/07/05	77/12/28
00515	RESIDUE	DISS-105	C MG/L		5	1719.80	39237.5	198.085	2031.00	1493.00	77/07/05	77/12/28
00530	RESIDUE	TOT NFLT	MG/L		5	105.600	6113.81	78.1908	219.000	16.0000	77/07/05	77/12/28
00608	NH3+NH4-	N DISS	MG/L		4	1.81250	4.04176	2.01041	3.93000	.040000	77/07/05	77/11/31
00610	NH3+NH4-	N TOTAL	MG/L		1	6.10000			6.10000	6.10000	77/12/28	77/12/28
00613	NO2-N	DISS	MG/L		3	.010000	.000000	.000000	.010000	.010000	77/09/15	77/11/31
				K	2	.010000	-.145E-10	.000000	.010000	.010000	77/07/05	77/12/28
				TOT	5	.010000	.000000	.000000	.010000	.010000	77/07/05	77/12/28
00618	NO3-N	DISS	MG/L		1	.100000			.100000	.100000	77/07/05	77/07/05
				K	3	.100000	-.186E-08	.000000	.100000	.100000	77/09/15	77/12/28
				TOT	4	.100000	-.248E-08	.000000	.100000	.100000	77/07/05	77/12/28
00620	NO3-N	TOTAL	MG/L	K	1	.100000			.100000	.100000	77/10/27	77/10/27
00625	TOT KJEL	N	MG/L		5	10.1160	7.71313	2.77725	12.8000	5.97000	77/07/05	77/12/28
00671	PHOS-DIS	ORTHO	MG/L P		5	.024200	.000141	.011883	.040000	.015000	77/07/05	77/12/28
31616	FEC COLI	MFM-FCBR	/100ML		1	27.0000			27.0000	27.0000	77/09/15	77/09/15
				K	3	5.33333	16.3333	4.04145	10.0000	3.00000	77/10/27	77/12/28
				TOT	4	10.7500	128.250	11.3248	27.0000	3.00000	77/09/15	77/12/28
70505	T PO4	P-COL	MG/L		4	.129000	.000101	.010067	.139000	.115000	77/07/05	77/12/28
70506	SOL PO4-	T P-COL	MG/L		1	.064000			.064000	.064000	77/09/15	77/09/15

Table IV-8.

STORET RETRIEVAL DATE 84/09/11 - INVENT - VERSION OF SEP. 1981

460A06
44 26 38.0 096 58 41.0 2
E OAKWOOD W SHORE T111N R51W SEC 5
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
/TYPA/AMBNT/LAKE 21SDLAKE 810516
0000 CLASS 00 CSN-RSP 0591790-0620068

PARAMETER				RMK	NUMBER	MEAN	VARIANCE	STAN_DEV	MAXIMUM	MINIMUM	BEG_DATE	END_DATE
00010	WATER	TEMP	CENT		3	14.7933	61.8903	7.86704	23.3000	7.78000	78/04/13	78/07/12
00011	WATER	TEMP	FAHN		3	38.6667	481.336	21.9394	56.0000	14.0000	78/04/13	78/07/12
00020	AIR	TEMP	CENT		3	16.3000	46.9304	6.85058	23.9000	10.6000	78/04/13	78/07/12
00021	AIR	TEMP	FAHN		3	61.3333	152.336	12.3424	75.0000	51.0000	78/04/13	78/07/12
00061	STREAM	FLOW,	INST-CFS		2	.000000	.000000	.000000	.000000	.000000	78/02/16	78/03/16
00300	DO		MG/L		3	11.4667	53.3733	7.30570	18.6000	4.00000	78/04/13	78/07/12
00310	BOD	5 DAY	MG/L		3	7.94666	28.2923	5.31905	14.0000	4.02000	78/04/13	78/07/12
00335	COD	LOWLEVEL	MG/L		3	96.0000	301.000	17.3493	115.000	81.0000	78/04/13	78/07/12
00403	LAB	PH	SU		3	8.46666	.532600	.729795	9.29000	7.90000	78/04/13	78/07/12
00410	T ALK	CACO3	MG/L		3	145.000	201.000	14.1774	156.000	129.000	78/04/13	78/07/12
00500	RESIDUE	TOTAL	MG/L		3	1011.67	4971.00	70.5053	1082.00	941.000	78/04/13	78/07/12
00515	RESIDUE	DISS-105	C MG/L		3	985.333	6247.00	79.0380	1076.00	931.000	78/04/13	78/07/12
00530	RESIDUE	TOT NFLT	MG/L		3	26.3333	1012.33	31.8172	63.0000	6.00000	78/04/13	78/07/12
00608	NH3+NH4-	N DISS	MG/L		1	.370000			.370000	.370000	78/05/17	78/05/17
00610	NH3+NH4-	N TOTAL	MG/L		2	2.67500	3.94804	1.98697	4.08000	1.27000	78/04/13	78/07/12
00613	NO2-N	DISS	MG/L		3	.053333	.001233	.035119	.090000	.020000	78/04/13	78/07/12
00618	NO3-N	DISS	MG/L		1	.100000			.100000	.100000	78/05/17	78/05/17
				K	1	.100000			.100000	.100000	78/07/12	78/07/12
				TOT	2	.100000	-.372E-08	.000000	.100000	.100000	78/05/17	78/07/12
00620	NO3-N	TOTAL	MG/L	K	1	.100000			.100000	.100000	78/04/13	78/04/13
00625	TOT KJEL	N	MG/L		3	4.96667	3.09302	1.75870	6.98000	3.73000	78/04/13	78/07/12
00671	PHOS-DIS	ORTHO	MG/L P		3	.013333	.000058	.007638	.020000	.005000	78/04/13	78/07/12
31616	FEC COLI	MFM-FCBR	/100ML		1	17.0000			17.0000	17.0000	78/07/12	78/07/12
				K	2	3.00000	.000000	.000000	3.00000	3.00000	78/04/13	78/05/17
				TOT	3	7.66667	65.3334	8.08291	17.0000	3.00000	78/04/13	78/07/12
70505	T PO4	P-COL	MG/L		3	.113000	.001933	.043966	.162000	.077000	78/04/13	78/07/12

Table IV-9.

STORET RETRIEVAL DATE 84/09/11 - INVENT - VERSION OF SEP. 1981

460A06
44 26 38.0 096 58 41.0 2
E OAKWOOD W SHORE T111N R51W SEC 5
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810516
0000 CLASS 00 CSN-RSP 0591790-0620068

/TYPA/AMBNT/LAKE

PARAMETER			RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010 WATER	TEMP	CENT		17	13.2700	81.6098	9.03381	25.6000	.560000	79/04/24	79/12/18
00011 WATER	TEMP	FAHN		17	55.8823	264.362	16.2592	78.0000	33.0000	79/04/24	79/12/18
00020 AIR	TEMP	CENT		17	13.0047	77.5513	8.80632	28.9000	.000000	79/04/24	79/12/18
00021 AIR	TEMP	FAHN		17	55.4118	251.384	15.8551	84.0000	32.0000	79/04/24	79/12/18
00300 DO		MG/L		17	13.5706	439.906	20.9739	94.0000	2.50000	79/04/24	79/12/18
00310 BOD	5 DAY	MG/L		5	7.65200	26.1597	5.11466	16.0000	2.04000	79/04/24	79/09/04
00400 PH		SU		11	7.64545	.752759	.867617	8.60000	6.40000	79/07/10	79/12/18
00403 LAB	PH	SU		10	8.59799	.185574	.430783	9.20000	7.80000	79/04/24	79/08/21
00410 T ALK	CACO3	MG/L		10	160.400	392.055	19.8004	182.000	122.000	79/04/24	79/09/04
00500 RESIDUE	TOTAL	MG/L		17	967.647	6891.62	83.0158	1126.00	845.000	79/04/24	79/12/18
00515 RESIDUE	DISS-105	C MG/L		17	932.823	4998.31	70.6987	1080.00	831.000	79/04/24	79/12/18
00530 RESIDUE	TOT NFLT	MG/L		17	84.2353	47106.9	217.041	912.000	4.00000	79/04/24	79/12/18
00608 NH3+NH4-	N DISS	MG/L		2	.250000	.020000	.141421	.350000	.150000	79/07/24	79/08/07
00610 NH3+NH4-	N TOTAL	MG/L		14	.404285	.140780	.375207	1.39000	.030000	79/04/24	79/12/18
			K	1	.020000			.020000	.020000	79/09/18	79/09/18
00613 NO2-N	DISS	MG/L	TOT	15	.378666	.140569	.374926	1.39000	.020000	79/04/24	79/12/18
				2	.030000	.000800	.028284	.050000	.010000	79/05/08	79/06/26
			K	15	.010000	.498E-10	.000007	.010000	.010000	79/04/24	79/12/18
00618 NO3-N	DISS	MG/L	TOT	17	.012353	.000094	.009701	.050000	.010000	79/04/24	79/12/18
00620 NO3-N	TOTAL	MG/L	K	2	.100000	-.372E-08	.000000	.100000	.100000	79/07/24	79/08/07
				7	.157143	.006191	.078680	.300000	.100000	79/04/24	79/12/18
			K	8	.100000	.000000	.000000	.100000	.100000	79/05/08	79/11/20
00625 TOT KJEL	N	MG/L	TOT	15	.126667	.003524	.059362	.300000	.100000	79/04/24	79/12/18
00671 PHOS-DIS	ORTHO	MG/L P		17	2.42999	.423387	.650682	3.80000	1.62000	79/04/24	79/12/18
				2	.053500	.000085	.009192	.060000	.047000	79/07/24	79/08/07
			K	1	.005000			.005000	.005000	79/04/24	79/04/24
31616 FEC COLI	MFM-FCBR	/100ML	TOT	3	.037333	.000826	.028746	.060000	.005000	79/04/24	79/08/07
				10	141.600	49933.8	223.459	570.000	3.00000	79/05/22	79/12/04
			K	7	17.7143	1323.90	36.3855	100.000	2.00000	79/04/24	79/12/18
			TOT	17	90.5882	32534.0	180.372	570.000	2.00000	79/04/24	79/12/18
70505 T PO4	P-COL	MG/L		17	.105412	.007326	.085591	.356000	.034000	79/04/24	79/12/18
70507 PHOS-T	ORTHO	MG/L P		11	.032091	.001006	.031713	.102000	.007000	79/05/01	79/11/20
			K	3	.005000	.000000	.000000	.005000	.005000	79/07/10	79/12/18
			TOT	14	.026286	.000907	.030111	.102000	.005000	79/05/01	79/12/18

Table IV-10.

STORET RETRIEVAL DATE 84/09/11 - INVENT - VERSION OF SEP. 1981

460K2
44 22 53.0 097 02 20.0 2
INLET TO E OAKWOOD T112N-R51W-S33 CCDC
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER BASIN 090700
BIG SIOUX RIVER BASIN
21SDLAKE 840824
0000 CLASS 00 CSN-RSP 0741945-0744336

/TYPA/AMBNT/STREAM

PARAMETER			RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010 WATER	TEMP	CENT		3	8.68333	64.3523	8.02199	16.6000	.560000	83/03/15	83/05/12
00011 WATER	TEMP	FAHN		3	47.3333	196.336	14.0120	61.0000	33.0000	83/03/15	83/05/12
00020 AIR	TEMP	CENT		3	7.22333	65.1154	8.06941	15.0000	-.110E+01	83/03/15	83/05/12
00021 AIR	TEMP	FAHN		3	45.0000	211.000	14.5258	59.0000	30.0000	83/03/15	83/05/12
00095 CNDUCTVY	AT 25C	MICROMHO		1	874.000			874.000	874.000	83/04/20	83/04/20
00310 BOD	5 DAY	MG/L		2	4.50000	12.5000	3.53553	7.00000	2.00000	83/03/15	83/05/12
00400 PH		SU		3	7.83333	.173447	.416469	8.30000	7.50000	83/03/15	83/05/12
00403 LAB	PH	SU		1	8.18000			8.18000	8.18000	83/04/20	83/04/20
00410 T ALK	CACO3	MG/L		1	174.000			174.000	174.000	83/04/20	83/04/20
00500 RESIDUE	TOTAL	MG/L		3	678.333	24761.5	157.358	851.000	543.000	83/03/15	83/05/12
00530 RESIDUE	TOT NFLT	MG/L		1	4.00000			4.00000	4.00000	83/03/15	83/03/15
			K	1	1.00000			1.00000	1.00000	83/05/12	83/05/12
			TOT	2	2.50000	4.50000	2.12132	4.00000	1.00000	83/03/15	83/05/12
00610 NH3+NH4-	N TOTAL	MG/L		3	.166667	.016933	.130128	.300000	.040000	83/03/15	83/05/12
00613 NO2-N	DISS	MG/L		1	.040000			.040000	.040000	83/03/15	83/03/15
			K	2	.010000	-.145E-10	.000000	.010000	.010000	83/04/20	83/05/12
			TOT	3	.020000	.000300	.017321	.040000	.010000	83/03/15	83/05/12
00620 NO3-N	TOTAL	MG/L		1	.400000			.400000	.400000	83/03/15	83/03/15
			K	2	.100000	-.372E-08	.000000	.100000	.100000	83/04/20	83/05/12
			TOT	3	.200000	.030000	.173205	.400000	.100000	83/03/15	83/05/12
00625 TOT KJEL	N	MG/L		3	1.58333	.354433	.595342	2.19000	1.00000	83/03/15	83/05/12
00940 CHLORIDE	TOTAL	MG/L		1	7.90000			7.90000	7.90000	83/04/20	83/04/20
00945 SULFATE	SO4-TOT	MG/L		1	298.000			298.000	298.000	83/04/20	83/04/20
31616 FEC COLI	MFM-FCBR	/100ML		1	500.000			500.000	500.000	83/03/15	83/03/15
			K	2	10.0000	.000000	.000000	10.0000	10.0000	83/04/20	83/05/12
			TOT	3	173.333	80033.3	282.902	500.000	10.0000	83/03/15	83/05/12
70300 RESIDUE	DISS-180	C MG/L		3	676.666	25345.0	159.201	851.000	539.000	83/03/15	83/05/12
70505 T PO4	P-COL	MG/!		2	1.20500	.266454	.516192	1.57000	.840000	83/03/15	83/05/12
70506 SOL PO4-	T P-COL	MG/L		1	.047000			.047000	.047000	83/04/20	83/04/20
70507 PHOS-T	ORTHO	MG/L P		3	.670000	.446656	.668323	1.35000	.014000	83/03/15	83/05/12

Table IV-11.

STORET RETRIEVAL DATE 84/09/11 - INVENT - VERSION OF SEP. 1981

460A01
44 28 12.0 096 59 10.0 2
OAKWOOD LK/N MORTIMER SLOUGH T112N R51W S 29/32
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 820109
0000 CLASS 00 CSN-RSP 0642857-0653614

/TYPA/AMBNT/STREAM/RUNOFF

PARAMETER				RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010	WATER	TEMP	CENT		14	20.0371	76.0943	8.72321	28.3000	.560000	77/03/11	77/07/05
00011	WATER	TEMP	FAHN		14	68.5000	253.038	15.9072	83.0000	33.0000	77/03/11	77/07/05
00020	AIR	TEMP	CENT		14	22.6171	55.7870	7.46907	30.0000	6.67000	77/03/11	77/07/05
00021	AIR	TEMP	FAHN		14	72.7143	181.149	13.4592	86.0000	44.0000	77/03/11	77/07/05
00300	DO		MG/L		3	4.70000	22.9300	4.78853	9.80000	.300000	77/06/17	77/07/05
				K	1	1.00000			1.00000	1.00000	77/06/24	77/06/24
				TOT	4	3.77500	18.7091	4.32541	9.80000	.300000	77/06/17	77/07/05
00310	BOD	5 DAY	MG/L		5	5.34000	8.61304	2.93480	9.20000	2.90000	77/06/16	77/07/05
00335	COD	LOWLEVEL	MG/L		13	59.0000	613.500	24.7689	103.000	12.0000	77/03/11	77/07/05
00400	PH		SU		1	8.20000			8.20000	8.20000	77/07/05	77/07/05
00403	LAB	PH	SU		14	7.23857	.129883	.360393	7.82000	6.52000	77/03/11	77/07/05
00410	T ALK	CACO3	MG/L		14	62.2285	345.953	18.5998	106.000	28.0000	77/03/11	77/07/05
00445	CO3 ION	CO3	MG/L		1	56.0000			56.0000	56.0000	77/06/18	77/06/18
00500	RESIDUE	TOTAL	MG/L		15	181.467	2660.13	51.5764	293.000	93.0000	77/03/11	77/07/05
00515	RESIDUE	DISS-105	C MG/L		14	150.929	1316.54	36.2841	205.000	88.0000	77/03/11	77/07/05
00530	RESIDUE	TOT NFLT	MG/L		14	22.5714	162.111	12.7323	41.0000	.000000	77/03/11	77/07/05
00608	NH3+NH4-	N DISS	MG/L		13	.723077	.496190	.704407	2.25000	.030000	77/03/11	77/06/24
00610	NH3+NH4-	N TOTAL	MG/L		2	.065000	.004050	.063640	.110000	.020000	77/06/24	77/07/05
00613	NO2-N	DISS	MG/L		14	.032857	.000607	.024629	.080000	.010000	77/03/11	77/07/05
00620	NO3-N	TOTAL	MG/L		4	.145000	.008100	.090000	.280000	.100000	77/03/11	77/06/17
				K	10	.100000	.000000	.000000	.100000	.100000	77/03/11	77/07/05
				TOT	14	.112857	.002314	.048107	.280000	.100000	77/03/11	77/07/05
00625	TOT KJEL	N	MG/L		15	1.42200	.427076	.653511	2.74000	.630000	77/03/11	77/07/05
00671	PHOS-DIS	ORTHO	MG/L P		1	.221000			.221000	.221000	77/07/05	77/07/05
31616	FEC COLI	MFM-FCBR	/100ML		8	1660.37	7387442	2717.98	7800.00	13.0000	77/06/16	77/07/05
70505	T PO4	P-COL	MG/L		15	.530933	.031756	.178202	.686000	.156000	77/03/11	77/07/05
70507	PHOS-T	ORTHO	MG/L P		14	.447714	.026534	.162891	.628000	.146000	77/03/11	77/06/24

Table IV-12.

STORET RETRIEVAL DATE 84/09/11 - INVENT - VERSION OF SEP. 1981

460A01
44 28 12.0 096 59 10.0 2
OAKWOOD LK/N MORTIMER SLOUGH T112N R51W S 29/32
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
/TYPA/AMBNT/STREAM/RUNOFF
BIG SIOUX RIVER
21SDLAKE 820109
0000 CLASS 00 CSN=RSP 0642857-0653614

PARAMETER				RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010	WATER	TEMP	CENT		2	8.33500	5.54446	2.35467	10.0000	6.67000	78/04/04	78/04/06
00011	WATER	TEMP	FAHN		2	47.0000	18.0000	4.24264	50.0000	44.0000	78/04/04	78/04/06
00020	AIR	TEMP	CENT		2	13.0500	3.64502	1.90919	14.4000	11.7000	78/04/04	78/04/06
00021	AIR	TEMP	FAHN		2	55.5000	12.5000	3.53553	58.0000	53.0000	78/04/04	78/04/06
00300	DO		MG/L		2	9.35000	.245041	.495016	9.70000	9.00000	78/04/04	78/04/06
00310	BOD	5 DAY	MG/L		2	2.49000	.088200	.296984	2.70000	2.28000	78/04/04	78/04/06
00335	COD	LOWLEVEL	MG/L		2	46.5000	112.500	10.6066	54.0000	39.0000	78/04/04	78/04/06
00403	LAB	PH	SU		2	7.75000	.001801	.042433	7.78000	7.72000	78/04/04	78/04/06
00410	T ALK	CACO3	MG/L		2	82.8000	241.996	15.5562	93.8000	71.8000	78/04/04	78/04/06
00500	RESIDUE	TOTAL	MG/L		2	179.500	684.500	26.1629	198.000	161.000	78/04/04	78/04/06
00515	RESIDUE	DISS-105	C MG/L		2	171.500	612.500	24.7487	189.000	154.000	78/04/04	78/04/06
00530	RESIDUE	TOT NFLT	MG/L		2	8.00000	2.00000	1.41421	9.00000	7.00000	78/04/04	78/04/06
00610	NH3+NH4-	N TOTAL	MG/L		2	.150000	.020000	.141421	.250000	.050000	78/04/04	78/04/06
00613	NO2-N	DISS	MG/L		2	.030000	.000200	.014142	.040000	.020000	78/04/04	78/04/06
00620	NO3-N	TOTAL	MG/L		1	.400000			.400000	.400000	78/04/04	78/04/04
				K	1	.100000			.100000	.100000	78/04/06	78/04/06
00625	TOT KJEL	N	MG/L	TOT	2	.250000	.045000	.212132	.400000	.100000	78/04/04	78/04/06
31616	FEC COLI	MFM-FCBR	/100ML		2	1.11000	.259199	.509116	1.47000	.750000	78/04/04	78/04/06
70505	T PO4	P-COL	MG/L		2	413.500	314425	560.736	810.000	17.0000	78/04/04	78/04/06
70507	PHOS-T	ORTHO	MG/L P		2	.234500	.536E-06	.000732	.235000	.234000	78/04/04	78/04/06
					2	.152500	.000364	.019092	.166000	.139000	78/04/04	78/04/06

Table IV-13.

STORET RETRIEVAL DATE 84/09/11 - INVENT - VERSION OF SEP. 1981

460A01
44 28 12.0 096 59 10.0 2
OAKWOOD LK/N MORTIMER SLOUGH T112N R51W S 29/32
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 820109
0000 CLASS 00 CSN-RSP 0642857-0653614

/TYPA/AMBNT/STREAM/RUNOFF

PARAMETER				RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010	WATER	TEMP	CENT		13	8.97845	30.4609	5.51914	17.8000	2.22000	79/04/03	79/06/07
00011	WATER	TEMP	FAHN		13	48.1538	98.4759	9.92350	64.0000	36.0000	79/04/03	79/06/07
C0020	AIR	TEMP	CENT		12	9.39999	40.1088	6.33315	19.4000	1.67000	79/04/03	79/06/07
00021	AIR	TEMP	FAHN		13	48.2308	125.361	11.1965	67.0000	35.0000	79/04/03	79/06/07
00300	DO		MG/L		12	9.03333	12.6861	3.56175	17.7000	3.50000	79/04/03	79/06/07
00310	BOD	5 DAY	MG/L		8	4.48874	3.97676	1.99418	8.04000	2.82000	79/04/03	79/05/31
				K	3	1.00000	.000000	.000000	1.00000	1.00000	79/04/24	79/05/15
				TOT	11	3.53727	5.43930	2.33223	8.04000	1.00000	79/04/03	79/05/31
00403	LAB	PH	SU		13	7.74846	.057617	.240036	8.12000	7.35000	79/04/03	79/06/07
00410	T ALK	CACO3	MG/L		13	145.985	4165.72	64.5424	236.000	65.4000	79/04/03	79/06/07
00500	RESIDUE	TOTAL	MG/L		13	292.077	8343.50	91.3428	403.000	161.000	79/04/03	79/06/07
00515	RESIDUE	DISS-105	C MG/L		13	284.231	8446.75	91.9062	397.000	140.000	79/04/03	79/06/07
00530	RESIDUE	TOT NFLT	MG/L		11	9.63636	40.6046	6.37217	21.0000	1.50000	79/04/03	79/06/07
				K	2	.510000	.480200	.692965	1.00000	.020000	79/04/19	79/04/26
				TOT	13	8.23231	45.6233	6.75450	21.0000	.020000	79/04/03	79/06/07
00608	NH3+NH4-	N DISS	MG/L		4	.175000	.000567	.023805	.190000	.140000	79/04/03	79/04/19
00610	NH3+NH4-	N TOTAL	MG/L		8	.042500	.000421	.020529	.090000	.030000	79/04/24	79/06/07
				K	1	.020000			.020000	.020000	79/05/17	79/05/17
				TOT	9	.040000	.000425	.020616	.090000	.020000	79/04/24	79/06/07
00613	NO2-N	DISS	MG/L		4	.012500	.000025	.005000	.020000	.010000	79/04/03	79/05/17
				K	9	.010000	.582E-10	.000008	.010000	.010000	79/04/10	79/06/07
				TOT	13	.010769	.000008	.002774	.020000	.010000	79/04/03	79/06/07
00618	NO3-N	DISS	MG/L		1	.200000			.200000	.200000	79/04/10	79/04/10
				K	1	.100000			.100000	.100000	79/05/17	79/05/17
				TOT	2	.150000	.005000	.070711	.200000	.100000	79/04/10	79/05/17
00620	NO3-N	TOTAL	MG/L		6	1.06667	1.50667	1.22746	2.60000	.100000	79/04/03	79/05/03
				K	5	.100000	-.279E-08	.000000	.100000	.100000	79/05/10	79/06/07
				TOT	11	.627272	1.00318	1.00408	2.60000	.100000	79/04/03	79/06/07
00625	TOT KJEL	N	MG/L		13	1.68461	.105782	.325241	2.33000	1.32000	79/04/03	79/06/07
00671	PHOS-DIS	ORTHO	MG/L P		4	.290000	.007947	.089148	.364000	.180000	79/04/03	79/04/19
31616	FEC COLI	MFM-FCBR	/100ML		9	96.4444	47520.0	217.991	670.000	3.00000	79/04/03	79/06/07
				K	4	3.00000	.000000	.000000	3.00000	3.00000	79/04/19	79/05/10
				TOT	13	67.6923	33695.1	183.562	670.000	3.00000	79/04/03	79/06/07
70505	T PO4	P-COL	MG/L		13	.345692	.021299	.145941	.526000	.193000	79/04/03	79/06/07
70507	PHOS-T	ORTHO	MG/L P		9	.265111	.019052	.138029	.452000	.134000	79/04/24	79/06/07

Table IV-14.

STORET RETRIEVAL DATE 84/09/11 - INVENT - VERSION OF SEP. 1981

460A01
44 28 12.0 096 59 10.0 2
OAKWOOD LK/N MORTIMER SLOUGH T112N R51W S 29/32
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 820109
0000 CLASS 00 CSN-RSP 0642857-0653614

/TYPA/AMBNT/STREAM/RUNOFF

PARAMETER			RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00011 WATER	TEMP	FAHN		1	34.0000			34.0000	34.0000	82/02/21	82/02/21
00021 AIR	TEMP	FAHN		1	55.0000			55.0000	55.0000	82/02/21	82/02/21
00500 RESIDUE	TOTAL	MG/L		1	156.000			156.000	156.000	82/02/21	82/02/21
00530 RESIDUE	TOT NFLT	MG/L		1	24.0000			24.0000	24.0000	82/02/21	82/02/21
00610 NH3+NH4-	N TOTAL	MG/L		1	.590000			.590000	.590000	82/02/21	82/02/21
00613 NO2-N	DISS	MG/L		1	.020000			.020000	.020000	82/02/21	82/02/21
00621 NO3 MUD	DRY WGT	MG/KG-N		1	1.20000			1.20000	1.20000	82/02/21	82/02/21
00625 TOT KJEL	N	MG/L		1	2.49000			2.49000	2.49000	82/02/21	82/02/21
31616 FEC COLI	MFM-FCBR	/100ML	K	1	3.00000			3.00000	3.00000	82/02/21	82/02/21
70506 SOL PO4-	T P-COL	MG/L		1	.882000			.882000	.882000	82/02/21	82/02/21
70507 PHOS-T	ORTHO	MG/L P		1	.834000			.834000	.834000	82/02/21	82/02/21

Table IV-15.

STORET RETRIEVAL DATE 84/09/11 - INVENT - VERSION OF SEP. 1981

460A02
44 28 12.0 096 59 43.0 2
OAKWOOD LK/N MORTIMER SLOUGH T112N R51N S 30/31
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 820109
0000 CLASS 00 CSN-RSP 0642858-0653615

/TYPA/AMBNT/STREAM/RUNOFF

PARAMETER				RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010	WATER	TEMP	CENT		17	18.9188	83.6858	9.14799	26.7000	.000000	77/03/10	77/07/05
00011	WATER	TEMP	FAHN		17	66.0588	271.187	16.4678	80.0000	32.0000	77/03/10	77/07/05
00020	AIR	TEMP	CENT		17	22.0935	60.7534	7.79445	33.3000	6.67000	77/03/10	77/07/05
00021	AIR	TEMP	FAHN		17	70.5882	170.012	13.0389	86.0000	44.0000	77/03/10	77/07/05
00300	DO		MG/L		4	2.40000	2.96667	1.72240	4.50000	.300000	77/06/17	77/07/05
00310	BOD	5 DAY	MG/L		7	12.1143	145.838	12.0763	38.0000	2.90000	77/03/10	77/07/05
00335	COD	LOWLEVEL	MG/L		15	60.7000	574.851	23.9761	117.000	26.0000	77/03/11	77/07/05
00400	PH		SU		1	8.70000			8.70000	8.70000	77/07/05	77/07/05
00403	LAB	PH	SU		17	7.30705	.064346	.253666	7.85000	6.80000	77/03/10	77/07/05
00410	T ALK	CACO3	MG/L		17	81.1411	1012.63	31.8219	170.000	31.2000	77/03/10	77/07/05
00500	RESIDUE	TOTAL	MG/L		17	247.765	33758.4	183.735	931.000	124.000	77/03/10	77/07/05
00515	RESIDUE	DISS-105	C MG/L		17	222.353	31981.5	178.834	882.000	64.0000	77/03/10	77/07/05
00530	RESIDUE	TOT NFLT	MG/L		17	25.4118	253.258	15.9141	60.0000	7.00000	77/03/10	77/07/05
00608	NH3+NH4-	N DISS	MG/L		15	.650666	.500978	.707798	2.26000	.020000	77/03/10	77/07/05
				K	1	.020000			.020000	.020000	77/06/24	77/06/24
				TOT	16	.611249	.492438	.701739	2.26000	.020000	77/03/10	77/07/05
00613	NO2-N	DISS	MG/L		17	.025882	.000601	.024510	.080000	.010000	77/03/10	77/07/05
00620	NO3-N	TOTAL	MG/L		4	.912500	.833558	.912994	2.22000	.100000	77/03/10	77/06/16
				K	13	.100000	.298E-07	.000173	.100000	.100000	77/06/17	77/07/05
				TOT	17	.291176	.282498	.531506	2.22000	.100000	77/03/10	77/07/05
00625	TOT KJEL	N	MG/L		16	1.97937	1.10203	1.04977	4.16000	.910000	77/03/10	77/07/05
31616	FEC COLI	MFM-FCBR	/100ML		10	1141.60	5057669	2248.93	7000.00	13.0000	77/03/10	77/07/05
70505	T PO4	P-COL	MG/L		15	.947666	.208370	.456476	2.22000	.278000	77/03/10	77/07/05
70507	PHOS-T	ORTHO	MG/L P		15	.758066	.186727	.432119	1.94000	.218000	77/03/10	77/07/05

Table IV-16.

STORET RETRIEVAL DATE 84/09/11 - INVENT - VERSION OF SEP. 1981

460A02
44 28 12.0 096 59 43.0 2
OAKWOOD LK/N MORTIMER SLOUGH T112N R51N S 30/31
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 820109
0000 CLASS 00 CSN-RSP 0642858-0653615

/TYPA/AMBNT/STREAM/RUNOFF

PARAMETER				RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010	WATER	TEMP	CENT		2	9.43999	5.51137	2.34763	11.1000	7.78000	78/04/04	78/04/06
00011	WATER	TEMP	FAHN		2	49.0000	18.0000	4.24264	52.0000	46.0000	78/04/04	78/04/06
00020	AIR	TEMP	CENT		2	13.0500	3.64502	1.90919	14.4000	11.7000	78/04/04	78/04/06
00021	AIR	TEMP	FAHN		2	55.5000	12.5000	3.53553	58.0000	53.0000	78/04/04	78/04/06
00300	DO		MG/L		2	10.8500	.405029	.636419	11.3000	10.4000	78/04/04	78/04/06
00310	BOD	5 DAY	MG/L		2	3.09000	.304214	.551556	3.48000	2.70000	78/04/04	78/04/06
00335	COD	LOWLEVEL	MG/L		2	52.0000	2.00000	1.41421	53.0000	51.0000	78/04/04	78/04/06
00403	LAB	PH	SU		2	7.89000	.000198	.014084	7.90000	7.88000	78/04/04	78/04/06
00410	T ALK	CACO3	MG/L		2	111.800	348.484	18.6677	125.000	98.6000	78/04/04	78/04/06
00500	RESIDUE	TOTAL	MG/L		2	264.000	4232.00	65.0538	310.000	218.000	78/04/04	78/04/06
00515	RESIDUE	DISS-105	C MG/L		2	261.500	4512.50	67.1751	309.000	214.000	78/04/04	78/04/06
00530	RESIDUE	TOT NFLT	MG/L		2	2.50000	4.50000	2.12132	4.00000	1.00000	78/04/04	78/04/06
00610	NH3+NH4-	N TOTAL	MG/L		1	.070000			.070000	.070000	78/04/04	78/04/04
				K	1	.020000			.020000	.020000	78/04/06	78/04/06
				TOT	2	.045000	.001250	.035355	.070000	.020000	78/04/04	78/04/06
00613	NO2-N	DISS	MG/L		2	.020000	-.232E-09	.000000	.020000	.020000	78/04/04	78/04/06
00620	NO3-N	TOTAL	MG/L		1	.200000			.200000	.200000	78/04/04	78/04/04
				K	1	.100000			.100000	.100000	78/04/06	78/04/06
				TOT	2	.150000	.005000	.070711	.200000	.100000	78/04/04	78/04/06
00625	TOT KJEL	N	MG/L		2	1.43500	.042052	.205066	1.58000	1.29000	78/04/04	78/04/06
00671	PHOS-DIS	ORTHO	MG/L P		1	.458000			.458000	.458000	78/04/06	78/04/06
31616	FEC COLI	MFM-FCBR	/100ML		2	31.5000	924.500	30.4056	53.0000	10.0000	78/04/04	78/04/06
70505	T PO4	P-COL	MG/L		2	.530000	.000200	.014158	.540000	.520000	78/04/04	78/04/06
70507	PHOS-T	ORTHO	MG/L P		1	.469000			.469000	.469000	78/04/04	78/04/04

Table IV-17.

