United States
Environmental Protection
Agency

Office of Air Quality
Planning and Standards
Washington, D.C. 20460

EPA-340/1-85-016a
September 1985

Stationary Source Compliance Series

EPA

# A Study of Particulate Matter Concentration Near Major Steel Mills (1973-1982)

## Volume 1

EPA-340/1-85-016a

# A Study of Particulate Matter Concentration Near Major Steel Mills (1973-1982)

## Volume 1

Prepared by

Geomet Technologies, Inc.
20251 Century Boulevard
Germantown, Maryland 20874

Contract No. 68-01-6311
Work Assignment No. 27

EPA Project Manager: John Busik
EPA Work Assignment Manager: Mark Antell

U.S. ENVIRONMENTAL PROTECTION AGENCY
Stationary Source Compliance Division
Office of Air Quality Planning and Standards
Washington D.C. 20460

September 1985

## DISCLAIMER

This report has been reviewed by the Stationary Source Compliance Division, U.S. Environmental Protection Agency, and approved for publication. Approval does not signify that the contents necessarily reflect the views and policies of the U.S. Environmental Protection Agency, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.

## ABSTRACT

Ambient air quality statistics have been generated on 1973-1982 data collected near the Nation's 55 major integrated steel facilities. The data show levels of TSP, BaP, and IP near each facility. Conclusions concerning the impact of each mill are based on pollution roses and on analyses of conditions during days on which the National Ambient Air Quality Standards were exceeded. Trends in the 12-month running geometric means of TSP have been examined. Statistical summaries of the data are presented so that the attainment status of the vicinity of each mill can be easily determined. Data used in the analyses consist of those available from the National Aerometric Data Bank as well as special study data obtained from EPA and state and local agencies.

Over eighty percent of the stations used in the analyses demonstrate long-term downward trends in TSP levels. Over the period 1981-1982, the monitoring sites near 17 mills indicated no violations of primary TSP standards.

The methodology for the analysis is described and the results are presented in a separate section for each steel mill.

Table of Contents


| | Page |
|---|---|
| VOLUME I | |
| Acknowledgment | ix |
| Methodology | xi |
| Summary | xxxi |
| Armco Steel, Hamilton, Ohio | 1-1 |
| Armco Steel, Middletown, Ohio | 2-1 |
| Armco Steel, Ashland, Kentucky | 3-1 |
| Armco Steel, Houston, Texas | 4-1 |
| Bethlehem Steel, Sparrows Point, Maryland | 5-1 |
| Bethlehem Steel, Lackawanna, New York | 6-1 |
| Bethlehem Steel, Bethlehem, Pennsylvania | 7-1 |
| Bethlehem Steel, Burns Harbor, Indiana | 8-1 |
| CF & I Steel, Pueblo, Colorado | 9-1 |
| Crucible Steel, Midland, Pennsylvania | 10-1 |
| Ford Motor Company, Dearborn, Michigan | 11-1 |
| Inland Steel, East Chicago, Indiana | 12-1 |
| Interlake Steel, Chicago, Illinois | 13-1 |
| Jones & Laughlin Steel, Aliquippa, Pennsylvania | 14-1 |
| Jones & Laughlin Steel, East Chicago, Indiana | 15-1 |
| Jones & Laughlin Steel, Pittsburgh, Pennsylvania | 16-1 |
| Jones & Laughlin Steel, Cleveland, Ohio | 17-1 |
| Jones & Laughlin Steel, Youngstown, Ohio | 18-1 |
| Kaiser Steel, Fontana, California | 19-1 |
| Lone Star Steel, Lone Star, Texas | 20-1 |
| National Steel, Weirton, West Virginia | 21-1 |
| National Steel, Granite City, Illinois | 22-1 |
| National Steel, Detroit, Michigan | 23-1 |
| Republic Steel, Buffalo, New York | 24-1 |
| Republic Steel, Birmingham, Alabama | 25-1 |
| Republic Steel, Gadsden, Alabama | 26-1 |
| Republic Steel, Canton, Ohio | 27-1 |
| Republic Steel, Chicago, Illinois | 28-1 |
| VOLUME II | |
| Republic Steel, Cleveland, Ohio | 29-1 |
| Republic Steel, Warren, Ohio | 30-1 |
| Republic Steel, Youngstown, Ohio | 31-1 |
| Sharon Steel, Fairmont, West Virginia | 32-1 |
| Sharon Steel, Farrell, Pennsylvania | 33-1 |


(Continued)

Table of Contents (Concluded)


| | Page |
|---|---|
| VOLUME II (Continued) | |
| United States Steel, Braddock, Pennsylvania | 34-1 |
| United States Steel, Clairton, Pennsylvania | 35-1 |
| United States Steel, Duquesne, Pennsylvania | 36-1 |
| United States Steel, Fairless Hills, Pennsylvania | 37-1 |
| United States Steel, Homestead, Pennsylvania | 38-1 |
| United States Steel, Saxonburg, Pennsylvania | 39-1 |
| United States Steel, Fairfield, Alabama | 40-1 |
| United States Steel, Chicago, Illinois | 41-1 |
| United States Steel, Cleveland, Ohio | 42-1 |
| United States Steel, Gary, Indiana | 43-1 |
| United States Steel, Lorain, Ohio | 44-1 |
| United States Steel, Youngstown, Ohio | 45-1 |
| United States Steel, Geneva, Utah | 46-1 |
| Wheeling-Pittsburgh Steel, Follansbee, West Virginia | 47-1 |
| Wheeling-Pittsburgh Steel, Monessen, Pennsylvania | 48-1 |
| Wheeling-Pittsburgh Steel, Steubenville, Ohio | 49-1 |
| Wisconsin Steel, Chicago, Illinois | 50-1 |
| Alabama Byproducts, Birmingham, Alabama | 51-1 |
| McLouth Steel, Ironton, Ohio | 52-1 |
| Bethlehem Steel, Johnstown, Pennsylvania | 53-1 |
| Empire-Detroit Steel, Portsmouth, Ohio | 54-1 |
| McLouth Steel, Trenton, Michigan | 55-1 |
| Shenango Steel, Pittsburgh, Pennsylvania | 56-1 |

## Steel Mills Indexed by EPA Region


| | Page |
|---|---|
| **REGION II** | |
| Bethlehem Steel, Lackawanna, New York | 6-1 |
| Republic Steel, Buffalo, New York | 24-1 |
| **REGION III** | |
| Bethlehem Steel, Sparrows Point, Maryland | 5-1 |
| Bethlehem Steel, Bethlehem, Pennsylvania | 7-1 |
| Crucible Steel, Midland, Pennsylvania | 10-1 |
| Jones & Laughlin Steel, Aliquippa, Pennsylvania | 14-1 |
| Jones & Laughlin Steel, Pittsburgh, Pennsylvania | 16-1 |
| National Steel, Weirton, West Virginia | 21-1 |
| Sharon Steel, Fairmont, West Virginia | 32-1 |
| Sharon Steel, Farrell, Pennsylvania | 33-1 |
| United States Steel, Braddock, Pennsylvania | 34-1 |
| United States Steel, Clairton, Pennsylvania | 35-1 |
| United States Steel, Duquesne, Pennsylvania | 36-1 |
| United States Steel, Fairless Hills, Pennsylvania | 37-1 |
| United States Steel, Homestead, Pennsylvania | 38-1 |
| United States Steel, Saxonburg, Pennsylvania | 39-1 |
| Wheeling-Pittsburgh Steel, Follansbee, West Virginia | 47-1 |
| Wheeling-Pittsburgh Steel, Monessen, Pennsylvania | 48-1 |
| Bethlehem Steel, Johnstown, Pennsylvania | 53-1 |
| Shenango Steel, Pittsburgh, Pennsylvania | 56-1 |
| **REGION IV** | |
| Armco Steel, Ashland, Kentucky | 3-1 |
| Republic Steel, Birmingham, Alabama | 25-1 |
| Republic Steel, Gadsden, Alabama | 26-1 |
| United States Steel, Fairfield, Alabama | 40-1 |
| Alabama Byproducts, Birmingham, Alabama | 51-1 |
| **REGION V** | |
| Armco Steel, Hamilton, Ohio | 1-1 |
| Armco Steel, Middletown, Ohio | 2-1 |
| Bethlehem Steel, Burns Harbor, Indiana | 8-1 |
| Ford Motor Company, Dearborn, Michigan | 11-1 |
| Inland Steel, East Chicago, Indiana | 12-1 |
| Interlake Steel, Chicago, Illinois | 13-1 |


(Continued)

Steel Mills Indexed by EPA Region (Concluded)


| | Page |
|---|---|
| REGION V (Continued) | |
| Jones & Laughlin Steel, East Chicago, Indiana | 15-1 |
| Jones & Laughlin Steel, Cleveland, Ohio | 17-1 |
| Jones & Laughlin Steel, Youngstown, Ohio | 18-1 |
| National Steel, Granite City, Illinois | 22-1 |
| National Steel, Detroit, Michigan | 23-1 |
| Republic Steel, Canton, Ohio | 27-1 |
| Republic Steel, Chicago, Illinois | 28-1 |
| Republic Steel, Cleveland, Ohio | 29-1 |
| Republic Steel, Warren, Ohio | 30-1 |
| Republic Steel, Youngstown, Ohio | 31-1 |
| United States Steel, Chicago, Illinois | 41-1 |
| United States Steel, Cleveland, Ohio | 42-1 |
| United States Steel, Gary, Indiana | 43-1 |
| United States Steel, Lorain, Ohio | 44-1 |
| United States Steel, Youngstown, Ohio | 45-1 |
| Wheeling-Pittsburgh Steel, Steubenville, Ohio | 49-1 |
| Wisconsin Steel, Chicago, Illinois | 50-1 |
| McLouth Steel, Ironton, Ohio | 52-1 |
| Empire-Detroit Steel, Portsmouth, Ohio | 54-1 |
| McLouth Steel, Trenton, Michigan | 55-1 |
| REGION VI | |
| Armco Steel, Houston, Texas | 4-1 |
| Lone Star Steel, Lone Star, Texas | 20-1 |
| REGION VIII | |
| CF & I Steel, Pueblo, Colorado | 9-1 |
| United States Steel, Geneva, Utah | 46-1 |
| REGION IX | |
| Kaiser Steel, Fontana, California | 19-1 |

ACKNOWLEDGMENT

This report was prepared by GEOMET Technologies, Inc., for the U.S. Environmental Protection Agency under Contract 68-01-6311. Mark Antell was the Task Manager from the EPA Stationary Source Compliance Division. The GEOMET Task Manager and principal author of the report was Kenneth E. Pickering. Assisting in the preparation of the report were Douglas J. Pelton and Mary B. Charlton. Alan L. Delman processed data and generated the computer output and computer graphics contained in the report.

Also acknowledged are personnel from state and local agencies located in the jurisdictions of the steel mills. These persons, listed below, helped to identify the monitoring sites impacted by steel mill emissions.

Ken Barrett, Alabama Air Pollution Control Commission
Randy Dillard, Jefferson County, Alabama Health Department
Bill Bope, South Coast Air Quality Management District
Tom Connors, Colorado Department of Health
Emmet Hance, Pueblo City-County Health Department
Terry Sweitzer, Illinois EPA
John Buck, Indiana State Board of Health
Ron Novak, Hammond Air Pollution Control
Joe Andrews, Kentucky Division of Air Pollution Control
Ed Carter, Maryland Air Management Administration
Alan Greenberg, Wayne County, Michigan Health Department
Art Sandberg, New Jersey Bureau of Air Pollution Control
Joe Sciascia, Erie County, New York Department of Environment and Planning
Bill Delaware, New York Department of Environmental Conservation
Al Walter, Ohio EPA
Ron Savukas, Allegheny County, Pennsylvania Health Department
Mr. Patel, Allegheny County, Pennsylvania Health Department
Ron Dubin, Pennsylvania Department of Environmental Resources
Larry Butts, Texas Air Control Board
Bob Dalley, Utah Bureau of Air Quality
Ken McBee, West Virginia Air Pollution Control Commission.

Special appreciation is extended to staff in the Pennsylvania, New York, New Jersey, Alabama, Jefferson County (Alabama), and Allegheny County (Pennsylvania) agencies. These persons provided special study data for the report. Special thanks are also extended to CF & I Steel Corporation, EPA Region V, and the Ontario Ministry of the Environment, all of which provided data.

# METHODOLOGY

## PURPOSE OF THE STUDY

This document is intended as a reference volume of available information on concentrations of total suspended particulate matter (TSP), inhalable particulate matter (IP), and benzo-a-pyrene (BaP) in the vicinities of each of the Nation's 55 integrated steel mills and major coke plants.

On two earlier occasions, GEOMET Technologies, Inc., has analyzed ambient particulate matter data from the vicinities of the major steel mills. These two analyses covered data on the vicinities of 50 major steel mills during 1973-1977 (Pickering et al. 1979) and during 1973-1980 (Pickering et al. 1983). This new, updated document extends the data analysis through 1982 and presents data collected in the vicinities of six additional plants. Data for one plant, however, have been eliminated because the plant permanently shutdown. These three documents--the original and the two updates--will provide air quality management and enforcement officials with an easily accessible reference for data on air quality near major steel facilities.

## SELECTION OF MONITORING SITES

In the original analysis, data were employed from all stations that might demonstrate even a minimal impact of the mill. Some stations either were a great distance from a mill or were situated so that persistent winds seldom blew from the mill toward the site. In the updates, however, data from these monitoring sites are excluded. Also excluded are those stations for which the mill impact is masked by other sources of TSP. Examples of such sources include road dust or other urban sources. In addition, data were not repeated in the update reports for special study sites that existed only in or before 1977. Data were chosen from those sites that best demonstrated a mill's impact or that best served as a background station. Mill impact was determined primarily through the use of pollution roses. State and local air pollution control agencies were contacted to determine if the selected stations were still in operation and if any new stations had been established near the mills.

The preparation of this update involved again making contacts with state and local agencies to determine if any of the TSP monitoring sites used previously had been discontinued or relocated, or if any new sites had been established. These contacts also helped determine whether state or local agencies had analyzed hi-vol filters for BaP or operated any IP samplers. In addition, these contacts provided information both on existing sites and on the location of new sites.

The original 1973-1977 report contained an assessment of the adequacy of hi-vol networks near each of the mills. The assessment was based on evaluations of (1) the sites relative to the EPA siting guidelines for TSP monitors

(Federal Register 1979) summarized below, and (2) the monitor locations relative to the frequencies of persistent winds by direction.

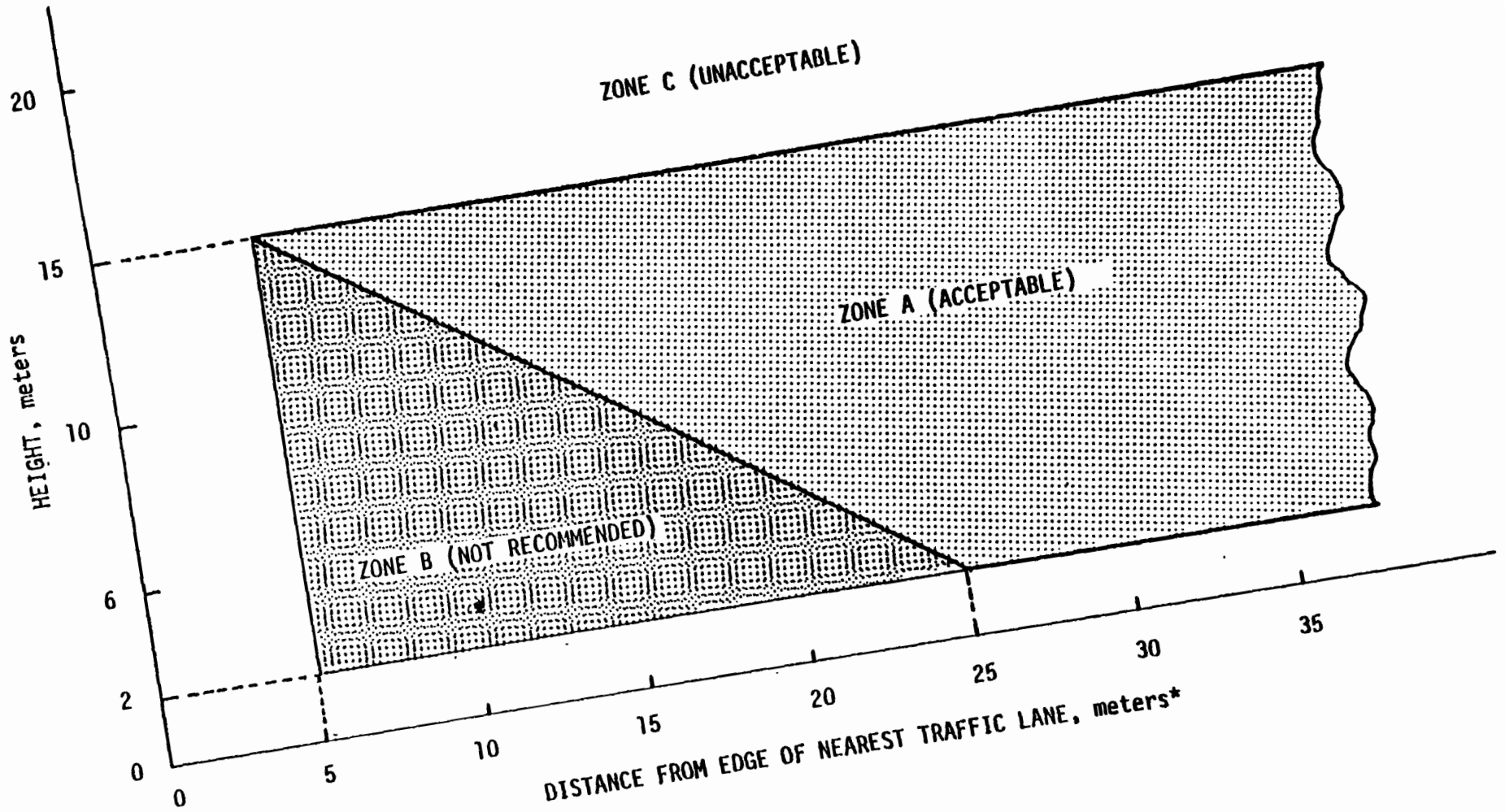
The following guidelines for locating TSP samplers were provided in the Federal Register, May 10, 1979:

- Air intake must be between 2 and 15 m above ground level
- Samplers on building roofs must be at least 2 m from walls, parapets, or penthouses
- Samplers should be at least 20 m from trees
- Samplers must be located such that the distance from an obstacle is at least twice the height that the obstacle protrudes above the sampler
- There must be unrestricted airflow in an arc of at least 270° around the sampler and the predominant wind direction for the season of greatest pollutant concentration must be included in the 270° arc
- There must be no nearby furnace or incinerator flues
- Sampler spacing from roads must comply with criteria shown in Figure 1.

Wind persistence roses have been included with the data for most steel mills in the following sections. The locations of the TSP monitoring sites can be compared with the wind persistence rose to estimate which monitoring sites are downwind of the steel mills under the most persistent wind direction. (The data used to develop the wind persistence roses are from the stations listed in Table 5, page xxv.) In any case where wind data were not available from a station that adequately represented the vicinity of the mill, no wind persistence rose is included for that mill.

The adequacy of the TSP monitoring networks around the steel mills is based on several points, including the following:

- The assessment of the monitoring networks made during preparation of the original 1973-1977 report
- Review of recent changes of the monitoring sites with State and local agency personnel who are familiar with the steel mills in question
- As mentioned above, compliance with EPA siting guidelines and assessment of the monitoring locations with respect to the persistence of the wind as indicated by the wind persistence roses.




* APPLIES WHERE ADT > 3,000

Figure 1. Acceptable zone for siting TSP monitors.

On the basis of the above, criteria judgements have been made regarding the adequacy of the TSP monitoring as indicated in Tables 1 and 2.

It must be noted that these judgements should not be interpreted as being as rigorous as may be used by EPA for other purposes (e.g., Section 107 redesignations). Therefore, the statements of monitoring adequacy should be applied for the purpose intended in this report and extrapolation for other applications must be done cognizant of the fact that other restrictions may be applicable.

The original analysis showed that the monitoring networks in 1972-1977 were fully adequate to demonstrate representative TSP levels near 12 steel mills. These mills are listed in Table 1. Most of the mills inadequately monitored lacked monitors in locations that are frequently downwind of the mill under wind conditions. All 12 of these mills remained adequately monitored during 1978-1980.

Seven additional mills became adequately monitored during 1978-1980. Table 2 lists these steel mills. At five of these seven mills, however, the improved network resulted from special studies conducted by EPA Region V. At the end of these special studies, the five mills reverted to inadequate monitoring.

During 1981-1982, two additional mills became adequately monitored; these mills are McLouth in Ironton, Ohio, and Shenango in Pittsburgh, Pennsylvania. Therefore, at the end of 1982, there were 16 mills out of 55 at which the TSP monitoring was considered adequate to provide completely representative mill impact data.

If more information is desired concerning the monitoring sites than is presented in this report, the reader may refer to Table 3, which presents relevant agency addresses and telephone numbers.

DATA ACQUISITION

The vast majority of the TSP data used was obtained through retrievals from EPA's National Aerometric Data Bank (NADB) maintained by the EPA National Air Data Branch on the EPA UNIVAC computer at Research Triangle Park, North Carolina. The NADB contains data submitted by the state and local agencies for National Air Monitoring Stations (NAMS), State and Local Air Monitoring Stations (SLAMS), and special purpose stations. In addition, TSP data were also obtained from organizations that have operated special study hi-vol networks. These organizations are listed in Table 4. There were two mills for which no TSP monitors are located in close enough to be useful in assessing mill impact.

Wind data from NADB were retrieved for appropriate sites where available. For most of the mills, however, local airport wind data were used. These data are summarized for each day in the National Climatic Center publication, Local Climatological Data. There were four mills for which no computer-compatible wind data were available for the 1978-1982 period.

TABLE 1. STEEL MILLS WITH TSP NETWORKS JUDGED ADEQUATE FOR 1973-1977

| |
|---|
| Armco Steel--Middletown, OH |
| Bethlehem Steel--Lackawanna, NY |
| CF & I Steel--Pueblo, CO |
| National Steel--Detroit, MI |
| Republic Steel--Buffalo, NY |
| Republic Steel--Canton, OH |
| Republic Steel--Warren, OH |
| Sharon Steel--Farrell, PA |
| U.S. Steel--Homestead, PA |
| Wheeling-Pittsburgh--Steubenville, OH |
| Wheeling-Pittsburgh--Monessen, PA |
| McLouth Steel--Trenton, MI |

TABLE 2. STEEL MILLS WITH TSP NETWORKS THAT BECAME ADEQUATE DURING 1978-1980

| |
|---|
| Bethlehem Steel--Burns Harbor, IN* |
| Inland Steel--East Chicago, IN* |
| Jones & Laughlin Steel--East Chicago, IN* |
| National Steel--Granite City, IL |
| U.S. Steel--Fairless Hills, PA |
| U.S. Steel--Gary, IN* |
| U.S. Steel--Lorain, OH* |

* Became adequate due to special study.

TABLE 3. STATE AND LOCAL AGENCIES OPERATING TSP MONITORING NETWORKS NEAR MAJOR STEEL MILLS

| Steel mill number | Agency | Address | Telephone |
|---|---|---|---|
| 26 | Alabama Air Pollution Control Commission | 645 S. McDonough Street<br>Montgomery, AL 36130 | 205-834-6570 |
| 25, 40 | Jefferson County Department of Health | 1400 Sixth Avenue, South<br>Birmingham, AL 35202 | 205-933-9110 |
| 19 | South Coast Air Quality Management District | 9150 Flair Drive<br>El Monte, CA 91731 | 213-572-6200 |
| 9 | Pueblo City/County Health Department | 151 Central Main Street<br>Pueblo, CO 81003 | 303-544-8376 |
| | Colorado Air Pollution Control Division | 4210 E. 11th Avenue<br>Denver, CO 80220 | 303-320-4180 |
| 13, 22, 28, 41, 50 | Illinois Environmental Protection Agency | 2200 Churchill Road<br>Springfield, IL 62706 | 217-782-7326 |
| 8, 12, 15, 43 | Indiana State Board of Health | 1330 W. Michigan Street<br>Indianapolis, IN 46206 | 317-633-0644 |
| 3 | Kentucky Division of Air Pollution Control | Ft. Boone Plaza<br>18 Reilly Road<br>Frankfort, KY 40601 | 502-564-3382 |
| 5 | Maryland Air Management Administration | 201 W. Preston Street<br>Baltimore, MD 21201 | 301-383-3245 |
| 11, 23 | Wayne County Air Pollution Control Division | 1311 E. Jefferson Street<br>Detroit, MI 48207 | 313-224-4650 |
| 37 | New Jersey Bureau of Air Pollution Control | CN027<br>Trenton, NJ 08625 | 609-292-5450 |
| 6, 24 | Erie County Department of Environment and Planning | 95 Franklin Street<br>Buffalo, NY 14202 | 716-846-6370 |
| | New York State Department of Environmental Conservation | 50 Wolf Road<br>Albany, NY 12223 | 518-457-7127 |
| 1, 2, 17, 18, 21, 27, 29, 30, 31, 42, 44, 45, 47, 49 | Ohio Environmental Protection Agency | 361 E. Broad Street<br>Columbus, OH 43215 | 614-462-8674 |
| 7, 10, 14, 33, 48 | Pennsylvania Bureau of Air Quality Control | 200 N. Third Street<br>P.O. Box 2063<br>Harrisburg, PA 17120 | 717-787-9702 |
| 16, 34, 35, 36, 38 | Allegheny County Health Department | 301 39th Street<br>Pittsburgh, PA 15201 | 412-578-8101 |
| 4 | Texas Air Control Board | 6330 Highway 290 East<br>Austin, TX 78723 | 512-451-5711 |
| 46 | Utah Department of Health | 150 W. North Temple<br>Salt Lake City, UT 84110 | 801-533-6108 |
| 21, 32, 47, 49 | West Virginia Air Pollution Control Commission | 1558 Washington Street, East<br>Charleston, WV 25311 | 304-348-3286 |
| 23 | Ontario Ministry of the Environment (Southwestern Region) | 985 Adelaide Street, South<br>London, Ontario N6E 1V3<br>Canada | 519-681-3600 |

TABLE 4. ORGANIZATIONS CONTRIBUTING SPECIAL STUDY DATA

| |
|---|
| EPA Region II (Kolak et al. 1979) |
| EPA Region V (Regan 1983) |
| CF & I Steel |
| Ontario Ministry of the Environment |
| Pennsylvania Bureau of Air Quality Control |
| New York State Department of Environmental Conservation |
| New Jersey Bureau of Air Pollution Control |
| Alabama Air Pollution Control Commission |
| Jefferson County, Alabama, Department of Health |
| Allegheny County, Pennsylvania, Health Department |

Data for BaP a polynuclear aromatic hydrocarbon considered to be carcinogenic*, are available for the vicinities of 20 mills. These data were obtained from state and local agencies, and from EPA Region V (Regan 1983). BaP is a product of incomplete combustion and pyrolysis. Coke ovens are the major source of BaP within integrated steel mills.

Summaries of IP data for stations in the EPA Inhalable Particulate Monitoring Network were obtained from the EPA Environmental Monitoring Systems Laboratory (EMSL) in Research Triangle Park, North Carolina. The EPA network began operating in the summer of 1979, and stations were gradually added to the network through 1982. The IP network was deployed by EMSL, but the stations are operated and maintained by the state or local agencies. Sampling is conducted every third or sixth day. The sites are generally colocated with existing high-volume samplers. The instruments employed for IP sampling are the size-selective inlet hi-vol (SSI) and the dichotomous sampler (DICHOT). Some sites use the SSI, some use the DICHOT, and others have deployed both instruments. For stations having both instruments, both sets of data are presented in this report. The DICHOT and SSI employed in the network nominally sample particles less than 15 μm in diameter. However, the mass concentrations measured by the SSI are typically higher than simultaneous measurements by the DICHOT due to differences in the aerodynamics of the sampler air inlets, wind speed effects, and artifact sulfate and nitrate formation on the SSI filters. See Watson et al. (1981) for a full discussion of the characteristics of each of these samplers. In 1982, several dichotomous samplers with a 10 μm cut size were installed in the network. The 10 μm data are also presented in this report and are noted as such.

## DIFFICULTIES WITH COMPARISON OF TSP DATA OVER TIME

Changes in the types of filters employed in TSP sampling and the installation of sample saver devices on the high volume samplers have caused complications in the interpretation of TSP trends. The agencies performing TSP monitoring use filters specified by EPA. The brand of filter specified by EPA changed in 1979 and again in 1982. The filters used from 1979 through 1981 allowed greater artifact sulfate, nitrate, and organic formation than those used prior to 1979 or in 1982 (Witz et al. 1983). This effect caused the measured TSP to be 13 percent greater on the average for the 1979-1981 filter in experiments conducted by Witz in the Los Angeles area. The value of 13 percent should be considered the maximum magnitude of the effect; areas with lower concentrations of $SO_2$, $NO_x$, and gas-phase organics than Los Angeles might have experienced a 5 to 10 percent apparent TSP reduction due to less artifact formation in 1982 than in 1981.

---

* Third Annual Report on Carcinogens: Summary, September, 1983. Public Health Service (NTIS PB33-135855).

Some areas of the country, which have substantial open dust source emissions, have installed sample saver devices on the samplers to reduce the amount of passive deposition of particles on the filter during non-sampling periods. The magnitude of the reduction in apparent TSP may be highly variable, depending on the amount of open dust emission and wind speeds. It is generally thought that the effect of sample saver installation is smaller than that of the filter brand change. Dates of sample saver installation are listed below for the areas near major steel mills.

| Location | Installation Date |
|---|---|
| All Allegheny County Stations | April-October 1980 |
| Granite City, Illinois | |
| Station 142960007 | 10/06/81 |
| 142960009 | 7/15/82 |
| 142960010 | 10/07/82 |
| 142960011 | 10/07/82 |
| 142960015 | 10/07/82 |
| 142960016 | 10/25/82 |
| East Chicago, Indiana | |
| Station 151180001 | 8/82 |
| 151180003 | 8/82 |
| 151180004 | 8/82 |
| 151180006 | 8/82 |
| Gary Indiana | |
| Station 151520001 | 8/82 |
| 151520003 | 8/82 |
| 151520005 | 8/82 |
| 151520004 | 8/82 |
| 151520006 | 8/82 |
| Middletown, Ohio | |
| Station 364340005 | 1979 |

## ELEMENTS OF THE ANALYSES

This document contains a section dealing with each of the 55 mills that contains the following items:

- Updated monitoring site characteristics table* including new stations
- TSP roses for 1978-1982 on an area map of the mill environs
- Trend graphs of 12-month running geometric means of TSP for the period 1973-1982
- Trend graphs of the 12-month running percentage of TSP observations greater than 150 $\mu g/m^3$
- Trend graphs of the 12-month running percentage of TSP observations greater than 260 $\mu g/m^3$ (for those monitoring sites with a significant number of exceedances of 260 $\mu g/m^3$)
- Statistical summaries of the TSP data for 1972-1982 (one page per station)
- Air quality standard exceedance roses in tabular form for both the primary and secondary 24-hour TSP standards, giving both the number of occurrences and the mean value of the exceedance cases for each wind direction over the period 1972-1982
- BaP roses for 1978-1982 on an area map of the mill environs (if available)
- Graphs of monthly average, monthly composite, or quarterly composite BaP values (if available)
- A summary page that discusses both the trend graphs and the roses and the attainment status indicated for individual stations for the individual years
- Some IP data were obtained from the state agencies for 21 of the mills in this report.

---

* Table includes all sites that have been identified near the mills (i.e., all those used in the 1973-1977 analysis, plus new sites). Data have been analyzed in this report for a subset of this list containing those sites best demonstrating air quality impacts of the mills.

CALCULATIONS

Geometric mean values of TSP were computed for each month from January 1973 through December 1982 using data for the 12-month period ending that month. Computations were made as follows:

$$M_g = \exp\left(\frac{\sum_{i=1}^{N} \ln C_i}{N}\right)$$

where $C_i$ are the individual 24-hour TSP readings and N is the number of readings in the 12-month period being considered. Computer graphics were employed to display the trends of the geometric means. The same summary criteria used by the EPA Monitoring and Data Analysis Division were employed in the computation of geometric means (at least five observations had to be distributed representatively throughout each quarter of the 12-month period).

Wind speed and direction data from the vicinity of each mill (one or more stations) were used to compute a value of a wind persistence index ($\omega$) for each day. The index used is the ratio of the resultant wind speed for the day to the scalar average wind speed for the day and is computed as follows:

$$\omega = \frac{\sqrt{\left[\sum_{i=1}^{24} R_i \cos \theta_i\right]^2 + \sum_{i=1}^{24} \left[R_i \sin \theta_i\right]^2}}{\sum_{i=1}^{24} R_i}$$

where $R_i$ is the hourly wind speed and $\theta_i$ is the hourly wind direction.

Values of $\omega$ range from 0 to 1. On a day with high wind persistence, one can say with greater confidence that a particular hi-vol loading came from a source in the direction from which the wind was blowing than on a day with a lower value of $\omega$.

The impact on TSP by the steel mills was illustrated through the construction of pollution roses using monitoring data for days with persistent winds (with $\omega$ greater than or equal to a designated cut-off value). Mean values of TSP were computed for each of 16 wind direction sectors after matching each TSP value with its corresponding 24-hour average wind direction and wind persistence value. Cutoff values of $\omega$ were generally chosen so that each sector could be represented. The length of each ray on the pollution rose is equivalent to the averaged TSP received from that direction during the period.

Statistical summary pages for the period 1972-1982 were generated for each monitoring station. The summaries include the following parameters:

- Number of observations
- Geometric mean
- Geometric standard deviation
- Arithmetic mean
- Extrapolation of highest expected 24-hour TSP value using Larsen's method (Larsen 1971)
- Highest and second-highest observed TSP values along with their dates of occurrence
- Number of observations exceeding the Federal Primary 24-hour Standard of 260 $\mu g/m^3$
- Number of observations exceeding the Federal Primary 24-hour Standard of 150 $\mu g/m^3$
- Frequency distribution of the observed data.

The geometric standard deviation was computed as follows:

$$S_g = \exp \left[ \frac{\sum_{i=1}^{N} \ln^2 C_i}{N} - \frac{\left( \sum_{i=1}^{N} \ln C_i \right)^2}{N^2} \right]^{1/2}$$

The observed data were used to extrapolate the highest expected 24-hour TSP value in each calendar year using the Larsen method, which assumes that the TSP values are log-normally distributed:

$$C_{max} = M_g S_g^{2.94}$$

The Spearman rank correlation coefficient was used to evaluate the long-term trend of the 12-month running geometric means at each station. The coefficient ranges from -1.0 to +1.0 and is a measure of the direction and constancy of a trend. The geometric means were ranked from low to high, and the months were ranked from least to most recent. For the data covering the

period 1973-1982, the month of January 1973 would be ranked first and the month of December 1982 would be ranked last. The coefficient ($r_s$) is computed by the following formula:

$$r_s = 1 - \frac{6 \sum_i d_i^2}{(n-1)n(n+1)}$$

where

$d_i$ = the difference in ranks for the $i^{th}$ pair

$n$ = number of paired ranks.

The standard exceedance roses consist of two tables (one for the primary 24-hour standard and one for the 24-hour secondary standard) for each mill, which for each station give both the number of occurrences and the mean value of the standard exceedance cases associated with each wind direction. Also, the exceedance cases are broken down within each wind direction according to whether they were associated with winds that were persistent (i.e., above some criteria value of $\omega$, the wind persistence indicator) or variable.

WIND DATA REPRESENTATIVENESS

Table 5 lists the meteorological stations from which wind data were employed for constructing the pollution roses and standard exceedance roses. Wind data obtained from NADB were more prone to have missing values than the airport winds; therefore, a backup airport station was employed for mills using a NADB site as the primary source of wind data, unless use of airport data would be obviously inappropriate.

The question of how well the meteorological data used in constructing the pollution roses represents the monitoring sites is critical in this study. The term point-to-point representativeness is used for this purpose following the convention of Nappo et al. (1982) and distinguishes this concept from measurement representativeness and from point-to-volume representativeness.

Nappo et al. point out a number of the important elements that influence point-to-point representativeness, including but not limited to changes in surface roughness, topography, or atmospheric stability. In addition, there is the combined influence of the separation distance and the local synoptic and mesometeorological situation. Nappo et al. also describe the differences that will result, depending on the meteorological parameter that is of concern. They conclude with recommendations for further literature review/research, for the use of their described statistical techniques in intensive field

TABLE 5. METEOROLOGICAL DATA STATIONS (1978-1982) USED IN UPDATED ANALYSES

| Mill Number | Primary Station | Secondary Station | Tertiary Station |
|---|---|---|---|
| 1 | Greater Cincinnati Airport | | |
| 2 | Greater Cincinnati Airport | | |
| 3 | NADB #180080010 | Huntington Tri-State Airport | |
| 4 | NADB #452560034 | | |
| 5 | Baltimore-Washington Int'l Airport | | |
| 6 | Buffalo Airport | | |
| 7 | NADB #390780017 | | |
| 8 | NADB #153420011 | Chicago Midway Airport | Chicago O'Hare Airport |
| 9 | No digitized data available | | |
| 10 | Greater Pittsburgh Airport | | |
| 11 | Windsor, Ontario | Wayne County Airport | |
| 12 | NADB #153420001 | Chicago Midway Airport | Chicago O'Hare Airport |
| 13 | Chicago Midway Airport | Chicago O'Hare Airport | |
| 14 | NADB #390440004 | Greater Pittsburgh Airport | |
| 15 | NADB #153420001 | Chicago Midway Airport | Chicago O'Hare Airport |
| 16 | Greater Pittsburgh Airport | | |
| 17 | Cleveland Hopkins Airport | | |
| 18 | Youngstown Municipal Airport | | |
| 19 | No digitized data available | | |
| 20 | No analysis possible | | |
| 21 | NADB #366420012 | | |
| 22 | St. Louis Airport | | |
| 23 | Windsor, Ontario | Wayne County Airport | |
| 24 | Buffalo Airport | | |
| 25 | Birmingham Airport | | |
| 26 | Birmingham Airport | | |
| 27 | NADB #361000001 | Akron-Canton Airport | |
| 28 | Chicago Midway Airport | Chicago O'Hare Airport | |
| 29 | Cleveland Hopkins Airport | | |
| 30 | Youngstown Municipal Airport | | |

(continued)

TABLE 5. METEOROLOGICAL DATA STATIONS (1978-1982) USED IN UPDATED ANALYSES (Concluded)

| Mill Number | Primary Station | Secondary Station | Tertiary Station |
|---|---|---|---|
| 31 | Youngstown Municipal Airport | | |
| 32 | No digitized data available | | |
| 33 | Youngstown Municipal Airport | | |
| 34 | Greater Pittsburgh Airport | | |
| 35 | Greater Pittsburgh Airport | | |
| 36 | Greater Pittsburgh Airport | | |
| 37 | NADB #391080012 | | |
| 38 | Greater Pittsburgh Airport | | |
| 39 | No analysis possible | | |
| 40 | NADB #011300003 | Birmingham Airport | |
| 41 | Chicago Midway Airport | Chicago O'Hare Airport | |
| 42 | Cleveland Hopkins Airport | | |
| 43 | NADB #153420011 | Chicago Midway Airport | Chicago O'Hare Airport |
| 44 | Cleveland Hopkins Airport | | |
| 45 | Youngstown Municipal Airport | | |
| 46 | No digitized data available | | |
| 47 | NADB #366420012 | | |
| 48 | Greater Pittsburgh Airport | | |
| 49 | NADB #366420012 | | |
| 50 | Chicago Midway Airport | Chicago O'Hare Airport | |
| 51 | Birmingham Airport | | |
| 52 | NADB #180080010 | Huntington Tri-State Airport | |
| 53 | NADB #394460011 | | |
| 54 | Huntington Tri-State Airport | | |
| 55 | Windsor, Ontario | Wayne County Airport | |
| 56 | Greater Pittsburgh Airport | | |

programs/meteorological monitoring networks, for the inclusion of representativeness assessments in reporting, and for further joint efforts such as the workshop that they report. Their final recommendation is for the development of evaluation criteria "...although value judgment will be properly exercised in the scientific community."

A limited literature search has produced several references that provide data indirectly related to the subject of concern in this study, but that could only prove of limited value after considerable additional effort (Cormier 1975, Shreffler 1983, and Fujita and Wakimoto 1982).

In view of the limited and indirectly related quantitative data on this subject, and our agreement with Nappo et al. that value judgments be properly exercised, we have followed the approach of developing experienced judgments as to the representativeness of the meteorological sites to the TSP monitoring sites. In order to make the approach as objective as we could, and to take advantage of the fact that we have a number of experienced micrometeorologists/diffusion meteorologists readily available to us, we employed what has been called the Delphi approach. This involves defining the problem separately to a number of different experts in the field, and soliciting their best individual judgments as to the answer. These judgments are then combined, the degree of consistency is determined, and where significant disagreements are observed, if any, these are resolved by further consultation with experts, separately or together.

The question was posed to our experts in the form of the table in which we later present the results. It combines the two primary critical parameters (distance and topography, including surface roughness). The experts were asked to enter in each cell in the matrix their judgment of the representativeness of the meteorological station to the monitor site as Excellent (E), Very Good (VG), Good (G), or Unknown (U). The fourth rating (Unknown) was originally set as Poor, but it soon became evident that the word Poor implied a known degree of unrepresentativeness, when in fact it usually arose because the distance between the two sites became great enough to cause doubt, but not to ensure nonrepresentativeness. In some specific cases, in fact, when the rating scheme was applied to the sites studied, the rater judged that there was a fair (but undefinable) chance that the meteorological data were applicable to the monitor site. A case in point is when the sites are juxtaposed similarly on a lake shore (implying representativeness), but are simply too far apart (say, greater than 25 km) to provide any assurance.

The raters vary widely in experience: Education ranges from a bachelor degree to a doctorate in Meteorology; field experience from a year or so to as much as 20 years; and research and theoretical experience from none to many years. There were seven raters, and the results were as follows: Six of the 56 cells had unanimous results, in that all seven raters assigned the same rating. Seventeen of the cells (30%) had five or more of the raters

(70%) giving the same rating. An additional 24 cells had two adjacent ratings (E-VG or VG-G or G-U) with scores of 3 and 3 or 4 and 2 for a total of six raters with adjacent ratings. These two situations account for 41, or 73% of the cells.

Of the remaining 15 cells, 14 more (total of 55, or 96%) had a single rating with at least three raters' entries, and one had no consensus (not more than two votes for any one rating). Of the total ratings given (392, or 56 cells times 7 raters), 10 or 2-1/2 percent, were considered outliers in that the rater assigned a rating that appeared significantly different from the pattern of ratings assigned by the other raters for that cell.

All things considered, we believe that there is a gratifying degree of consistency in these findings. While the results could undoubtedly be refined by further recycling through these raters, or by the inclusion of more raters from other sources, we believe that careful examination of the resulting table will show that significant improvement is unlikely and not worth the effort. Accordingly, Table 6 is both the result of our Delphi method study and the basis for the representativeness ratings given with the pollution roses for each steel mill.

Once the table was established, it was unnecessary for any further joint action on the part of the raters. The subsequent analysis was simply a matter of establishing the terrain and distance characteristics of the meteorological and TSP stations in the vicinity of each mill; this was done by a single analyst. That action defines the terrain/distance combination cell in the table, which results in the assignment of the representativeness rating from that cell. In some cases the analyst was moved to comment on the significance of an unknown rating, and that is included with the terrain/distance combination and the representativeness rating for the plant being considered (see for example Mill No. 43, U.S. Steel, Gary, Indiana).

TABLE 6. REPRESENTATIVENESS OF ONE METEOROLOGICAL STATION COMPARED WITH ANOTHER AS A FUNCTION OF DISTANCE OF SEPARATION AND TERRAIN FEATURES (24-HOUR AVERAGE METEOROLOGICAL DATA)

| | | Distance, km | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | A | B | C | D | E | F | G | H |
| | Terrain | 0 to 0.5 | 0.6 to 1.0 | 1+ to 3 | 3+ to 6 | 6+ to 10 | 10+ to 15 | 15+ to 25 | >25 |
| I | Level* | E | E | E | E | E-VG | VG | VG-G | G |
| II | Gently Rolling† | E | E | E-VG | VG | VG-G | VG-G | G | G-U |
| III | Hilly# | E-VG | VG | G | G | U | U | U | U |
| IV | Mountain/ Valley (similar**) | E-VG | VG | G | G | G | G | G-U | U |
| V | Mountain/ Valley (different††) | G | G | U | U | U | U | U | U |
| VI | Local Circulation (Lake or Sea Breeze) (similar**) | E-VG | VG | VG | G | U | U | U | U |
| VII | Local Circulation (Lake or Sea Breeze) (different††) | VG-G | G | G-U | U | U | U | U | U |

Key to Cell Entries: E = Excellent, VG = Very Good, G = Good, U = Unknown (see text)

* <100 feet variation in 1 kilometer.

† 100 to 500 feet variation in 1 kilometer.

# 500 to 800 feet variation in 1 to 2 kilometers.

** The meteorological station and the TSP monitor site are in similar orientations and locations with respect to the terrain feature (mountain/valley or waterfront).

†† The meteorological station and the TSP monitor site are in different orientations and locations with respect to the terrain feature (mountain/valley or waterfront).

## SUMMARY

Ambient air quality statistics have been presented for the years 1973-1982 for TSP, BaP, and IP for the vicinities of the major integrated steel facilities in the United States. For each mill, conclusions have been drawn concerning the impact of the mill as discerned through pollution roses and analyses of the conditions occurring on days on which the National Ambient Air Quality Standards have been exceeded. Trends in the 12-month running geometric means of TSP and the frequency of exceedance of the 24-hour standards have been assessed.

The long-term trends (over several years), as evidenced by the Spearman rank correlation coefficients computed from the time series of 12-month running geometric means, are generally downward; 83 percent of the stations used in the analyses demonstrate long-term downward trends. Almost 20 percent of the stations had coefficients less than -0.9, indicating very strong downwind trends. Many stations showed particularly strong downwind progression of the 12-month running means from mid-1980 through 1982. Imbedded in this decline is the likely effect of the change in 1982 to a filter type that permits less artifact formation than did filters used in 1979-1981.

Of course, the degree to which the geometric means trends are representative of peak steel mill ambient impacts is to a great extent affected by how well the monitors are sited to take advantage of the greatest frequency of persistent wind conditions. The original 1973-1977 analysis document assessed the adequacy of the hi-vol networks in the vicinity of each of the mills; it was shown that the networks were truly adequate to assess the ambient impacts at only 12 of the mills. Monitoring networks became adequate in the vicinities of seven additional mills during 1978-1980, but three less mills were adequately monitored in 1981-1982 compared with 1978-1980.

The TSP roses show considerably more ambient impact of some mills than of others, because the average TSP values for the wind directions blowing from the mill are not only a function of the mill emissions, but also of how well the monitor is sited and the representativeness of the wind data. Generally, at mills with stations showing 24-hour standard exceedances, there is at least one site where some of the cases of exceedance can be tied to mill emissions through the wind direction analysis presented in the standard exceedance roses.

Tables 7 through 11 present a summary of the history of primary standard attainment status for the vicinity of each mill as determined solely by the data from the stations that existed during the eight quarters ending at the end of each given year. In the tables, "NV" indicates no monitored violation of the annual and 24-hour primary standards, "V" indicates a violation of either the annual or 24-hour standard was observed in the monitoring data, and "I/D" indicates insufficient data to determine the

TABLE 7. PRIMARY STANDARD ATTAINMENT STATUS

Region II

| Plant | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|
| Bethlehem-Lackawanna | V | V | V | V | V | V | V | V | V | V |
| Republic-Buffalo | V | V | V | V | V | V | V | V | V | V |

TABLE 8. PRIMARY STANDARD ATTAINMENT STATUS

Region III

| Plant | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|
| Bethlehem-Sparrows Pt. | NV | NV | V | V | NV | NV | NV | NV | NV | NV |
| Bethlehem-Bethlehem | I/D | NV | NV | V | V | V | V | V | V | NV |
| Crucible-Midland | V | V | V | V | V | V | V | V | V | NV |
| J&L-Alquippa | V | V | V | V | V | V | I/D | V | V | V |
| J&L-Pittsburgh | V | V | V | V | V | V | V | V | V | V |
| National-Weirton | I/D | V | V | V | V | I/D | V | V | V | V |
| Sharon-Fairmont | I/D | V | V | V | V | I/D | V | V | - | - |
| Sharon-Farrell | I/D | V | V | V | V | V | I/D | V | V | V |
| USSC-Braddock | I/D | V | V | V | V | V | V | V | V | V |
| USSC-Clairton | V | V | V | V | V | V | V | V | V | NV |
| USSC-Duquesne | V | V | V | V | V | V | V | V | V | NV |
| USSC-Fairless Hills | NV | NV | NV | NV | NV | NV | NV | NV | NV | NV |
| USSC-Homestead | V | V | V | V | V | V | V | V | V | V |
| USSC-Saxonburg | I/D | I/D | I/D | I/D | I/D | I/D | I/D | I/D | I/D | I/D |
| Wheel.-Pgh.-Follansbee | I/D | V | V | V | V | V | V | V | V | V |
| Wheel.-Pgh.-Monessen | I/D | V | V | V | V | V | I/D | V | V | V |
| Bethlehem-Johnstown | V | V | V | V | V | V | V | V | V | V |
| Shenango-Pittsburgh | I/D | I/D | I/D | I/D | I/D | I/D | I/D | I/D | NV | NV |

TABLE 9. PRIMARY STANDARD ATTAINMENT STATUS

Region IV

| Plant | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|
| Armco-Ashland | V | V | V | V | V | V | V | V | V | V |
| Republic-Birmingham | V | V | V | V | V | V | V | V | V | NV |
| Republic-Gadsden | I/D | I/D | I/D | V | V | V | V | NV | V | V |
| USSC-Fairfield | V | V | V | V | V | V | V | V | V | V |
| Alabama Byproducts | V | V | V | V | V | V | V | V | V | V |

TABLE 10. PRIMARY STANDARD ATTAINMENT STATUS

Region V

| Plant | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|
| Armco-Hamilton | I/D | I/D | I/D | NV | NV | NV | NV | NV | NV | NV |
| Armco-Middletown | V | V | V | V | V | V | V | I/D | NV | NV |
| Bethlehem-Burns Harbor | I/D | I/D | I/D | I/D | I/D | I/D | V | N | V | I/D |
| Ford-Dearborn | V | V | V | V | V | V | V | V | V | V |
| Inland-East Chicago | V | V | V | V | V | V | V | V | V | V |
| Interlake-Chicago | V | V | V | V | V | V | V | V | V | V |
| J&L-East Chicago | V | V | V | V | V | V | V | V | V | V |
| J&L-Cleveland | V | V | V | V | V | V | V | V | V | V |
| J&L-Youngstown | V | V | V | V | V | V | V | V | V | V |
| National-Granite City | V | I/D | V | V | V | V | V | V | V | V |
| National-Detroit | V | V | V | V | V | V | V | V | V | V |
| Republic-Canton | V | V | V | V | V | V | V | V | NV | NV |
| Republic-Chicago | V | V | V | V | V | V | V | V | V | V |
| Republic-Cleveland | V | V | V | V | V | V | V | V | V | V |
| Republic-Warren | V | V | V | V | V | V | V | V | V | NV |
| Republic-Youngstown | V | V | V | V | V | V | V | V | V | V |
| USSC-Chicago | V | V | V | V | V | V | V | V | V | V |
| USSC-Cleveland | V | V | V | V | V | V | V | V | V | V |
| USSC-Gary | V | V | V | V | V | V | V | V | V | V |
| USSC-Lorain | V | V | V | V | V | V | V | V | V | NV |
| USSC-Youngstown | V | V | V | V | V | V | V | V | V | V |
| Wheel.-Pgh.-Steubenville | V | V | V | V | V | V | V | V | V | V |
| Wisconsin-Chicago | V | V | V | V | V | V | V | V | V | V |
| McLouth-Ironton | V | V | I/D | V | V | V | V | NV | NV | NV |
| Empire Detroit-Portsmouth | V | V | V | NV | V | V | NV | NV | NV | NV |
| McLouth-Trenton | V | V | V | V | NV | NV | NV | NV | NV | NV |

TABLE 11. PRIMARY STANDARD ATTAINMENT STATUS

Region VI

| Plant | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|
| Armco-Houston | V | I/D | V | V | V | V | V | V | V | V |
| Lone Star-Lone Star | I/D | I/D | I/D | I/D | I/D | I/D | I/D | I/D | I/D | I/D |

Region VIII

| Plant | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|
| CF&I-Pueblo | V | V | V | V | V | V | V | V | V | NV |
| USSC-Geneva | I/D | V | V | V | V | V | V | V | V | V |

Region IX

| Plant | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|
| Kaiser-Fontana | I/D | I/D | I/D | V | V | V | V | V | V | V |

status. Table 12 indicates the number of mills at which the surrounding monitoring stations show no violations of the primary TSP standards as of the end of each year from 1973 through 1982. Over the period 1981-1982, there were 17 mills at which no violations of the primary standards were recorded.

Table 13 is a tabulation of the steel mills in the order in which they appear in the report, along with the town, county, state, and EPA region where the mill is located.

