STATE OF NEW HAMPSHIRE

INTER-DEPARTMENT COMMUNICATION

Judy

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

DATE: December 1, 1995 Moved to public file per DOJ/Amy Mills. MM 1.25.02

AT(OFFICE): Waste Management Engineering Bureau

FROM: John Cotton, Hydrogeologist
Permit Application & Design Review Section
Waste Management Engineering Bureau
through John Regan, Supervisor JMR 12-1-95
Groundwater Remediation & Permits Section
Groundwater Protection Bureau

CONFIDENTIAL

SUBJECT: **Bethlehem - North Country Environmental Services Landfill: Technical Reply to Letter from Nick Mike to Governor Stephen Merrill**

TO: Pamela H. Sprague, Supervisor
Permit Application & Design Review Section
Waste Management Engineering Bureau

12-04-95

Richard S. Reed, Supervisor
Solid Waste Compliance Section
Waste Management Compliance Bureau

I have reviewed the letter (dated 9/26/95) from Mr. Nick Mike to Governor Merrill in which he makes two allegations. The first allegation is that "a private landfill has been illegally spewing a stream of toxic wastes into the Ammonoosuc River." The landfill referred to is owned by North Country Environmental Services (NCES). The second allegation is that the Department of Environmental Services "refuses to act" in a responsible manner to the first allegation. The following discussion responds to both allegations. I respond first to the second allegation.

1. Department of Environmental Services' Actions

The Department of Environmental Services (Department) regulates facilities such as NCES with a family of permits. Both allegations are apparently based on the occurrence of volatile organic compounds (VOCs) in groundwater beneath one part of the subject property. (Mr. Mike enclosed with his letter bar graphs showing the concentrations of specific VOCs in three monitoring wells.) The Permit pertaining to groundwater protection for this site is comprised of two parts:

a. A groundwater release detection monitoring permit exists for the double lined landfill which includes monitoring for regulated constituents that might be inadvertently released to groundwater. Monitoring wells (400 series) have been constructed and routinely sampled for this purpose since 1987.

b. A groundwater management permit exists for the former unlined and single lined landfills (both were completely removed by October 1993), which includes monitoring for regulated constituents that have caused and continue to cause a violation of the groundwater quality criteria of the Groundwater Protection Rules (Env-Ws 410.03). A separate series of monitoring wells (100 series) have been constructed and routinely sampled for this purpose since 1984. A natural spring (known as the Seep), located about 800 feet down hydraulic gradient from the former unlined landfill, has also been routinely sampled since 1984.

Another component of the groundwater management permit is the establishment of a Groundwater Management Zone (GMZ). This zone includes the subsurface volume in which groundwater contamination (associated with the former release of regulated contaminants from the unlined and single lined landfills) is contained. The requirement for a GMZ was included in the updated rules adopted in February 1993, and was included as a condition in the revised Permit (dated 4/18/95) for this site. Documentation supporting the delineation for this GMZ was received by the Department on 9/1/95. The Department has approved the GMZ and this approval will be formalized in a revised permit which will be issued in early December.

The GMZ is temporary and will remain in effect until the remedial action (the removal of the source of the contamination) and natural flushing of the groundwater system results in improved groundwater quality which meets Ambient Groundwater Quality Standards (AGQS). When AGQS are achieved the groundwater management permit will no longer be needed, but the site will be monitored with the groundwater release detection permit to ensure that any potential future release from the double lined landfill is detected.

Significant concentrations of VOCs in groundwater have been limited to water taken from monitoring wells in the 100 series and water samples from the Seep (i.e. the sites in the network that monitor contaminated water from the former unlined and single lined landfills). The graphs (see Group 1 Figures) that Mr. Mike included with his letter show concentrations with time of specific VOCs from three wells in this 100 series. (Note that the last value in each graph is dated 9/9/94, but should be dated 7/8/94.)

The Department's concern about contaminated groundwater as measured in the 100 series wells led to the removal of the waste in the unlined and single lined landfills and placement of that waste in Stage I of the doubled lined landfill. This was a condition of the Stage II Solid Waste Permit for the expansion of doubled lined landfill operations. The relocation of refuse began on December 1991 and was completed in October 1993.

The concentrations of total VOCs in the 100 series wells generally began to increase in the time period from about October 1992 to April 1993, and continued to increase through July 1994. Concerned over these increases, the Department conducted a detailed review of the hydrogeology of the site and all water quality information in the fall of 1994.

Based on groundwater flow data, the Department concluded that impacts to groundwater quality in the vicinity of the 100-series monitoring wells and Seep were not unexpected. These sampling sites are downgradient from the waste removal operations. The removal of the waste material during relocation resulted in disturbance of the waste. Further, the excavation of waste temporarily resulted in increased infiltration of precipitation into the remaining waste mass, resulting in short-term generation of additional leachate.

In a November 14, 1994, letter to NCES, the Department concluded "from our review of the water quality data that the former unlined and single lined landfill areas are the source of the recent increases in contaminant concentrations detected in some of the wells ('100' series and MW-406U) and the Seep. The landfill wastes, which constituted the 'source', have been removed from these areas and placed in the double lined landfill. The soil sampling performed after the landfill areas were excavated did not detect significant contamination. The Department's experience at other 'source' removal projects has been that a short term release of contaminants occurs during the excavation of the source material. The increase in contaminant concentrations at these sites were shown to be a short term occurrence. The Department expects that contaminant concentrations in the wells and the seep will ultimately decrease with time, but future monitoring will determine the actual water quality trends." These conclusions were also presented by Department staff at a public meeting in Bethlehem on December 12, 1994. Mr. Mike attended that meeting.

During the last twelve months, analytical results of four regular sampling rounds, from November 1994 to November 1995, as required by the Groundwater Permit, **have shown that VOC concentrations in the 100 series wells and the Seep have consistently decreased**. The graphs submitted by Mr. Mike have been updated to include these results (see Group 1 Figures). In addition, time plots of <u>total</u> VOC concentrations for all the 100 series wells are included as Group 2 Figures. Concentrations of total VOCs in all wells have decreased dramatically since July 1994. Groundwater quality has improved as expected, and the Permit will continue to monitor the performance of the source removal until groundwater quality meets AGQS.

In summary, this site has followed the same process as other lined and unlined landfills in the State. The groundwater permits are effectively regulating the landfill impacts to groundwater and surface water quality, and will continue to monitor the site until water quality standards are met. While we share Mr Mike's concern for the environment, we strongly disagree with his statement that the Department refuses to act.

2. VOCs Entering the Ammonoosuc River

No VOCs have been detected in two surveys of the Ammonoosuc River conducted on October 14, 1994 and June 20, 1995 in a reach of the river beginning upstream of the NCES facility and ending at Wing Road Bridge. Five sites were sampled in each of these surveys.

There is a strong inference in Mr. Mike's letter that the concentrations of VOCs detected in the 100 series monitoring wells are the concentrations of VOCs in water discharging to the Ammonoosuc River. While, as discussed above, groundwater quality is a concern and will remain a concern until compliance with AGQS, the water quality in the 100 series wells is not representative of the quality of water directly discharging to the Ammonoosuc River. The monitoring wells are about 1000 feet from the river bank. Much lower concentrations of VOCs to no VOCs occur in groundwater near the river as measured in water, which is discharging to the ground surface along the steep slope above the river.

VOCs in the water from the Seep have been monitored since 1984. Since January 1994, water samples have been analyzed monthly. The Seep is the single significant occurrence of VOCs along the slope face. A time plot of total VOC concentrations for the Seep is included as the Group 3 Figure. This plot shows a similar pattern to the 100 series wells for the increase and decrease of total VOC concentrations.

Previous investigations of other seeps (springs) have shown that the main Seep is the only area of significant VOCs. In September 1984, no VOCs were detected in another small spring about 100 feet easterly of the Seep. No VOCs were detected in this spring in May 1995. A detailed survey in April 1995 along the steep slope above the river located nine other very small springs. Six of the these springs were analyzed for VOCs. No VOCs were detected in four springs, and only 4 and 5 ug/L of 1,1-Dichloroethane (well below the AGQS of 81 ug/L) were detected in two springs.

In summary, the Seep is the significant occurrence of VOCs and only a few VOCs have been detected in Seep water; acetone, MEK and toluene have been the primary ones. MEK has been the only detected VOC above AGQS. These higher values have only occurred after the removal of wastes from the unlined and single lined landfills, and concentrations of MEK have decreased dramatically since June of this year. **Concentrations of MEK were below the detection limit in water sampled in September, October, and November.**

While the water quality at the Seep is a primary concern of the Department, it is not indicative of the quality of water from the Seep area as it drains into the Ammonoosuc River. The Seep is about 200 feet laterally from and about 80 vertical feet higher than the river. As water from the Seep area flows turbulently down the steep slope to the river, VOC concentrations are greatly reduced by aeration. No VOCs were detected in river water on July 13 or November 14, 1995 where the Seep discharge enters the river.

Conservative estimates of the potential impact to the Ammonoosuc River can be made using streamflow measurements from the U. S. Geological Survey gaging station (about 1100 feet upstream from Pierce Bridge) for prior times when higher concentrations of VOCs at the Seep were measured. Even assuming no reduction in VOC concentrations through aeration in water from the Seep before it discharged to the river, any potential VOC impact was very unlikely because of rapid dilution by river water. Nonetheless, the Department is committed to ensuring that groundwater quality continues to improve to meet AGQS, and, consequently, that impact to Seep water and any potential impact to surface water is eliminated over time.