STORET RETRIEVAL DATE 84/09/11 - INVENT - VERSION OF SEP. 1981

460A02
44 28 12.0 096 59 43.0 2
OAKWOOD LK/N MORTIMER SLOUGH T112N R51N S 30/31
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 820109
0000 CLASS 00 CSN-RSP 0642858-0653615

/TYPA/AMBNT/STREAM/RUNOFF

PARAMETER				RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010 WATER	TEMP		CENT		13	13.0300	234.250	15.3052	61.0000	2.78000	79/04/10	79/06/07
00011 WATER	TEMP		FAHN		13	42.8000	298.485	17.2767	66.0000	4.30000	79/04/10	79/06/07
00020 AIR	TEMP		CENT		13	9.57230	40.8500	6.39140	20.6000	1.67000	79/04/10	79/06/07
00021 AIR	TEMP		FAHN		13	45.7692	282.360	16.8036	69.0000	5.00000	79/04/10	79/06/07
00300 DO			MG/L		12	8.10833	12.7045	3.56434	13.4000	2.30000	79/04/10	79/06/07
00310 BOD	5 DAY		MG/L		10	7.79199	21.8377	4.67308	19.0000	1.02000	79/04/10	79/05/31
				K	1	1.00000			1.00000	1.00000	79/05/15	79/05/15
				TOT	11	7.17454	23.8477	4.88341	19.0000	1.00000	79/04/10	79/05/31
00403 LAB	PH		SU		13	7.72?84	.033386	.182719	8.10000	7.40000	79/04/10	79/06/07
00410 T ALK	CACO3		MG/L		13	142.338	2568.73	50.6826	219.000	65.0000	79/04/10	79/06/07
00500 RESIDUE	TOTAL		MG/L		13	406.077	10904.9	104.427	542.000	211.000	79/04/10	79/06/07
00515 RESIDUE	DISS-105	C	MG/L		13	360.461	9488.83	97.4106	522.000	179.000	79/04/10	79/06/07
00530 RESIDUE	TOT NFLT		MG/L		12	49.4167	3339.36	57.7872	208.000	9.00000	79/04/10	79/06/07
				K	1	1.00000			1.00000	1.00000	79/04/26	79/04/26
				TOT	13	45.6923	3241.40	56.9333	208.000	1.00000	79/04/10	79/06/07
00610 NH3+NH4-	N TOTAL		MG/L		13	.050769	.003358	.057945	.240000	.020000	79/04/10	79/06/07
00613 NO2-N	DISS		MG/L		2	.010000	-.145E-10	.000000	.010000	.010000	79/04/19	79/05/17
				K	11	.010000	.465E-10	.000007	.010000	.010000	79/04/10	79/06/07
				TOT	13	.010000	.776E-10	.000009	.010000	.010000	79/04/10	79/06/07
00618 NO3-N	DISS		MG/L		1	.700000			.700000	.700000	79/04/17	79/04/17
00620 NO3-N	TOTAL		MG/L		5	.160000	.018000	.134164	.400000	.100000	79/04/10	79/05/15
				K	7	.100000	.000000	.000000	.100000	.100000	79/04/24	79/06/07
				TOT	12	.125000	.007500	.086603	.400000	.100000	79/04/10	79/06/07
00625 TOT KJEL	N		MG/L		13	1.89923	.140134	.374345	2.71000	1.47000	79/04/10	79/06/07
31616 FEC COLI	MFM-FCBR		/100ML		9	140.667	82023.7	286.398	890.000	3.00000	79/04/10	79/06/07
				K	4	4.75000	12.2500	3.50000	10.0000	3.00000	79/04/17	79/05/03
				TOT	13	98.8461	58948.6	242.793	890.000	3.00000	79/04/10	79/06/07
70505 T PO4	P-COL		MG/L		13	.565923	.014778	.121566	.811000	.437000	79/04/10	79/06/07
70507 PHOS-T	ORTHO		MG/L P		13	.477307	.023195	.152300	.793000	.308000	79/04/10	79/06/07

Table IV-18.

STORET RETRIEVAL DATE 84/09/11 - INVENT - VERSION OF SEP. 1981

460A03
44 27 23.0 097 01 39.0 2
OAKWOOD LK/W TRIB T111/112N R52W SEC 35/36/2/1
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 820109
0000 CLASS 00 CSN-RSP 0642859-0653616

/TYPA/AMBNT/STREAM/RUNOFF

PARAMETER				RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010	WATER	TEMP	CENT		17	17.7053	102.705	10.1343	28.9000	.560000	77/03/09	77/07/05
00011	WATER	TEMP	FAHN		17	63.8823	333.113	18.2514	84.0000	33.0000	77/03/09	77/07/05
00020	AIR	TEMP	CENT		17	21.2529	75.3037	8.67777	32.8000	6.67000	77/03/09	77/07/05
00021	AIR	TEMP	FAHN		17	70.7647	254.945	15.9670	91.0000	44.0000	77/03/09	77/07/05
00095	CNDUCTVY	AT 25C	MICROMHO		1	.257000			.257000	.257000	77/03/09	77/03/09
00300	DO		MG/L		3	3.20000	.840004	.916517	4.00000	2.20000	77/06/17	77/06/24
00310	BOD	5 DAY	MG/L		6	13.4833	174.962	13.2273	37.5000	4.70000	77/03/09	77/07/05
00335	COD	LOWLEVEL	MG/L		14	68.0000	592.154	24.3342	129.000	43.0000	77/03/11	77/07/05
00403	LAB	PH	SU		17	7.32881	.061813	.248623	7.81000	6.82000	77/03/09	77/07/05
00410	T ALK	CACO3	MG/L		17	96.5058	1334.73	36.5340	167.000	39.6000	77/03/09	77/07/05
00500	RESIDUE	TOTAL	MG/L		17	692.470	238847	488.719	2026.00	220.000	77/03/09	77/07/05
00515	RESIDUE	DISS-105	C MG/L		17	613.470	254231	504.213	1993.00	135.000	77/03/09	77/07/05
00530	RESIDUE	TOT NFLT	MG/L		17	79.0000	7780.00	88.2043	406.000	16.0000	77/03/09	77/07/05
00608	NH3+NH4-	N DISS	MG/L		15	.889999	1.08284	1.04059	3.88000	.030000	77/03/10	77/07/05
00610	NH3+NH4-	N TOTAL	MG/L		1	.080000			.080000	.080000	77/06/24	77/06/24
00613	NO2-N	DISS	MG/L		14	.050000	.002415	.049146	.160000	.010000	77/03/09	77/07/05
				K	2	.010000	-.145E-10	.000000	.010000	.010000	77/06/24	77/06/24
				TOT	16	.045000	.002280	.047749	.160000	.010000	77/03/09	77/07/05
00618	NO3-N	DISS	MG/L	K	1	.100000			.100000	.100000	77/07/05	77/07/05
00620	NO3-N	TOTAL	MG/L		5	1.13000	.862001	.928440	2.68000	.400000	77/03/09	77/06/16
				K	10	.100000	.000000	.000000	.100000	.100000	77/06/17	77/06/24
				TOT	15	.443333	.498881	.706315	2.68000	.100000	77/03/09	77/06/24
00625	TOT KJEL	N	MG/L		17	2.19117	.939580	.969319	4.28000	1.24000	77/03/09	77/07/05
00671	PHOS-DIS	ORTHO	MG/L P		2	.088000	.010658	.103238	.161000	.015000	77/06/24	77/07/05
31616	FEC COLI	MFM-FCBR	/100ML		10	3328.30	.946E+08	9727.77	31000.0	33.0000	77/03/09	77/07/05
70505	T PO4	P-COL	MG/L		17	.421117	.018892	.137447	.690000	.195000	77/03/09	77/07/05
70507	PHOS-T	ORTHO	MG/L P		15	.622600	1.30610	1.14285	4.73000	.131000	77/03/09	77/06/24

Table IV-19.

STORET RETRIEVAL DATE 84/09/11 - INVENT - VERSION OF SEP. 1981

460A03
44 27 23.0 097 01 39.0 2
OAKWOOD LK/W TRIB T111/112N R52W SEC 35/36/2/1
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 820109
0000 CLASS 00 CSN-RSP 0642859-0653616

/TYPA/AMBNT/STREAM/RUNOFF

PARAMETER				RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010	WATER	TEMP	CENT		10	7.45099	25.3529	5.03517	16.1000	.000000	79/04/10	79/05/17
00011	WATER	TEMP	FAHN		10	45.4000	82.0460	9.05792	61.0000	32.0000	79/04/10	79/05/17
00020	AIR	TEMP	CENT		10	7.34100	33.4636	5.78478	18.9000	.560000	79/04/10	79/05/17
00021	AIR	TEMP	FAHN		9	45.6667	123.252	11.1019	66.0000	31.0000	79/04/10	79/05/17
00300	DO		MG/L		10	9.72999	6.08678	2.46714	14.5000	6.70000	79/04/10	79/05/17
00310	BOD	5 DAY	MG/L		6	4.86333	17.8227	4.22170	13.0000	1.00000	79/04/10	79/05/10
				K	1	1.00000			1.00000	1.00000	79/04/24	79/04/24
				TOT	7	4.31142	16.9845	4.12122	13.0000	1.00000	79/04/10	79/05/10
00403	LAB	PH	SU		10	7.80199	.141547	.376228	8.58000	7.39000	79/04/10	79/05/17
00410	T ALK	CACO3	MG/L		10	140.080	1336.78	36.5621	187.000	84.8000	79/04/10	79/05/17
00500	RESIDUE	TOTAL	MG/L		10	608.800	31175.8	176.567	830.000	359.000	79/04/10	79/05/17
00515	RESIDUE	DISS-105	C MG/L		10	596.700	31962.1	178.779	829.000	346.000	79/04/10	79/05/17
00530	RESIDUE	TOT NFLT	MG/L		9	13.4444	97.0278	9.85027	31.0000	1.00000	79/04/10	79/05/17
				K	1	.020000			.020000	.020000	79/04/11	79/04/11
				TOT	10	12.1020	104.269	10.2112	31.0000	.020000	79/04/10	79/05/17
00608	NH3+NH4-	N DISS	MG/L		2	.275000	.018050	.134350	.370000	.180000	79/04/10	79/04/17
00610	NH3+NH4-	N TOTAL	MG/L		7	.104286	.013562	.116455	.310000	.030000	79/04/11	79/05/15
				K	1	.020000			.020000	.020000	79/05/17	79/05/17
				TOT	8	.093750	.012512	.111859	.310000	.020000	79/04/11	79/05/17
00613	NO2-N	DISS	MG/L		3	.046667	.003033	.055076	.110000	.010000	79/04/11	79/04/19
				K	6	.010000	-.931E-10	.000000	.010000	.010000	79/04/10	79/05/17
				TOT	9	.022222	.001094	.033082	.110000	.010000	79/04/10	79/05/17
00618	NO3-N	DISS	MG/L		1	3.00000			3.00000	3.00000	79/04/17	79/04/17
00620	NO3-N	TOTAL	MG/L		5	.760000	.738000	.859069	2.20000	.100000	79/04/10	79/05/17
				K	4	.077500	.002025	.045000	.100000	.010000	79/04/24	79/05/15
				TOT	9	.456666	.499150	.706505	2.20000	.010000	79/04/10	79/05/17
00625	TOT KJEL	N	MG/L		10	1.74100	.290522	.539001	2.63000	1.23000	79/04/10	79/05/17
00671	PHOS-DIS	ORTHO	MG/L P		2	.240000	.000392	.019798	.254000	.226000	79/04/10	79/04/17
31616	FEC COLI	MFM-FCBR	/100ML		7	7.00000	40.3333	6.35085	20.0000	3.00000	79/04/11	79/05/15
				K	3	3.00000	.000000	.000000	3.00000	3.00000	79/04/10	79/05/17
				TOT	10	5.80000	30.6222	5.53374	20.0000	3.00000	79/04/10	79/05/17
70505	T PO4	P-COL	MG/L		10	.215700	.011442	.106969	.349000	.078000	79/04/10	79/05/17
70507	PHOS-T	ORTHO	MG/L P		8	.123500	.006404	.080027	.239000	.050000	79/04/11	79/05/17

Table IV-20.

STORET RETRIEVAL DATE 84/09/11 - INVENT - VERSION OF SEP. 1981

460A03
44 27 23.0 097 01 39.0 2
OAKWOOD LK/W TRIB T111/112N R52W SEC 35/36/2/1
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 820109
0000 CLASS 00 CSN-RSP 0642859-0653616

/TYPA/AMBNT/STREAM/RUNOFF

PARAMETER			RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00011 WATER	TEMP	FAHN		1	34.0000			34.0000	34.0000	82/02/21	82/02/21
00021 AIR	TEMP	FAHN		1	55.0000			55.0000	55.0000	82/02/21	82/02/21
00500 RESIDUE	TOTAL	MG/L		1	156.000			156.000	156.000	82/02/21	82/02/21
00530 RESIDUE	TOT NFLT	MG/L		1	24.0000			24.0000	24.0000	82/02/21	82/02/21
00610 NH3+NH4-	N TOTAL	MG/L		1	.590000			.590000	.590000	82/02/21	82/02/21
00613 NO2-N	DISS	MG/L		1	.020000			.020000	.020000	82/02/21	82/02/21
00620 NO3-N	TOTAL	MG/L		1	1.20000			1.20000	1.20000	82/02/21	82/02/21
00625 TOT KJEL	N	MG/L		1	2.49000			2.49000	2.49000	82/02/21	82/02/21
31673 FECSTREP	MFKFAGAR	/100ML	K	1	3.00000			3.00000	3.00000	82/02/21	82/02/21
70506 SOL PO4-	T P-COL	MG/L		1	.882000			.882000	.882000	82/02/21	82/02/21
70507 PHOS-T	ORTHO	MG/L P		1	.834000			.834000	.834000	82/02/21	82/02/21

Table IV-21.

STORET RETRIEVAL DATE 84/09/11 - INVENT - VERSION OF SEP. 1981

460A03
44 27 23.0 097 01 39.0 2
OAKWOOD LK/W TRIB T111/112N R52W SEC 35/36/2/1
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 820109
0000 CLASS 00 CSN-RSP 0642859-0653616

/TYPA/AMBNT/STREAM/RUNOFF

PARAMETER				RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010	WATER	TEMP	CENT		1	.560000			.560000	.560000	83/03/15	83/03/15
00011	WATER	TEMP	FAHN		1	33.0000			33.0000	33.0000	83/03/15	83/03/15
00020	AIR	TEMP	CENT		1	-.110E+01			-.110E+01	-.110E+01	83/03/15	83/03/15
00021	AIR	TEMP	FAHN		1	30.0000			30.0000	30.0000	83/03/15	83/03/15
00310	BOD	5 DAY	MG/L		1	2.00000			2.00000	2.00000	83/03/15	83/03/15
00400	PH		SU		1	7.50000			7.50000	7.50000	83/03/15	83/03/15
00500	RESIDUE	TOTAL	MG/L		1	869.000			869.000	869.000	83/03/15	83/03/15
00530	RESIDUE	TOT NFLT	MG/L		1	10.0000			10.0000	10.0000	83/03/15	83/03/15
00610	NH3+NH4-	N TOTAL	MG/L		1	.040000			.040000	.040000	83/03/15	83/03/15
00613	NO2-N	DISS	MG/L		1	.020000			.020000	.020000	83/03/15	83/03/15
00620	NO3-N	TOTAL	MG/L		1	.400000			.400000	.400000	83/03/15	83/03/15
00625	TOT KJEL	N	MG/L		1	.940000			.940000	.940000	83/03/15	83/03/15
31616	FEC COLI	MFM-FCBR	/100ML	K	1	10.0000			10.0000	10.0000	83/03/15	83/03/15
70300	RESIDUE	DISS-180	C MG/L		1	859.000			859.000	859.000	83/03/15	83/03/15
70505	T PO4	P-COL	MG/L		1	.217000			.217000	.217000	83/03/15	83/03/15
70507	PHOS-T	ORTHO	MG/L P		1	.115000			.115000	.115000	83/03/15	83/03/15

Table IV-22.

STORET RETRIEVAL DATE 84/09/11 - INVENT - VERSION OF SEP. 1981

460A04
44 26 30.0 097 01 00.0 2
OAKWOOD LK/S JOHNSON T111N R52W SEC1/12
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 820109
0000 CLASS 00 CSN-RSP 0642860-0653617

/TYPA/AMBNT/STREAM/RUNOFF

PARAMETER				RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010	WATER	TEMP	CENT		13	20.0823	82.9284	9.10650	29.4000	.560000	77/03/11	77/06/24
00011	WATER	TEMP	FAHN		13	68.1538	268.977	16.4005	85.0000	33.0000	77/03/11	77/06/24
00020	AIR	TEMP	CENT		13	22.5069	61.9749	7.87242	30.0000	6.67000	77/03/11	77/06/24
00021	AIR	TEMP	FAHN		13	72.5384	201.109	14.1813	86.0000	44.0000	77/03/11	77/06/24
00300	DO		MG/L		3	6.86666	.853432	.923814	7.40000	5.80000	77/06/17	77/06/24
00310	BOD	5 DAY	MG/L		4	3.62500	2.04250	1.42916	5.60000	2.20000	77/06/16	77/06/23
00335	COD	LOWLEVEL	MG/L		13	55.2692	333.944	18.2741	102.000	36.0000	77/03/11	77/06/24
00403	LAB	PH	SU		13	7.35076	.187134	.432590	7.92000	6.70000	77/03/11	77/06/24
00410	T ALK	CACO3	MG/L		12	70.1166	395.087	19.8768	93.2000	37.0000	77/03/11	77/06/24
00500	RESIDUE	TOTAL	MG/L		13	235.923	4915.25	70.1089	350.000	138.000	77/03/11	77/06/24
00515	RESIDUE	DISS-105	C MG/L		13	158.462	1051.44	32.4259	197.000	117.000	77/03/11	77/06/24
00530	RESIDUE	TOT NFLT	MG/L		13	77.4615	6771.61	82.2898	221.000	3.00000	77/03/11	77/06/24
00603	NH3+NH4-	N DISS	MG/L		10	.533999	.231560	.481206	1.35000	.050000	77/03/11	77/06/23
				K	1	.020000			.020000	.020000	77/06/24	77/06/24
				TOT	11	.487272	.232421	.482101	1.35000	.020000	77/03/11	77/06/24
00610	NH3+NH4-	N TOTAL	MG/L		1	.750000			.750000	.750000	77/06/18	77/06/18
				K	1	.020000			.020000	.020000	77/06/24	77/06/24
				TOT	2	.385000	.266450	.516188	.750000	.020000	77/06/18	77/06/24
00613	NO2-N	DISS	MG/L		13	.045385	.000510	.022589	.080000	.010000	77/03/11	77/06/24
00620	NO3-N	TOTAL	MG/L		7	.368571	.133047	.364757	.940000	.100000	77/03/11	77/06/18
				K	5	.100000	-.279E-08	.000000	.100000	.100000	77/06/19	77/06/24
				TOT	12	.256666	.091697	.302815	.940000	.100000	77/03/11	77/06/24
00625	TOT KJEL	N	MG/L		13	1.64999	1.07143	1.03510	4.20000	.720000	77/03/11	77/06/24
00671	PHOS-DIS	ORTHO	MG/L P		1	.220000			.220000	.220000	77/06/18	77/06/18
01055	MANGNESE	MN	UG/L	K	1	.100000			.100000	.100000	77/06/23	77/06/23
31616	FEC COLI	MFM-FCBR	/100ML		7	3706.29	.802E+08	8958.01	24000.0	17.0000	77/06/16	77/06/24
70505	T PO4	P-COL	MG/L		13	32.8082	13674.4	116.937	422.000	.138000	77/03/11	77/06/24
70507	PHOS-T	ORTHO	MG/L P		12	.257583	.003527	.059390	.362000	.189000	77/03/11	77/06/24

Table IV-23.

STORET RETRIEVAL DATE 84/09/11 - INVENT - VERSION OF SEP. 1981

460A07
44 25 59.0 096 58 59.0 2
W OAKWOOD E SHORE T111N R51W SEC 8
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810516
0000 CLASS 00 CSN-RSP 0591791-0620069

/TYPA/AMBNT/LAKE

PARAMETER				RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010	WATER	TEMP	CENT		5	10.2380	122.300	11.0589	25.6000	.000000	77/07/05	77/12/28
00011	WATER	TEMP	FAHN		5	50.4000	394.801	19.8696	78.0000	32.0000	77/07/05	77/12/28
00020	AIR	TEMP	CENT		6	11.9983	231.956	15.2301	30.6000	-.666E+01	77/07/05	77/12/28
00021	AIR	TEMP	FAHN		6	53.8333	767.370	27.7014	87.0000	20.0000	77/07/05	77/12/28
00095	CNDUCTVY	AT 25C	MICROMHO		2	1220.00	.000000	.000000	1220.00	1220.00	77/10/27	77/11/31
00300	DO		MG/L		5	8.59999	25.5250	5.05223	13.0000	1.70000	77/07/05	77/12/28
00310	BOD	5 DAY	MG/L		6	11.9567	100.926	10.0462	26.7000	1.00000	77/07/05	77/12/28
00335	COD	LOWLEVEL	MG/L		6	159.833	1393.79	37.3335	211.000	118.000	77/07/05	77/12/28
00400	PH		SU		1	8.40000			8.40000	8.40000	77/07/05	77/07/05
00403	LAB	PH	SU		6	8.52666	.873437	.934579	10.0500	7.72000	77/07/05	77/12/28
00410	T ALK	CACO3	MG/L		6	132.667	729.875	27.0162	179.000	102.000	77/07/05	77/12/28
00500	RESIDUE	TOTAL	MG/L		6	1089.50	2610.80	51.0960	1156.00	1035.00	77/07/05	77/12/28
00515	RESIDUE	DISS-105	C MG/L		6	1026.00	2297.20	47.9291	1108.00	973.000	77/07/05	77/12/28
00530	RESIDUE	TOT NFLT	MG/L		6	62.6667	228.671	15.1219	92.0000	48.0000	77/07/05	77/12/28
00608	NH3+NH4-	N DISS	MG/L		4	2.07000	4.31446	2.07713	4.29000	.120000	77/07/05	77/11/31
00610	NH3+NH4-	N TOTAL	MG/L		2	3.35000	16.2450	4.03051	6.20000	.500000	77/09/15	77/12/28
00613	NO2-N	DISS	MG/L		4	.010000	-.776E-10	.000000	.010000	.010000	77/08/04	77/11/31
				K	2	.010000	-.145E-10	.000000	.010000	.010000	77/07/05	77/12/28
				TOT	6	.010000	-.465E-10	.000000	.010000	.010000	77/07/05	77/12/28
00618	NO3-N	DISS	MG/L	K	5	.082000	.001620	.040249	.100000	.010000	77/07/05	77/12/28
00620	NO3-N	TOTAL	MG/L	K	1	.100000			.100000	.100000	77/10/27	77/10/27
00625	TOT KJEL	N	MG/L		6	9.06166	3.06997	1.75213	10.9000	5.82000	77/07/05	77/12/28
00671	PHOS-DIS	ORTHO	MG/L P		5	.029800	.000264	.016239	.051000	.007000	77/07/05	77/12/28
31616	FEC COLI	MFM-FCBR	/100ML		3	7.66667	4.33340	2.08168	10.0000	6.00000	77/07/05	77/11/31
				K	3	5.33333	16.3333	4.04145	10.0000	3.00000	77/08/04	77/12/28
				TOT	6	6.50000	9.90000	3.14643	10.0000	3.00000	77/07/05	77/12/28
70505	T PO4	P-COL	MG/L		5	.162800	.002397	.048956	.232000	.100000	77/07/05	77/12/28
70506	SOL PO4-	T P-COL	MG/L		1	.060000			.060000	.060000	77/09/15	77/09/15
70507	PHOS-T	ORTHO	MG/L P		1	.042000			.042000	.042000	77/11/31	77/11/31

Table IV-26.

STORET RETRIEVAL DATE 84/09/11 - INVENT - VERSION OF SEP. 1981

460A07
44 25 59.0 096 58 59.0 2
W OAKWOOD E SHORE T111N R51W SEC 8
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810516
0000 CLASS 00 CSN-RSP 0591791-0620069

/TYPA/AMBNT/LAKE

PARAMETER				RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010	WATER	TEMP	CENT		8	12.3550	90.5264	9.51453	22.8000	.000000	78/02/16	78/07/12
~~00011~~	~~WATER~~	~~TEMP~~	~~FAHN~~		8	54.2500	293.357	17.1277	73.0000	32.0000	78/02/16	78/07/12
00020	AIR	TEMP	CENT		8	9.99875	160.021	12.6500	22.8000	-.160E+02	78/02/16	78/07/12
00021	AIR	TEMP	FAHN		8	49.0000	485.714	22.0389	73.0000	3.00000	78/02/16	78/07/12
00300	DO		MG/L		7	7.44285	31.5662	5.61838	13.8000	.000000	78/02/16	78/07/12
00310	BOD	5 DAY	MG/L		7	8.02857	9.80103	3.13066	13.0000	3.42000	78/02/16	78/07/12
00335	COD	LOWLEVEL	MG/L		8	104.625	1263.98	35.5525	165.000	75.0000	78/02/16	78/07/12
00403	LAB	PH	SU		8	8.08249	.526053	.725295	9.35000	7.49000	78/02/16	78/07/12
00410	T ALK	CACO3	MG/L		8	143.925	2980.85	54.5971	236.000	95.4000	78/02/16	78/07/12
00500	RESIDUE	TOTAL	MG/L		8	828.625	113099	336.301	1389.00	601.000	78/02/16	78/07/12
00515	RESIDUE	DISS-105	C MG/L		8	774.125	100615	317.198	1323.00	568.000	78/02/16	78/07/12
00530	RESIDUE	TOT NFLT	MG/L		8	54.5000	682.571	26.1261	103.000	18.0000	78/02/16	78/07/12
00608	NH3+NH4-	N DISS	MG/L		2	8.07999	.231369	.481008	8.42000	7.74000	78/02/16	78/03/16
00610	NH3+NH4-	N TOTAL	MG/L		6	1.37500	2.30266	1.51745	4.28000	.030000	78/04/13	78/07/12
00613	NO2-N	DISS	MG/L		8	.065000	.005457	.073872	.220000	.010000	78/02/16	78/07/12
00618	NO3-N	DISS	MG/L		1	.300000			.300000	.300000	78/05/17	78/05/17
				K	1	.100000			.100000	.100000	78/06/14	78/06/14
				TOT	2	.200000	.020000	.141421	.300000	.100000	78/05/17	78/06/14
00620	NO3-N	TOTAL	MG/L		2	.150000	.005000	.070711	.200000	.100000	78/04/13	78/07/12
				K	4	.100000	-.248E-08	.000000	.100000	.100000	78/02/16	78/06/28
				TOT	6	.116667	.001667	.040825	.200000	.100000	78/02/16	78/07/12
00625	TOT KJEL	N	MG/L		8	7.00624	20.4165	4.51847	14.8000	3.52000	78/02/16	78/07/12
00671	PHOS-DIS	ORTHO	MG/L P		6	.110000	.006987	.083589	.204000	.015000	78/02/16	78/07/12
31616	FEC COLI	MFM-FCBR	/100ML		4	2327.50	7674090	2770.21	6100.00	80.0000	78/05/31	78/07/12
				K	4	4.75000	12.2500	3.50000	10.0000	3.00000	78/02/16	78/05/17
				TOT	8	1166.12	4830374	2197.81	6100.00	3.00000	78/02/16	78/07/12
70505	T PO4	P-COL	MG/L		8	.227125	.004482	.066949	.329000	.139000	78/02/16	78/07/12
70507	PHOS-T	ORTHO	MG/L P		2	.074000	.004232	.065054	.120000	.028000	78/06/14	78/06/28

Table IV-27.

STORET RETRIEVAL DATE 84/09/11 - INVENT - VERSION OF SEP. 1981

460A07
44 25 59.0 096 58 59.0 2
W OAKWOOD E SHORE T111N R51W SEC 8
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810516
0000 CLASS 00 CSN-RSP 0591791-0620069

/TYPA/AMBNT/LAKE

PARAMETER				RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010	WATER	TEMP	CENT		17	12.5200	91.6013	9.57085	25.6000	.000000	79/04/26	79/12/18
00011	WATER	TEMP	FAHN		17	55.1765	275.031	16.5840	78.0000	32.0000	79/04/26	79/12/18
00020	AIR	TEMP	CENT		17	12.8765	68.8529	8.29776	25.6000	1.11000	79/04/26	79/12/18
00021	AIR	TEMP	FAHN		17	55.3529	218.119	14.7688	78.0000	34.0000	79/04/26	79/12/18
00061	STREAM	FLOW,	INST-CFS		1	30.0000			30.0000	30.0000	79/09/04	79/09/04
00300	DO		MG/L		17	9.42941	18.6822	4.32229	21.5000	5.10000	79/04/26	79/12/18
00310	BOD	5 DAY	MG/L		1	4.44000			4.44000	4.44000	79/06/26	79/06/26
00400	PH		SU		10	7.80999	.914388	.956236	8.90000	6.20000	79/07/10	79/12/18
00403	LAB	PH	SU		11	8.52545	.426489	.653061	9.31000	7.50000	79/04/26	79/09/04
00410	T ALK	CACO3	MG/L		10	144.000	392.666	19.8158	174.000	105.000	79/04/26	79/09/04
00500	RESIDUE	TOTAL	MG/L		17	693.882	3778.69	61.4710	782.000	591.000	79/04/26	79/12/18
00515	RESIDUE	DISS-105	C MG/L		17	629.718	30060.9	173.381	781.000	.200000	79/04/26	79/12/18
00530	RESIDUE	TOT NFLT	MG/L		16	57.7500	22262.2	149.205	612.000	1.00000	79/04/26	79/12/18
				K	1	1.00000			1.00000	1.00000	79/12/04	79/12/04
				TOT	17	54.4118	21060.3	145.122	612.000	1.00000	79/04/26	79/12/18
00608	NH3+NH4-	N DISS	MG/L		2	.435000	.266450	.516188	.800000	.070000	79/07/24	79/08/07
00610	NH3+NH4-	N TOTAL	MG/L		14	.451428	.268921	.518576	1.78000	.020000	79/04/26	79/12/18
				K	1	.020000			.020000	.020000	79/05/22	79/05/22
				TOT	15	.422666	.262121	.511977	1.78000	.020000	79/04/26	79/12/18
00613	NO2-N	DISS	MG/L		1	.020000			.020000	.020000	79/07/24	79/07/24
				K	16	.010000	.465E-10	.000007	.010000	.010000	79/04/26	79/12/18
				TOT	17	.010588	.000006	.002425	.020000	.010000	79/04/26	79/12/18
00618	NO3-N	DISS	MG/L		3	.266667	.023333	.152753	.400000	.100000	79/04/26	79/12/18
00620	NO3-N	TOTAL	MG/L		4	.125000	.002500	.050000	.200000	.100000	79/05/08	79/12/04
				K	9	.100000	.000000	.000000	.100000	.100000	79/05/22	79/11/06
				TOT	13	.107692	.000769	.027735	.200000	.100000	79/05/08	79/12/04
00625	TOT KJEL	N	MG/L		17	2.29411	.469596	.685271	3.85000	1.24000	79/04/26	79/12/18
00671	PHOS-DIS	ORTHO	MG/L P		2	.081000	.005832	.076368	.135000	.027000	79/07/24	79/08/07
31616	FEC COLI	MFM-FCBR	/100ML		10	100.200	13006.2	114.045	330.000	3.00000	79/05/01	79/12/04
				K	6	6.33333	16.2667	4.03320	10.0000	2.00000	79/06/12	79/12/18
				TOT	16	65.0000	10011.9	100.059	330.000	2.00000	79/05/01	79/12/18
70505	T PO4	P-COL	MG/L		17	.126117	.004808	.069337	.248000	.010000	79/04/26	79/12/18
70507	PHOS-T	ORTHO	MG/L P		12	.042333	.001976	.044451	.151000	.005000	79/04/26	79/12/04
				K	3	.005000	.000000	.000000	.005000	.005000	79/05/22	79/12/18
				TOT	15	.034867	.001791	.042325	.151000	.005000	79/04/26	79/12/18

Table IV-28.

STORET RETRIEVAL DATE 84/09/11 - INVENT - VERSION OF SEP. 1981

460A08
44 27 25.0 097 00 27.0 2
W OAKWOOD SWIMMING BEACH DOCK T112N R51W SEC 31/
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810516
0000 CLASS 00 CSN-RSP 0591792-0620070

/TYPA/AMBNT/LAKE

PARAMETER				RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010	WATER	TEMP	CENT		2	12.7950	30.4980	5.52250	16.7000	8.89000	77/09/15	77/10/27
00011	WATER	TEMP	FAHN		2	55.0000	98.0000	9.89949	62.0000	48.0000	77/09/15	77/10/27
00020	AIR	TEMP	CENT		3	17.4333	72.2439	8.49964	26.7000	10.0000	77/08/04	77/10/27
00021	AIR	TEMP	FAHN		3	63.3333	233.336	15.2753	80.0000	50.0000	77/08/04	77/10/27
00095	CNDUCTVY	AT 25C	MICROMHO		1	1230.00			1230.00	1230.00	77/10/27	77/10/27
00300	DO		MG/L		2	8.89999	25.9202	5.09119	12.5000	5.30000	77/08/04	77/10/27
00310	BOD	5 DAY	MG/L		3	16.6333	20.3033	4.50592	21.0000	12.0000	77/08/04	77/10/27
00335	COD	LOWLEVEL	MG/L		3	203.333	1792.37	42.3365	240.000	157.000	77/08/04	77/10/27
00403	LAB	PH	SU		3	8.88333	1.33608	1.15589	10.1000	7.80000	77/08/04	77/10/27
00410	T ALK	CACO3	MG/L		3	109.667	766.350	27.6830	139.000	84.0000	77/08/04	77/10/27
00500	RESIDUE	TOTAL	MG/L		3	1111.67	3750.00	61.2372	1181.00	1065.00	77/08/04	77/10/27
00515	RESIDUE	DISS-105	C MG/L		3	1028.00	3244.00	56.9561	1078.00	966.000	77/08/04	77/10/27
00530	RESIDUE	TOT NFLT	MG/L		3	83.6667	905.336	30.0888	103.000	49.0000	77/08/04	77/10/27
00608	NH3+NH4-	N DISS	MG/L		3	1.26333	3.10014	1.76072	3.29000	.110000	77/08/04	77/10/27
00613	NO2-N	DISS	MG/L		2	.010000	-.145E-10	.000000	.010000	.010000	77/09/15	77/10/27
				K	1	.010000			.010000	.010000	77/08/04	77/08/04
				TOT	3	.010000	.000000	.000000	.010000	.010000	77/08/04	77/10/27
00618	NO3-N	DISS	MG/L	K	2	.100000	-.372E-08	.000000	.100000	.100000	77/08/04	77/09/15
00620	NO3-N	TOTAL	MG/L	K	1	.100000			.100000	.100000	77/10/27	77/10/27
00625	TOT KJEL	N	MG/L		3	9.84000	.667236	.816845	10.7600	9.20000	77/08/04	77/10/27
00671	PHOS-DIS	ORTHO	MG/L P		3	.028333	.000366	.019140	.044000	.007000	77/08/04	77/10/27
31616	FEC COLI	MFM-FCBR	/100ML		2	55.0000	2888.00	53.7401	93.0000	17.0000	77/09/15	77/10/27
				K	1	3.00000			3.00000	3.00000	77/08/04	77/08/04
				TOT	3	37.6667	2345.34	48.4287	93.0000	3.00000	77/08/04	77/10/27
70505	T PO4	P-COL	MG/L		2	.204000	.017298	.131522	.297000	.111000	77/08/04	77/10/27
70506	SOL PO4-	T P-COL	MG/L		1	.068000			.068000	.068000	77/09/15	77/09/15

Table IV-29.