TABLE 12. NUMBER OF MILLS AT WHICH STATIONS INDICATE PRIMARY STANDARD ATTAINMENT

| Year | Number of Mills |
|---|---|
| 1973 | 2 |
| 1974 | 3 |
| 1975 | 2 |
| 1976 | 3 |
| 1977 | 4 |
| 1978 | 4 |
| 1979 | 5 |
| 1980 | 7 |
| 1981 | 9 |
| 1982 | 17 |

TABLE 13. STEEL MILL LOCATIONS

| Report Number | Name of Company | Town | County | State | EPA Region |
|---|---|---|---|---|---|
| 1 | Armco Steel | Hamilton | Butler | Ohio | V |
| 2 | Armco Steel | Middletown | Butler | Ohio | V |
| 3 | Armco Steel | Ashland | Boyd | Kentucky | IV |
| 4 | Armco Steel | Houston | Harris | Texas | VI |
| 5 | Bethlehem Steel | Sparrows Point | Baltimore | Maryland | III |
| 6 | Bethlehem Steel | Lackawanna | Erie | New York | II |
| 7 | Bethlehem Steel | Bethlehem | Northampton | Pennsylvania | III |
| 8 | Bethlehem Steel | Burns Harbor | Porter | Indiana | V |
| 9 | CF & I Steel | Pueblo | Pueblo | Colorado | VIII |
| 10 | Crucible Steel | Midland | Beaver | Pennsylvania | III |
| 11 | Ford Motor Co. | Dearborn | Wayne | Michigan | V |
| 12 | Inland Steel | East Chicago | Lake | Indiana | V |
| 13 | Interlake Steel | Chicago | Cook | Illinois | V |
| 14 | Jones & Laughlin | Aliquippa | Beaver | Pennsylvania | III |
| 15 | Jones & Laughlin | East Chicago | Lake | Indiana | V |
| 16 | Jones & Laughlin | Pittsburgh | Allegheny | Pennsylvania | III |
| 17 | Jones & Laughlin | Cleveland | Cuyahoga | Ohio | V |
| 18 | Jones & Laughlin | Youngstown | Mahoning | Ohio | V |
| 19 | Kaiser Steel | Fontana | San Bernardino | California | IX |
| 20 | Lone Star Steel | Lone Star | Morris | Texas | VI |
| 21 | National Steel | Weirton | Hancock | West Virginia | III |
| 22 | National Steel | Granite City | Madison | Illinois | V |
| 23 | National Steel | Detroit | Wayne | Michigan | V |
| 24 | Republic Steel | Buffalo | Erie | New York | II |
| 25 | Republic Steel | Birmingham | Jefferson | Alabama | IV |
| 26 | Republic Steel | Gadsden | Etowah | Alabama | IV |
| 27 | Republic Steel | Canton | Stark | Ohio | V |
| 28 | Republic Steel | Chicago | Cook | Illinois | V |

(Continued)

TABLE 13. STEEL MILL LOCATIONS (Concluded)

| Report Number | Name of Company | Town | County | State | EPA Region |
|---|---|---|---|---|---|
| 29 | Republic Steel | Cleveland | Cuyahoga | Ohio | V |
| 30 | Republic Steel | Warren | Trumbull | Ohio | V |
| 31 | Republic Steel | Youngstown | Mahoning | Ohio | V |
| 32 | Sharon Steel | Fairmont | Marion | West Virginia | III |
| 33 | Sharon Steel | Farrell | Mercer | Pennsylvania | III |
| 34 | United States Steel | Braddock | Allegheny | Pennsylvania | III |
| 35 | United States Steel | Clairton | Allegheny | Pennsylvania | III |
| 36 | United States Steel | Duquesne | Allegheny | Pennsylvania | III |
| 37 | United States Steel | Fairless Hills | Bucks | Pennsylvania | III |
| 38 | United States Steel | Homestead | Allegheny | Pennsylvania | III |
| 39 | United States Steel | Saxonburg | Butler | Pennsylvania | III |
| 40 | United States Steel | Fairfield | Jefferson | Alabama | IV |
| 41 | United States Steel | Chicago | Cook | Illinois | V |
| 42 | United States Steel | Cleveland | Cuyahoga | Ohio | V |
| 43 | United States Steel | Gary | Lake | Indiana | V |
| 44 | United States Steel | Lorain | Lorain | Ohio | V |
| 45 | United States Steel | Youngstown | Mahoning | Ohio | V |
| 46 | United States Steel | Geneva | Pueblo | Utah | VIII |
| 47 | Wheeling-Pittsburgh Steel | Follansbee | Brooke | West Virginia | III |
| 48 | Wheeling-Pittsburgh Steel | Monessen | Westmoreland | Pennsylvania | III |
| 49 | Wheeling-Pittsburgh Steel | Steubenville | Jefferson | Ohio | V |
| 50 | Wisconsin Steel | Chicago | Cook | Illinois | V |
| 51 | Alabama Byproducts | Birmingham | Jefferson | Alabama | IV |
| 52 | McLouth Steel | Ironton | Lawrence | Ohio | V |
| 53 | Bethlehem Steel | Johnstown | Cambria | Pennsylvania | III |
| 54 | Empire-Detroit Steel | Portsmouth | Scioto | Ohio | V |
| 55 | McLouth Steel | Trenton | Wayne | Michigan | V |
| 56 | Shenango Steel | Pittsburgh | Allegheny | Pennsylvania | III |

## REFERENCES


Cormier, R.V. The Horizontal Variability of Vertically Integrated Boundary Layer Winds. Journal of Geophysical Research, Vol. 80, No. 24. 1975.

Federal Register. Ambient Air Quality Monitoring, Data Reporting, and Surveillance Provisions. Vol. 44, No. 92, pp. 27558-604. 1979.

Fujita, T.T., and R.M. Wakimoto. Effects of Misoscale and Mesoscale Obstructions on PAM Winds Obtained during Project NIMROD. Journal of Applied Meteorology, Vol. 21. 1982.

Kolak, N.P., J. Hyde, and R. Forrester. Particulate Source Contributions in the Niagara Frontier. EPA 902/4-79-006. U.S. Environmental Protection Agency, Region II, New York, New York. 1979.

Larsen, R.I. A Mathematical Model for Relating Air Quality Measurements to Air Quality Standards. Publication AP-89. U.S. Environmental Protection Agency, Research Triangle Park, N.C. 1971.

Nappo, C.J., et al. The Workshop on the Representativeness of Meteorological Observations. Bulletin of the American Meteorological Society, Vol. 63, No. 7. 1982.

Pickering, K.E., et al. A Study of Ambient Air Quality in the Vicinity of Major Steel Facilities. GEOMET Report ES-793, prepared for the Division of Stationary Source Enforcement, U.S. Environmental Protection Agency, Washington, D.C. 1979.

Pickering, K.E., J.M. Vilardo, H.E. Rector, and S.D. Thayer. A Study of Ambient TSP Levels Near Major Steel Facilities (1978-1980 Update). EPA-340/1-83-024a,b. U.S. Environmental Protection Agency, Washington, D.C. 1983.

Regan, G.F. Benzo-a-pyrene as a Tracer for Coke Oven Emissions. APCA Specialty Conference on Measurement and Monitoring of Non-criteria (Toxic) Contaminants in Air, Chicago, Il. 1983.

Shreffler, J.H. Representativeness of Wind Speed and Direction Measurements in an Urban Area. WMO/AMS/CMOS Fifth Conference on Meteorological Observations and Instrumentation, Toronto, Canada. 1983.

Watson, J.G., J.C. Chow, and J.J. Shah. Analysis of Inhalable and Fine Particulate Matter. EPA-450/4-81-035. U.S. Environmental Protection Agency, Research Triangle Park, North Carolina.

Witz, S., M.M. Smith, and A.B. Moore, Jr. Comparative Performance of Glass Fiber Hi-Vol Filters. J. of the Air Pollution Control Association, 33:988-991. 1983.

ARMCO STEEL
Hamilton
Butler County
Ohio
EPA Region V

Hi-Vol Monitoring Sites--Armco Steel, Hamilton, Ohio

| Site ID Number | SAROAD Number | Site Name and Address | Plant Location from Site: Facility/ Bearing (°) | Plant Location from Site: Distance (km) | Elevation (m): Above Ground | Elevation (m): Above MSL | Elevation (m): Above Plant | Site Description | Nearest Roadway: Name | Nearest Roadway: Direction | Nearest Roadway: Distance (m) | Nearest Roadway: Type and Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1* | 36-2700-002-H01 | Hamilton Municipal Bldg. | Blast furnaces | 42 3.9 | 19 | 198 | 15 | Roof | High St. | S | 9 | 4-lane, M |
| | | Monument & High Sts. | Boilers | 40 4.5 | | | | Center city-commercial | | | | |
| | | Hamilton, OH | Coal crusher & coke plant | 40 4.5 | | | | | U.S. Rt. 127 | NE | 1,000-4,000 | 4-lane, M |
| | | | | | | | | | This roadway runs between the monitoring site and the steel mill. | | | |
| 2** | 36-0900-001-G01 | North Water Works | Blast furnaces | 19 0.7 | 4.5 | 183 | 0 | Roof | Baltimore & Ohio RR. | W | 400 | 2 tracks |
| | | U.S. Rt. 127 S. | Boilers | 26 1.3 | | | | Open field | | | | |
| | | New Miami, OH | Coal crusher & coke plant | 26 1.3 | | | | Rural-industrial | U.S. Rt. 127 | W | 425 | 4-lane, M |

Key: U = Unavailable M = Moderate
L = Light H = Heavy

* Data from this station were included in the original 1973-1977 analysis; however, no strong mill impact on TSP was noted at this site. Based on the likelihood that this situation has not changed, data from this site were not employed in the 1978-1980 or the 1981-1982 updates.

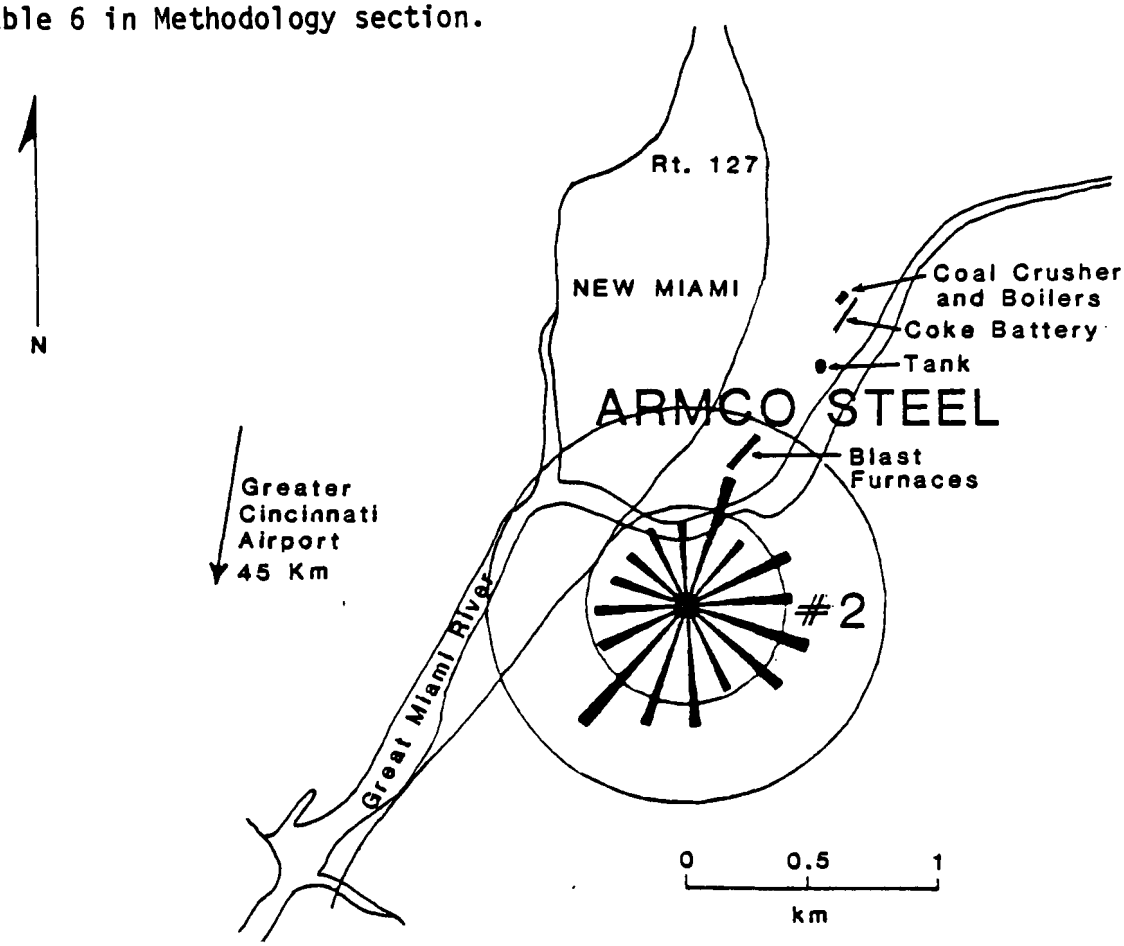
** The North Water Works site was activated 2/6/76. SAROAD #36-0900-001-G01 was used for 1976 and 1978-1982; SAROAD #36-2700-003-H01, for 1977.

Wind Data Representativeness

| Station # | Terrain | Distance | Rating |
|---|---|---|---|
| 2 | II | H | U |

Comment: At this distance the representativeness of the meteorology is questionable.

N.B. See Table 6 in Methodology section.



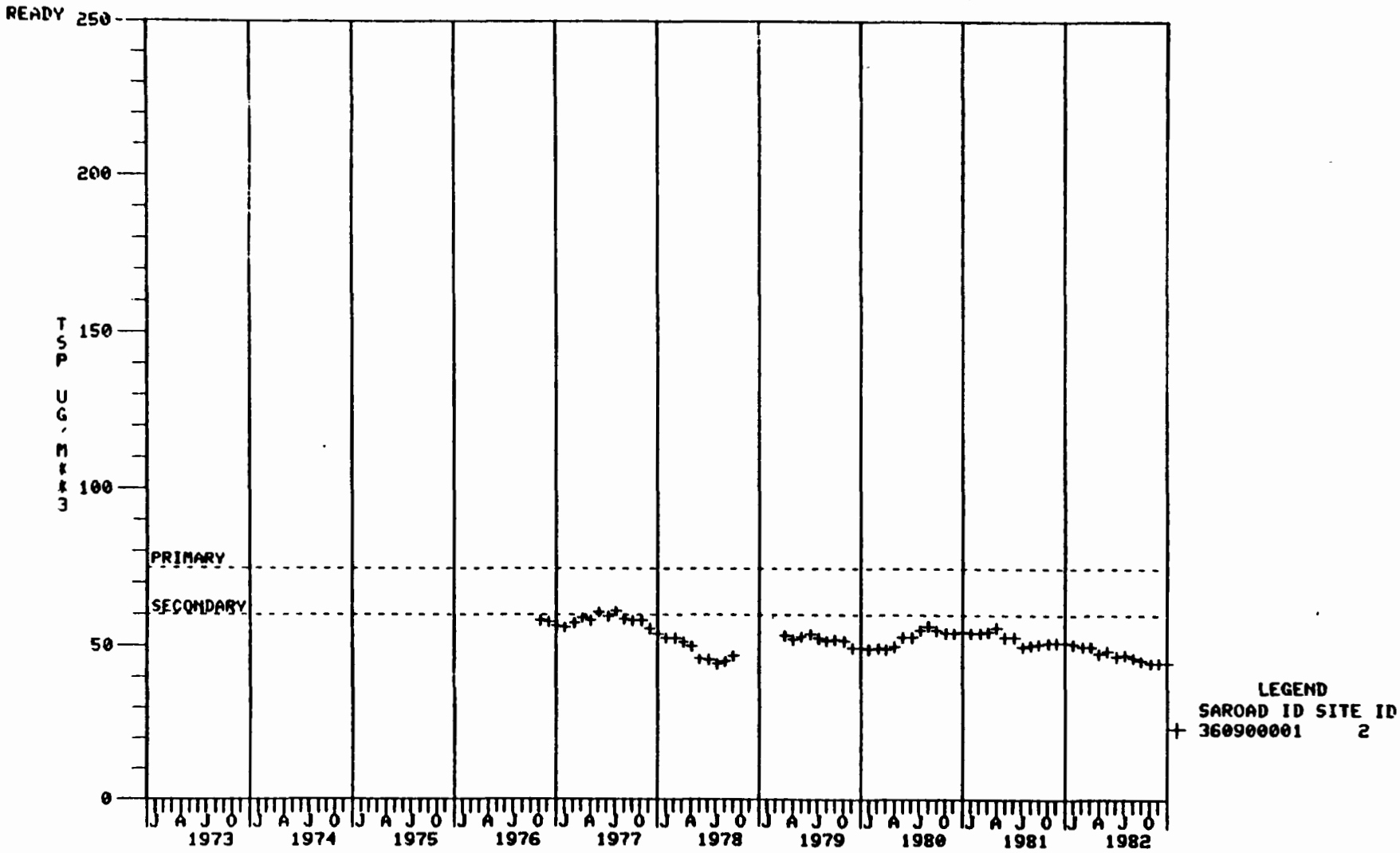

TSP roses for Armco Steel - Hamilton, Ohio, for the period 1978-1982 for cases of $\omega>0.85$. Each circle represents 50 $\mu g/m^3$.

NUMBER OF TSP OBSERVATIONS USED IN POLLUTION ROSES

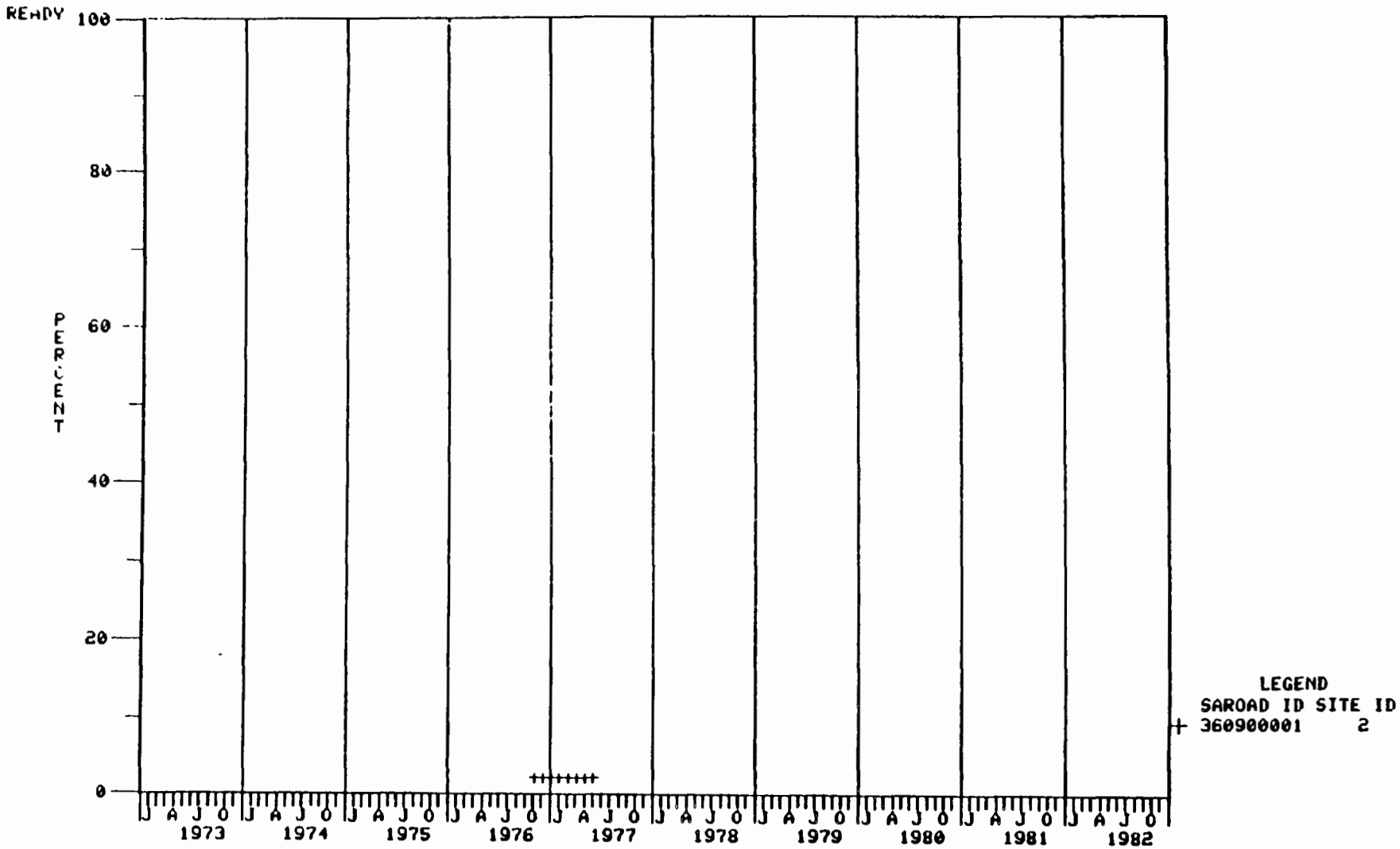
Armco--Hamilton, OH

| Wind Direction | Monitoring Site Numbers #2 |
|---|---|
| N | 8 |
| NNE | 5 |
| NE | 3 |
| ENE | 10 |
| E | 12 |
| ESE | 7 |
| SE | 5 |
| SSE | 3 |
| S | 15 |
| SSW | 15 |
| SW | 12 |
| WSW | 13 |
| W | 15 |
| WNW | 8 |
| NW | 1 |
| NNW | 4 |
| Total | 136 |

TSP 12 MONTH RUNNING GEOMETRIC MEANS (UG/M**3) FOR ARMCO - HAMILTON, OH



TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 150 (UG/M**3) FOR ARMCO - HAMILTON, OH



TSP DATA SUMMARY FOR ARMCO - HAMILTON, OH
SAROAD STATION # 360900001 SITE ID # 02
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 0 | 0 | 54 | 50 | 44 | 43 | 53 | 59 | 49 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | ****** | 56.7 | 54.0 | ****** | 49.4 | 54.9 | 51.2 | 44.6 |
| GEOMETRIC S.D.: | ****** | ****** | ****** | ****** | 1.6 | 1.7 | ****** | 1.5 | 1.4 | 1.4 | 1.5 |
| ARITHMETIC MEAN | ****** | ****** | ****** | ****** | 63.5 | 61.2 | ****** | 53.7 | 58.4 | 54.1 | 48.2 |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | ****** | 227.2 | 245.1 | ****** | 175.2 | 153.1 | 137.1 | 139.0 |
| 1ST HIGHEST: | ****** | ****** | ****** | ****** | 207.0 | 139.0 | 114.0 | 95.0 | 133.0 | 98.0 | 118.0 |
| DATE : | ****** | ****** | ****** | ****** | 760611 | 770519 | 781104 | 790322 | 800509 | 810428 | 820505 |
| 2ND HIGHEST: | ****** | ****** | ****** | ****** | 125.0 | 132.0 | 108.0 | 95.0 | 104.0 | 88.0 | 112.0 |
| DATE : | ****** | ****** | ****** | ****** | 761015 | 770513 | 780911 | 790626 | 800614 | 810615 | 820803 |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 0 | 0 | 33 | 34 | 31 | 30 | 37 | 43 | 41 |
| 66-130: | 0 | 0 | 0 | 0 | 20 | 14 | 13 | 13 | 15 | 16 | 8 |
| 131-195: | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 |
| 196-260: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

24-HR STANDARD EXCEEDANCE ROSE FOR
ARMCO - HAMILTON, OH
(ALL CASES > 260 UG/M**3)
X=0.850
COUNT/AVERAGE TSP OF PRIMARY EXCEEDANCES

SAROAD # 360900001
SITE ID # 2

| DIRECTION | | W>=X | W<X |
|---|---|---|---|
| N | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| NNE | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| NE | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| ENE | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| E | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| ESE | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| SE | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| SSE | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| S | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| SSW | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| SW | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| WSW | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| W | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| WNW | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| NW | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| NNW | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| ALL | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |

24-HR STANDARD EXCEEDANCE ROSE FOR
ARMCO - HAMILTON, OH
(ALL CASES > 150 UG/M**3)
X=0.850
COUNT/AVERAGE TSP OF SECONDARY EXCEEDANCES

SAROAD # 360900001
SITE ID # 2

| DIRECTION | W>=X | W<X |
|---|---|---|
| N COUNT: | 0 | 0 |
| AVE TSP: | 0. | 0. |
| NNE COUNT: | 0 | 0 |
| AVE TSP: | 0. | 0. |
| NE COUNT: | 0 | 0 |
| AVE TSP: | 0. | 0. |
| ENE COUNT: | 0 | 0 |
| AVE TSP: | 0. | 0. |
| E COUNT: | 0 | 0 |
| AVE TSP: | 0. | 0. |
| ESE COUNT: | 0 | 0 |
| AVE TSP: | 0. | 0. |
| SE COUNT: | 0 | 0 |
| AVE TSP: | 0. | 0. |
| SSE COUNT: | 0 | 0 |
| AVE TSP: | 0. | 0. |
| S COUNT: | 0 | 0 |
| AVE TSP: | 0. | 0. |
| SSW COUNT: | 0 | 0 |
| AVE TSP: | 0. | 0. |
| SW COUNT: | 0 | 0 |
| AVE TSP: | 0. | 0. |
| WSW COUNT: | 1 | 0 |
| AVE TSP: | 207. | 0. |
| W COUNT: | 0 | 0 |
| AVE TSP: | 0. | 0. |
| WNW COUNT: | 0 | 0 |
| AVE TSP: | 0. | 0. |
| NW COUNT: | 0 | 0 |
| AVE TSP: | 0. | 0. |
| NNW COUNT: | 0 | 0 |
| AVE TSP: | 0. | 0. |
| ALL COUNT: | 1 | 0 |
| AVE TSP: | 207. | 0. |

## AIR QUALITY EVALUATION - ARMCO STEEL, HAMILTON, OHIO

Air quality trends:

The Spearman rank correlation coefficient for station #2 is -0.58, implying a moderate downward trend. This is based on measurements between 1976 and 1982. Annual geometric means are generally near 50 $\mu g/m^3$ during this period. The percent of observations exceeding the secondary 24-hour standard was nonzero only in 1976-1977.

Standard exceedance status:

Station #2 did not exceed the primary TSP standards throughout the period.

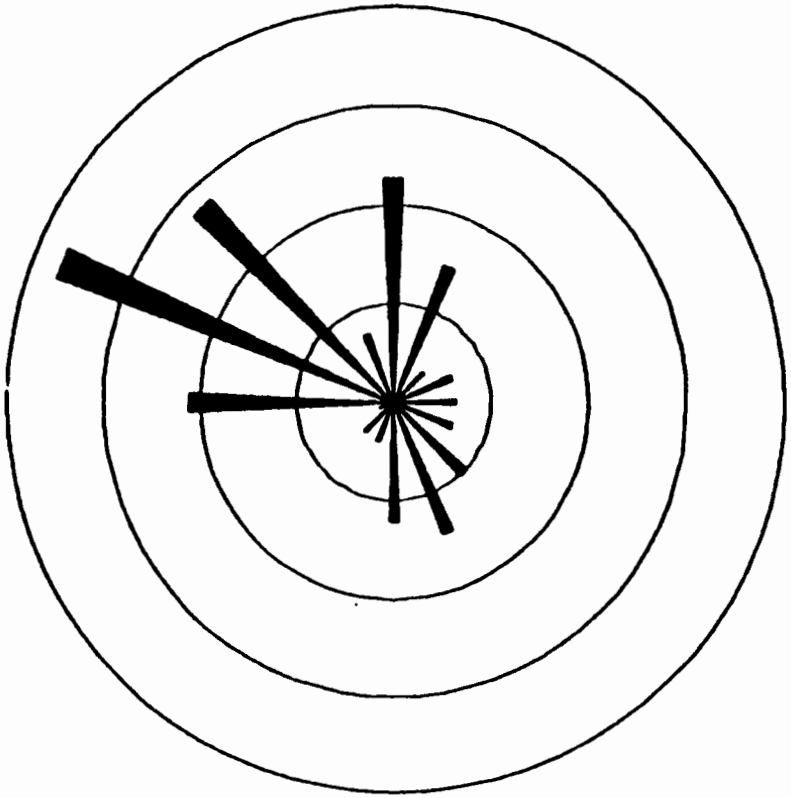
Pollution roses:

The TSP rose is generally circular with only a slight contribution from the mill indicated.

Standard exceedance roses:

No excursions beyond 24-hour primary or secondary standards were recorded by station #2 in 1977-1982. The lone excursion beyond standards for the entire period of sampler operation (1976-1980) occurred in 1976 when west-southwest winds coincided with an excursion beyond the 24-hour secondary standard. This TSP value does not represent a steel mill impact.

WIND ROSE
PERSISTENCE CLASS 0.95
WIND STATION 93814



NORTH

ARMCO STEEL
Middletown
Butler County
Ohio
EPA Region V

Hi-Vol Monitoring Sites--Armco Steel, Middletown, Ohio

| Site ID Number | SAROAD Number | Site Name and Address | Plant Location from Site: Facility/ Bearing (°) | | Distance (km) | Elevation (m): Above Ground | Above MSL | Above Plant | Site Description | Nearest Roadway: Name | Direction | Distance (m) | Type and Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1* | 36-4340-001-H01 | Middletown High School** Gerald & Baltimore Sts. Middletown, OH | Boiler #2 | 157 | 3.1 | 15** | 216** | 15** | Roof Center city | Verity Pkwy. (Rts. 4 & 73) | W | 275 | 4-lane, M to H |
| | | | Blast furnace #3 | 157 | 3.3 | | | | | | | | |
| | | | Coke plant #2 | 158 | 3.9 | | | | | | | | |
| | | | Coke plant #3 | 153 | 4.1 | | | | | | | | |
| | | | Recycling | 157 | 3.5 | | | | | | | | |
| | | | BOF | 151 | 3.8 | | | | | | | | |
| | | | Open hearth furnace | 151 | 3.3 | | | | | | | | |
| 2 | 36-4340-002-H01 | Armco East Works Highland St. & Lefferson Rd. Middletown, OH | Boiler #2 | 219 | 0.7 | 3.2 | 206 | 5 | Roof Industrial Residential | Highland St. | E | 15 | 2-lane, M |
| | | | Blast furnace #3 | 210 | 0.8 | | | | | Lefferson Rd. | S | 8 | 2-lane, dead ends at plant gate |
| | | | Coke plant | 186 | 1.2 | | | | | | | | |
| | | | Coke plant | 167 | 1.3 | | | | | | | | |
| | | | Recycling | 199 | 0.9 | | | | | | | | |
| | | | BOF | 167 | 0.9 | | | | | RR. | SW | 30 | H, RR. yard for mill |
| | | | Open hearth furnace | 186 | 0.5 | | | | | | | | |
| 3 | 36-4340-003-G01 | Middletown Verity School Middletown, OH | Boiler #2 | 251 | 3.0 | 3.5 | 209 | 8 | Roof Residential-industrial | Breiel Blvd. | SW | 150 | 4-lane, M |
| | | | Blast furnace #3 | 249 | 3.0 | | | | | | | | |
| | | | Coke plant #2 | 237 | 3.1 | | | | | | | | |
| | | | Coke plant #3 | 232 | 2.7 | | | | | | | | |
| | | | Recycling | 245 | 3.0 | | | | | | | | |
| | | | BOF | 239 | 2.6 | | | | | | | | |
| | | | Open hearth furnace | 248 | 2.6 | | | | | | | | |
| 4* | 36-4340-004-H01 | Middletown CAM Hook Field 1711 N. Verity Pkwy. Middletown, OH | Boiler #2 | 172 | 4.9 | 3.5 | 201 | 0 | Roof Airport | Main Runway | NW | 250 | L |
| | | | Blast furnace #3 | 171 | 5.0 | | | | | Verity Pkwy. | SSE | 360 | 4-lane, M |
| | | | Coke plant #2 | 170 | 5.6 | | | | | | | | |
| | | | Coke plant #3 | 166 | 5.7 | | | | | | | | |
| | | | Recycling | 170 | 5.2 | | | | | | | | |
| | | | BOF | 166 | 5.4 | | | | | | | | |
| | | | Open hearth furnace | 168 | 4.9 | | | | | | | | |
| 5 | 36-4340-005-G01 | Wilson School 2104 Brentwood Middletown, OH | Center of plant | 205 | 3.4 | 3.6 | 195 | -2 | Center city-residential | Highview Rd. | E | | M |

(Continued)

Key: U = Unavailable M = Moderate
L = Light H = Heavy

* Data from this station were included in the original 1973-1977 analysis; however, no strong mill impact on TSP was noted at this site. Based on the likelihood that this situation has not changed, data from this site were not employed in the 1978-1980 or the 1981-1982 updates.

** Middletown High School site was discontinued in 1975. The hi-vol sampler location was not accurately determined and elevations were estimated.

Hi-Vol Monitoring Sites--Armco Steel, Middletown, Ohio (Concluded)

| Site ID Number | SAROAD Number | Site Name and Address | Plant Location from Site | | | Elevation (m) | | | Site Description | Nearest Roadway | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Facility/ Bearing (°) | | Distance (km) | Above Ground | Above MSL | Above Plant | | Name | Direc- tion | Distance (m) | Type and Volume |
| 6 | 36-4340-006-G01 | Armco Research Facility 919 Cincinnati-Dayton Rd. Middletown, OH | Center of plant | 140 | 2.9 | 3.6 | 195 | -2 | Rural-agricultural | U | U | U | U |
| 7 | 36-4340-007-A05 | Yankee Road Gate Middletown, OH | Center of plant | 140 | 1.2 | 3.6 | 195 | -2 | Suburban Industrial | Yankee Rd. | U | U | U |
| 8 | 36-4340-009-A05 | Coke Plant Gate Middletown, OH | Center of plant | 20 | 0.6 | 3.6 | 195 | -2 | Suburban Industrial | U | U | U | U |
| 9 | 36-4340-010-A05 | Replaces old Wilson School site Middletown, OH | Center of plant | 205 | 3.4 | 3.6 | 195 | -2 | Suburban Industrial | Highview Rd. | E | U | U |

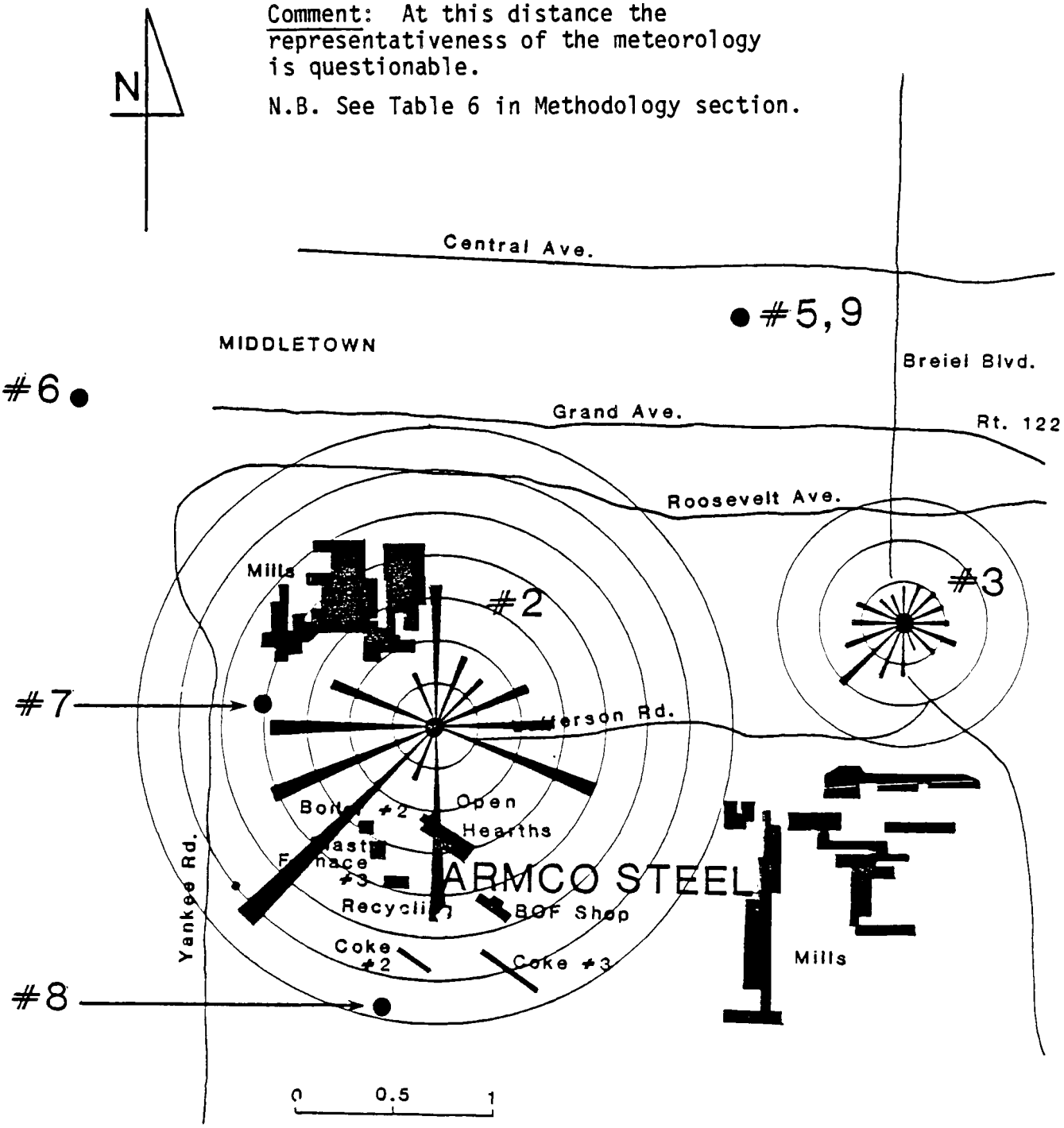
Key: U = Unavailable M = Moderate
L = Light H = Heavy

Wind Data Representativeness

| Station # | Terrain | Distance | Rating |
|---|---|---|---|
| 2, 3 | II | H | U |

Comment: At this distance the representativeness of the meteorology is questionable.

N.B. See Table 6 in Methodology section.



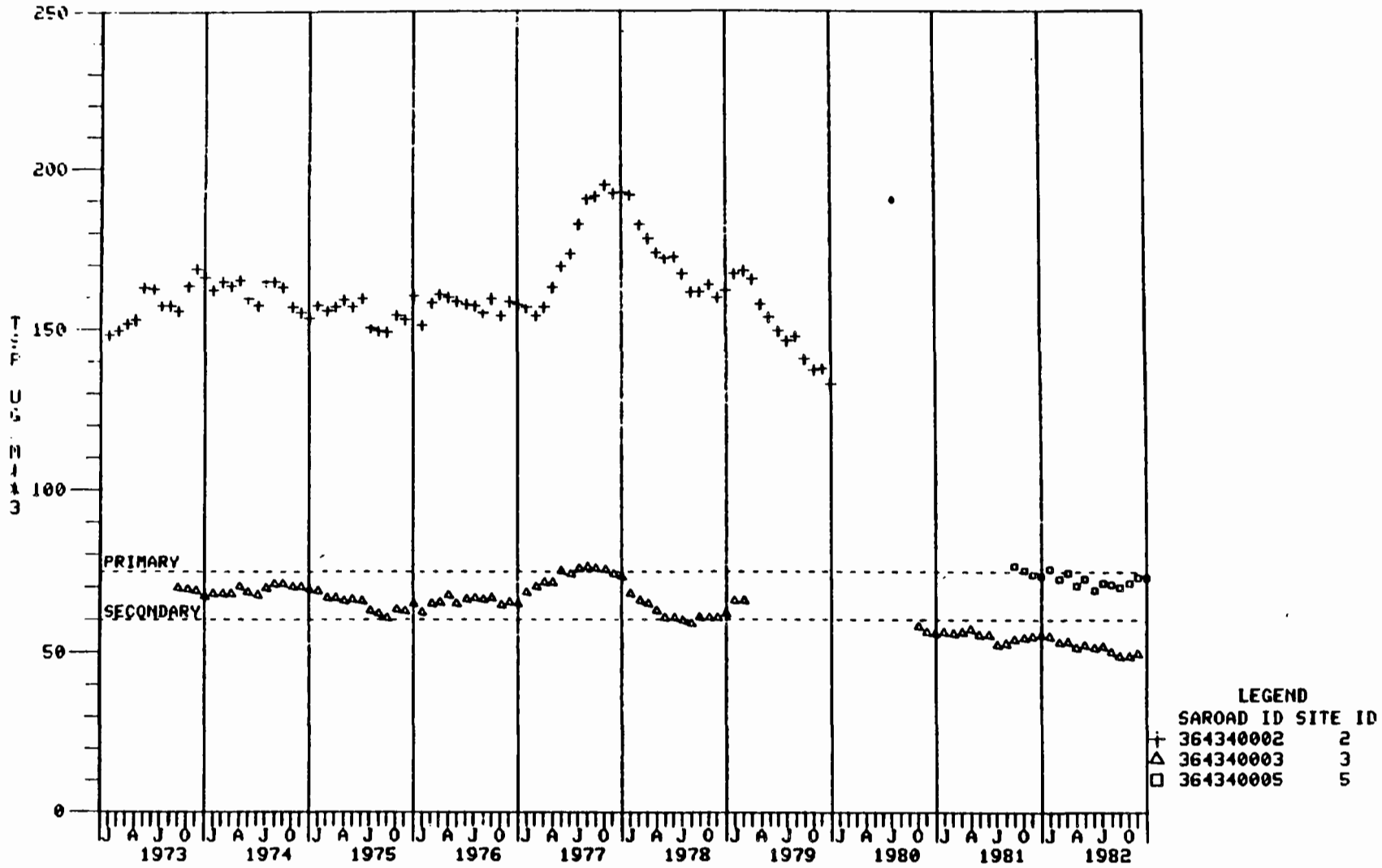

TSP roses for Armco Steel - Middletown, Ohio, for the period 1978-1982 for cases of $\omega>0.85$. Each circle represents 50 $\mu g/m^3$.

NUMBER OF TSP OBSERVATIONS USED IN POLLUTION ROSES

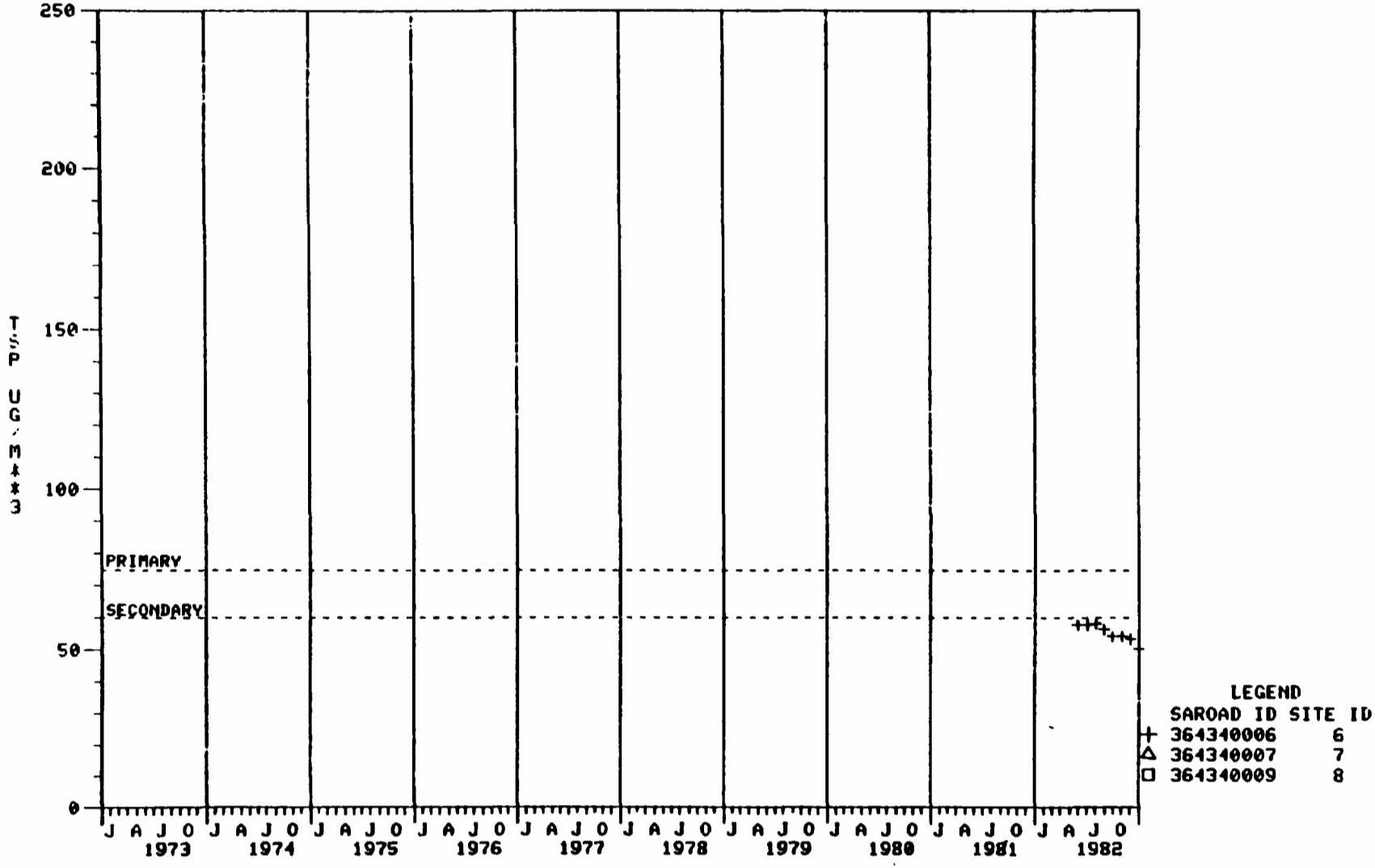
Armco--Middletown, OH

| Wind Direction | Monitoring Site Numbers #2 | #3 |
|---|---|---|
| N | 3 | 8 |
| NNE | 1 | 5 |
| NE | 2 | 3 |
| ENE | 6 | 11 |
| E | 3 | 10 |
| ESE | 2 | 7 |
| SE | 0 | 5 |
| SSE | 0 | 2 |
| S | 5 | 13 |
| SSW | 1 | 12 |
| SW | 7 | 11 |
| WSW | 4 | 15 |
| W | 7 | 12 |
| WNW | 7 | 7 |
| NW | 0 | 1 |
| NNW | 5 | 6 |
| Total | 53 | 128 |

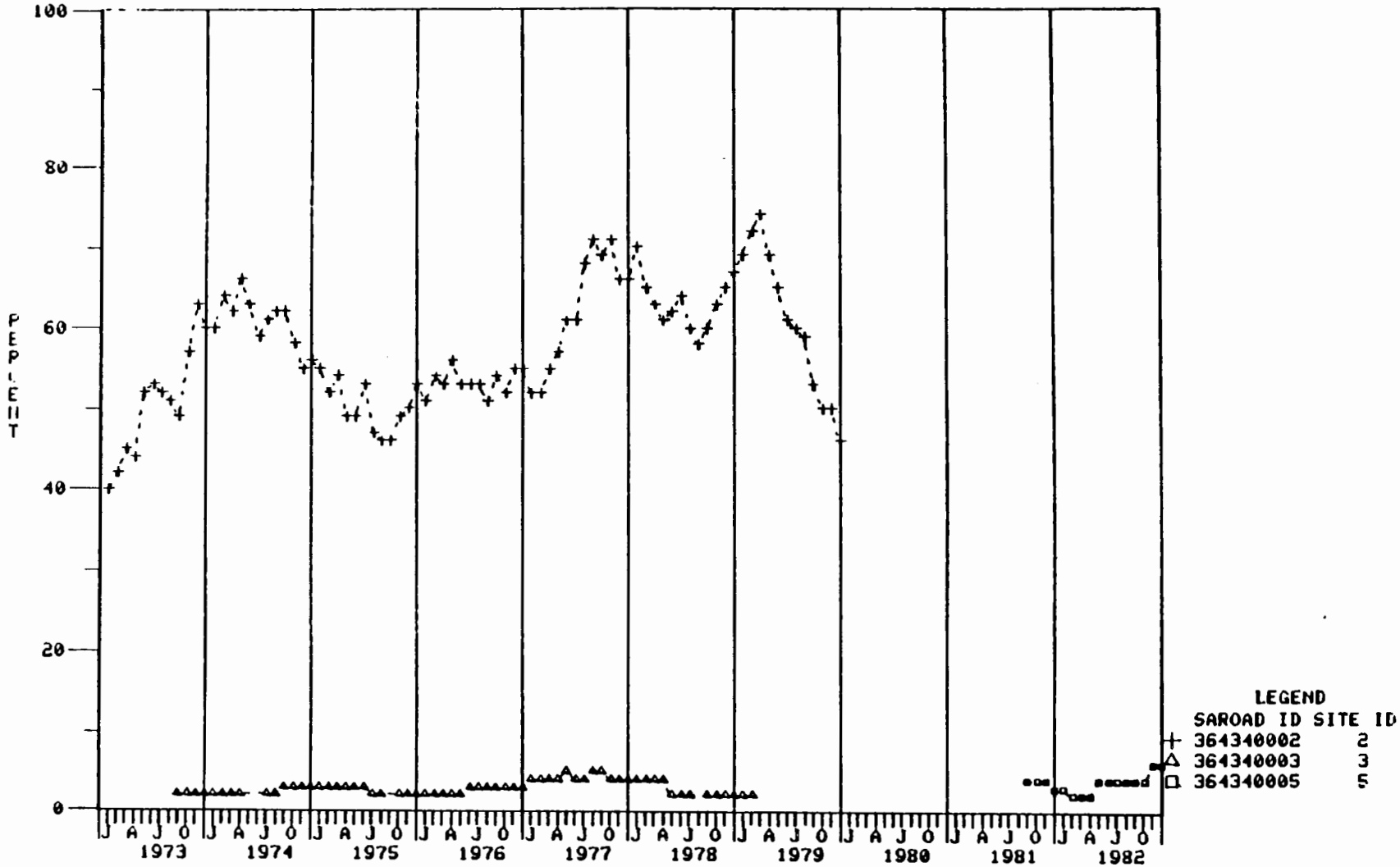
TSP 12 MONTH RUNNING GEOMETRIC MEANS (UG/M**3) FOR ARMCO - MIDDLETOWN, OH



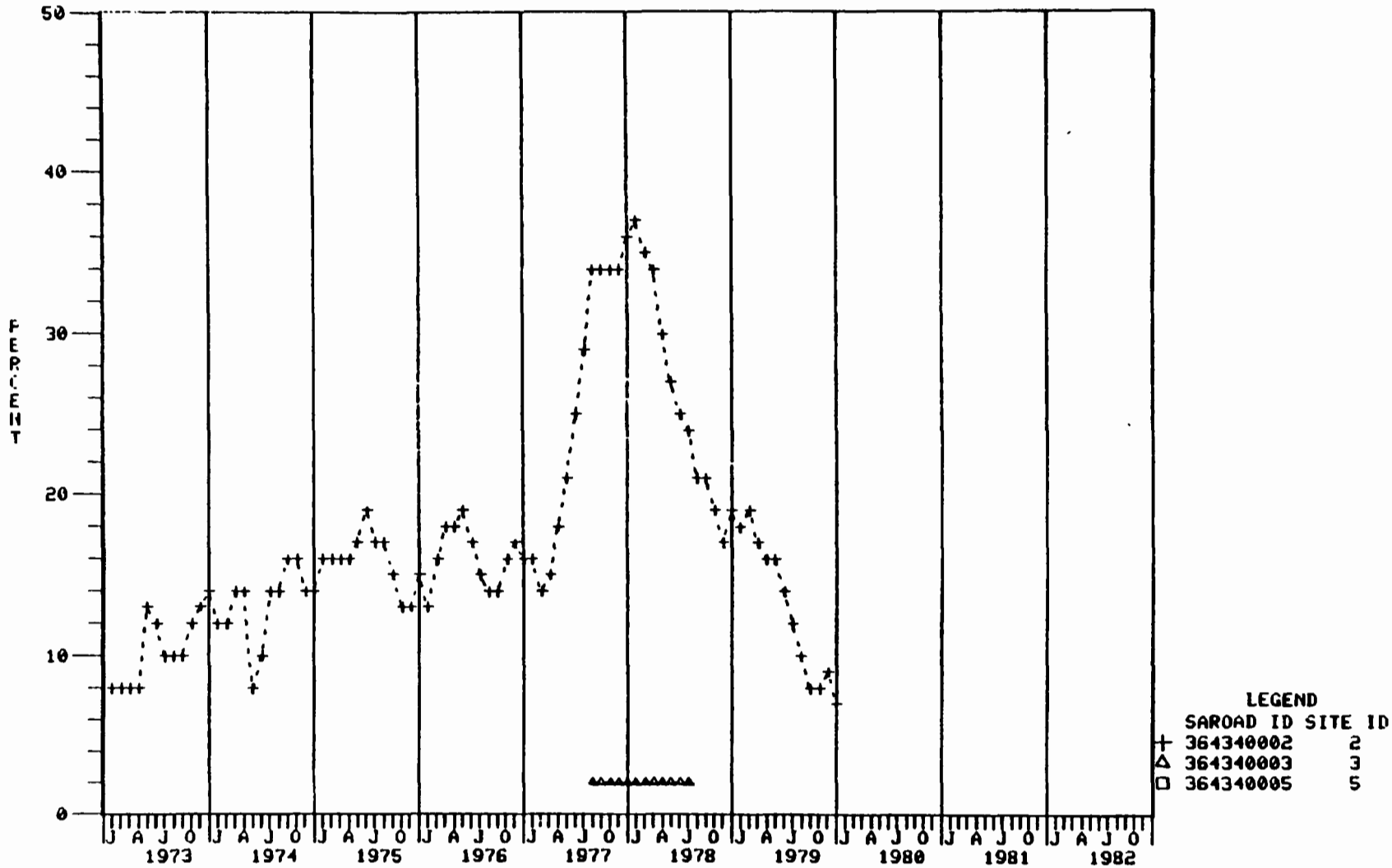
TSP 12 MONTH RUNNING GEOMETRIC MEANS (UG/M**3) FOR ARMCO - MIDDLETOWN, OH



TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 150 (UG/M**3) FOR ARMCO - MIDDLETOWN, OH



TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 260 (UG/M**3) FOR ARMCO - MIDDLETOWN, OH