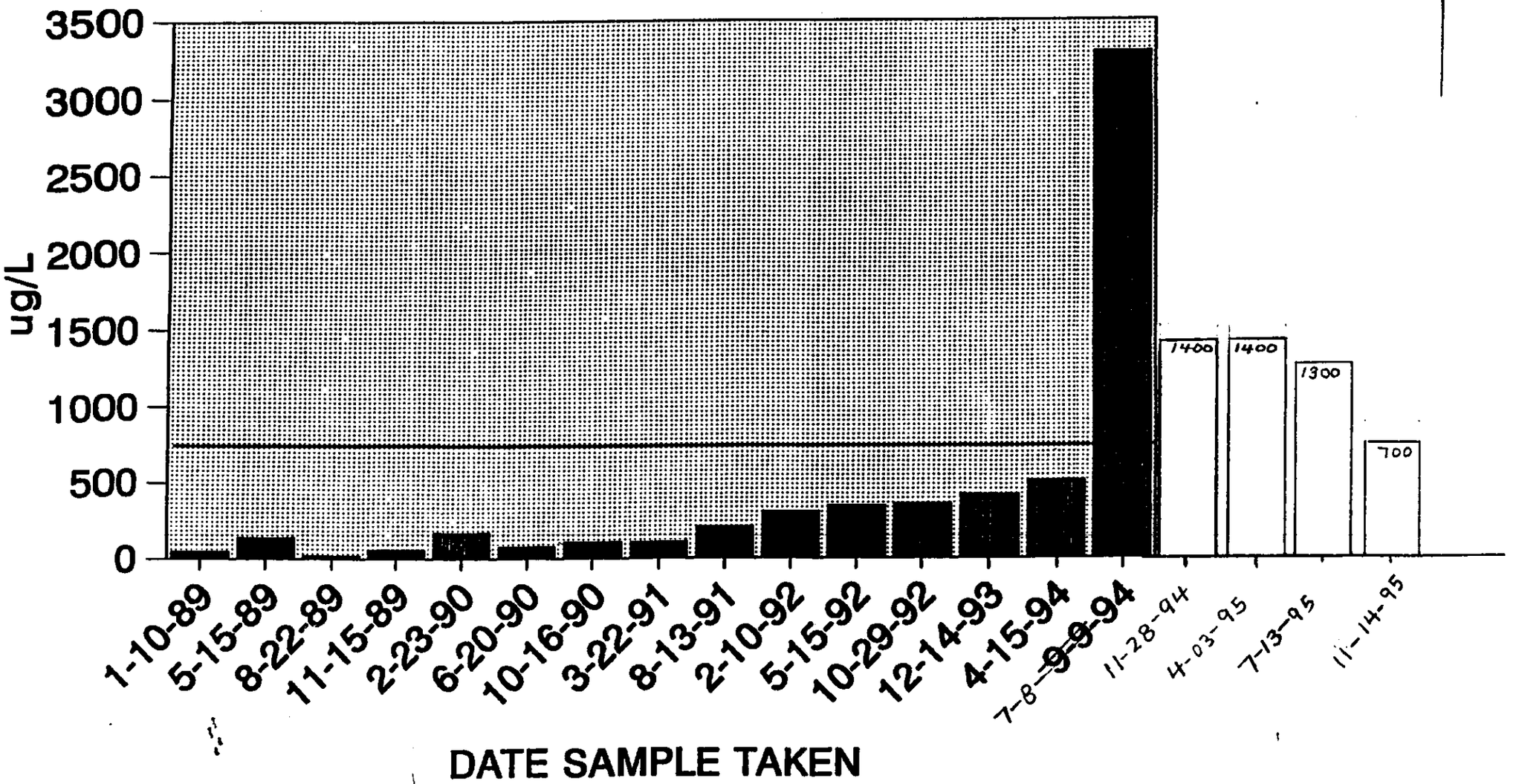
If you have any questions regarding these technical comments please contact me. I understand that there may be a need to "boil down" these comments for incorporation into the response letter to Mr. Mike. I am willing to try to do this after your review of this memo.

cc: Harry T. Stewart, P.E., GPB Administrator
GPB PM File (DES #870433)
PA&DRS File

GROUP 1 FIGURES

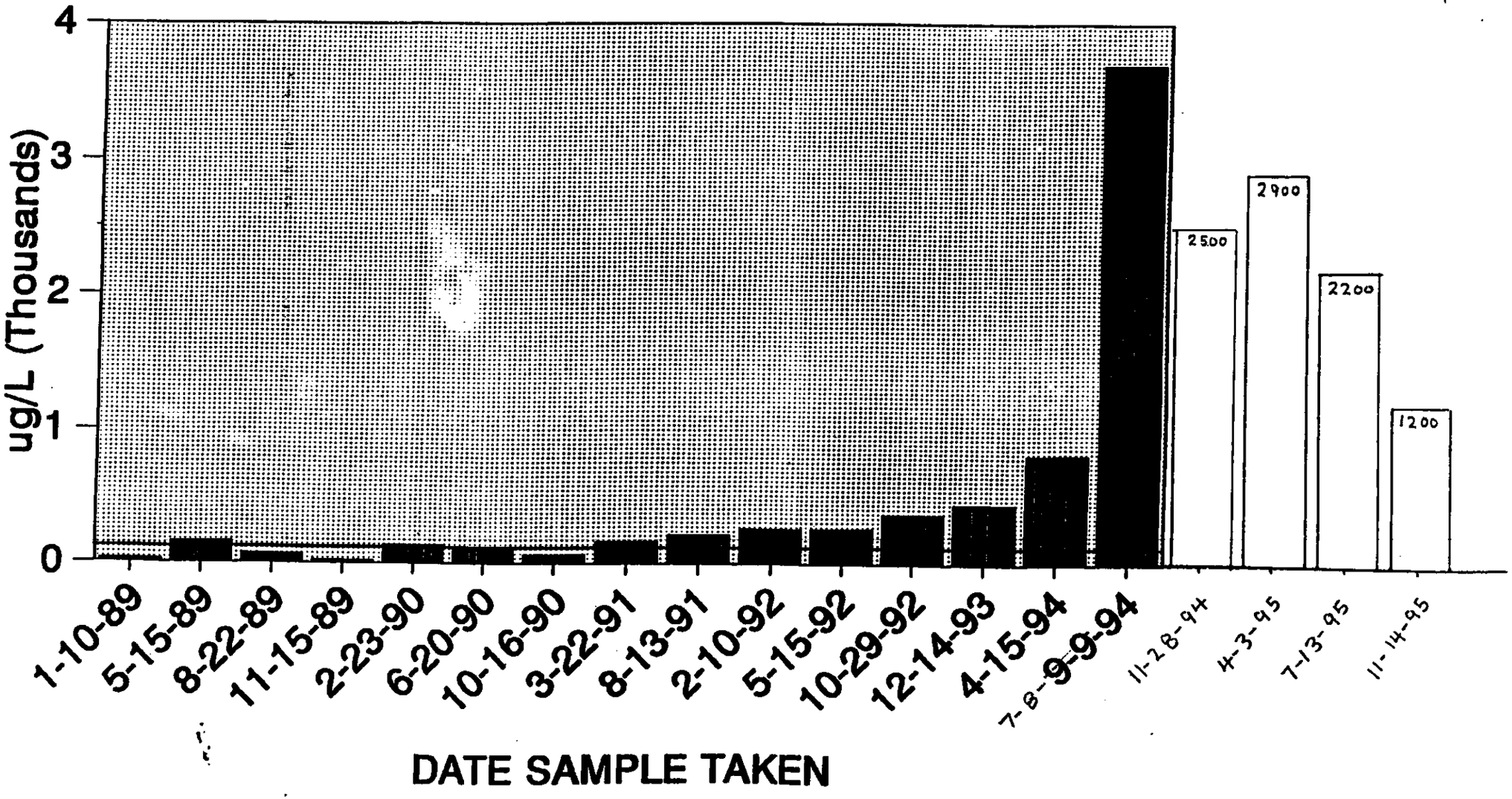
WELL B-101

ACETONE



WELL B-101

MEK



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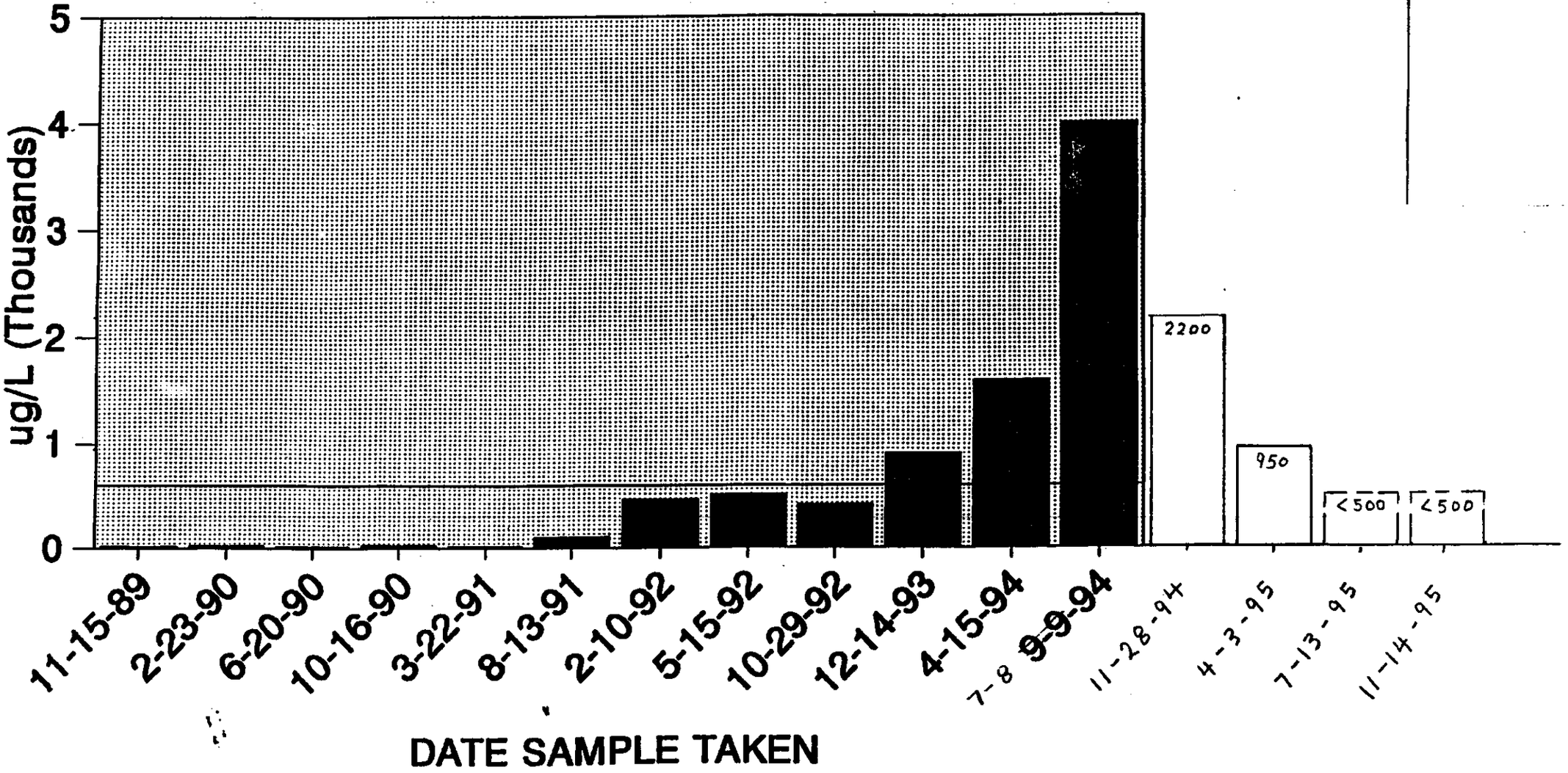