STORET RETRIEVAL DATE 84/09/11 - INVENT - VERSION OF SEP. 1981

460A08
44 27 25.0 097 00 27.0 2
W OAKWOOD SWIMMING BEACH DOCK T112N R51W SEC 31/
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
/TYPA/AMBNT/LAKE
21SDLAKE 810516
0000 CLASS 00 CSN-RSP 0591792-0620070

PARAMETER				RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010	WATER	TEMP	CENT		5	11.9920	79.8084	8.93356	20.0000	.000000	78/02/16	78/06/14
00011	WATER	TEMP	FAHN		5	53.6000	258.805	16.0874	68.0000	32.0000	78/02/16	78/06/14
00020	AIR	TEMP	CENT		5	20.9980	1250.46	35.3619	79.4000	-.160E+02	78/02/16	78/06/14
00021	AIR	TEMP	FAHN		5	48.2000	708.701	26.6214	68.0000	3.00000	78/02/16	78/06/14
00061	STREAM	FLOW,	INST-CFS		2	.000000	.000000	.000000	.000000	.000000	78/03/16	78/07/12
00300	DO		MG/L		5	8.15999	27.8180	5.27428	14.7000	.000000	78/02/16	78/06/14
00310	BOD	5 DAY	MG/L		5	8.45600	8.14612	2.85414	11.0000	4.32000	78/02/16	78/06/14
00335	COD	LOWLEVEL	MG/L		5	135.800	5228.72	72.3099	215.000	71.0000	78/02/16	78/06/14
00400	PH		SU		1	6.82000			6.82000	6.82000	78/02/16	78/02/16
00403	LAB	PH	SU		5	8.48199	.740784	.860688	9.54000	7.70000	78/02/16	78/06/14
00410	T ALK	CACO3	MG/L		5	152.680	8831.03	93.9736	319.000	91.4000	78/02/16	78/06/14
00500	RESIDUE	TOTAL	MG/L		5	957.600	548214	740.415	2281.00	585.000	78/02/16	78/06/14
00515	RESIDUE	DISS-105	C MG/L		5	908.000	521463	722.124	2199.00	548.000	78/02/16	78/06/14
00530	RESIDUE	TOT NFLT	MG/L		5	49.6000	408.302	20.2065	82.0000	30.0000	78/02/16	78/06/14
00608	NH3+NH4-	N DISS	MG/L		1	8.56000			8.56000	8.56000	78/02/16	78/02/16
00610	NH3+NH4-	N TOTAL	MG/L		3	1.66333	5.06332	2.25018	4.23000	.030000	78/04/13	78/06/14
				K	1	.020000			.020000	.020000	78/05/31	78/05/31
				TOT	4	1.25250	4.05068	2.01263	4.23000	.020000	78/04/13	78/06/14
00613	NO2-N	DISS	MG/L		4	.022500	.000225	.015000	.040000	.010000	78/04/13	78/06/14
				K	1	.010000			.010000	.010000	78/02/16	78/02/16
				TOT	5	.020000	.000200	.014142	.040000	.010000	78/02/16	78/06/14
00618	NO3-N	DISS	MG/L	K	2	.100000	-.372E-08	.000000	.100000	.100000	78/05/17	78/06/14
00620	NO3-N	TOTAL	MG/L		1	.300000			.300000	.300000	78/04/13	78/04/13
				K	2	.100000	-.372E-08	.000000	.100000	.100000	78/02/16	78/05/31
				TOT	3	.166667	.013333	.115470	.300000	.100000	78/02/16	78/05/31
00625	TOT KJEL	N	MG/L		5	6.81400	35.0489	5.92021	17.1000	3.20000	78/02/16	78/06/14
00671	PHOS-DIS	ORTHO	MG/L P		3	.076000	.010096	.100479	.192000	.016000	78/04/13	78/05/31
				K	1	.004000			.004000	.004000	78/02/16	78/02/16
				TOT	4	.058000	.008027	.089592	.192000	.004000	78/02/16	78/05/31
31616	FEC COLI	MFM-FCBR	/100ML		2	136.500	35644.5	188.798	270.000	3.00000	78/05/31	78/06/14
				K	3	3.00000	.000000	.000000	3.00000	3.00000	78/02/16	78/05/17
				TOT	5	56.4000	14257.8	119.406	270.000	3.00000	78/02/16	78/06/14
70505	T PO4	P-COL	MG/L		5	.186200	.008425	.091786	.325000	.100000	78/02/16	78/06/14
70507	PHOS-T	ORTHO	MG/L P		1	.010000			.010000	.010000	78/06/14	78/06/14

Table IV-30.

STORET RETRIEVAL DATE 84/09/11 - INVENT - VERSION OF SEP. 1981

460A08
44 27 25.0 097 00 27.0 2
W OAKWOOD SWIMMING BEACH DOCK T112N R51W SEC 31/
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810516
0000 CLASS 00 CSN-RSP 0591792-0620070

/TYPA/AMBNT/LAKE

PARAMETER				RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010	WATER	TEMP	CENT		17	13.4376	82.2492	9.06913	25.6000	.000000	79/04/26	79/12/18
00011	WATER	TEMP	FAHN		17	56.1765	266.281	16.3181	78.0000	32.0000	79/04/26	79/12/18
00020	AIR	TEMP	CENT		17	13.3671	70.5520	8.39952	24.4000	1.67000	79/04/26	79/12/18
00021	AIR	TEMP	FAHN		17	55.9412	228.186	15.1058	76.0000	35.0000	79/04/26	79/12/18
00300	DO		MG/L		17	9.83529	22.8799	4.78330	22.6000	4.30000	79/04/26	79/12/18
00310	BOD	5 DAY	MG/L	K	1	1.00000			1.00000	1.00000	79/06/26	79/06/26
00400	PH		SU		9	9.60000	15.5175	3.93923	20.0000	7.40000	79/07/10	79/12/18
00403	LAB	PH	SU		11	8.26090	2.34539	1.53147	9.50000	4.04000	79/04/26	79/09/04
00410	T ALK	CACO3	MG/L		10	140.100	325.000	18.0278	162.000	109.000	79/04/26	79/09/04
00500	RESIDUE	TOTAL	MG/L		17	664.117	5333.06	73.0278	751.000	512.000	79/04/26	79/12/18
00515	RESIDUE	DISS-105	C MG/L		17	644.294	5650.25	75.1681	741.000	494.000	79/04/26	79/12/18
00530	RESIDUE	TOT NFLT	MG/L		17	55.1176	21048.4	145.081	616.000	4.00000	79/04/26	79/12/18
00608	NH3+NH4-	N DISS	MG/L		2	.190000	.020000	.141421	.290000	.090000	79/05/01	79/07/24
00610	NH3+NH4-	N TOTAL	MG/L		12	.555000	.761445	.872608	2.48000	.020000	79/04/26	79/12/18
				K	3	.020000	-.232E-09	.000000	.020000	.020000	79/05/08	79/09/18
				TOT	15	.448000	.647345	.804578	2.48000	.020000	79/04/26	79/12/18
00613	NO2-N	DISS	MG/L		4	.040000	.003600	.060000	.130000	.010000	79/05/08	79/07/24
				K	13	.010000	.582E-10	.000008	.010000	.010000	79/04/26	79/12/18
				TOT	17	.017059	.000847	.029104	.130000	.010000	79/04/26	79/12/18
00618	NO3-N	DISS	MG/L		1	.400000			.400000	.400000	79/04/26	79/04/26
00620	NO3-N	TOTAL	MG/L		4	.150000	.010000	.100000	.300000	.100000	79/05/01	79/12/04
				K	12	.100000	.108E-07	.000104	.100000	.100000	79/05/08	79/12/18
				TOT	16	.112500	.002500	.050000	.300000	.100000	79/05/01	79/12/18
00625	TOT KJEL	N	MG/L		17	2.32705	1.12671	1.06147	5.10000	1.25000	79/04/26	79/12/18
00671	PHOS-DIS	ORTHO	MG/L P		2	.051500	.003280	.057276	.092000	.011000	79/05/01	79/07/24
31616	FEC COLI	MFM-FCBR	/100ML		4	142.500	53958.3	232.289	490.000	10.0000	79/07/10	79/10/02
				K	13	5.00000	12.1667	3.48808	10.0000	2.00000	79/04/26	79/12/18
				TOT	17	37.3529	13740.7	117.221	490.000	2.00000	79/04/26	79/12/18
70505	T PO4	P-COL	MG/L		17	.155882	.007592	.087134	.329000	.014000	79/04/26	79/12/18
70507	PHOS-T	ORTHO	MG/L P		12	.490666	2.02105	1.42163	5.00000	.008000	79/04/26	79/11/20
				K	3	.005000	.000000	.000000	.005000	.005000	79/05/22	79/12/18
				TOT	15	.393533	1.62840	1.27609	5.00000	.005000	79/04/26	79/12/18

Table IV-31.

STORET RETRIEVAL DATE 84/09/11 - INVENT - VERSION OF SEP. 1981

OAK1
44 24 34.0 097 01 31.0 2
COMPOSITE SAMPLE T111N-R51W-S6 CDCD
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER BASIN 090700
BIG SIOUX RIVER BASIN
21SDLAKE 840824
0000 CLASS 00 CSN-RSP 0741943-0744334

/TYPA/AMBNT/LAKE

PARAMETER				RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010	WATER	TEMP	CENT		2	.000000	.000000	.000000	.000000	.000000	82/01/05	82/12/15
00011	WATER	TEMP	FAHN		2	32.0000	.000000	.000000	32.0000	32.0000	82/01/05	82/12/15
00020	AIR	TEMP	CENT		2	-.970E+01	112.200	10.5925	-.221E+01	-.171E+02	82/01/05	82/12/15
00021	AIR	TEMP	FAHN		2	15.0000	338.000	18.3848	28.0000	2.00000	82/01/05	82/12/15
00095	CNDUCTVY	AT 25C	MICROMHO		1	1304.00			1304.00	1304.00	82/01/05	82/01/05
00300	DO		MG/L		2	8.64999	102.245	10.1116	15.8000	1.50000	82/01/05	82/12/15
00400	PH		SU		2	7.80000	.180023	.424291	8.10000	7.50000	82/01/05	82/12/15
00403	LAB	PH	SU		2	7.99000	.124985	.353532	8.24000	7.74000	82/01/05	82/12/15
00500	RESIDUE	TOTAL	MG/L		1	913.000			913.000	913.000	82/12/15	82/12/15
00515	RESIDUE	DISS-105	C MG/L		1	1000.00			1000.00	1000.00	82/01/05	82/01/05
00530	RESIDUE	TOT NFLT	MG/L		2	9.00000	50.0000	7.07107	14.0000	4.00000	82/01/05	82/12/15
00610	NH3+NH4-	N TOTAL	MG/L		2	2.13500	1.71125	1.30815	3.06000	1.21000	82/01/05	82/12/15
00613	NO2-N	DISS	MG/L	K	2	.010000	-.145E-10	.000000	.010000	.010000	82/01/05	82/12/15
00620	NO3-N	TOTAL	MG/L	K	2	.100000	-.372E-08	.000000	.100000	.100000	82/01/05	82/12/15
00625	TOT KJEL	N	MG/L		1	4.99000			4.99000	4.99000	82/12/15	82/12/15
00940	CHLORIDE	TOTAL	MG/L		1	17.2000			17.2000	17.2000	82/12/15	82/12/15
00945	SULFATE	SO4-TOT	MG/L		1	442.000			442.000	442.000	82/12/15	82/12/15
31616	FEC COLI	MFM-FCBR	/100ML	K	1	3.00000			3.00000	3.00000	82/12/15	82/12/15
70300	RESIDUE	DISS-180	C MG/L		1	909.000			909.000	909.000	82/12/15	82/12/15
70505	T PO4	P-COL	MG/L		1	.040000			.040000	.040000	82/01/05	82/01/05
70506	SOL PO4-	T P-COL	MG/L		1	.081000			.081000	.081000	82/12/15	82/12/15
70507	PHOS-T	ORTHO	MG/L P		2	.016500	.000005	.002121	.018000	.015000	82/01/05	82/12/15

Table IV-32.

STORET RETRIEVAL DATE 84/09/11 - INVENT - VERSION OF SEP. 1981

OAK1
44 24 34.0 097 01 31.0 2
COMPOSITE SAMPLE T111N-R51W-S6 CDCD
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER BASIN 090700
BIG SIOUX RIVER BASIN
/TYPA/AMBNT/LAKE 21SDLAKE 840824
0000 CLASS 00 CSN-RSP 0741943-0744334

PARAMETER				RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010	WATER	TEMP	CENT		8	11.4775	129.402	11.3755	26.7000	.000000	83/01/12	83/08/10
00011	WATER	TEMP	FAHN		8	52.6250	417.982	20.4446	80.0000	32.0000	83/01/12	83/08/10
00020	AIR	TEMP	CENT		8	11.8062	151.837	12.3222	28.3000	-.110E+01	83/01/12	83/08/10
00021	AIR	TEMP	FAHN		8	53.2500	491.928	22.1795	83.0000	30.0000	83/01/12	83/08/10
00095	CNDUCTVY	AT 25C	MICROMHO		6	953.500	1349.60	36.7369	990.000	894.000	83/03/15	83/08/10
00300	DO		MG/L		8	11.3375	1.82561	1.35115	13.4000	9.10000	83/01/12	83/08/10
00400	PH		SU		8	8.56249	.088483	.297462	9.00000	8.10000	83/01/12	83/08/10
00403	LAB	PH	SU		8	8.38374	.221715	.470866	9.04000	7.71000	83/01/12	83/08/10
00410	T ALK	CACO3	MG/L		6	138.000	177.600	13.3267	150.000	115.000	83/03/15	83/08/10
00415	PHEN-PH-	LFIN ALK	MG/L		3	10.0000	19.0000	4.35890	13.0000	5.00000	83/05/12	83/08/10
00500	RESIDUE	TOTAL	MG/L		8	825.875	9823.57	99.1139	994.000	705.000	83/01/12	83/08/10
00530	RESIDUE	TOT NFLT	MG/L		8	31.1250	569.553	23.8653	64.0000	1.00000	83/01/12	83/08/10
00610	NH3+NH4-	N TOTAL	MG/L		7	1.30857	2.48694	1.57700	3.66000	.020000	83/01/12	83/08/10
				K	1	.020000			.020000	.020000	83/03/15	83/03/15
				TOT	8	1.14750	2.33922	1.52945	3.66000	.020000	83/01/12	83/08/10
00613	NO2-N	DISS	MG/L		1	.020000			.020000	.020000	83/03/15	83/03/15
				K	7	.010000	.776E-10	.000009	.010000	.010000	83/01/12	83/08/10
				TOT	8	.011250	.000013	.003536	.020000	.010000	83/01/12	83/08/10
00620	NO3-N	TOTAL	MG/L		3	.133333	.003333	.057735	.200000	.100000	83/02/15	83/04/20
				K	5	.100000	-.279E-08	.000000	.100000	.100000	83/01/12	83/08/10
				TOT	8	.112500	.001250	.035355	.200000	.100000	83/01/12	83/08/10
00625	TOT KJEL	N	MG/L		8	4.65750	2.24117	1.49705	7.62000	3.19000	83/01/12	83/08/10
00940	CHLORIDE	TOTAL	MG/L		8	15.5625	4.21987	2.05423	18.3000	11.8000	83/01/12	83/08/10
00945	SULFATE	SO4-TOT	MG/L		8	392.500	2679.71	51.7660	480.000	324.000	83/01/12	83/08/10
31616	FEC COLI	MFM-FCBR	/100ML		3	40.0000	900.000	30.0000	70.0000	10.0000	83/05/12	83/07/13
				K	5	7.20000	14.7001	3.83407	10.0000	3.00000	83/01/12	83/08/10
				TOT	8	19.5000	553.714	23.5311	70.0000	3.00000	83/01/12	83/08/10
70300	RESIDUE	DISS-180	C MG/L		8	794.750	11770.6	108.492	993.000	695.000	83/01/12	83/08/10
70505	T PO4	P-COL	MG/L		6	.228166	.027562	.166018	.556000	.112000	83/03/15	83/08/10
70506	SOL PO4-	T P-COL	MG/L		2	.045500	.000005	.002121	.047000	.044000	83/01/12	83/02/15
70507	PHOS-T	ORTHO	MG/L P		8	.023250	.000178	.013350	.046000	.010000	83/01/12	83/08/10

Table IV-33.

STORET RETRIEVAL DATE 84/09/11 - STAND - VERSION OF APR. 1983 STN 5.SUMMARY.1

460A05
44 25 36.0 096 57 35.0 2
E OAKWOOD AT S BOAT RAMP T111N R51W SEC 16
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
/TYPA/AMBNT/LAKE 21SDLAKE 810516
0000 FEET DEPTH CLASS 00 CSN-RSP 0591789-0620067

SUMMARY OF VIOLATIONS ON SAMPLES COLLECTED FROM 77/08/04 TO 83/08/10

	00300 DO MG/L	00403 LAB PH SU	31616 FEC COLI MFM-FCBR /100ML	70300 RESIDUE DISS-180 C MG/L	00530 RESIDUE TOT NFLT MG/L	00610 NH3+NH4- N TOTAL MG/L	00619 UN-IONZD NH3-NH3 MG/L	00620 NO3-N TOTAL MG/L	00011 WATER TEMP FAHN	00415 PHEN-PH- LFIN ALK MG/L
NO OF VALUES	34	32	38	8	38	27	23	31	39	29
MEAN	9.644	8.379	644.4	1135.	50.5	0.891	0.0344	0.13	51.77	164.4
MEDIAN	9.650	8.310	10.0	1100.	22.5	0.490	0.0194	0.10	56.00	165.0
NO OF VIOLS	1	17	4	0	5	0	8	0	0	0
PERCENT VIOL	3.	53.	11.	0.	13.	0.	35.	0.	0.	0.
MINIMUM VIOL	0.300	8.310	220.0	0.	157.0	0.0	0.0559	0.0	0.0	0.0
MEAN VIOL	0.300	8.780	5905.0	0.	187.2	0.0	0.0724	0.0	0.0	0.0
MAXIMUM VIOL	0.300	9.610	21000.0	0.	266.0	0.0	0.1256	0.0	0.0	0.0
MIN CRITERIA	4.000	6.500	*********	*********	*********	*********	*********	*********	*********	*********
MAX CRITERIA	*********	8.300	200.0	2500.	150.0	*********	0.0500	50.00	90.00	750.0

Table IV-34.

STORET RETRIEVAL DATE 84/09/11 - STAND - VERSION OF APR. 1983 STN 5 PAGE 1.1
VIOLATIONS ONLY

460A05
44 25 36.0 096 57 35.0 2
E OAKWOOD AT S BOAT RAMP T111N R51W SEC 16
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
/TYPA/AMBNT/LAKE 21SDLAKE 810516
0000 FEET DEPTH CLASS 00 CSN-RSP 0591789-0620067

DATE	TIME	00300 DO MG/L	00403 LAB PH SU	31616 FEC COLI MFM-FCBR /100ML	70300 RESIDUE DISS-180 C MG/L	00530 RESIDUE TOT NFLT MG/L	00610 NH3+NH4- N TOTAL MG/L	00619 UN-IONZD NH3-NH3 MG/L	00620 NO3-N TOTAL MG/L	00011 WATER TEMP FAHN	00415 PHEN-PH- LFIN ALK MG/L
77/08/04	1100		9.610*								
77/09/15	0820		8.780*			165.0*					
77/11/31	1300					161.0*					
77/12/28	1200	0.300*				187.0*					
78/02/16	1155					157.0*					
78/03/16	1215					266.0*					
78/05/17	0845		9.320*								
78/05/31	0910		9.300*								
78/06/14	0925		8.380*					0.0654*			
78/06/28	0915			21000.0*							
78/07/12	0930							0.0956*			
79/04/24	0900		8.310*					0.0592*			
79/05/01	0845		8.800*					0.0559*			
79/05/08	0915		8.920*					0.0608*			
79/05/22	0845		8.820*								
79/06/26	0850							0.0581*			
79/07/10	1115							0.1256*			
79/07/24	1200		8.550*	300.0*							
79/08/07	1055		8.420*					0.0584*			
79/08/21	0815		8.800*								
79/09/04	0750		8.900*								
83/05/12	1435		8.380*								
83/06/15	1415		8.310*								
83/07/13	1115		8.510*	220.0*							
83/08/10	1400		9.150*	2100.0*							

Table IV-34a.

STORET RETRIEVAL DATE 84/09/11 - STAND - VERSION OF APR. 1983 STN 6.SUMMARY.1

460A06
44 26 38.0 096 58 41.0 2
E OAKWOOD W SHORE T111N R51W SEC 5
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
/TYPA/AMBNT/LAKE 21SDLAKE 810516
0000 FEET DEPTH CLASS 00 CSN-RSP 0591790-0620068

SUMMARY OF VIOLATIONS ON SAMPLES COLLECTED FROM 77/07/05 TO 79/12/18

	00300 DO MG/L	00403 LAB PH SU	31616 FEC COLI MFM-FCBR /100ML	70300 RESIDUE DISS-180 C MG/L	00530 RESIDUE TOT NFLT MG/L	00610 NH3+NH4- N TOTAL MG/L	00619 UN-IONZD NH3-NH3 MG/L	00620 NO3-N TOTAL MG/L	00011 WATER TEMP FAHN	00415 PHEN-PH- LFIN ALK MG/L
NO OF VALUES	24	18	24	0	25	18	11	17	25	18
MEAN	12.692	8.518	66.9	0.	81.6	0.952	0.0365	0.12	52.84	165.1
MEDIAN	9.950	8.690	8.0	*********	24.0	0.455	0.0430	0.10	56.00	162.5
NO OF VIOLS	1	11	2	0	2	0	4	0	0	0
PERCENT VIOL	4.	61.	8.	0.	8.	0.	36.	0.	0.	0.
MINIMUM VIOL	2.500	8.350	540.0	0.	219.0	0.0	0.0553	0.0	0.0	0.0
MEAN VIOL	2.500	8.854	555.0	0.	565.5	0.0	0.0611	0.0	0.0	0.0
MAXIMUM VIOL	2.500	9.290	570.0	0.	912.0	0.0	0.0645	0.0	0.0	0.0
MIN CRITERIA	4.000	6.500	*********	*********	*********	*********	*********	*********	*********	*********
MAX CRITERIA	*********	8.300	200.0	2500.	150.0	*********	0.0500	50.00	90.00	750.0

Table IV-35.

STORET RETRIEVAL DATE 84/09/11 - STAND - VERSION OF APR. 1983 STN 6 PAGE 1.1
VIOLATIONS ONLY

460A06
44 26 38.0 096 58 41.0 2
E OAKWOOD W SHORE T111N R51W SEC 5
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810516
/TYPA/AMBNT/LAKE 0000 FEET DEPTH CLASS 00 CSN-RSP 0591790-0620068

DATE	TIME	00300 DO . MG/L	00403 LAB PH SU	31616 FEC COLI MFM-FCBR /100ML	70300 RESIDUE DISS-180 C MG/L	00530 RESIDUE TOT NFLT MG/L	00610 NH3+NH4- N TOTAL MG/L	00619 UN-IONZD NH3-NH3 MG/L	00620 NO3-N TOTAL MG/L	00011 WATER TEMP FAHN	00415 PHEN-PH- LFIN ALK MG/L
77/07/05	1300		9.020*								
77/09/15	0910		8.880*			219.0*					
78/04/13	1210							0.0607*			
78/05/17	0930		9.290*								
79/04/24	0930		8.600*					0.0645*			
79/05/01	0945		8.830*								
79/05/08	1000		8.790*					0.0553*			
79/05/22	0930		8.820*								
79/06/12	0945	2.500*									
79/06/26	0930							0.0641*			
79/07/10	1010		9.200*	570.0*							
79/07/24	1200		8.830*								
79/08/07	0920		8.350*								
79/08/21	1245		8.780*	540.0*							
79/10/02	1000					912.0*					

Table IV-35a.

STORET RETRIEVAL DATE 84/09/11 - STAND - VERSION OF APR. 1983 STN 9.SUMMARY.1

460K2
44 22 53.0 097 02 20.0 2
INLET TO E OAKWOOD T112N-R51W-S33 CCDC
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER BASIN 090700
BIG SIOUX RIVER BASIN
/TYPA/AMBNT/STREAM
21SDLAKE 840824
0000 FEET DEPTH CLASS 00 CSN-RSP 0741945-0744336

SUMMARY OF VIOLATIONS ON SAMPLES COLLECTED FROM 83/03/15 TO 83/05/12

	00300 DO MG/L	00403 LAB PH SU	31616 FEC COLI MFM-FCBR /100ML	70300 RESIDUE DISS-180 C MG/L	00530 RESIDUE TOT NFLT MG/L	00610 NH3+NH4- N TOTAL MG/L	00619 UN-IONZD NH3-NH3 MG/L	00620 NO3-N TOTAL MG/L	00011 WATER TEMP FAHN	00415 PHEN-PH- LFIN ALK MG/L
NO OF VALUES	0	1	3	3	2	3	1	3	3	1
MEAN	0.0	8.180	173.3	677.	2.5	0.167	0.0012	0.20	47.33	174.0
MEDIAN	*********	8.180	10.0	640.	2.5	0.160	0.0012	0.10	48.00	174.0
NO OF VIOLS	0	0	1	0	0	0	0	0	0	0
PERCENT VIOL	0.	0.	33.	0.	0.	0.	0.	0.	0.	0.
MINIMUM VIOL	0.0	0.0	500.0	0.	0.0	0.0	0.0	0.0	0.0	0.0
MEAN VIOL	0.0	0.0	500.0	0.	0.0	0.0	0.0	0.0	0.0	0.0
MAXIMUM VIOL	0.0	0.0	500.0	0.	0.0	0.0	0.0	0.0	0.0	0.0
MIN CRITERIA	4.000	6.500	*********	*********	*********	*********	*********	*********	*********	*********
MAX CRITERIA	*********	8.300	200.0	2500.	150.0	*********	0.0500	50.00	90.00	750.0

Table IV-36.

STORET RETRIEVAL DATE 84/09/11 - STAND - VERSION OF APR. 1983 STN 9 PAGE 1.1
VIOLATIONS ONLY

460K2
44 22 53.0 097 02 20.0 2
INLET TO E OAKWOOD T112N-R51W-S33 CCDC
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER BASIN 090700
BIG SIOUX RIVER BASIN
21SDLAKE 840824
0000 FEET DEPTH CLASS 00 CSN-RSP 0741945-0744336

/TYPA/AMBNT/STREAM

DATE	TIME	00300 DO MG/L	00403 LAB PH SU	31616 FEC COLI MFM-FCBR /100ML	70300 RESIDUE DISS-180 C MG/L	00530 RESIDUE TOT NFLT MG/L	00610 NH3+NH4- N TOTAL MG/L	00619 UN-IONZD NH3-NH3 MG/L	00620 NO3-N TOTAL MG/L	00011 WATER TEMP FAHN	00415 PHEN-PH- LFIN ALK MG/L
83/03/15	1350			500.0*							

Table IV-36a.

STORET RETRIEVAL DATE 84/09/11 - STAND - VERSION OF APR. 1983 STN 1.SUMMARY.1

460A01
44 28 12.0 096 59 10.0 2
OAKWOOD LK/N MORTIMER SLOUGH T112N R51W S 29/32
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 820109
0000 FEET DEPTH CLASS 00 CSN-RSP 0642857-0653614

/TYPA/AMBNT/STREAM/RUNOFF

SUMMARY OF VIOLATIONS ON SAMPLES COLLECTED FROM 77/03/11 TO 82/02/21

	00300 DO MG/L	00403 LAB PH SU	31616 FEC COLI MFM-FCBR /100ML	70300 RESIDUE DISS-180 C MG/L	00530 RESIDUE TOT NFLT MG/L	00610 NH3+NH4- N TOTAL MG/L	00619 UN-IONZD NH3-NH3 MG/L	00620 NO3-N TOTAL MG/L	00011 WATER TEMP FAHN	00415 PHEN-PH- LFIN ALK MG/L
NO OF VALUES	18	29	24	0	30	14	13	27	30	29
MEAN	7.900	7.502	624.7	0.	15.4	0.099	0.0011	0.33	57.10	101.2
MEDIAN	8.550	7.560	15.0	*********	11.5	0.040	0.0006	0.10	57.50	69.8
NO OF VIOLS	3	0	7	0	0	0	0	0	0	0
PERCENT VIOL	17.	0.	29.	0.	0.	0.	0.	0.	0.	0.
MINIMUM VIOL	0.300	0.0	530.0	0.	0.0	0.0	0.0	0.0	0.0	0.0
MEAN VIOL	1.600	0.0	2097.1	0.	0.0	0.0	0.0	0.0	0.0	0.0
MAXIMUM VIOL	3.500	0.0	7800.0	0.	0.0	0.0	0.0	0.0	0.C	0.0
MIN CRITERIA	4.000	6.500	*********	*********	*********	*********	*********	*********	*********	*********
MAX CRITERIA	*********	8.300	200.0	2500.	150.0	*********	0.0500	50.00	90.00	750.0

Table IV-37.

STORET RETRIEVAL DATE 84/09/11 - STAND - VERSION OF APR. 1983 STN 1 PAGE 1.1
VIOLATIONS ONLY

460A01
44 28 12.0 096 59 10.0 2
OAKWOOD LK/N MORTIMER SLOUGH T112N R51W S 29/32
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 820109
0000 FEET DEPTH CLASS 00 CSN-RSP 0642857-0653614

/TYPA/AMBNT/STREAM/RUNOFF

DATE	TIME	00300 DO MG/L	00403 LAB PH SU	31616 FEC COLI MFM-FCBR /100ML	70300 RESIDUE DISS-180 C MG/L	00530 RESIDUE TOT NFLT MG/L	00610 NH3+NH4- N TOTAL MG/L	00619 UN-IONZD NH3-NH3 MG/L	00620 NO3-N TOTAL MG/L	00011 WATER TEMP FAHN	00415 PHEN-PH- LFIN ALK MG/L
77/06/16	1450			7800.0*							
77/06/19	1000			700.0*							
77/06/20	1430			530.0*							
77/06/22	1145			3400.0*							
77/06/24	1300	0.300*									
77/06/24	1420	1.000*									
77/07/05	1325			770.0*							
78/04/06	1250			810.0*							
79/05/31	0945			670.0*							
79/06/07	1030	3.500*									

Table IV-37a.

STORET RETRIEVAL DATE 84/09/11 - STAND - VERSION OF APR. 1983 STN 2.SUMMARY.1

460A02
44 28 12.0 096 59 43.0 2
OAKWOOD LK/N MORTIMER SLOUGH T112N R51N S 30/31
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 820109
0000 FEET DEPTH CLASS 00 CSN-RSP 0642858-0653615

/TYPA/AMBNT/STREAM/RUNOFF

SUMMARY OF VIOLATIONS ON SAMPLES COLLECTED FROM 77/03/10 TO 79/06/07

	00300 DO MG/L	00403 LAB PH SU	31616 FEC COLI MFM-FCBR /100ML	70300 RESIDUE DISS-180 C MG/L	00530 RESIDUE TOT NFLT MG/L	00610 NH3+NH4- N TOTAL MG/L	00619 UN-IONZD NH3-NH3 MG/L	00620 NO3-N TOTAL MG/L	00011 WATER TEMP FAHN	00415 PHEN-PH- LFIN ALK MG/L
NO OF VALUES	18	32	25	0	32	15	15	31	32	32
MEAN	7.144	7.513	510.6	0.	32.2	0.0500	0.0005	0.22	55.54	107.9
MEDIAN	7.300	7.510	33.0	*********	22.5	0.0300	0.0004	0.10	59.00	95.5
NO OF VIOLS	5	0	5	0	1	0	0	0	0	0
PERCENT VIOL	28.	0.	20.	0.	3.	0.	0.	0.	0.	0.
MINIMUM VIOL	0.300	0.0	480.0	0.	208.0	0.0	0.0	0.0	0.0	0.0
MEAN VIOL	2.260	0.0	2378.0	0.	208.0	0.0	0.0	0.0	0.0	0.0
MAXIMUM VIOL	3.900	0.0	7000.0	0.	208.0	0.0	0.0	0.0	0.0	0.0
MIN CRITERIA	4.000	6.500	*********	*********	*********	*********	*********	*********	*********	*********
MAX CRITERIA	*********	8.300	200.0	2500.	150.0	*********	0.0500	50.00	90.00	750.0

Table IV-38.

STORET RETRIEVAL DATE 84/09/11 - STAND - VERSION OF APR. 1983 STN 2 PAGE 1.1
VIOLATIONS ONLY

460A02
44 28 12.0 096 59 43.0 2
OAKWOOD LK/N MORTIMER SLOUGH T112N R51N S 30/31
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 820109
0000 FEET DEPTH CLASS 00 CSN-RSP 0642858-0653615

/TYPA/AMBNT/STREAM/RUNOFF

DATE	TIME	00300 DO MG/L	00403 LAB PH SU	31616 FEC COLI MFM-FCBR /100ML	70300 RESIDUE DISS-180 C MG/L	00530 RESIDUE TOT NFLT MG/L	00610 NH3+NH4- N TOTAL MG/L	00619 UN-IONZD NH3-NH3 MG/L	00620 NO3-N TOTAL MG/L	00011 WATER TEMP FAHN	00415 PHEN-PH- LFIN ALK MG/L
77/06/16	1500			7000.0*							
77/06/19	0945			520.0*							
77/06/22	1130			480.0*							
77/06/24	1315	2.600*									
77/06/24	1435	2.200*									
77/07/05	1340	0.300*		3000.0*							
79/05/10	1100					208.0*					
79/06/07	0900	2.300*									
79/06/07	1100	3.900*		890.0*							

Table IV-38a.

STORET RETRIEVAL DATE 84/09/11 - STAND - VERSION OF APR. 1983 STN 3.SUMMARY.1

460A03
44 27 23.0 097 01 39.0 2
OAKWOOD LK/W TRIB T111/112N R52W SEC 35/36/2/1
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 820109
0000 FEET DEPTH CLASS 00 CSN-RSP 0642859-0653616

/TYPA/AMBNT/STREAM/RUNOFF

SUMMARY OF VIOLATIONS ON SAMPLES COLLECTED FROM 77/03/09 TO 83/03/15

	00300 DO MG/L	00403 LAB PH SU	31616 FEC COLI MFM-FCBR /100ML	70300 RESIDUE DISS-180 C MG/L	00530 RESIDUE TOT NFLT MG/L	00610 NH3+NH4- N TOTAL MG/L	00619 UN-IONZD NH3-NH3 MG/L	00620 NO3-N TOTAL MG/L	00011 WATER TEMP FAHN	00415 PHEN-PH- LFIN ALK MG/L
NO OF VALUES	13	27	21	1	29	11	9	26	29	27
MEAN	8.223	7.504	1588.1	859.	51.7	0.1327	0.0014	0.48	55.41	112.6
MEDIAN	8.700	7.400	20.0	859.	32.0	0.0400	0.0009	0.10	52.00	102.0
NO OF VIOLS	2	1	5	0	1	0	0	0	0	0
PERCENT VIOL	15.	4.	24.	0.	3.	0.	0.	0.	0.	0.
MINIMUM VIOL	2.200	8.580	210.0	0.	406.0	0.0	0.0	0.0	0.0	0.0
MEAN VIOL	2.800	8.580	6568.0	0.	406.0	0.0	0.0	0.0	0.0	0.0
MAXIMUM VIOL	3.400	8.580	31000.0	0.	406.0	0.0	0.0	0.0	0.0	0.0
MIN CRITERIA	4.000	6.500	*********	*********	*********	*********	*********	*********	*********	*********
MAX CRITERIA	*********	8.300	200.0	2500.	150.0	*********	0.0500	50.00	90.00	750.0

Table IV-39.