TSP DATA SUMMARY FOR ARMCO - MIDDLETOWN, OH
SAROAD STATION # 364340002 SITE ID # 02
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 57 | 58 | 59 | 53 | 58 | 56 | 54 | 41 | 0 | 0 | 0 |
| GEOMETRIC MEAN: | 142.8 | 166.2 | 153.6 | 160.6 | 157.7 | 192.6 | 162.2 | 132.9 | ****** | ****** | ****** |
| GEOMETRIC S.D.: | 1.5 | 1.5 | 1.6 | 1.6 | 1.7 | 1.7 | 1.8 | 1.6 | ****** | ****** | ****** |
| ARITHMETIC MEAN | 154.4 | 179.6 | 172.0 | 178.9 | 182.1 | 221.7 | 190.3 | 148.3 | ****** | ****** | ****** |
| HIGHEST BY LARSEN EXTRP: | 448.7 | 532.0 | 642.7 | 585.1 | 760.5 | 923.1 | 948.9 | 553.8 | ****** | ****** | ****** |
| 1ST HIGHEST: | 366.0 | 450.0 | 416.0 | 631.0 | 537.0 | 707.0 | 475.0 | 301.0 | ****** | ****** | ****** |
| DATE : | 720714 | 730516 | 740710 | 750418 | 760506 | 770916 | 780414 | 790608 | ****** | ****** | ****** |
| 2ND HIGHEST: | 333.0 | 351.0 | 355.0 | 438.0 | 469.0 | 483.0 | 434.0 | 294.0 | ****** | ****** | ****** |
| DATE : | 720614 | 730416 | 741014 | 751214 | 760224 | 771115 | 780601 | 790316 | ****** | ****** | ****** |
| # OF READINGS EXCEEDING 260 : | 4 | 7 | 8 | 8 | 9 | 20 | 10 | 3 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 20 | 35 | 33 | 28 | 32 | 37 | 36 | 19 | 0 | 0 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 1 | 0 | 3 | 0 | 2 | 0 | 4 | 3 | 0 | 0 | 0 |
| 66-130: | 21 | 16 | 21 | 18 | 20 | 17 | 13 | 18 | 0 | 0 | 0 |
| 131-195: | 24 | 21 | 12 | 20 | 14 | 9 | 13 | 12 | 0 | 0 | 0 |
| 196-260: | 7 | 14 | 15 | 7 | 13 | 10 | 14 | 5 | 0 | 0 | 0 |
| 261-325: | 1 | 5 | 6 | 5 | 4 | 10 | 4 | 3 | 0 | 0 | 0 |
| 326-390: | 3 | 1 | 1 | 0 | 1 | 5 | 2 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 1 | 2 | 2 | 1 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR ARMCO - MIDDLETOWN, OH
SAROAD STATION # 364340003 SITE ID # 03
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 60 | 59 | 59 | 58 | 54 | 52 | 23 | 56 | 58 | 39 |
| GEOMETRIC MEAN: | ****** | 66.6 | 69.2 | 64.6 | 64.6 | 73.0 | 61.6 | ****** | 55.7 | 55.2 | ****** |
| GEOMETRIC S.D.: | ****** | 1.5 | 1.5 | 1.5 | 1.6 | 1.6 | 1.6 | ****** | 1.4 | 1.4 | ****** |
| ARITHMETIC MEAN | ****** | 71.9 | 75.0 | 69.4 | 71.3 | 80.4 | 68.4 | ****** | 59.2 | 58.2 | ****** |
| HIGHEST BY LARSEN EXTRP: | ****** | 209.1 | 225.3 | 201.7 | 241.6 | 270.7 | 239.9 | ****** | 156.0 | 142.1 | ****** |
| 1ST HIGHEST: | ****** | 190.0 | 198.0 | 151.0 | 174.0 | 263.0 | 203.0 | 119.0 | 131.0 | 118.0 | 92.0 |
| DATE : | ****** | 730516 | 740710 | 751015 | 760611 | 770805 | 780911 | 790906 | 800509 | 810428 | 820505 |
| 2ND HIGHEST: | ****** | 142.0 | 160.0 | 134.0 | 157.0 | 150.0 | 140.0 | 114.0 | 101.0 | 102.0 | 83.0 |
| DATE : | ****** | 730709 | 740920 | 750822 | 761015 | 770513 | 780601 | 790807 | 800614 | 810522 | 820716 |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 1 | 2 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 28 | 24 | 30 | 31 | 25 | 27 | 11 | 37 | 42 | 30 |
| 66-130: | 0 | 30 | 32 | 27 | 23 | 27 | 22 | 12 | 18 | 16 | 9 |
| 131-195: | 0 | 2 | 2 | 2 | 4 | 1 | 2 | 0 | 1 | 0 | 0 |
| 196-260: | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR ARMCO - MIDDLETOWN, OH
SAROAD STATION # 364340005 SITE ID # 05
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 30 | 61 | 53 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 73.6 | 72.9 |
| GEOMETRIC S.D.: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 1.5 | 1.6 |
| ARITHMETIC MEAN | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 80.8 | 80.9 |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 250.9 | 276.0 |
| 1ST HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 109.0 | 219.0 | 227.0 |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 800506 | 810329 | 821101 |
| 2ND HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 93.0 | 200.0 | 197.0 |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 800825 | 810209 | 820330 |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 3 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 19 | 29 | 20 |
| 66-130: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 26 | 29 |
| 131-195: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 2 |
| 196-260: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR ARMCO - MIDDLETOWN, OH
SAROAD STATION # 364340006 SITE ID # 06
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 56 | 19 | 56 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 50.5 |
| GEOMETRIC S.D.: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 1.5 |
| ARITHMETIC MEAN | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 55.0 |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 180.2 |
| 1ST HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 122.0 | 108.0 | 104.0 |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 800506 | 810913 | 820505 |
| 2ND HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 122.0 | 98.0 | 97.0 |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 800702 | 810814 | 820716 |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 26 | 8 | 38 |
| 66-130: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 30 | 11 | 18 |
| 131-195: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 196-260: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR ARMCO - MIDDLETOWN, OH
SAROAD STATION # 364340007 SITE ID # 07
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 57 | 0 | 0 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| GEOMETRIC S.D.: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| ARITHMETIC MEAN | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| 1ST HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 173.0 | ****** | ****** |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 800828 | ****** | ****** |
| 2ND HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 167.0 | ****** | ****** |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 800325 | ****** | ****** |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15 | 0 | 0 |
| 66-130: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 35 | 0 | 0 |
| 131-195: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 0 |
| 196-260: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR ARMCO - MIDDLETOWN, OH
SAROAD STATION # 364340009 SITE ID # 08
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 54 | 0 | 0 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| GEOMETRIC S.D.: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| ARITHMETIC MEAN | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| 1ST HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 232.0 | ****** | ****** |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 801009 | ****** | ****** |
| 2ND HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 189.0 | ****** | ****** |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 800328 | ****** | ****** |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 0 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 0 | 0 |
| 66-130: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 27 | 0 | 0 |
| 131-195: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14 | 0 | 0 |
| 196-260: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR ARMCO - MIDDLETOWN, OH
SAROAD STATION # 364340010 SITE ID # 09
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 57 | 0 | 0 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| GEOMETRIC S.D.: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| ARITHMETIC MEAN | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| 1ST HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 329.0 | ****** | ****** |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 801009 | ****** | ****** |
| 2ND HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 122.0 | ****** | ****** |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 800506 | ****** | ****** |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 36 | 0 | 0 |
| 66-130: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20 | 0 | 0 |
| 131-195: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 196-260: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

24-HR STANDARD EXCEEDANCE ROSE FOR
ARMCO - MIDDLETOWN, OH
(ALL CASES > 260 UG/M**3)
X=0.850
COUNT/AVERAGE TSP OF PRIMARY EXCEEDANCES

| SAROAD # | 364340002 | | 364340003 | | 364340005 | | 364340006 | | 364340007 | | 364340009 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SITE ID # | 2 | | 3 | | 5 | | 6 | | 7 | | 8 | |
| DIRECTION | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X |
| N COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| NNE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| NE COUNT: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 262. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| ENE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| E COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| ESE COUNT: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 270. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| SE COUNT: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 262. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| SSE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S COUNT: | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 310. | 302. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| SSW COUNT: | 19 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 403. | 290. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| SW COUNT: | 12 | 8 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 328. | 345. | 263. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| WSW COUNT: | 5 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 329. | 297. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| W COUNT: | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 292. | 395. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| WNW COUNT: | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 274. | 376. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| NW COUNT: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 279. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| NNW COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| ALL COUNT: | 44 | 21 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 354. | 332. | 263. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |

24-HR STANDARD EXCEEDANCE ROSE FOR
ARMCO - MIDDLETOWN, OH
(ALL CASES > 260 UG/M**3)
X=0.850
COUNT/AVERAGE TSP OF PRIMARY EXCEEDANCES

SAROAD # 364340010
SITE ID # 9

| DIRECTION | | W>=X | W<X |
|---|---|---|---|
| N | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| NNE | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| NE | COUNT: | 0 | 1 |
| | AVE TSP: | 0. | 329. |
| ENE | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| E | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| ESE | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| SE | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| SSE | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| S | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| SSW | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| SW | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| WSW | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| W | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| WNW | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| NW | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| NNW | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| ALL | COUNT: | 0 | 1 |
| | AVE TSP: | 0. | 329. |

24-HR STANDARD EXCEEDANCE ROSE FOR
ARMCO - MIDDLETOWN, OH
(ALL CASES > 150 UG/M**3)
X=0.850
COUNT/AVERAGE TSP OF SECONDARY EXCEEDANCES

| SAROAD # | 364340002 | | 364340003 | | 364340005 | | 364340006 | | 364340007 | | 364340009 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SITE ID # | 2 | | 3 | | 5 | | 6 | | 7 | | 8 | |
| DIRECTION | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X |
| N COUNT: | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| AVE TSP: | 182. | 206. | 0. | 0. | 0. | 0. | 0. | 0. | 167. | 0. | 0. | 0. |
| NNE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| NE COUNT: | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| AVE TSP: | 0. | 217. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 193. |
| ENE COUNT: | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 192. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| E COUNT: | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 |
| AVE TSP: | 182. | 166. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 165. | 155. |
| ESE COUNT: | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| AVE TSP: | 236. | 156. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 189. |
| SE COUNT: | 1 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 151. | 191. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| SSE COUNT: | 4 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 179. | 202. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S COUNT: | 10 | 13 | 0 | 0 | 3 | 0 | 0 | 0 | 1 | 0 | 1 | 1 |
| AVE TSP: | 247. | 208. | 0. | 0. | 191. | 0. | 0. | 0. | 173. | 0. | 158. | 152. |
| SSW COUNT: | 32 | 14 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 325. | 217. | 0. | 160. | 214. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| SW COUNT: | 31 | 22 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| AVE TSP: | 252. | 249. | 233. | 194. | 0. | 0. | 0. | 0. | 0. | 0. | 165. | 179. |
| WSW COUNT: | 13 | 7 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 262. | 231. | 163. | 157. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| W COUNT: | 9 | 13 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 199. | 219. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| WNW COUNT: | 9 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 190. | 266. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| NW COUNT: | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 249. | 193. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| NNW COUNT: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 201. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| ALL COUNT: | 119 | 101 | 4 | 4 | 5 | 0 | 0 | 0 | 2 | 0 | 4 | 7 |
| AVE TSP: | 256. | 222. | 198. | 176. | 200. | 0. | 0. | 0. | 170. | 0. | 163. | 179. |

24-HR STANDARD EXCEEDANCE ROSE FOR
ARMCO - MIDDLETOWN, OH
(ALL CASES > 150 UG/M**3)
X=0.850
COUNT/AVERAGE TSP OF SECONDARY EXCEEDANCES

SAROAD # 364340010
SITE ID # 9

| DIRECTION | | W>=X | W<X |
|---|---|---|---|
| N | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| NNE | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| NE | COUNT: | 0 | 1 |
| | AVE TSP: | 0. | 329. |
| ENE | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| E | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| ESE | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| SE | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| SSE | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| S | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| SSW | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| SW | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| WSW | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| W | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| WNW | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| NW | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| NNW | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| ALL | COUNT: | 0 | 1 |
| | AVE TSP: | 0. | 329. |

## AIR QUALITY EVALUATION - ARMCO STEEL, MIDDLETOWN, OHIO

Air quality trends:

Only stations #2 and #3 have a record of sufficient length to develop systematic tendencies for the geometric mean. The 12-month running geometric means for station #2 were consistently above primary standards until the end of its operation in 1979. Typical values were on the order of 150 $\mu g/m^{-3}$. The Spearman rank correlation coefficient for the entire period was near 0.10, indicating no trend. However, running geometric means were in steady decline for 1978-1979. Station #3 has an oscillating record characterized by values consistently above the secondary standard until 1980. The Spearman rank correlation coefficient for this station was -0.74 for the entire period, indicating a strong downward trend. Stations #5 and #6 have Spearman rank correlation coefficients of -0.63 and -0.90, respectively, over short periods of record.

The percent of observations exceeding 150 $\mu g/m^3$ at station #2 ranged between 40 and 70 percent during 1973-1979. Stations #3 and #5 steadily show values $\leq$ 5 percent, while Station #6 indicates no observations exceeding 150 $\mu g/m^3$. Excursions over 260 $\mu g/m^3$ peaked in late 1977 and early 1978 at stations #2 and #3.

Standard exceedance status:

Station #2 indicates exceedances of the primary standard throughout its existence. Station #3, more distant from the major mill sources, indicates no primary standard exceedances throughout the period.

Pollution roses:

Pollution roses for stations #2 and #3 tend to show elevated levels of TSP when the wind blows persistently from production facilities to samplers.

Standard exceedance roses:

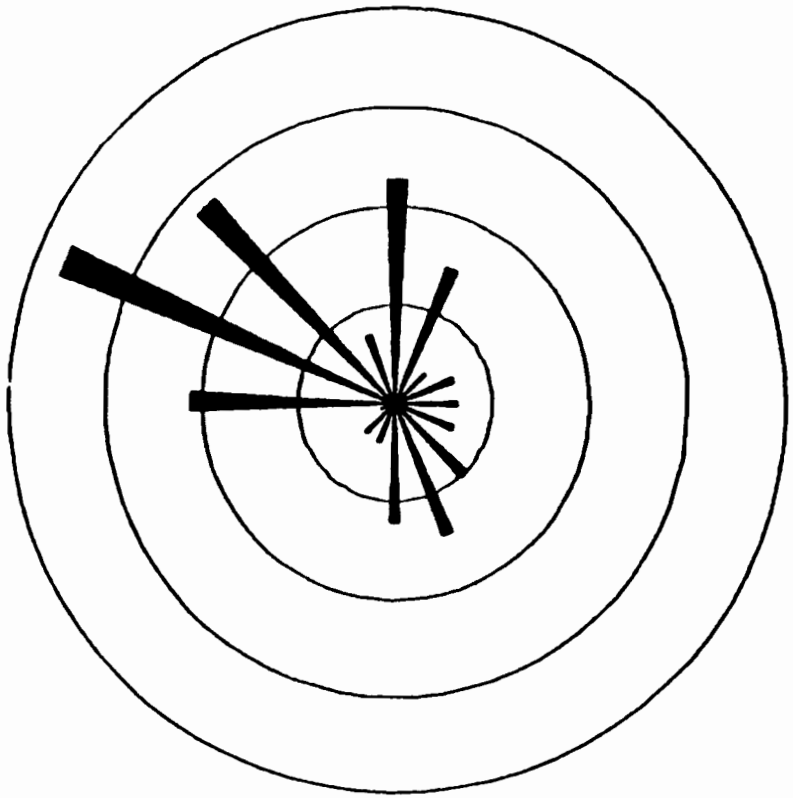
The standard exceedance rose for station #2 indicates that nearly all exceedances (primary and secondary) occurred under steady winds from directions of plant activities. A similar situation holds for station #3. At the newer stations, exceedances were rarer. For example, station #9 registered only one exceedance of primary standards and this case occurred under variable winds. Similarly, for excursions beyond secondary standards at the newer stations, the majority came under variable winds.

Inhalable Particulate Matter:

Station #5 samples IP as part of the EPA IP Network. Data summarized for 1980-1982 are as follows:

| Year | Instrument | # of Obs. | Arithmetic Mean | Highest | Second Highest | Standard Deviation |
|---|---|---|---|---|---|---|
| 1980 | SSI | 25 | 59.8 | 131.8 | 131.7 | 28.3 |
| 1981 | SSI | 55 | 65.4 | 159.3 | 143.5 | 28.7 |
| 1981 | DICHOT | 9 | 46.8 | 81.1 | 61.7 | 20.7 |
| 1982 | DICHOT | 21 | 49.8 | 94.2 | 90.7 | 21.1 |

WIND ROSE
PERSISTENCE CLASS 0.95
WIND STATION 93814



ARMCO STEEL
Ashland
Boyd County
Kentucky
EPA Region IV

Hi-Vol Monitoring Sites--Armco Steel, Ashland, Kentucky

| Site ID Number | SAROAD Number | Site Name and Address | Plant Location from Site: Facility/ Bearing (°) | Plant Location from Site: Distance (km) | Elevation (m): Above Ground | Elevation (m): Above MSL | Elevation (m): Above Plant | Site Description | Nearest Roadway: Name | Nearest Roadway: Direction | Nearest Roadway: Distance (m) | Nearest Roadway: Type and Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 36-3080-003-H01 | WIRO Radio Station Bldg.<br>Box 299<br>Ironton, OH | Sinter plant<br>#3 Boiler<br>BOF<br>Blast furnaces | 181<br>173<br>170<br>178 | 4.1<br>3.9<br>4.7<br>4.2 | 1 | 227 | 59 | Ground level<br>Residential-suburban | U.S. Rt. 52<br><br><br>State Rt. 93 | SW<br><br><br>NW | 200<br><br><br>75 | 4-lane, M to H<br><br><br>4-lane, M |
| 2* | 36-3080-004-H01<br>36-3080-009-P01 | Ironton Jr. High School<br>302 Delaware St.<br>Ironton, OH | Sinter plant<br>#3 Boiler<br>BOF<br>Blast furnaces | 154<br>147<br>148<br>151 | 6.1<br>6.2<br>7.0<br>6.3 | 5 | 168 | 0 | Roof<br>Residential | U.S. Rt. 52 | NE | 350 | 4-lane, M to H |
| 3* | 36-3080-005-H01 | 2827 S. 10th St.**<br>Ironton, OH | Sinter plant<br>#3 Boiler<br>BOF<br>Blast furnaces | 226<br>220<br>195<br>220 | 2.1<br>1.6<br>2.1<br>2.0 | 3 | 170 | 2 | Roof<br>Residential<br>Source oriented to coke facility | No major roadways (Ironton Coke) | S | 800 | |
| 4* | 36-3080-006-H01 | Lawrence-Ironton Health Center<br>2120 S. 8th St.<br>Ironton, OH | Sinter plant<br>#3 Boiler<br>BOF<br>Blast furnaces | 205<br>191<br>179<br>198 | 2.2<br>1.8<br>2.5<br>2.2 | 5 | 173 | 5 | Roof<br>Urban<br>Residential | 8th St. | NE | 25 | 2-lane, L to M |
| 5* | 36-3080-007-H01 | Memorial Building**<br>403 Railroad St.<br>Ironton, OH | Sinter plant<br>#3 Boiler<br>BOF<br>Blast furnaces | 169<br>160<br>158<br>165 | 4.0<br>3.9<br>4.7<br>4.0 | 17 | 183 | 15 | Roof<br>Urban<br>Downtown | Railroad St. | SE | 10 | L to M |
| 6 | 36-3080-010-H09 | Lawrence County Hosp.<br>2228 S. 9th St.<br>Ironton, OH | Sinter plant<br>#3 Boiler<br>BOF<br>Blast furnaces | 205<br>191<br>179<br>198 | 2.2<br>1.8<br>2.5<br>2.2 | 10 | 178 | 10 | Roof<br>Urban<br>Residential | 8th St.<br><br><br>9th St. | SW<br><br><br>NE | 30<br><br><br>60 | 2-lane, L to M<br><br><br>2-lane, L to M |
| 7 | 18-0080-003-F01 | Economic Security Bldg.<br>19th and Carter<br>Ashland, KY | Sinter plant<br>#3 Boiler<br>BOF<br>Blast furnaces | 309<br>317<br>313<br>311 | 4.4<br>4.2<br>3.4<br>4.3 | 7.5 | 177 | 9 | Roof<br>Urban<br>Residential<br>Commercial | 19th St.<br><br><br>Carter Ave. | SE<br><br><br>SW | 20<br><br><br>15 | 2-lane, L<br><br><br>2-lane, L to M |
| 8 | 18-0080-005-F01 | Water Treatment Plant<br>4051 Winchester<br>Ashland, KY | Sinter plant<br>#3 Boiler<br>BOF<br>Blast furnaces | 314<br>318<br>317<br>315 | 7.6<br>7.5<br>6.6<br>7.4 | 25 | 189 | 21 | Roof<br>Residential<br>Industrial | Winchester Ave. (Rts. 23 & 60)<br>Semet-Solvey Coke (Allied)<br>RR. | E<br><br>NNE<br><br>E | 50<br><br>500<br><br>70 | 4-lane, M<br><br>U<br><br>4 tracks |

(Continued)

Key: U = Unavailable M = Moderate
L = Light H = Heavy

* Data from this station were included in the original 1973-1977 analysis; however, no strong mill impact on TSP was noted at this site. Based on the likelihood that this situation has not changed, data from this site were not employed in the 1978-1980 or the 1981-1982 updates.

** Discontinued sites. Elevations and distances were estimated by Portsmouth City Health District field personnel.

Hi-Vol Monitoring Sites--Armco Steel, Ashland, Kentucky (Continued)

| Site ID Number | SAROAD Number | Site Name and Address | Plant Location from Site: Facility/ Bearing (°) | Distance (km) | Elevation (m): Above Ground | Above MSL | Above Plant | Site Description | Nearest Roadway: Name | Direction | Distance (m) | Type and Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9 | 18-0080-006-F01 | Millseat School<br>1922 Hoods Creek Rd.<br>Ashland, KY | Sinter plant 0<br>#3 Boiler 16<br>BOF 37<br>Blast furnaces 8 | 1.7<br>2.1<br>1.5<br>1.7 | 6 | 198 | 30 | Roof<br>Residential | Hood St. | SE | 75 | 2-lane, L |
| 10 | 18-0080-007-F01 | Poage Elem. School<br>29th & Beech<br>Ashland, KY | Sinter plant 341<br>#3 Boiler 347<br>BOF 350<br>Blast furnaces 344 | 5.6<br>5.7<br>4.8<br>5.5 | 6 | 212 | 44 | Roof<br>Residential | 29th St. | SE | 100 | 2-lane, L to M |
| 11 | 18-0080-008-F01 | 23d & Lexington<br>Ashland, KY | Sinter plant 314<br>#3 Boiler 321<br>BOF 319<br>Blast furnaces 316 | 5.1<br>4.9<br>4.0<br>4.0 | 4.5 | 180 | 12 | Roof<br>Urban<br>Residential<br>Commercial | Lexington Ave. | NNE | 8 | 2-lane, L |
| 12 | 18-1540-001-F01 | Bellefonte School<br>Bellefonte, KY | Sinter plant 37<br>#3 Boiler 46<br>BOF 76<br>Blast furnaces 46 | 1.2<br>1.7<br>1.7<br>1.3 | 4.5 | 209 | 41 | Roof<br>Residential | State Rt. 5 | NW | 100 | 2-lane, L to M |
| 13* | 36-3080-002-P01 | Arting Hotel**<br>202 Park Ave.<br>Ironton, OH | Sinter plant 168<br>#3 Boiler 158<br>BOF 157<br>Blast furnaces 164 | 3.7<br>3.6<br>4.5<br>3.8 | 25 | 191 | 23 | Roof<br>Urban-<br>center city | Park Ave. | NW | 10 | L to M |
| 14* | 36-1380-001-H02 | George's Elec. Co.**,†<br>203 Marion Pike<br>Coal Grove, OH | Sinter plant 276<br>#3 Boiler 287<br>BOF 258<br>Blast furnaces 275 | 2.2<br>1.7<br>1.3<br>1.9 | 4 | 176 | 8 | Roof<br>Residential<br>Commercial | Rt. 243<br><br>Rt. 52 | NW<br><br>NE | 50<br><br>100 | 2-lane, M<br>4-lane, M to H |
| 15* | 36-3380-003-H01 | Holiday Inn<br>U.S. Rt. 52<br>South Point, OH | Sinter plant 308<br>#3 Boiler 311<br>BOF 310<br>Blast furnaces 309 | 9.4<br>9.2<br>8.4<br>9.2 | 5 | 176 | 8 | Roof<br>Residential | U.S. Rt. 52 | E | 200 | 4-lane, M to H |
| 16 | 36-1380-002-H02 | Coal Grove Day Care† Center<br>300 Marion Pike<br>Coal Grove, OH | Sinter plant 271<br>#3 Boiler 279<br>BOF 251<br>Blast furnaces 270 | 2.4<br>1.8<br>1.5<br>2.1 | 4 | 177 | 9 | Roof<br>Suburban-<br>industrial | Rt. 243<br><br>Rt. 52 | SE<br><br>W & SW | 30<br><br>75 | 2-lane, M<br>4-lane, M to H |

(Continued)

Key: U = Unavailable M = Moderate
L = Light H = Heavy

* Data from this station were included in the original 1973-1977 analysis; however, no strong mill impact on TSP was noted at this site. Based on the likelihood that this situation has not changed, data from this site were not employed in the 1978-1980 or the 1981-1982 updates.

** Discontinued sites. Elevations and distances were estimated by Portsmouth City Health District field personnel.

† George's Electric Company (SAROAD #36-1380-001-H02) is an $SO_2$ bubbler site. Coal Grove Day Care Center (SAROAD #36-1380-002-H02) is a hi-vol site. Hi-vol data filed under 36-1380-001 is for 36-1380-002.

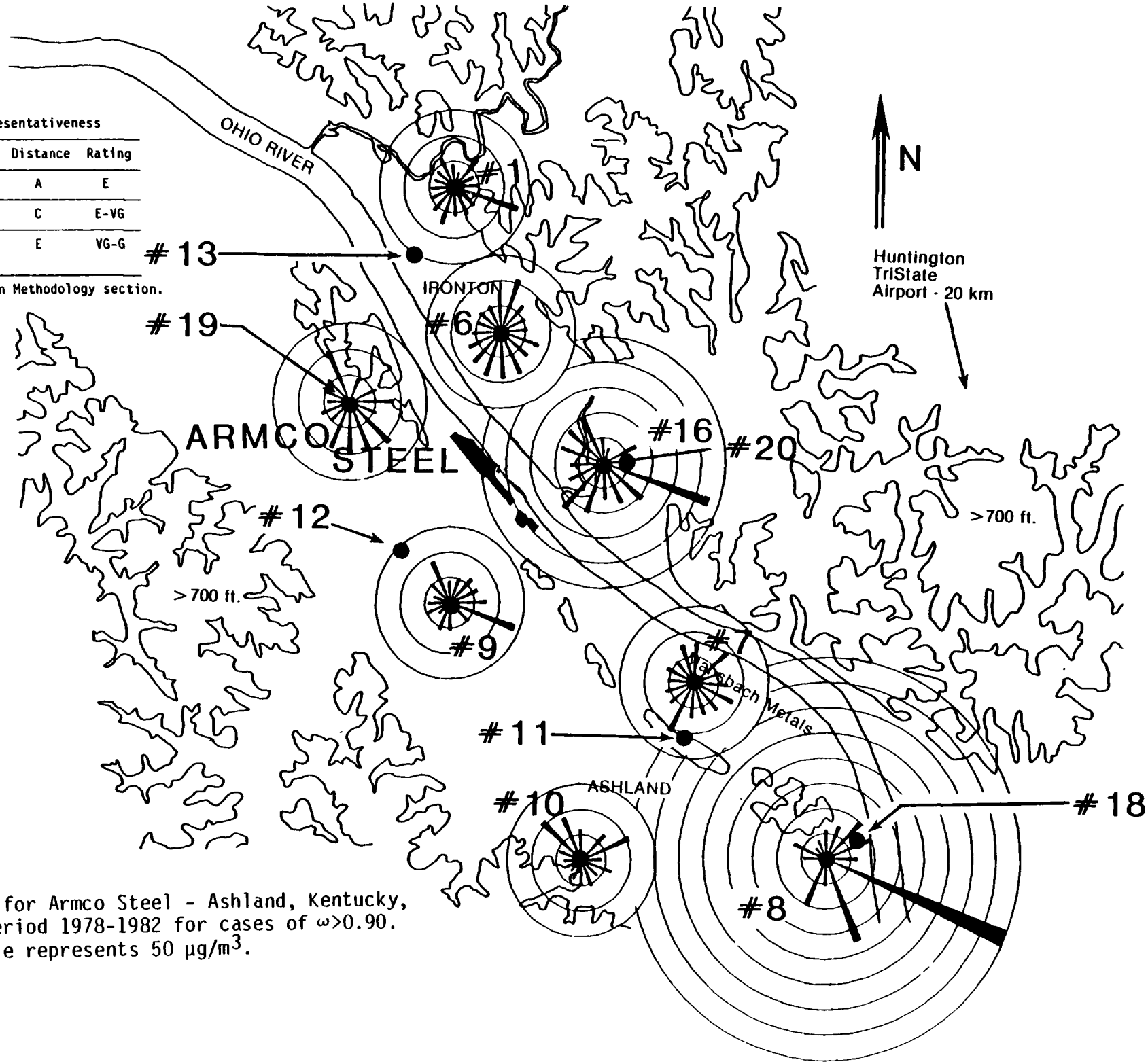
Hi-Vol Monitoring Sites--Armco Steel, Ashland, Kentucky (Concluded)

| Site ID Number | SAROAD Number | Site Name and Address | Plant Location from Site: Facility/ Bearing (°) | | Plant Location from Site: Distance (km) | Elevation (m): Above Ground | Elevation (m): Above MSL | Elevation (m): Above Plant | Site Description | Nearest Roadway: Name | Nearest Roadway: Direction | Nearest Roadway: Distance (m) | Nearest Roadway: Type and Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 18 | 18-0080-012-F01 | Fire Station #2 | Sinter plant | 315 | 7.7 | 6.1 | 170 | 0 | Roof | Winchester | U | 30 | Major road |
| | | Winchester & 42d St. | #3 Boiler | 319 | 7.6 | | | | | | | | |
| | | Ashland, KY | BOF | 318 | 6.7 | | | | | 41st St. | U | 60 | Side road |
| | | | Blast furnaces | 317 | 7.6 | | | | | | | | |
| 19 | 18-1540-003-F02 | Riverview Nursing Home | Sinter plant | 157 | 1.7 | 4.2 | 170 | 0 | Roof | U.S. 123 | U | 30 | Well-traveled |
| | | U.S. 123 | #3 Boiler | 137 | 1.8 | | | | | | | | |
| | | Greenup County, KY | BOF | 144 | 2.6 | | | | | | | | |
| | | | Blast furnaces | 153 | 1.9 | | | | | | | | |
| 20 | 36-1380-003-H02 | Dawson Bryant High School | Sinter plant | 270 | 2.8 | 5 | 174 | 6 | Roof | Marion Pike | U | U | U |
| | | Marion Pike | #3 Boiler | 277 | 2.3 | | | | Suburban-residential | | | | |
| | | Coal Grove, OH | BOF | 25 | 1.9 | | | | | | | | |
| | | | Blast furnaces | 265 | 2.4 | | | | | | | | |

Wind Data Representativeness

| Station # | Terrain | Distance | Rating |
|---|---|---|---|
| 8 | II | A | E |
| 7, 10 | II | C | E-VG |
| 1, 6, 9, 16, 19 | II | E | VG-G |

N.B. See Table 6 in Methodology section.



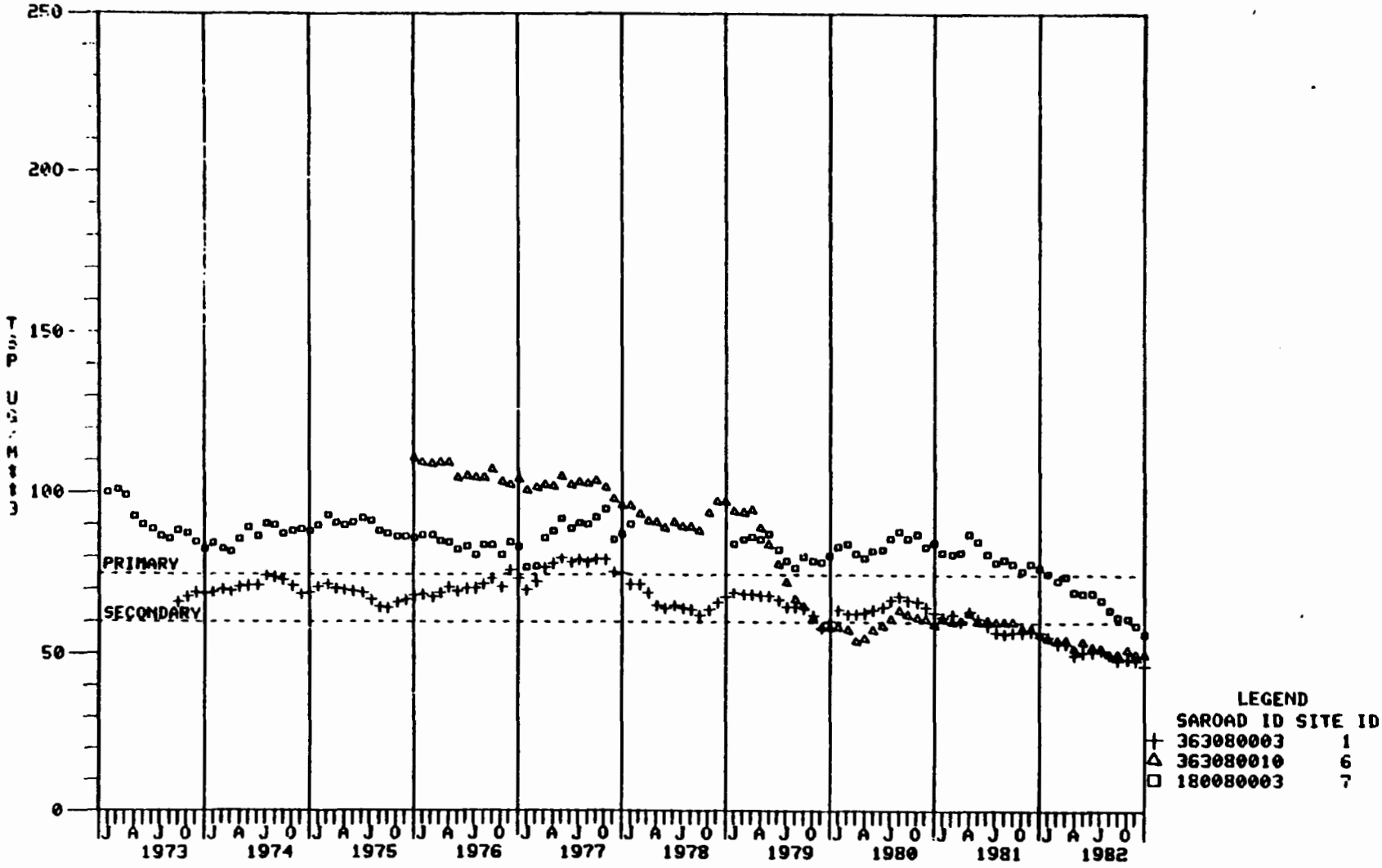

TSP roses for Armco Steel - Ashland, Kentucky, for the period 1978-1982 for cases of $\omega>0.90$. Each circle represents 50 $\mu g/m^3$.

NUMBER OF TSP OBSERVATIONS USED IN POLLUTION ROSES

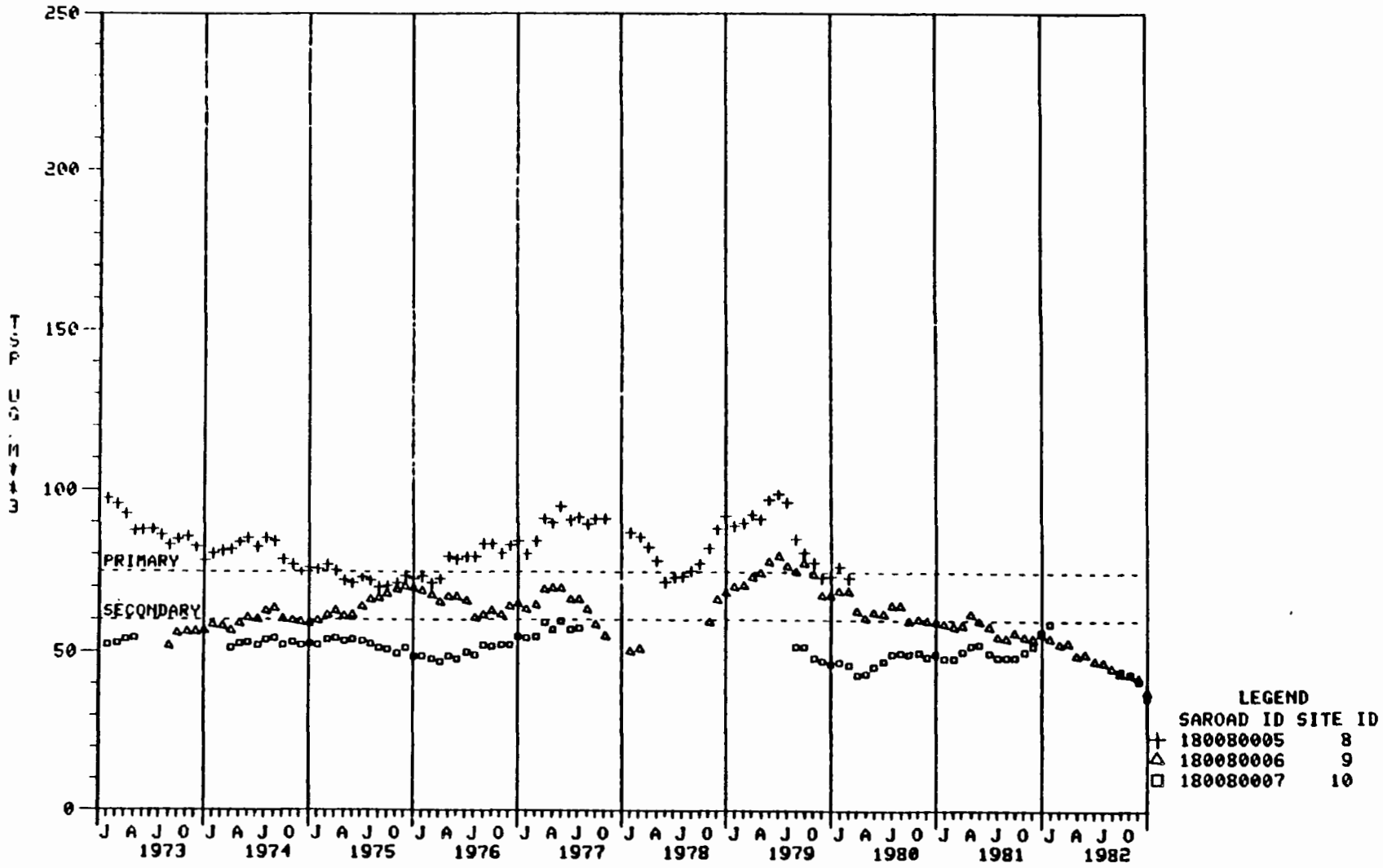
Armco--Ashland, KY

| Wind Direction | Monitoring Site Numbers | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | #1 | #6 | #7 | #8 | #9 | #10 | #16 | #18 | #19 |
| N | 2 | 14 | 2 | 1 | 1 | 2 | 1 | 1 | 0 |
| NNE | 1 | 3 | 0 | 1 | 1 | 0 | 1 | 0 | 1 |
| NE | 2 | 6 | 2 | 1 | 2 | 2 | 0 | 1 | 0 |
| ENE | 3 | 16 | 2 | 2 | 3 | 1 | 3 | 1 | 1 |
| E | 4 | 16 | 4 | 1 | 4 | 3 | 3 | 3 | 1 |
| ESE | 4 | 16 | 4 | 1 | 3 | 4 | 4 | 3 | 2 |
| SE | 5 | 18 | 3 | 0 | 4 | 5 | 3 | 3 | 4 |
| SSE | 3 | 9 | 2 | 1 | 1 | 2 | 3 | 0 | 2 |
| S | 3 | 16 | 3 | 1 | 1 | 1 | 2 | 1 | 2 |
| SSW | 8 | 25 | 9 | 6 | 8 | 7 | 8 | 1 | 6 |
| SW | 4 | 32 | 4 | 0 | 3 | 4 | 1 | 3 | 4 |
| WSW | 7 | 17 | 5 | 1 | 6 | 5 | 3 | 5 | 3 |
| W | 10 | 39 | 10 | 6 | 8 | 8 | 7 | 3 | 3 |
| WNW | 4 | 23 | 5 | 2 | 4 | 5 | 2 | 1 | 4 |
| NW | 8 | 29 | 8 | 1 | 7 | 4 | 2 | 5 | 6 |
| NNW | 5 | 22 | 3 | 2 | 4 | 5 | 3 | 1 | 5 |
| Total | 73 | 301 | 66 | 27 | 60 | 58 | 46 | 32 | 44 |

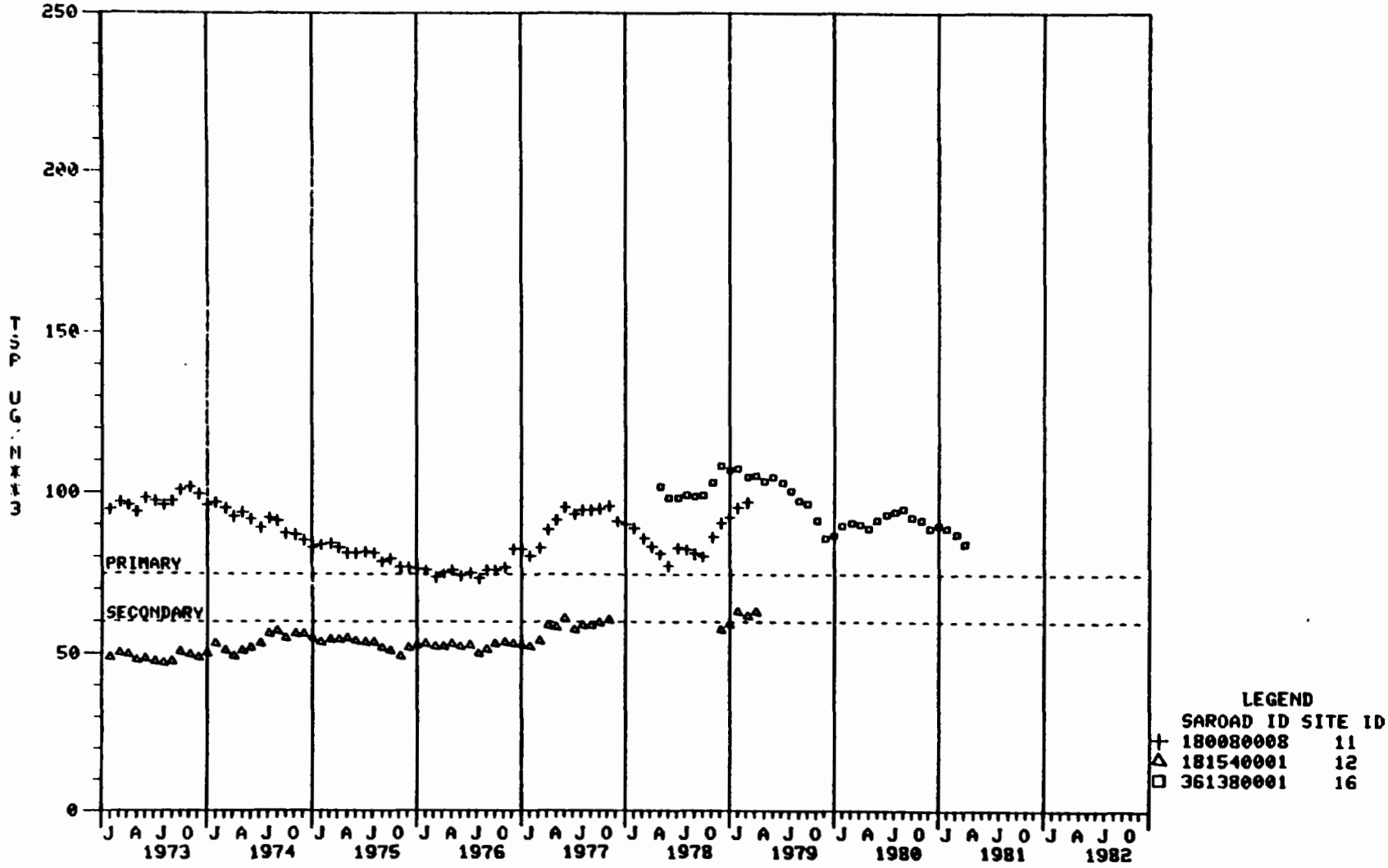
TSP 12 MONTH RUNNING GEOMETRIC MEANS (UG/M**3) FOR ARMCO - ASHLAND, KY



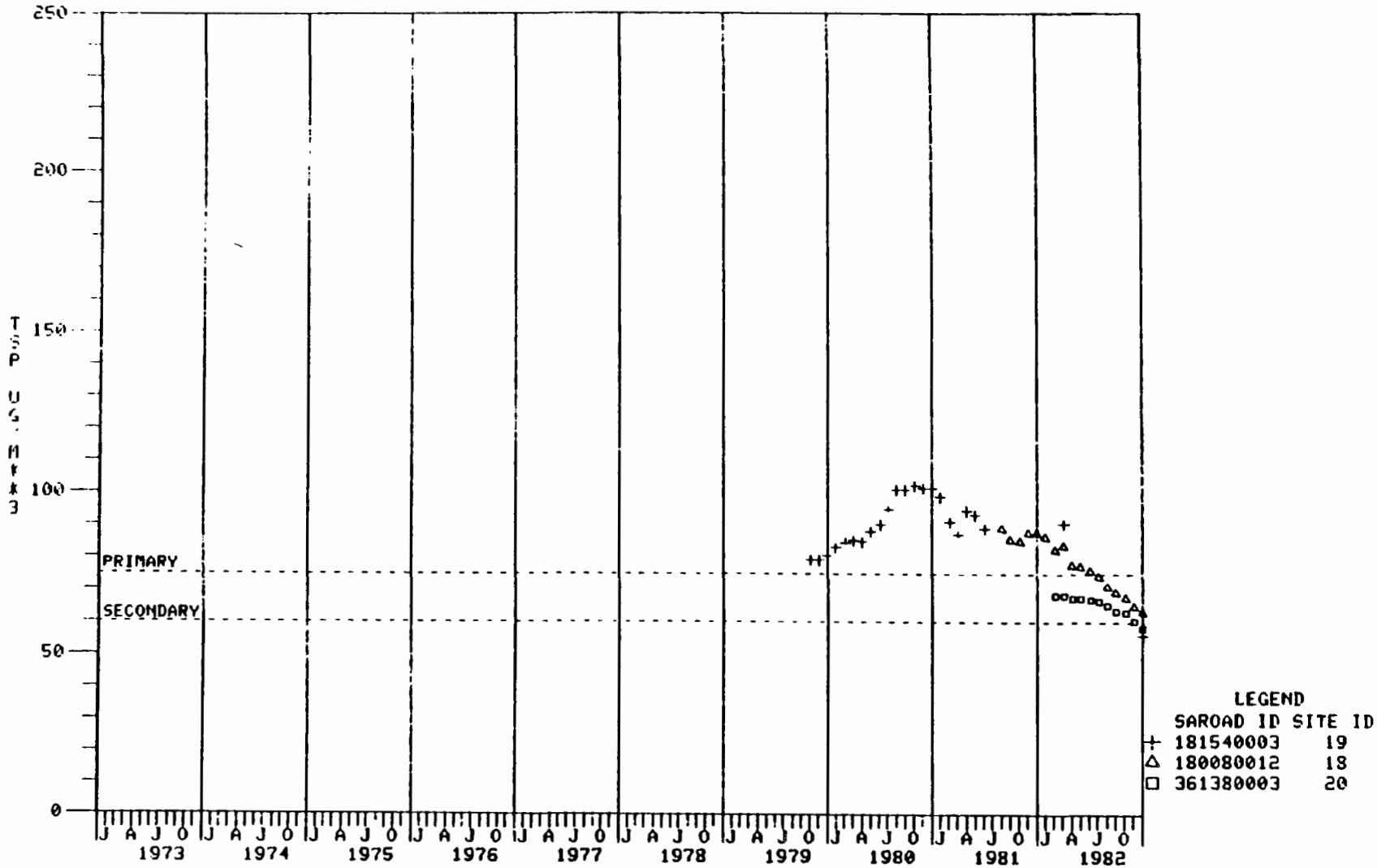
TSP 12 MONTH RUNNING GEOMETRIC MEANS (UG/M**3) FOR ARMCO - ASHLAND, KY



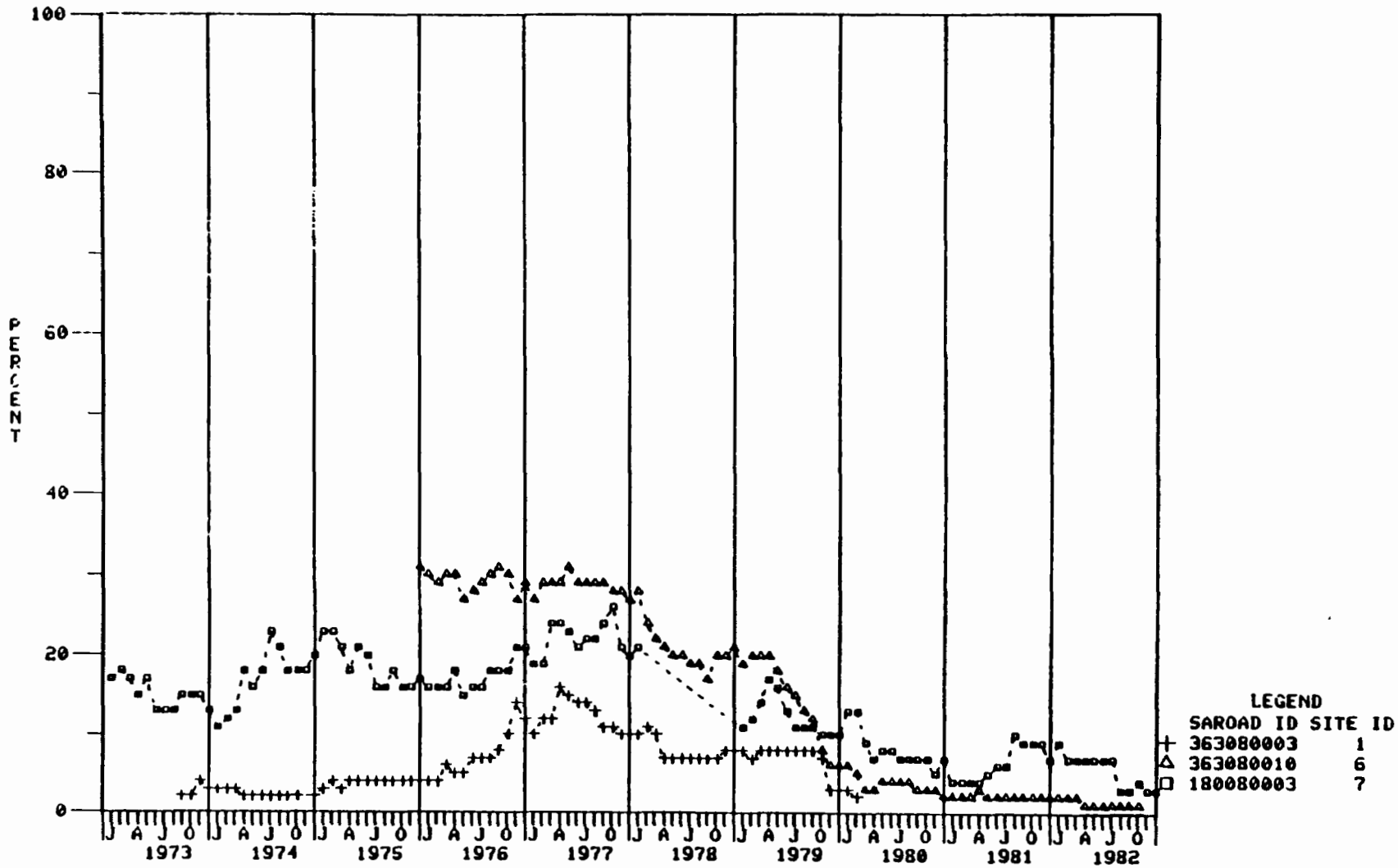
TSP 12 MONTH RUNNING GEOMETRIC MEANS (UG/M**3) FOR ARMCO - ASHLAND, KY

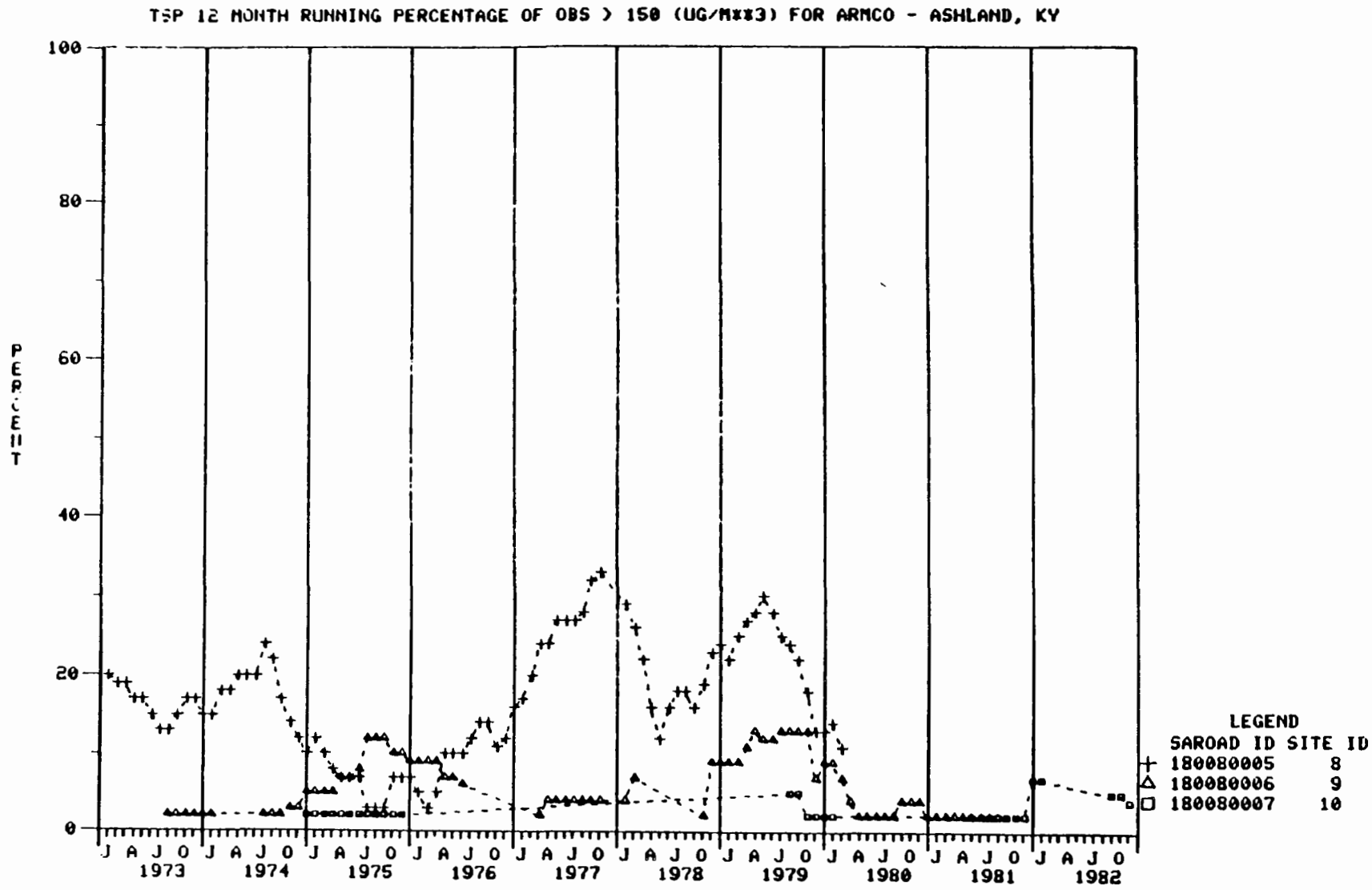


TSP 12 MONTH RUNNING GEOMETRIC MEANS (UG/M**3) FOR ARMCO-ASHLAND, KY

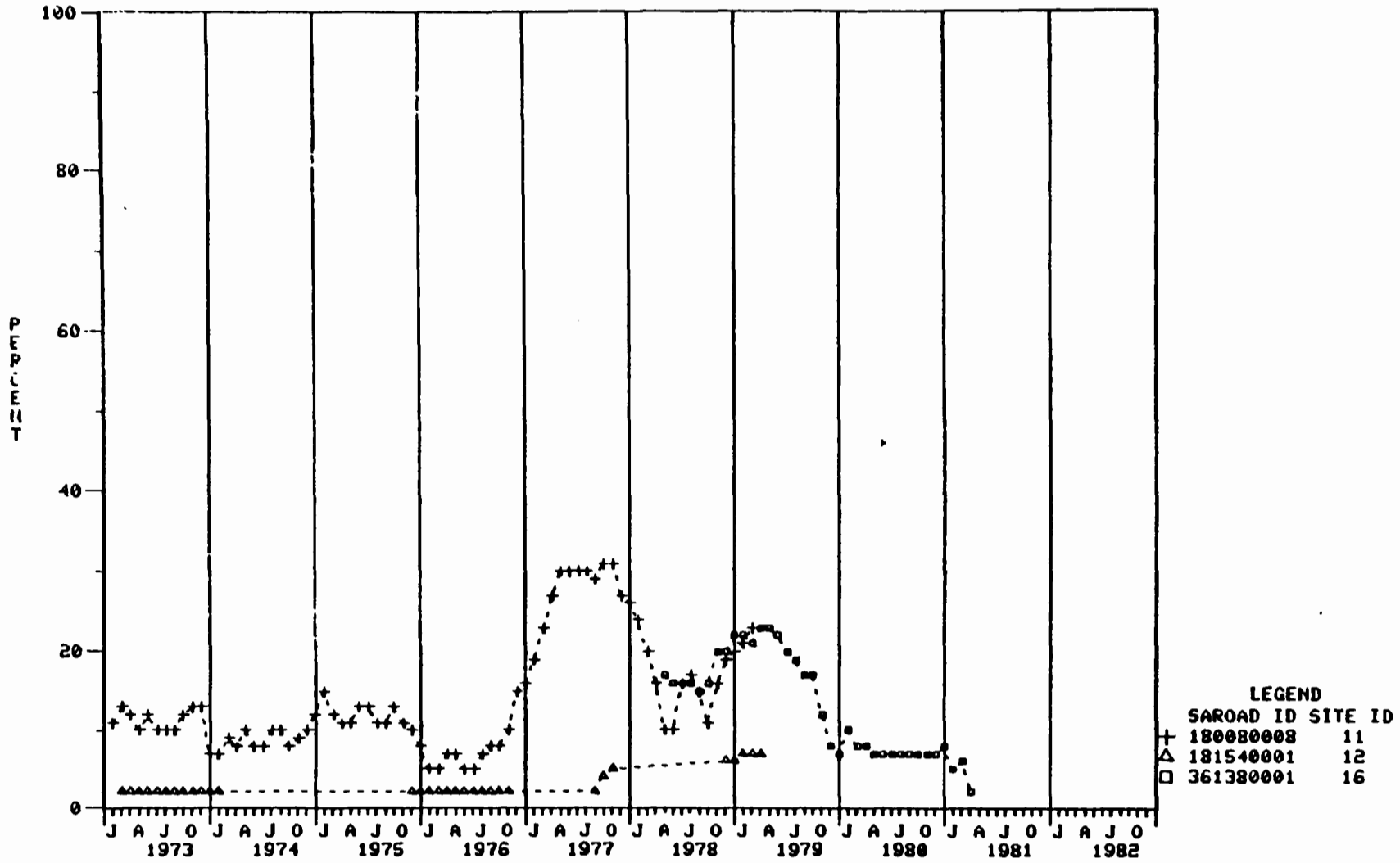


TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 150 (UG/M**3) FOR ARMCO - ASHLAND, KY