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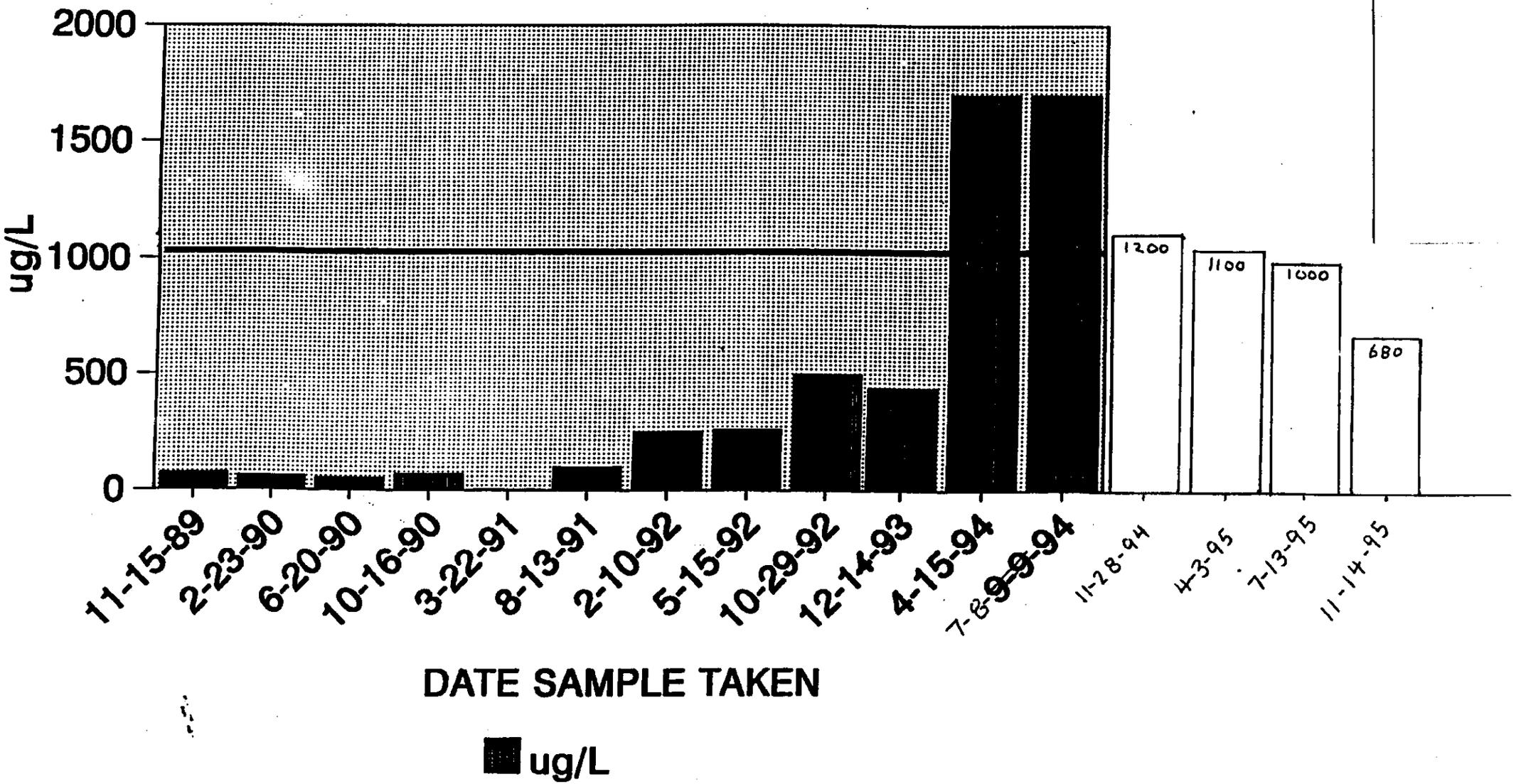

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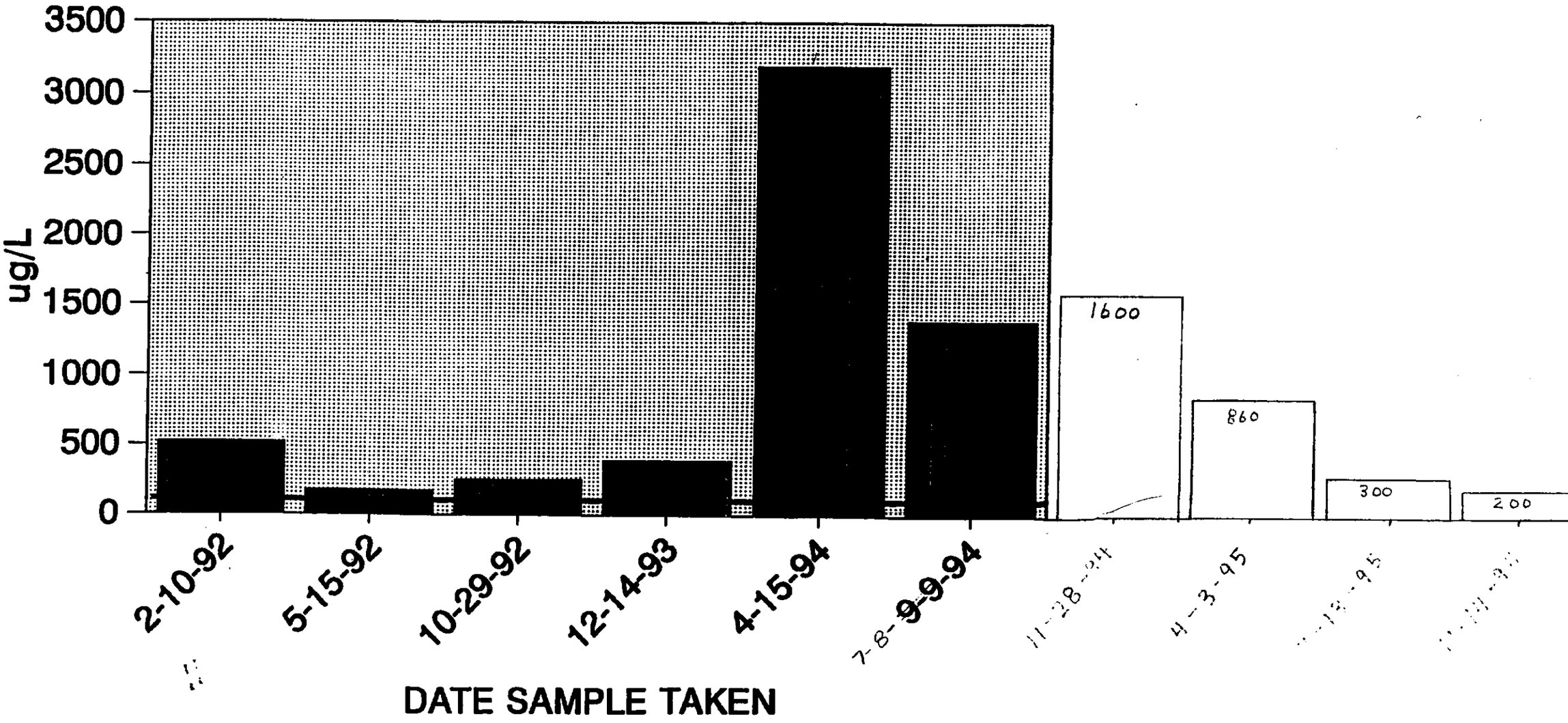
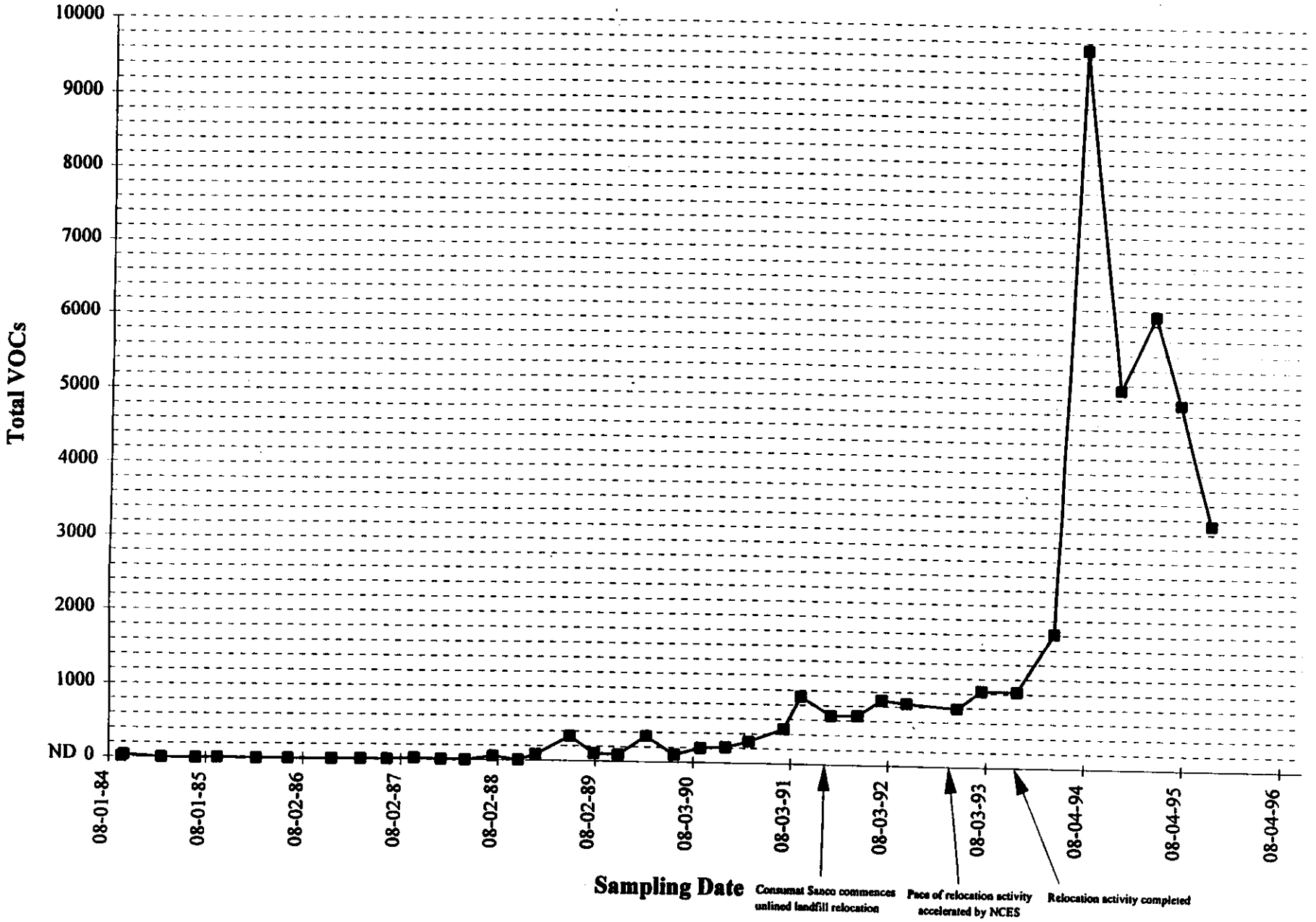