STORET RETRIEVAL DATE 84/09/11 - STAND - VERSION OF APR. 1983 STN 3 PAGE 1.1
VIOLATIONS ONLY

460A03
44 27 23.0 097 01 39.0 2
OAKWOOD LK/W TRIB T111/112N R52W SEC 35/36/2/1
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
/TYPA/AMBNT/STREAM/RUNOFF 21SDLAKE 820109
0000 FEET DEPTH CLASS 00 CSN-RSP 0642859-0653616

DATE	TIME	00300 DO MG/L	00403 LAB PH SU	31616 FEC COLI MFM-FCBR /100ML	70300 RESIDUE DISS-180 C MG/L	00530 RESIDUE TOT NFLT MG/L	00610 NH3+NH4- N TOTAL MG/L	00619 UN-IONZD NH3-NH3 MG/L	00620 NO3-N TOTAL MG/L	00011 WATER TEMP FAHN	00415 PHEN-PH- LFIN ALK MG/L
77/03/09	1730			230.0*							
77/03/10	1430			210.0*							
77/06/16	1505			31000.0*		406.0*					
77/06/17	1500	2.200*									
77/06/19	0915			1100.0*							
77/06/24	1330	3.400*		300.0*							
79/04/26	0835		8.580*								

Table IV-39a.

STORET RETRIEVAL DATE 84/09/11 - STAND - VERSION OF APR. 1983 STN 4.SUMMARY.1

460A04
44 26 30.0 097 01 00.0 2
OAKWOOD LK/S JOHNSON T111N R52W SEC1/12
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 820109
/TYPA/AMBNT/STREAM/RUNOFF
0000 FEET DEPTH CLASS 00 CSN-RSP 0642860-0653617

SUMMARY OF VIOLATIONS ON SAMPLES COLLECTED FROM 77/03/11 TO 79/05/31

	00300 DO MG/L	00403 LAB PH SU	31616 FEC COLI MFM-FCBR /100ML	70300 RESIDUE DISS-180 C MG/L	00530 RESIDUE TOT NFLT MG/L	00610 NH3+NH4- N TOTAL MG/L	00619 UN-IONZD NH3-NH3 MG/L	00620 NO3-N TOTAL MG/L	00011 WATER TEMP FAHN	00415 PHEN-PH- LFIN ALK MG/L
NO OF VALUES	19	30	24	0	30	16	16	28	30	29
MEAN	10.479	7.624	1477.4	0.	41.8	0.141	0.0018	0.61	54.37	117.9
MEDIAN	10.900	7.635	155.0	*********	13.5	0.045	0.0008	0.10	51.00	93.2
NO OF VIOLS	0	0	11	0	3	0	0	0	0	0
PERCENT VIOL	0.	0.	46.	0.	10.	0.	0.	0.	0.	0.
MINIMUM VIOL	0.0	0.0	270.0	0.	194.0	0.0	0.0	0.0	0.0	0.0
MEAN VIOL	0.0	0.0	3166.4	0.	205.7	0.0	0.0	0.0	0.0	0.0
MAXIMUM VIOL	0.0	0.0	24000.0	0.	221.0	0.0	0.0	0.0	0.0	0.0
MIN CRITERIA	4.000	6.500	*********	*********	*********	*********	*********	*********	*********	*********
MAX CRITERIA	*********	8.300	200.0	2500.	150.0	*********	0.0500	50.00	90.00	750.0

Table IV-40.

STORET RETRIEVAL DATE 84/09/11 - STAND - VERSION OF APR. 1983 STN 4 PAGE 1.1
VIOLATIONS ONLY

460A04
44 26 30.0 097 01 00.0 2
OAKWOOD LK/S JOHNSON T111N R52W SEC1/12
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 820109
0000 FEET DEPTH CLASS 00 CSN-RSP 0642860-0653617

/TYPA/AMBNT/STREAM/RUNOFF

DATE	TIME	00300 DO MG/L	00403 LAB PH SU	31616 FEC COLI MFM-FCBR /100ML	70300 RESIDUE DISS-180 C MG/L	00530 RESIDUE TOT NFLT MG/L	00610 NH3+NH4- N TOTAL MG/L	00619 UN-IONZD NH3-NH3 MG/L	00620 NO3-N TOTAL MG/L	00011 WATER TEMP FAHN	00415 PHEN-PH- LFIN ALK MG/L
77/06/16	1520			24000.0*		221.0*					
77/06/18	0930					202.0*					
77/06/18	1100					194.0*					
77/06/19	0900			1200.0*							
77/06/23	1330			330.0*							
77/06/23	1430			270.0*							
79/04/24	0945			290.0*							
79/05/03	0915			880.0*							
79/05/10	1000			5000.0*							
79/05/15	0900			700.0*							
79/05/17	0900			440.0*							
79/05/31	0900			1000.0*							
79/05/31	1200			720.0*							

Table IV-40a.

STORET RETRIEVAL DATE 84/09/11 - STAND - VERSION OF APR. 1983 STN 7.SUMMARY.1

460A07
44 25 59.0 096 58 59.0 2
W OAKWOOD E SHORE T111N R51W SEC 8
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810516
0000 FEET DEPTH CLASS 00 CSN-RSP 0591791-0620069

/TYPA/AMBNT/LAKE

SUMMARY OF VIOLATIONS ON SAMPLES COLLECTED FROM 77/07/05 TO 79/12/13

	00300 DO MG/L	00403 LAB PH SU	31616 FEC COLI MFM-FCBR /100ML	70300 RESIDUE DISS-180 C MG/L	00530 RESIDUE TOT NFLT MG/L	00610 NH3+NH4- N TOTAL MG/L	00619 UN-IONZD NH3-NH3 MG/L	00620 NO3-N TOTAL MG/L	00011 WATER TEMP FAHN	00415 PHEN-PH- LFIN ALK MG/L
NO OF VALUES	29	25	30	0	31	23	17	20	30	24
MEAN	8.807	8.384	346.9	0.	56.0	0.926	0.0579	0.11	54.13	141.1
MEDIAN	8.600	8.010	10.0	*********	37.0	0.490	0.0259	0.10	57.50	135.0
NO OF VIOLS	3	12	5	0	1	0	5	0	0	0
PERCENT VIOL	10.	48.	17.	0.	3.	0.	29.	0.	0.	0.
MINIMUM VIOL	0.0	8.660	220.0	0.	612.0	0.0	0.0597	0.0	0.0	0.0
MEAN VIOL	0.567	9.087	1956.0	0.	612.0	0.0	0.1566	0.0	0.0	0.0
MAXIMUM VIOL	1.700	10.050	6100.0	0.	612.0	0.0	0.3730	0.0	0.0	0.0
MIN CRITERIA	4.000	6.500	*********	*********	*********	*********	*********	*********	*********	*********
MAX CRITERIA	*********	8.300	200.0	2500.	150.0	*********	0.0500	50.00	90.00	750.0

Table IV-41.

STORET RETRIEVAL DATE 84/09/11 - STAND - VERSION OF APR. 1983 STN 7 PAGE 1.1
VIOLATIONS ONLY

460A07
44 25 59.0 096 58 59.0 2
W OAKWOOD E SHORE T111N R51W SEC 8
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810516
/TYPA/AMBNT/LAKE 0000 FEET DEPTH CLASS 00 CSN-RSP 0591791-0620069

DATE	TIME	00300 DO MG/L	00403 LAB PH SU	31616 FEC COLI MFM-FCBR /100ML	70300 RESIDUE DISS-180 C MG/L	00530 RESIDUE TOT NFLT MG/L	00610 NH3+NH4- N TOTAL MG/L	00619 UN-IONZD NH3-NH3 MG/L	00620 NO3-N TOTAL MG/L	00011 WATER TEMP FAHN	00415 PHEN-PH-LFIN ALK MG/L
77/07/05	1225		9.100*								
77/08/04	1130		10.050*								
77/09/15	0850		8.680*					0.0784*			
77/12/28	1100	1.700*									
78/02/16	1210	0.0 *									
78/03/16	1240	0.0 *									
78/05/17	0905		9.350*					0.2084*			
78/05/31	0935		9.100*	2700.0*							
78/06/28	0930			6100.0*							
78/07/12	1000			430.0*				0.0597*			
79/04/26	0945		9.100*								
79/05/01	0900		9.180*								
79/05/22	0900		8.660*								
79/06/26	0910							0.0635*			
79/07/10	0855		8.770*					0.3730*			
79/07/24	0930			220.0*							
79/08/07	0830		8.950*	330.0*							
79/08/21	0930		8.800*								
79/09/04	0940		9.310*								
79/10/02	1050					612.0*					

Table IV-41a.

STORET RETRIEVAL DATE 84/09/11 - STAND - VERSION OF APR. 1983 STN 8.SUMMARY.1

460A08
44 27 25.0 097 00 27.0 2
W OAKWOOD SWIMMING BEACH DOCK T112N R51W SEC 31/
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810516
0000 FEET DEPTH CLASS 00 CSN-RSP 0591792-0620070

/TYPA/AMBNT/LAKE

SUMMARY OF VIOLATIONS ON SAMPLES COLLECTED FROM 77/08/04 TO 79/12/18

	00300 DO MG/L	00403 LAB PH SU	31616 FEC COLI MFM-FCBR /100ML	70300 RESIDUE DISS-180 C MG/L	00530 RESIDUE TOT NFLT MG/L	00610 NH3+NH4- N TOTAL MG/L	00619 UN-IONZD NH3-NH3 MG/L	00620 NO3-N TOTAL MG/L	00011 WATER TEMP FAHN	00415 PHEN-PH- LFIN ALK MG/L
NO OF VALUES	24	19	25	0	25	19	13	20	24	18
MEAN	9.408	8.417	41.2	0.	57.4	0.617	0.0302	0.12	55.54	138.5
MEDIAN	8.400	8.750	3.0	*********	30.0	0.060	0.0103	0.10	58.00	133.5
NO OF VIOLS	1	12	2	0	1	0	2	0	0	0
PERCENT VIOL	4.	63.	8.	0.	4.	0.	15.	0.	0.	0.
MINIMUM VIOL	0.0	4.040	270.0	0.	616.0	0.0	0.0780	0.0	0.0	0.0
MEAN VIOL	0.0	8.757	380.0	0.	616.0	0.0	0.1230	0.0	0.0	0.0
MAXIMUM VIOL	0.0	10.100	490.0	0.	616.0	0.0	0.1680	0.0	0.0	0.0
MIN CRITERIA	4.000	6.500	*********	*********	*********	*********	*********	*********	*********	*********
MAX CRITERIA	*********	8.300	200.0	2500.	150.0	*********	0.0500	50.00	90.00	750.0

Table IV-42.

STORET RETRIEVAL DATE 84/09/11 - STAND - VERSION OF APR. 1983 STN 8 PAGE 1.1
VIOLATIONS ONLY

460A08
44 27 25.0 097 00 27.0 2
W OAKWOOD SWIMMING BEACH DOCK T112N R51W SEC 31/
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810516
/TYPA/AMBNT/LAKE 0000 FEET DEPTH CLASS 00 CSN-RSP 0591792-0620070

DATE	TIME	00300 DO MG/L	00403 LAB PH SU	31616 FEC COLI MFM-FCBR /100ML	70300 RESIDUE DISS-180 C MG/L	00530 RESIDUE TOT NFLT MG/L	00610 NH3+NH4- N TOTAL MG/L	00619 UN-IONZD NH3-NH3 MG/L	00620 NO3-N TOTAL MG/L	00011 WATER TEMP FAHN	00415 PHEN-PH- LFIN ALK MG/L
77/08/04	1200		10.100*								
77/09/15	0930		8.750*								
78/02/16	1235	0.0 *									
78/05/17	1000		9.540*								
78/05/31	1015		9.270*								
78/06/14	0905			270.0*							
79/04/26	1030		9.150*								
79/05/01	1000		9.500*								
79/05/08	1030		9.300*								
79/05/22	1000		8.800*								
79/06/26	1000							0.0780*			
79/07/10	0745							0.1680*			
79/07/24	1015		8.620*	490.0*							
79/08/07	1005		4.040*								
79/08/21	1040		8.880*								
79/09/04	1040		9.130*								
79/10/02	1140					616.0*					

Table IV-42a.

STORET RETRIEVAL DATE 84/09/11 - STAND - VERSION OF APR. 1983 STN 10.SUMMARY.1

OAK1
44 24 34.0 097 01 31.0 2
COMPOSITE SAMPLE T111N-R51W-S6 CDCD
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER BASIN 090700
BIG SIOUX RIVER BASIN
21SDLAKE 840824
0000 FEET DEPTH CLASS 00 CSN-KSP 0741943-0744334

/TYPA/AMBNT/LAKE

SUMMARY OF VIOLATIONS ON SAMPLES COLLECTED FROM 82/01/05 TO 83/08/10

	00300 DO MG/L	00403 LAB PH SU	31616 FEC COLI MFM-FCBR /100ML	70300 RESIDUE DISS-180 C MG/L	00530 RESIDUE TOT NFLT MG/L	00610 NH3+NH4- N TOTAL MG/L	00619 UN-IONZD NH3-NH3 MG/L	00620 NO3-N TOTAL MG/L	00011 WATER TEMP FAHN	00415 PHEN-PH- LFIN ALK MG/L
NO OF VALUES	10	10	9	9	10	10	10	10	10	6
MEAN	10.800	8.305	17.7	807.	26.7	1.345	0.0266	0.11	48.50	76.7
MEDIAN	11.400	8.240	10.0	789.	23.0	0.795	0.0196	0.10	37.50	74.0
NO OF VIOLS	1	4	0	0	0	0	2	0	0	0
PERCENT VIOL	10.	40.	0.	0.	0.	0.	20.	0.	0.	0.
MINIMUM VIOL	1.500	8.660	0.0	0.	0.0	0.0	0.0525	0.0	0.0	0.0
MEAN VIOL	1.500	8.782	0.0	0.	0.0	0.0	0.0551	0.0	0.0	0.0
MAXIMUM VIOL	1.500	9.040	0.0	0.	0.0	0.0	0.0577	0.0	0.0	0.0
MIN CRITERIA	4.000	6.500	*********	*********	*********	*********	*********	*********	*********	*********
MAX CRITERIA	*********	8.300	200.0	2500.	150.0	*********	0.0500	50.00	90.00	750.0

Table IV-43.

STORET RETRIEVAL DATE 84/09/11 - STAND - VERSION OF APR. 1983 STN 10 PAGE 1:1

VIOLATIONS ONLY

OAK1
44 24 34.0 097 01 31.0 2
COMPOSITE SAMPLE T111N-R51W-S6 CDCD
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER BASIN 090700
BIG SIOUX RIVER BASIN
21SDLAKE 840824
0000 FEET DEPTH CLASS 00 CSN-RSP 0741943-0744334

/TYPA/AMBNT/LAKE

DATE	TIME	00300 DO MG/L	00403 LAB PH SU	31616 FEC COLI MFM-FCBR /100ML	70300 RESIDUE DISS-180 C MG/L	00530 RESIDUE TOT NFLT MG/L	00610 NH3+NH4- N TOTAL MG/L	00619 UN-IONZD NH3-NH3 MG/L	00620 NO3-N TOTAL MG/L	00011 WATER TEMP FAHN	00415 PHEN-PH- LFIN ALK MG/L
82/01/05	1100	1.500*						0.0525*			
82/12/15	1355							0.0577*			
83/05/12	1200		8.700*								
83/06/15	1445		8.660*								
83/07/13	1030		8.730*								
83/08/10	1415		9.040*								

Table IV-43a.

Year		Inorganic (mg/l)	Organic (mg/l)
1984	Mean	1.49	3.09
	Standard Deviation	1.61	1.96
	Number of Observations	7	7
	Range	<.13 - 3.28	1.46 - 4.12
1983	Mean	.79	2.60
	Standard Deviation	.84	1.57
	Number of Observations	11	11
	Range	<.13 - 2.31	1.15 - 6.97
1982	Mean	2.01	.990
	Number of Observations	1	1
1979	Mean	.59	2.06
	Standard Deviation	.44	.56
	Number of Observations	37	37
	Range	<.13 - 1.54	.92 - 3.45
1978	Mean	3.51	4.39
	Standard Deviation	3.45	2.43
	Number of Observations	9	9
	Range	<.13 - 4.20	1.81 - 9.15
1977	Mean	2.81	7.54
	Standard Deviation	2.52	2.60
	Number of Observations	10	10
	Range	.16 - 6.66	5.78 - 11.65

Table IV-44. Statistical summary of the inorganic and organic nitrogen data observed at Site OA05 and OA06 in East Oakwood Lake.

Year		Inorganic (mg/l)	Organic (mg/l)
1979	Mean	.58	1.90
	Standard Deviation	.62	.70
	Number of Observations	34	34
	Range	<.13 - 2.59	1.10 - 4.40
1978	Mean	3.11	4.01
	Standard Deviation	3.33	1.85
	Number of Observations	13	13
	Range	<.14 - 8.67	1.92 - 8.54
1977	Mean	2.16	7.24
	Standard Deviation	2.28	2.12
	Number of Observations	9	9
	Range	<.13 - 6.31	4.70 - 10.37

Tables IV-45. Statistical summary of the inorganic and organic nitrogen data observed at Sites OA07 and OA08 in West Oakwood Lake.

		East Oakwood	West Oakwood
1984	Mean	77.76	-
	Standard Deviation	11.24	-
	Number of Observations	7	-
	Range	64.2 - 95.3	-
1983	Mean	75.40	-
	Standard Deviation	8.30	-
	Number of Observations	18	-
	Range	58.7 - 81.3	-
1982		62.73 (one sample)	-
1979	Mean	67.60	72.03
	Standard Deviation	7.61	11.79
	Number of Observations	37	33
	Range	55.0 - 87.6	37.4 - 87.8
1978	Mean	72.84	80.30
	Standard Deviation	5.45	5.31
	Number of Observations	9	14
	Range	61.2 - 81.9	73.1 - 87.8
1977	Mean	72.79	74.67
	Standard Deviation	6.21	7.72
	Number of Observations	10	9
	Range	61.2 - 75.3	63.2 - 86.3

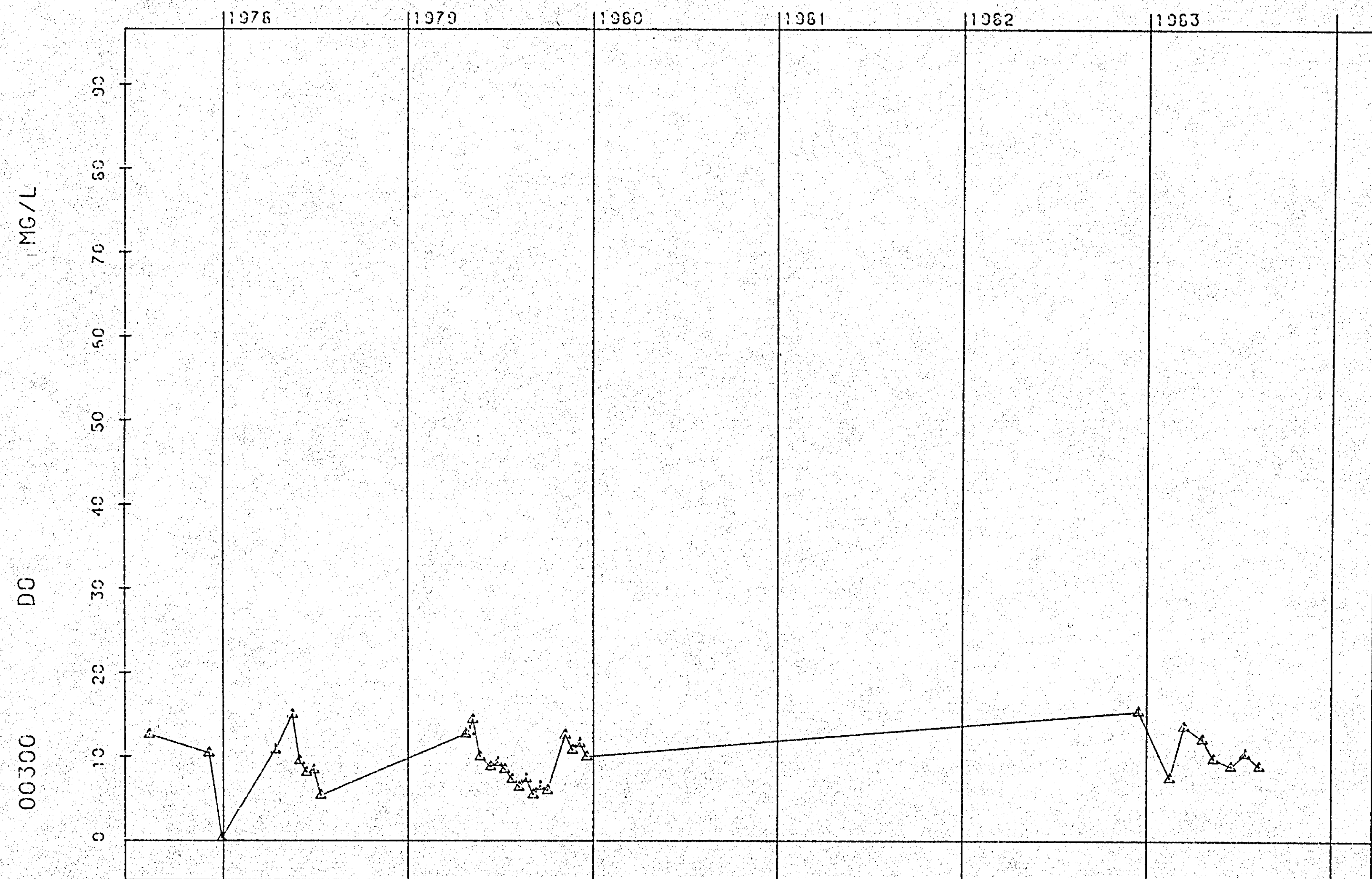
Table IV-46. Mean trophic state indices, based on total phosphorus, for East and West Oakwood Lakes.

Year		East Oakwood	West Oakwood
1984	Mean	33.71	-
	Standard Deviation	27.40	-
	Number of Observations	7	-
	Range	7.3 - 81.4	-
1983	Mean	31.43	-
	Standard Deviation	27.40	-
	Number of Observations	11	-
	Range	8.9 - 105.5	-
1982		51.72 (one sample)	
1979	Mean	35.96	30.23
	Standard Deviation	16.99	38.32
	Number of Observations	38	34
	Range	37.4 - 87.6	6.3 - 203.0
1978	Mean	70.91	37.31
	Standard Deviation	56.90	40.81
	Number of Observations	9	14
	Range	23.3 - 187.1	16.4 - 172.1
1977	Mean	101.39	82.27
	Standard Deviation	63.22	49.41
	Number of Observations	10	9
	Range	33.8 - 201.7	11.7 - 172.1

Table IV-47. Mean total nitrogen to total phosphorus ratios for East and West Oakwood.

460A05
44 25 36.0 096 57 35.0 2
E OAKWOOD AT S BOAT RAMP T111N R51W SEC 16
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810516
0000 FEET DEPTH CLASS 00 CSN-RSP 0591789-0620067

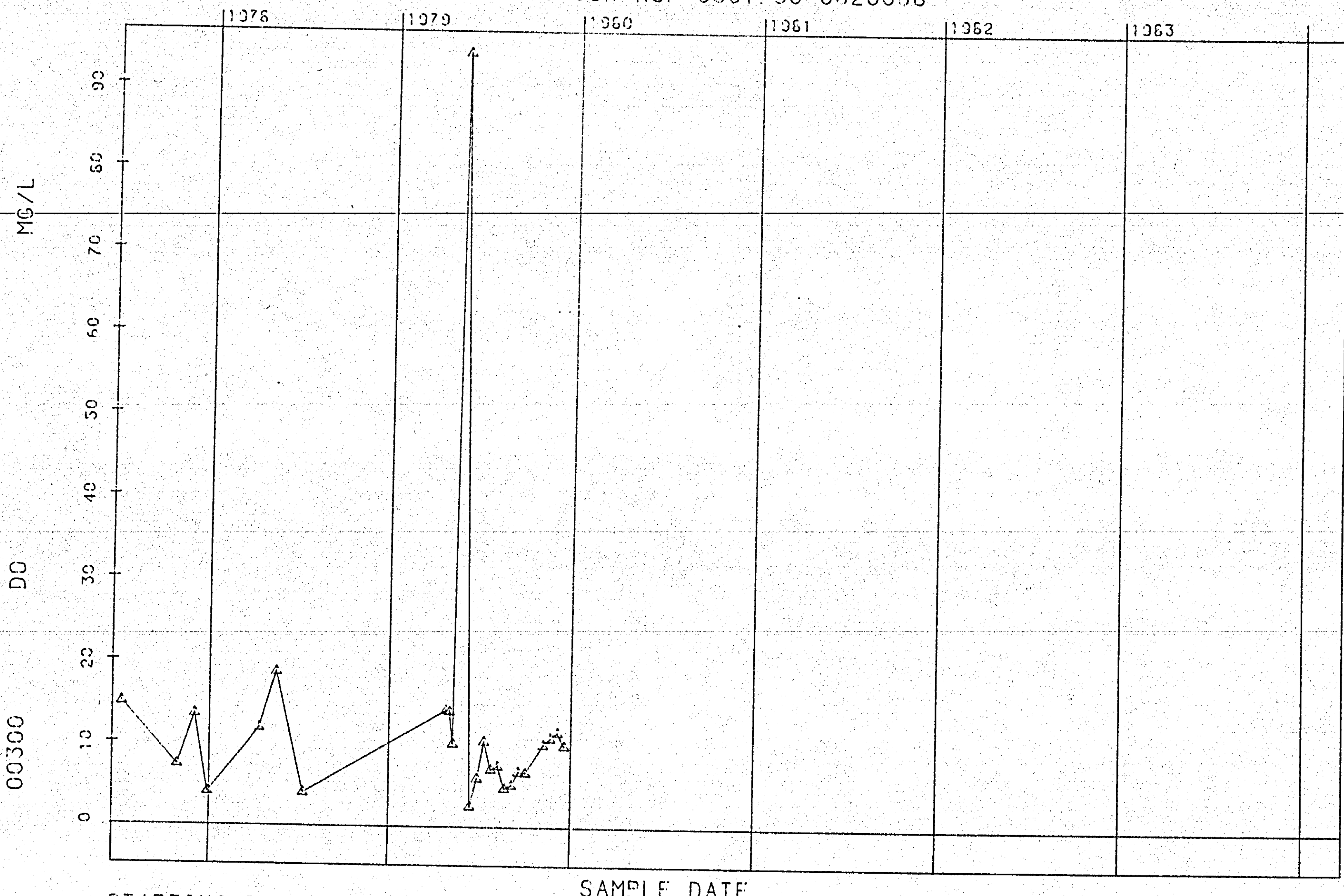
Figure IV-1.



STARTING DATE 77/6 /17

Figure IV-2.

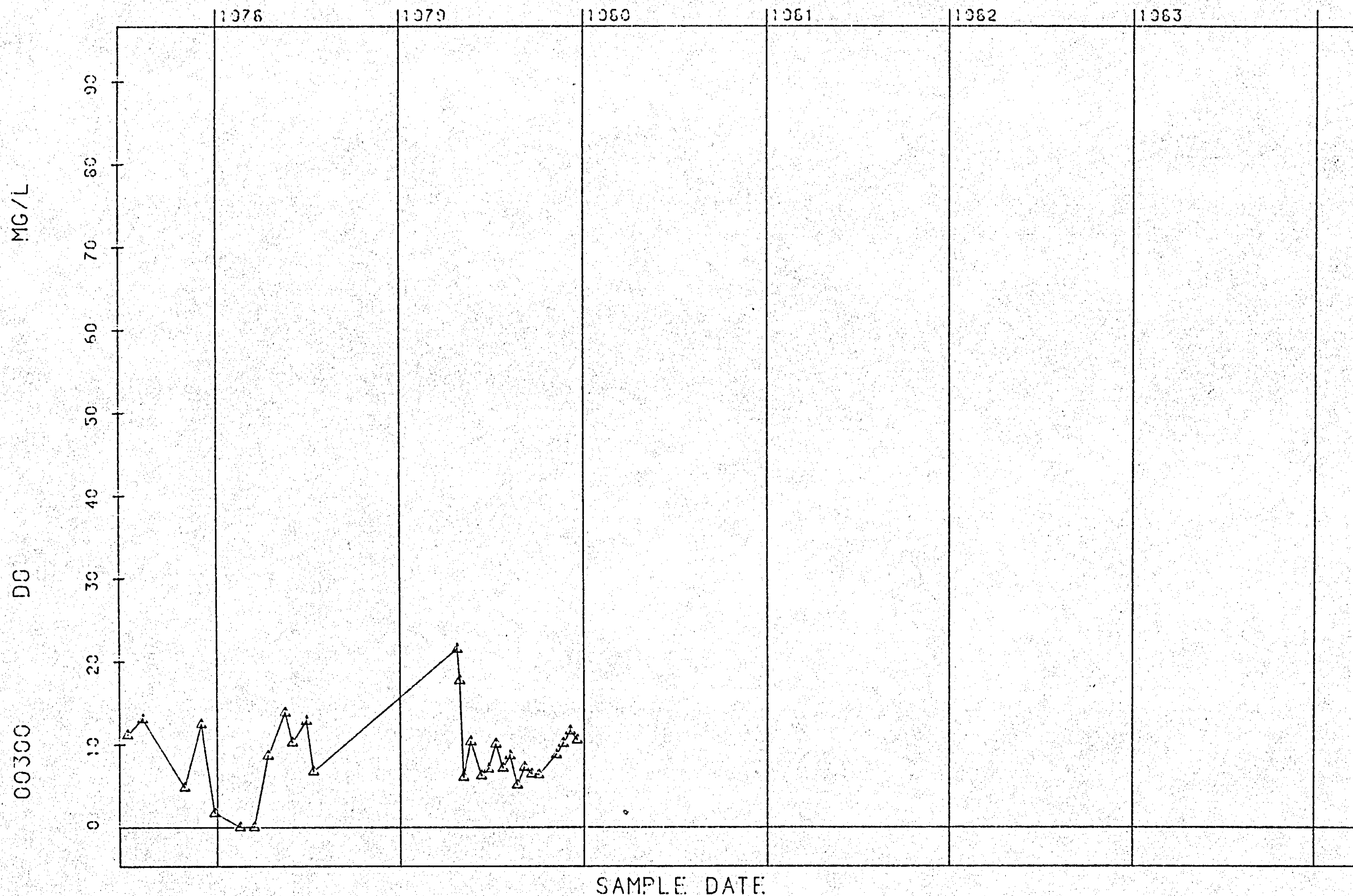
460A06
44 26 38.0 096 58 41.0 2
E OAKWOOD W SHORE T111N R51W SEC 5
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810516
0000 FEET DEPTH CLASS 00 CSN-RSP 0591790-0620068



STARTING DATE 77/6 /17

Figure IV-3.

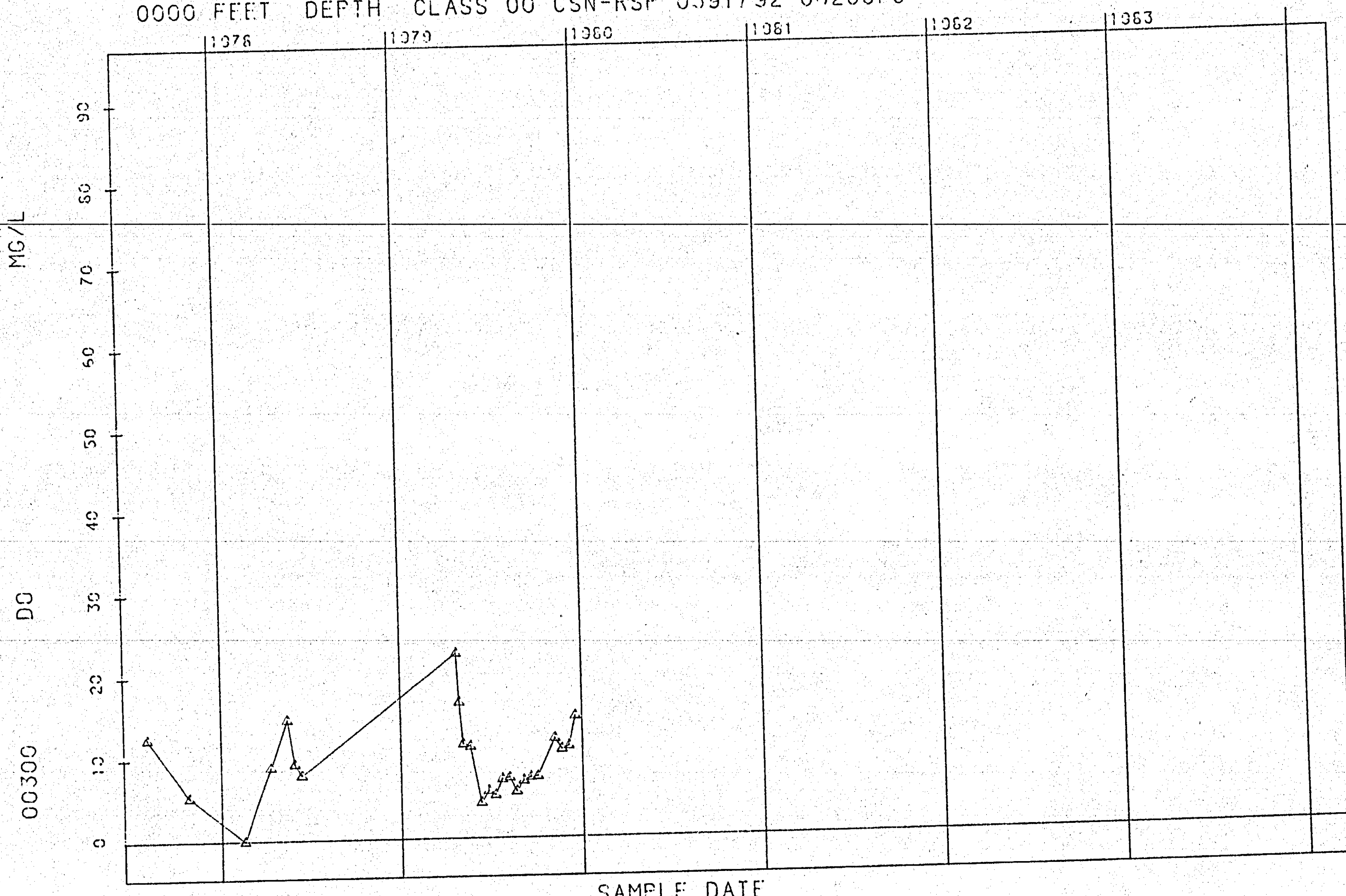
460A07
44 25 59.0 096 58 59.0 2
W OAKWOOD E SHORE T111N R51W SEC 8
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810516
0000 FEET DEPTH CLASS 00 CSN-RSP 0591791-0620069



STARTING DATE 77/6 /17

Figure IV-4.