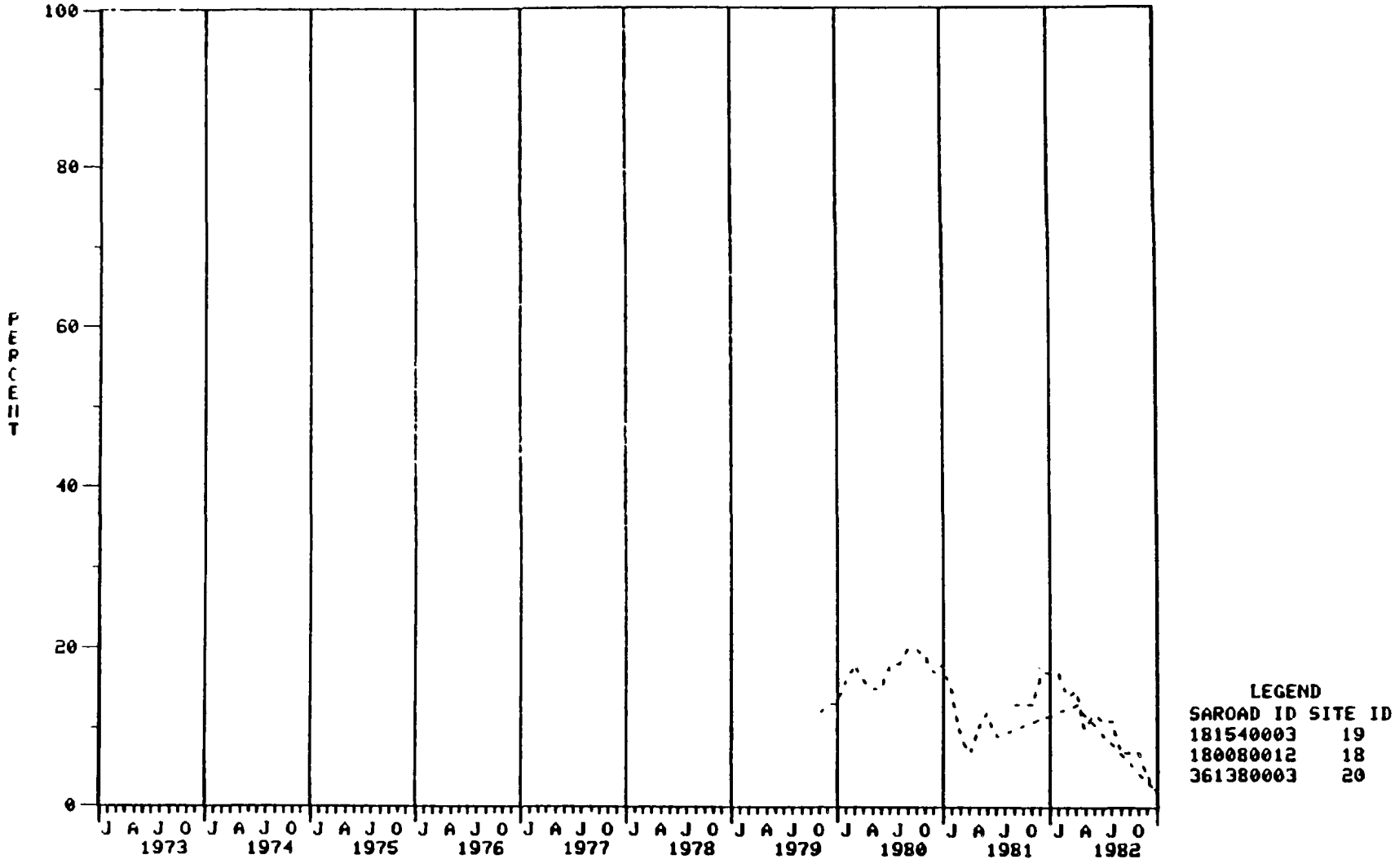



TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 150 (UG/M**3) FOR ARMCO - ASHLAND, KY
PERCENT
100
80
60
40
20
0
J A J O
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
LEGEND
SAROAD ID SITE ID
180080005 8
180080006 9
180080007 10

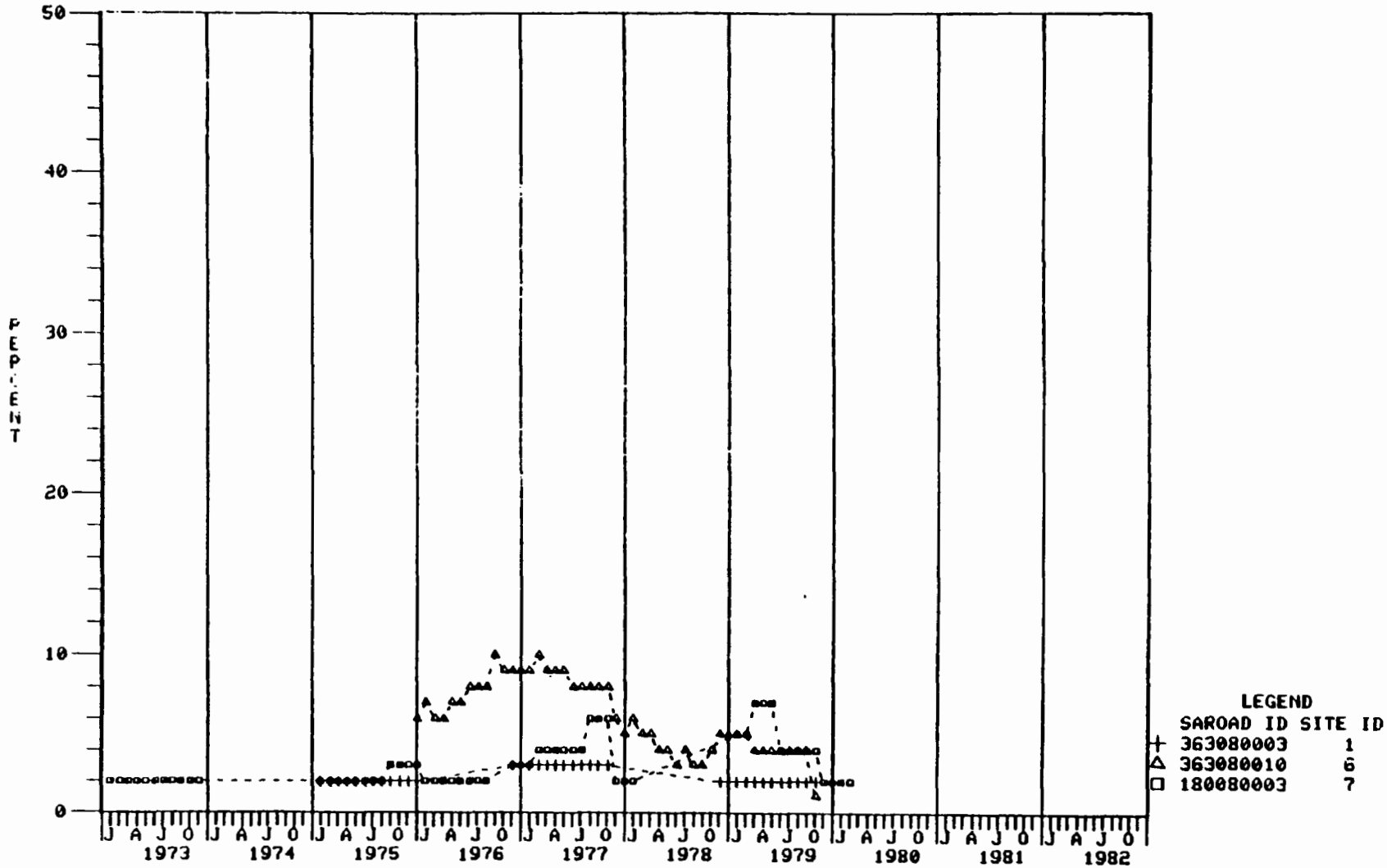
TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 150 (UG/M**3) FOR ARMCO - ASHLAND, KY



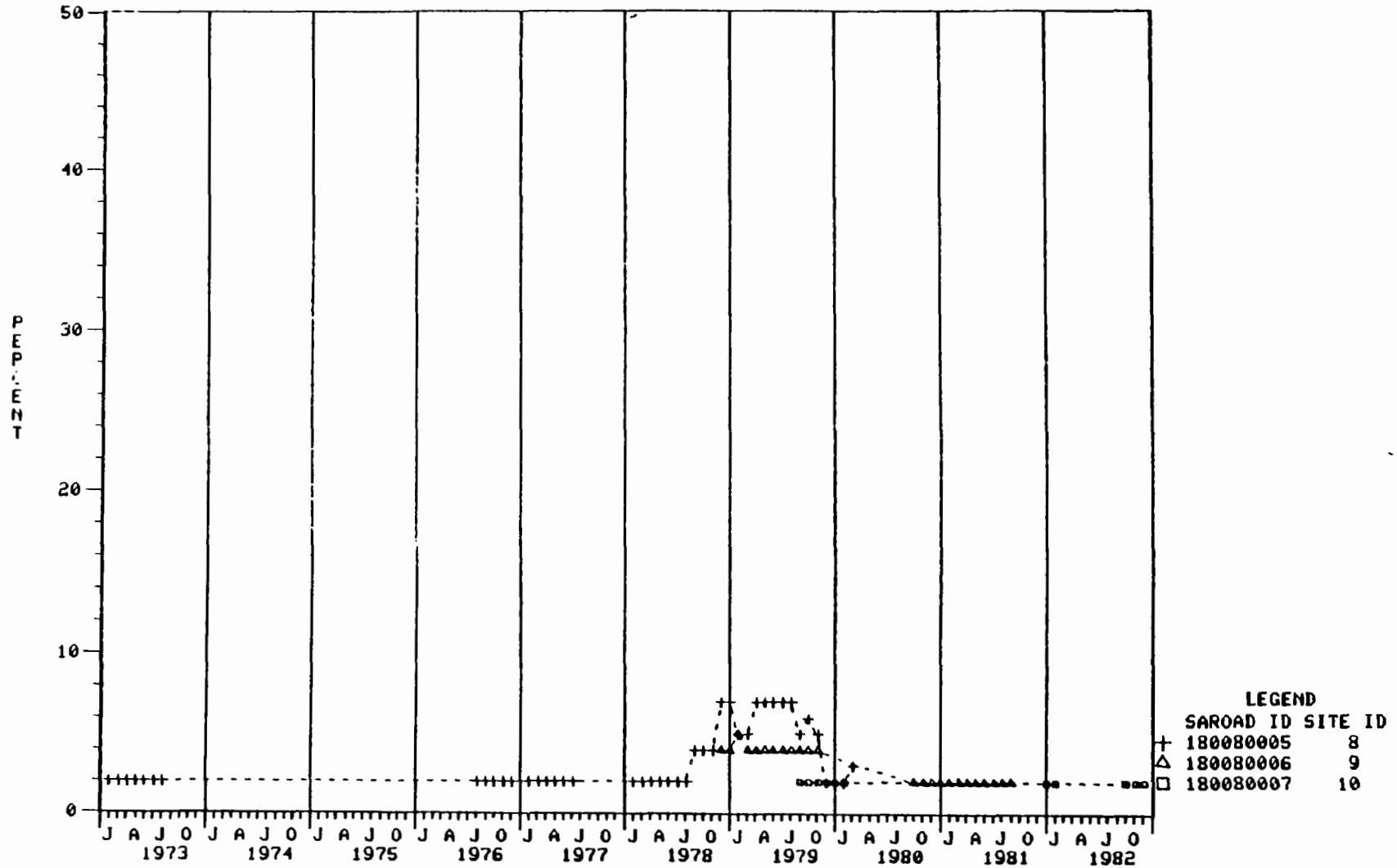
TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 150 (UG/M**3) FOR ARMCO - ASHLAND, KY



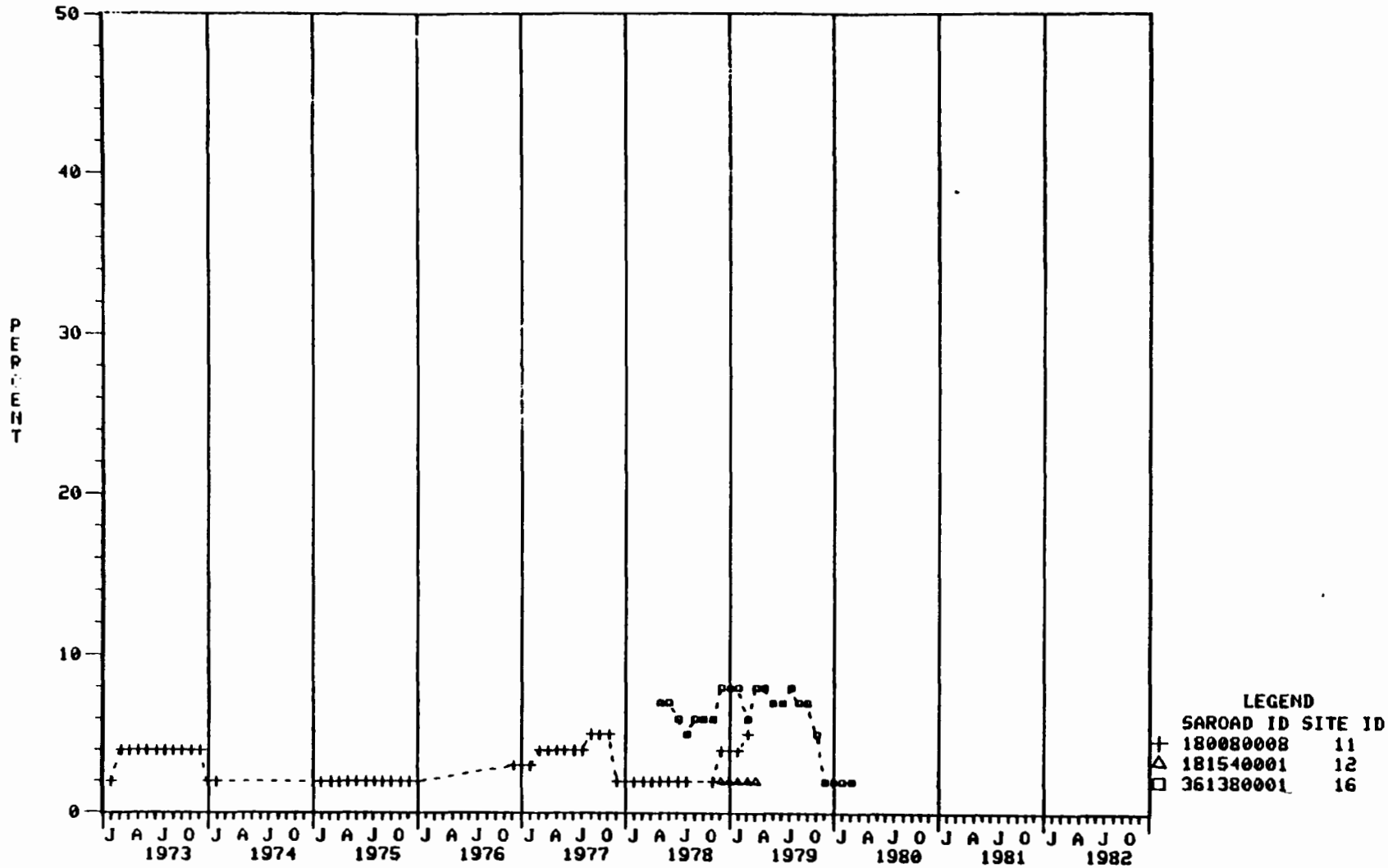
TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 260 (UG/M**3) FOR ARMCO - ASHLAND, KY



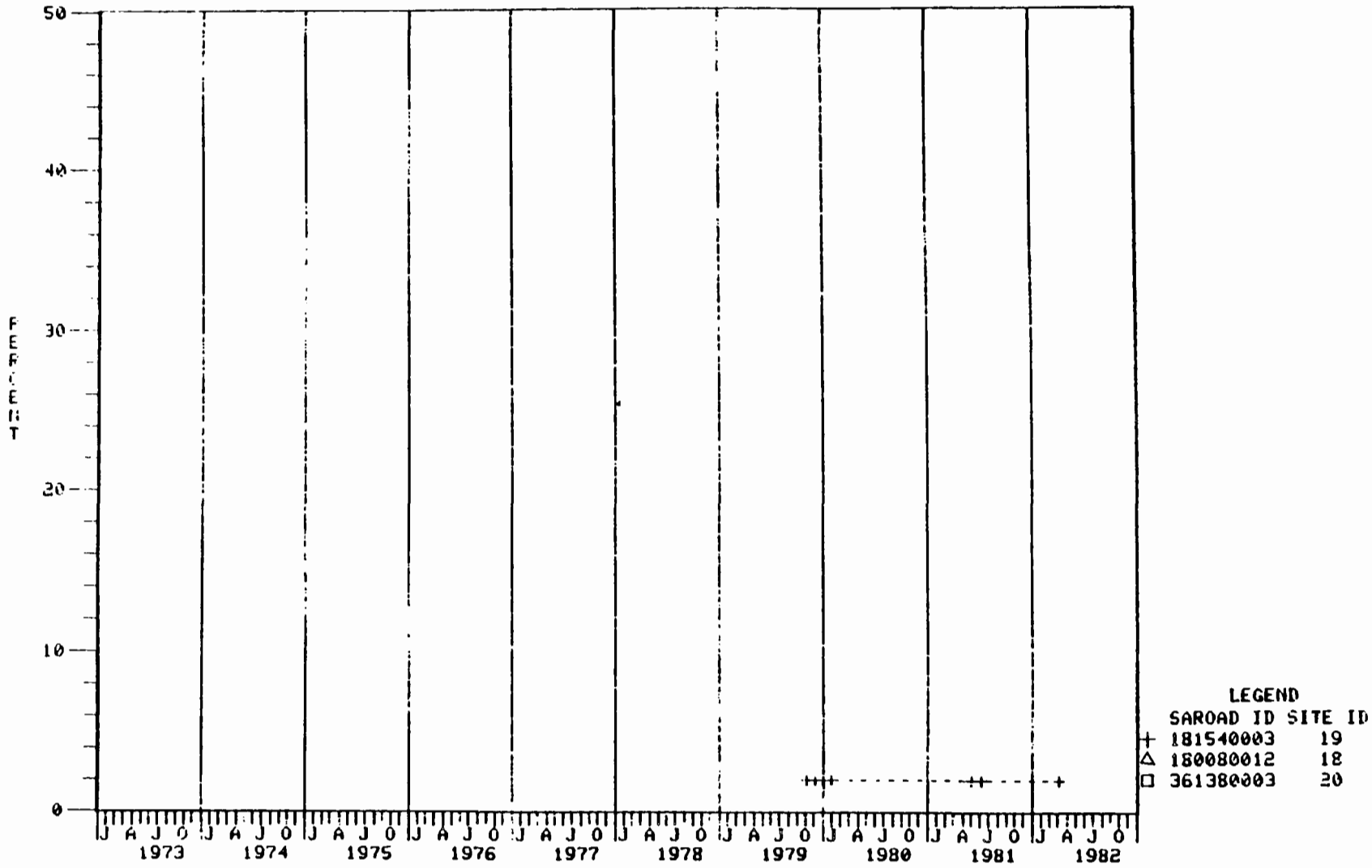
TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 260 (UG/M**3) FOR ARMCO - ASHLAND, KY



TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 260 (UG/M**3) FOR ARMCO - ASHLAND, KY



TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 260 (UG/M**3) FOR ARMCO-ASHLAND, KY



TSP DATA SUMMARY FOR ARMCO - ASHLAND, KY
SAROAD STATION # 363080003 SITE ID # 01
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 61 | 58 | 53 | 59 | 61 | 60 | 58 | 58 | 57 | 53 |
| GEOMETRIC MEAN: | ****** | 68.5 | 69.2 | 68.2 | 73.3 | 75.4 | 67.7 | 60.4 | 63.2 | 57.0 | 46.5 |
| GEOMETRIC S.D.: | ****** | 1.6 | 1.5 | 1.6 | 1.8 | 1.7 | 1.7 | 1.6 | 1.4 | 1.5 | 1.5 |
| ARITHMETIC MEAN | ****** | 75.4 | 76.0 | 77.0 | 88.7 | 85.8 | 79.7 | 68.0 | 67.5 | 61.2 | 50.0 |
| HIGHEST BY LARSEN EXTRP: | ****** | 252.4 | 250.1 | 276.6 | 395.9 | 343.1 | 336.7 | 246.1 | 187.2 | 170.4 | 143.6 |
| 1ST HIGHEST: | ****** | 170.0 | 210.0 | 293.0 | 438.0 | 200.0 | 360.0 | 205.0 | 137.0 | 140.0 | 110.0 |
| DATE : | ****** | 731112 | 741207 | 750124 | 761102 | 771022 | 781110 | 790220 | 800110 | 810215 | 820505 |
| 2ND HIGHEST: | ****** | 155.0 | 147.0 | 175.0 | 322.0 | 198.0 | 231.0 | 175.0 | 119.0 | 135.0 | 87.0 |
| DATE : | ****** | 730416 | 740728 | 751214 | 761114 | 770308 | 780201 | 790322 | 800215 | 810404 | 820511 |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 1 | 2 | 0 | 1 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 2 | 1 | 2 | 7 | 6 | 5 | 2 | 0 | 0 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 30 | 25 | 28 | 29 | 26 | 28 | 34 | 31 | 37 | 39 |
| 66-130: | 0 | 25 | 30 | 20 | 23 | 25 | 25 | 21 | 26 | 18 | 14 |
| 131-195: | 0 | 6 | 2 | 4 | 4 | 8 | 4 | 2 | 1 | 2 | 0 |
| 196-260: | 0 | 0 | 1 | 0 | 1 | 2 | 2 | 1 | 0 | 0 | 0 |
| 261-325: | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR ARMCO - ASHLAND, KY
SAROAD STATION # 363080010 SITE ID # 06
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 0 | 193 | 254 | 248 | 268 | 246 | 241 | 247 | 253 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | 110.5 | 104.2 | 96.0 | 97.5 | 58.4 | 59.2 | 56.1 | 50.2 |
| GEOMETRIC S.D.: | ****** | ****** | ****** | 1.7 | 1.8 | 1.8 | 1.8 | 1.7 | 1.7 | 1.7 | 1.6 |
| ARITHMETIC MEAN | ****** | ****** | ****** | 127.6 | 125.5 | 114.6 | 115.7 | 67.3 | 68.5 | 63.6 | 56.4 |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | 537.9 | 616.7 | 570.1 | 538.1 | 270.7 | 285.3 | 256.0 | 209.7 |
| 1ST HIGHEST: | ****** | ****** | ****** | 502.0 | 405.0 | 368.0 | 570.0 | 239.0 | 582.0 | 204.0 | 171.0 |
| DATE : | ****** | ****** | ****** | 751028 | 761117 | 770209 | 781106 | 790221 | 801114 | 810402 | 821110 |
| 2ND HIGHEST: | ****** | ****** | ****** | 340.0 | 384.0 | 348.0 | 421.0 | 195.0 | 201.0 | 186.0 | 145.0 |
| DATE : | ****** | ****** | ****** | 751120 | 760415 | 770203 | 781010 | 791122 | 800506 | 810403 | 820507 |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 12 | 24 | 13 | 14 | 0 | 1 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 0 | 58 | 71 | 65 | 55 | 14 | 5 | 5 | 1 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 0 | 33 | 62 | 68 | 54 | 157 | 134 | 150 | 175 |
| 66-130: | 0 | 0 | 0 | 89 | 108 | 99 | 142 | 64 | 97 | 87 | 73 |
| 131-195: | 0 | 0 | 0 | 42 | 41 | 52 | 39 | 24 | 8 | 9 | 5 |
| 196-260: | 0 | 0 | 0 | 17 | 19 | 16 | 19 | 1 | 1 | 1 | 0 |
| 261-325: | 0 | 0 | 0 | 8 | 14 | 9 | 6 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 3 | 9 | 4 | 6 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR ARMCO - ASHLAND, KY
SAROAD STATION # 180080003 SITE ID # 07
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 58 | 56 | 61 | 60 | 61 | 45 | 36 | 52 | 56 | 55 | 59 |
| GEOMETRIC MEAN: | 104.2 | 82.6 | 88.3 | 86.0 | 83.4 | 87.3 | ****** | 80.9 | 84.6 | 76.8 | 56.6 |
| GEOMETRIC S.D.: | 1.6 | 1.7 | 1.7 | 1.7 | 1.9 | 1.9 | ****** | 1.7 | 1.5 | 1.6 | 1.6 |
| ARITHMETIC MEAN | 117.3 | 94.2 | 101.1 | 100.0 | 102.2 | 106.1 | ****** | 93.2 | 92.7 | 84.7 | 64.0 |
| HIGHEST BY LARSEN EXTRP: | 450.0 | 418.2 | 425.3 | 425.8 | 522.3 | 567.3 | ****** | 369.3 | 302.7 | 294.1 | 246.6 |
| 1ST HIGHEST: | 350.0 | 208.0 | 254.0 | 350.0 | 434.0 | 373.0 | 553.0 | 347.0 | 202.0 | 170.0 | 169.0 |
| DATE : | 721229 | 731025 | 740728 | 750124 | 761102 | 770823 | 781104 | 790322 | 800116 | 810215 | 820129 |
| 2ND HIGHEST: | 345.0 | 185.0 | 234.0 | 265.0 | 378.0 | 251.0 | 389.0 | 259.0 | 202.0 | 166.0 | 163.0 |
| DATE : | 720103 | 730116 | 741207 | 750903 | 761114 | 770904 | 780607 | 790220 | 800215 | 810826 | 820505 |
| # OF READINGS EXCEEDING 260 : | 2 | 0 | 0 | 2 | 2 | 1 | 2 | 1 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 9 | 6 | 12 | 10 | 12 | 9 | 4 | 5 | 4 | 2 | 2 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 7 | 18 | 18 | 19 | 24 | 15 | 14 | 20 | 16 | 21 | 38 |
| 66-130: | 34 | 27 | 27 | 29 | 22 | 15 | 17 | 24 | 33 | 28 | 18 |
| 131-195: | 12 | 10 | 13 | 8 | 11 | 10 | 2 | 5 | 5 | 6 | 3 |
| 196-260: | 3 | 1 | 3 | 2 | 2 | 4 | 1 | 2 | 2 | 0 | 0 |
| 261-325: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 2 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR ARMCO - ASHLAND, KY
SARCAD STATION # 180080005 SITE ID # 08
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 59 | 54 | 59 | 59 | 56 | 45 | 58 | 48 | 0 | 0 | 0 |
| GEOMETRIC MEAN: | 99.3 | 78.2 | 76.0 | 72.6 | 84.3 | ****** | 92.2 | 73.5 | ****** | ****** | ****** |
| GEOMETRIC S.D.: | 1.8 | 1.9 | 1.7 | 1.7 | 1.9 | ****** | 2.1 | 2.1 | ****** | ****** | ****** |
| ARITHMETIC MEAN | 115.7 | 92.0 | 86.5 | 83.1 | 101.4 | ****** | 120.3 | 93.2 | ****** | ****** | ****** |
| HIGHEST BY LARSEN EXTRP: | 538.6 | 480.4 | 362.6 | 345.0 | 550.6 | ****** | 820.8 | 671.7 | ****** | ****** | ****** |
| 1ST HIGHEST: | 340.0 | 189.0 | 187.0 | 195.0 | 306.0 | 242.0 | 588.0 | 342.0 | ****** | ****** | ****** |
| DATE : | 720831 | 730901 | 740728 | 750124 | 760705 | 770823 | 781104 | 790322 | ****** | ****** | ****** |
| 2ND HIGHEST: | 254.0 | 186.0 | 166.0 | 192.0 | 230.0 | 233.0 | 399.0 | 225.0 | ****** | ****** | ****** |
| DATE : | 720906 | 730925 | 740210 | 751021 | 761114 | 770419 | 781110 | 790421 | ****** | ****** | ****** |
| # OF READINGS EXCEEDING 260 : | 1 | 0 | 0 | 0 | 1 | 0 | 4 | 1 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 13 | 8 | 6 | 4 | 9 | 13 | 14 | 6 | 0 | 0 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 13 | 18 | 21 | 26 | 16 | 16 | 21 | 16 | 0 | 0 | 0 |
| 66-130: | 25 | 25 | 31 | 25 | 25 | 15 | 19 | 24 | 0 | 0 | 0 |
| 131-195: | 14 | 11 | 7 | 8 | 9 | 10 | 10 | 5 | 0 | 0 | 0 |
| 196-260: | 6 | 0 | 0 | 0 | 5 | 4 | 4 | 2 | 0 | 0 | 0 |
| 261-325: | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 0 |
| 326-390: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR ARMCO - ASHLAND, KY
SAROAD STATION # 180080006 SITE ID # 09
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 29 | 53 | 61 | 57 | 54 | 43 | 46 | 44 | 48 | 50 | 57 |
| GEOMETRIC MEAN: | ****** | 56.4 | 58.7 | 69.4 | 64.9 | ****** | 68.3 | 67.6 | 59.3 | 55.5 | 37.9 |
| GEOMETRIC S.D.: | ****** | 1.6 | 1.8 | 1.8 | 1.7 | ****** | 1.9 | 1.7 | 1.8 | 1.5 | 1.7 |
| ARITHMETIC MEAN | ****** | 63.2 | 69.0 | 82.4 | 74.0 | ****** | 84.0 | 78.8 | 68.9 | 60.5 | 43.2 |
| HIGHEST BY LARSEN EXTRP: | ****** | 233.4 | 330.0 | 422.8 | 314.6 | ****** | 441.1 | 345.1 | 313.7 | 201.1 | 188.8 |
| 1ST HIGHEST: | 221.0 | 157.0 | 166.0 | 222.0 | 147.0 | 151.0 | 338.0 | 209.0 | 288.0 | 110.0 | 105.0 |
| DATE : | 720103 | 730209 | 741008 | 750629 | 760903 | 770419 | 781104 | 790226 | 800906 | 811218 | 820129 |
| 2ND HIGHEST: | 136.0 | 147.0 | 163.0 | 201.0 | 143.0 | 150.0 | 315.0 | 206.0 | 137.0 | 108.0 | 100.0 |
| DATE : | 720427 | 730323 | 740716 | 750717 | 761214 | 770302 | 781110 | 790421 | 800215 | 810416 | 820505 |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 1 | 1 | 3 | 5 | 0 | 1 | 4 | 4 | 1 | 0 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 12 | 33 | 37 | 24 | 24 | 25 | 22 | 22 | 24 | 30 | 49 |
| 66-130: | 15 | 18 | 18 | 24 | 25 | 16 | 20 | 17 | 22 | 20 | 8 |
| 131-195: | 1 | 2 | 6 | 7 | 5 | 2 | 1 | 3 | 1 | 0 | 0 |
| 196-260: | 1 | 0 | 0 | 2 | 0 | 0 | 1 | 2 | 0 | 0 | 0 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR ARMCO - ASHLAND, KY
SAROAD STATION # 180080007 SITE ID # 10
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 63 | 38 | 58 | 59 | 57 | 32 | 33 | 46 | 54 | 46 | 49 |
| GEOMETRIC MEAN: | 53.4 | ****** | 52.5 | 48.7 | 54.6 | ****** | ****** | 46.6 | 49.5 | 56.7 | 36.1 |
| GEOMETRIC S.D.: | 1.6 | ****** | 1.7 | 1.6 | 1.6 | ****** | ****** | 1.8 | 1.5 | 1.8 | 1.6 |
| ARITHMETIC MEAN | 58.9 | ****** | 60.1 | 54.8 | 60.3 | ****** | ****** | 55.8 | 54.0 | 68.5 | 39.8 |
| HIGHEST BY LARSEN EXTRP: | 202.2 | ****** | 234.1 | 206.7 | 207.4 | ****** | ****** | 246.4 | 169.9 | 310.7 | 131.8 |
| 1ST HIGHEST: | 135.0 | 127.0 | 254.0 | 149.0 | 121.0 | 247.0 | 186.0 | 261.0 | 127.0 | 325.0 | 90.0 |
| DATE : | 721229 | 730323 | 741213 | 750506 | 760804 | 770823 | 781017 | 790226 | 800503 | 811224 | 820505 |
| 2ND HIGHEST: | 118.0 | 117.0 | 116.0 | 115.0 | 117.0 | 147.0 | 127.0 | 135.0 | 122.0 | 203.0 | 79.0 |
| DATE : | 720304 | 730209 | 740728 | 750217 | 761015 | 770904 | 780219 | 790316 | 800602 | 811230 | 820517 |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 3 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 40 | 24 | 38 | 39 | 35 | 21 | 20 | 34 | 41 | 29 | 44 |
| 66-130: | 22 | 14 | 19 | 19 | 22 | 8 | 12 | 10 | 13 | 13 | 5 |
| 131-195: | 1 | 0 | 0 | 1 | 0 | 2 | 1 | 1 | 0 | 2 | 0 |
| 196-260: | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR ARMCO - ASHLAND, KY
SARCAD STATION # 180080008 SITE ID # 11
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 44 | 54 | 59 | 60 | 61 | 50 | 50 | 0 | 0 | 0 | 0 |
| GEOMETRIC MEAN: | 92.1 | 96.1 | 82.9 | 76.7 | 82.6 | 90.4 | 92.6 | ****** | ****** | ****** | ****** |
| GEOMETRIC S.D.: | 1.5 | 1.4 | 1.6 | 1.6 | 1.7 | 1.8 | 1.7 | ****** | ****** | ****** | ****** |
| ARITHMETIC MEAN | 100.0 | 102.3 | 91.2 | 86.7 | 97.1 | 107.3 | 108.8 | ****** | ****** | ****** | ****** |
| HIGHEST BY LARSEN EXTRP: | 295.1 | 268.2 | 305.2 | 314.8 | 412.4 | 488.1 | 458.8 | ****** | ****** | ****** | ****** |
| 1ST HIGHEST: | 300.0 | 282.0 | 201.0 | 280.0 | 372.0 | 355.0 | 472.0 | ****** | ****** | ****** | ****** |
| DATE : | 721229 | 730203 | 740728 | 750124 | 761102 | 770823 | 781110 | ****** | ****** | ****** | ****** |
| 2ND HIGHEST: | 198.0 | 177.0 | 185.0 | 253.0 | 325.0 | 253.0 | 284.0 | ****** | ****** | ****** | ****** |
| DATE : | 720608 | 730522 | 740210 | 750106 | 761114 | 770218 | 781011 | ****** | ****** | ****** | ****** |
| # OF READINGS EXCEEDING 260 : | 1 | 1 | 0 | 1 | 2 | 1 | 2 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 5 | 4 | 6 | 5 | 10 | 13 | 10 | 0 | 0 | 0 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 9 | 8 | 18 | 23 | 20 | 21 | 14 | 0 | 0 | 0 | 0 |
| 66-130: | 28 | 36 | 31 | 28 | 26 | 15 | 22 | 0 | 0 | 0 | 0 |
| 131-195: | 5 | 9 | 9 | 7 | 12 | 8 | 11 | 0 | 0 | 0 | 0 |
| 196-260: | 1 | 0 | 1 | 1 | 1 | 5 | 1 | 0 | 0 | 0 | 0 |
| 261-325: | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR ARMCO - ASHLAND, KY
SAROAD STATION # 181540001 SITE ID # 12
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 56 | 50 | 56 | 58 | 50 | 40 | 47 | 0 | 0 | 0 | 0 |
| GEOMETRIC MEAN: | 52.6 | 49.8 | 54.6 | 52.6 | 52.5 | ****** | 59.1 | ****** | ****** | ****** | ****** |
| GEOMETRIC S.D.: | 1.7 | 1.6 | 1.8 | 1.7 | 1.7 | ****** | 2.0 | ****** | ****** | ****** | ****** |
| ARITHMETIC MEAN | 60.6 | 55.4 | 64.1 | 59.7 | 59.8 | ****** | 73.7 | ****** | ****** | ****** | ****** |
| HIGHEST BY LARSEN EXTRP: | 256.1 | 192.0 | 311.6 | 233.3 | 241.1 | ****** | 484.6 | ****** | ****** | ****** | ****** |
| 1ST HIGHEST: | 201.0 | 182.0 | 147.0 | 173.0 | 144.0 | 176.0 | 293.0 | ****** | ****** | ****** | ****** |
| DATE : | 720103 | 730209 | 740815 | 751114 | 761102 | 770823 | 781110 | ****** | ****** | ****** | ****** |
| 2ND HIGHEST: | 149.0 | 122.0 | 131.0 | 113.0 | 130.0 | 153.0 | 193.0 | ****** | ****** | ****** | ****** |
| DATE : | 720328 | 730913 | 741207 | 750506 | 760903 | 770922 | 781104 | ****** | ****** | ****** | ****** |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 1 | 1 | 0 | 1 | 0 | 2 | 3 | 0 | 0 | 0 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 34 | 38 | 33 | 35 | 30 | 23 | 25 | 0 | 0 | 0 | 0 |
| 66-130: | 20 | 11 | 21 | 22 | 19 | 14 | 19 | 0 | 0 | 0 | 0 |
| 131-195: | 1 | 1 | 2 | 1 | 1 | 3 | 2 | 0 | 0 | 0 | 0 |
| 196-260: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR ARMCO - ASHLAND, KY
SAROAD STATION # 361380001 SITE ID # 16
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 0 | 0 | 0 | 25 | 51 | 60 | 60 | 0 | 0 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | ****** | ****** | ****** | 107.6 | 87.0 | 90.2 | ****** | ****** |
| GEOMETRIC S.D.: | ****** | ****** | ****** | ****** | ****** | ****** | 1.8 | 1.5 | 1.5 | ****** | ****** |
| ARITHMETIC MEAN | ****** | ****** | ****** | ****** | ****** | ****** | 131.0 | 94.3 | 97.2 | ****** | ****** |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | ****** | ****** | ****** | 618.1 | 273.8 | 288.2 | ****** | ****** |
| 1ST HIGHEST: | ****** | ****** | ****** | ****** | ****** | 450.0 | 591.0 | 266.0 | 198.0 | ****** | ****** |
| DATE : | ****** | ****** | ****** | ****** | ****** | 771022 | 781110 | 790322 | 800310 | ****** | ****** |
| 2ND HIGHEST: | ****** | ****** | ****** | ****** | ****** | 263.0 | 393.0 | 202.0 | 178.0 | ****** | ****** |
| DATE : | ****** | ****** | ****** | ****** | ****** | 771115 | 781104 | 790220 | 800110 | ****** | ****** |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 0 | 2 | 4 | 1 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 0 | 0 | 0 | 4 | 11 | 4 | 5 | 0 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 0 | 0 | 0 | 4 | 10 | 13 | 14 | 0 | 0 |
| 66-130: | 0 | 0 | 0 | 0 | 0 | 16 | 26 | 36 | 35 | 0 | 0 |
| 131-195: | 0 | 0 | 0 | 0 | 0 | 1 | 8 | 9 | 10 | 0 | 0 |
| 196-260: | 0 | 0 | 0 | 0 | 0 | 2 | 3 | 1 | 1 | 0 | 0 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR ARMCO - ASHLAND, KY
SAROAD STATION # 181540003 SITE ID # 19
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 54 | 44 | 42 | 44 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 79.6 | 101.5 | ****** | 56.0 |
| GEOMETRIC S.D.: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 1.7 | 1.7 | ****** | 1.7 |
| ARITHMETIC MEAN | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 92.3 | 113.5 | ****** | 64.9 |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 360.5 | 443.7 | ****** | 283.7 |
| 1ST HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 335.0 | 259.0 | 266.0 | 160.0 |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 790220 | 800122 | 810504 | 820505 |
| 2ND HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 255.0 | 215.0 | 231.0 | 135.0 |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 790322 | 800316 | 811001 | 821107 |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 8 | 6 | 1 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 22 | 7 | 14 | 28 |
| 66-130: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 22 | 25 | 17 | 14 |
| 131-195: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 7 | 8 | 2 |
| 196-260: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 5 | 2 | 0 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR ARMCO - ASHLAND, KY
SAROAD STATION # 180080012 SITE ID # 18
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 29 | 48 | 55 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 87.2 | 63.2 |
| GEOMETRIC S.D.: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 1.6 | 1.7 |
| ARITHMETIC MEAN | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 97.5 | 72.0 |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 348.0 | 291.7 |
| 1ST HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 158.0 | 265.0 | 240.0 | 206.0 |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 791229 | 800116 | 810227 | 820505 |
| 2ND HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 98.0 | 249.0 | 210.0 | 145.0 |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 791211 | 800110 | 811230 | 820517 |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 4 | 8 | 1 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 7 | 16 | 28 |
| 66-130: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 16 | 20 | 24 |
| 131-195: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 10 | 2 |
| 196-260: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 2 | 1 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR ARMCO - ASHLAND, KY
SAROAD STATION # 361380003 SITE ID # 20
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 36 | 56 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 58.4 |
| GEOMETRIC S.D.: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 1.5 |
| ARITHMETIC MEAN | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 62.7 |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 180.3 |
| 1ST HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 125.0 | 124.0 |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 811118 | 820505 |
| 2ND HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 119.0 | 118.0 |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 811001 | 821026 |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15 | 33 |
| 66-130: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21 | 23 |
| 131-195: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 196-260: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

24-HR STANDARD EXCEEDANCE ROSE FOR
ARMCO - ASHLAND, KY
(ALL CASES > 260 UG/M**3)
X=0.900
COUNT/AVERAGE TSP OF PRIMARY EXCEEDANCES

| SAROAD # | 363080003 | | 363080010 | | 180080003 | | 180080005 | | 180080006 | | 180080007 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SITE ID # | 1 | | 6 | | 7 | | 8 | | 9 | | 10 | |
| DIRECTION | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X |
| N COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| NNE COUNT: | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 312. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| NE COUNT: | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 310. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| ENE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| E COUNT: | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 310. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| ESE COUNT: | 1 | 0 | 0 | 2 | 0 | 1 | 1 | 2 | 1 | 0 | 0 | 0 |
| AVE TSP: | 360. | 0. | 0. | 436. | 0. | 347. | 399. | 324. | 315. | 0. | 0. | 0. |
| SE COUNT: | 0 | 0. | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 288. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| SSE COUNT: | 0 | 0 | 1 | 5 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 308. | 328. | 0. | 373. | 0. | 0. | 0. | 0. | 0. | 0. |
| S COUNT: | 1 | 0 | 0 | 7 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 0 |
| AVE TSP: | 293. | 0. | 0. | 345. | 350. | 553. | 0. | 588. | 0. | 338. | 0. | 0. |
| SSW COUNT: | 0 | 1 | 1 | 3 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 322. | 267. | 332. | 389. | 378. | 0. | 0. | 0. | 0. | 0. | 0. |
| SW COUNT: | 0 | 1 | 3 | 13 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 438. | 332. | 316. | 0. | 434. | 0. | 0. | 0. | 0. | 0. | 0. |
| WSW COUNT: | 0 | 0 | 3 | 9 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 310. | 345. | 0. | 0. | 0. | 274. | 0. | 0. | 0. | 0. |
| W COUNT: | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 291. | 0. | 0. | 0. | 312. | 0. | 0. | 0. | 0. |
| WNW COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| NW COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 325. | 0. |
| NNW COUNT: | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 |
| AVE TSP: | 0. | 0. | 0. | 305. | 0. | 265. | 0. | 0. | 0. | 288. | 261. | 0. |
| ALL COUNT: | 2 | 2 | 8 | 56 | 2 | 6 | 1 | 5 | 1 | 2 | 2 | 0 |
| AVE TSP: | 327. | 380. | 313. | 326. | 370. | 392. | 399. | 364. | 315. | 313. | 293. | 0. |

24-HR STANDARD EXCEEDANCE ROSE FOR
ARMCO - ASHLAND, KY
(ALL CASES > 150 UG/M**3)
X=0.900
COUNT/AVERAGE TSP OF SECONDARY EXCEEDANCES

| SARCAD # | 363080003 | | 363080010 | | 180080003 | | 180080005 | | 180080006 | | 180080007 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SITE ID # | 1 | | 6 | | 7 | | 8 | | 9 | | 10 | |
| DIRECTION | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X |
| N COUNT: | 0 | 0 | 2 | 3 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 212. | 198. | 0. | 178. | 0. | 166. | 0. | 0. | 0. | 0. |
| NNE COUNT: | 0 | 1 | 0 | 4 | 0 | 2 | 0 | 0 | 0 | 4 | 0 | 0 |
| AVE TSP: | 0. | 162. | 0. | 274. | 0. | 159. | 0. | 0. | 0. | 164. | 0. | 0. |
| NE COUNT: | 0 | 0 | 0 | 7 | 0 | 1 | 1 | 5 | 0 | 1 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 228. | 0. | 251. | 164. | 188. | 0. | 199. | 0. | 0. |
| ENE COUNT: | 0 | 0 | 0 | 3 | 1 | 5 | 1 | 5 | 0 | 3 | 0 | 1 |
| AVE TSP: | 0. | 0. | 0. | 180. | 168. | 173. | 225. | 171. | 0. | 188. | 0. | 186. |
| E COUNT: | 0 | 1 | 1 | 7 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 231. | 191. | 219. | 0. | 187. | 179. | 169. | 0. | 0. | 0. | 0. |
| ESE COUNT: | 1 | 1 | 2 | 13 | 1 | 7 | 1 | 5 | 1 | 2 | 0 | 1 |
| AVE TSP: | 360. | 175. | 217. | 223. | 170. | 204. | 399. | 238. | 315. | 173. | 0. | 156. |
| SE COUNT: | 1 | 2 | 1 | 7 | 1 | 2 | 0 | 2 | 1 | 0 | 0 | 0 |
| AVE TSP: | 210. | 180. | 249. | 231. | 234. | 212. | 0. | 198. | 159. | 0. | 0. | 0. |
| SSE COUNT: | 1 | 1 | 1 | 17 | 0 | 6 | 1 | 7 | 0 | 2 | 0 | 1 |
| AVE TSP: | 155. | 168. | 308. | 243. | 0. | 216. | 175. | 191. | 0. | 178. | 0. | 247. |
| S COUNT: | 1 | 2 | 5 | 29 | 2 | 11 | 1 | 7 | 0 | 1 | 0 | 0 |
| AVE TSP: | 293. | 183. | 183. | 223. | 268. | 221. | 195. | 242. | 0. | 338. | 0. | 0. |
| SSW COUNT: | 2 | 3 | 7 | 18 | 1 | 6 | 1 | 6 | 0 | 0 | 0 | 0 |
| AVE TSP: | 174. | 240. | 196. | 227. | 389. | 222. | 197. | 197. | 0. | 0. | 0. | 0. |
| SW COUNT: | 0 | 3 | 21 | 42 | 0 | 5 | 0 | 6 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 231. | 196. | 230. | 0. | 231. | 0. | 198. | 0. | 0. | 0. | 0. |
| WSW COUNT: | 0 | 2 | 7 | 36 | 1 | 3 | 0 | 2 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 160. | 233. | 230. | 159. | 169. | 0. | 216. | 0. | 0. | 0. | 0. |
| W COUNT: | 0 | 2 | 5 | 18 | 0 | 5 | 0 | 3 | 0 | 1 | 0 | 0 |
| AVE TSP: | 0. | 169. | 175. | 223. | 0. | 182. | 0. | 214. | 0. | 152. | 0. | 0. |
| WNW COUNT: | 0 | 0 | 1 | 4 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 189. | 185. | 0. | 174. | 0. | 0. | 0. | 0. | 0. | 0. |
| NW COUNT: | 0 | 0 | 2 | 4 | 0 | 1 | 0 | 2 | 0 | 1 | 1 | 2 |
| AVE TSP: | 0. | 0. | 182. | 193. | 0. | 212. | 0. | 217. | 0. | 206. | 325. | 229. |
| NNW COUNT: | 0 | 1 | 0 | 7 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 |
| AVE TSP: | 0. | 155. | 0. | 214. | 0. | 265. | 151. | 0. | 209. | 298. | 261. | 0. |
| ALL COUNT: | 6 | 19 | 55 | 219 | 7 | 59 | 8 | 52 | 3 | 16 | 2 | 5 |
| AVE TSP: | 228. | 202. | 201. | 226. | 236. | 205. | 211. | 204. | 228. | 194. | 293. | 209. |

24-HR STANDARD EXCEEDANCE ROSE FOR
ARMCO - ASHLAND, KY
(ALL CASES > 260 UG/M**3)
X=0.900
COUNT/AVERAGE TSP OF PRIMARY EXCEEDANCES

| SAROAD # | 180080008 | | 181540001 | | 361380001 | | 181540003 | | 180080012 | | 361380003 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SITE ID # | 11 | | 12 | | 16 | | 19 | | 18 | | 20 | |
| DIRECTION | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X |
| N COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 266. | 0. | 0. | 0. | 0. |
| NNE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| NE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| ENE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 265. | 0. | 0. |
| E COUNT: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 335. | 0. | 0. | 0. | 0. | 0. | 0. |
| ESE COUNT: | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 472. | 0. | 293. | 0. | 591. | 266. | 0. | 0. | 0. | 0. | 0. | 0. |
| SE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 335. | 0. | 0. | 0. | 0. |
| SSE COUNT: | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 284. | 355. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S COUNT: | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 280. | 0. | 0. | 0. | 0. | 393. | 0. | 0. | 0. | 0. | 0. | 0. |
| SSW COUNT: | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 325. | 0. | 0. | 263. | 450. | 0. | 0. | 0. | 0. | 0. | 0. |
| SW COUNT: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 372. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| WSW COUNT: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 282. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| W COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| WNW COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| NW COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| NNW COUNT: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 354. | 0. | 0. | 0. | 0. | 0. | 0. |
| ALL COUNT: | 4 | 3 | 1 | 0 | 2 | 5 | 0 | 2 | 0 | 1 | 0 | 0 |
| AVE TSP: | 330. | 351. | 293. | 0. | 427. | 360. | 0. | 301. | 0. | 265. | 0. | 0. |

24-HR STANDARD EXCEEDANCE ROSE FOR
ARMCO - ASHLAND, KY
(ALL CASES > 150 UG/M**3)
X=0.900
COUNT/AVERAGE TSP OF SECONDARY EXCEEDANCES

| SARDAD # | 180080008 | | 181540001 | | 361380001 | | 181540003 | | 180080012 | | 361380003 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SITE ID # | 11 | | 12 | | 16 | | 19 | | 18 | | 20 | |
| DIRECTION | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X |
| N COUNT: | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| AVE TSP: | 190. | 170. | 0. | 0. | 0. | 0. | 0. | 266. | 0. | 0. | 0. | 0. |
| NNE COUNT: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 182. | 0. | 0. | 0. | 178. | 0. | 168. | 0. | 0. |
| NE COUNT: | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 206. | 0. | 163. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| ENE COUNT: | 1 | 2 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 3 | 0 | 0 |
| AVE TSP: | 183. | 168. | 0. | 0. | 0. | 174. | 0. | 160. | 0. | 209. | 0. | 0. |
| E COUNT: | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 1 | 0 | 0 |
| AVE TSP: | 0. | 193. | 0. | 0. | 0. | 257. | 0. | 207. | 0. | 249. | 0. | 0. |
| ESE COUNT: | 1 | 4 | 1 | 1 | 2 | 1 | 0 | 2 | 0 | 0 | 0 | 0 |
| AVE TSP: | 472. | 173. | 293. | 153. | 371. | 266. | 0. | 212. | 0. | 0. | 0. | 0. |
| SE COUNT: | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 0 |
| AVE TSP: | 0. | 165. | 0. | 0. | 0. | 202. | 197. | 335. | 0. | 176. | 0. | 0. |
| SSE COUNT: | 1 | 4 | 0 | 1 | 1 | 2 | 0 | 2 | 0 | 0 | 0 | 0 |
| AVE TSP: | 284. | 234. | 0. | 176. | 169. | 208. | 0. | 200. | 0. | 0. | 0. | 0. |
| S COUNT: | 1 | 6 | 0 | 1 | 0 | 3 | 0 | 3 | 0 | 1 | 0 | 0 |
| AVE TSP: | 280. | 172. | 0. | 193. | 0. | 282. | 0. | 213. | 0. | 240. | 0. | 0. |
| SSW COUNT: | 0 | 6 | 0 | 0 | 1 | 4 | 1 | 3 | 0 | 2 | 0 | 0 |
| AVE TSP: | 0. | 227. | 0. | 0. | 263. | 268. | 193. | 213. | 0. | 193. | 0. | 0. |
| SW COUNT: | 0 | 7 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 0 |
| AVE TSP: | 0. | 203. | 0. | 0. | 0. | 188. | 0. | 0. | 0. | 203. | 0. | 0. |
| WSW COUNT: | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| AVE TSP: | 282. | 151. | 0. | 0. | 0. | 185. | 0. | 164. | 0. | 0. | 0. | 0. |
| W COUNT: | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |
| AVE TSP: | 211. | 174. | 0. | 0. | 0. | 0. | 0. | 171. | 0. | 158. | 0. | 0. |
| WNW COUNT: | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 157. | 0. | 0. | 0. | 180. | 0. | 0. | 0. | 0. | 0. | 0. |
| NW COUNT: | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 2 | 0 | 1 | 0 | 0 |
| AVE TSP: | 0. | 0. | 173. | 0. | 0. | 178. | 0. | 165. | 0. | 210. | 0. | 0. |
| NNW COUNT: | 0 | 2 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 |
| AVE TSP: | 0. | 157. | 0. | 0. | 0. | 354. | 231. | 0. | 151. | 0. | 0. | 0. |
| ALL COUNT: | 7 | 41 | 2 | 5 | 4 | 20 | 3 | 19 | 1 | 13 | 0 | 0 |
| AVE TSP: | 272. | 192. | 233. | 173. | 294. | 238. | 207. | 206. | 151. | 199. | 0. | 0. |

## AIR QUALITY EVALUATION - ARMCO STEEL, ASHLAND, KENTUCKY

Air quality trends:

All stations demonstrate declines in the 12-month running geometric mean from 1980 through 1982.