GROUP 2 FIGURES

TOTAL VOCs (ppb)
B-101

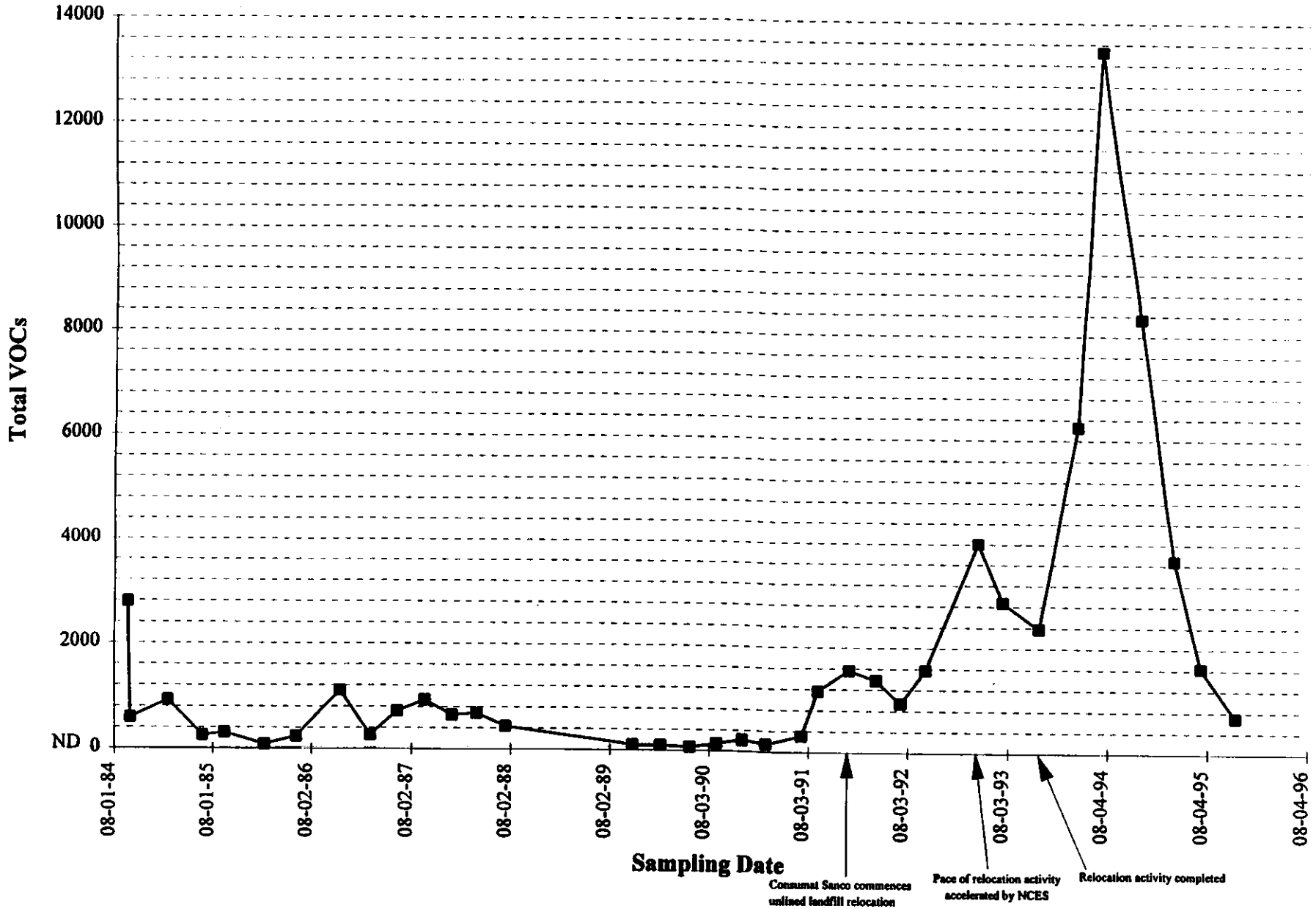


North Country Environmental Services, Inc.

Bethlehem, New Hampshire

Sanborn, Head & Associates, Inc.

TOTAL VOCs (ppb)
B-102D



North Country Environmental Services, Inc.
Bethlehem, New Hampshire

Sanborn, Head & Associates, Inc.

Project No. 1003.1\c1195\CHAR.XLW

TOTAL VOCs (ppb)
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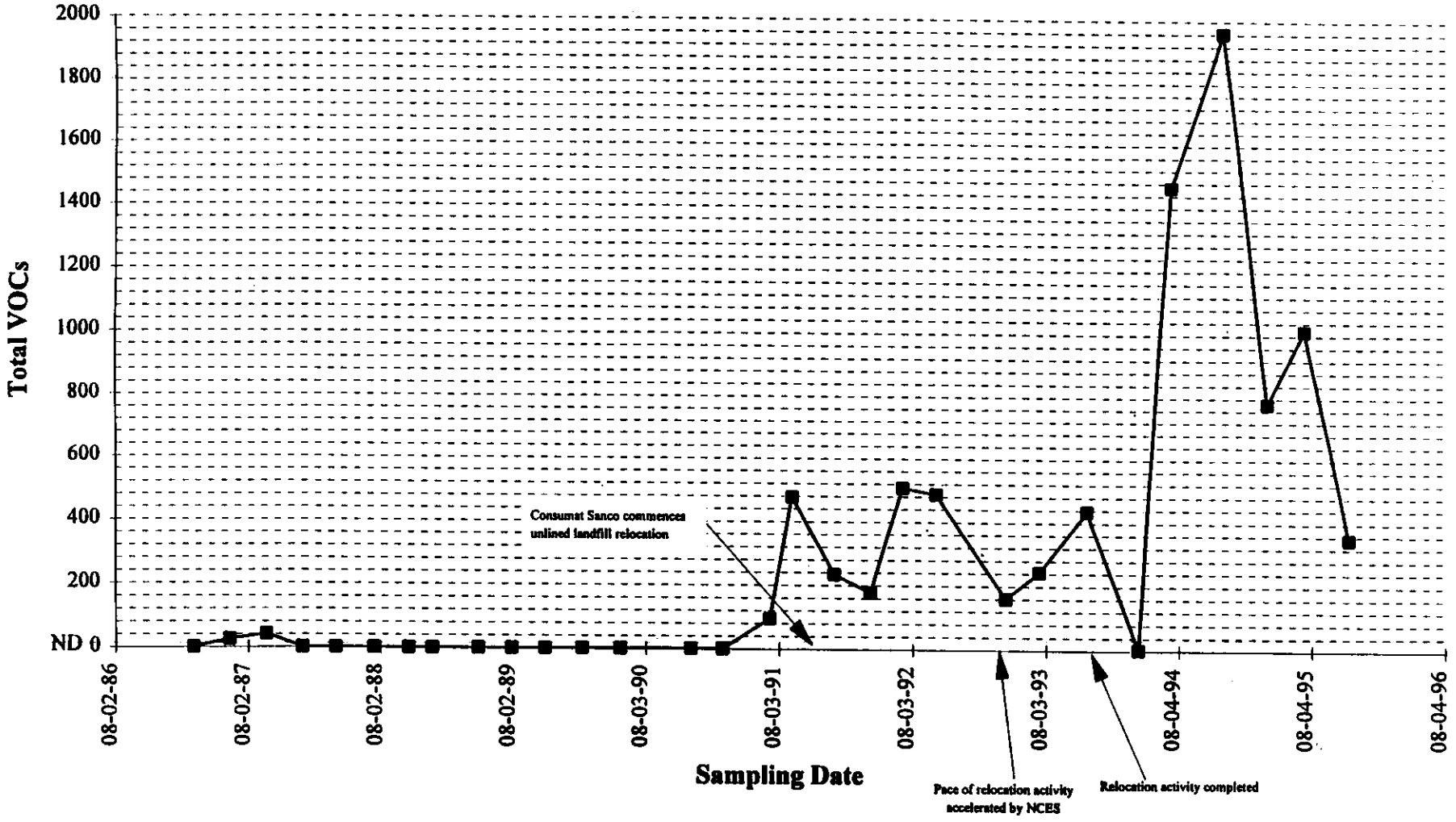

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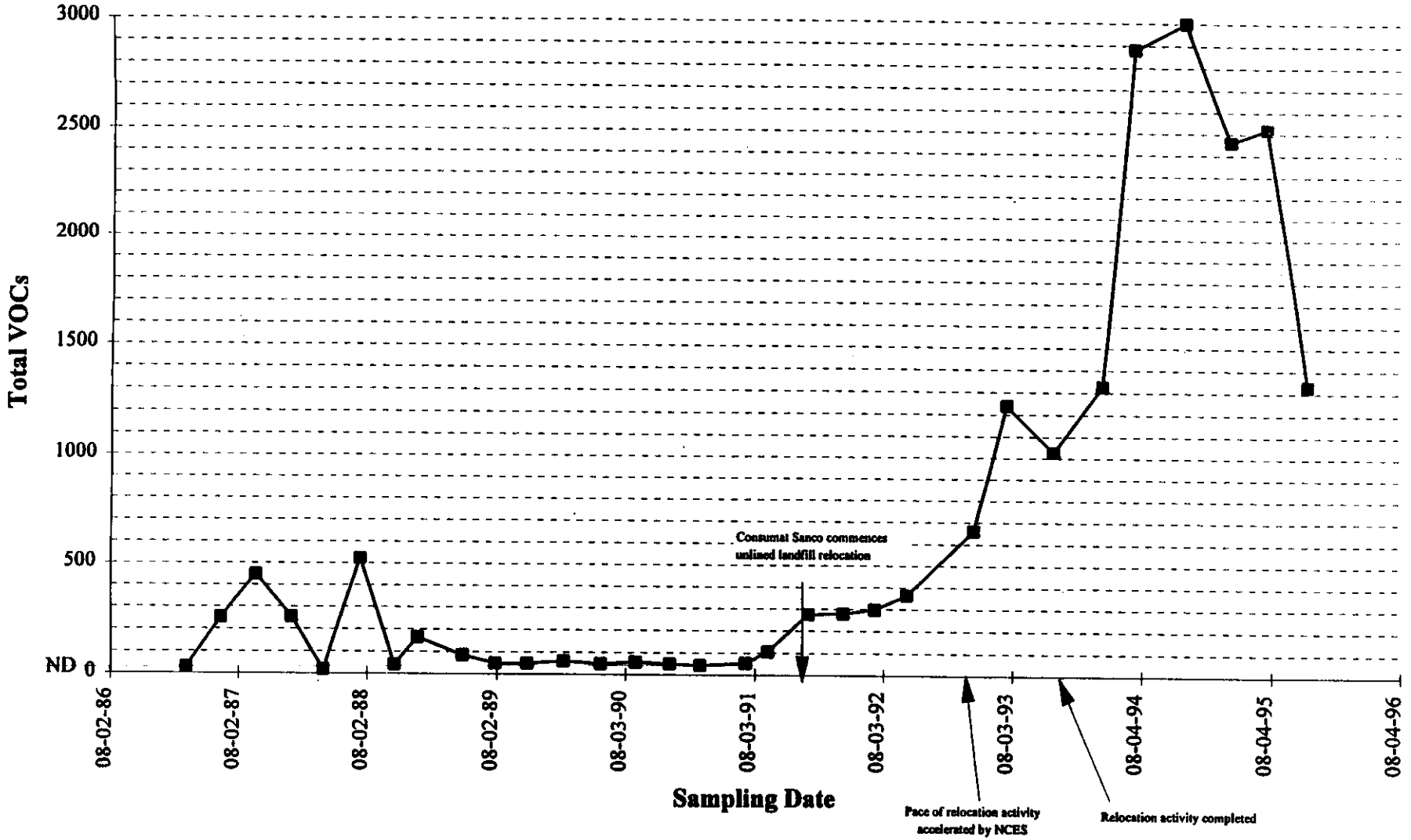