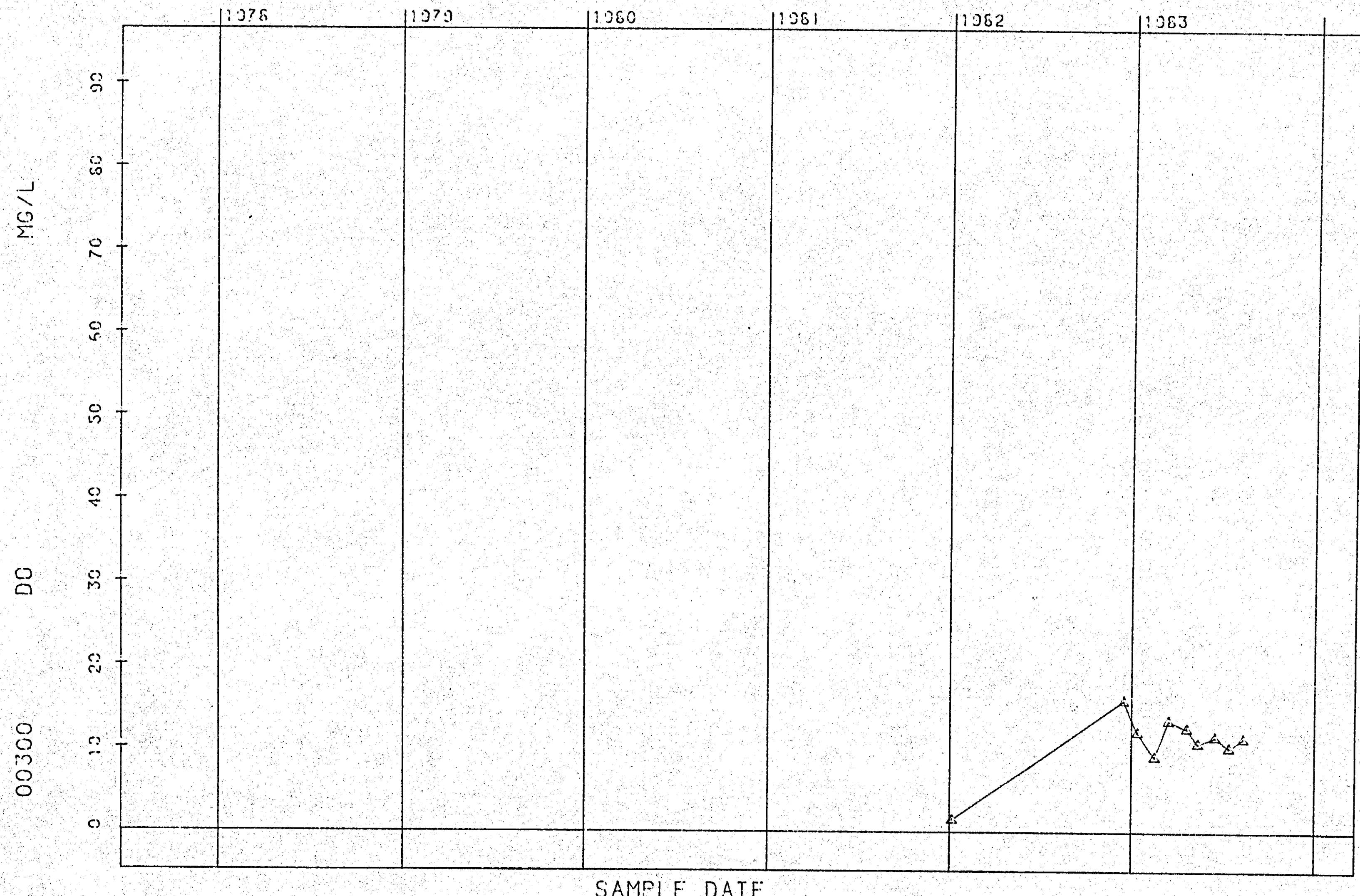
460A08
44 27 25.0 097 00 27.0 2
W OAKWOOD SWIMMING BEACH DOCK T112N R51W SEC 31/
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810516
0000 FEET DEPTH CLASS 00 CSN-RSP 0591792-0620070



STARTING DATE 77/6 /17

Figure IV-5.

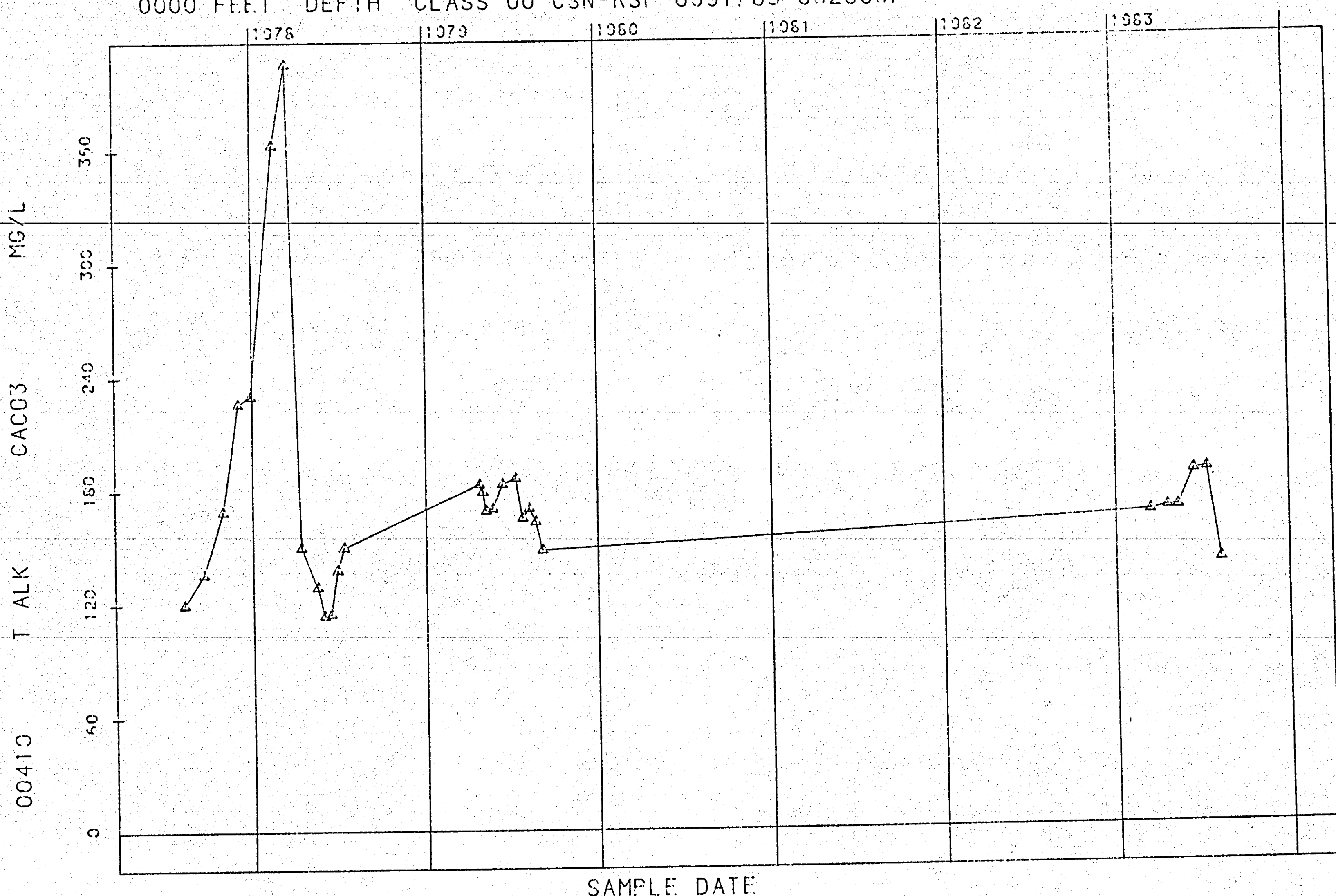
OAK1
44 24 34.0 097 01 31.0 2
COMPOSITE SAMPLE T111N-R51W-S6 CDCD
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER BASIN 090700
BIG SIOUX RIVER BASIN
21SDLAKE 840824
0000 FEET DEPTH CLASS 00 CSN-RSP 0741943-0744334



STARTING DATE 77/6 /17

Figure IV-6.

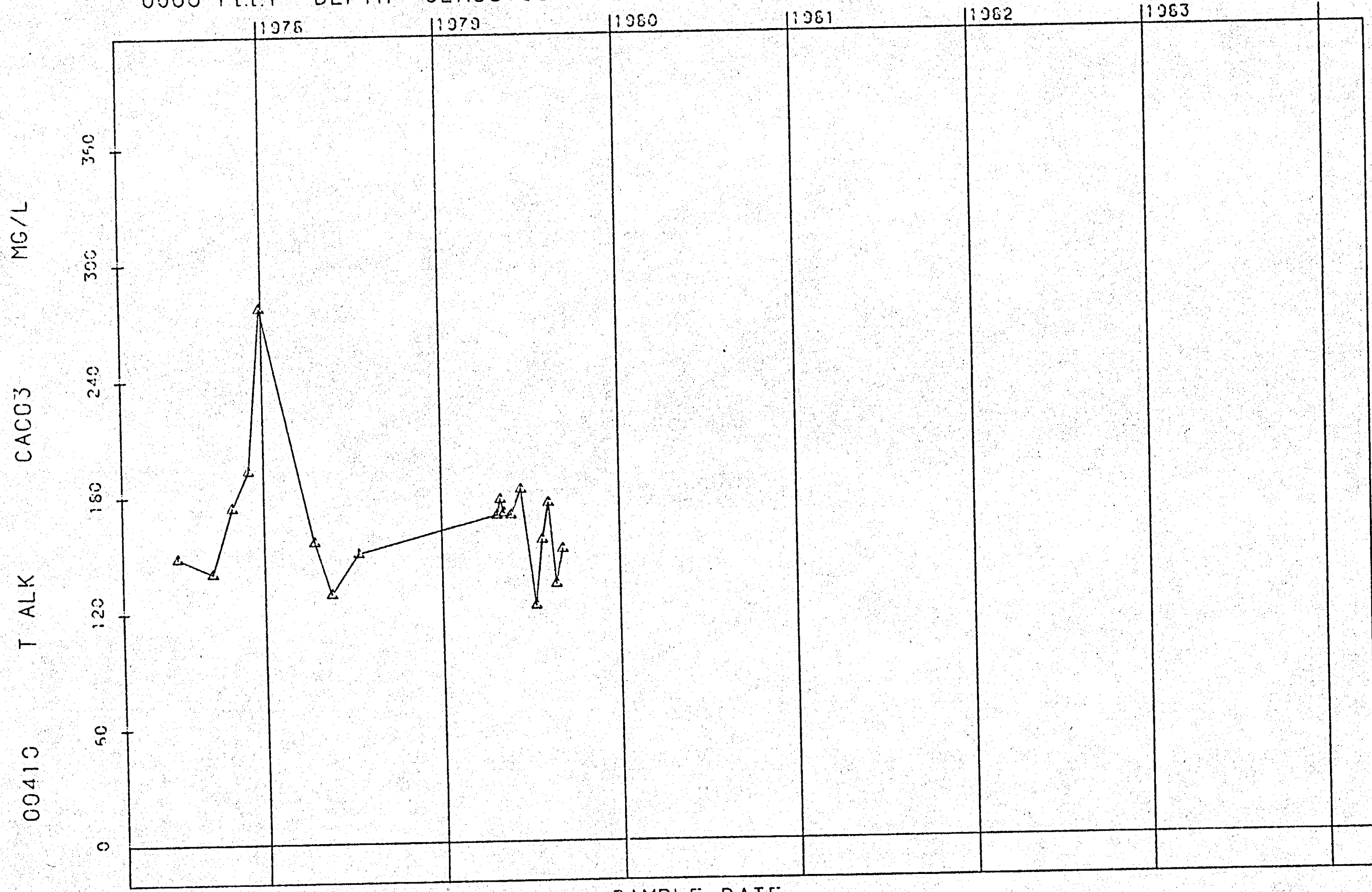
460A05
44 25 36.0 096 57 35.0 2
E OAKWOOD AT S BOAT RAMP T111N R51W SEC 16
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810516
0000 FEET DEPTH CLASS 00 CSN-RSP 0591789-0620067



STARTING DATE 77/3 /9

46UA05
44 26 38.0 096 58 41.0 2
E OAKWOOD W SHORE T111N R51W SEC 5
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810516
0000 FEET DEPTH CLASS 00 CSN-RSP 0591790-0620068

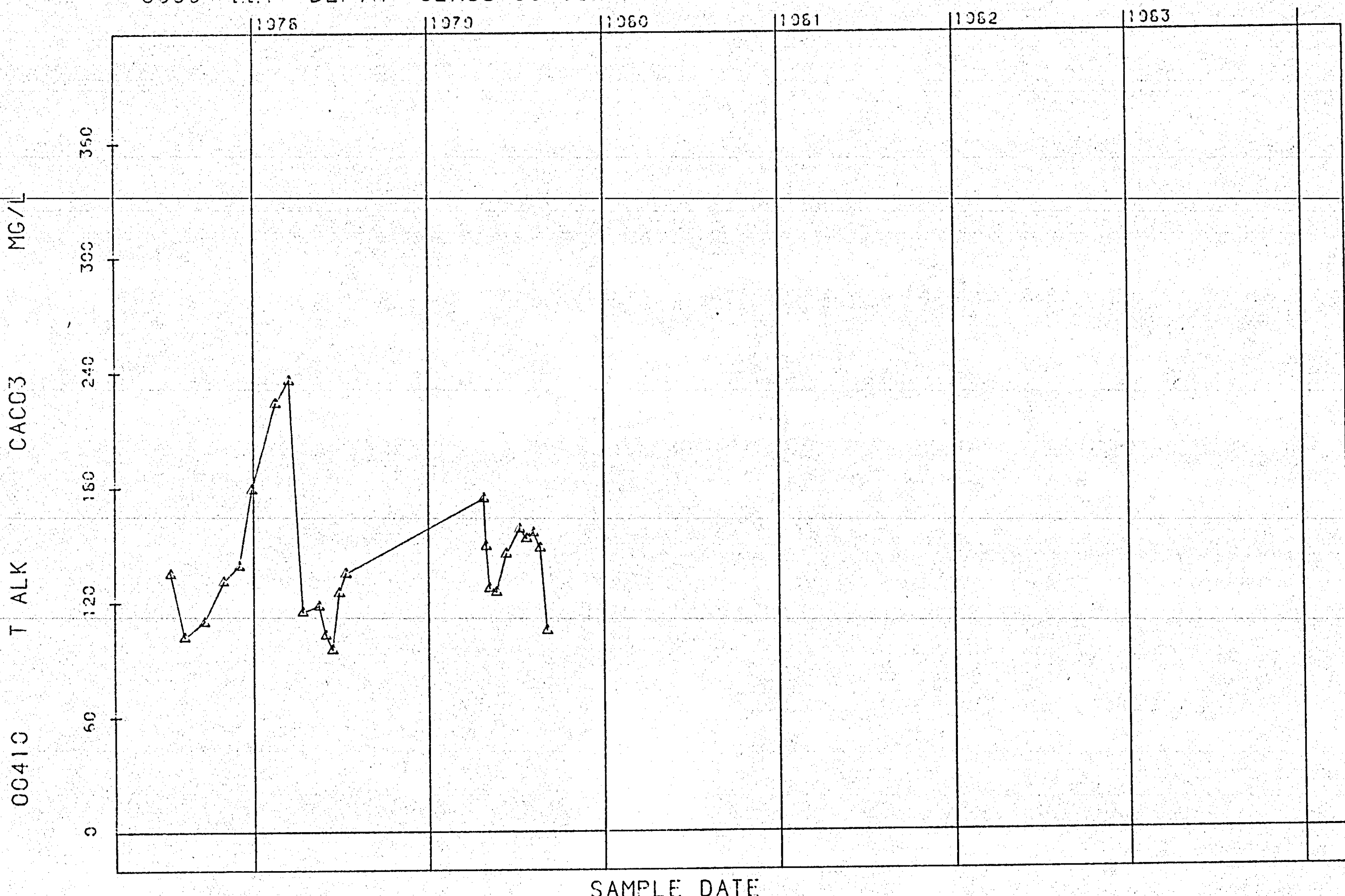
Figure IV-7.



STARTING DATE 77/3 /9

Figure IV-8.

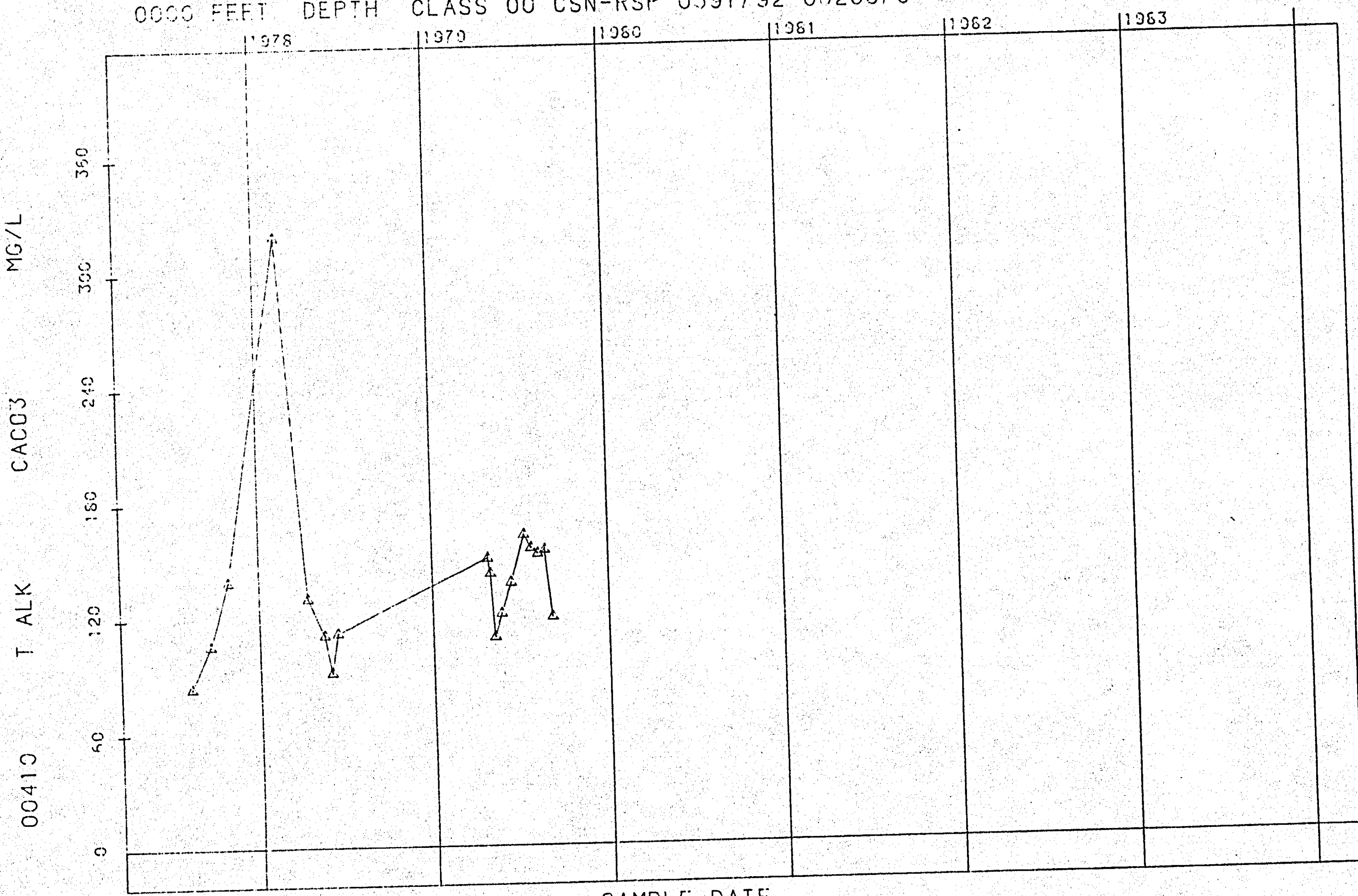
460A07
44 25 59.0 096 58 59.0 2
W OAKWOOD E SHORE T111N R51W SEC 8
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810516
0000 FEET DEPTH CLASS 00 CSN-RSP 0591791-0620069



STARTING DATE 77/3 /9

Figure IV-9.

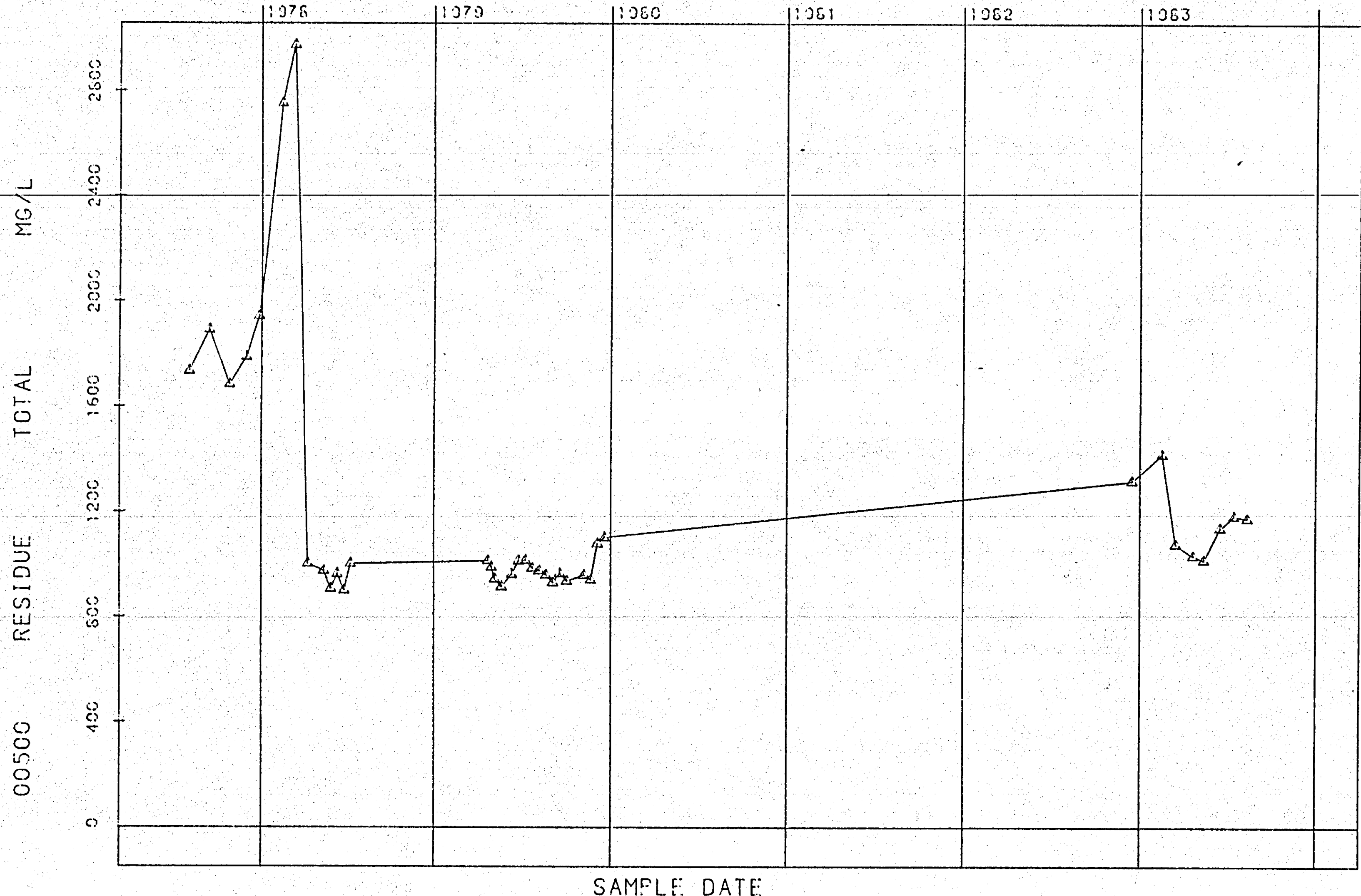
460A08
44 27 25.0 097 00 27.0 2
W OAKWOOD SWIMMING BEACH DOCK T112N R51W SEC 31/
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810516
0000 FEET DEPTH CLASS 00 CSN-RSP 0591792-0620070



STARTING DATE 77/3 /9

Figure IV-10.

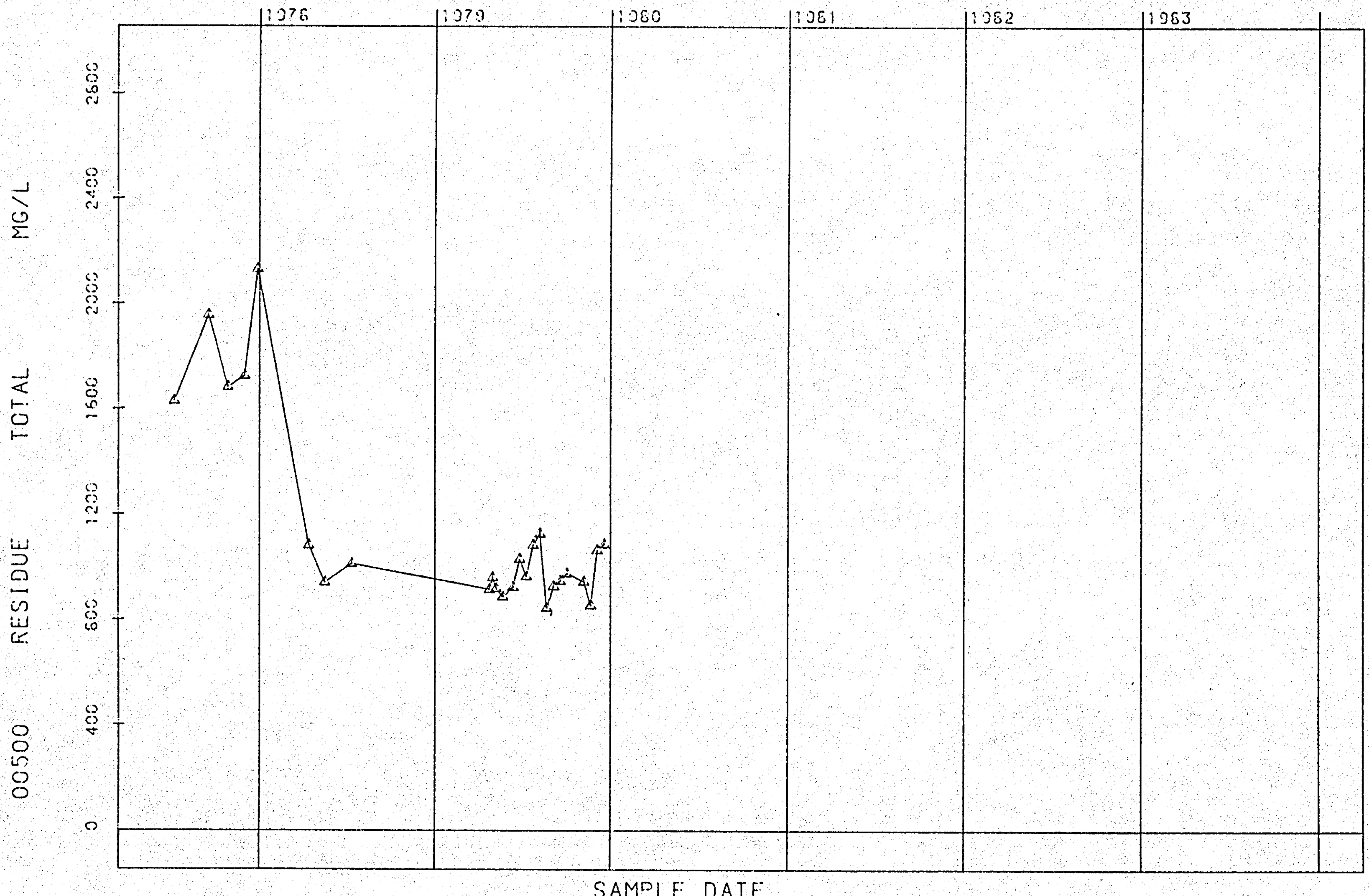
460A05
44 25 36.0 096 57 35.0 2
E OAKWOOD AT S BOAT RAMP T111N R51W SEC 16
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810516
0000 FEET DEPTH CLASS 00 CSN-RSP 0591789-0620067



STARTING DATE 77/3 /9

Figure IV-11.

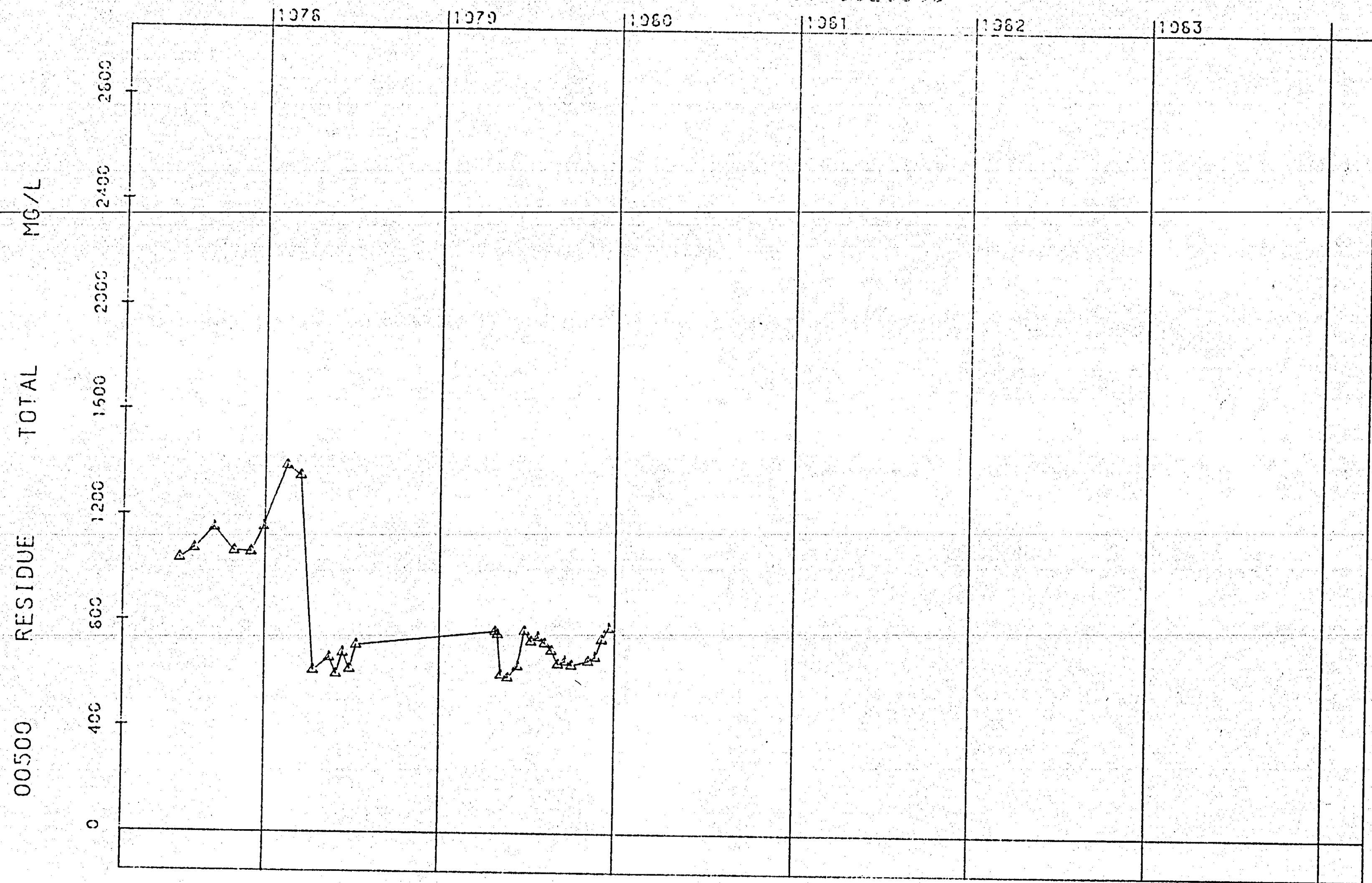
460A06
44 26 38.0 096 58 41.0 2
E OAKWOOD W SHORE T111N R51W SEC 5
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810516
0000 FEET DEPTH CLASS 00 CSN-RSP 0591790-0620068



STARTING DATE 77/3 /9

460A07
44 25 59.0 096 58 59.0 2
W OAKWOOD E SHORE T111N R51W SEC 8
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810516
0000 FEET DEPTH CLASS 00 CSN-RSP 0591791-0620069

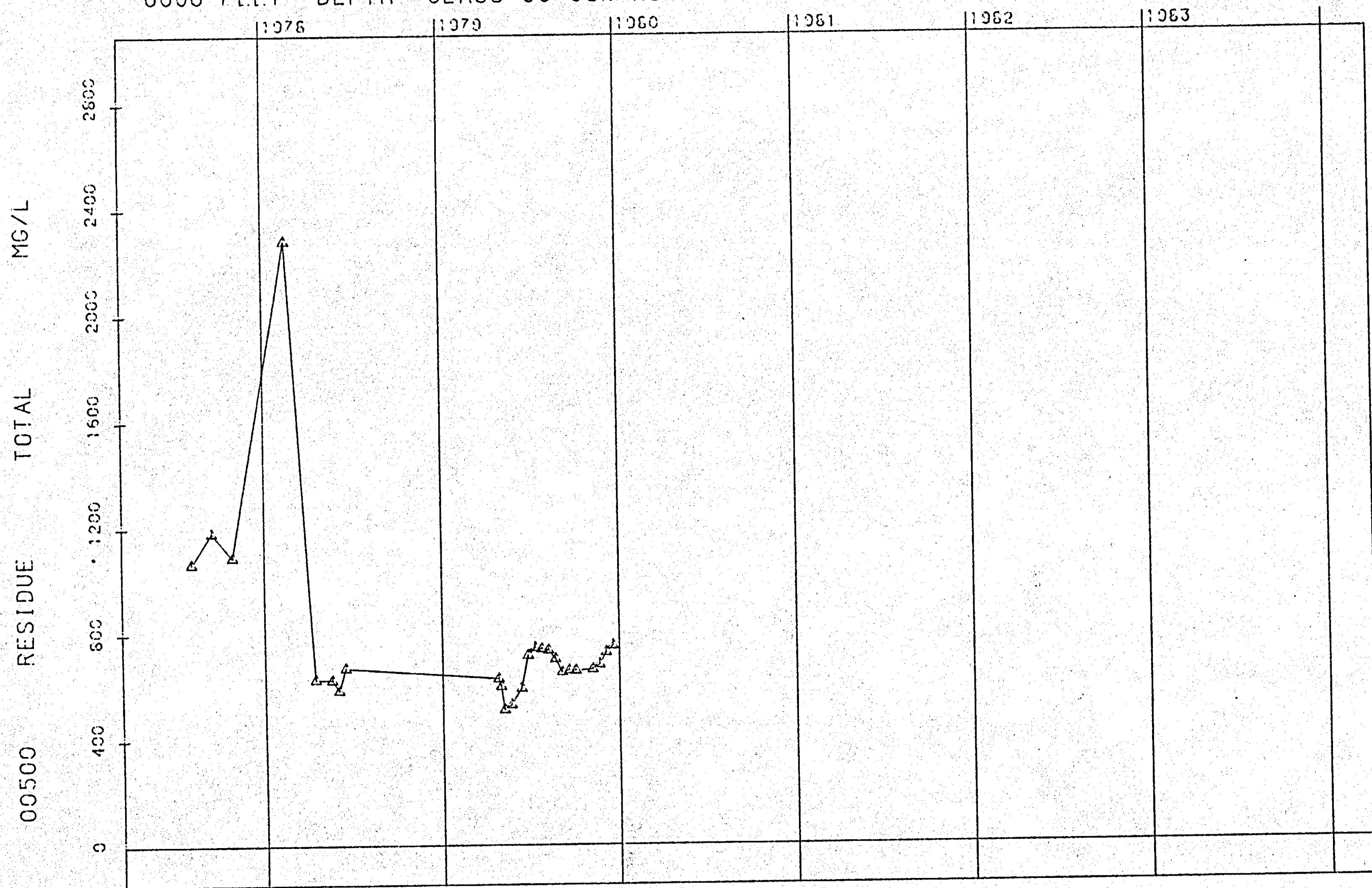
Figure IV-12.