Station #6 displayed a very strong negative trend in geometric means (Spearman correlation coefficient of -0.95). Stations #7 and #16 also displayed moderate to strong downward trends. However, station #9 displayed only a weak trend, and stations #12 and #19 showed upward trends.

The percentage of observations exceeding 150 $\mu g/m^3$ declined sharply during 1979 at several of the stations and remained at much lower levels during 1980-1982 than had occurred prior to 1979. The percentage of observations greater than 260 $\mu g/m^3$ peaked in late 1976 and early 1977 at station #6, but in early to mid-1979 at station #16.

Standard exceedance status:

None of the stations nearest the Armco facility (#6, #7, #9, #12, #16, and #19), indicated any exceedances of the primary TSP standards during 1982.

Pollution and standard exceedance roses:

The majority of the wind data used in construction of the pollution roses and the standard exceedance roses were observed at Huntington Tristate Airport, which is approximately 20 km distant from the mill and located on a plateau. The terrain in this area is complex. Therefore, the wind data are likely not to be representative of conditions near the mill. The roses should therefore be treated with caution.

Inhalable Particulate matter:

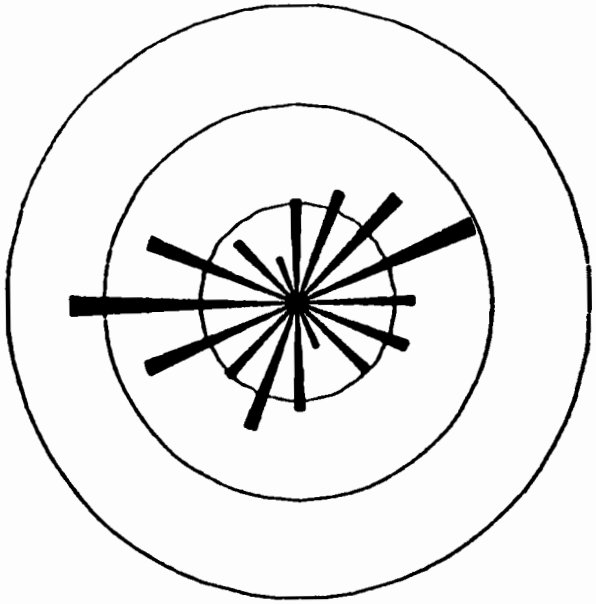
Station #6 samples IP as part of the EPA IP Network. Data summarized for this site are as follows:

| Year | Instrument | # of Obs. | Arithmetic Mean | Highest | Second Highest | Standard Deviation |
|---|---|---|---|---|---|---|
| 1980 | SSI | 12 | 49.4 | 83.5 | 66.6 | 16.0 |
| 1980 | DICHOT | 10 | 37.8 | 58.3 | 47.2 | 11.1 |
| 1981 | SSI | 17 | 65.1 | 122.5 | 121.4 | 27.9 |
| 1981 | DICHOT | 28 | 44.3 | 123.7 | 88.3 | 24.1 |
| 1982 | DICHOT | 10 | 44.6 | 52.6 | 52.4 | 10.4 |

An IP sampler operated by the State agency is located at station #7 and is not part of the EPA Network.

| Year | Instrument | # of Obs. | Arithmetic Mean | Highest | Second Highest | Standard Deviation |
|---|---|---|---|---|---|---|
| 1981 | SSI | 51 | 64 | 151 | 134 | -- |
| 1982 | SSI | 44 | 38 | 86 | 84 | -- |

WIND ROSE
PERSISTENCE CLASS 0.75
WIND STATION 180080010



ARMCO STEEL
Houston
Harris County
Texas
EPA Region VI

Hi-Vol Monitoring Sites--Armco Steel, Houston, Texas

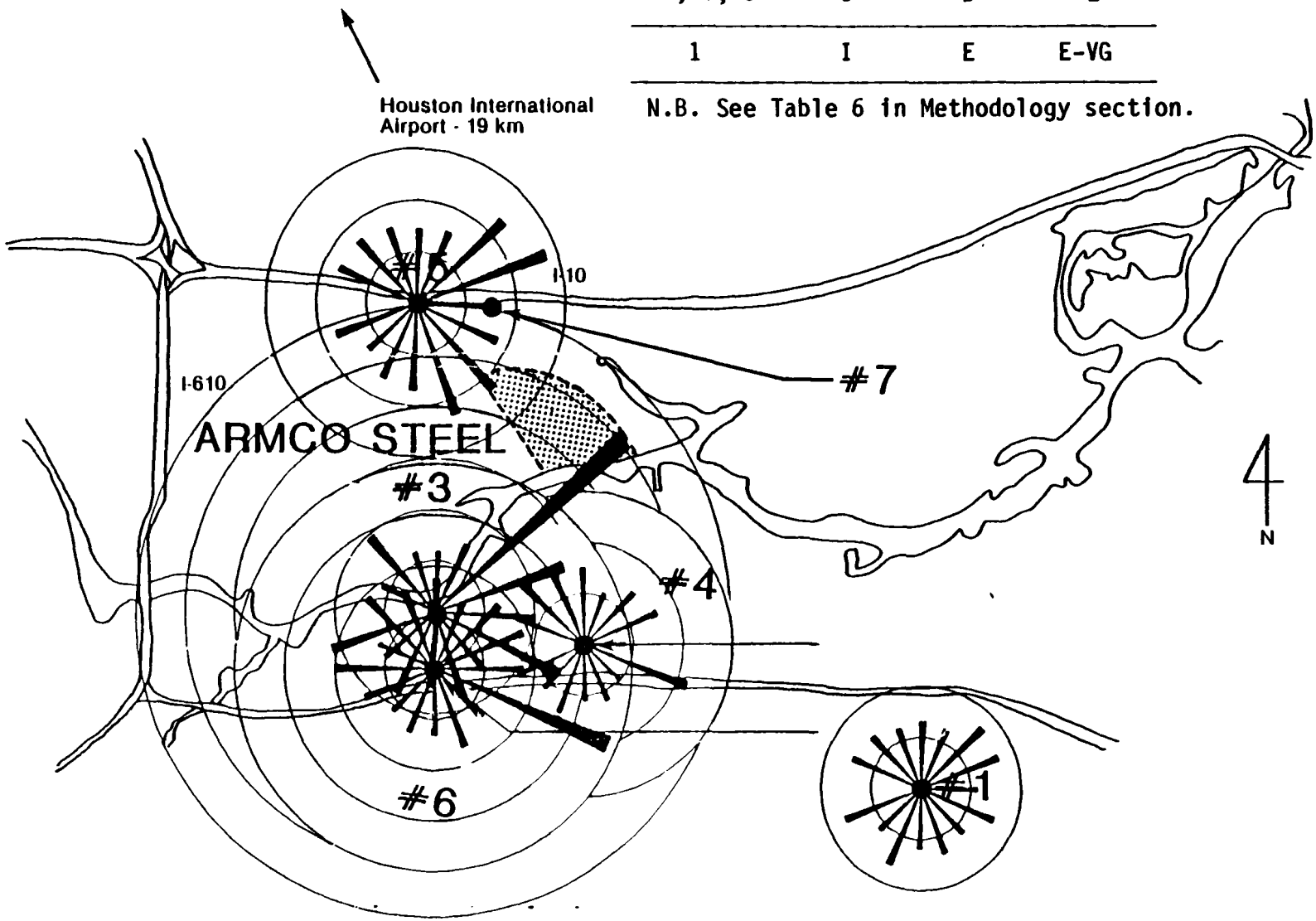
| Site ID Number | SAROAD Number | Site Name and Address | Plant Location from Site | | Elevation (m) | | | Site Description | Nearest Roadway | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Bearing (°) | Distance (km) | Above Ground | Above MSL | Above Plant | | Name | Direc-tion | Distance (m) | Volume |
| 1 | 45-1370-001 | 1301 Center St.<br>Deer Park, TX | 312 | 8.8 | 1 | 8 | 0.5 | Ground level | Center St.<br>13th St. | E<br>N | 30<br>5 | M<br>L |
| 2* | 45-2330-006 | 828 Sheldon Rd.<br>Channelview, TX | 238 | 8.1 | 8 | 20 | 12 | Roof | Sheldon Rd. | W | 45 | M |
| 3 | 45-2560-017 | Houston #17<br>12550 Clinton at Federal<br>Houston, TX | 46 | 2.7 | 1 | 7 | 0 | Ground level | Federal Rd.<br>Clinton Rd. | E<br>S | 45<br>45 | H<br>H |
| 4 | 45-2560-028 | Addams Terminal<br>Texas Rt. 225<br>Houston, TX | 344 | 3.8 | 6 | 15 | 7 | Roof | (Unnamed paved rd.) | N | 18 | M |
| 5 | 45-2560-034 | CAMS #1<br>Harris Elementary School<br>1224 Mae Drive<br>Houston, TX | 127 | 3.3 | 4 | 12 | 5 | Roof | Mae Dr.<br>I-10 | E<br>N | 10<br>100 | L<br>H |
| 6 | 45-4060-002 | Municipal Court Bldg.<br>208 W. Shaw<br>Pasadena, TX | 24 | 4.6 | 10 | 17 | 10 | Roof | W. Shaw Ave. | W | 10 | M |
| 7 | 45-2560-015 | Houston #15<br>12759 Market St.<br>Houston, TX | 145 | 1.8 | 1 | 15 | 8 | Ground level | Unpaved dr. (dirt/crushed shell) | E | 12 | M |

Key: U = Unavailable M = Moderate
L = Light H = Heavy

* Data from this station were included in the original 1973-1977 analysis; however, no strong mill impact on TSP was noted at this site. Based on the likelihood that this situation has not changed, data from this site were not employed in the 1978-1980 or the 1981-1982 updates.

| Station # | Terrain | Distance | Rating |
|---|---|---|---|
| 4 | I | A | E |
| 3, 5, 6 | I | D | E |
| 1 | I | E | E-VG |

N.B. See Table 6 in Methodology section.



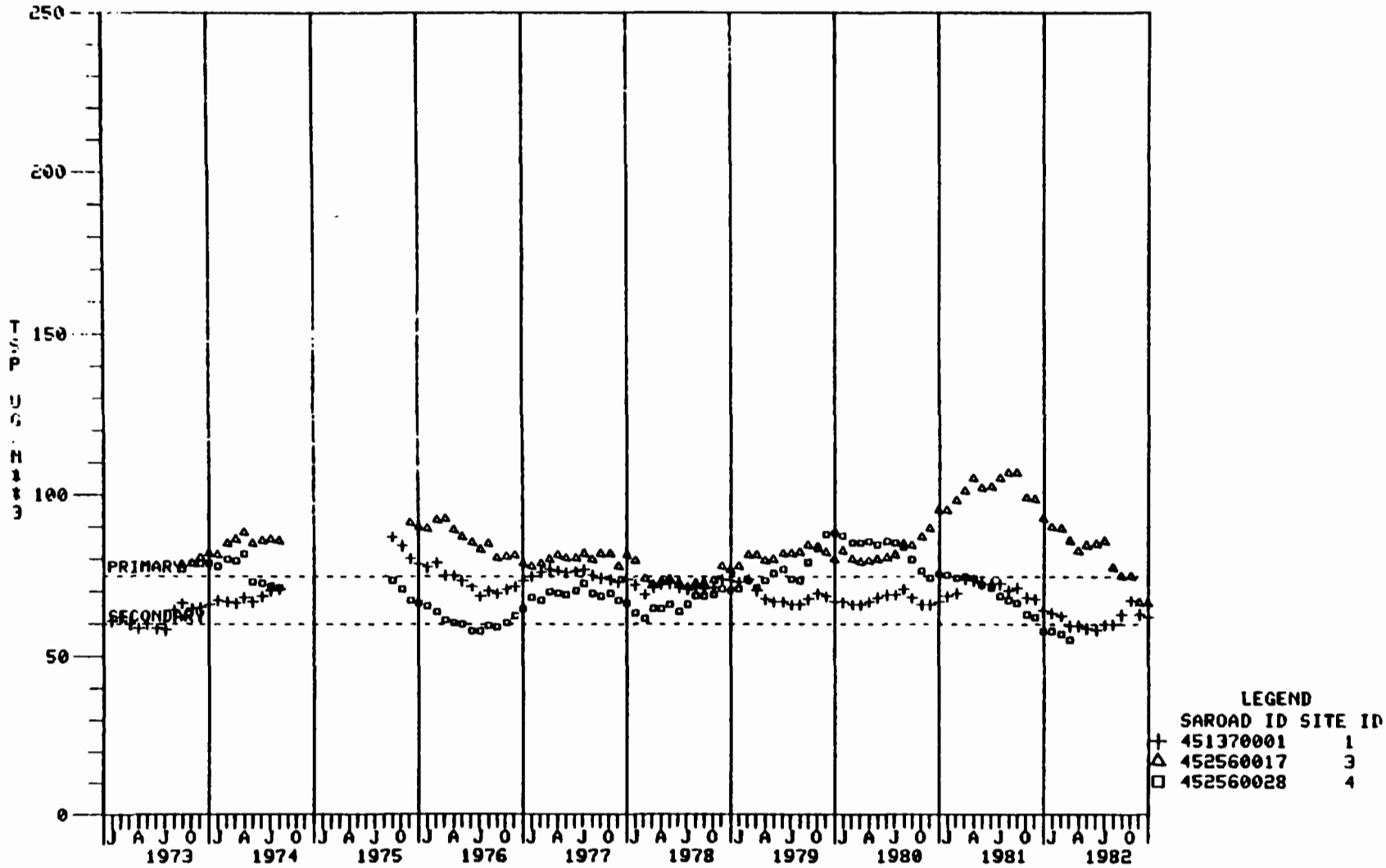

TSP roses for Armco Steel - Houston, Texas, for the period 1978-1982 for cases of $\omega>0.85$. Each circle represents 50 $\mu g/m^3$.

NUMBER OF TSP OBSERVATIONS USED IN POLLUTION ROSES

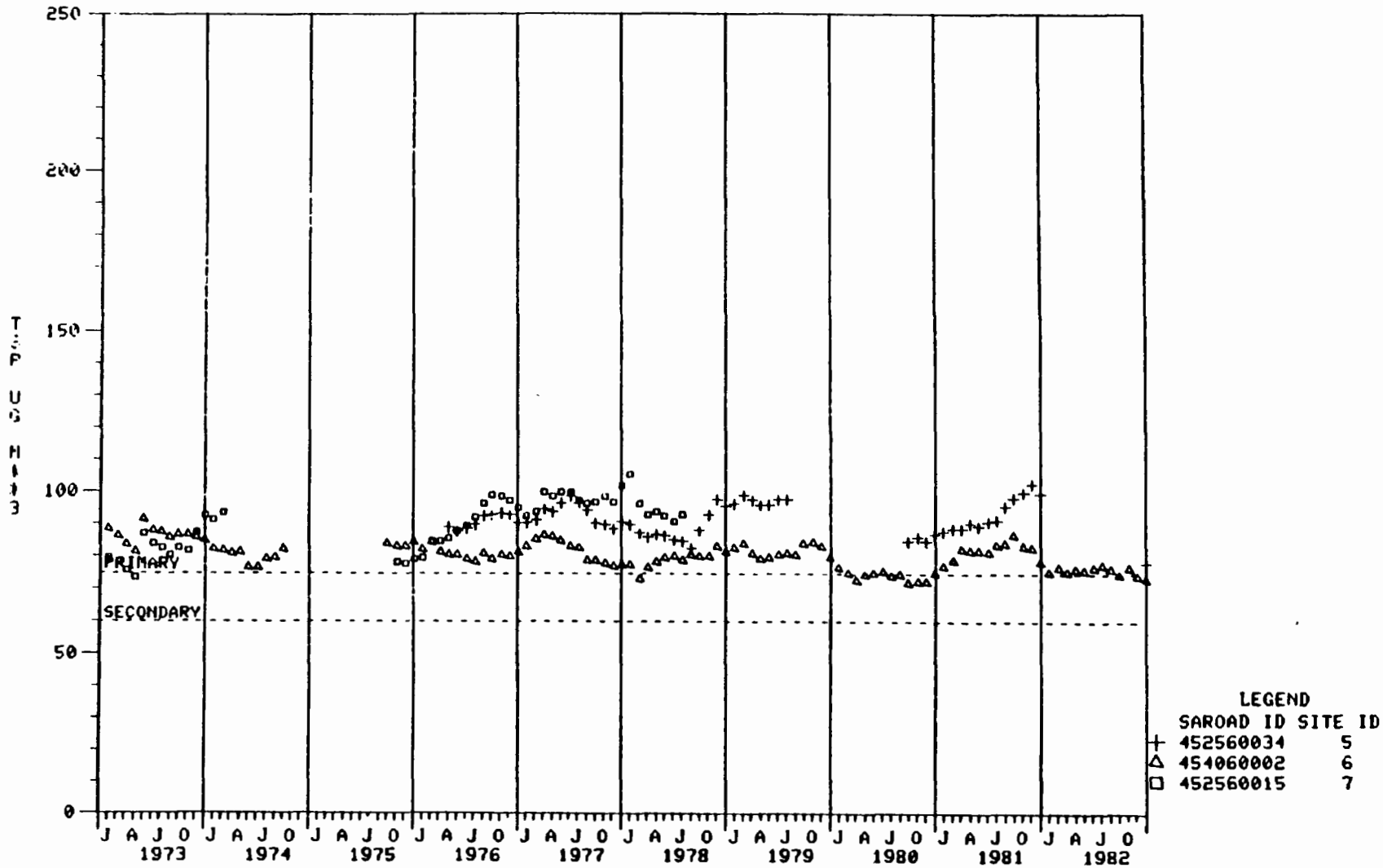
Armco--Houston, TX

| Wind Direction | Monitoring Site Numbers | | | | |
|---|---|---|---|---|---|
| | #1 | #3 | #4 | #5 | #6 |
| N | 10 | 10 | 9 | 8 | 9 |
| NNE | 12 | 11 | 9 | 7 | 9 |
| NE | 2 | 3 | 3 | 3 | 3 |
| ENE | 3 | 3 | 3 | 3 | 3 |
| E | 2 | 2 | 1 | 2 | 2 |
| ESE | 2 | 2 | 1 | 2 | 2 |
| SE | 3 | 3 | 3 | 3 | 3 |
| SSE | 9 | 9 | 8 | 8 | 10 |
| S | 14 | 16 | 14 | 16 | 19 |
| SSW | 12 | 13 | 8 | 7 | 10 |
| SW | 4 | 4 | 4 | 3 | 5 |
| WSW | 2 | 1 | 2 | 2 | 2 |
| W | 0 | 0 | 0 | 0 | 1 |
| WNW | 1 | 1 | 1 | 1 | 1 |
| NW | 4 | 4 | 5 | 5 | 4 |
| NNW | 16 | 12 | 15 | 12 | 14 |
| Total | 96 | 94 | 86 | 82 | 97 |

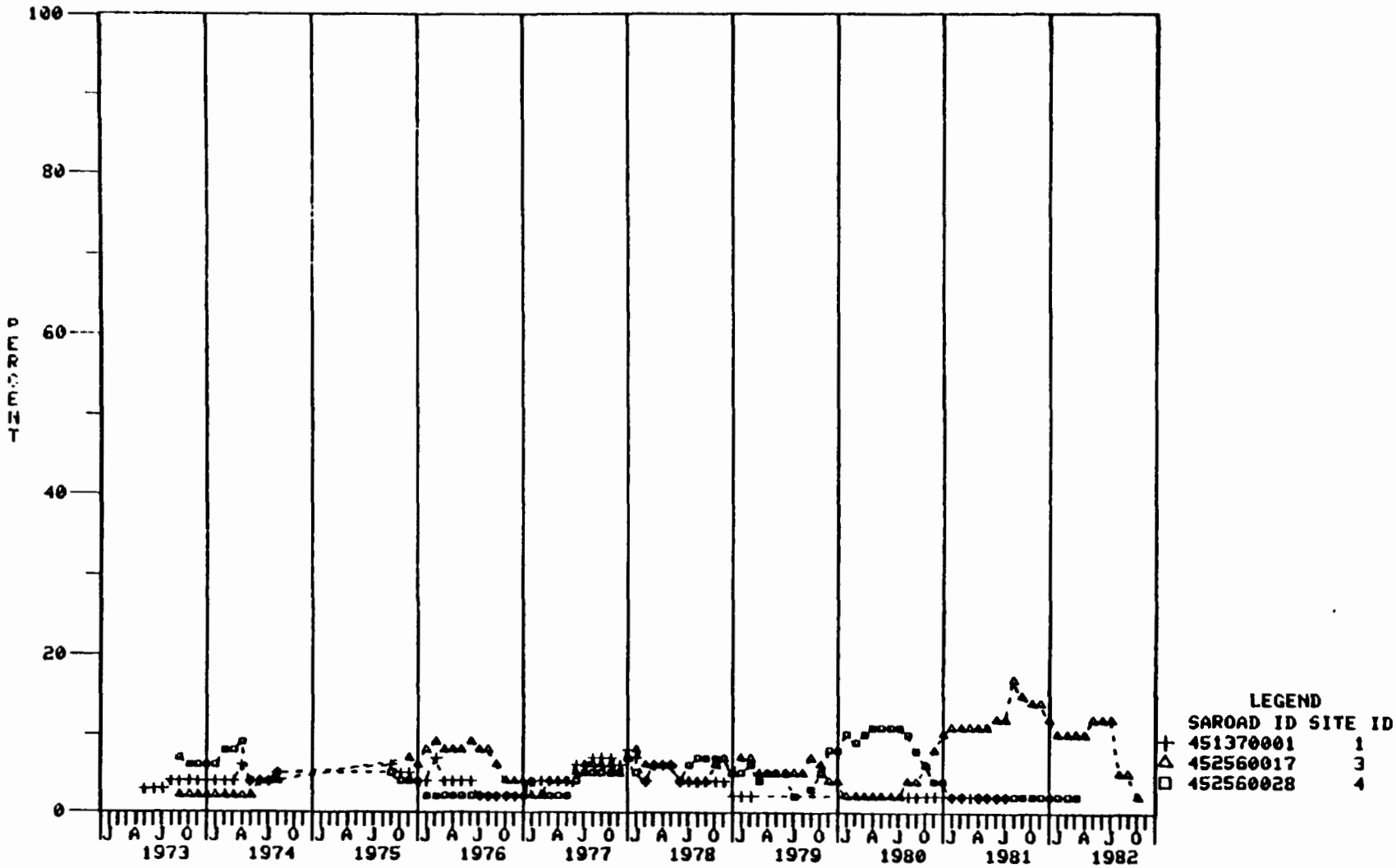
TSP 12 MONTH RUNNING GEOMETRIC MEANS (UG/M**3) FOR ARMCO - HOUSTON, TX



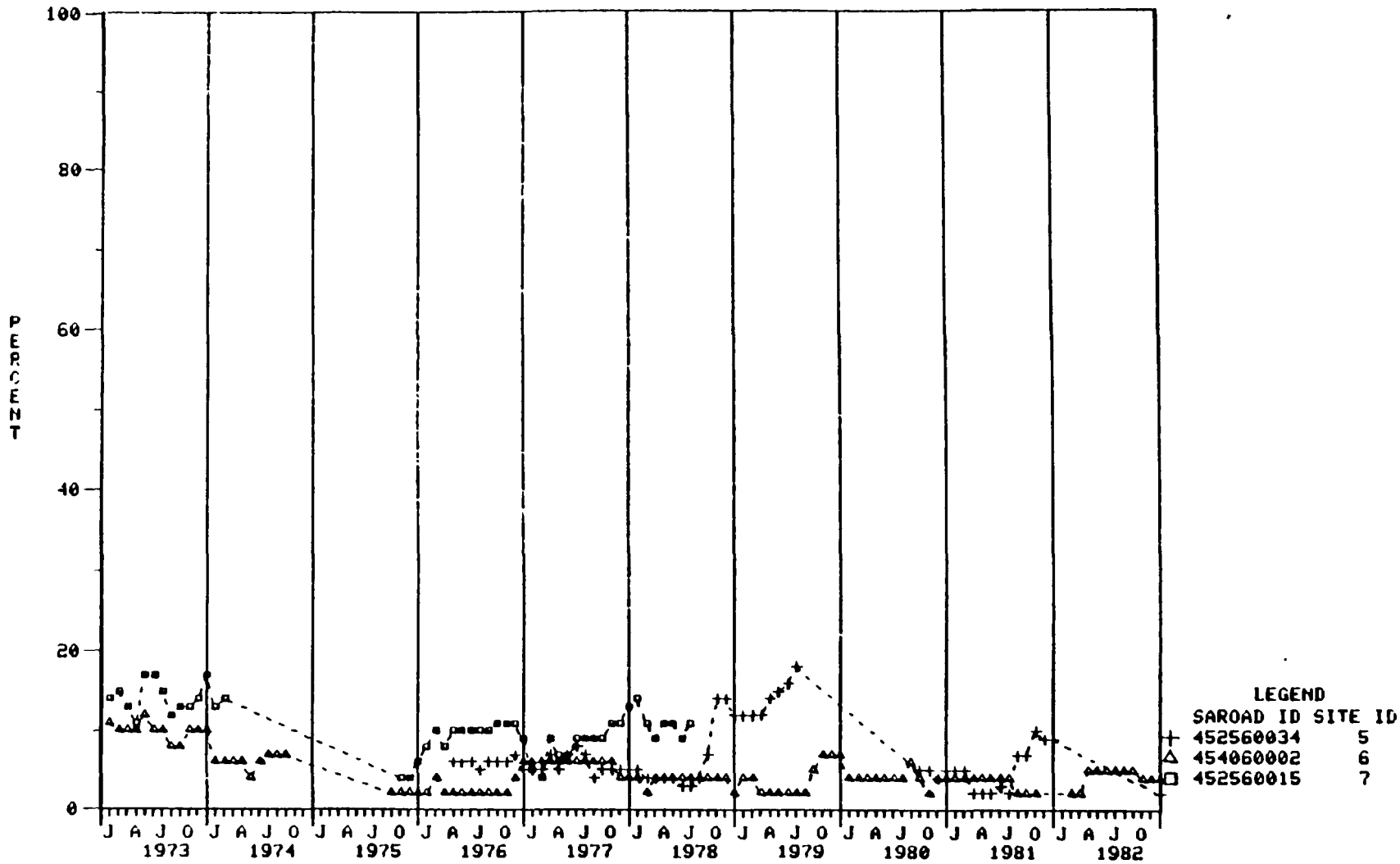
TSP 12 MONTH RUNNING GEOMETRIC MEANS (UG/M**3) FOR ARMCO - HOUSTON, TX



TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 150 (UG/M**3) FOR ARMCO - HOUSTON, TX



TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 150 (UG/M**3) FOR ARMCO - HOUSTON, TX



TSP DATA SUMMARY FOR ARMCO - HOUSTON, TX
SAROAD STATION # 451370001 SITE ID # 01
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 60 | 56 | 23 | 45 | 51 | 48 | 53 | 57 | 53 | 52 | 39 |
| GEOMETRIC MEAN: | 58.8 | 66.2 | ****** | 78.6 | 73.3 | 73.7 | 73.5 | 67.1 | 67.0 | 64.4 | 62.1 |
| GEOMETRIC S.D.: | 1.9 | 1.6 | ****** | 1.5 | 1.4 | 1.8 | 1.4 | 1.4 | 1.5 | 1.4 | 1.6 |
| ARITHMETIC MEAN | 66.5 | 75.3 | ****** | 85.3 | 78.6 | 101.6 | 77.3 | 71.6 | 72.5 | 68.0 | 68.7 |
| HIGHEST BY LARSEN EXTRP: | 400.5 | 275.2 | ****** | 253.1 | 211.2 | 407.1 | 188.5 | 197.3 | 217.9 | 167.1 | 238.7 |
| 1ST HIGHEST: | 135.0 | 325.0 | 158.0 | 230.0 | 248.0 | 1259.0 | 174.0 | 131.0 | 174.0 | 141.0 | 141.0 |
| DATE : | 720608 | 730528 | 740405 | 750729 | 760218 | 770224 | 780315 | 791012 | 800801 | 810311 | 821002 |
| 2ND HIGHEST: | 130.0 | 152.0 | 158.0 | 163.0 | 141.0 | 337.0 | 118.0 | 126.0 | 148.0 | 119.0 | 131.0 |
| DATE : | 720316 | 730510 | 740511 | 750325 | 761208 | 771221 | 780414 | 791030 | 800203 | 810826 | 820405 |
| # OF READINGS EXCEEDING 260 : | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 2 | 2 | 2 | 1 | 4 | 1 | 0 | 1 | 0 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 33 | 28 | 8 | 15 | 23 | 22 | 16 | 25 | 20 | 26 | 22 |
| 66-130: | 26 | 24 | 12 | 25 | 26 | 22 | 36 | 31 | 30 | 25 | 15 |
| 131-195: | 1 | 3 | 3 | 4 | 1 | 2 | 1 | 1 | 3 | 1 | 2 |
| 196-260: | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 261-325: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR ARMCO - HOUSTON, TX
SAROAD STATION # 452560017 SITE ID # 03
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 59 | 25 | 48 | 48 | 55 | 56 | 54 | 51 | 51 | 44 |
| GEOMETRIC MEAN: | ****** | 82.5 | ****** | 89.9 | 78.9 | 81.5 | 76.5 | 80.0 | 95.1 | 92.5 | 66.6 |
| GEOMETRIC S.D.: | ****** | 1.6 | ****** | 1.5 | 1.5 | 1.8 | 1.5 | 1.6 | 1.7 | 1.6 | 1.6 |
| ARITHMETIC MEAN | ****** | 91.1 | ****** | 96.9 | 85.8 | 108.3 | 83.4 | 88.1 | 115.0 | 102.6 | 74.1 |
| HIGHEST BY LARSEN EXTRP: | ****** | 324.8 | ****** | 303.7 | 264.4 | 449.5 | 266.7 | 310.8 | 466.4 | 345.2 | 270.0 |
| 1ST HIGHEST: | ****** | 269.0 | 171.0 | 171.0 | 239.0 | 1346.0 | 164.0 | 168.0 | 609.0 | 363.0 | 144.0 |
| DATE : | ****** | 730528 | 740505 | 751003 | 760218 | 770224 | 780315 | 790924 | 801006 | 810826 | 820722 |
| 2ND HIGHEST: | ****** | 148.0 | 151.0 | 165.0 | 161.0 | 236.0 | 164.0 | 156.0 | 534.0 | 203.0 | 142.0 |
| DATE : | ****** | 730104 | 740628 | 750325 | 760107 | 771221 | 781017 | 790115 | 800825 | 810814 | 820902 |
| # OF READINGS EXCEEDING 260 : | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 3 | 1 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 1 | 2 | 3 | 2 | 4 | 3 | 2 | 5 | 6 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 17 | 8 | 9 | 12 | 17 | 22 | 16 | 12 | 7 | 21 |
| 66-130: | 0 | 34 | 14 | 31 | 32 | 31 | 27 | 30 | 32 | 32 | 17 |
| 131-195: | 0 | 7 | 3 | 8 | 3 | 4 | 7 | 8 | 3 | 9 | 5 |
| 196-260: | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 1 | 2 | 0 |
| 261-325: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR ARMCO - HOUSTON, TX
SAROAD STATION # 452560028 SITE ID # 04
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 53 | 28 | 54 | 58 | 43 | 56 | 38 | 50 | 49 | 36 |
| GEOMETRIC MEAN: | ****** | 79.1 | ****** | 66.4 | 64.9 | 66.5 | 70.4 | 88.1 | 75.6 | 58.0 | ****** |
| GEOMETRIC S.D.: | ****** | 1.6 | ****** | 1.6 | 1.4 | 1.6 | 1.5 | 1.5 | 1.5 | 1.4 | ****** |
| ARITHMETIC MEAN | ****** | 89.8 | ****** | 75.1 | 69.9 | 76.9 | 77.2 | 96.8 | 81.7 | 61.8 | ****** |
| HIGHEST BY LARSEN EXTRP: | ****** | 333.2 | ****** | 262.8 | 188.4 | 261.1 | 233.2 | 315.3 | 233.2 | 162.7 | ****** |
| 1ST HIGHEST: | ****** | 325.0 | 210.0 | 333.0 | 229.0 | 354.0 | 272.0 | 205.0 | 255.0 | 152.0 | 140.0 |
| DATE : | ****** | 730528 | 740210 | 750223 | 760218 | 770107 | 780719 | 791105 | 800128 | 810422 | 820405 |
| 2ND HIGHEST: | ****** | 253.0 | 180.0 | 216.0 | 149.0 | 281.0 | 203.0 | 199.0 | 164.0 | 124.0 | 129.0 |
| DATE : | ****** | 730510 | 740405 | 750112 | 760131 | 771221 | 780818 | 791030 | 800328 | 810311 | 820123 |
| # OF READINGS EXCEEDING 260 : | 0 | 1 | 0 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 3 | 2 | 2 | 1 | 3 | 3 | 3 | 2 | 1 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 17 | 13 | 30 | 34 | 22 | 20 | 9 | 17 | 34 | 27 |
| 66-130: | 0 | 30 | 12 | 22 | 21 | 17 | 33 | 22 | 31 | 14 | 8 |
| 131-195: | 0 | 3 | 2 | 0 | 2 | 2 | 1 | 4 | 1 | 1 | 1 |
| 196-260: | 0 | 2 | 1 | 1 | 1 | 0 | 1 | 3 | 1 | 0 | 0 |
| 261-325: | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR ARMCO - HOUSTON, TX
SAROAD STATION # 452560034 SITE ID # 05
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 27 | 31 | 36 | 58 | 112 | 57 | 31 | 44 | 33 | 44 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | ****** | 90.3 | 90.8 | 95.7 | ****** | 86.9 | 99.5 | 78.3 |
| GEOMETRIC S.D.: | ****** | ****** | ****** | ****** | 1.4 | 1.5 | 1.5 | ****** | 1.5 | 1.3 | 1.5 |
| ARITHMETIC MEAN | ****** | ****** | ****** | ****** | 95.0 | 101.2 | 103.6 | ****** | 92.6 | 103.7 | 84.9 |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | ****** | 236.4 | 296.4 | 317.6 | ****** | 264.1 | 230.1 | 273.7 |
| 1ST HIGHEST: | ****** | 310.0 | 172.0 | 204.0 | 198.0 | 842.0 | 206.0 | 166.0 | 152.0 | 198.0 | 155.0 |
| DATE : | ****** | 730528 | 740129 | 751202 | 760218 | 770224 | 780414 | 790427 | 800322 | 811025 | 820511 |
| 2ND HIGHEST: | ****** | 158.0 | 151.0 | 135.0 | 162.0 | 297.0 | 202.0 | 159.0 | 152.0 | 169.0 | 138.0 |
| DATE : | ****** | 731112 | 740417 | 751114 | 760810 | 771221 | 781017 | 790409 | 801111 | 810826 | 820505 |
| # OF READINGS EXCEEDING 260 : | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 2 | 2 | 1 | 3 | 6 | 7 | 3 | 2 | 3 | 1 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 3 | 11 | 8 | 9 | 18 | 12 | 9 | 8 | 3 | 14 |
| 66-130: | 0 | 20 | 17 | 25 | 42 | 83 | 31 | 18 | 32 | 25 | 27 |
| 131-195: | 0 | 3 | 3 | 2 | 6 | 8 | 12 | 4 | 4 | 4 | 3 |
| 196-260: | 0 | 0 | 0 | 1 | 1 | 1 | 2 | 0 | 0 | 1 | 0 |
| 261-325: | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR ARMCO - HOUSTON, TX
SAROAD STATION # 454060002 SITE ID # 06
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 54 | 50 | 30 | 54 | 52 | 50 | 53 | 46 | 50 | 46 | 49 |
| GEOMETRIC MEAN: | 87.8 | 85.0 | ****** | 84.4 | 81.1 | 77.6 | 81.3 | 79.4 | 74.7 | 78.3 | 73.1 |
| GEOMETRIC S.D.: | 2.0 | 1.5 | ****** | 1.3 | 1.5 | 1.7 | 1.4 | 1.5 | 1.4 | 1.3 | 1.4 |
| ARITHMETIC MEAN | 99.2 | 94.4 | ****** | 88.1 | 87.5 | 102.0 | 86.6 | 87.0 | 79.7 | 81.6 | 77.5 |
| HIGHEST BY LARSEN EXTRP: | 698.4 | 302.6 | ****** | 199.6 | 248.4 | 370.3 | 232.7 | 262.1 | 218.6 | 184.9 | 197.0 |
| 1ST HIGHEST: | 176.0 | 348.0 | 189.0 | 156.0 | 252.0 | 1196.0 | 205.0 | 281.0 | 158.0 | 140.0 | 175.0 |
| DATE : | 720608 | 730528 | 740222 | 750319 | 760218 | 770224 | 780315 | 790115 | 801111 | 810305 | 820222 |
| 2ND HIGHEST: | 166.0 | 206.0 | 153.0 | 142.7 | 168.0 | 348.0 | 145.0 | 170.0 | 157.0 | 137.0 | 156.0 |
| DATE : | 720831 | 730227 | 740628 | 750106 | 761102 | 771221 | 780414 | 791024 | 800825 | 811001 | 820405 |
| # OF READINGS EXCEEDING 260 : | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 4 | 5 | 2 | 1 | 3 | 2 | 1 | 3 | 2 | 0 | 2 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 9 | 17 | 11 | 13 | 17 | 19 | 17 | 16 | 14 | 12 | 21 |
| 66-130: | 33 | 27 | 14 | 37 | 30 | 27 | 34 | 24 | 33 | 32 | 25 |
| 131-195: | 12 | 4 | 5 | 4 | 4 | 2 | 1 | 5 | 3 | 2 | 3 |
| 196-260: | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 326-390: | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR ARMCO - HOUSTON, TX
SAROAD STATION # 452560015 SITE ID # 07
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 49 | 48 | 16 | 53 | 44 | 48 | 21 | 0 | 0 | 0 | 0 |
| GEOMETRIC MEAN: | 76.7 | 92.8 | ****** | 79.2 | 95.4 | 102.2 | ****** | ****** | ****** | ****** | ****** |
| GEOMETRIC S.D.: | 2.4 | 1.7 | ****** | 1.6 | 1.6 | 1.9 | ****** | ****** | ****** | ****** | ****** |
| ARITHMETIC MEAN | 94.8 | 105.6 | ****** | 87.3 | 104.5 | 140.1 | ****** | ****** | ****** | ****** | ****** |
| HIGHEST BY LARSEN EXTRP: | 962.8 | 438.0 | ****** | 304.2 | 357.3 | 696.9 | ****** | ****** | ****** | ****** | ****** |
| 1ST HIGHEST: | 194.0 | 306.0 | 239.0 | 190.0 | 298.0 | 1510.0 | 175.0 | ****** | ****** | ****** | ****** |
| DATE : | 720403 | 730528 | 740517 | 750325 | 760218 | 770224 | 780414 | ****** | ****** | ****** | ****** |
| 2ND HIGHEST: | 186.0 | 250.0 | 173.0 | 185.0 | 183.0 | 398.0 | 152.0 | ****** | ****** | ****** | ****** |
| DATE : | 720626 | 731218 | 740429 | 750130 | 760119 | 771221 | 780321 | ****** | ****** | ****** | ****** |
| # OF READINGS EXCEEDING 260 : | 0 | 1 | 0 | 0 | 1 | 3 | 0 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 5 | 8 | 6 | 3 | 4 | 6 | 2 | 0 | 0 | 0 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 14 | 11 | 5 | 15 | 7 | 11 | 3 | 0 | 0 | 0 | 0 |
| 66-130: | 27 | 25 | 5 | 29 | 27 | 26 | 13 | 0 | 0 | 0 | 0 |
| 131-195: | 8 | 10 | 5 | 9 | 9 | 6 | 5 | 0 | 0 | 0 | 0 |
| 196-260: | 0 | 1 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 |
| 261-325: | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

24-HR STANDARD EXCEEDANCE ROSE FOR
ARMCO - HOUSTON, TX
(ALL CASES > 260 UG/M**3)
X=0.850
COUNT/AVERAGE TSP OF PRIMARY EXCEEDANCES

| SARCAD # | 451370001 | | 452560017 | | 452560028 | | 452560034 | | 454060002 | | 452560015 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SITE ID # | 1 | | 3 | | 4 | | 5 | | 6 | | 7 | |
| DIRECTION | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X |
| N COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| NNE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| NE COUNT: | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 609. | 301. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| ENE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| E COUNT: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 363. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| ESE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 281. | 0. | 291. | 0. |
| SE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| SSE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S COUNT: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 354. | 0. | 0. | 0. | 0. | 0. | 0. |
| SSW COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| SW COUNT: | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 |
| AVE TSP: | 1259. | 0. | 1346. | 0. | 0. | 0. | 842. | 0. | 1196. | 0. | 1510. | 0. |
| WSW COUNT: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 272. | 0. | 0. | 0. | 0. | 0. | 0. |
| W COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| WNW COUNT: | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 |
| AVE TSP: | 337. | 0. | 0. | 0. | 281. | 0. | 297. | 0. | 348. | 0. | 398. | 298. |
| NW COUNT: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 333. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| NNW COUNT: | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 |
| AVE TSP: | 325. | 0. | 269. | 0. | 325. | 0. | 310. | 0. | 348. | 0. | 306. | 0. |
| ALL COUNT: | 3 | 0 | 3 | 2 | 3 | 2 | 3 | 0 | 4 | 0 | 4 | 1 |
| AVE TSP: | 640. | 0. | 741. | 332. | 313. | 313. | 483. | 0. | 543. | 0. | 626. | 298. |

24-HR STANDARD EXCEEDANCE ROSE FOR
ARMCO - HOUSTON, TX
(ALL CASES > 150 UG/M**3)
X=0.850
COUNT/AVERAGE TSP OF SECONDARY EXCEEDANCES

| SARCAD # | 451370001 | | 452560017 | | 452560028 | | 452560034 | | 454060002 | | 452560015 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SITE ID # | 1 | | 3 | | 4 | | 5 | | 6 | | 7 | |
| DIRECTION | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X |
| N COUNT: | 0 | 2 | 1 | 2 | 2 | 0 | 1 | 0 | 2 | 1 | 0 | 0 |
| AVE TSP: | 0. | 194. | 161. | 187. | 206. | 0. | 166. | 0. | 184. | 170. | 0. | 0. |
| NNE COUNT: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |
| AVE TSP: | 0. | 0. | 168. | 0. | 0. | 0. | 0. | 172. | 0. | 168. | 0. | 0. |
| NE COUNT: | 0 | 0 | 2 | 1 | 0 | 0 | 1 | 3 | 1 | 1 | 0 | 0 |
| AVE TSP: | 0. | 0. | 390. | 301. | 0. | 0. | 160. | 173. | 175. | 158. | 0. | 0. |
| ENE COUNT: | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 164. | 0. | 0. | 164. | 202. | 159. | 0. | 0. | 0. | 0. |
| E COUNT: | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 2 | 0 | 1 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 260. | 0. | 0. | 164. | 160. | 0. | 157. | 0. | 0. |
| ESE COUNT: | 0 | 1 | 2 | 1 | 0 | 1 | 2 | 3 | 1 | 0 | 2 | 3 |
| AVE TSP: | 0. | 163. | 184. | 165. | 0. | 255. | 186. | 174. | 281. | 0. | 234. | 170. |
| SE COUNT: | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 0 | 0 | 7 | 2 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 205. | 155. | 184. | 0. | 0. | 198. | 161. |
| SSE COUNT: | 1 | 0 | 1 | 3 | 2 | 0 | 2 | 1 | 0 | 1 | 3 | 2 |
| AVE TSP: | 162. | 0. | 171. | 177. | 179. | 0. | 172. | 154. | 0. | 153. | 179. | 167. |
| S COUNT: | 1 | 1 | 0 | 1 | 2 | 2 | 0 | 2 | 0 | 2 | 2 | 1 |
| AVE TSP: | 152. | 159. | 0. | 203. | 203. | 277. | 0. | 191. | 0. | 155. | 159. | 175. |
| SSW COUNT: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| AVE TSP: | 174. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 175. | 0. | 0. |
| SW COUNT: | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 1 |
| AVE TSP: | 1259. | 0. | 1346. | 0. | 0. | 210. | 842. | 0. | 1196. | 0. | 1510. | 196. |
| WSW COUNT: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 272. | 0. | 0. | 0. | 0. | 0. | 152. |
| W COUNT: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 203. | 0. | 0. | 0. | 0. | 0. | 0. |
| WNW COUNT: | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 |
| AVE TSP: | 337. | 248. | 236. | 239. | 281. | 229. | 297. | 198. | 348. | 204. | 398. | 298. |
| NW COUNT: | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 1 |
| AVE TSP: | 0. | 0. | 162. | 0. | 337. | 0. | 0. | 0. | 189. | 176. | 0. | 142. |
| NNW COUNT: | 2 | 0 | 1 | 1 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | 0 |
| AVE TSP: | 243. | 0. | 269. | 161. | 253. | 0. | 310. | 0. | 348. | 0. | 306. | 0. |
| ALL COUNT: | 7 | 5 | 12 | 10 | 10 | 9 | 14 | 15 | 8 | 11 | 17 | 12 |
| AVE TSP: | 367. | 192. | 319. | 208. | 229. | 232. | 238. | 174. | 367. | 170. | 290. | 179. |

## AIR QUALITY EVALUATION - ARMCO STEEL, HOUSTON, TEXAS

Air quality trends:

Graphs of the 12-month running geometric means do not show any major trends. Station #1 displayed no significant overall trend (Spearman correlation coefficient of -0.19). A moderately negative trend was apparent at station #6 (-0.55). All other stations indicated very weak or no trends. No particular trends are detected in the graphs of the percent of observations exceeding 150 $\mu g/m^3$.

Standard exceedance status:

Station #1 showed an exceedance of the primary annual standard in 1975, but not in any other year. Station #3 exceeded the primary annual standard in all years except 1982; this site also violated the 24-hour primary standard in 1980. Station #5 was the only site remaining in violation of the annual primary standard in 1982.

Pollution roses:

The pollution rose for station #3 implies a substantial impact from the Armco facility. Substantial impact from the southeast is noted at both stations #3 and #6; the source of this impact is not known.

Persistent winds from the southeast are infrequent; however, station #5 shows a minor increase in TSP levels from this direction, which contains the Armco facility.

Standard exceedance roses:

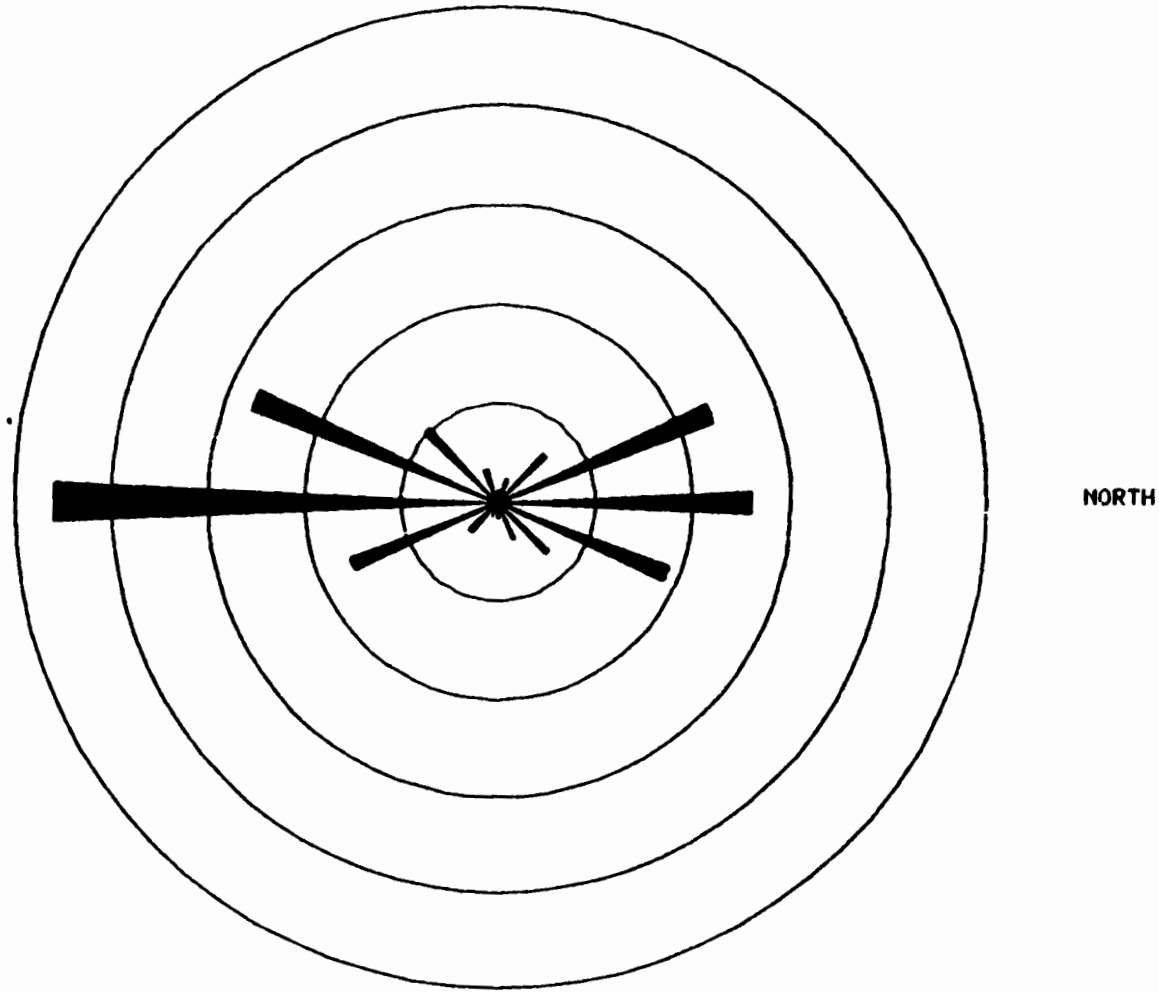
At station #3, only one of the three exceedances of 260 $\mu g/m^3$ that occurred with persistent winds can be attributed to the mill. A similar situation exists with station #4. Primary standard exceedances at the other sites cannot be tied to the mill by the wind direction analysis.