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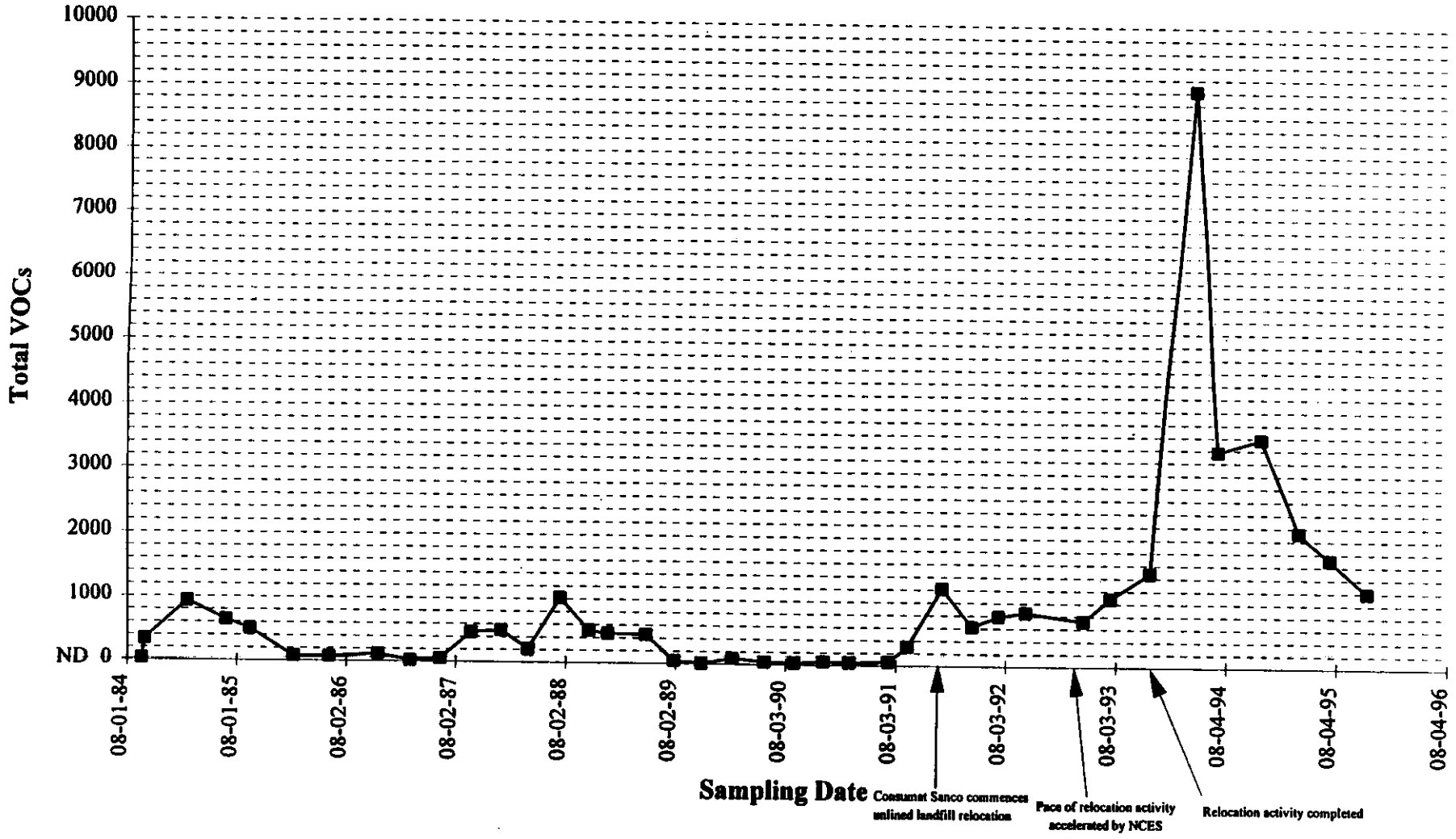

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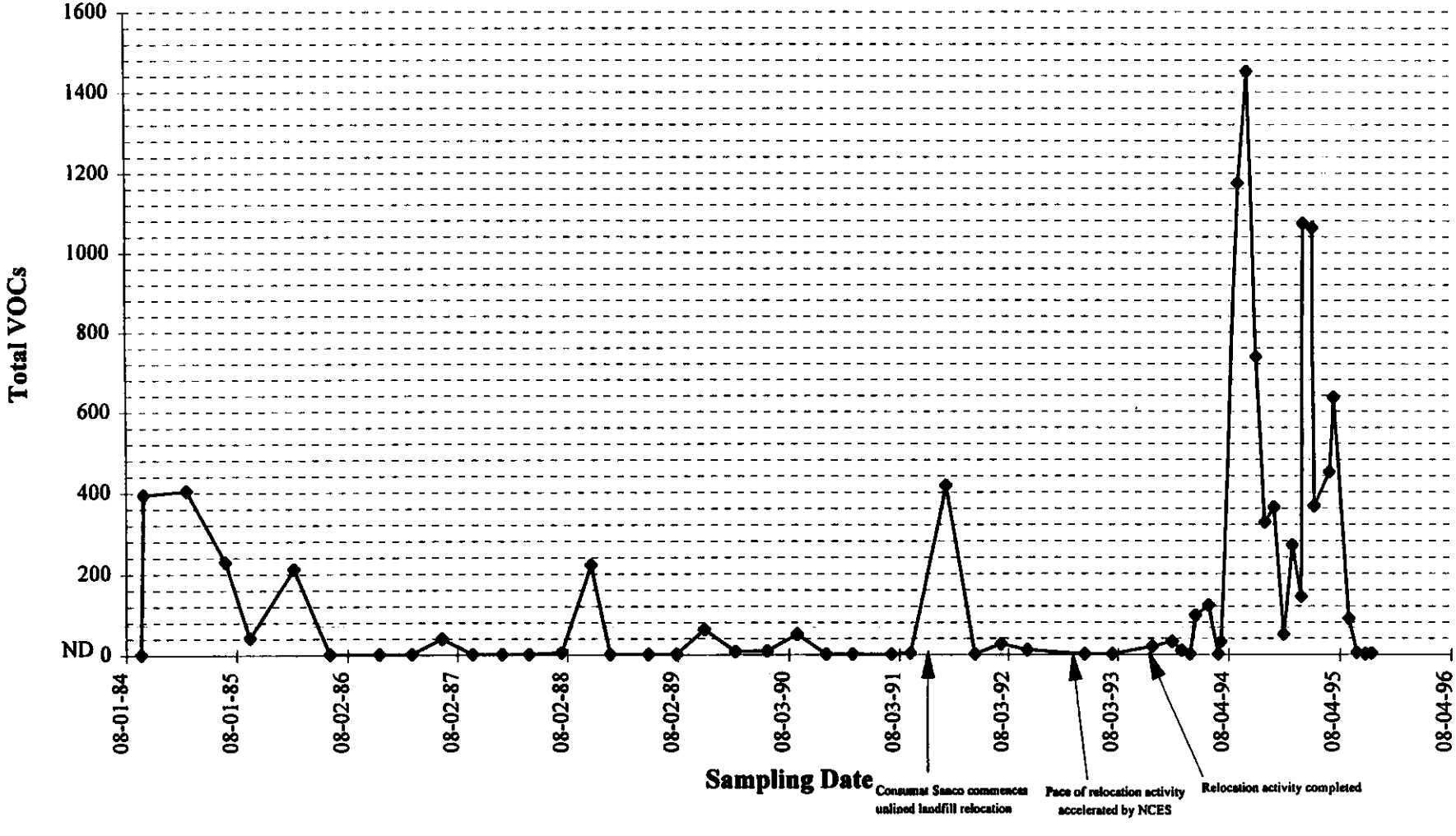
GROUP 3 FIGURE

Total VOCs (ppb)
SEEP



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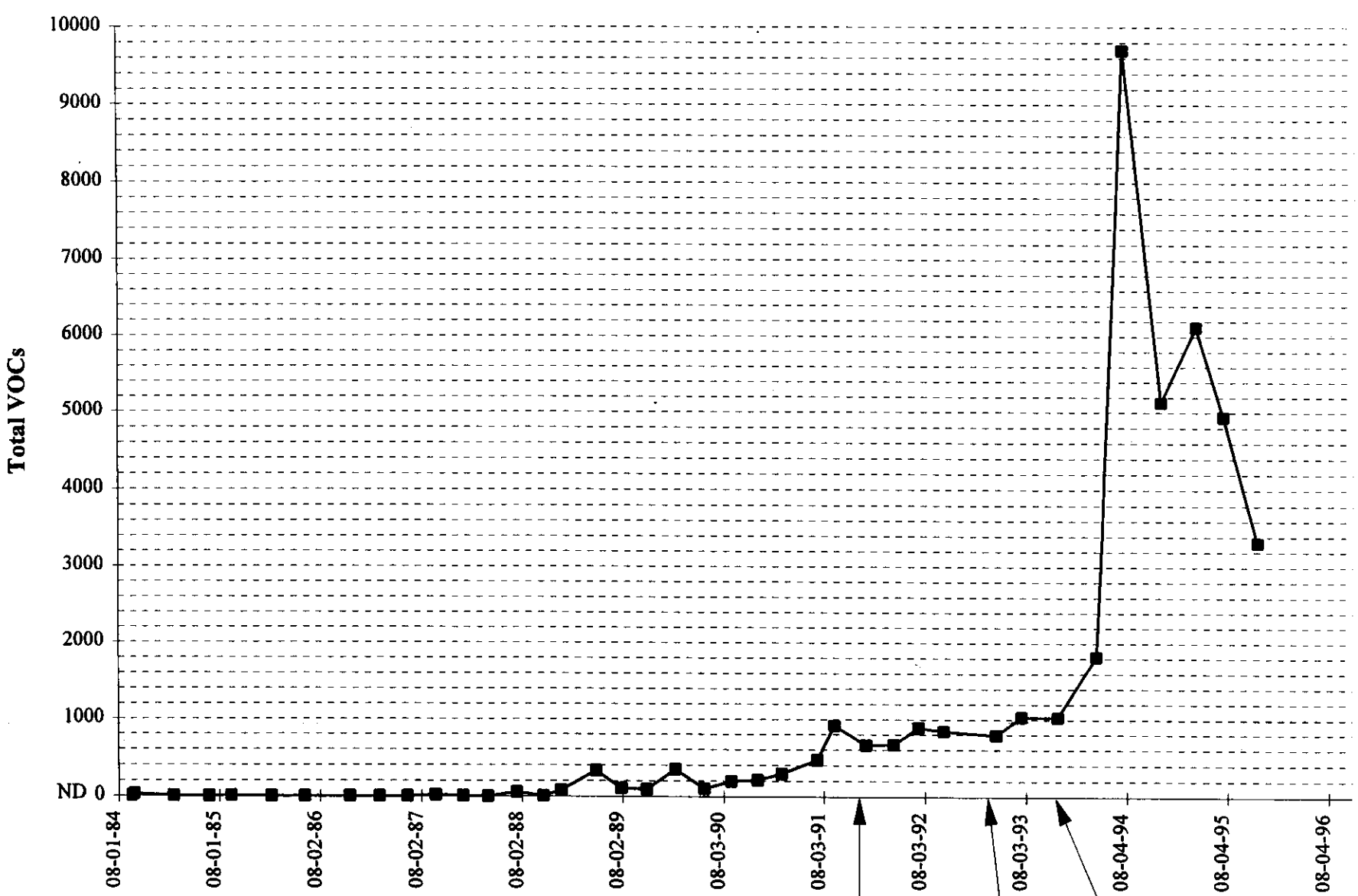
Project No. 1003.1\SEEPCHAR.XLW