STARTING DATE 77/3 /9

Figure IV-13.

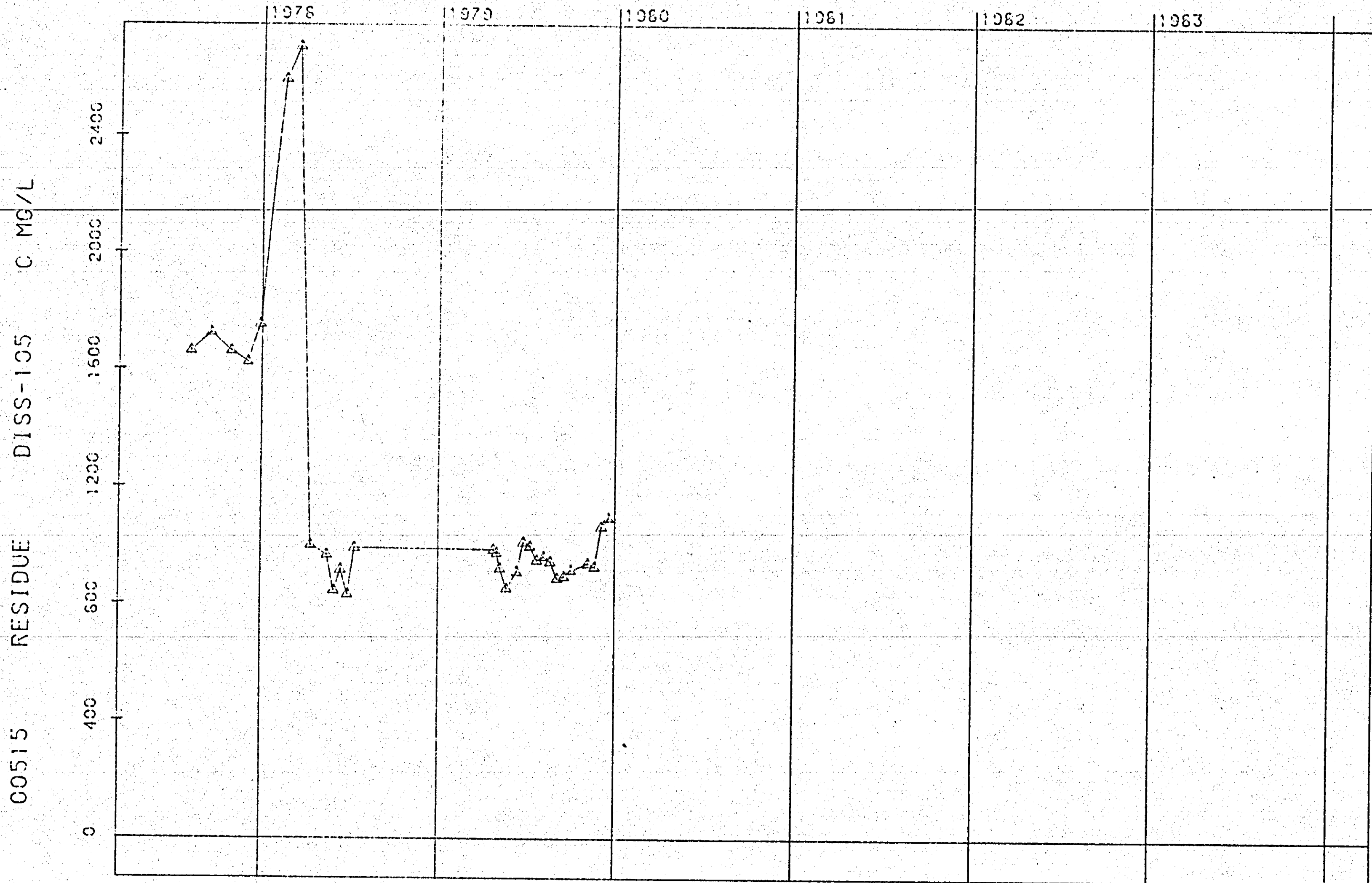
460A08
44 27 25.0 097 00 27.0 2
W OAKWOOD SWIMMING BEACH DOCK T112N R51W SEC 31/
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810516
0000 FEET DEPTH CLASS 00 CSN-RSP 0591792-0620070



STARTING DATE 77/3 /9

460A05
44 25 36.0 096 57 35.0 2
E OAKWOOD AT S BOAT RAMP T111N R51W SEC 16
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810516
0000 FEET DEPTH CLASS 00 CSN-RSP 0591789-0620067

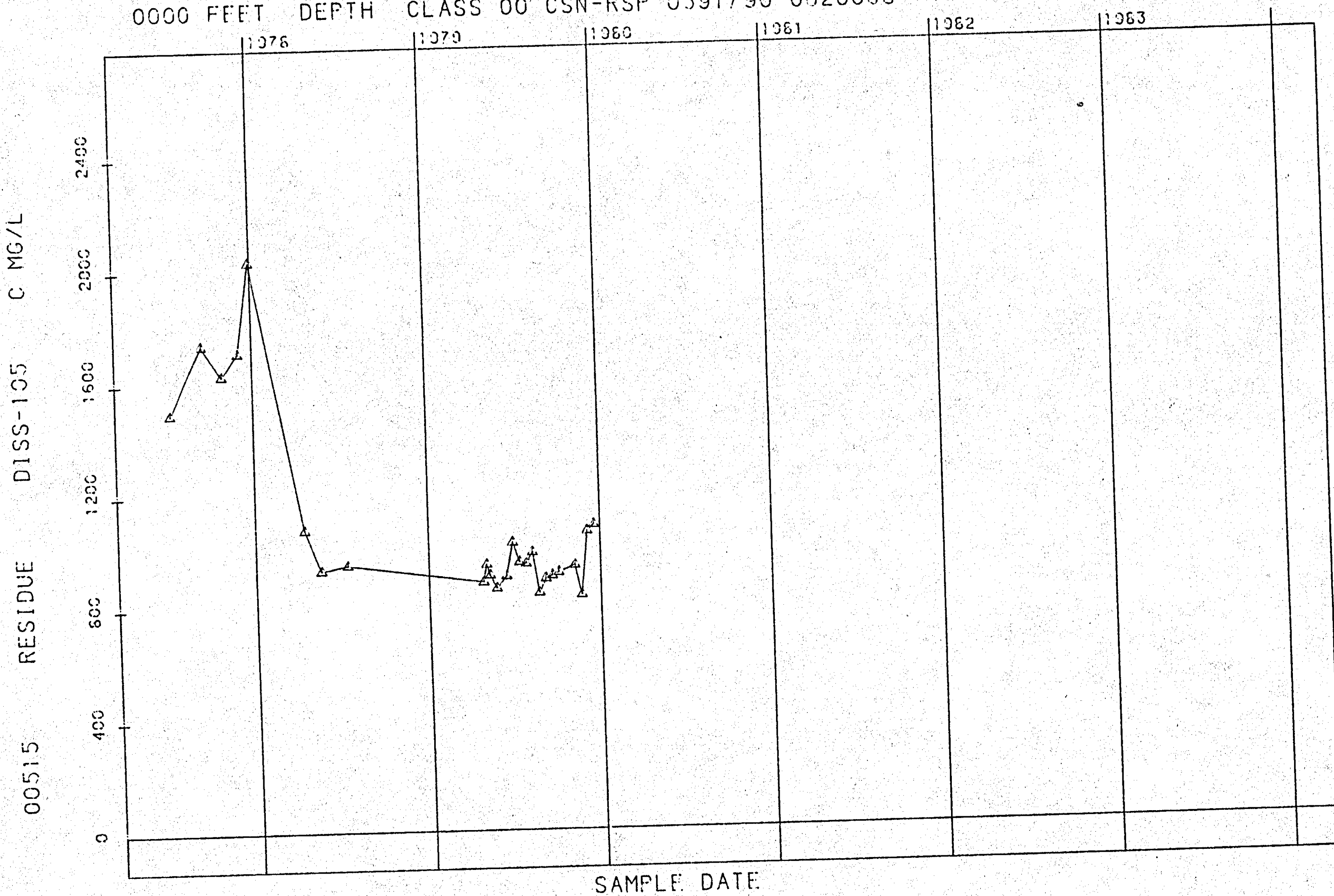
Figure IV-14.



STARTING DATE 77/3 /9

Figure IV-15.

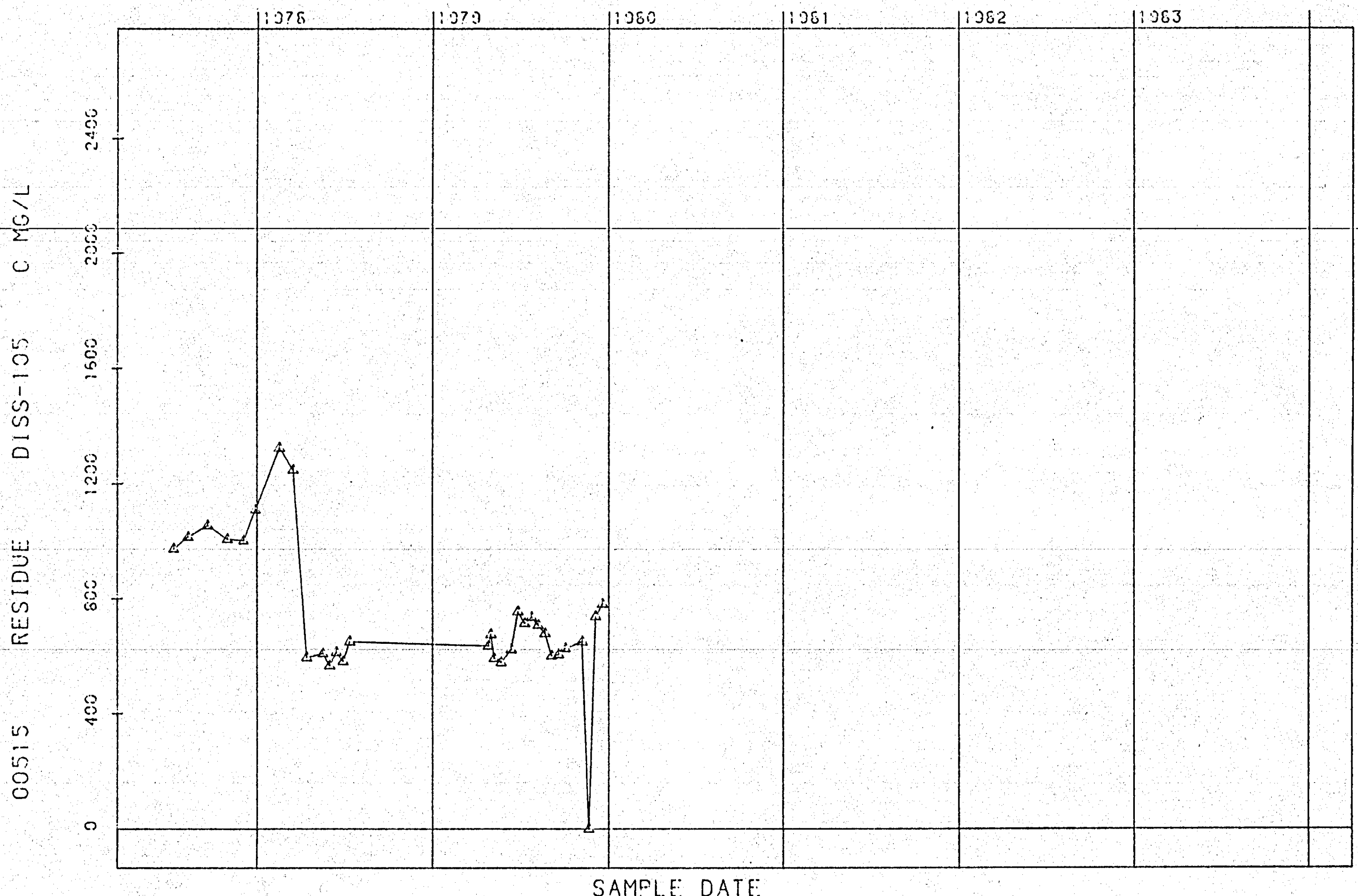
460A06
44 26 38.0 096 58 41.0 2
E OAKWOOD W SHORE T111N R51W SEC 5
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810516
0000 FEET DEPTH CLASS 00 CSN-RSP 0591790-0620068



STARTING DATE 77/3 /9

Figure IV-16.

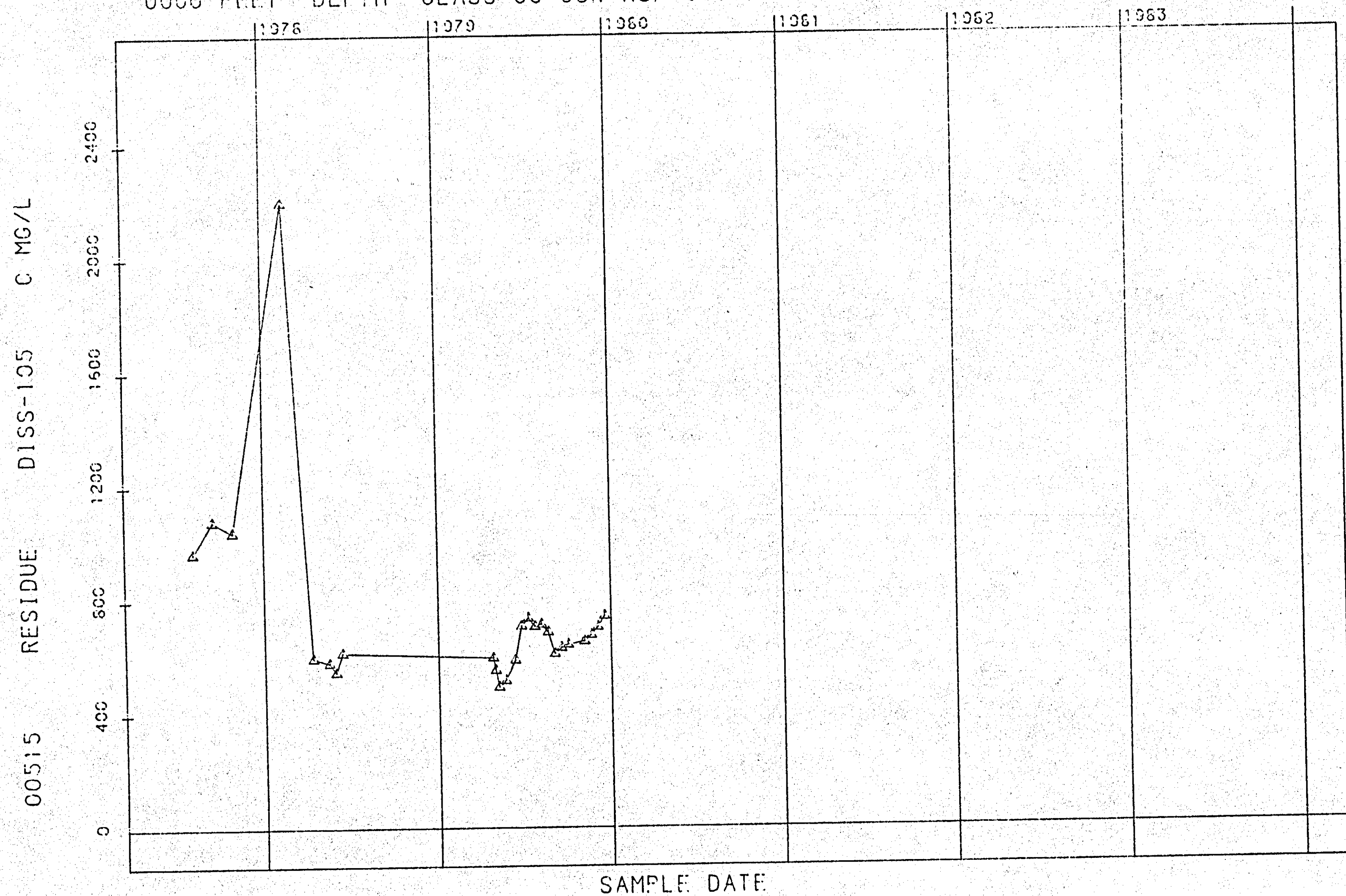
460A07
44 25 59.0 096 58 59.0 2
W OAKWOOD E SHORE T111N R51W SEC 8
46011   SOUTH DAKOTA   BROOKINGS
MISSOURI RIVER   090700
BIG SIOUX RIVER
21SDLAKE 810516
0000 FEET DEPTH CLASS 00 CSN-RSP 0591791-0620069



STARTING DATE 77/3 /9

Figure IV-17.

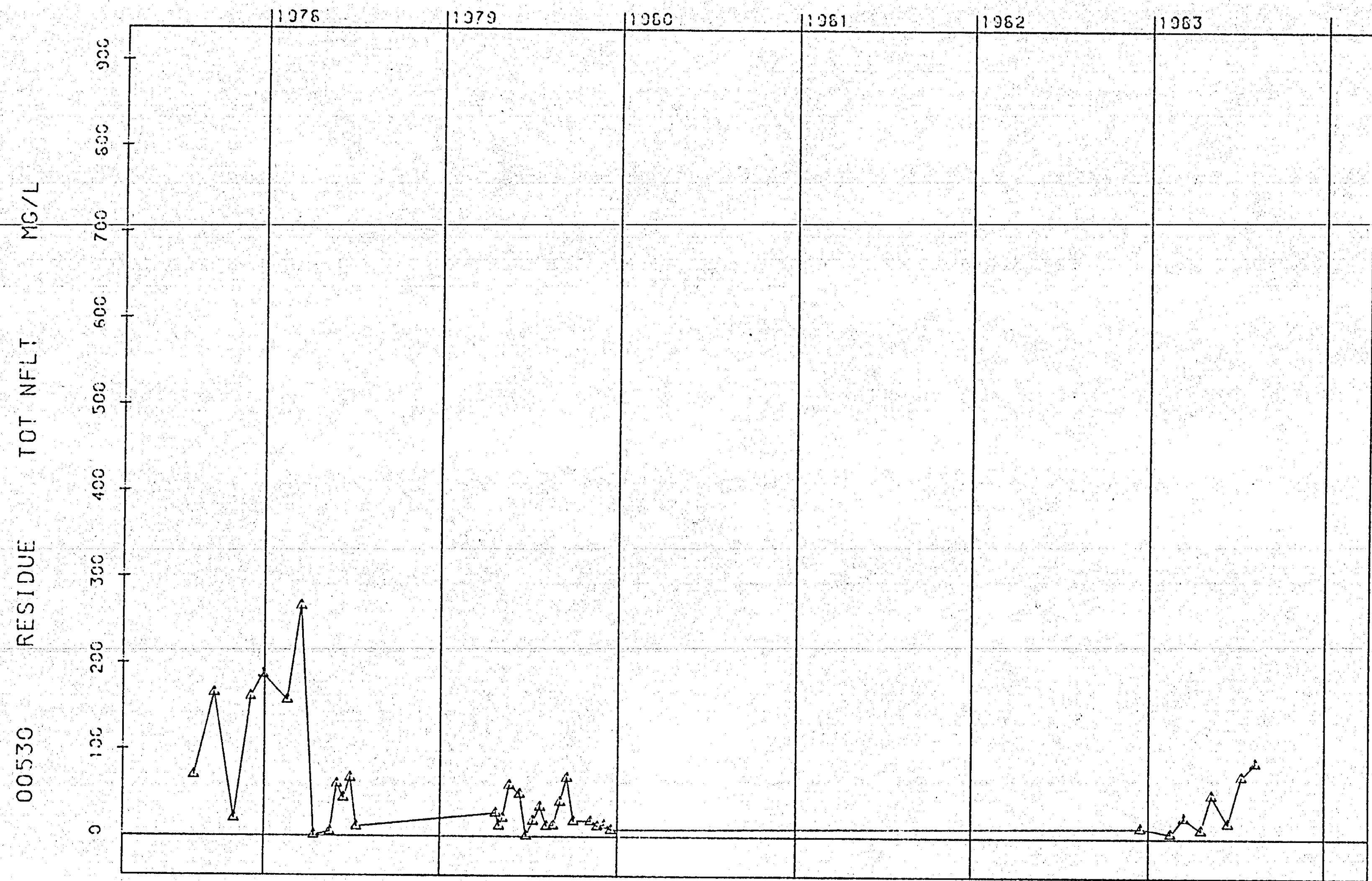
460A08
44 27 25.0 097 00 27.0 2
W OAKWOOD SWIMMING BEACH DOCK T112N R51W SEC 31/
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810516
0000 FEET DEPTH CLASS 00 CSN-RSP 0591792-0620070



STARTING DATE 77/3 /9

Figure IV-18.

460A05
44 25 36.0 096 57 35.0 2
E OAKWOOD AT S BOAT RAMP T111N R51W SEC 16
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810516
0000 FEET DEPTH CLASS 00 CSN-RSP 0591789-0620067



STARTING DATE 77/3 /9

460A06
44 26 38.0 096 58 41.0 2
E OAKWOOD W SHORE T111N R51W SEC 5
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810516
0000 FEET DEPTH CLASS 00 CSN-RSP 0591790-0620068

Figure IV-19.

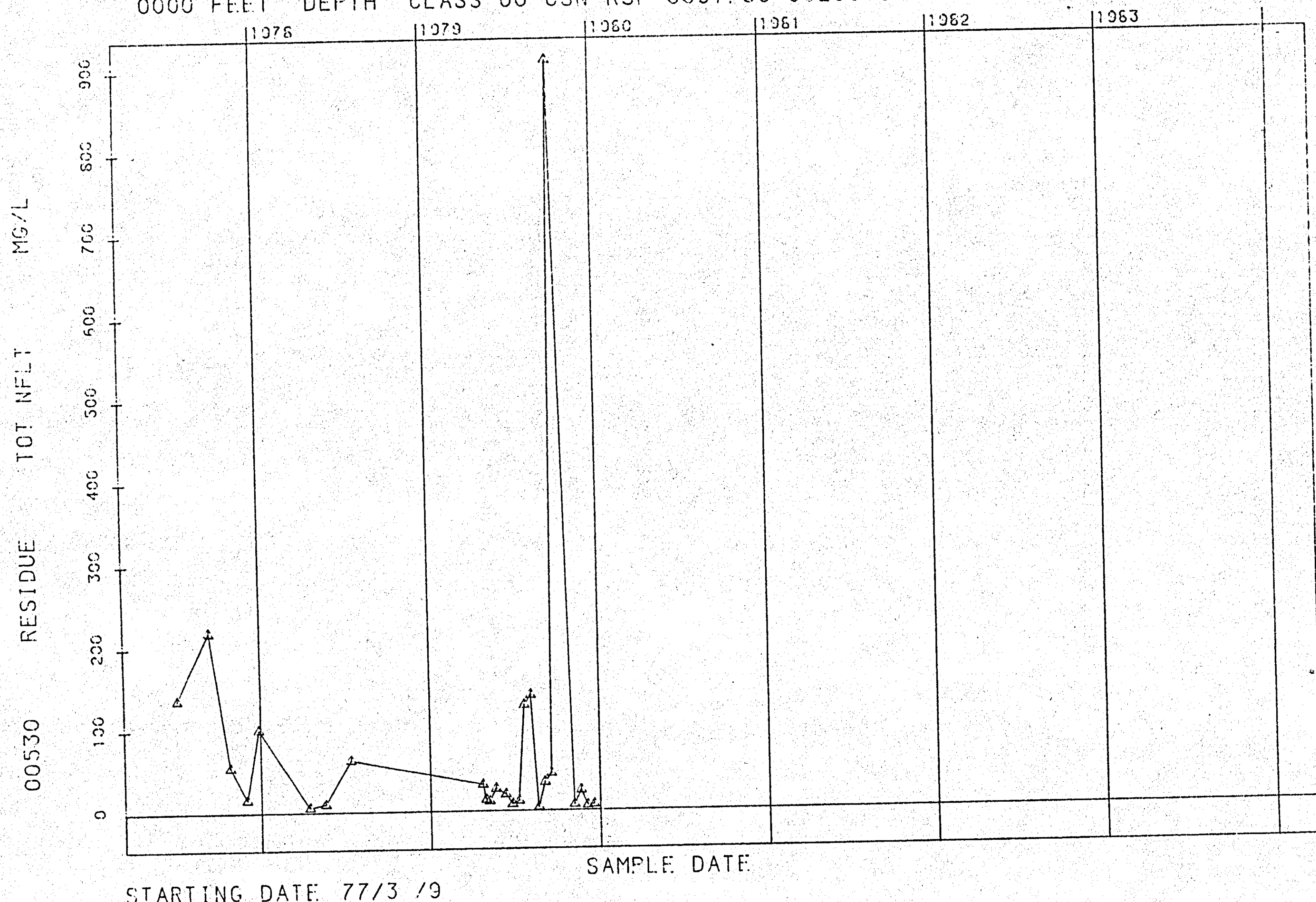
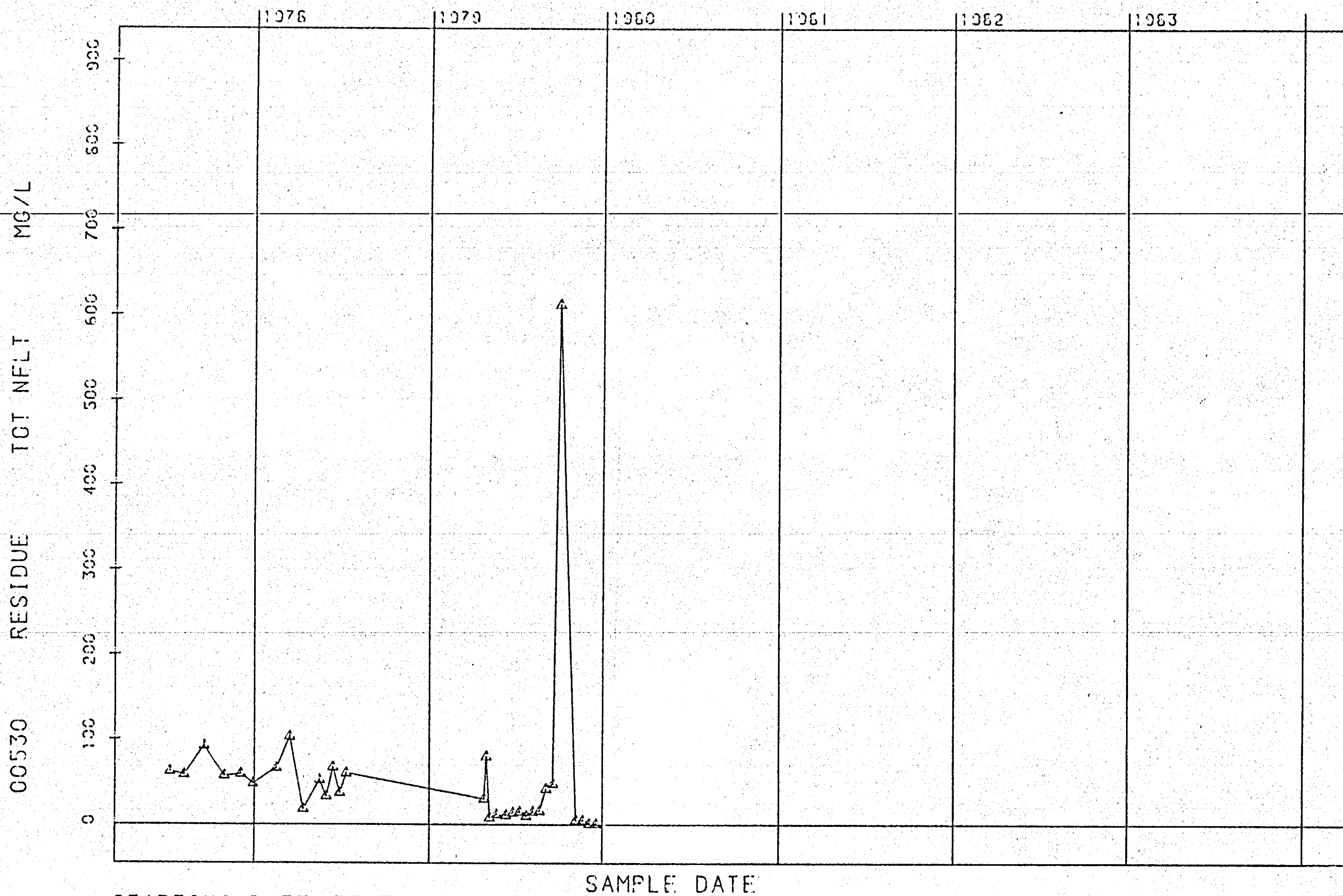


Figure IV-20.

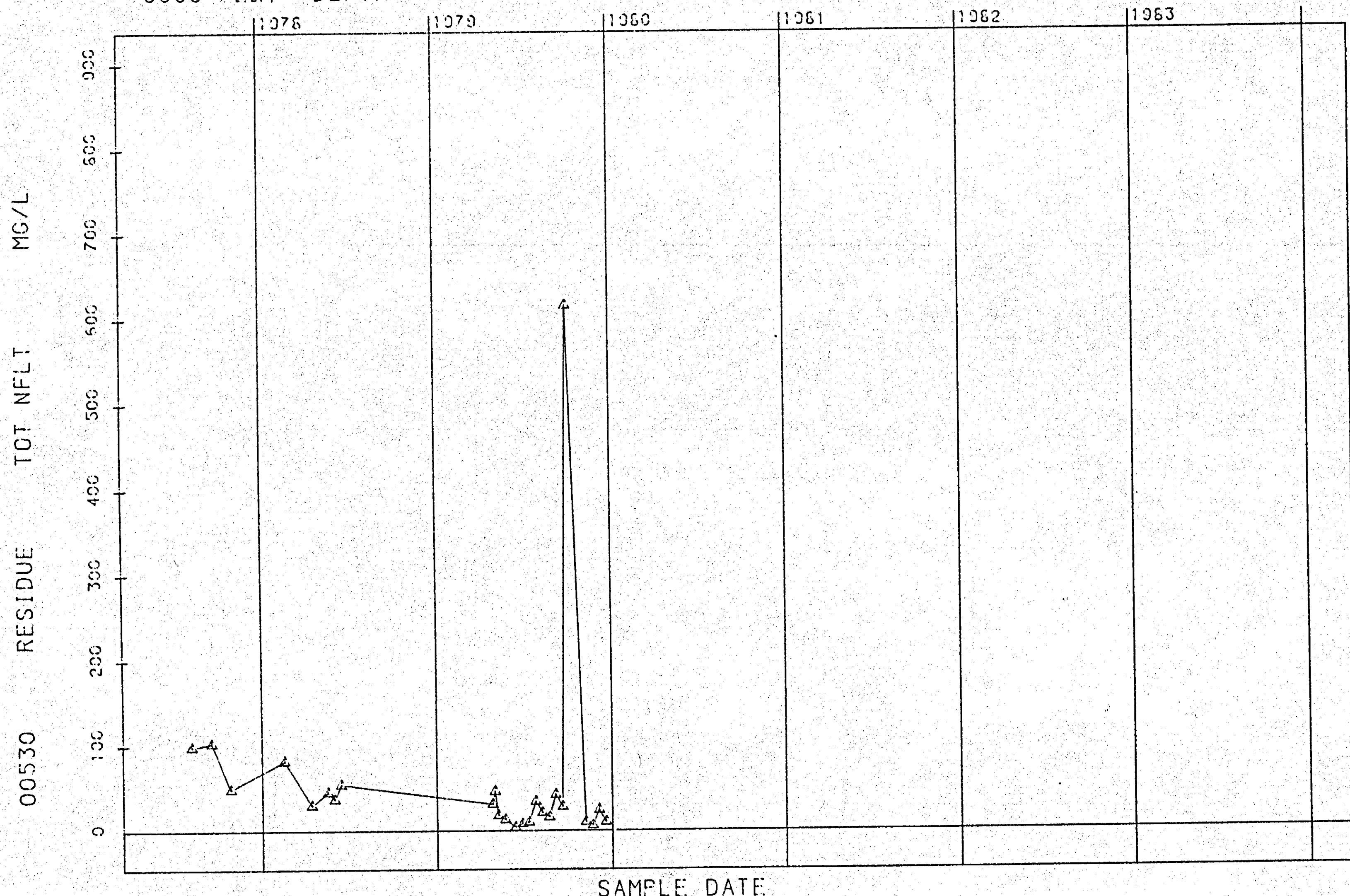
460A07
44 25 59.0 096 58 59.0 2
W OAKWOOD E SHORE T111N R51W SEC 8
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810516
0000 FEET DEPTH CLASS 00 CSN-RSP 0591791-0620069



STARTING DATE 77/3 /9

Figure IV-21.

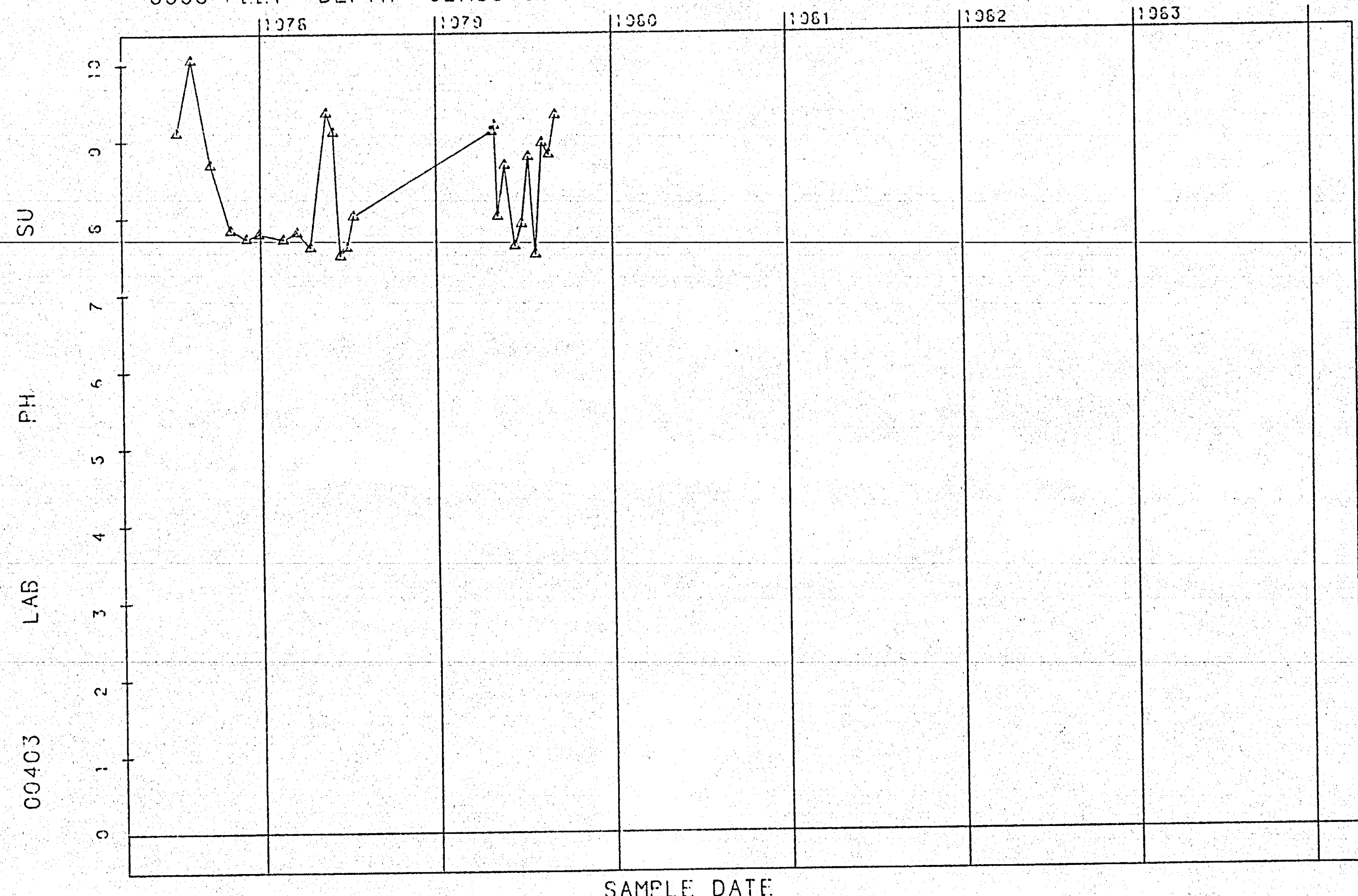
460A08
44 27 25.0 097 00 27.0 2
W OAKWOOD SWIMMING BEACH DOCK T112N R51W SEC 31/
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810516
0000 FEET DEPTH CLASS 00 CSN-RSP 0591792-0620070



STARTING DATE 77/3 /9

Figure IV-22.