Inhalable Particulate matter:

Station #5 samples IP as part of the EPA IP Network. Data summarized for this site are as follows:

| Year | Instrument | # of Obs. | Arithmetic Mean | Highest | Second Highest | Standard Deviation |
|---|---|---|---|---|---|---|
| 1980 | SSI | 12 | 89.1 | 140.7 | 122.8 | 29.7 |
| 1981 | SSI | 28 | 80.8 | 116.6 | 116.4 | 23.0 |
| 1982 | SSI | 26 | 73.2 | 122.3 | 117.1 | 22.9 |
| 1982 | DICHOT | 13 | 45.9 | 88.6 | 72.2 | 18.2 |
| 1982 | DICHOT(10 μm) | 16 | 37.7 | 61.5 | 56.3 | 10.6 |

WIND ROSE
PERSISTENCE CLASS 0.85
WIND STATION 452560034



BETHLEHEM STEEL
Sparrows Point
Baltimore County
Maryland
EPA Region III

Hi-Vol Monitoring Sites--Bethlehem Steel, Sparrows Point, Maryland

| Site ID Number | SAROAD Number | Site Name and Address | Plant Location from Site | | Elevation (m) | | | Site Description | Nearest Roadway | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Bearing (°) | Distance (km) | Above Ground | Above MSL | Above Plant | | Name | Direc-tion | Distance (m) | Volume |
| 1* | 21-0140-002 | Fort Howard Veterans' Hospital<br>Baltimore County, MD | 312 | 4.1 | 3 | 6 | 3 | Ground level | (Unknown paved rd.) | NE | 10 | L |
| 2* | 21-0620-001 | Regional Vocational Training Center<br>325 Sollers Pt. Rd.<br>Dundalk, MD | 132 | 3.4 | 8 | 11 | 8 | Roof | Sollers Pt. Rd. | NW | 35 | H |
| 3* | 21-0620-002 | Cleaners Hangars<br>8801 Wise Ave.<br>Dundalk, MD | 202 | 4.2 | 5 | 10 | 7 | Roof | Wise Ave.<br>Gary Ave. | NE<br>NW | 15<br>15 | H<br>H |
| 4* | 21-0620-003 | Sandy Plains Elem. School<br>8330 Kavanaugh Rd.<br>Dundalk, MD | 175 | 4.3 | 10 | 20 | 10 | Roof | Kavanaugh Rd. | SW | 20 | M |
| 5 | 21-0645-001 | Edgemere Fire Station<br>7500 N. Point Rd.<br>Edgemere, MD | 234 | 3.7 | 5 | 14 | 11 | Roof | Greenhill Rd.<br>Md. Rt. 20 | NW<br>SW | 25<br>30 | L<br>H |
| 6 | 21-1360-002-G01 | Riviera Beach Elem. School<br>Jenkins Rd.<br>Riviera Beach, MD | 21 | 7.4 | 4 | 14 | 11 | Roof<br>Suburban-residential | Jenkins Rd. | SE | 10 | L |
| 7 | 21-0140-006-F01 | Chesapeake Terrace Elem. School<br>Lodge Farm Rd. & Bay Front Rd.<br>Baltimore County, MD | 271 | 2.9 | 5 | 10 | 7 | Roof<br>Suburban-industrial | Lodge Farm Rd.<br>Ellen Ave. | E<br>S | 20<br>15 | M<br>L |

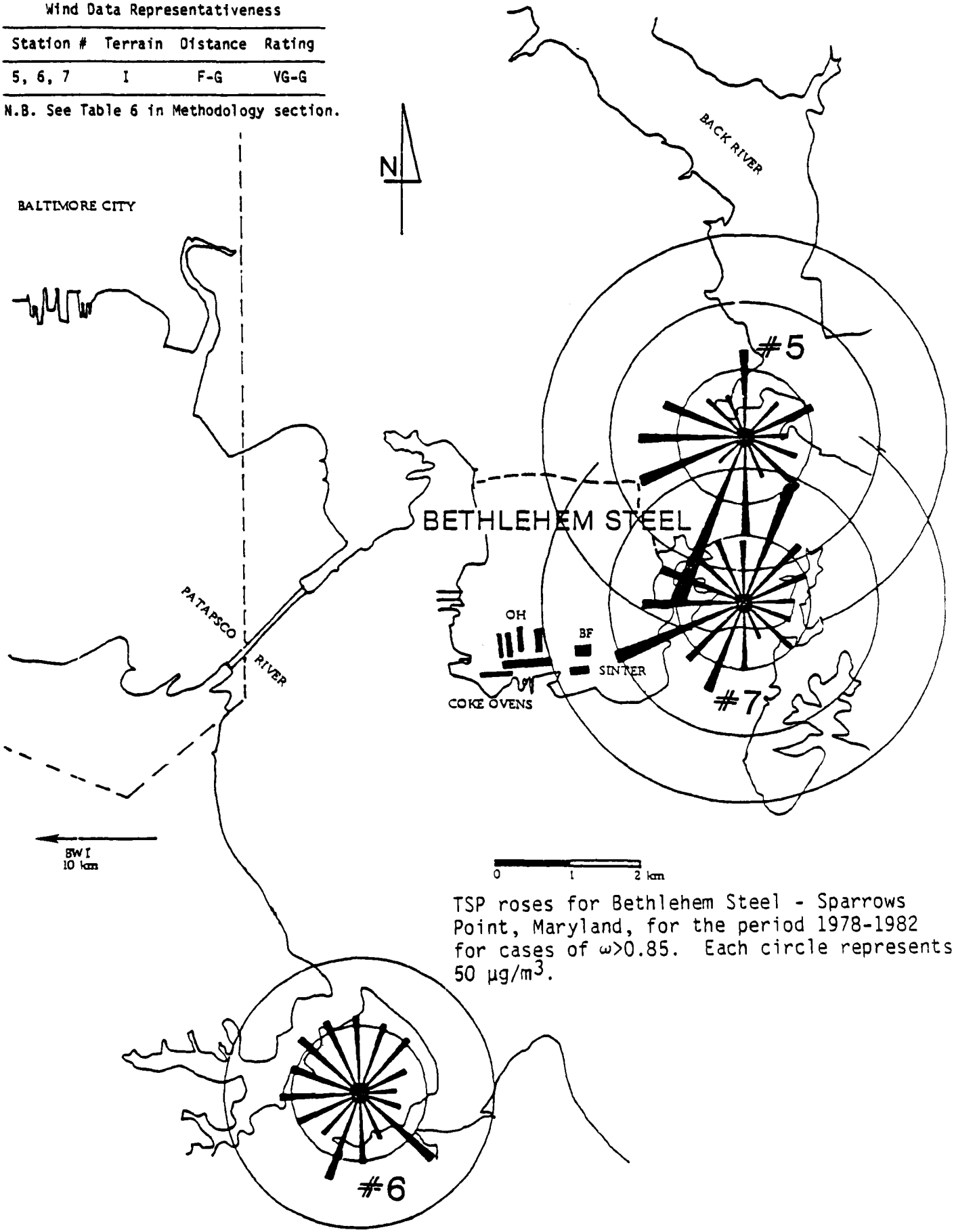
Key: U = Unavailable M = Moderate
L = Light H = Heavy

* Data from this station were included in the original 1973-1977 analysis; however, no strong mill impact on TSP was noted at this site. Based on the likelihood that this situation has not changed, data from this site were not employed in the 1978-1980 or the 1981-1982 updates.

Wind Data Representativeness

| Station # | Terrain | Distance | Rating |
|---|---|---|---|
| 5, 6, 7 | I | F-G | VG-G |

N.B. See Table 6 in Methodology section.



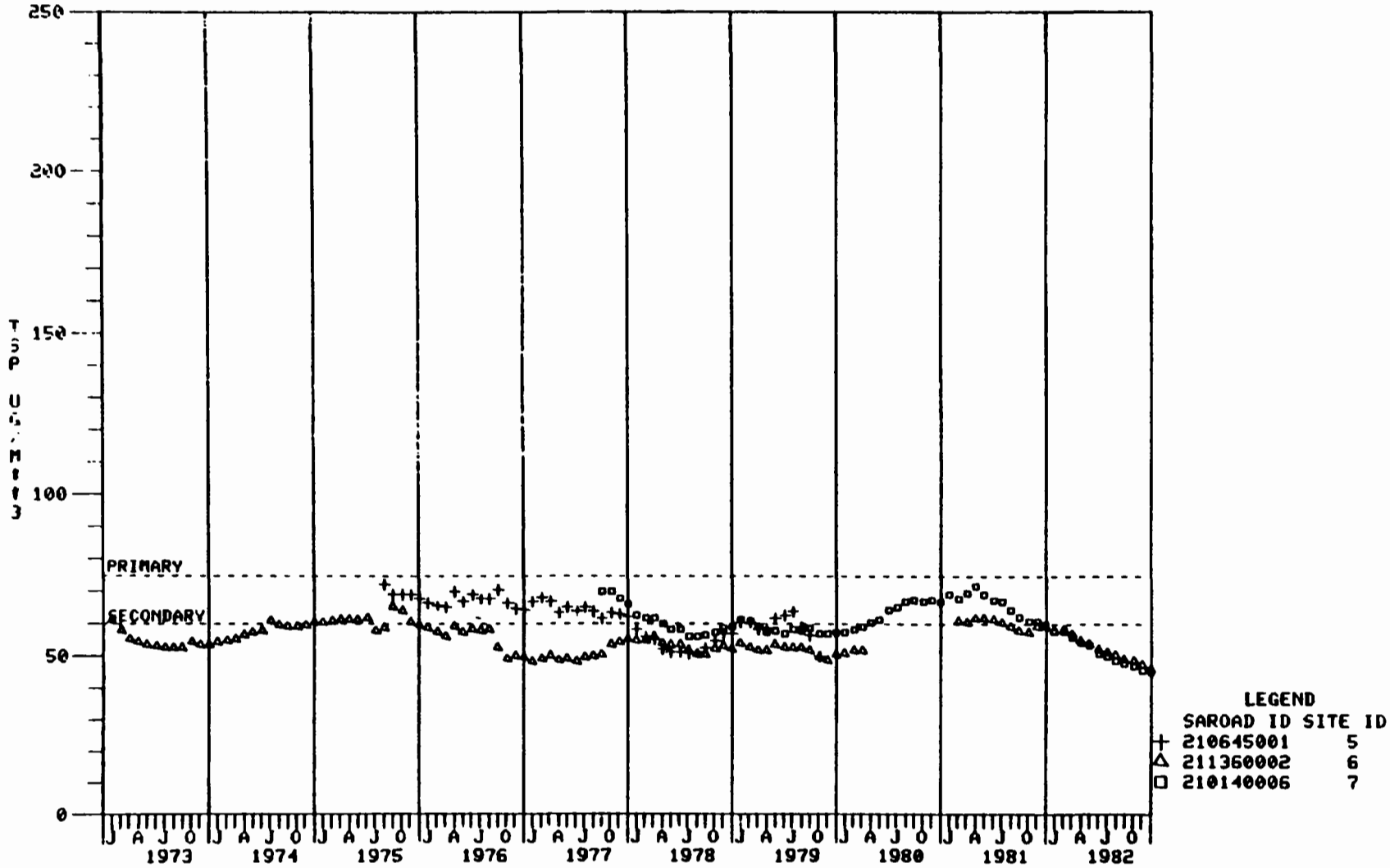

TSP roses for Bethlehem Steel - Sparrows Point, Maryland, for the period 1978-1982 for cases of $\omega>0.85$. Each circle represents 50 $\mu g/m^3$.

NUMBER OF TSP OBSERVATIONS USED IN POLLUTION ROSES

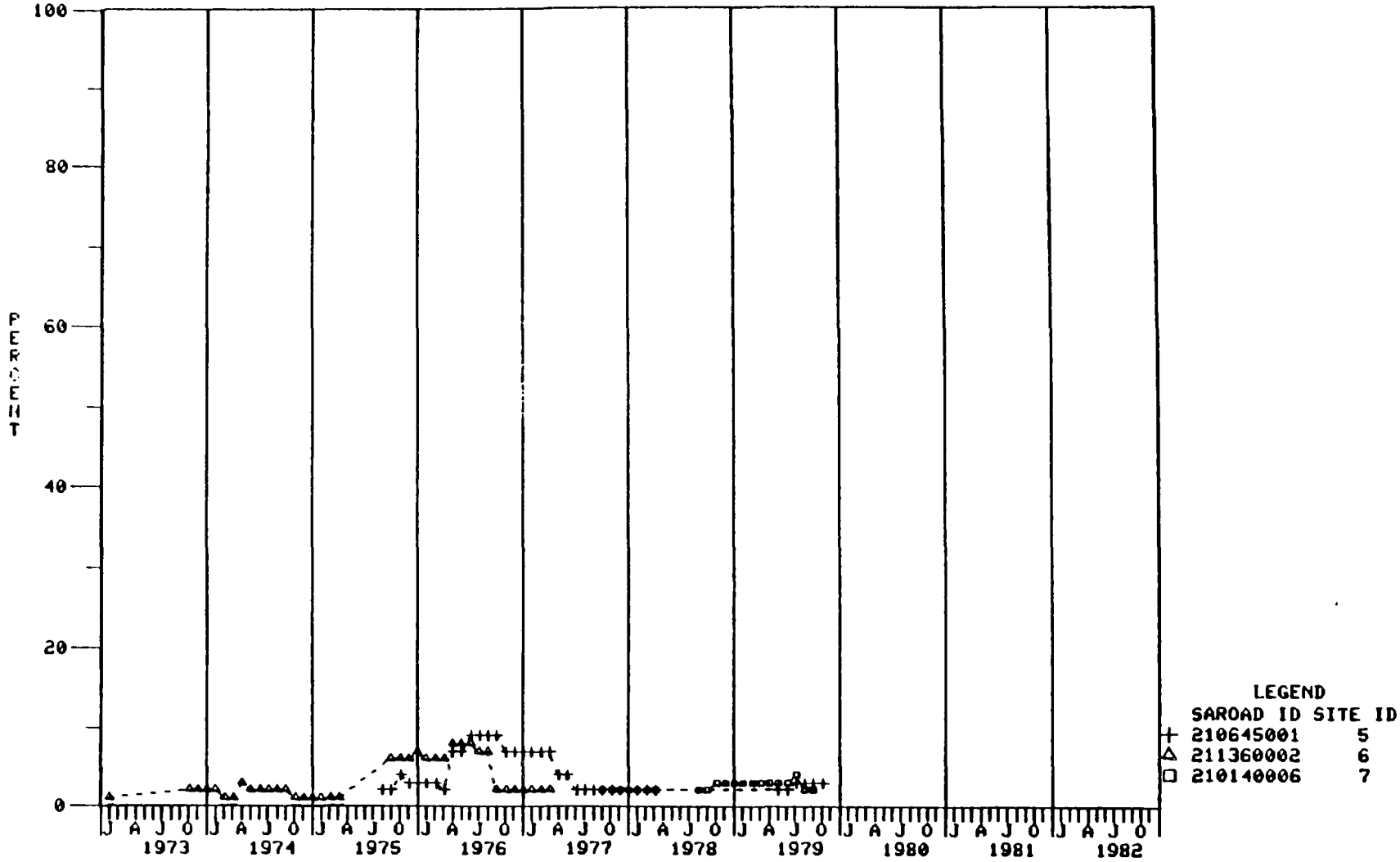
Bethlehem Steel--Sparrows Point, MD

| Wind Direction | Monitoring Site Numbers #5 | #6 | #7 |
|---|---|---|---|
| N | 3 | 8 | 4 |
| NNE | 0 | 2 | 1 |
| NE | 2 | 8 | 6 |
| ENE | 1 | 6 | 4 |
| E | 1 | 4 | 2 |
| ESE | 1 | 2 | 1 |
| SE | 1 | 2 | 3 |
| SSE | 1 | 2 | 2 |
| S | 7 | 13 | 8 |
| SSW | 2 | 6 | 5 |
| SW | 2 | 6 | 4 |
| WSW | 3 | 3 | 5 |
| W | 6 | 22 | 12 |
| WNW | 7 | 19 | 15 |
| NW | 4 | 12 | 10 |
| NNW | 1 | 2 | 2 |
| Total | 42 | 117 | 84 |

TSP 12 MONTH RUNNING GEOMETRIC MEANS (UG/M**3) FOR BETHLEHEM - SPARROWS POINT, MD



TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 150 (UG/M**3) FOR BETHLEHEM - SPARROWS POINT, MD



TSP DATA SUMMARY FOR BETHLEHEM - SPARROWS POINT, MD
SAROAD STATION # 210645001 SITE ID # 05
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 4 | 59 | 56 | 56 | 52 | 36 | 0 | 0 | 0 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | 67.9 | 64.4 | 62.2 | 57.1 | ****** | ****** | ****** | ****** |
| GEOMETRIC S.D.: | ****** | ****** | ****** | 1.6 | 1.9 | 1.4 | 1.6 | ****** | ****** | ****** | ****** |
| ARITHMETIC MEAN | ****** | ****** | ****** | 75.1 | 80.4 | 66.6 | 62.8 | ****** | ****** | ****** | ****** |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | 247.1 | 424.3 | 185.4 | 212.0 | ****** | ****** | ****** | ****** |
| 1ST HIGHEST: | ****** | ****** | 109.0 | 217.0 | 475.0 | 162.0 | 146.0 | 162.0 | ****** | ****** | ****** |
| DATE : | ****** | ****** | 741213 | 750325 | 760418 | 770413 | 780824 | 790503 | ****** | ****** | ****** |
| 2ND HIGHEST: | ****** | ****** | 100.0 | 166.0 | 231.0 | 118.0 | 130.0 | 132.0 | ****** | ****** | ****** |
| DATE : | ****** | ****** | 741225 | 751015 | 760430 | 770718 | 781023 | 790316 | ****** | ****** | ****** |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 0 | 2 | 4 | 1 | 0 | 1 | 0 | 0 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 1 | 31 | 33 | 29 | 32 | 20 | 0 | 0 | 0 |
| 66-130: | 0 | 0 | 3 | 23 | 15 | 26 | 19 | 14 | 0 | 0 | 0 |
| 131-195: | 0 | 0 | 0 | 4 | 6 | 1 | 1 | 2 | 0 | 0 | 0 |
| 196-260: | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR BETHLEHEM - SPARROWS POINT, MD
SAROAD STATION # 211360002 SITE ID # 06
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 95 | 61 | 106 | 43 | 56 | 54 | 52 | 59 | 34 | 57 | 49 |
| GEOMETRIC MEAN: | 61.0 | 53.4 | 60.4 | 59.5 | 49.5 | 55.3 | 52.1 | 50.5 | ****** | 59.2 | 46.0 |
| GEOMETRIC S.D.: | 1.5 | 1.5 | 1.4 | 1.9 | 1.6 | 1.4 | 1.5 | 1.4 | ****** | 1.5 | 1.4 |
| ARITHMETIC MEAN | 67.1 | 58.2 | 64.5 | 76.8 | 55.9 | 58.0 | 56.5 | 53.5 | ****** | 63.4 | 48.5 |
| HIGHEST BY LARSEN EXTRP: | 218.8 | 180.5 | 176.2 | 388.2 | 209.0 | 136.9 | 171.2 | 140.3 | ****** | 178.6 | 125.1 |
| 1ST HIGHEST: | 261.0 | 171.0 | 163.0 | 406.0 | 156.0 | 123.0 | 132.0 | 114.0 | 89.0 | 137.0 | 88.0 |
| DATE : | 720201 | 731025 | 740429 | 750903 | 760418 | 770419 | 781110 | 790503 | 800801 | 810215 | 820129 |
| 2ND HIGHEST: | 168.0 | 117.0 | 134.0 | 357.0 | 146.0 | 103.0 | 98.0 | 106.0 | 85.0 | 108.0 | 81.0 |
| DATE : | 720112 | 730901 | 740710 | 750909 | 760611 | 770823 | 781104 | 791223 | 800714 | 810428 | 820210 |
| # OF READINGS EXCEEDING 260 : | 1 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 2 | 1 | 1 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 53 | 40 | 67 | 27 | 40 | 40 | 37 | 47 | 15 | 33 | 43 |
| 66-130: | 39 | 20 | 37 | 13 | 14 | 14 | 14 | 12 | 19 | 23 | 6 |
| 131-195: | 2 | 1 | 2 | 0 | 2 | 0 | 1 | 0 | 0 | 1 | 0 |
| 196-260: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 261-325: | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR BETHLEHEM - SPARROWS POINT, MD
SAROAD STATION # 210140006 SITE ID # 07
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 0 | 0 | 0 | 58 | 60 | 59 | 55 | 60 | 58 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | ****** | ****** | 65.8 | 59.3 | 57.3 | 67.0 | 60.0 | 45.1 |
| GEOMETRIC S.D.: | ****** | ****** | ****** | ****** | ****** | 1.4 | 1.5 | 1.4 | 1.4 | 1.5 | 1.4 |
| ARITHMETIC MEAN | ****** | ****** | ****** | ****** | ****** | 70.2 | 64.9 | 61.0 | 70.9 | 65.2 | 47.4 |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | ****** | ****** | 187.5 | 204.1 | 167.4 | 181.2 | 199.7 | 119.9 |
| 1ST HIGHEST: | ****** | ****** | ****** | ****** | ****** | 193.0 | 187.0 | 131.0 | 147.0 | 140.0 | 86.0 |
| DATE : | ****** | ****** | ****** | ****** | ****** | 770413 | 780824 | 790906 | 800801 | 810814 | 820423 |
| 2ND HIGHEST: | ****** | ****** | ****** | ****** | ****** | 120.0 | 156.0 | 131.0 | 138.0 | 125.0 | 74.0 |
| DATE : | ****** | ****** | ****** | ****** | ****** | 770630 | 781023 | 791117 | 800602 | 810215 | 820728 |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 0 | 0 | 0 | 30 | 33 | 38 | 27 | 35 | 52 |
| 66-130: | 0 | 0 | 0 | 0 | 0 | 27 | 25 | 19 | 26 | 24 | 6 |
| 131-195: | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 2 | 2 | 1 | 0 |
| 196-260: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

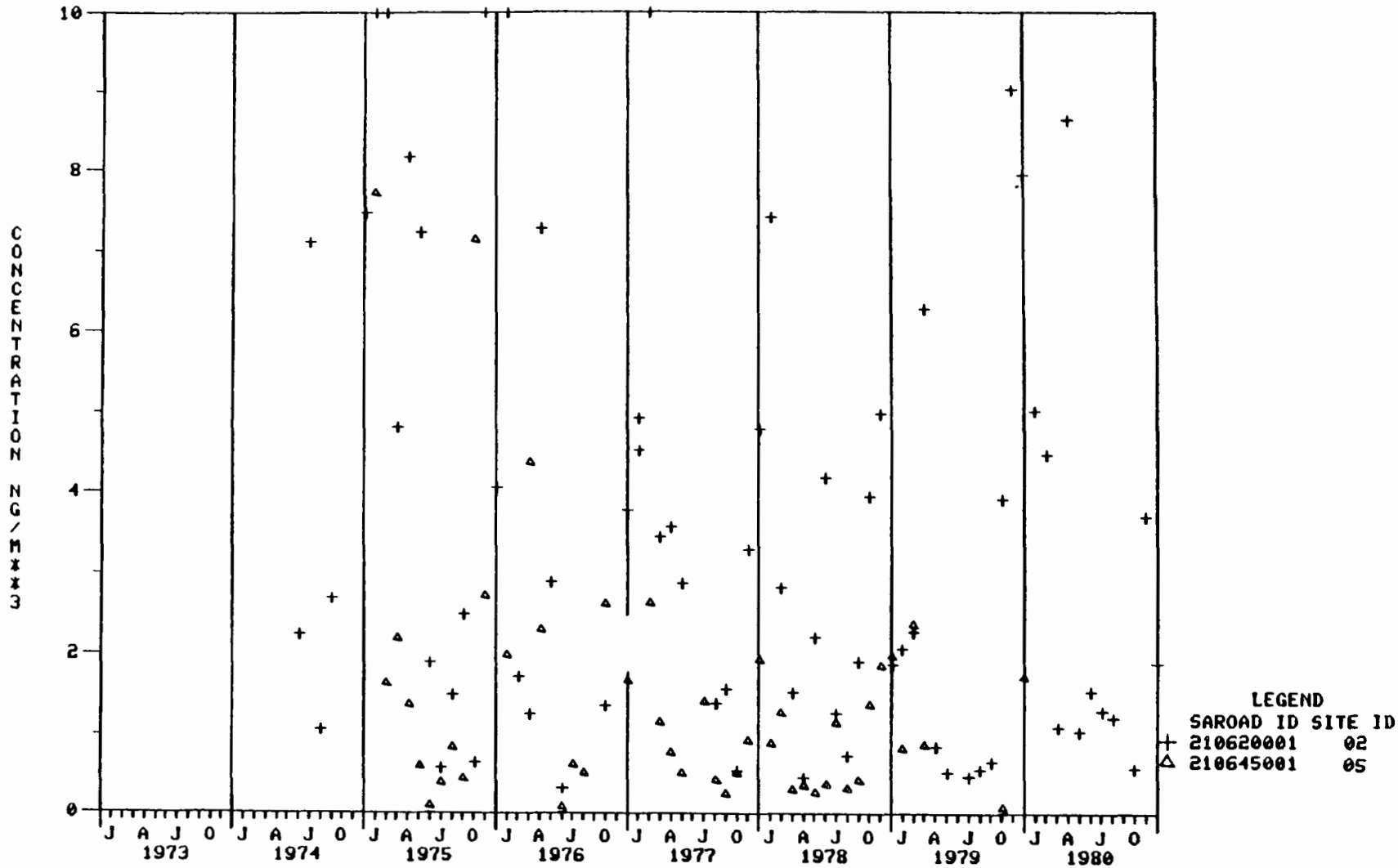
24-HR STANDARD EXCEEDANCE ROSE FOR
BETHLEHEM - SPARROWS POINT, MD
(ALL CASES > 260 UG/M**3)
X=0.850
COUNT/AVERAGE TSP OF PRIMARY EXCEEDANCES

| SAROAD # | 210645001 | | 211360002 | | 210140006 | |
|---|---|---|---|---|---|---|
| SITE ID # | 5 | | 6 | | 7 | |
| DIRECTION | W>=X | W<X | W>=X | W<X | W>=X | W<X |
| N COUNT: | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. |
| NNE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. |
| NE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. |
| ENE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. |
| E COUNT: | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. |
| ESE COUNT: | 0 | 0 | 0 | 1 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 271. | 0. | 0. |
| SE COUNT: | 0 | 1 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 475. | 0. | 0. | 0. | 0. |
| SSE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. |
| S COUNT: | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. |
| SSW COUNT: | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. |
| SW COUNT: | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. |
| WSW COUNT: | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. |
| W COUNT: | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. |
| WNW COUNT: | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. |
| NW COUNT: | 0 | 0 | 1 | 1 | 0 | 0 |
| AVE TSP: | 0. | 0. | 406. | 357. | 0. | 0. |
| NNW COUNT: | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. |
| ALL COUNT: | 0 | 1 | 1 | 2 | 0 | 0 |
| AVE TSP: | 0. | 475. | 406. | 314. | 0. | 0. |

24-HR STANDARD EXCEEDANCE ROSE FOR
BETHLEHEM - SPARROWS POINT, MD
(ALL CASES > 150 UG/M**3)
X=0.850
COUNT/AVERAGE TSP OF SECONDARY EXCEEDANCES

| SAROAD # | 210645001 | | 211360002 | | 210140006 | |
|---|---|---|---|---|---|---|
| SITE ID # | 5 | | 6 | | 7 | |
| DIRECTION | W>=X | W<X | W>=X | W<X | W>=X | W<X |
| N COUNT: | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. |
| NNE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. |
| NE COUNT: | 0 | 0 | 0 | 1 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 171. | 0. | 0. |
| ENE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. |
| E COUNT: | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. |
| ESE COUNT: | 0 | 0 | 0 | 1 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 271. | 0. | 0. |
| SE COUNT: | 0 | 1 | 0 | 1 | 0 | 0 |
| AVE TSP: | 0. | 475. | 0. | 156. | 0. | 0. |
| SSE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. |
| S COUNT: | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. |
| SSW COUNT: | 1 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 162. | 0. | 0. | 0. | 0. | 0. |
| SW COUNT: | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. |
| WSW COUNT: | 1 | 0 | 1 | 0 | 0 | 0 |
| AVE TSP: | 166. | 0. | 163. | 0. | 0. | 0. |
| W COUNT: | 1 | 1 | 0 | 0 | 1 | 0 |
| AVE TSP: | 170. | 217. | 0. | 0. | 187. | 0. |
| WNW COUNT: | 1 | 0 | 0 | 0 | 0 | 1 |
| AVE TSP: | 165. | 0. | 0. | 0. | 0. | 156. |
| NW COUNT: | 0 | 0 | 1 | 1 | 0 | 0 |
| AVE TSP: | 0. | 0. | 406. | 357. | 0. | 0. |
| NNW COUNT: | 0 | 1 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 231. | 0. | 0. | 0. | 0. |
| ALL COUNT: | 4 | 3 | 2 | 4 | 1 | 1 |
| AVE TSP: | 166. | 308. | 285. | 239. | 187. | 156. |

BAP MONTHLY COMPOSITE (NG/M**3) FOR BETHLEHEM -SPARROWS POINT, MD



## AIR QUALITY EVALUATION - BETHLEHEM STEEL, SPARROWS POINT, MARYLAND

Air quality trends:

Station #5 showed a strong negative trend (Spearman correlation coefficient of -0.83); however, this site was discontinued in 1979. The records for stations #6 and #7 show essentially no long-term trends; however, these two sites indicate a short-term rise in the geometric mean through 1980 and a decline from early 1981 through 1982. The frequency of observations exceeding 150 $\mu g/m^3$ peaked in 1976.

Standard exceedance status:

None of the stations indicate exceedance of the primary standards.

Pollution roses:

Stations #5 and #7 continued to demonstrate apparent impact from the plant.

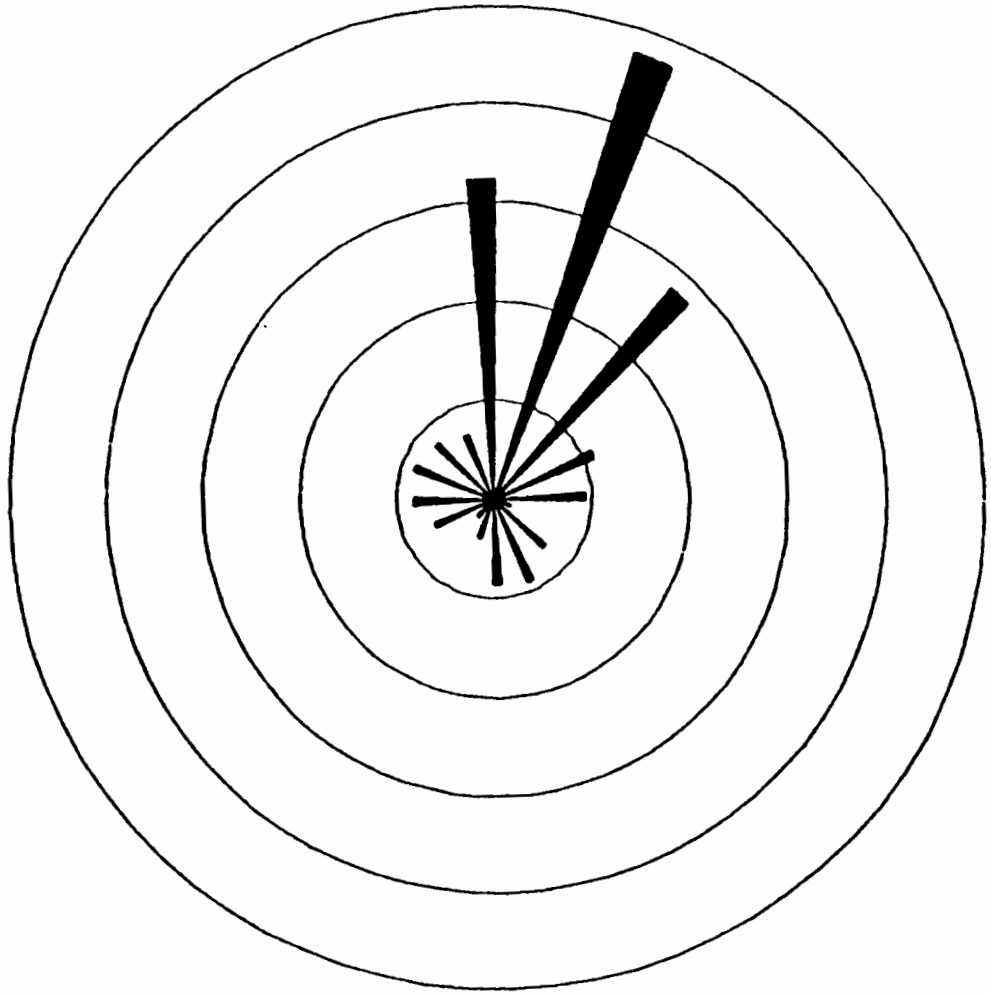
Standard exceedance roses:

For the four excursions beyond the 24-hour primary TSP standard in the period 1972-1982, wind conditions were either variable or were such that they would not be expected to transport plant emissions to the sampler. At station #5, only one of the four exceedances of 150 $\mu g/m^3$ occurring with persistent winds can be attributed to the mill.

BaP:

BaP was sampled at station #5 (through 1979) and at station #2 (through 1980). Monthly composite concentrations at station #5 were generally lower than those at station #2. Monthly composite concentrations at both sites were generally lower after 1978 than those measured prior to 1978.

WIND ROSE
PERSISTENCE CLASS 0.90
WIND STATION 93721



BETHLEHEM STEEL
Lackawanna
Erie County
New York
EPA Region II

Hi-Vol Monitoring Sites--Bethlehem Steel, Lackawanna, New York

| Site ID Number | SAROAD Number | Site Name and Address | Plant Location from Site: Facility/ Bearing (°) | | Distance (km) | Elevation (m): Above Ground | Above MSL | Above Plant | Site Description | Nearest Roadway: Name | Direction | Distance (m) | Type and Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 33-3520-001-F01 | Lackawanna Sewage Treatment Plant<br>252 Lehigh St.<br>Lackawanna, NY | Coke plant<br>Blast furnace<br>Sinter plant<br>BOF | 288<br>293<br>258<br>238 | 1.9<br>1.7<br>1.3<br>1.4 | 5 | 178 | 0 | Roof<br>Center city-industrial | Lehigh St. | W | 12 | 2-lane, L |
| 2 | 33-3520-002-F01 | Our Lady of Victory Hosp.<br>800 Ridge Rd.<br>Lackawanna, NY | Coke plant<br>Blast furnace<br>Sinter plant<br>BOF | 268<br>269<br>250<br>240 | 3.3<br>3.0<br>2.9<br>3.0 | 14 | 187 | 9 | Roof<br>Center city-commercial | Ridge Rd. | S | 45 | 2-lane, M |
| 3* | 33-0500-001 | Blasdell Village Hall<br>Blasdell, NY | Coke plant<br>Blast furnace<br>Sinter plant<br>BOF | 323<br>320<br>316<br>311 | 4.0<br>3.8<br>2.9<br>2.5 | 8 | 180 | 2 | Roof<br>Suburban-residential | Miriam St. | S | 12 | 2-lane, L, dirt |
| 4 | 33-3520-004 | Public School #4<br>36 11th St.<br>Lackawanna, NY | Coke plant<br>Blast furnace<br>Sinter plant<br>BOF | 247<br>242<br>193<br>186 | 1.0<br>0.5<br>1.3<br>1.7 | 9 | 178 | 0 | Roof<br>Center city-industrial | Rt. 5 | WSW | 45 | 4-lane, express-way |
| 5 | 33-0660-006-F01 | Holy Family School<br>920 Tift St.<br>Buffalo, NY | Coke plant<br>Blast furnace<br>Sinter plant<br>BOF | 231<br>229<br>219<br>210 | 3.8<br>3.5<br>4.1<br>4.4 | 15 | 180 | 2 | Roof<br>Center city-commercial | Tift St. | S | 15 | 2-lane, M |
| 6* | 33-7450-002-F01 | West Seneca High School<br>West Seneca, NY | Coke plant<br>Blast furnace<br>Sinter plant<br>BOF | 263<br>263<br>255<br>251 | 7.1<br>6.8<br>6.7<br>6.7 | 15 | 192 | 14 | Roof | Seneca St. | W | 30 | 2-lane, M |
| 7 | 33-0660-014-F01 | Buffalo Port Terminal<br>901 Fuhrman Blvd.<br>Buffalo, NY | Coke plant<br>Blast furnace<br>Sinter plant<br>BOF | 167<br>162<br>162<br>162 | 3.4<br>3.4<br>4.3<br>4.8 | 9 | 178 | 0 | Roof<br>Center city-industrial | Rt. 5 | NE | 90 | 4-lane, express-way |
| 8 | 33-3520-005-G05 | Lackawanna Wilmuth St. Water Treatment<br>Holbrook Ave.<br>Lackawanna, NY | Coke plant<br>Blast furnace<br>Sinter plant<br>BOF | 297<br>305<br>267<br>239 | 1.7<br>1.5<br>1.0<br>1.0 | 6 | 182 | 4 | Roof<br>Center city-industrial | Holbrook Ave.<br>Wilmuth St. | U<br>W | U<br>U | U<br>U |
| 9 | State ID #140210 | Friendship House<br>264 Ridge Rd.<br>Lackawanna, NY | Coke plant<br>Blast furnace<br>Sinter plant<br>BOF | 260<br>260<br>215<br>203 | 1.4<br>1.1<br>1.4<br>1.8 | 5 | 177 | -1 | Commercial | Ridge Rd. | U | U | U |

Key: U = Unavailable M = Moderate
L = Light H = Heavy

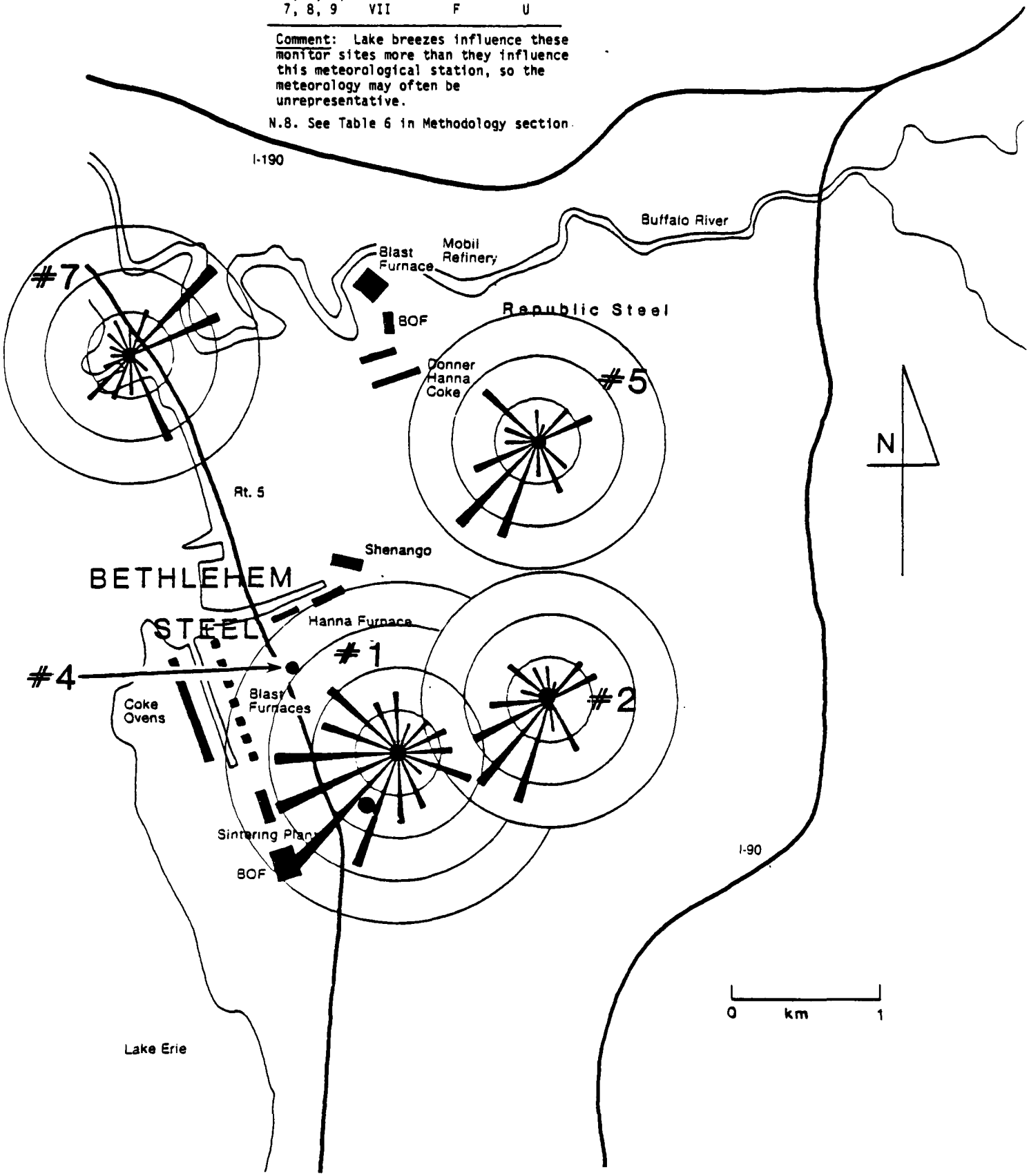
* Data from this station were included in the original 1973-1977 analysis; however, no strong mill impact on TSP was noted at this site. Based on the likelihood that this situation has not changed, data from this site were not employed in the 1978-1980 or the 1981-1982 updates.

Wind Data Representativeness

| Station # | Terrain | Distance | Rating |
|---|---|---|---|
| 1, 2, 5, 7, 8, 9 | VII | F | U |

Comment: Lake breezes influence these monitor sites more than they influence this meteorological station, so the meteorology may often be unrepresentative.

N.8. See Table 6 in Methodology section.



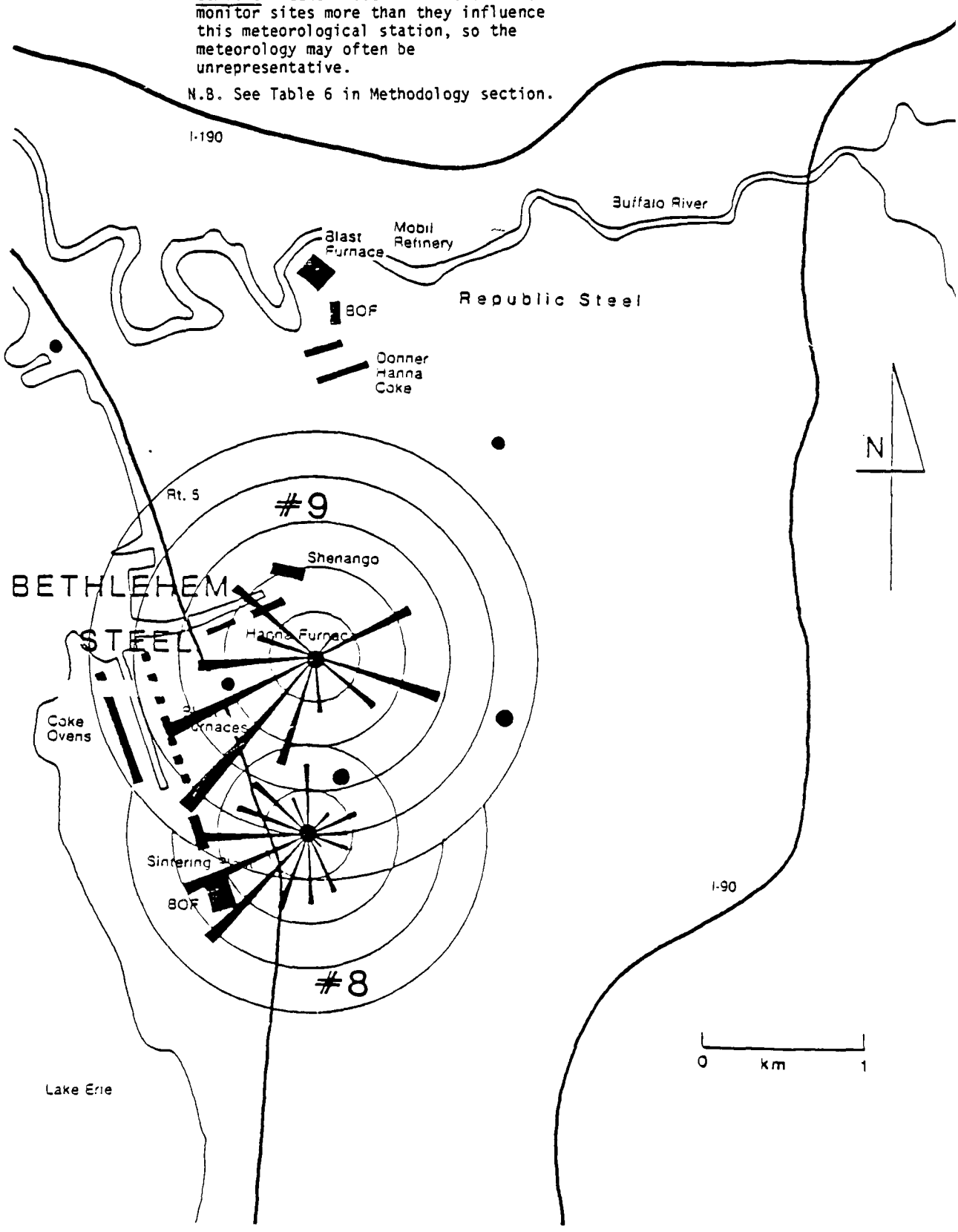

TSP roses for Bethlehem Steel - Lackawanna, New York, for the period 1978-1982 for cases of $\omega$>0.95. Each circle represents 50 $\mu g/m^3$.

Wind Data Representativeness

| Station # | Terrain | Distance | Rating |
|---|---|---|---|
| 1, 2, 5, 7, 8, 9 | VII | F | U |

Comment: Lake breezes influence these monitor sites more than they influence this meteorological station, so the meteorology may often be unrepresentative.

N.B. See Table 6 in Methodology section.



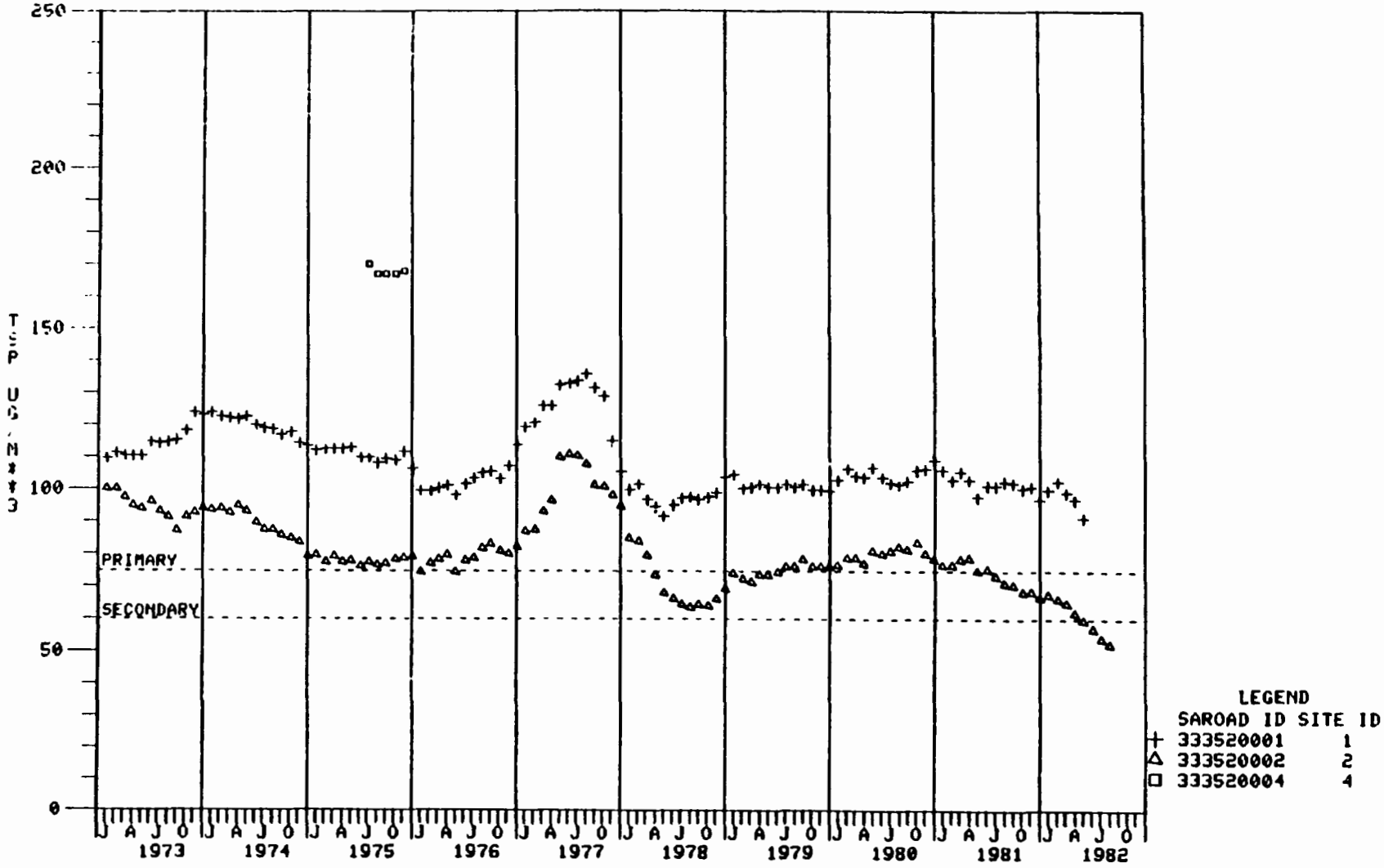

TSP roses for Bethlehem Steel - Lackawanna, New York, for the period 1978-1982 for cases of $\omega$>0.95. Each circle represents 50 $\mu g/m^3$.