GROUP 2 FIGURES

TOTAL VOCs (ppb)
B-101



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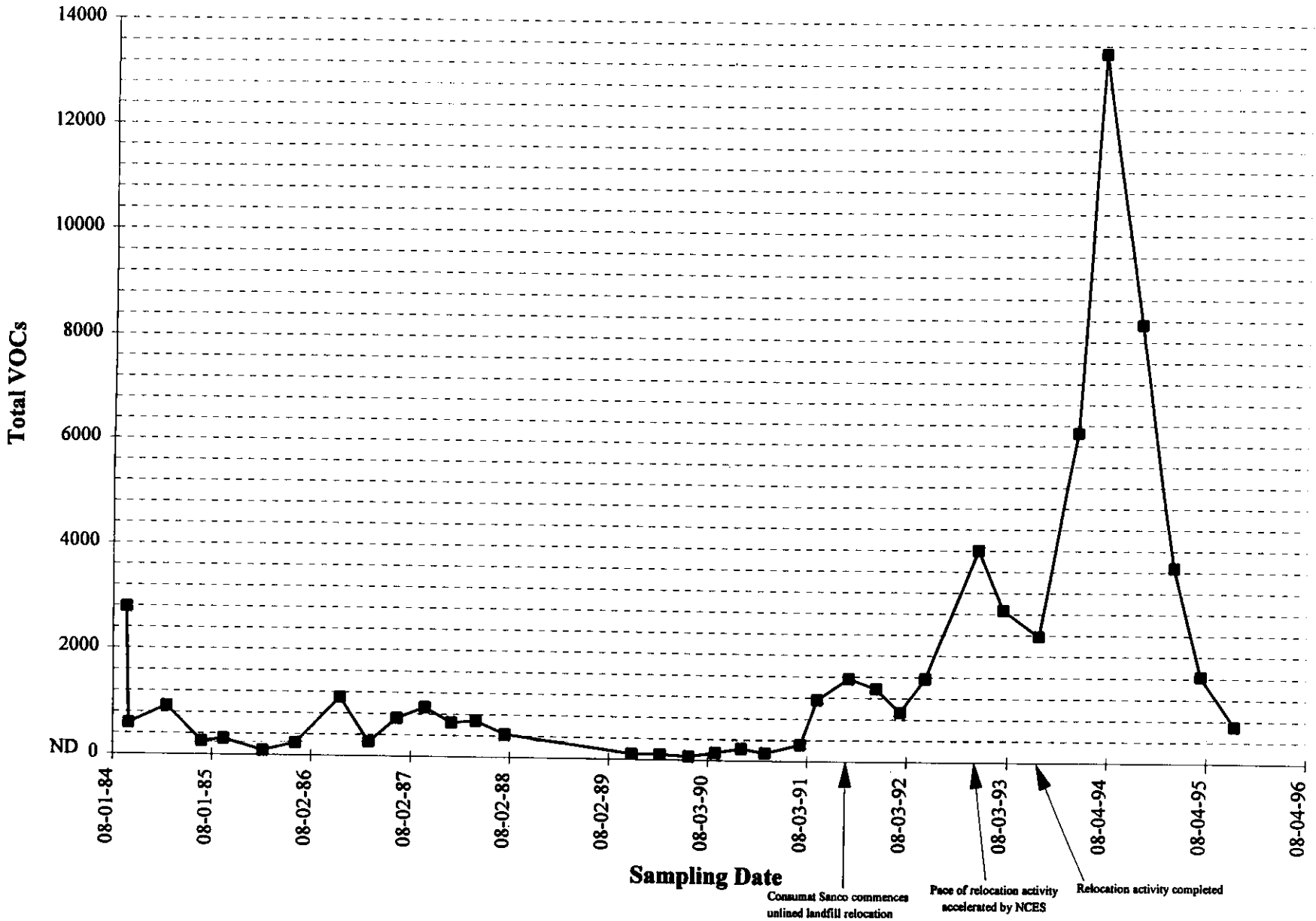
Project No. 1003.1\c1195CHAR.XLW

TOTAL VOCs (ppb)
B-102 *D*



Sanborn, Head & Associates, Inc.

North Country Environmental Services, Inc.
Bethlehem, New Hampshire

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TOTAL VOCs (ppb)
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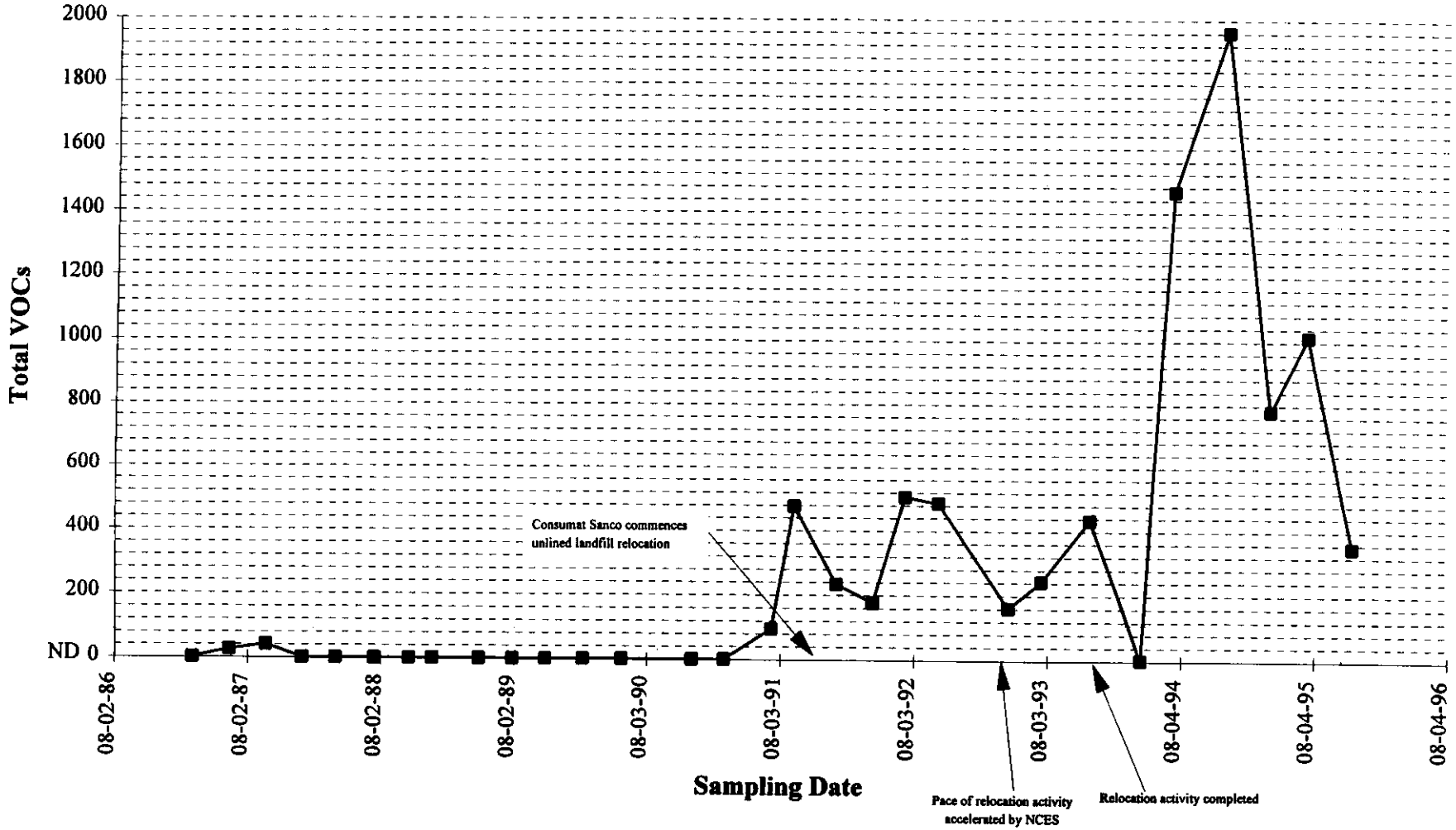

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Total VOCs (ppb)
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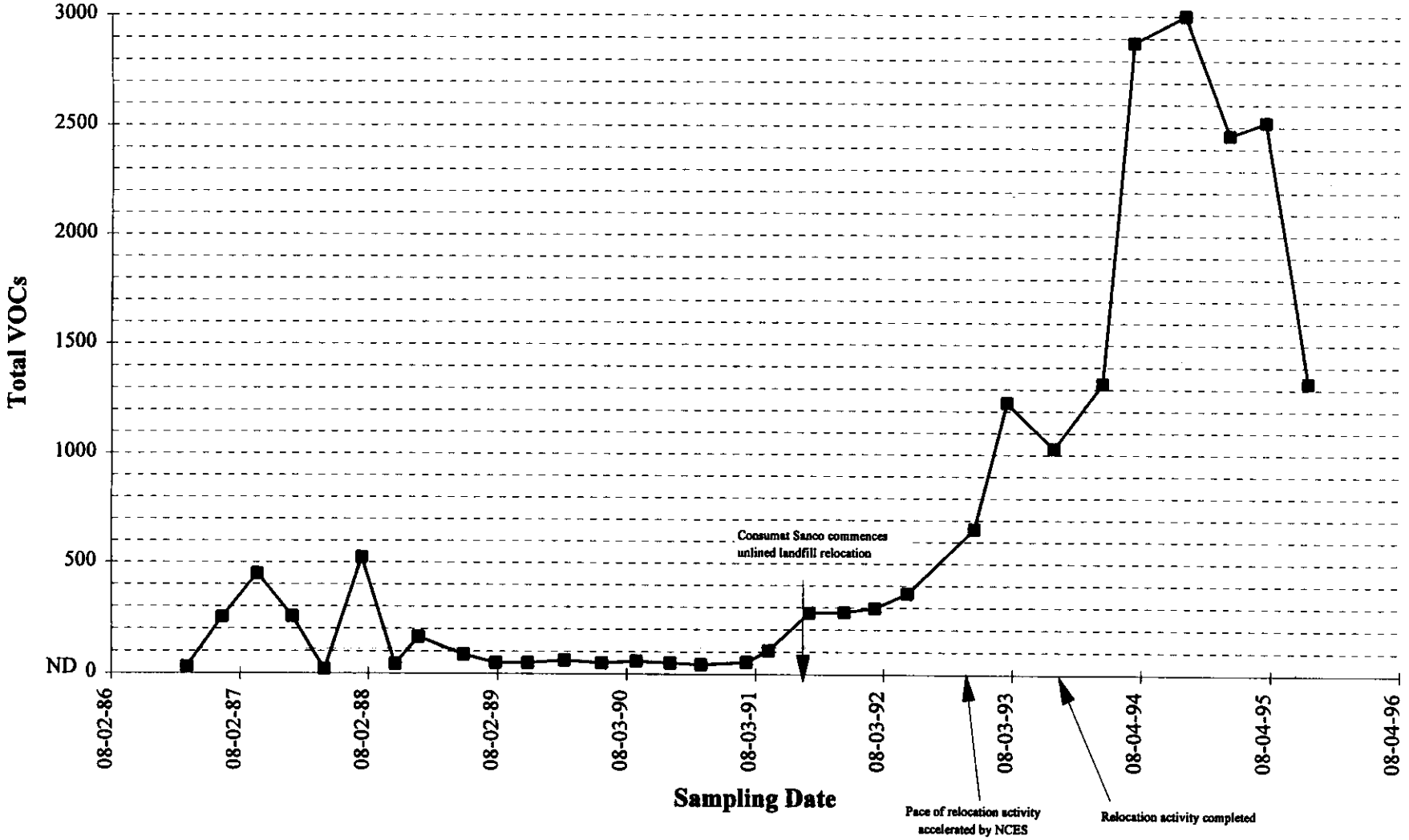