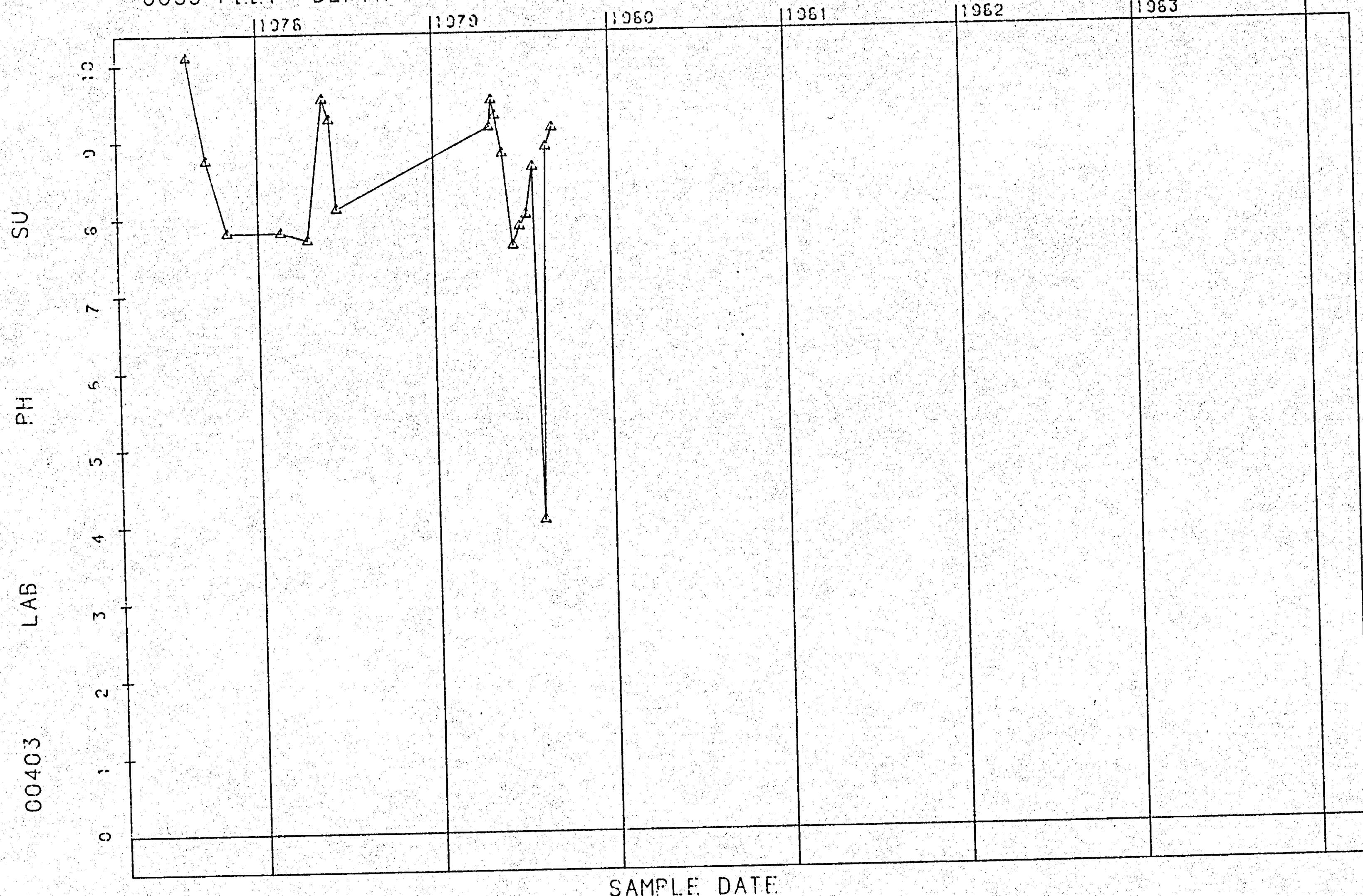
460A07
44 25 59.0 096 58 59.0 2
W OAKWOOD E SHORE T111N R51W SEC 8
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810516
0000 FEET DEPTH CLASS 00 CSN-RSP 0591791-0620069



STARTING DATE 77/3 /9

460A08
44 27 25.0 097 00 27.0 2
W OAKWOOD SWIMMING BEACH DOCK T112N R51W SEC 31/
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810516
0000 FEET DEPTH CLASS 00 CSN-RSP 0591792-0620070

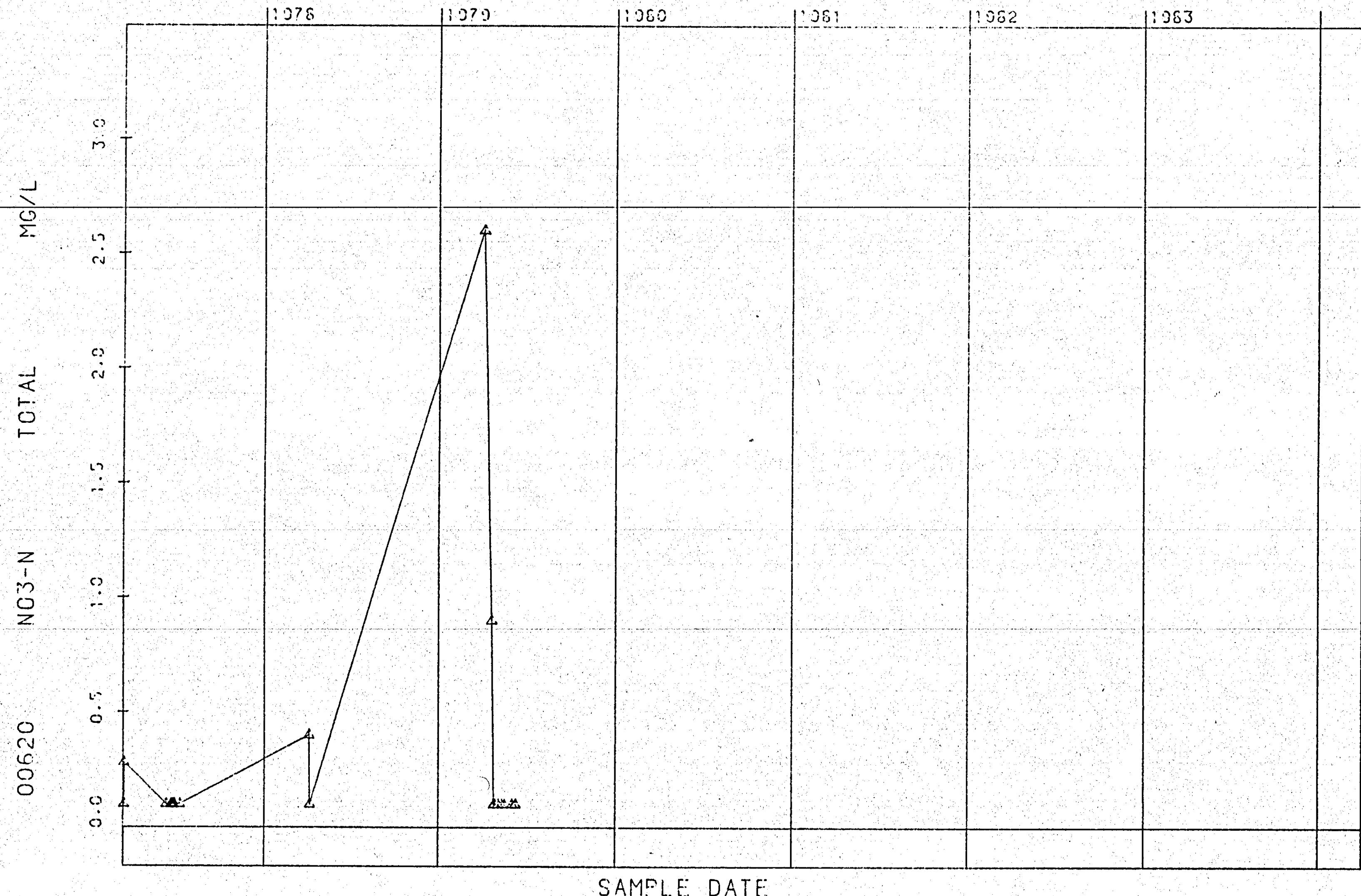
Figure IV-23.



STARTING DATE 77/3 /9

Figure IV-24.

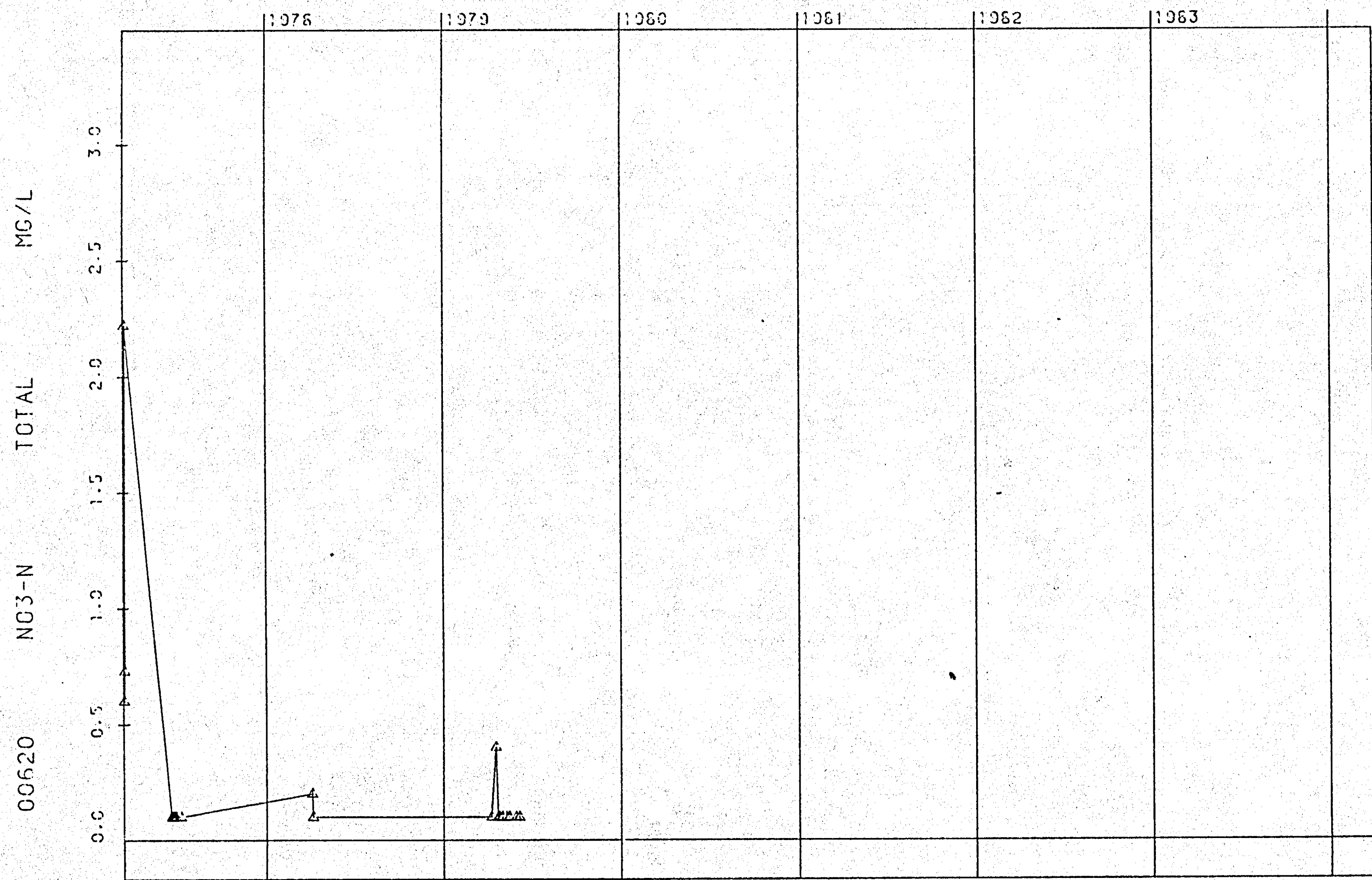
460A01
44 28 12.0 096 59 10.0 2
OAKWOOD LK/N MORTIMER SLOUGH T112N R51W S 29/32
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 820109
0000 FEET DEPTH CLASS 00 CSN-RSP 0642857 0653614



STARTING DATE 77/3 /9

Figure IV-25.

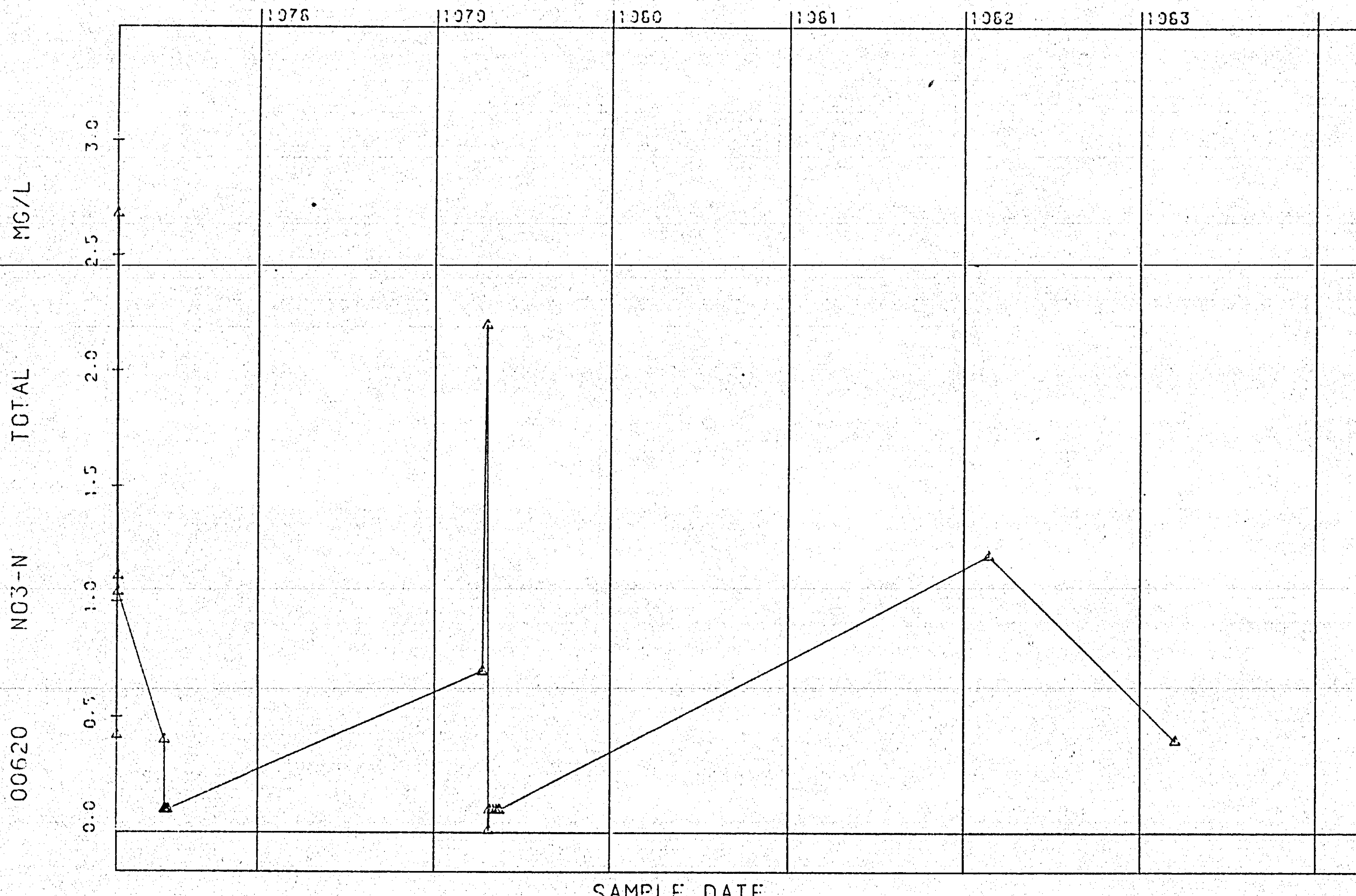
460A02
44 28 12.0 096 59 43.0 2
OAKWOOD LK/N MORTIMER SLOUGH T112N R51N S 30/31
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 820109
0000 FEET DEPTH CLASS 00 CSN-RSP 0642858-0653615



STARTING DATE 77/3 /9

Figure IV-26.

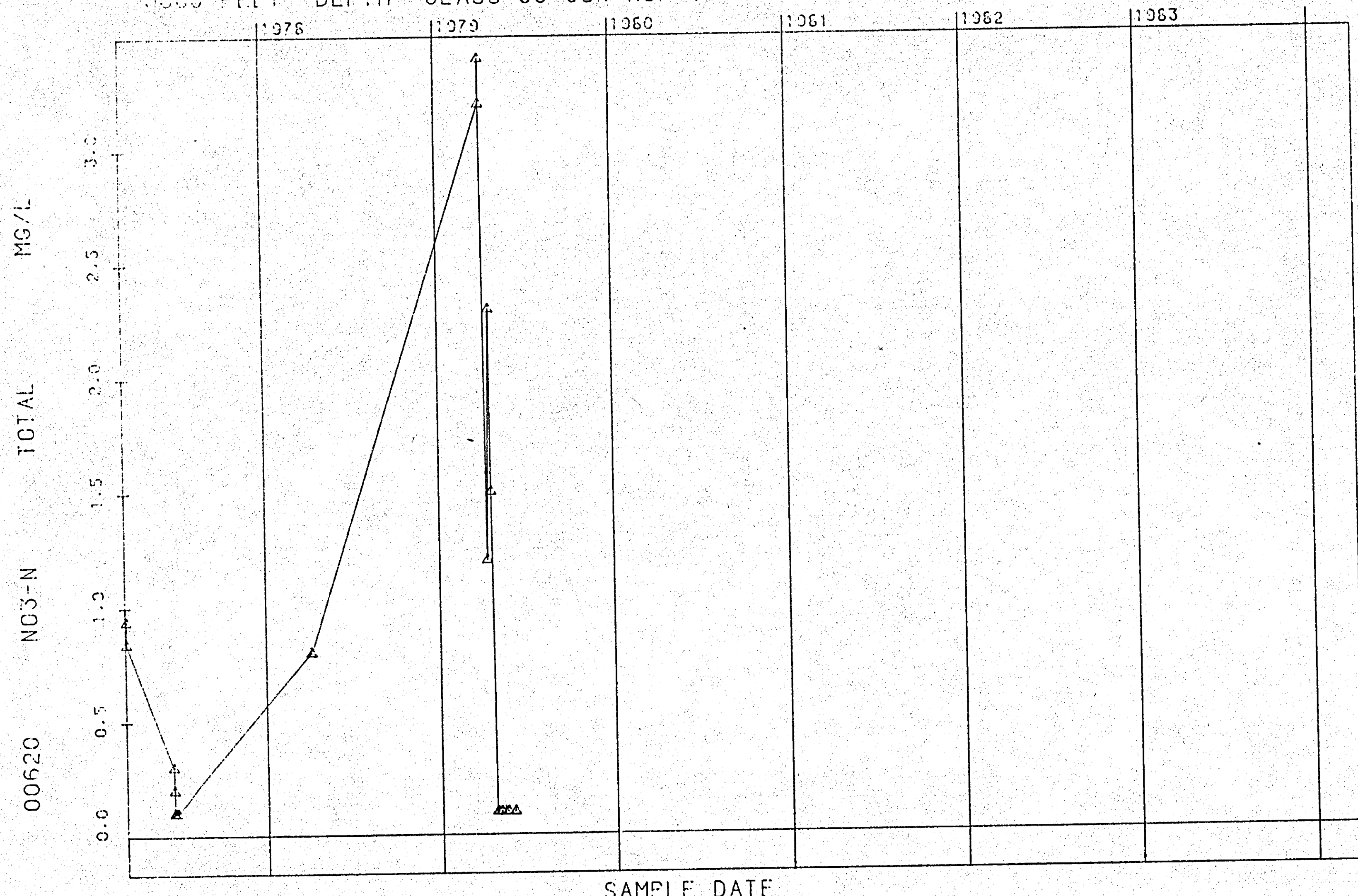
460A03
44 27 23.0 097 01 39.0 2
OAKWOOD LK/W TRIB T111/112N R52W SEC 35/36/2/1
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 820109
0000 FEET DEPTH CLASS 00 CSN-RSP 0642859-0653616



STARTING DATE 77/3 /9

460A04
44 26 30.0 097 01 00.0 2
OAKWOOD LK/S JOHNSON T111N R52W SEC1/12
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 820109
0000 FEET DEPTH CLASS 00 CSN-RSP 0642860-0653617

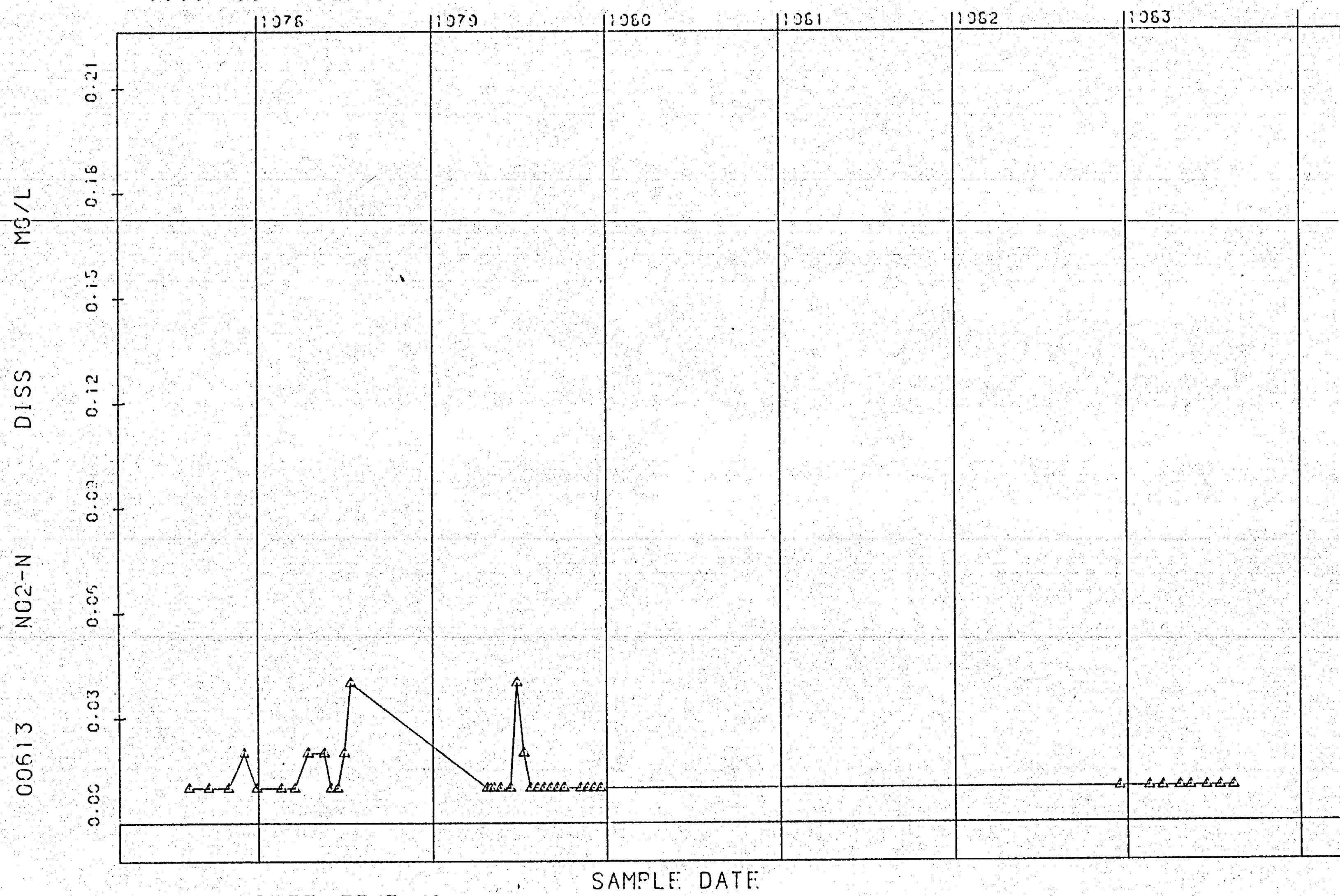
Figure IV-27.



STARTING DATE 77/3 /9

Figure IV-28.

460A05
44 25 36.0 096 57 35.0 2
E OAKWOOD AT S BOAT RAMP T111N R51W SEC 16
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810516
0000 FEET DEPTH CLASS 00 CSN-RSP 0591789-0620067



STARTING DATE 77/3 /9

460A06
44 26 38.0 096 58 41.0 2
E OAKWOOD W SHORE T111N R51W SEC 5
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810516
0000 FEET DEPTH CLASS 00 CSN-RSP 0591790-0620068

Figure IV-29.

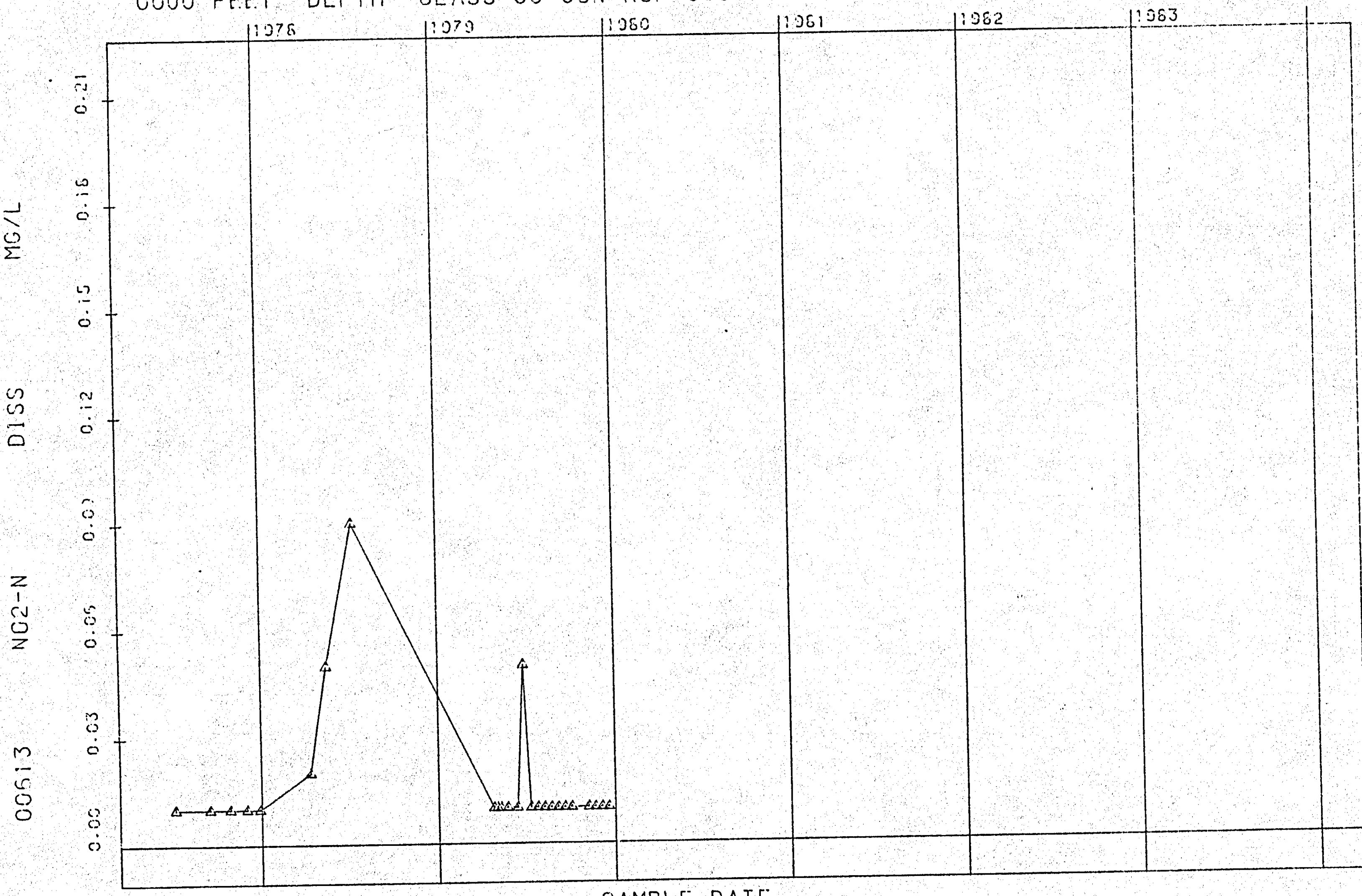


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Figure IV-30.

460A07
44 25 59.0 096 58 59.0 2
W OAKWOOD E SHORE T111N R51W SEC 8
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810516
0000 FEET DEPTH CLASS 00 CSN-RSP 0591791-0620069

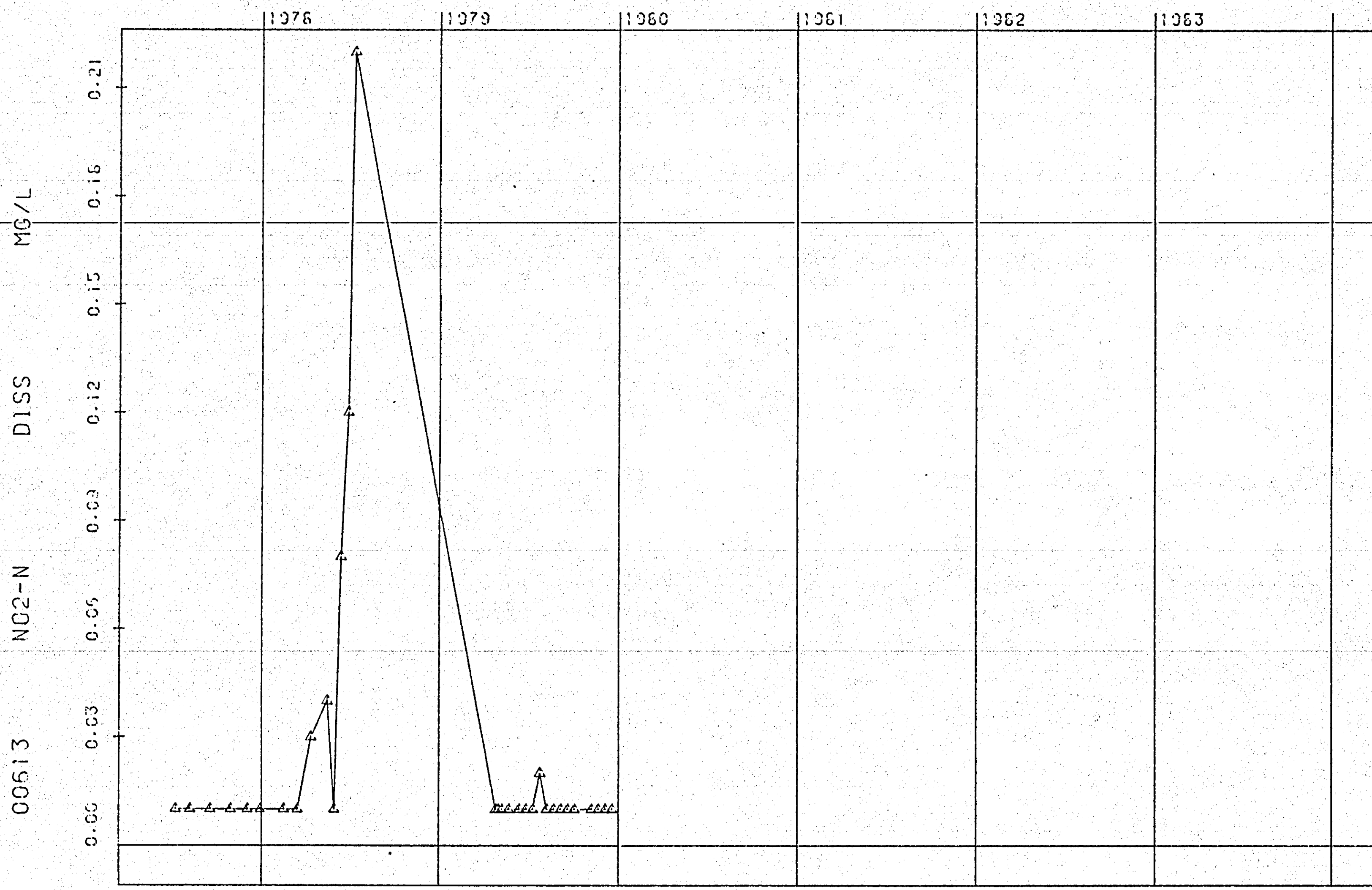

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Figure IV-31.