NUMBER OF TSP OBSERVATIONS USED IN POLLUTION ROSES

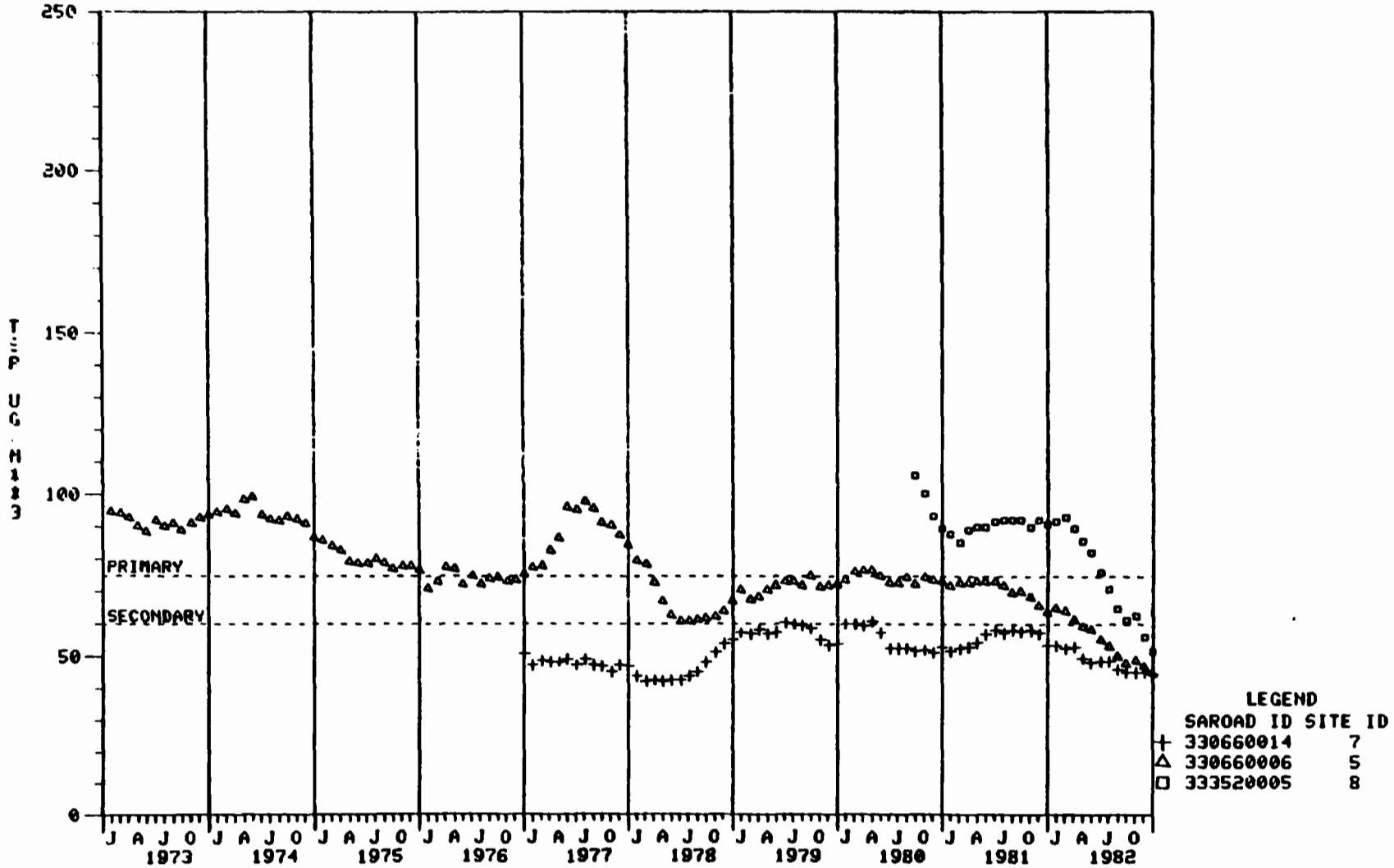
Bethlehem Steel--Lackawanna, NY

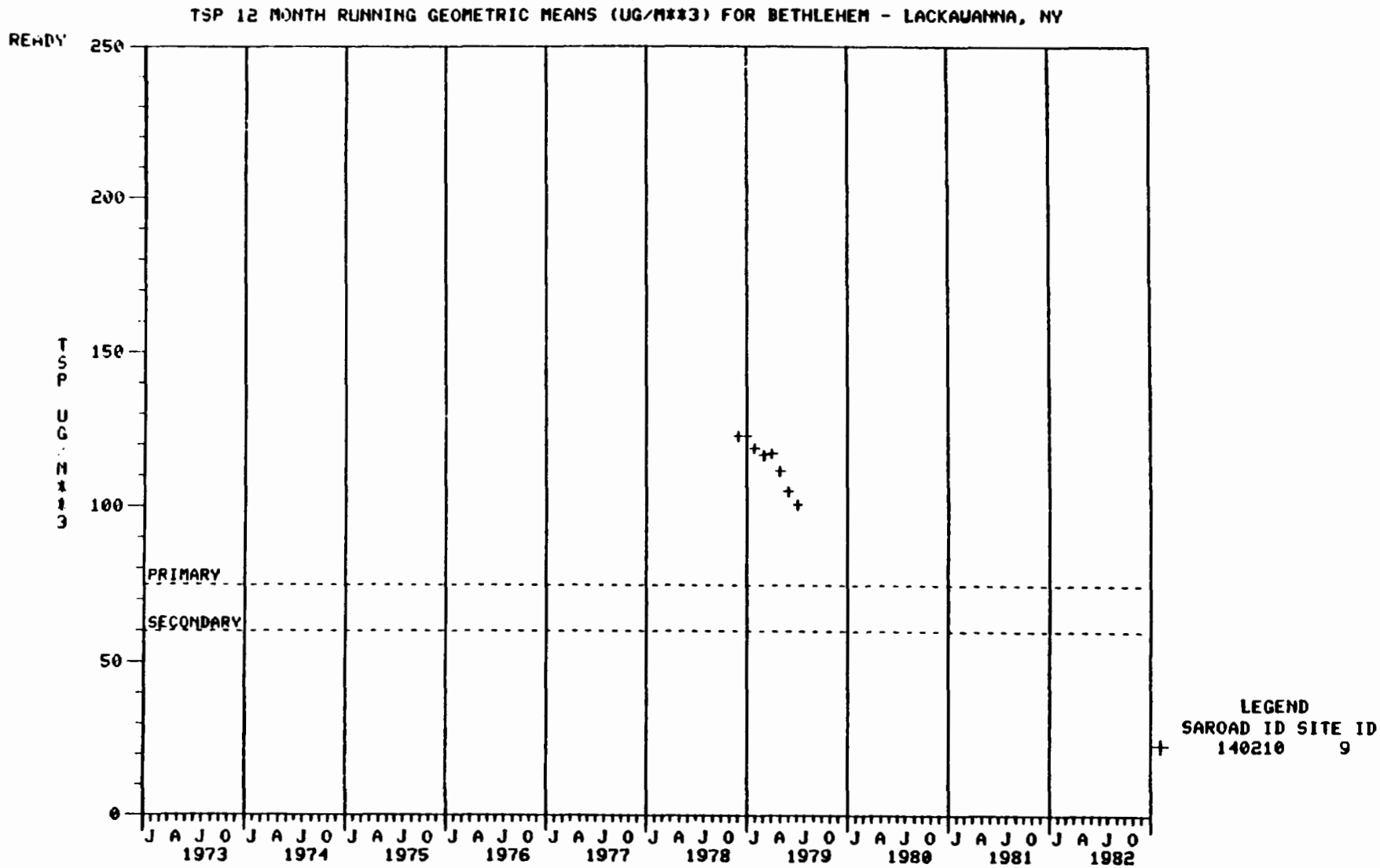
| Wind Direction | Monitoring Site Numbers | | | | | |
|---|---|---|---|---|---|---|
| | #1 | #2 | #5 | #7 | #8 | #9 |
| N | 5 | 2 | 2 | 2 | 2 | 0 |
| NNE | 3 | 1 | 1 | 1 | 0 | 0 |
| NE | 5 | 2 | 2 | 2 | 1 | 2 |
| ENE | 14 | 3 | 3 | 3 | 9 | 1 |
| E | 8 | 0 | 0 | 0 | 4 | 0 |
| ESE | 1 | 0 | 0 | 0 | 1 | 1 |
| SE | 2 | 0 | 1 | 1 | 1 | 1 |
| SSE | 9 | 3 | 4 | 5 | 3 | 0 |
| S | 18 | 3 | 4 | 3 | 5 | 1 |
| SSW | 21 | 6 | 5 | 5 | 13 | 1 |
| SW | 43 | 9 | 10 | 8 | 23 | 9 |
| WSW | 38 | 15 | 16 | 16 | 27 | 5 |
| W | 36 | 7 | 9 | 9 | 16 | 4 |
| WNW | 18 | 4 | 5 | 4 | 13 | 2 |
| NW | 11 | 3 | 3 | 3 | 5 | 1 |
| NNW | 6 | 1 | 0 | 1 | 6 | 0 |
| Total | 238 | 59 | 65 | 63 | 129 | 28 |

TSP 12 MONTH RUNNING GEOMETRIC MEANS (UG/M**3) FOR BETHLEHEM - LACKAWANNA, NY

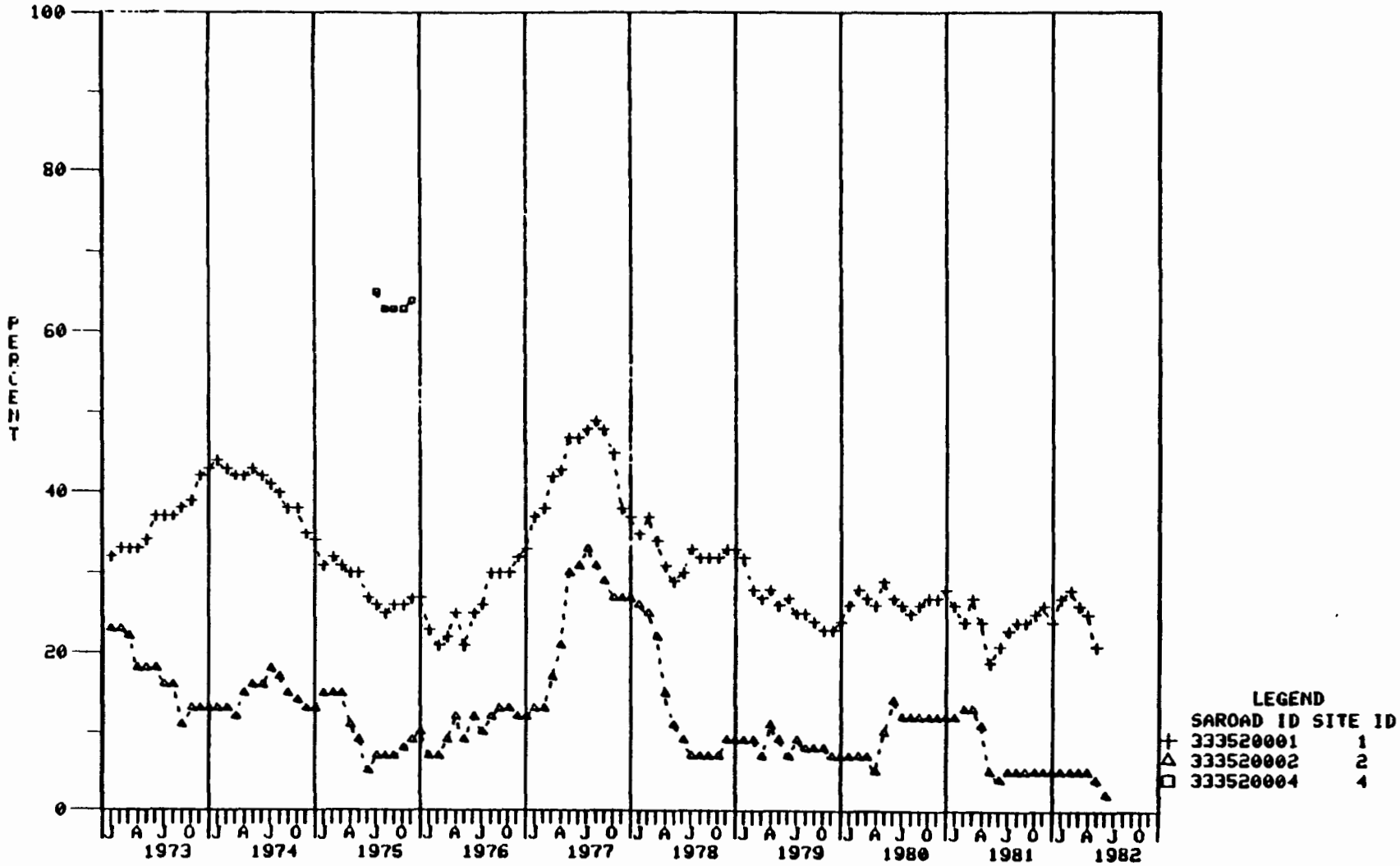


TSP 12 MONTH RUNNING GEOMETRIC MEANS (UG/M**3) FOR BETHLEHEM - LACKAWANNA, NY

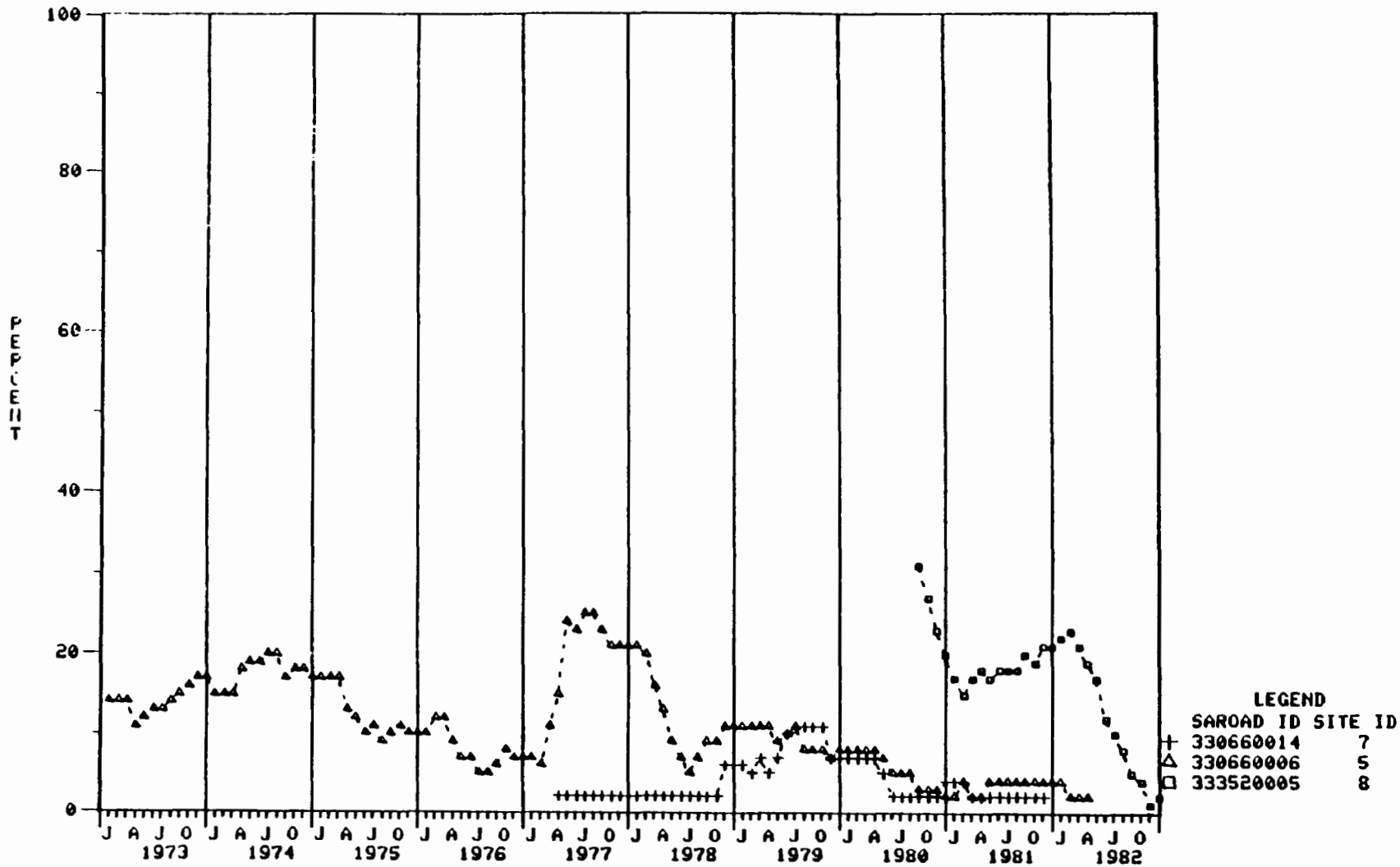


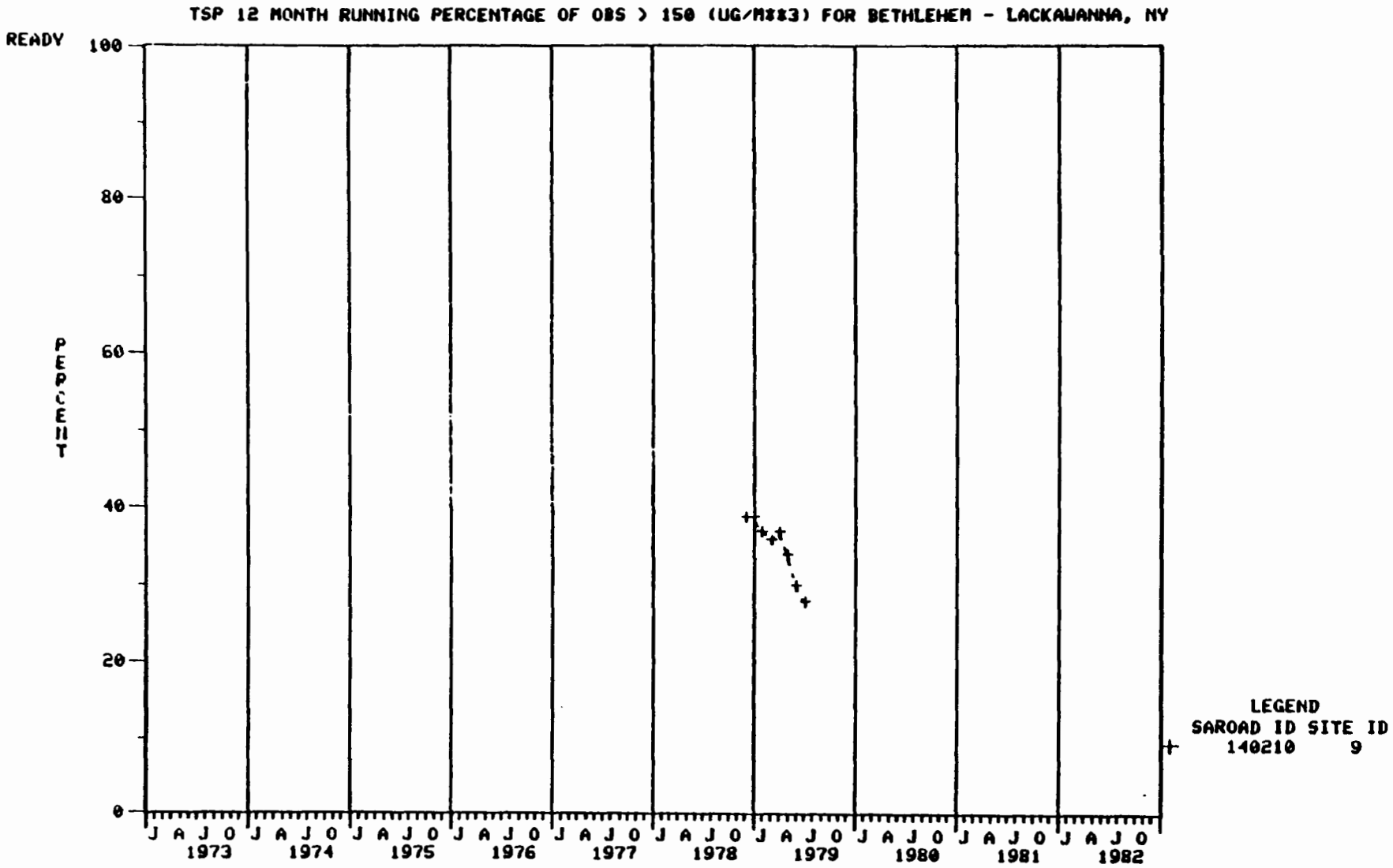

TSP 12 MONTH RUNNING GEOMETRIC MEANS (UG/M**3) FOR BETHLEHEM - LACKAWANNA, NY
READY
TSP UG/M**3
250
200
150
100
50
0
PRIMARY
SECONDARY
J A J O
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
LEGEND
SAROAD ID SITE ID
140210 9

TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 150 (UG/M**3) FOR BETHLEHEM - LACKAWANNA, NY

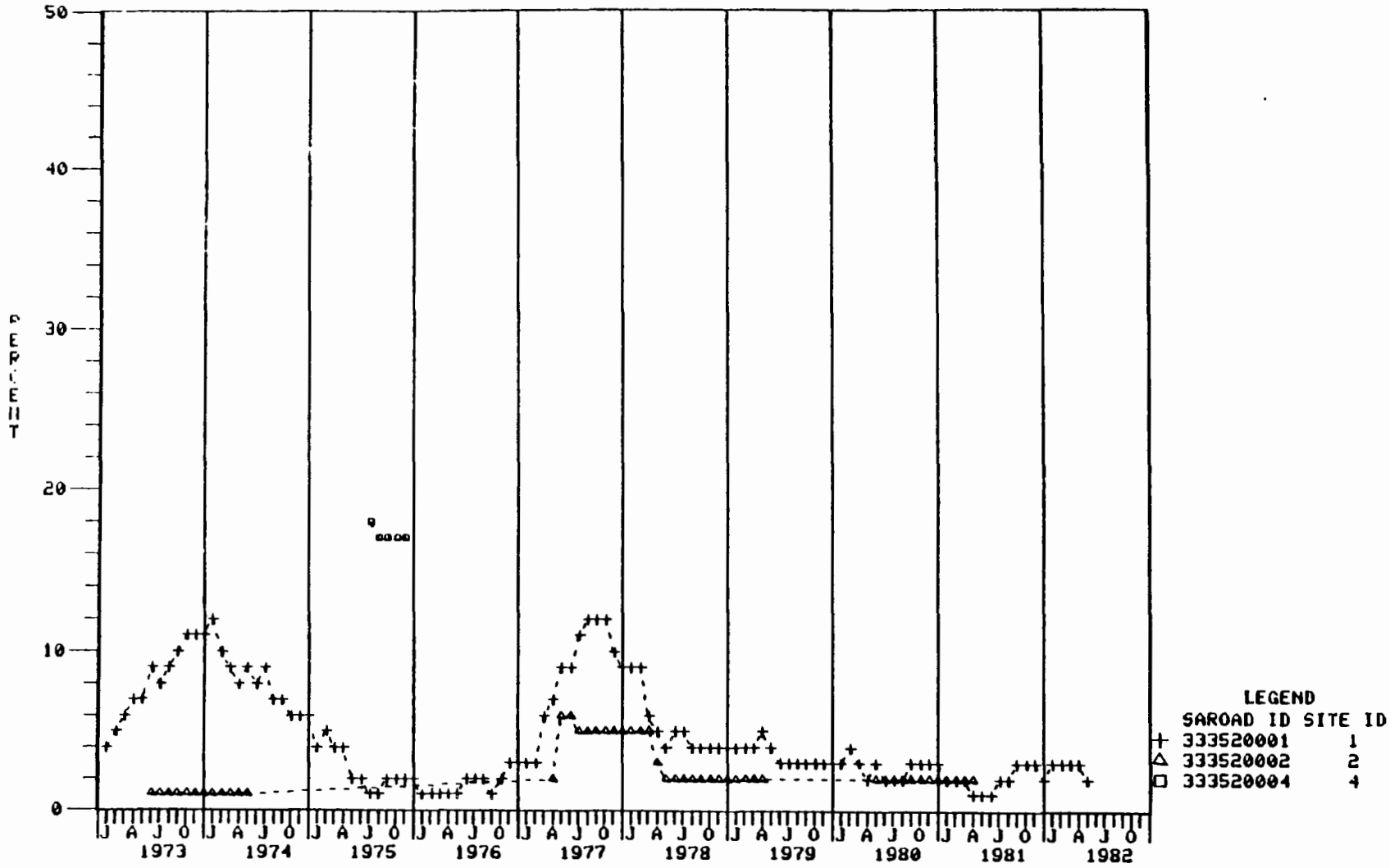


TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 150 (UG/M**3) FOR BETHLEHEM - LACKAWANNA, NY

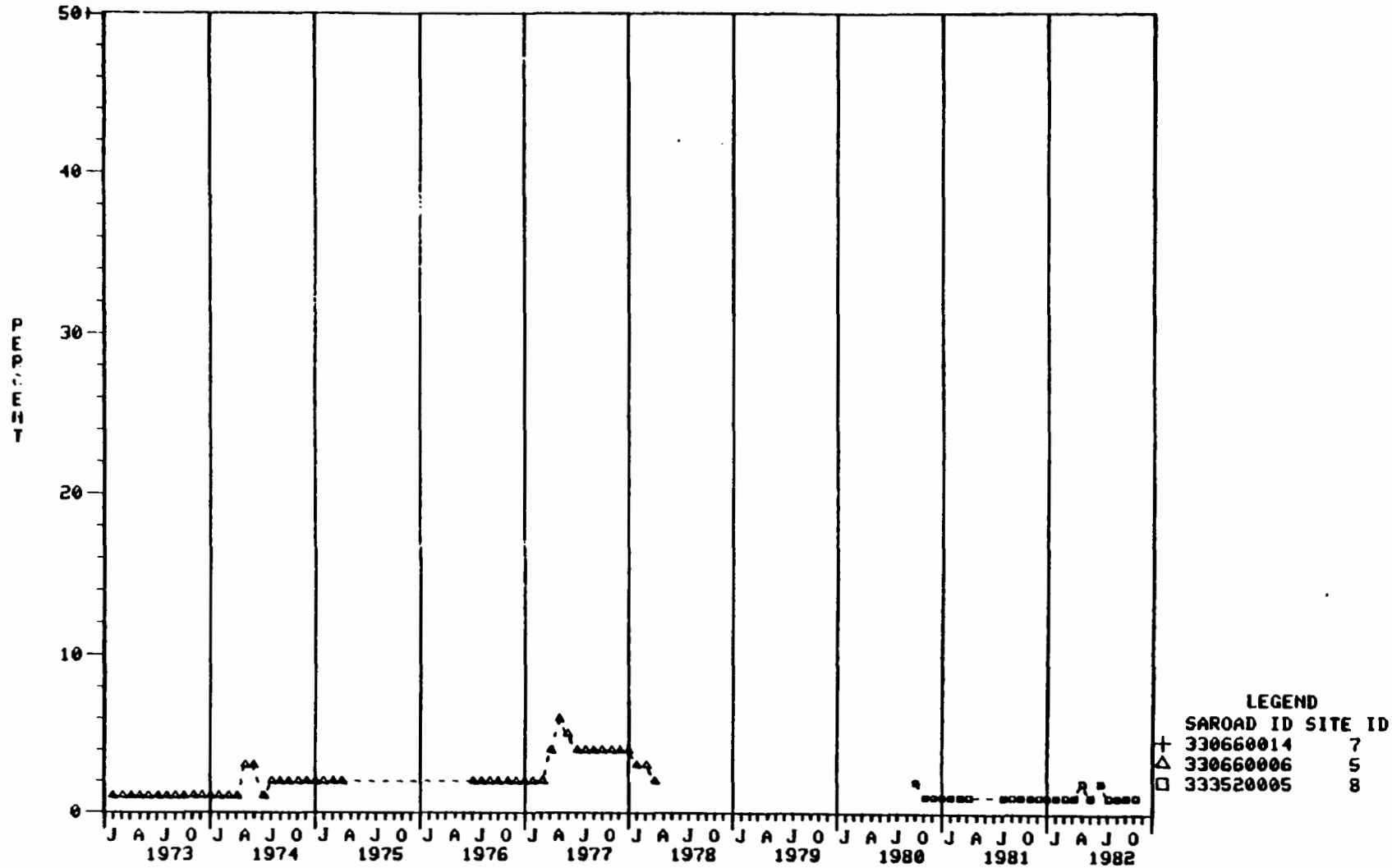


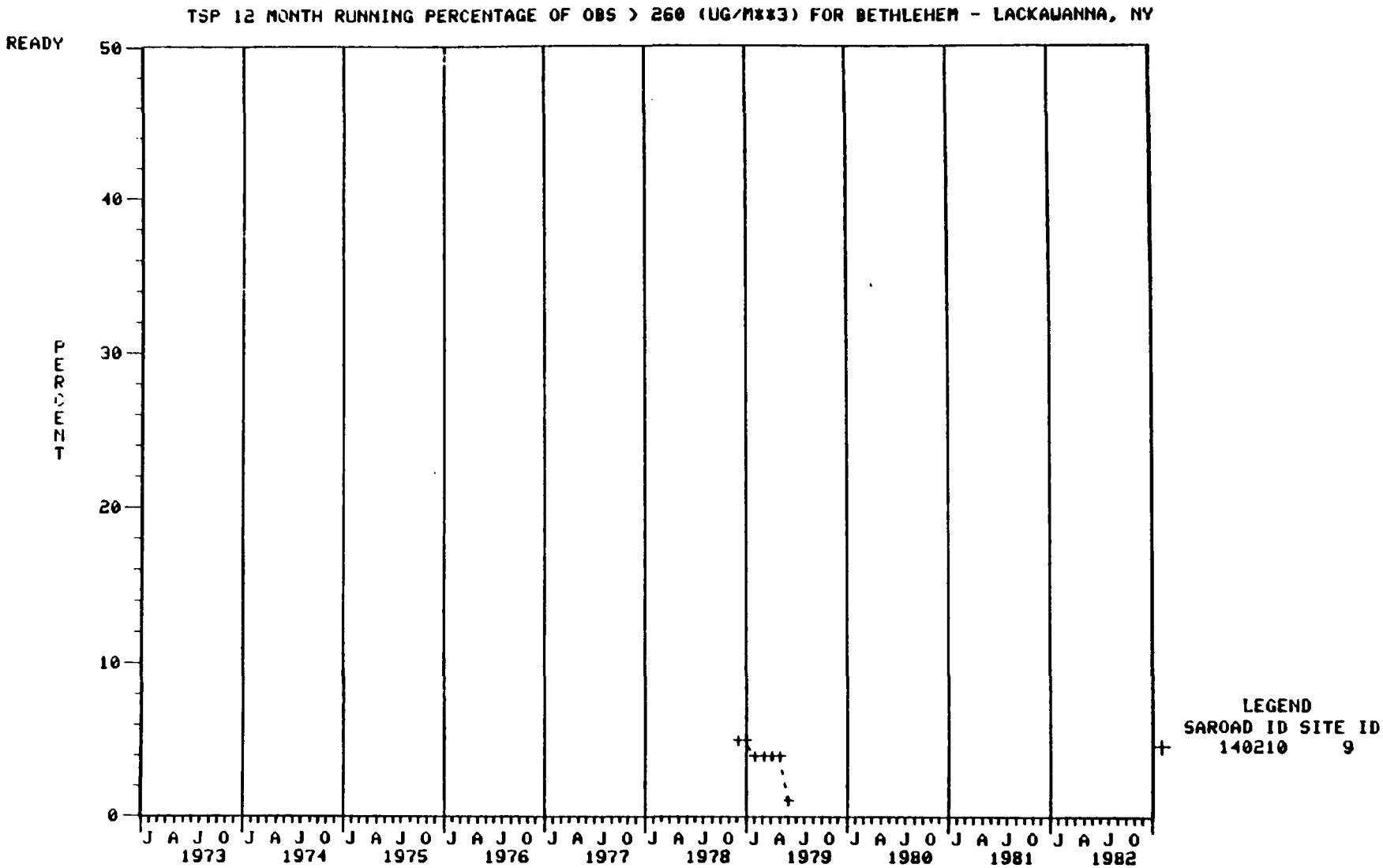

TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 150 (UG/M**3) FOR BETHLEHEM - LACKAWANNA, NY
READY
PERCENT
100
80
60
40
20
0
J A J O
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
LEGEND
SAROAD ID SITE ID
140210 9

TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 260 (UG/M**3) FOR BETHLEHEM - LACKAWANNA, NY



TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 260 (UG/M**3) FOR BETHLEHEM - LACKAWANNA, NY




TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 260 (UG/M**3) FOR BETHLEHEM - LACKAWANNA, NY
READY
PERCENT
50
40
30
20
10
0
J A J O J A J O J A J O J A J O J A J O J A J O J A J O J A J O J A J O J A J O
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
LEGEND
SAROAD ID SITE ID
140210 9

TSP DATA SUMMARY FOR BETHLEHEM - LACKAWANNA, NY
SAROAD STATION # 333520001 SITE ID # 01
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 275 | 306 | 301 | 256 | 332 | 213 | 308 | 339 | 255 | 165 | 29 |
| GEOMETRIC MEAN: | 106.8 | 123.2 | 113.6 | 106.5 | 113.9 | 105.7 | 103.8 | 99.6 | 109.3 | 97.0 | ****** |
| GEOMETRIC S.D.: | 1.7 | 1.8 | 1.7 | 1.7 | 1.7 | 2.0 | 1.9 | 1.7 | 1.7 | 1.7 | ****** |
| ARITHMETIC MEAN | 121.8 | 145.2 | 130.5 | 120.1 | 129.9 | 132.6 | 123.3 | 113.6 | 123.3 | 111.9 | ****** |
| HIGHEST BY LARSEN EXTRP: | 504.0 | 708.0 | 547.1 | 470.2 | 549.4 | 863.4 | 642.8 | 464.1 | 498.6 | 483.4 | ****** |
| 1ST HIGHEST: | 301.0 | 450.0 | 522.0 | 340.0 | 412.0 | 414.0 | 388.0 | 327.0 | 450.0 | 331.0 | 178.0 |
| DATE : | 720326 | 730423 | 740116 | 750114 | 761122 | 770513 | 780428 | 790406 | 800524 | 810709 | 820429 |
| 2ND HIGHEST: | 299.0 | 385.0 | 385.0 | 317.0 | 383.0 | 388.0 | 365.0 | 320.0 | 375.0 | 272.0 | 155.0 |
| DATE : | 720524 | 730228 | 740115 | 750213 | 761113 | 770301 | 780518 | 790510 | 800523 | 810526 | 820716 |
| # OF READINGS EXCEEDING 260 : | 8 | 31 | 16 | 4 | 9 | 20 | 13 | 9 | 8 | 4 | 0 |
| # OF READINGS EXCEEDING 150 : | 80 | 132 | 97 | 68 | 109 | 78 | 102 | 79 | 70 | 40 | 2 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 61 | 61 | 58 | 41 | 61 | 55 | 71 | 76 | 38 | 43 | 14 |
| 66-130: | 106 | 93 | 112 | 121 | 121 | 66 | 106 | 146 | 116 | 70 | 11 |
| 131-195: | 73 | 68 | 83 | 61 | 97 | 45 | 87 | 85 | 78 | 34 | 4 |
| 196-260: | 27 | 53 | 32 | 29 | 44 | 27 | 31 | 23 | 15 | 14 | 0 |
| 261-325: | 8 | 25 | 11 | 3 | 6 | 15 | 10 | 8 | 5 | 3 | 0 |
| 326-390: | 0 | 5 | 4 | 1 | 2 | 4 | 3 | 1 | 2 | 1 | 0 |
| 391-455: | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 |
| >455: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR BETHLEHEM - LACKAWANNA, NY
SAROAD STATION # 333520002 SITE ID # 02
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 140 | 83 | 54 | 42 | 57 | 55 | 57 | 60 | 57 | 58 | 19 |
| GEOMETRIC MEAN: | 100.1 | 93.7 | 79.3 | 79.2 | 82.0 | 94.7 | 69.0 | 76.3 | 78.4 | 66.5 | ****** |
| GEOMETRIC S.D.: | 1.6 | 1.6 | 1.6 | 1.6 | 1.7 | 1.9 | 1.7 | 1.6 | 1.7 | 1.6 | ****** |
| ARITHMETIC MEAN | 111.2 | 103.7 | 88.4 | 88.3 | 93.3 | 116.5 | 80.9 | 85.0 | 90.4 | 75.1 | ****** |
| HIGHEST BY LARSEN EXTRP: | 406.0 | 353.4 | 317.8 | 322.2 | 368.0 | 630.7 | 356.7 | 307.7 | 360.2 | 282.9 | ****** |
| 1ST HIGHEST: | 249.0 | 291.0 | 194.0 | 206.0 | 251.0 | 393.0 | 294.0 | 216.0 | 305.0 | 204.0 | 99.0 |
| DATE : | 720521 | 730609 | 740411 | 750524 | 760611 | 770513 | 780526 | 790415 | 800527 | 810522 | 820511 |
| 2ND HIGHEST: | 218.0 | 223.0 | 188.0 | 176.0 | 232.0 | 352.0 | 231.0 | 179.0 | 248.0 | 171.0 | 96.0 |
| DATE : | 720608 | 730522 | 740523 | 750717 | 760418 | 770519 | 780520 | 790403 | 800521 | 810709 | 820312 |
| # OF READINGS EXCEEDING 260 : | 0 | 1 | 0 | 0 | 0 | 3 | 1 | 0 | 1 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 33 | 11 | 7 | 4 | 7 | 15 | 4 | 4 | 7 | 3 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 26 | 20 | 20 | 13 | 19 | 15 | 29 | 23 | 24 | 28 | 10 |
| 66-130: | 67 | 43 | 24 | 23 | 27 | 25 | 20 | 30 | 22 | 25 | 9 |
| 131-195: | 40 | 16 | 10 | 5 | 9 | 8 | 6 | 6 | 8 | 4 | 0 |
| 196-260: | 7 | 3 | 0 | 1 | 2 | 4 | 1 | 1 | 2 | 1 | 0 |
| 261-325: | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR BETHLEHEM - LACKAWANNA, NY
SAROAD STATION # 333520004 SITE ID # 04
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 40 | 162 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| GEOMETRIC S.D.: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| ARITHMETIC MEAN | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| 1ST HIGHEST: | ****** | ****** | 440.0 | 592.0 | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| DATE : | ****** | ****** | 741101 | 750519 | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| 2ND HIGHEST: | ****** | ****** | 439.0 | 449.0 | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| DATE : | ****** | ****** | 741219 | 750418 | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 10 | 26 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 21 | 106 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 2 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 66-130: | 0 | 0 | 15 | 39 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 131-195: | 0 | 0 | 8 | 58 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 196-260: | 0 | 0 | 5 | 35 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 261-325: | 0 | 0 | 6 | 13 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 2 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR BETHLEHEM - LACKAWANNA, NY
SAROAD STATION # 330660006 SITE ID # 05
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 139 | 82 | 52 | 40 | 58 | 57 | 56 | 59 | 57 | 57 | 43 |
| GEOMETRIC MEAN: | 94.7 | 93.4 | 86.3 | 76.4 | 75.2 | 84.5 | 66.9 | 72.2 | 73.0 | 63.4 | 44.7 |
| GEOMETRIC S.D.: | 1.5 | 1.6 | 1.6 | 1.6 | 1.6 | 1.8 | 1.8 | 1.7 | 1.4 | 1.6 | 1.6 |
| ARITHMETIC MEAN | 102.4 | 104.1 | 97.2 | 86.3 | 86.5 | 102.0 | 79.0 | 82.0 | 77.8 | 70.6 | 49.6 |
| HIGHEST BY LARSEN EXTRP: | 309.8 | 362.4 | 364.2 | 325.1 | 324.4 | 510.1 | 370.5 | 333.6 | 208.4 | 249.9 | 188.3 |
| 1ST HIGHEST: | 279.0 | 351.0 | 292.0 | 215.0 | 414.0 | 314.0 | 235.0 | 220.0 | 154.0 | 161.0 | 114.0 |
| DATE : | 720608 | 730609 | 740417 | 750418 | 760611 | 770413 | 780526 | 790509 | 800304 | 810522 | 820511 |
| 2ND HIGHEST: | 195.0 | 213.0 | 196.0 | 214.0 | 182.0 | 308.0 | 200.0 | 175.0 | 140.0 | 157.0 | 103.0 |
| DATE : | 720917 | 730608 | 740411 | 750623 | 761015 | 770302 | 780911 | 790602 | 800421 | 810227 | 820429 |
| # OF READINGS EXCEEDING 260 : | 1 | 1 | 1 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 17 | 13 | 9 | 4 | 4 | 12 | 5 | 5 | 1 | 2 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 29 | 20 | 14 | 14 | 25 | 19 | 28 | 24 | 22 | 33 | 37 |
| 66-130: | 78 | 41 | 26 | 20 | 25 | 23 | 21 | 28 | 31 | 20 | 6 |
| 131-195: | 31 | 16 | 10 | 4 | 7 | 9 | 5 | 6 | 4 | 4 | 0 |
| 196-260: | 0 | 4 | 1 | 2 | 0 | 4 | 2 | 1 | 0 | 0 | 0 |
| 261-325: | 1 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR BETHLEHEM - LACKAWANNA, NY
SAROAD STATION # 330660014 SITE ID # 07
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 0 | 0 | 42 | 51 | 52 | 55 | 56 | 57 | 53 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | ****** | 49.4 | 46.9 | 55.2 | 54.0 | 53.2 | 53.6 | 44.6 |
| GEOMETRIC S.D.: | ****** | ****** | ****** | ****** | 1.8 | 1.8 | 2.4 | 2.0 | 1.8 | 1.8 | 1.7 |
| ARITHMETIC MEAN | ****** | ****** | ****** | ****** | 58.7 | 55.8 | 72.6 | 67.0 | 62.8 | 61.8 | 50.3 |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | ****** | 293.3 | 273.2 | 757.8 | 436.3 | 292.0 | 278.2 | 198.8 |
| 1ST HIGHEST: | ****** | ****** | ****** | ****** | 149.0 | 203.0 | 232.0 | 180.0 | 205.0 | 135.0 | 113.0 |
| DATE : | ****** | ****** | ****** | ****** | 760605 | 770419 | 781116 | 790620 | 800328 | 810323 | 820716 |
| 2ND HIGHEST: | ****** | ****** | ****** | ****** | 120.0 | 128.0 | 222.0 | 175.0 | 154.0 | 131.0 | 100.0 |
| DATE : | ****** | ****** | ****** | ****** | 760418 | 770922 | 780426 | 790322 | 801205 | 810422 | 820330 |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 4 | 2 | 0 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 0 | 0 | 26 | 34 | 28 | 31 | 35 | 29 | 40 |
| 66-130: | 0 | 0 | 0 | 0 | 15 | 16 | 20 | 17 | 17 | 25 | 13 |
| 131-195: | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 7 | 3 | 3 | 0 |
| 196-260: | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 0 | 1 | 0 | 0 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR BETHLEHEM - LACKAWANNA, NY
SAROAD STATION # 333520005 SITE ID # 08
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 206 | 341 | 56 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 89.1 | 91.0 | 51.9 |
| GEOMETRIC S.D.: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 1.7 | 1.7 | 1.7 |
| ARITHMETIC MEAN | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 101.1 | 105.1 | 58.6 |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 395.1 | 451.0 | 229.5 |
| 1ST HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 430.0 | 591.0 | 163.0 |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 800430 | 811115 | 820429 |
| 2ND HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 351.0 | 329.0 | 138.0 |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 800523 | 810708 | 820517 |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 4 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 40 | 68 | 1 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 54 | 90 | 38 |
| 66-130: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 103 | 155 | 16 |
| 131-195: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 44 | 73 | 2 |
| 196-260: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 19 | 0 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR BETHLEHEM - LACKAWANNA, NY
SAROAD STATION # 140210 SITE ID # 09
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 0 | 0 | 0 | 0 | 85 | 25 | 0 | 0 | 0 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | ****** | ****** | ****** | 122.8 | ****** | ****** | ****** | ****** |
| GEOMETRIC S.D.: | ****** | ****** | ****** | ****** | ****** | ****** | 1.9 | ****** | ****** | ****** | ****** |
| ARITHMETIC MEAN | ****** | ****** | ****** | ****** | ****** | ****** | 142.8 | ****** | ****** | ****** | ****** |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | ****** | ****** | ****** | 815.0 | ****** | ****** | ****** | ****** |
| 1ST HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | 290.4 | 183.1 | ****** | ****** | ****** |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | 780627 | 790320 | ****** | ****** | ****** |
| 2ND HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | 272.1 | 182.0 | ****** | ****** | ****** |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | 780520 | 790316 | ****** | ****** | ****** |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 0 | 0 | 0 | 0 | 33 | 7 | 0 | 0 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 4 | 0 | 0 | 0 |
| 66-130: | 0 | 0 | 0 | 0 | 0 | 0 | 32 | 14 | 0 | 0 | 0 |
| 131-195: | 0 | 0 | 0 | 0 | 0 | 0 | 21 | 7 | 0 | 0 | 0 |
| 196-260: | 0 | 0 | 0 | 0 | 0 | 0 | 19 | 0 | 0 | 0 | 0 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

24-HR STANDARD EXCEEDANCE ROSE FOR
BETHLEHEM - LACKAWANNA, NY
(ALL CASES > 260 UG/M**3)
X=0.950
COUNT/AVERAGE TSP OF PRIMARY EXCEEDANCES

| SAROAD # | 333520001 | | 333520002 | | 333520004 | | 330660014 | | 330660006 | | 333520005 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SITE ID # | 1 | | 2 | | 4 | | 7 | | 5 | | 8 | |
| DIRECTION | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X |
| N COUNT: | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| AVE TSP: | 0. | 358. | 0. | 0. | 0. | 345. | 0. | 0. | 0. | 0. | 0. | 430. |
| NNE COUNT: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 270. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| NE COUNT: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| AVE TSP: | 0. | 268. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 591. |
| ENE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| E COUNT: | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 264. | 0. | 0. | 0. | 316. | 0. | 0. | 0. | 0. | 0. | 0. |
| ESE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| SE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| SSE COUNT: | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 275. | 0. | 0. | 0. | 332. | 0. | 0. | 0. | 0. | 0. | 0. |
| S COUNT: | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| AVE TSP: | 0. | 375. | 0. | 0. | 275. | 449. | 0. | 0. | 0. | 0. | 0. | 351. |
| SSW COUNT: | 3 | 7 | 1 | 0 | 1 | 5 | 0 | 0 | 0 | 0 | 0 | 1 |
| AVE TSP: | 298. | 297. | 294. | 0. | 370. | 380. | 0. | 0. | 0. | 0. | 0. | 273. |
| SW COUNT: | 17 | 17 | 0 | 1 | 5 | 10 | 0 | 0 | 1 | 1 | 0 | 0 |
| AVE TSP: | 302. | 288. | 0. | 316. | 347. | 327. | 0. | 0. | 308. | 314. | 0. | 0. |
| WSW COUNT: | 24 | 16 | 1 | 2 | 4 | 3 | 0 | 0 | 2 | 1 | 2 | 0 |
| AVE TSP: | 310. | 318. | 291. | 329. | 317. | 273. | 0. | 0. | 322. | 414. | 311. | 0. |
| W COUNT: | 7 | 7 | 0 | 1 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 297. | 324. | 0. | 393. | 282. | 305. | 0. | 0. | 0. | 0. | 0. | 0. |
| WNW COUNT: | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 326. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| NW COUNT: | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 279. | 267. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| NNW COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| ALL COUNT: | 53 | 60 | 2 | 4 | 12 | 24 | 0 | 0 | 3 | 2 | 2 | 4 |
| AVE TSP: | 304. | 304. | 293. | 342. | 327. | 335. | 0. | 0. | 317. | 364. | 311. | 411. |

24-HR STANDARD EXCEEDANCE ROSE FOR
BETHLEHEM - LACKAWANNA, NY
(ALL CASES > 150 UG/M**3)
X=0.950
COUNT/AVERAGE TSP OF SECONDARY EXCEEDANCES

| SARCAD # | 333520001 | | 333520002 | | 333520004 | | 330660014 | | 330660006 | | 333520005 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SITE ID # | 1 | | 2 | | 4 | | 7 | | 5 | | 8 | |
| DIRECTION | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X |
| N COUNT: | 1 | 8 | 1 | 1 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 2 |
| AVE TSP: | 171. | 203. | 164. | 176. | 0. | 222. | 0. | 0. | 0. | 0. | 0. | 297. |
| NNE COUNT: | 0 | 5 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 200. | 0. | 0. | 0. | 181. | 0. | 0. | 0. | 0. | 0. | 0. |
| NE COUNT: | 0 | 7 | 0 | 1 | 0 | 3 | 1 | 1 | 0 | 1 | 0 | 2 |
| AVE TSP: | 0. | 202. | 0. | 242. | 0. | 185. | 222. | 203. | 0. | 212. | 0. | 389. |
| ENE COUNT: | 0 | 4 | 0 | 0 | 2 | 1 | 0 | 2 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 182. | 0. | 0. | 157. | 157. | 0. | 180. | 0. | 0. | 0. | 0. |
| E COUNT: | 0 | 9 | 0 | 0 | 0 | 3 | 0 | 2 | 0 | 1 | 0 | 2 |
| AVE TSP: | 0. | 194. | 0. | 0. | 0. | 235. | 0. | 204. | 0. | 155. | 0. | 165. |
| ESE COUNT: | 0 | 4 | 0 | 0 | 0 | 4 | 0 | 1 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 167. | 0. | 0. | 0. | 184. | 0. | 197. | 0. | 0. | 0. | 0. |
| SE COUNT: | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 179. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| SSE COUNT: | 0 | 5 | 0 | 1 | 1 | 6 | 1 | 0 | 0 | 1 | 0 | 0 |
| AVE TSP: | 0. | 198. | 0. | 188. | 157. | 222. | 180. | 0. | 0. | 168. | 0. | 0. |
| S COUNT: | 3 | 18 | 0 | 2 | 2 | 6 | 0 | 0 | 0 | 2 | 0 | 2 |
| AVE TSP: | 175. | 196. | 0. | 169. | 253. | 229. | 0. | 0. | 0. | 184. | 0. | 253. |
| SSW COUNT: | 21 | 98 | 2 | 10 | 2 | 22 | 0 | 1 | 2 | 5 | 3 | 11 |
| AVE TSP: | 203. | 193. | 249. | 171. | 265. | 245. | 0. | 156. | 198. | 161. | 187. | 184. |
| SW COUNT: | 83 | 147 | 8 | 9 | 9 | 24 | 0 | 0 | 13 | 10 | 14 | 25 |
| AVE TSP: | 222. | 201. | 190. | 183. | 285. | 262. | 0. | 0. | 190. | 190. | 190. | 174. |
| WSW COUNT: | 82 | 98 | 9 | 7 | 8 | 17 | 0 | 0 | 9 | 7 | 12 | 16 |
| AVE TSP: | 229. | 212. | 187. | 246. | 262. | 206. | 0. | 0. | 211. | 212. | 205. | 176. |
| W COUNT: | 36 | 72 | 1 | 7 | 2 | 4 | 0 | 0 | 0 | 2 | 4 | 9 |
| AVE TSP: | 215. | 208. | 181. | 224. | 228. | 264. | 0. | 0. | 0. | 193. | 170. | 195. |
| WNW COUNT: | 7 | 32 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 4 |
| AVE TSP: | 195. | 215. | 0. | 0. | 0. | 161. | 0. | 0. | 0. | 0. | 0. | 177. |
| NW COUNT: | 6 | 10 | 0 | 2 | 0 | 4 | 0 | 0 | 0 | 1 | 1 | 1 |
| AVE TSP: | 220. | 219. | 0. | 211. | 0. | 197. | 0. | 0. | 0. | 204. | 185. | 165. |
| NNW COUNT: | 1 | 3 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 1 |
| AVE TSP: | 202. | 195. | 0. | 0. | 0. | 222. | 0. | 0. | 0. | 0. | 0. | 161. |
| ALL COUNT: | 240 | 524 | 21 | 40 | 26 | 101 | 2 | 7 | 24 | 30 | 34 | 75 |
| AVE TSP: | 220. | 203. | 193. | 200. | 255. | 231. | 201. | 189. | 198. | 189. | 192. | 189. |

24-HR STANDARD EXCEEDANCE ROSE FOR
BETHLEHEM - LACKAWANNA, NY
(ALL CASES > 260 UG/M**3)
X=0.950
COUNT/AVERAGE TSP OF PRIMARY EXCEEDANCES

SARCAD # 140210
SITE ID # 9

| DIRECTION | | W>=X | W<X |
|---|---|---|---|
| N | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| NNE | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| NE | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| ENE | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| E | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| ESE | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| SE | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| SSE | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| S | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| SSW | COUNT: | 0 | 1 |
| | AVE TSP: | 0. | 272. |
| SW | COUNT: | 2 | 0 |
| | AVE TSP: | 281. | 0. |
| WSW | COUNT: | 1 | 0 |
| | AVE TSP: | 271. | 0. |
| W | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| WNW | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| NW | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| NNW | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| ALL | COUNT: | 3 | 1 |
| | AVE TSP: | 278. | 272. |

24-HR STANDARD EXCEEDANCE ROSE FOR
BETHLEHEM - LACKAWANNA, NY
(ALL CASES > 150 UG/M**3)
X=0.950
COUNT/AVERAGE TSP OF SECONDARY EXCEEDANCES

SAROAD # 140210
SITE ID # 9

| DIRECTION | | W>=X | W<X |
|---|---|---|---|
| N | COUNT: | 0 | 1 |
| | AVE TSP: | 0. | 223. |
| NNE | COUNT: | 0 | 1 |
| | AVE TSP: | 0. | 183. |
| NE | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| ENE | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| E | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| ESE | COUNT: | 0 | 1 |
| | AVE TSP: | 0. | 201. |
| SE | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| SSE | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| S | COUNT: | 0 | 1 |
| | AVE TSP: | 0. | 164. |
| SSW | COUNT: | 0 | 8 |
| | AVE TSP: | 0. | 205. |
| SW | COUNT: | 8 | 6 |
| | AVE TSP: | 233. | 200. |
| WSW | COUNT: | 4 | 4 |
| | AVE TSP: | 204. | 197. |
| W | COUNT: | 2 | 3 |
| | AVE TSP: | 160. | 198. |
| WNW | COUNT: | 0 | 1 |
| | AVE TSP: | 0. | 242. |
| NW | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| NNW | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| ALL | COUNT: | 14 | 26 |
| | AVE TSP: | 214. | 201. |

## AIR QUALITY EVALUATION - BETHLEHEM STEEL, LACKAWANNA, NEW YORK

Air quality trends:

Stations #1, #2, and #5 displayed 12-month running geometric means that vary in phase. Long-term trends for these stations (as evidenced by the Spearman correlation coefficient) were moderately to strongly negative. The coefficient for station #1 was -0.62; for station #2, -0.65; and for station #5, -0.80. Station #7 displayed running 12-month geometric means below the secondary standard; a weak positive trend is indicated (Spearman correlation coefficient of 0.26). Station #8 generated annual geometric means in excess of the primary standard until mid-1982, thereby demonstrating a moderate downtrend (coefficient of -0.69). The general trend for all stations was downward during 1982. The frequency of observations exceeding 150 $\mu g/m^3$ peaked in 1977 and has been in a general decline since that year.

Standard exceedance status:

Station #1 indicated exceedance of the primary annual standard in 1981. In addition, the 24-hour standard was violated at station #1 in 1981. Station #2 showed no further exceedances beyond 1980 and Station #5 has had no standard exceedances since 1977. Station #8 violated both the annual and 24-hour primary standards in 1981, but experienced dramatic reductions in TSP in 1982.

Pollution roses:

Pollution roses for stations #1, #2, #5, and #8 indicate strong mill impact. Station #7 indicates background levels under conditions that force impact at #1, #2, #5, and #8.

Standard exceedance roses:

The majority of the 24-hour primary and secondary exceedances at stations #1, #2, #5, and #8 that occur under steady winds involve directions that contain plant activities. For station #7, normally a background station, one secondary 24-hour exceedance occurred with steady winds coming from the plant. A second exceedance of the 24-hour secondary standard occurred under northeast winds at this station.