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Total VOCs (ppb)
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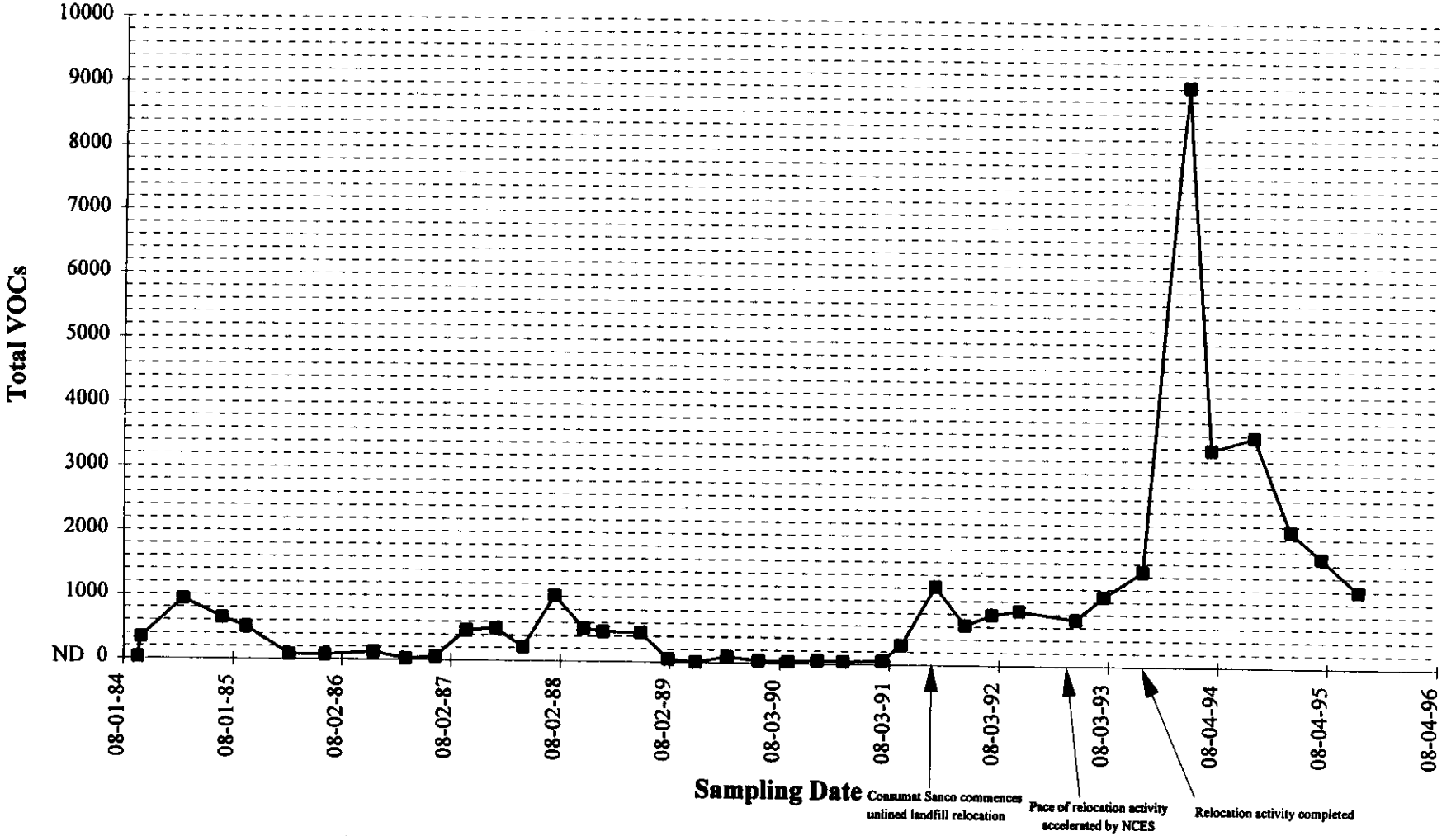

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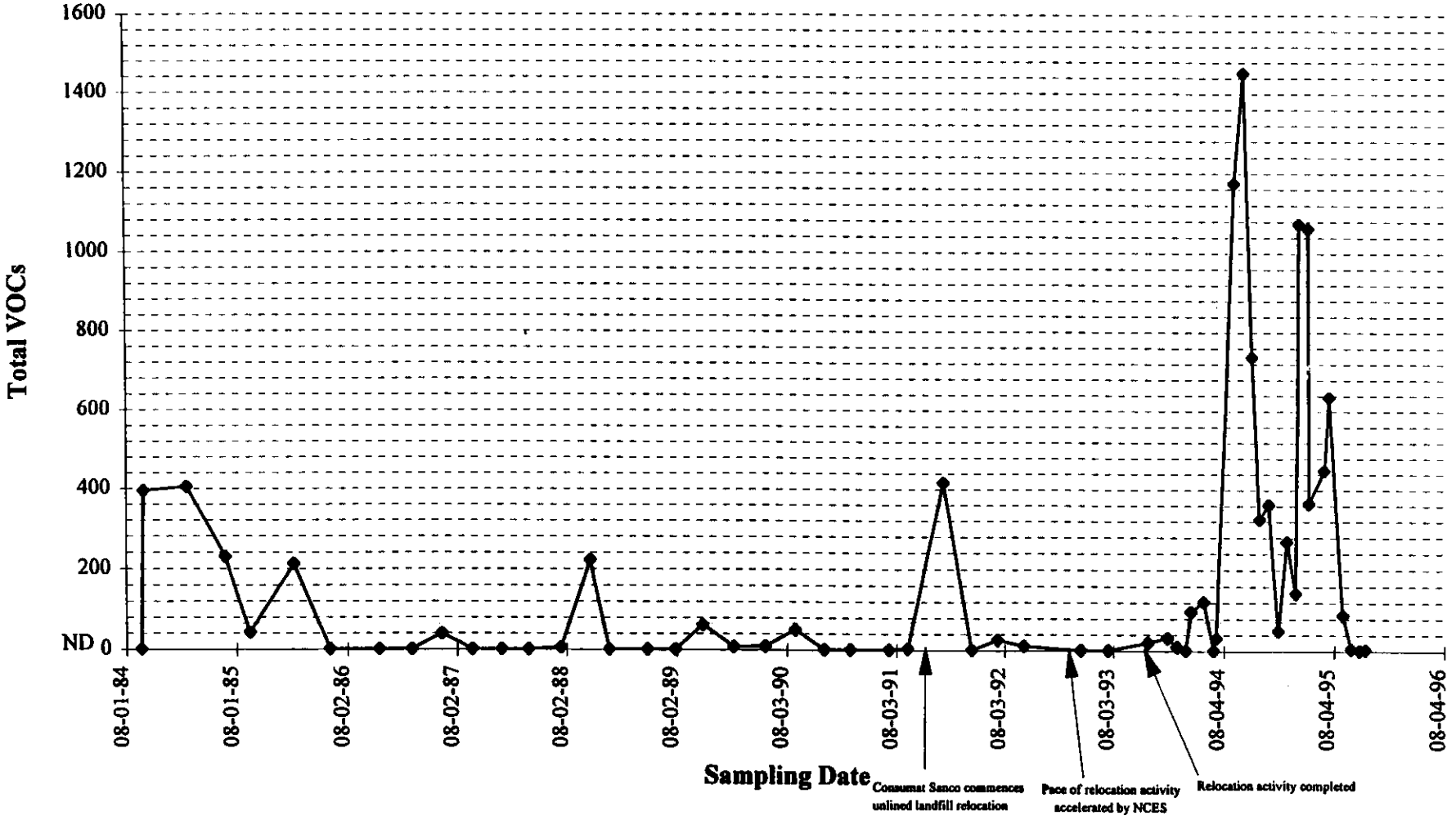

GROUP 1 FIGURES

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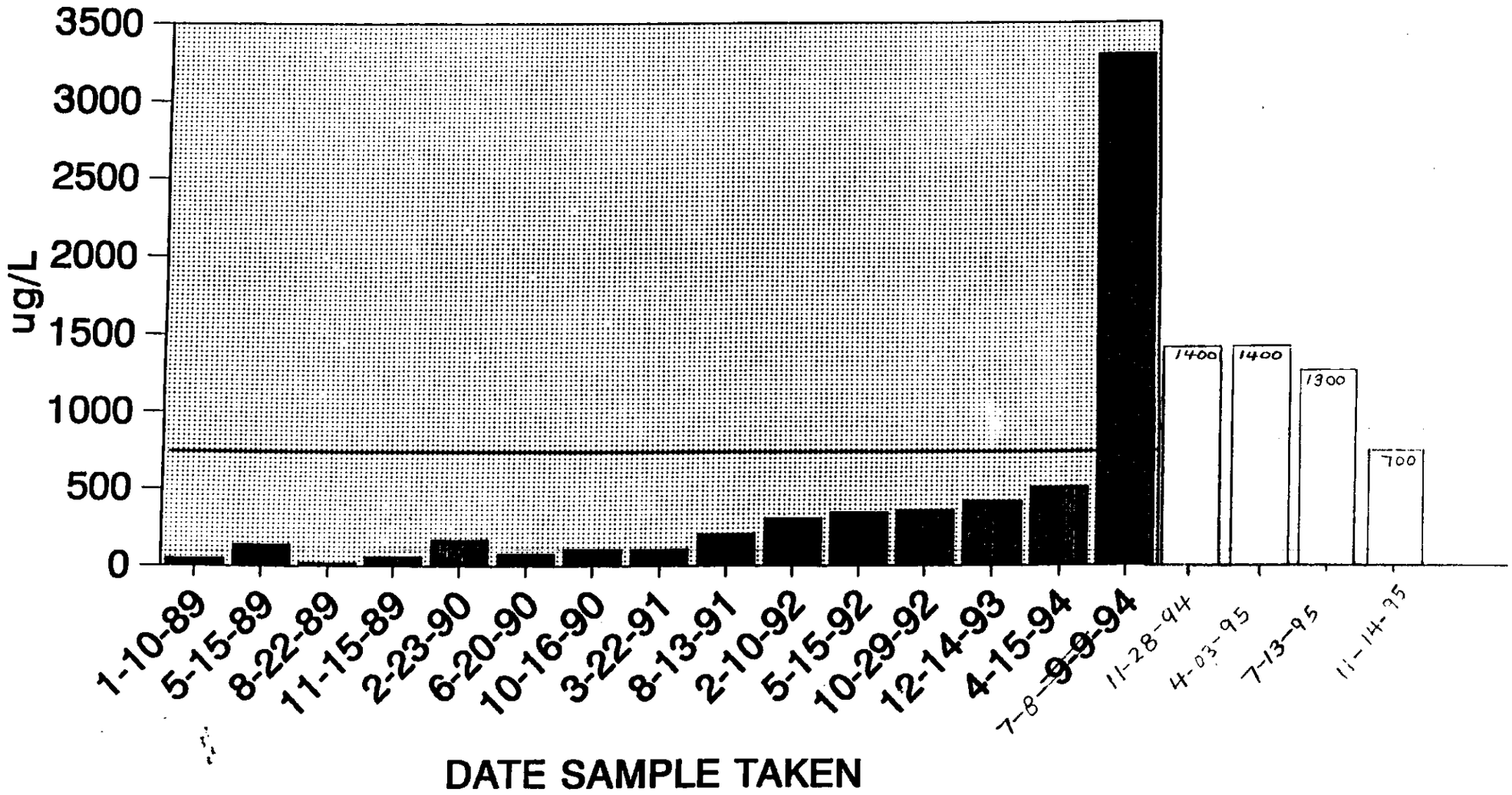
ACETONE