460A08
44 27 25.0 097 00 27.0 2
W OAKWOOD SWIMMING BEACH DOCK T112N R51W SEC 31/
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810516
0000 FEET DEPTH CLASS 00 CSN-RSP 0591792-0620070

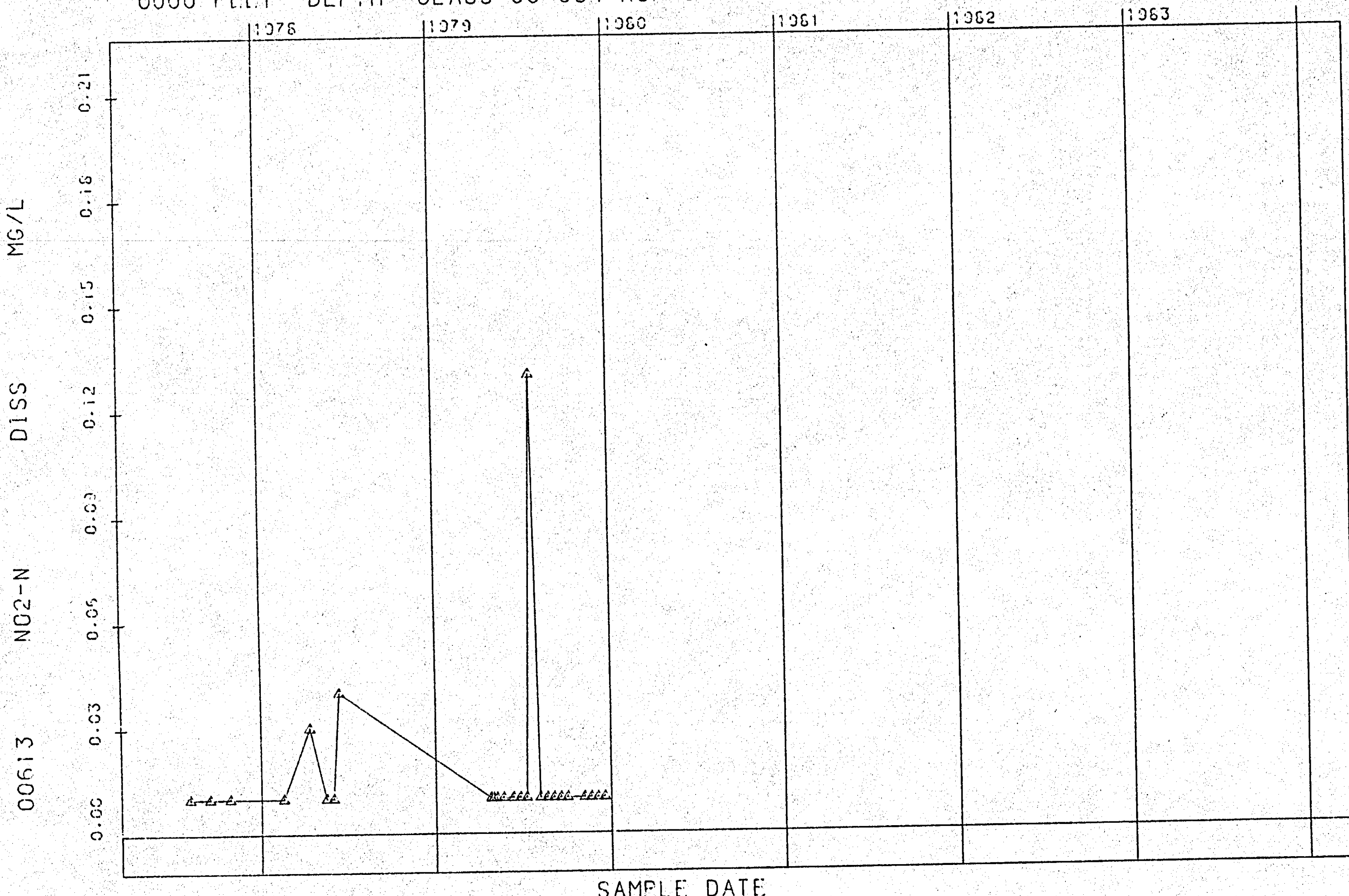

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Figure IV-32.

460A01
44 28 12.0 096 59 10.0 2
OAKWOOD LK/N MORTIMER SLOUGH T112N R51W S 29/32
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 820109
0000 FEET DEPTH CLASS 00 CSN-RSP 0642857 0653614

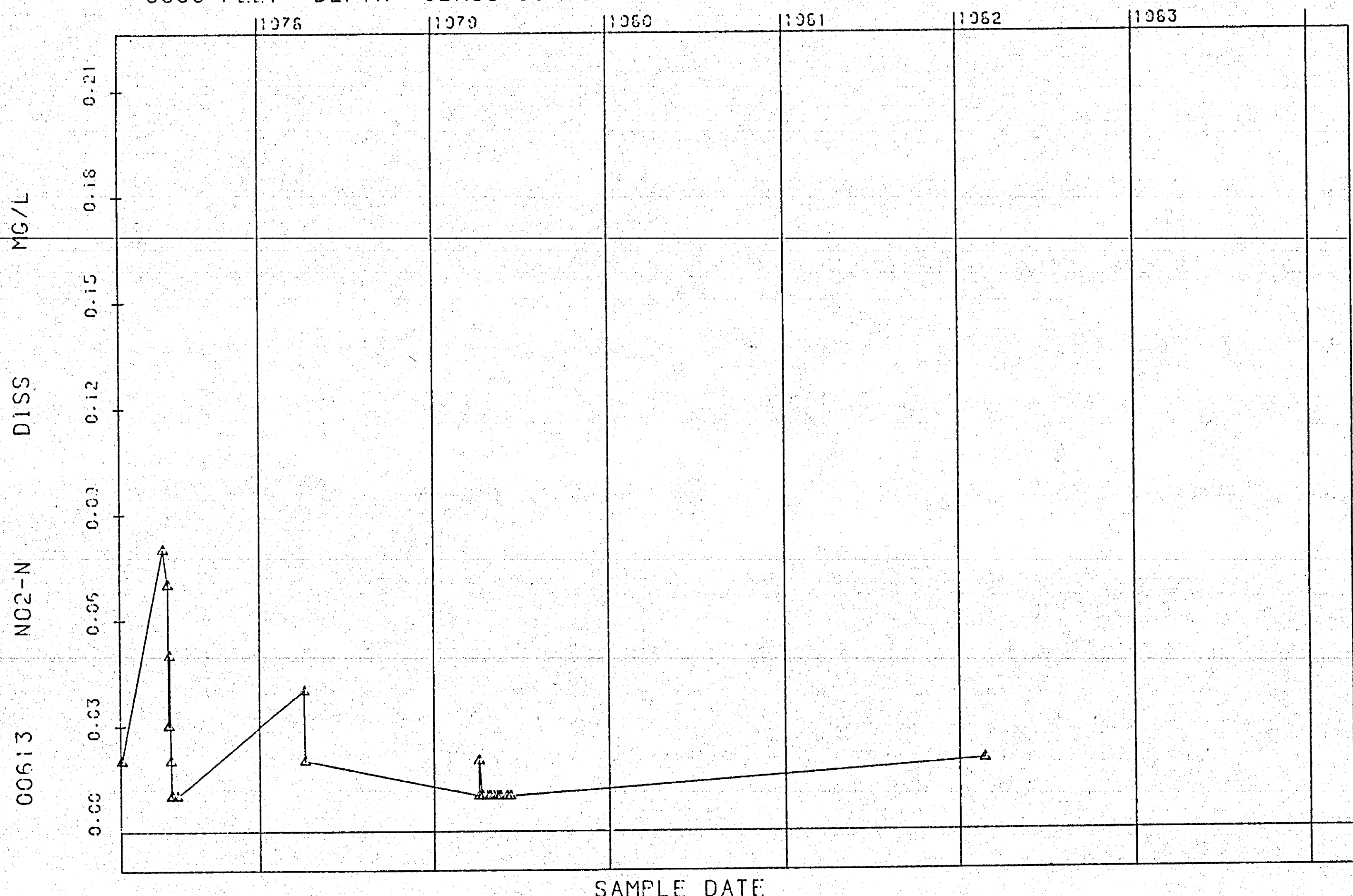

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Figure IV-33.

460A02
44 28 12.0 096 59 43.0 2
OAKWOOD LK/N MORTIMER SLOUGH T112N R51N S 30/31
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 820109
0000 FEET DEPTH CLASS 00 CSN-RSP 0642858-0653615

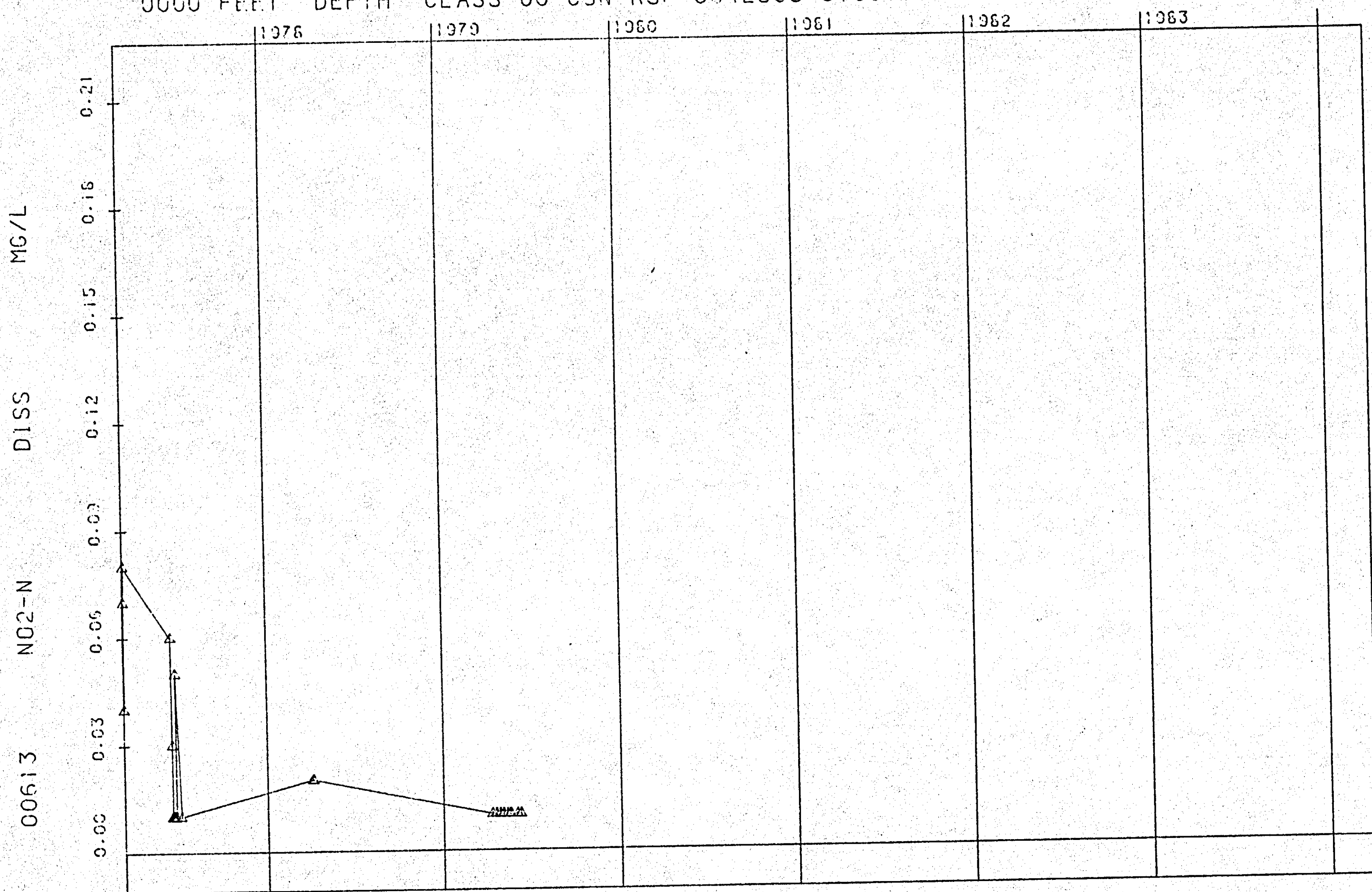

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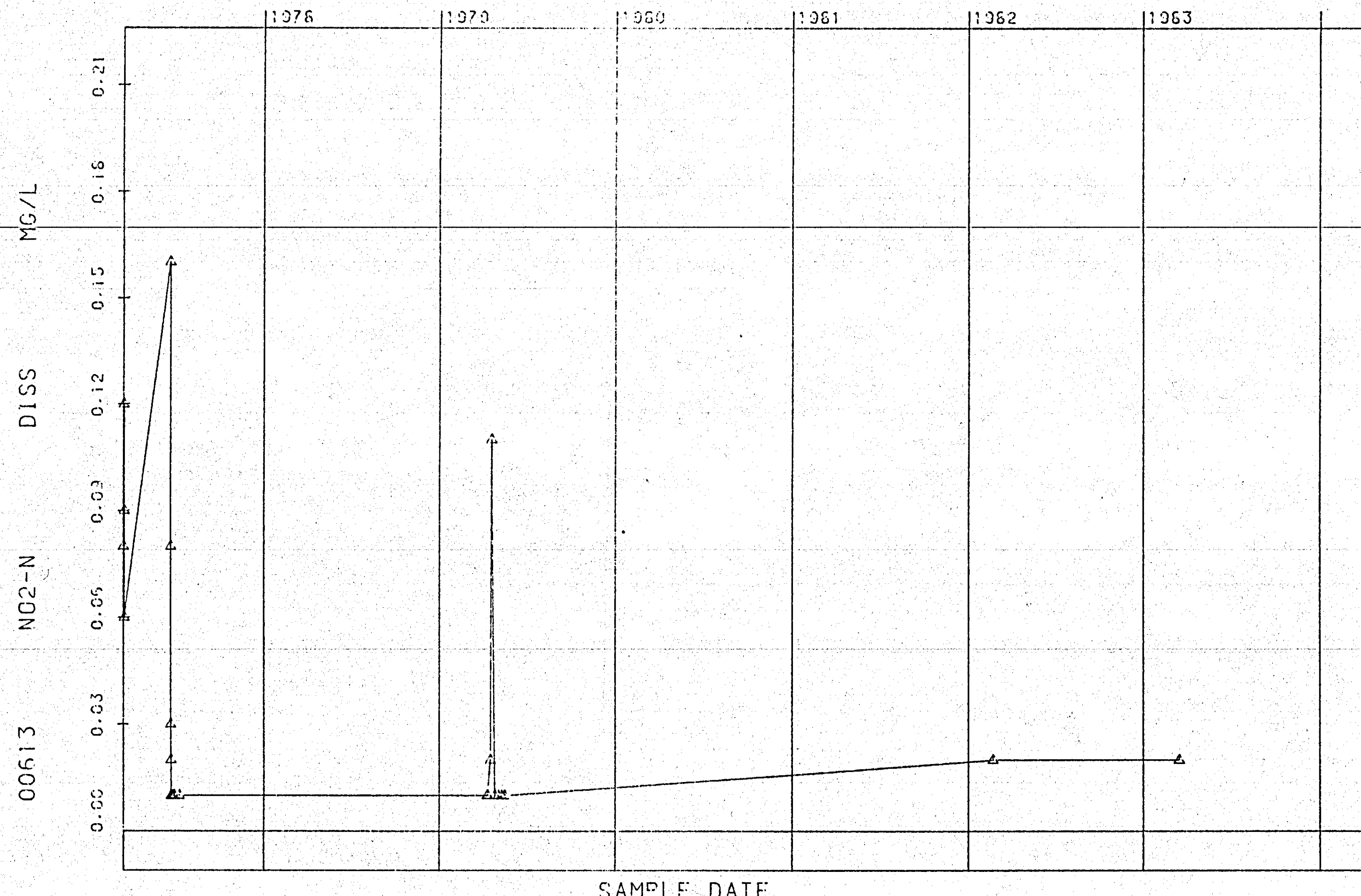
Figure IV-34.

460A03
44 27 23.0 097 01 39.0 2
OAKWOOD LK/W TRIB T111/112N R52W SEC 35/36/2/1
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 820109
0000 FEET DEPTH CLASS 00 CSN-RSP 0642859-0653616



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460A04
44 26 30.0 097 01 00.0 2
OAKWOOD LK/S JOHNSON T111N R52W SEC1/12
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 820109
0000 FEET DEPTH CLASS 00 CSN-RSP 0642860-0653617

Figure IV-35.

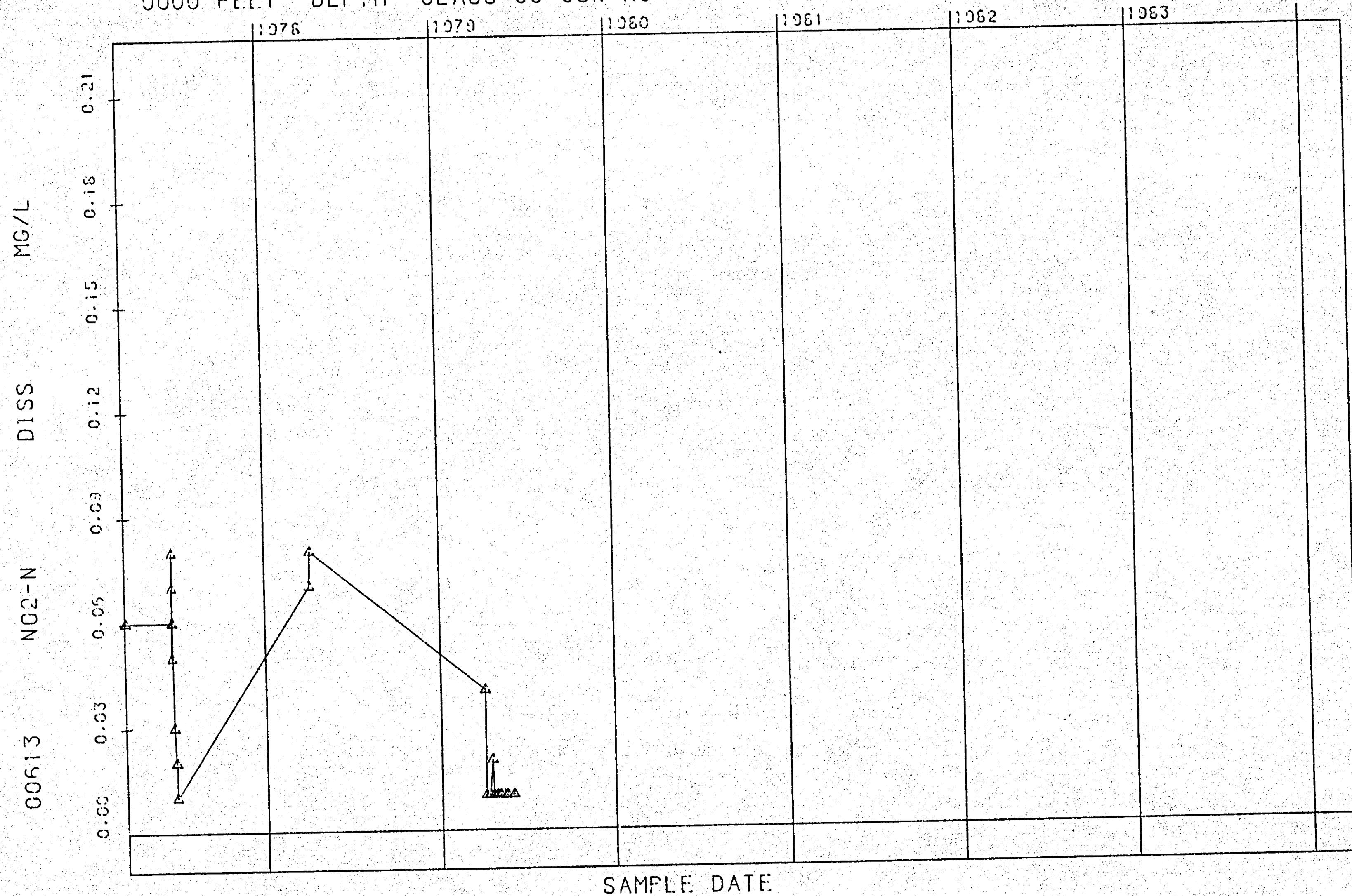

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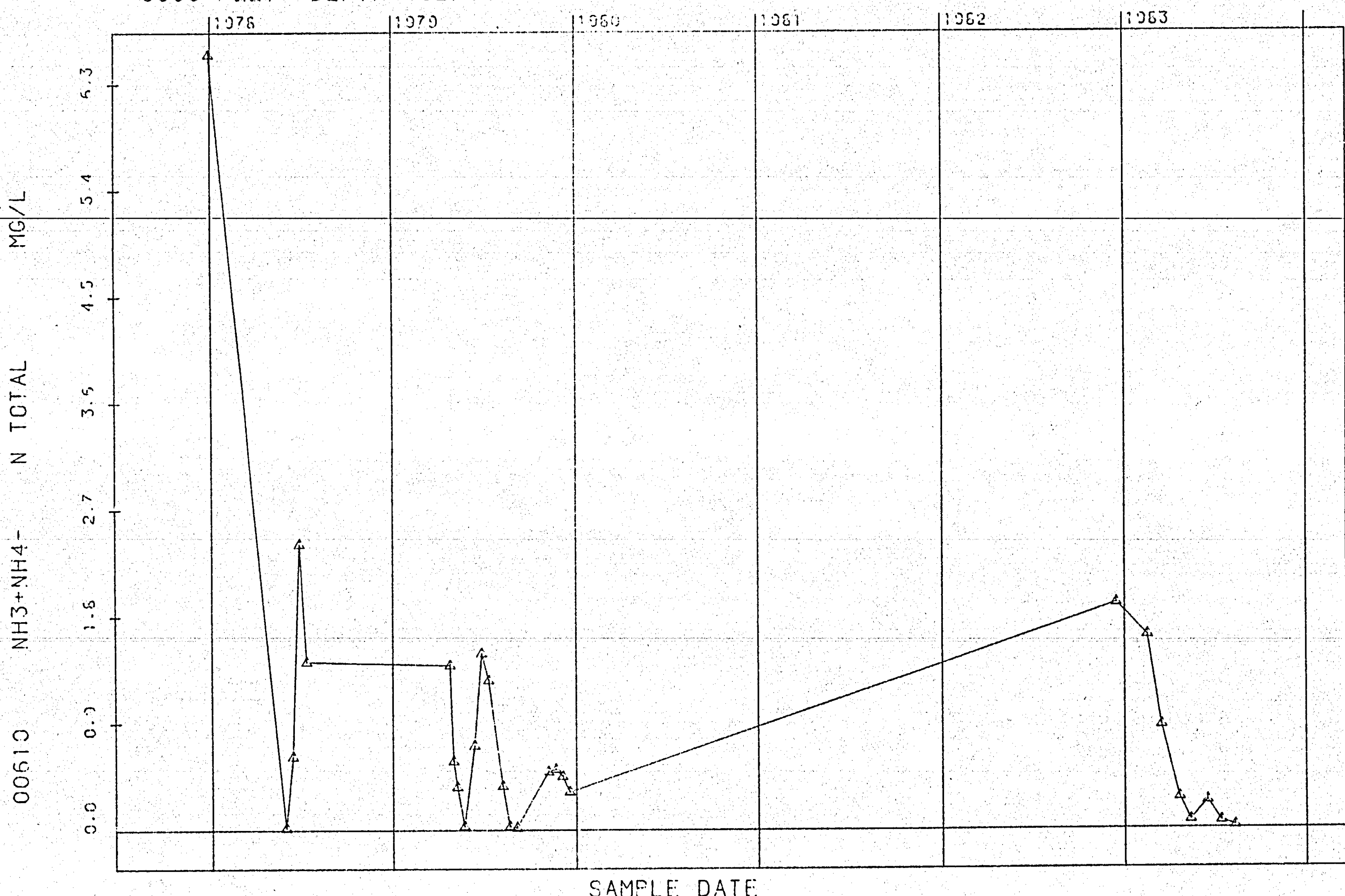
Figure IV-36.

460A05
44 25 36.0 096 57 35.0 2
E OAKWOOD AT S BOAT RAMP T111N R51W SEC 16
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810516
0000 FEET DEPTH CLASS 00 CSN-RSP 0591789-0620067



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460A06
44 26 38.0 096 58 41.0 2
E OAKWOOD W SHORE T111N R51W SEC 5
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810516
0000 FEET DEPTH CLASS 00 CSN-RSP 0591790-0620068

Figure IV-37.

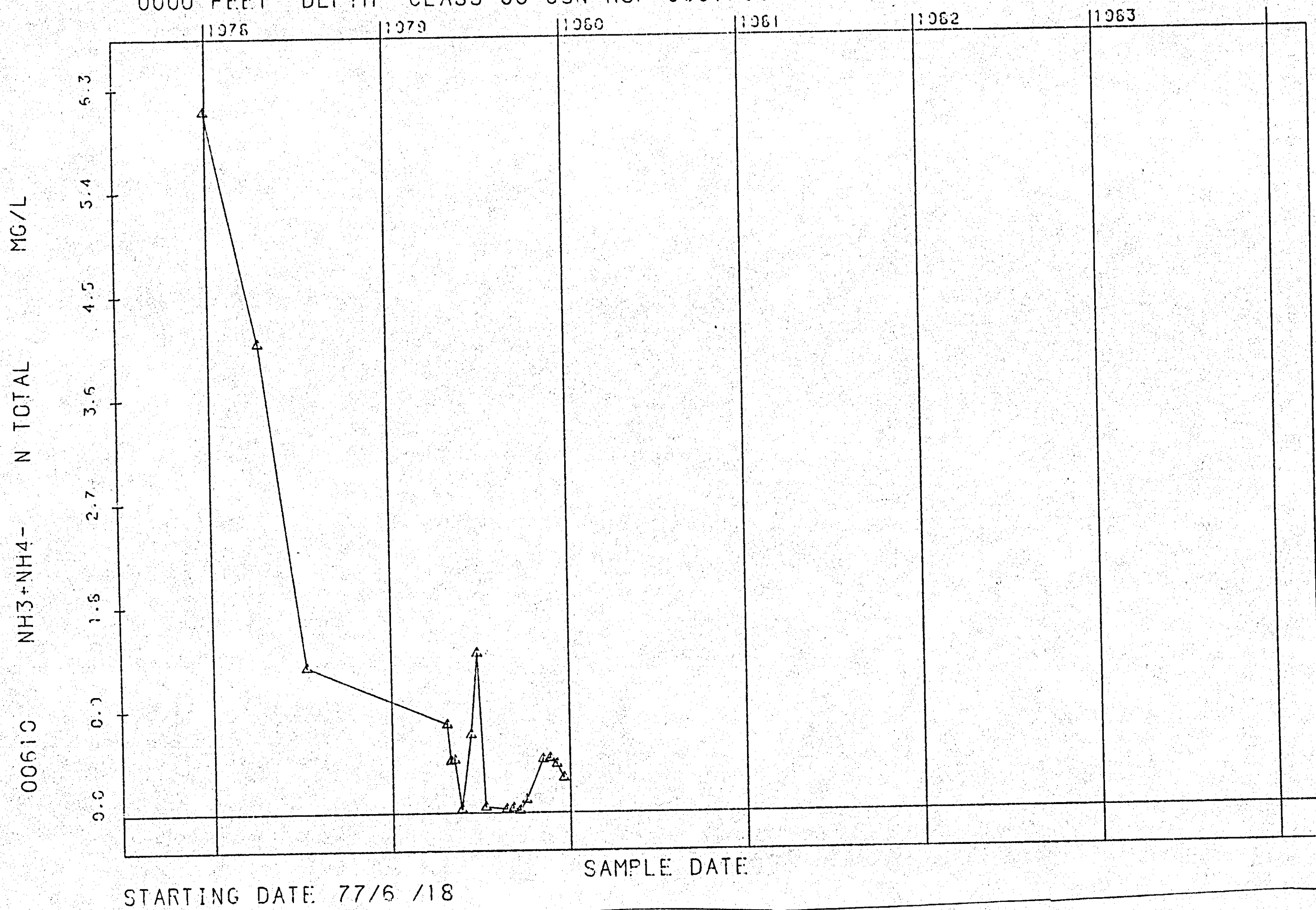

Figure IV-38.

460A07
44 25 59.0 096 58 59.0 2
W OAKWOOD E SHORE T111N R51W SEC 8
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810516
0000 FEET DEPTH CLASS 00 CSN-RSP 0591791-0620069

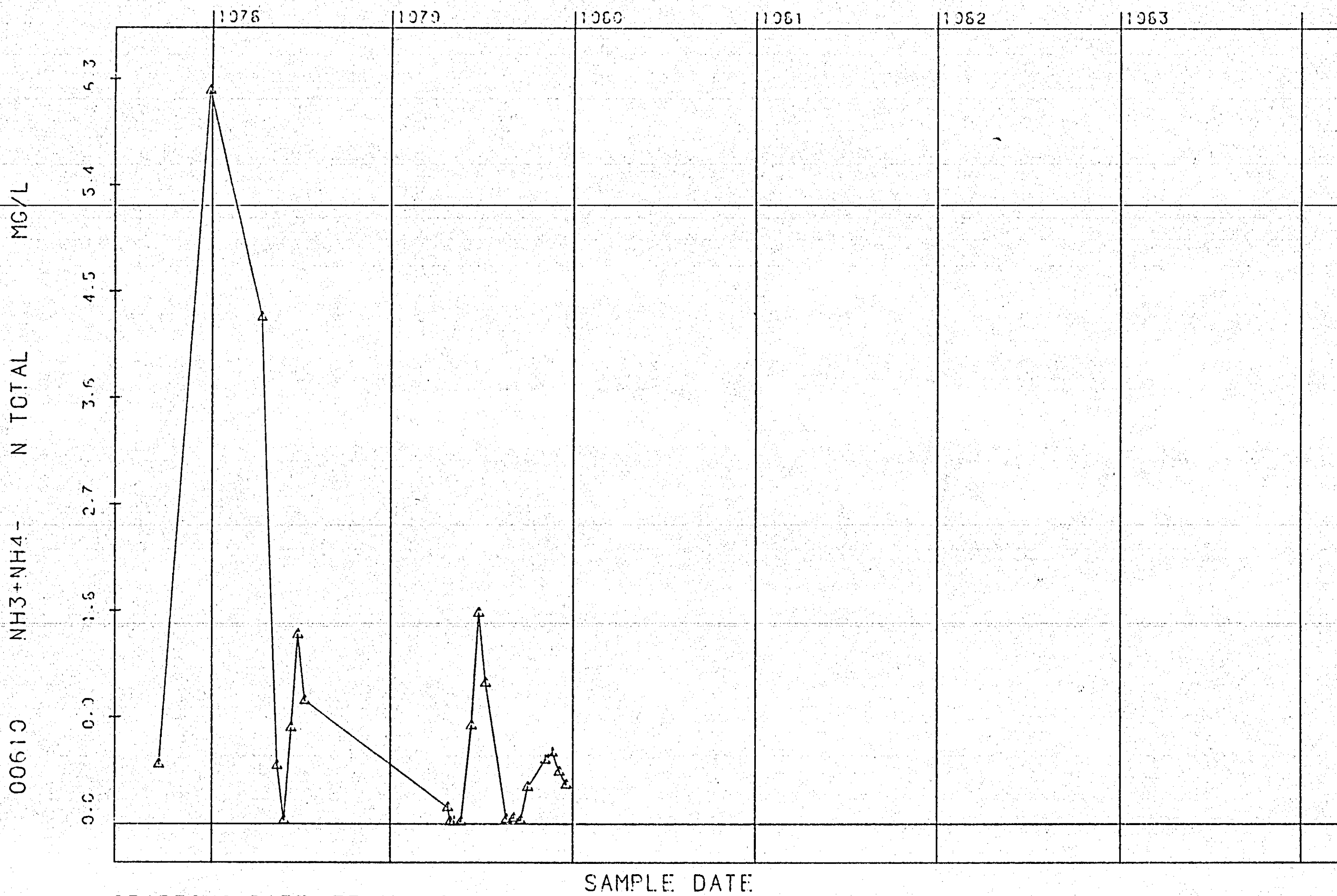

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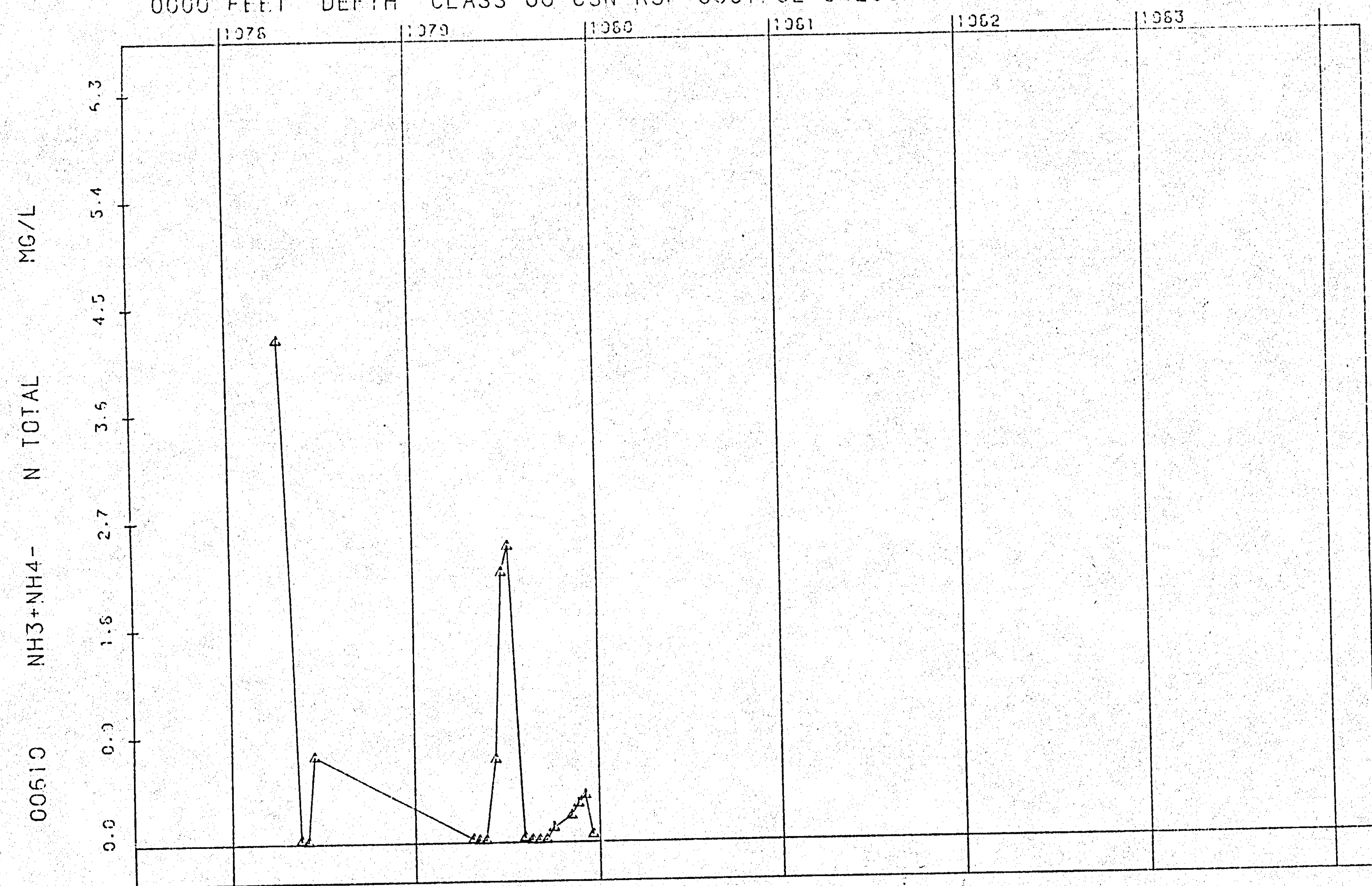
Figure IV-39.

460A08
44 27 25.0 097 00 27.0 2
W OAKWOOD SWIMMING BEACH DOCK T112N R51W SEC 31/
46011 SOUTH DAKOTA BROOKINGS
MISSOURI RIVER 090700
BIG SIOUX RIVER
21SDLAKE 810516
0000 FEET DEPTH CLASS 00 CSN-RSP 0591792-0620070



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