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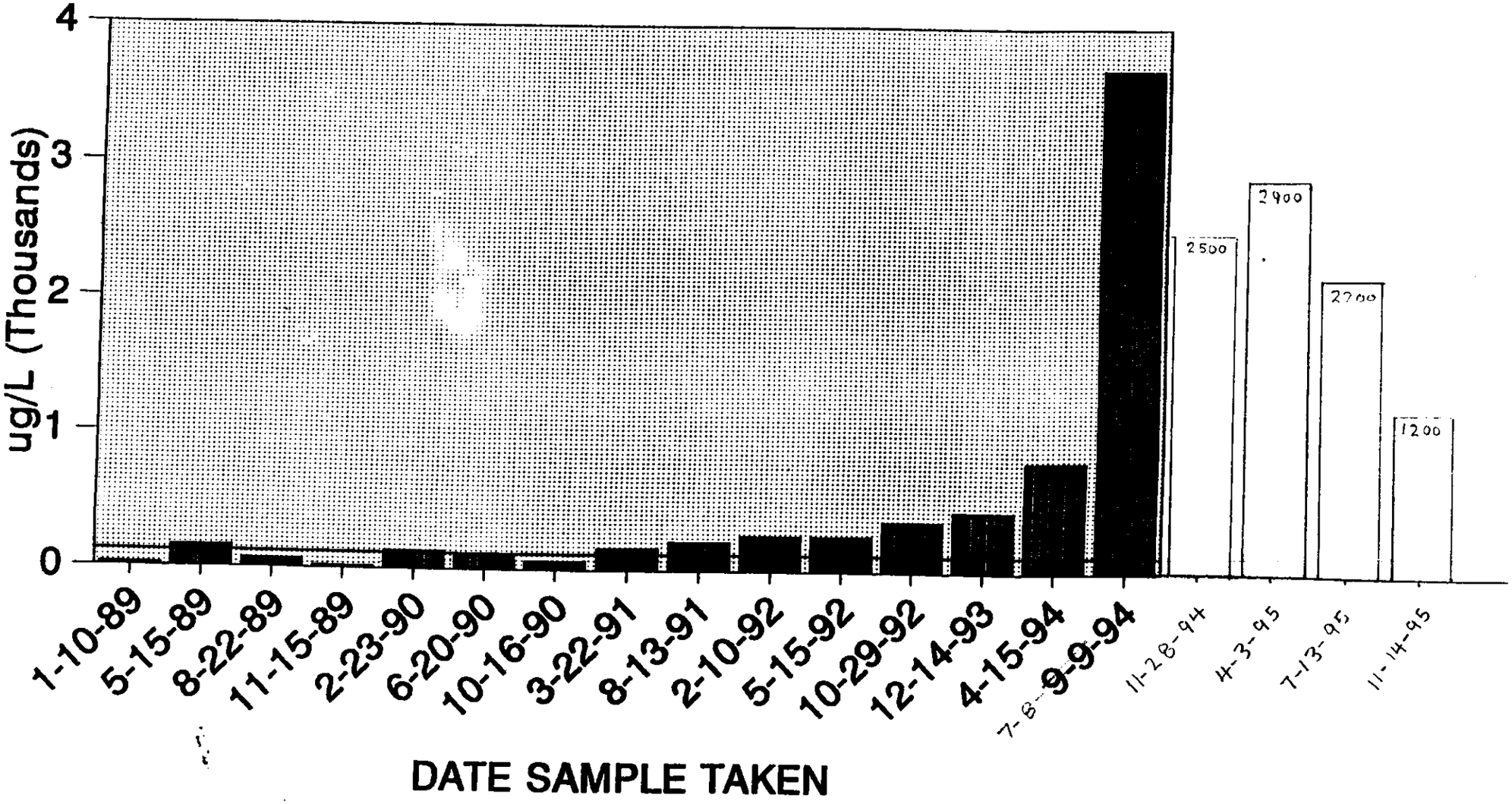

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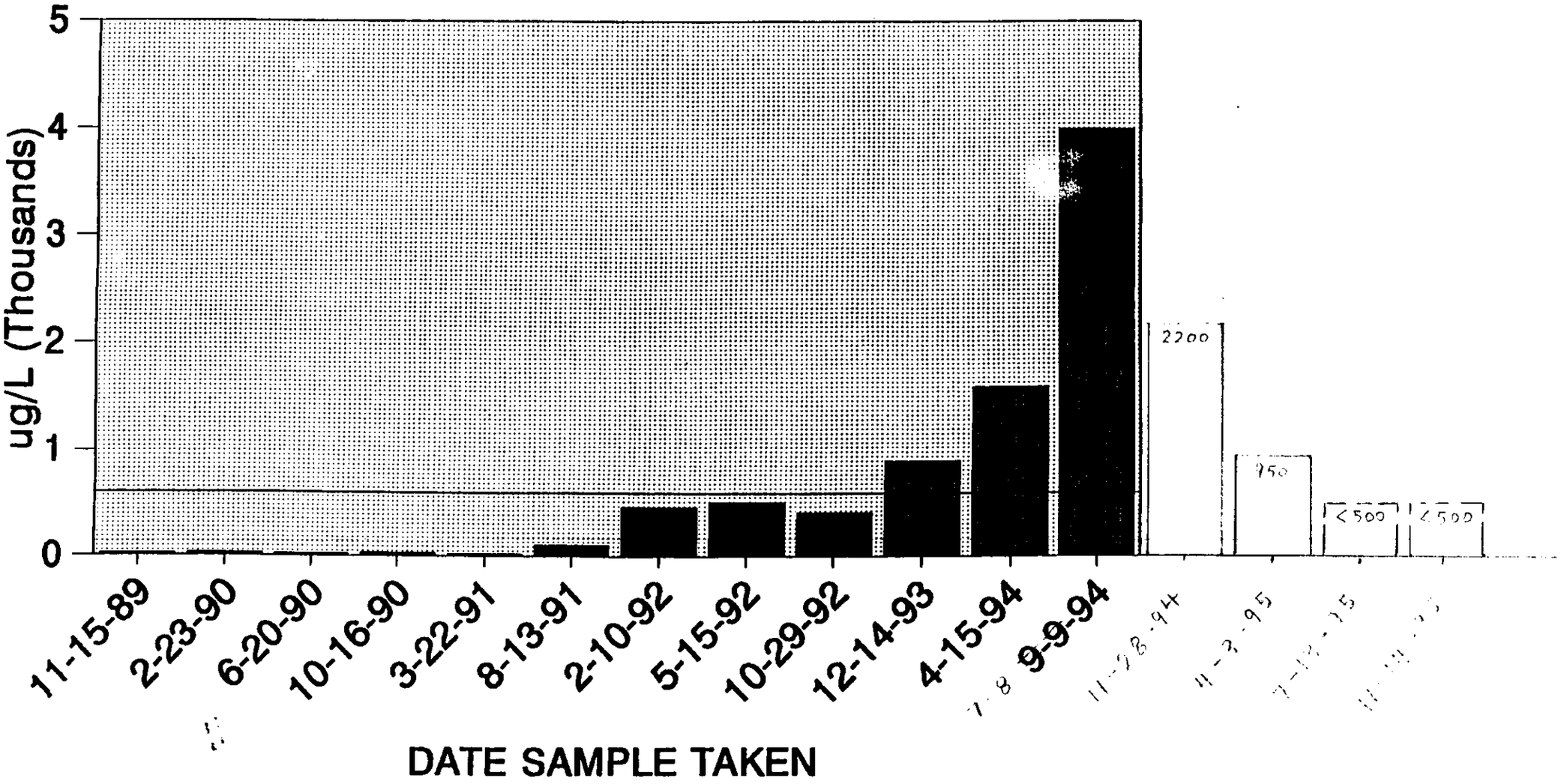

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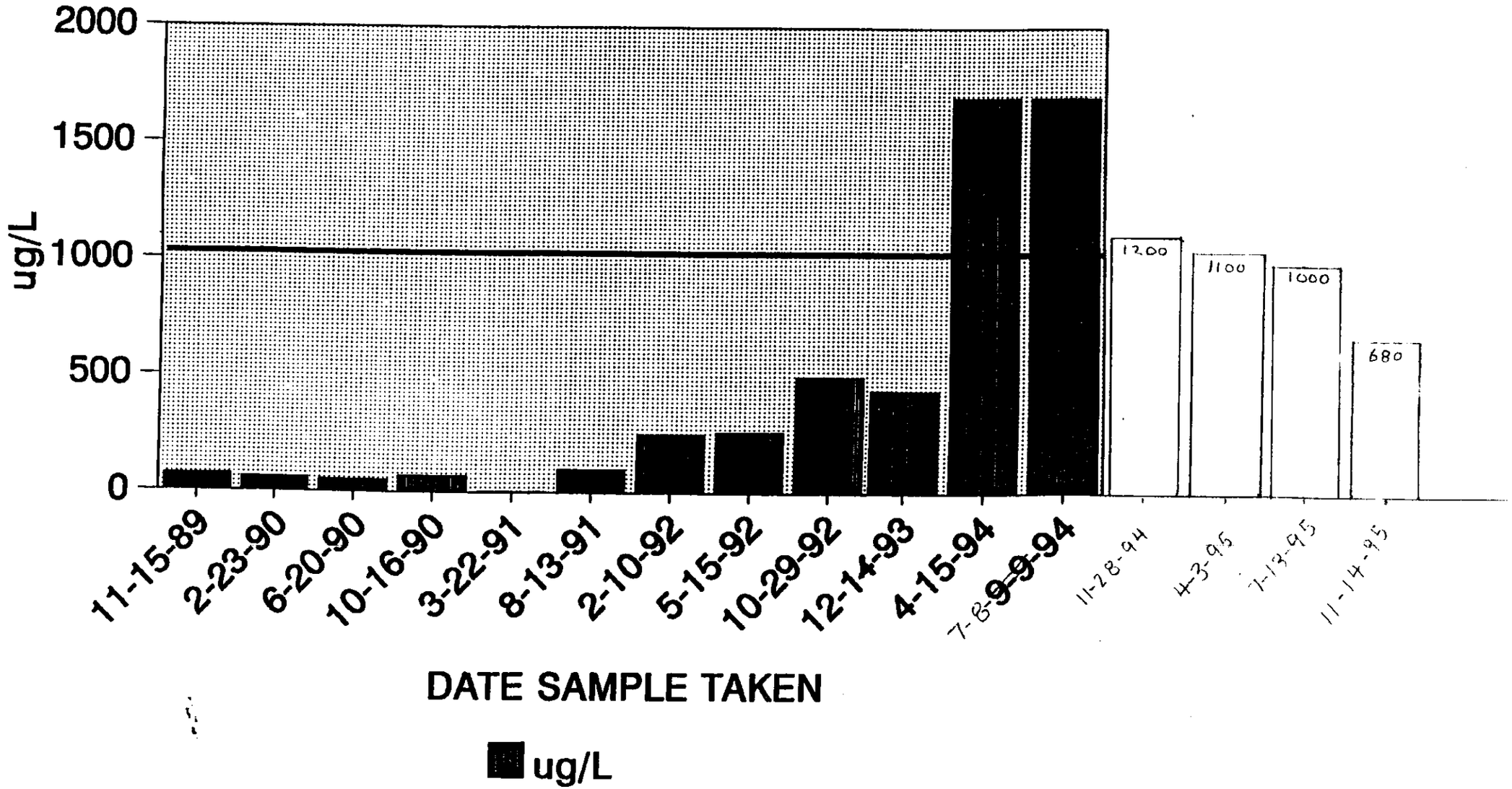
TOLUENE



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