Inhalable particulate matter:

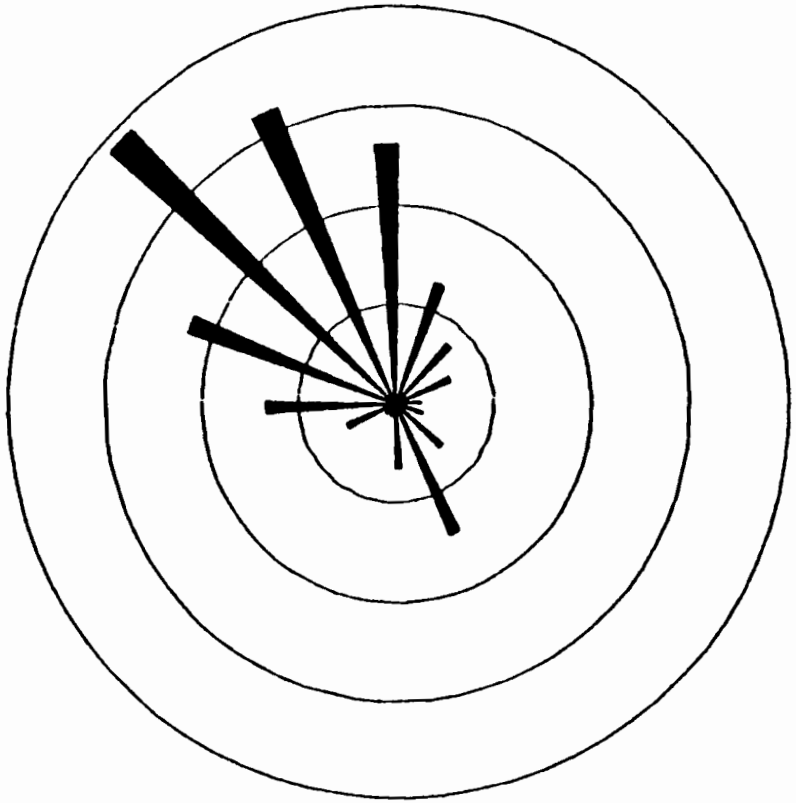
Station #8 samples IP as part of the EPA IP Network. Data summarized for this site are as follows:

| Year | Instrument | # of Obs. | Arithmetic Mean | Highest | Second Highest | Standard Deviation |
|---|---|---|---|---|---|---|
| 1981 | SSI | 46 | 81.7 | 209.0 | 168.1 | 38.3 |
| 1981 | DICHOT | 15 | 64.8 | 198.2 | 187.2 | 65.1 |

A special study was conducted by the New York State Department of Environmental Conservation from July 1978 through March 1979 that involved IP sampling at three of the TSP monitoring sites (stations #1, #5, and #9).

| Station | Instrument | # of Obs. | Arithmetic Mean | Highest | Second Highest | Standard Deviation |
|---|---|---|---|---|---|---|
| #1 | DICHOT | 43 | 50.7 | 121 | 97 | 24.6 |
| #5 | DICHOT | 57 | 42.9 | 132 | 96 | 23.8 |
| #9 | DICHOT | 41 | 50.6 | 154 | 146 | 30.7 |

WIND ROSE
PERSISTENCE CLASS 0.90
WIND STATION 14733



BETHLEHEM STEEL
Bethlehem
Northampton County
Pennsylvania
EPA Region III

Hi-Vol Monitoring Sites--Bethlehem Steel, Bethlehem, Pennsylvania

| Site ID Number | SAROAD Number | Site Name and Address | Plant Location from Site: Facility/ Bearing (°) | Distance (km) | Elevation (m): Above Ground | Above MSL | Above Plant | Site Description | Nearest Roadway: Name | Direction | Distance (m) | Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 39-0780-703 | Bethlehem Central<br>520 E. Broad St.<br>Bethlehem, PA | Blast furnace 196<br>Electric arc furnace 173<br>Sinter plant 122<br>BOF 122<br>Mills 107<br>Coke plant 122 | 0.8<br>1.0<br>1.1<br>1.5<br>2.0<br>3.8 | 12 | 103 | 30<br>30<br>24<br>12<br>15<br>12 | Roof | E. Broad St. | N | 15 | H |
| 2 | 39-0780-017-F01 | Bethlehem Central<br>E. Market and Wood Sts.<br>Bethlehem, PA | Blast furnace 227<br>Electric arc furnace 192<br>Sinter plant 124<br>BOF 124<br>Mills 107<br>Coke plant 107 | 0.8<br>0.9<br>0.7<br>1.4<br>1.8<br>3.5 | 1 | 95 | 22<br>22<br>16<br>4<br>7<br>4 | Ground level<br>Suburban-industrial | E. Market St. | N | 15 | H |
| 3 | 39-6560-705 | Bethlehem East<br>Freemansburg Municipal Bldg.<br>Freemansburg, PA | Blast furnace 243<br>Electric arc furnace 235<br>Sinter plant 230<br>BOF 215<br>Mills 215<br>Coke plant 167 | 2.5<br>2.4<br>1.5<br>1.4<br>1.0<br>2.7 | 1 | 95 | 22<br>22<br>16<br>4<br>7<br>4 | Ground level | Cambria | W | 15 | M |
| 4* | 39-6560-705 | Bethlehem East<br>Victory Firehouse<br>Bethlehem, PA | Blast furnace 65<br>Electric arc furnace 80<br>Sinter plant 75<br>BOF 83<br>Mills 80<br>Coke plant 103 | 0.7<br>1.0<br>2.0<br>2.4<br>3.0<br>4.2 | 6 | 82 | 9<br>9<br>3<br>-9<br>-6<br>-9 | Roof | 4th St. | S | 12 | M |
| 5 | 39-0780-725-F02 | Bethlehem East<br>Water Treatment Plant<br>Bethlehem, PA | Blast furnace 265<br>Electric arc furnace 260<br>Sinter plant 265<br>BOF 260<br>Mills 265<br>Coke plant 170 | 3.2<br>3.0<br>2.0<br>1.5<br>1.2<br>1.5 | 6 | 67 | -6<br>-6<br>-12<br>-14<br>-21<br>-14 | Roof<br>Suburban-industrial | Apple Butter Rd. | E | 20 | H |
| 6 | State ID #401 | Donegan School<br>(temporary site)<br>E. 5th St.<br>Bethlehem, PA | Blast furnace 303<br>Electric arc furnace 300<br>Sinter plant 24<br>BOF 67<br>Mills 50-75<br>Coke plant 109 | 1.0<br>0.9<br>0.8<br>1.0<br>1.3-1.9<br>3.1 | 12 | 122 | 49<br>46<br>43<br>31<br>40<br>31 | Roof<br>Center city-industrial | E. 4th St.<br>Duncan St.<br>E. 5th St. | N<br>NE<br>E | 55<br>67<br>21 | M<br>L<br>L |

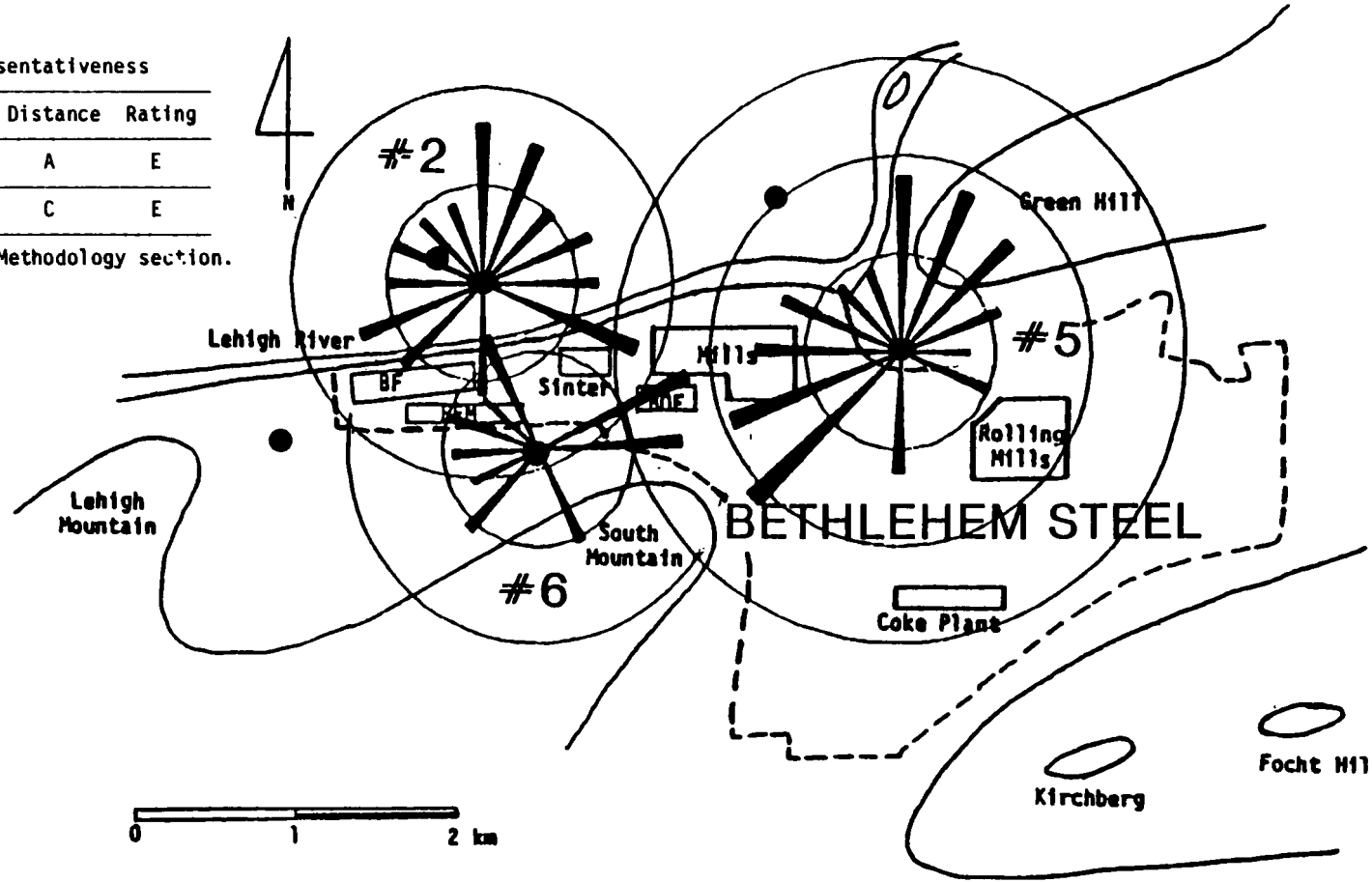
Key: U = Unavailable M = Moderate
L = Light H = Heavy

* Data from this station were included in the original 1973-1977 analysis; however, no strong mill impact on TSP was noted at this site. Based on the likelihood that this situation has not changed, data from this site were not employed in the 1978-1980 or the 1981-1982 updates.

Wind Data Representativeness

| Station # | Terrain | Distance | Rating |
|---|---|---|---|
| 2 | I | A | E |
| 5, 6 | II | C | E |

N.B. See Table 6 in Methodology section.



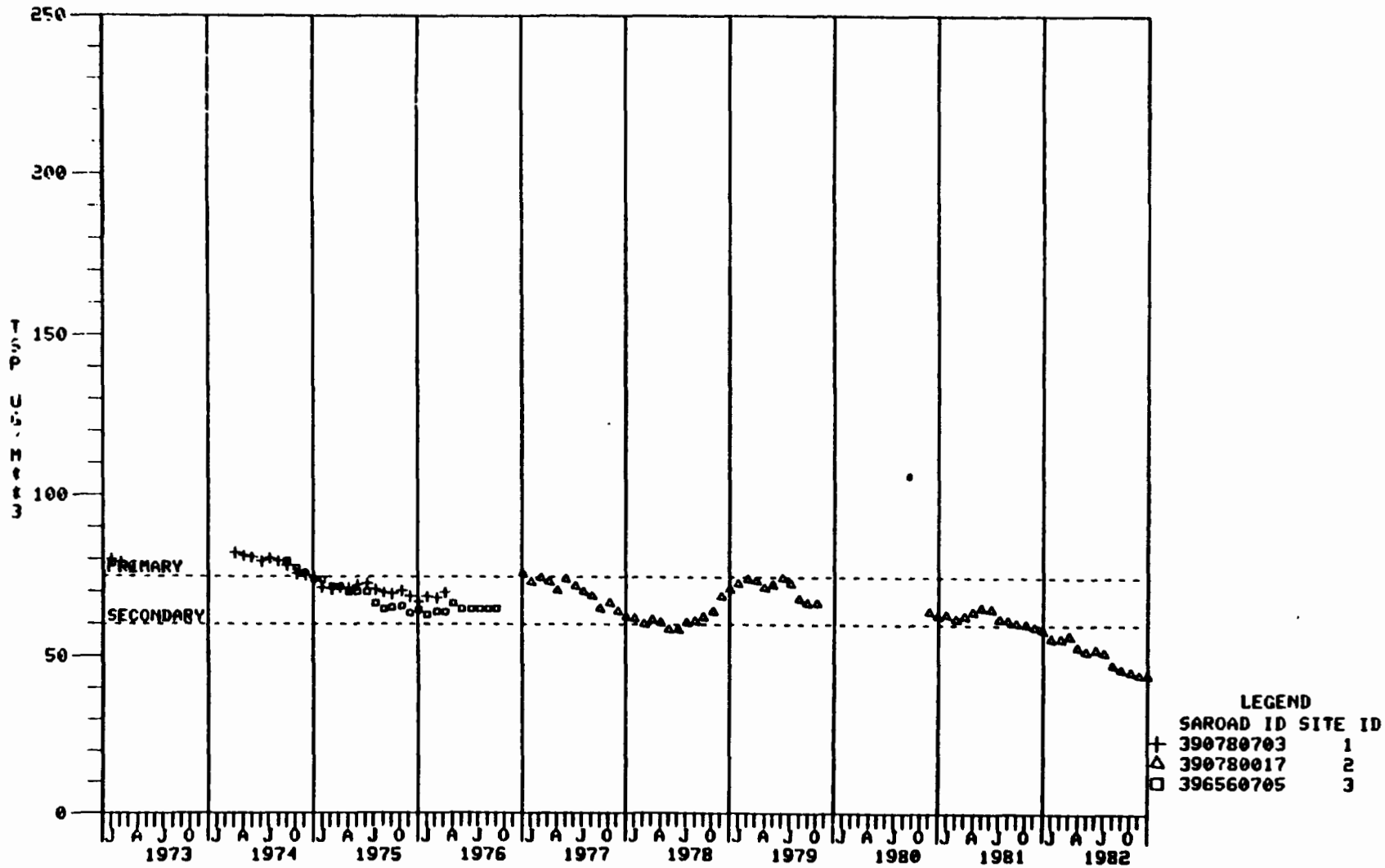

TSP roses for Bethlehem Steel - Bethlehem, Pennsylvania, for the period 1978-1982 for cases of $\omega>0.90$. Each circle represents 50 $\mu g/m^3$.

NUMBER OF TSP OBSERVATIONS USED IN POLLUTION ROSES

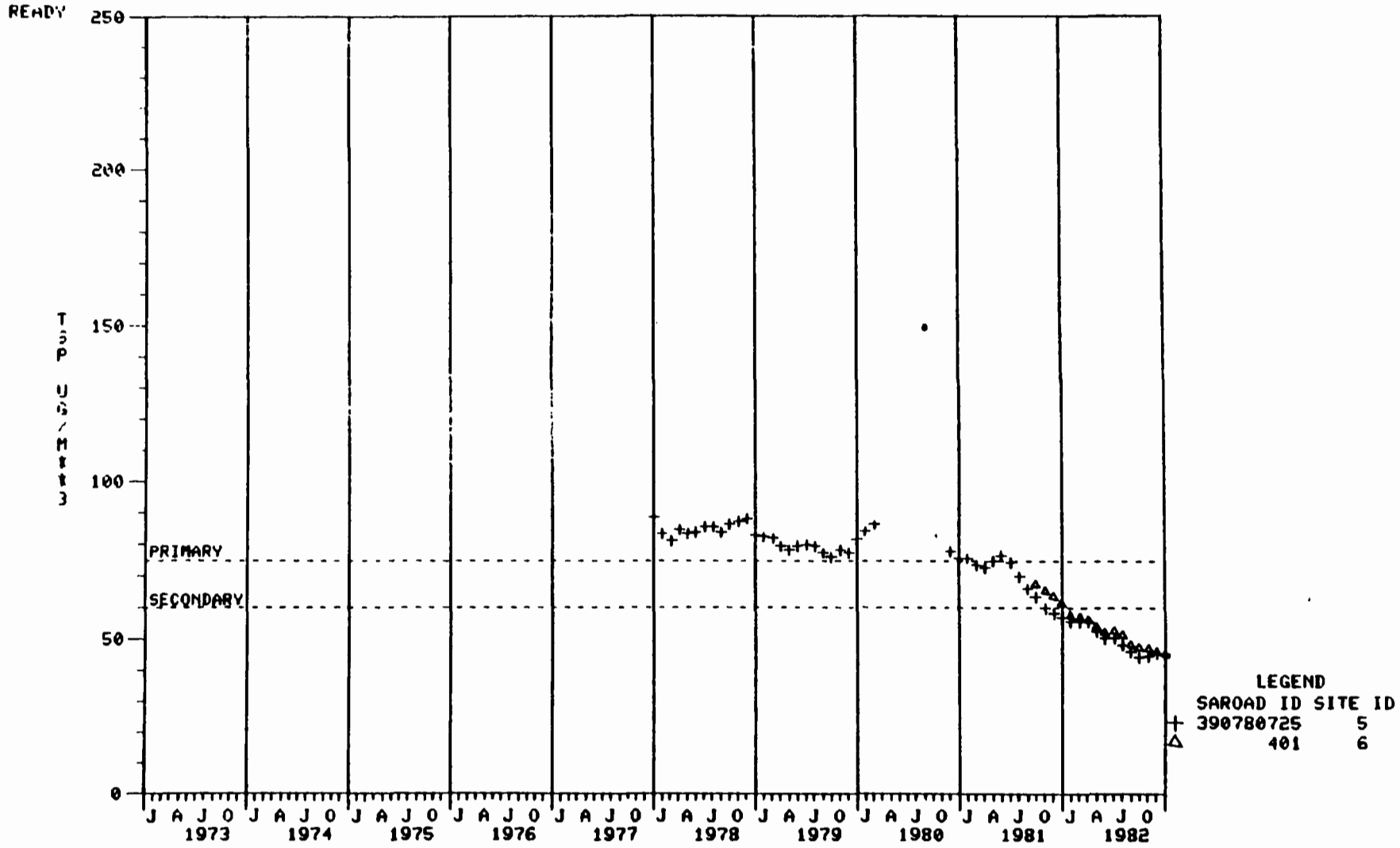
Bethlehem Steel--Bethelehem, PA

| Wind Direction | Monitoring Site Numbers #2 | #5 | #6 |
|---|---|---|---|
| N | 15 | 15 | 0 |
| NNE | 32 | 43 | 0 |
| NE | 1 | 1 | 0 |
| ENE | 7 | 7 | 2 |
| E | 5 | 4 | 4 |
| ESE | 1 | 1 | 0 |
| SE | 0 | 0 | 0 |
| SSE | 0 | 0 | 1 |
| S | 1 | 1 | 0 |
| SSW | 0 | 0 | 0 |
| SW | 3 | 3 | 2 |
| WSW | 4 | 4 | 1 |
| W | 15 | 14 | 8 |
| WNW | 17 | 16 | 16 |
| NW | 9 | 9 | 4 |
| NNW | 3 | 2 | 1 |
| Total | 113 | 120 | 39 |

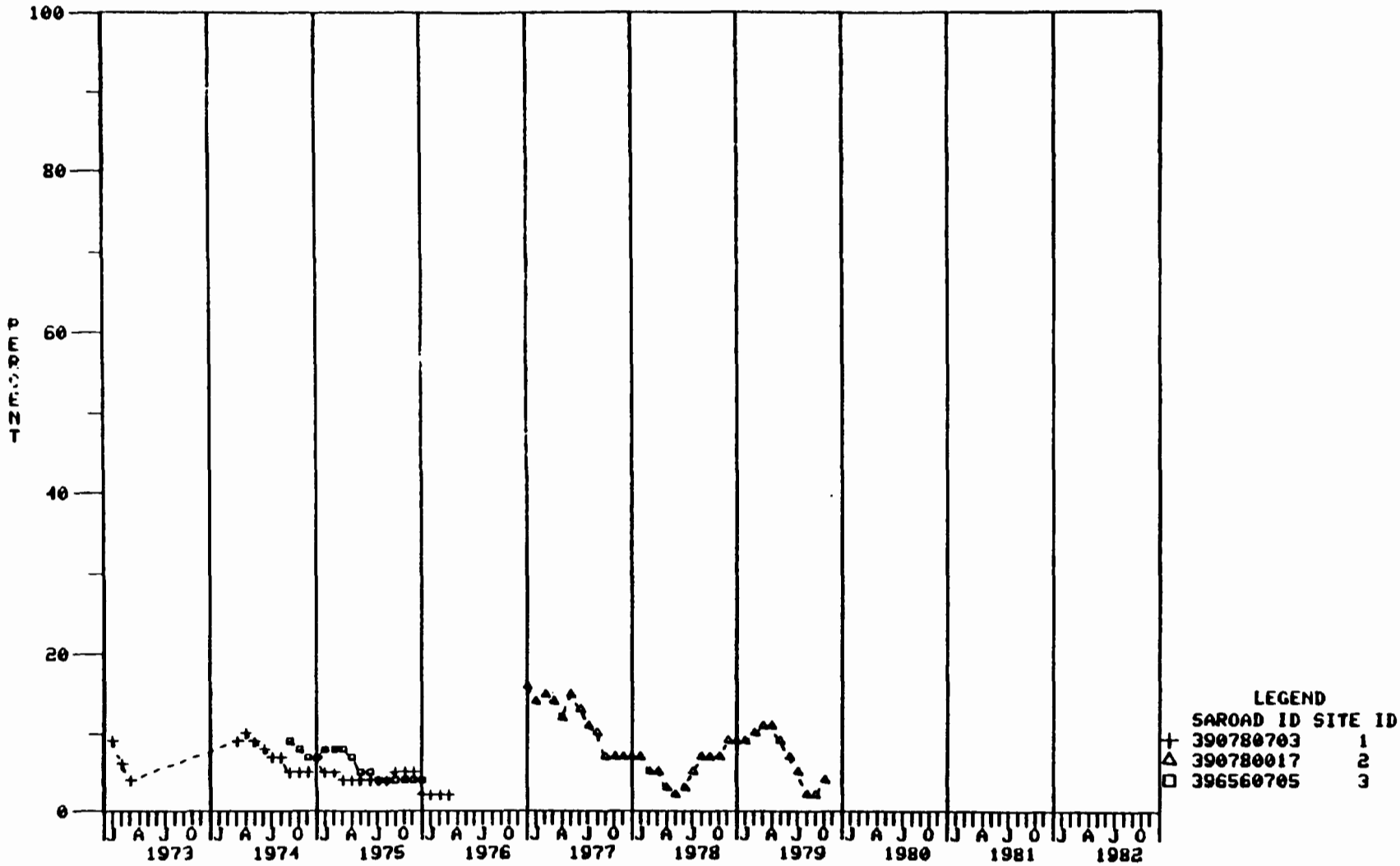
TSP 12 MONTH RUNNING GEOMETRIC MEANS (UG/M**3) FOR BETHLEHEM - BETHLEHEM, PA



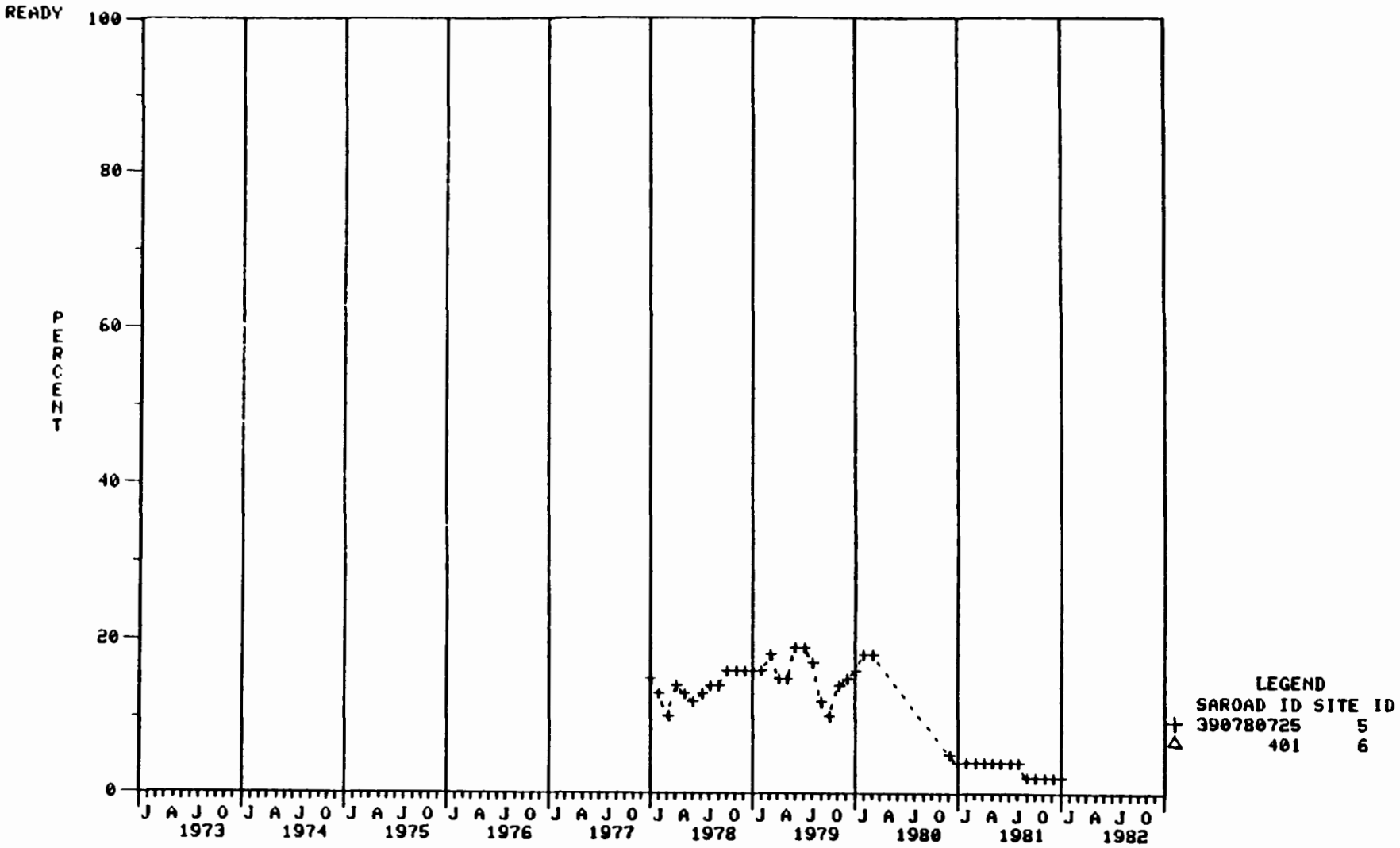
TSP 12 MONTH RUNNING GEOMETRIC MEANS (UG/M**3) FOR BETHLEHEM - BETHLEHEM, PA



TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 150 (UG/M**3) FOR BETHLEHEM - BETHLEHEM, PA



TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 150 (UG/M**3) FOR BETHLEHEM - BETHLEHEM, PA



TSP DATA SUMMARY FOR BETHLEHEM - BETHLEHEM, PA
SAROAD STATION # 390780703 SITE ID # 01
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 56 | 30 | 59 | 41 | 16 | 0 | 0 | 0 | 0 | 0 | 0 |
| GEOMETRIC MEAN: | 79.8 | ****** | 74.5 | 66.8 | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| GEOMETRIC S.D.: | 1.6 | ****** | 1.5 | 1.5 | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| ARITHMETIC MEAN | 87.4 | ****** | 81.5 | 71.7 | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| HIGHEST BY LARSEN EXTRP: | 297.9 | ****** | 263.7 | 201.0 | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| 1ST HIGHEST: | 190.0 | 162.0 | 195.0 | 165.0 | 127.0 | ****** | ****** | ****** | ****** | ****** | ****** |
| DATE : | 720614 | 730901 | 740123 | 750418 | 760224 | ****** | ****** | ****** | ****** | ****** | ****** |
| 2ND HIGHEST: | 174.0 | 157.0 | 172.0 | 126.0 | 117.0 | ****** | ****** | ****** | ****** | ****** | ****** |
| DATE : | 720304 | 730709 | 741213 | 750211 | 760212 | ****** | ****** | ****** | ****** | ****** | ****** |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 5 | 2 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 16 | 8 | 22 | 19 | 4 | 0 | 0 | 0 | 0 | 0 | 0 |
| 66-130: | 35 | 19 | 32 | 21 | 12 | 0 | 0 | 0 | 0 | 0 | 0 |
| 131-195: | 5 | 3 | 5 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 196-260: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR BETHLEHEM - BETHLEHEM, PA
SAROAD STATION # 390780017 SITE ID # 02
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 0 | 0 | 45 | 60 | 58 | 46 | 50 | 55 | 54 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | ****** | 75.5 | 62.1 | 70.9 | ****** | 62.4 | 58.3 | 44.2 |
| GEOMETRIC S.D.: | ****** | ****** | ****** | ****** | 1.8 | 1.6 | 1.7 | ****** | 1.4 | 1.6 | 1.6 |
| ARITHMETIC MEAN | ****** | ****** | ****** | ****** | 89.9 | 70.0 | 80.5 | ****** | 66.0 | 64.6 | 49.0 |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | ****** | 447.9 | 252.3 | 309.4 | ****** | 172.3 | 228.4 | 169.4 |
| 1ST HIGHEST: | ****** | ****** | ****** | ****** | 275.0 | 193.0 | 203.0 | 157.0 | 111.0 | 126.0 | 131.0 |
| DATE : | ****** | ****** | ****** | ****** | 760915 | 770519 | 781104 | 791023 | 800626 | 810329 | 820312 |
| 2ND HIGHEST: | ****** | ****** | ****** | ****** | 207.0 | 172.0 | 179.0 | 141.0 | 108.0 | 125.0 | 95.0 |
| DATE : | ****** | ****** | ****** | ****** | 760822 | 770419 | 780824 | 790720 | 800801 | 810522 | 820324 |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 0 | 0 | 7 | 4 | 5 | 1 | 0 | 0 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 0 | 0 | 17 | 36 | 28 | 20 | 29 | 31 | 42 |
| 66-130: | 0 | 0 | 0 | 0 | 18 | 19 | 20 | 23 | 21 | 24 | 11 |
| 131-195: | 0 | 0 | 0 | 0 | 7 | 5 | 9 | 3 | 0 | 0 | 1 |
| 196-260: | 0 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 0 |
| 261-325: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR BETHLEHEM - BETHLEHEM, PA
SAROAD STATION # 396560705 SITE ID # 03
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 60 | 45 | 31 | 0 | 0 | 0 | 0 | 0 | 0 |
| GEOMETRIC MEAN: | ****** | ****** | 74.4 | 64.3 | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| GEOMETRIC S.D.: | ****** | ****** | 1.6 | 1.6 | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| ARITHMETIC MEAN | ****** | ****** | 83.8 | 71.6 | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | 324.3 | 257.8 | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| 1ST HIGHEST: | ****** | ****** | 211.0 | 167.0 | 136.0 | ****** | ****** | ****** | ****** | ****** | ****** |
| DATE : | ****** | ****** | 740429 | 750130 | 760430 | ****** | ****** | ****** | ****** | ****** | ****** |
| 2ND HIGHEST: | ****** | ****** | 179.0 | 151.0 | 130.0 | ****** | ****** | ****** | ****** | ****** | ****** |
| DATE : | ****** | ****** | 740517 | 750124 | 760418 | ****** | ****** | ****** | ****** | ****** | ****** |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 4 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 26 | 23 | 10 | 0 | 0 | 0 | 0 | 0 | 0 |
| 66-130: | 0 | 0 | 26 | 19 | 20 | 0 | 0 | 0 | 0 | 0 | 0 |
| 131-195: | 0 | 0 | 7 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 196-260: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR BETHLEHEM - BETHLEHEM, PA
SAROAD STATION # 390780725 SITE ID # 05
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 0 | 0 | 0 | 41 | 56 | 55 | 46 | 52 | 61 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | ****** | ****** | 87.5 | 83.0 | 81.6 | 75.6 | 56.8 | 45.6 |
| GEOMETRIC S.D.: | ****** | ****** | ****** | ****** | ****** | 1.6 | 1.6 | 1.7 | 1.5 | 1.6 | 1.6 |
| ARITHMETIC MEAN | ****** | ****** | ****** | ****** | ****** | 98.9 | 93.4 | 93.9 | 82.2 | 63.0 | 51.0 |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | ****** | ****** | 373.4 | 352.0 | 399.8 | 259.3 | 231.7 | 181.6 |
| 1ST HIGHEST: | ****** | ****** | ****** | ****** | ****** | 225.0 | 223.0 | 253.0 | 177.0 | 155.0 | 144.0 |
| DATE : | ****** | ****** | ****** | ****** | ****** | 770308 | 780824 | 790220 | 800122 | 810122 | 820111 |
| 2ND HIGHEST: | ****** | ****** | ****** | ****** | ****** | 209.0 | 183.0 | 238.0 | 150.0 | 114.0 | 139.0 |
| DATE : | ****** | ****** | ****** | ****** | ****** | 770718 | 780818 | 791005 | 800807 | 810410 | 821008 |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 0 | 0 | 0 | 6 | 8 | 9 | 1 | 1 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 0 | 0 | 0 | 17 | 20 | 18 | 18 | 33 | 48 |
| 66-130: | 0 | 0 | 0 | 0 | 0 | 12 | 23 | 27 | 24 | 18 | 11 |
| 131-195: | 0 | 0 | 0 | 0 | 0 | 10 | 12 | 7 | 4 | 1 | 2 |
| 196-260: | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 3 | 0 | 0 | 0 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR BETHLEHEM - BETHLEHEM, PA
SAROAD STATION # 401 SITE ID # 06
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| OF READINGS : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 60 | 51 |
| EOMETRIC MEAN: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 60.8 | 45.3 |
| EOMETRIC S.D.: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 1.5 | 1.5 |
| RITHMETIC MEAN | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 66.0 | 48.5 |
| GHEST BY RSEN EXTRP: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 201.1 | 141.0 |
| T HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 136.0 | 90.0 |
| TE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 810428 | 820216 |
| ) HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 131.0 | 82.0 |
| E : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 810116 | 820610 |
| F READINGS EEDING 260 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| F READINGS EEDING 150 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| GE | | | | | | | | | | | |
| 65: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 34 | 43 |
| 130: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 24 | 8 |
| 195: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| 60: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 25: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 90: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 55: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 35: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

INDICATES MISSING OR INSUFFICIENT DATA

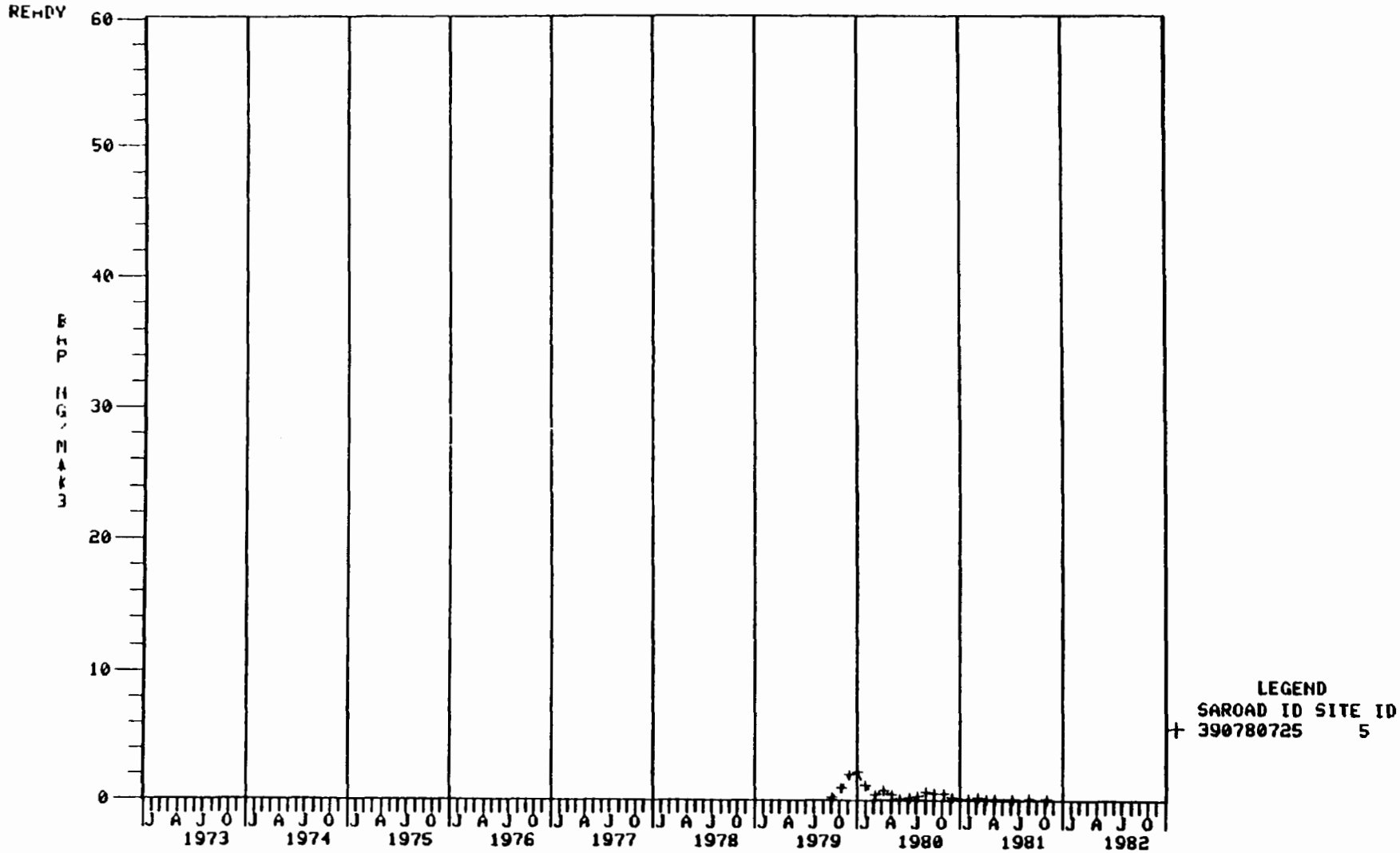
24-HR STANDARD EXCEEDANCE ROSE FOR
BETHLEHEM - BETHLEHEM, PA
(ALL CASES > 260 UG/M**3)
X=0.900
COUNT/AVERAGE TSP OF PRIMARY EXCEEDANCES

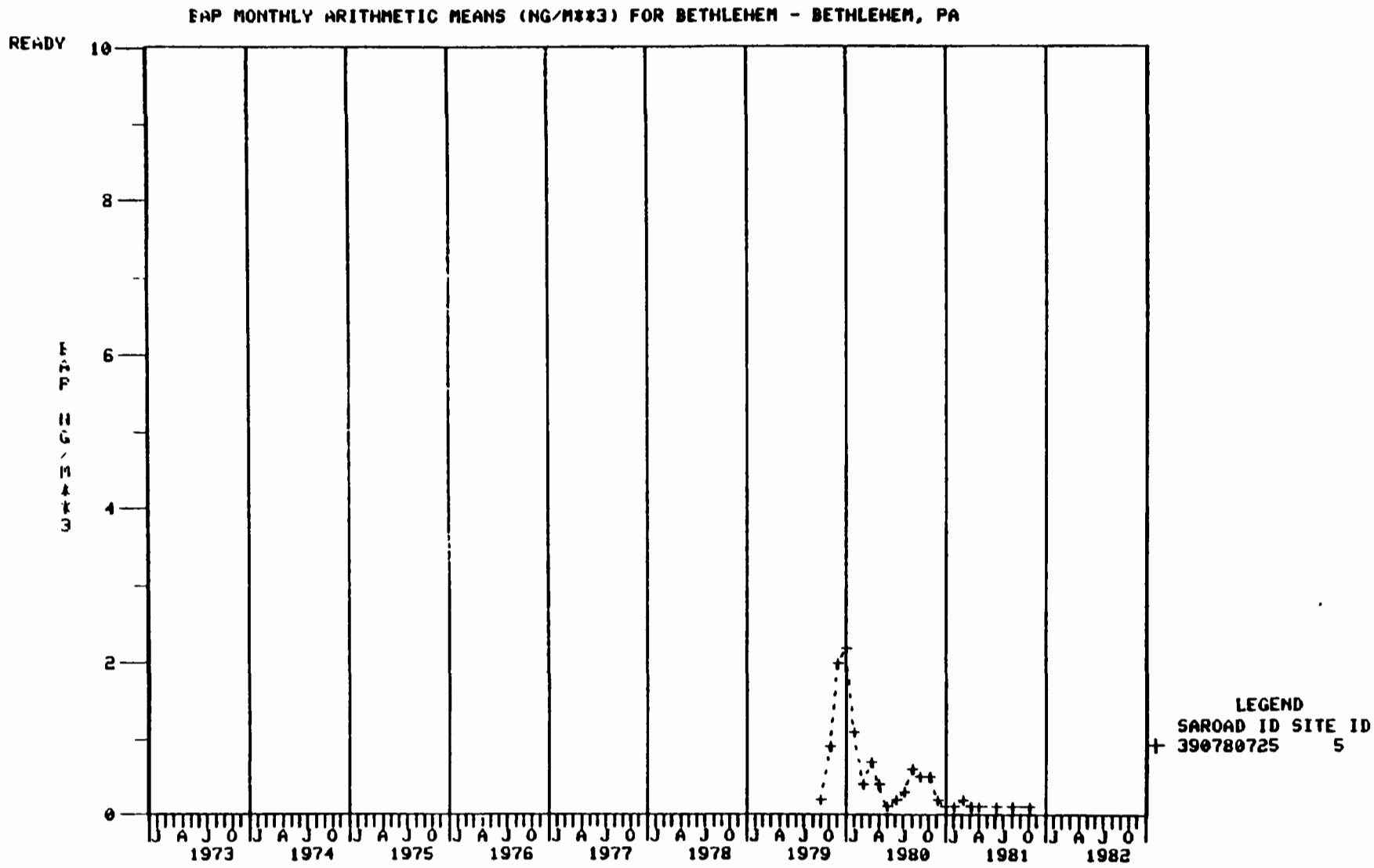
| SARCAD # | 390780703 | | 390780017 | | 396560705 | | 390780725 | | | 401 |
|---|---|---|---|---|---|---|---|---|---|---|
| SITE ID # | 1 | | 2 | | 3 | | 5 | | 6 | |
| DIRECTION | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X |
| N COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| NNE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| NE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| ENE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| E COUNT: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 275. | 0. | 0. | 0. | 0. | 0. | 0. |
| ESE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| SE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| SSE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| SSW COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| SW COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| WSW COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| W COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| WNW COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| NW COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| NNW COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| ALL COUNT: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 275. | 0. | 0. | 0. | 0. | 0. | 0. |

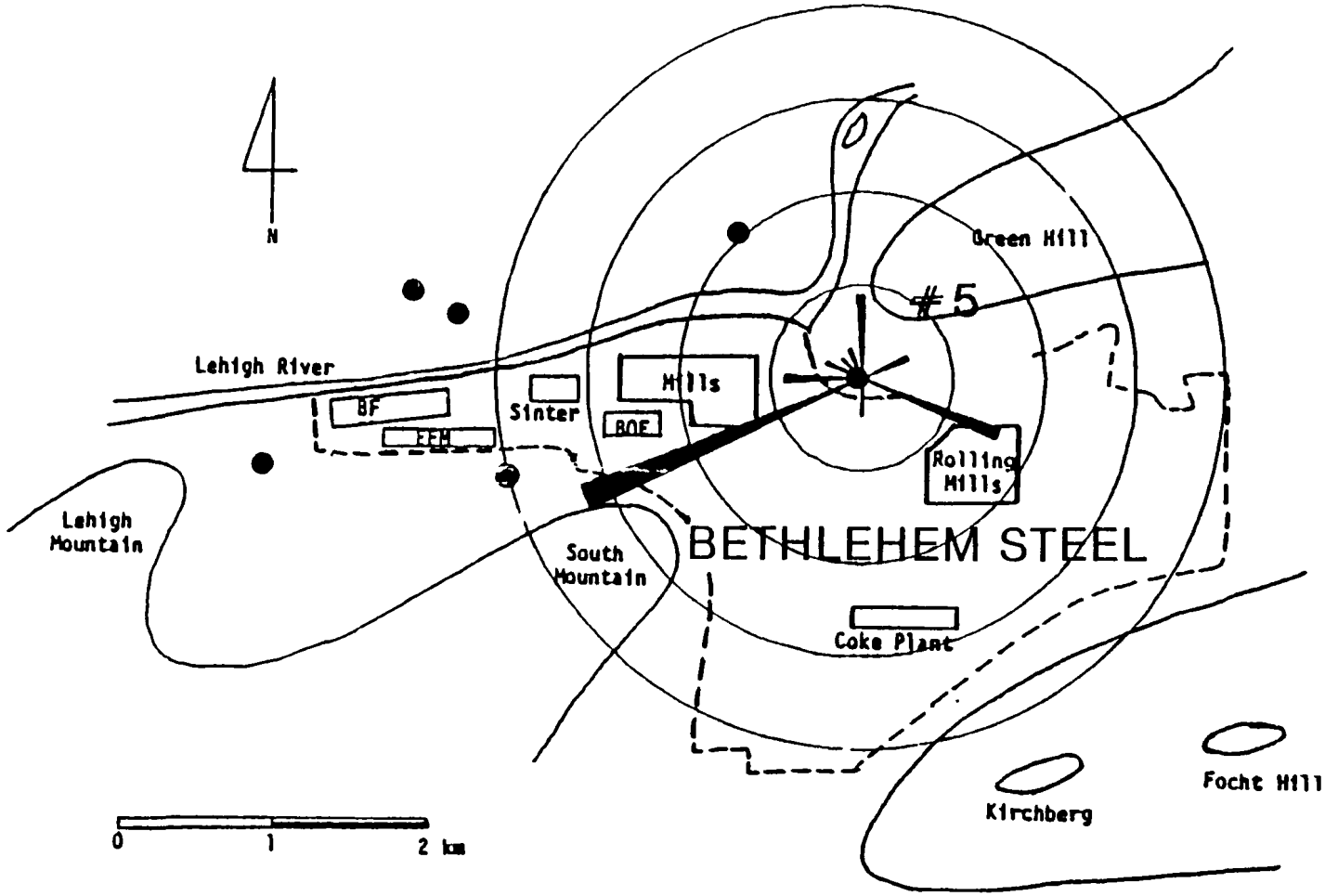
24-HR STANDARD EXCEEDANCE ROSE FOR
BETHLEHEM - BETHLEHEM, PA
(ALL CASES > 150 UG/M**3)
X=0.900
COUNT/AVERAGE TSP OF SECONDARY EXCEEDANCES

| SAROAD # | 390780703 | | 390780017 | | 396560705 | | 390780725 | | 401 | |
|---|---|---|---|---|---|---|---|---|---|---|
| SITE ID # | 1 | | 2 | | 3 | | 5 | | 6 | |
| DIRECTION | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X |
| N COUNT: | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 203. | 0. | 0. | 0. | 180. | 0. | 0. | 0. |
| NNE COUNT: | 0 | 0 | 1 | 0 | 0 | 0 | 6 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 155. | 0. | 0. | 0. | 191. | 0. | 0. | 0. |
| NE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| ENE COUNT: | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 172. | 0. | 151. | 0. | 0. | 0. | 0. | 0. | 0. |
| E COUNT: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 275. | 0. | 0. | 0. | 0. | 0. | 0. |
| ESE COUNT: | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 176. | 0. | 0. | 0. | 0. | 0. | 0. |
| SE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| SSE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S COUNT: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| AVE TSP: | 0. | 165. | 0. | 0. | 0. | 0. | 0. | 155. | 0. | 0. |
| SSW COUNT: | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 3 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 161. | 0. | 0. | 0. | 188. | 0. | 0. |
| SW COUNT: | 0 | 3 | 0 | 0 | 1 | 1 | 0 | 3 | 0 | 0 |
| AVE TSP: | 0. | 162. | 0. | 0. | 151. | 179. | 0. | 181. | 0. | 0. |
| WSW COUNT: | 1 | 0 | 1 | 2 | 1 | 0 | 4 | 0 | 0 | 0 |
| AVE TSP: | 157. | 0. | 171. | 190. | 211. | 0. | 174. | 0. | 0. | 0. |
| W COUNT: | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 0 |
| AVE TSP: | 0. | 195. | 171. | 207. | 0. | 174. | 0. | 158. | 0. | 0. |
| WNW COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 155. | 225. | 0. | 0. |
| NW COUNT: | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 159. | 0. | 209. | 0. | 0. |
| NNW COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| ALL COUNT: | 1 | 6 | 4 | 10 | 2 | 4 | 13 | 10 | 0 | 0 |
| AVE TSP: | 157. | 170. | 175. | 186. | 181. | 168. | 181. | 185. | 0. | 0. |

BAP MONTHLY ARITHMETIC MEANS (NG/M**3) FOR BETHLEHEM - BETHLEHEM, PA




BAP MONTHLY ARITHMETIC MEANS (NG/M**3) FOR BETHLEHEM - BETHLEHEM, PA
READY
NG/M**3 BAP
10
8
6
4
2
0
J A J O
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
LEGEND
SAROAD ID SITE ID
+ 390780725 5




BaP roses for Bethlehem Steel - Bethlehem, Pennsylvania, for the period 1978-1982 for cases of $\omega$>0.85. Each circle represents 1.5 ng/m$^3$.

## AIR QUALITY EVALUATION - BETHLEHEM STEEL, BETHLEHEM, PENNSYLVANIA

Air quality trends:

Station #2 evidenced a moderate long-term downward trend in geometric means, with values above the primary standard in late 1976 declining to well below the secondary standard by 1982 (Spearman correlation coefficient of -0.69). Station #5 evidenced an even larger downward trend (Spearman correlation coefficient of -0.93). The station #6 geometric means closely matched those of station #5 during 1981 and 1982. No further observations exceeding 150 $\mu g/m^3$ were experienced after 1979 at station #2; a sharp decline in the frequency of such observations occurred in 1980 at station #5.

Standard exceedance status:

Station #5 indicated exceedance of the annual primary standard through 1980.

Pollution roses:

TSP levels under steady winds that would transport plant emissions toward the samplers are generally higher than other directions at stations #2, #5, and #6. However, contributions from the north through northeast appear to be substantial at stations #2 and #5.

Standard exceedance roses:

The primary 24-hour standard was exceeded only once at station #2; this exceedance occurred under variable winds. Less than one third of the secondary 24-hour standard exceedances under steady winds came under conditions that would involve the plant.

For station #5, the majority of secondary standard excursions came under steady winds opposite the plant. However, four secondary standard exceedances occurred under west-southwest winds that would involve the plant. No primary excursions were recorded. For both stations, excursions beyond the 24-hour secondary standard were most often associated with steady winds from directions not involving the plant or with variable winds.

BaP:

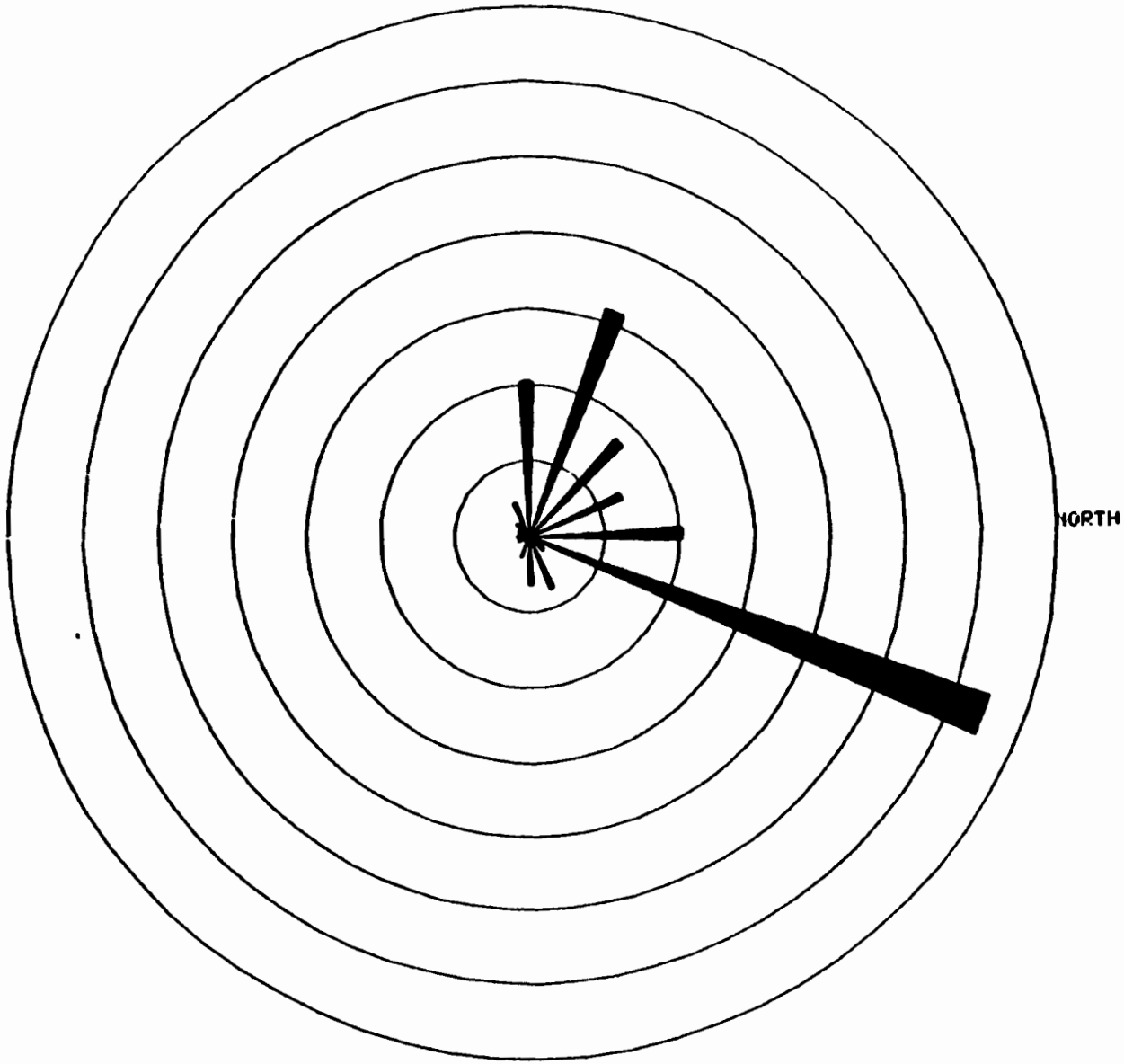
BaP was sampled at station #5 from late 1979 through 1981. Monthly averages were relatively low ($< 3$ $ng/m^3$). The BaP pollution rose for station #5 does not demonstrate any substantial contributions from the steel facility.

Inhalable particulate matter:

Station #5 samples IP as part of the EPA IP Network. Data summarized for this site are as follows:

| Year | Instrument | # of Obs. | Arithmetic Mean | Highest | Second Highest | Standard Deviation |
|---|---|---|---|---|---|---|
| 1980 | SSI | 11 | 39.8 | 77.3 | 66.4 | 18.3 |
| 1981 | SSI | 38 | 59.2 | 109.7 | 98.3 | 21.4 |
| 1981 | DICHOT | 20 | 27.8 | 53.9 | 53.9 | 12.3 |
| 1982 | DICHOT | 40 | 35.2 | 63.7 | 61.8 | 15.0 |

WIND ROSE
PERSISTENCE CLASS 0.85
WIND STATION 390780017



BETHLEHEM STEEL
Burns Harbor
Porter County
Indiana
EPA Region V

Hi-Vol Monitoring Sites--Bethlehem Steel, Burns Harbor, Indiana

| Site ID Number | SAROAD Number | Site Name and Address | Plant Location from Site: Facility/ Bearing (°) | Plant Location from Site: Distance (km) | Elevation (m): Above Ground | Elevation (m): Above MSL | Elevation (m): Above Plant | Site Description | Nearest Roadway: Name | Nearest Roadway: Direction | Nearest Roadway: Distance (m) | Nearest Roadway: Type and Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1* | 15-3420-005 | Beverly Shores School<br>Beverly Shores, IN | Center of plant 245 | 13.6 | 7 | 190 | 4 | Roof | Paved rd. | S | 60 | 2-lane, L |
| 2 | 15-3420-006 | Dune Acres Pumping Station<br>Porter County, IN | Center of plant 240 | 4.6 | 4 | 202 | 16 | Roof<br>Suburban-residential | Paved rd. | W | 6 | 2-lane, L |
| 3 | 15-3420-007 | Ogden Dunes Maintenance Building<br>Porter County, IN | Center of plant 70 | 4.4 | 5 | 191 | 5 | Roof<br>Suburban-residential | Paved rd. | E | 45 | 2-lane, L |
| 4 | 15-3420-009 | South Haven School<br>South Haven, IN | Center of plant 2 | 10.0 | 5 | 205 | 19 | Roof<br>Suburban-residential | West Rd. | W | 75 | 2-lane, L |
| 5 | 15-3420-901 | Station A<br>Region V Special Study | BOF 45<br>Coke plant 135 | 1.6<br>0.8 | 2.3 | 191 | 5 | Monitoring bench<br>Industrial | Boundary Rd. | E | 29 | 2-lane |
| 6 | 15-3420-902 | Station B<br>Region V Special Study | Coke plant 45 | 0.8 | 2.3 | 182 | -4 | Monitoring bench<br>Industrial | Boundary Rd. | W | 49 | 2-lane |
| 7 | 15-3420-903 | Station C<br>Region V Special Study | Coke plant 0 | 1.0 | 2.3 | 182 | -4 | Monitoring bench<br>Residential | U.S. 12 | S | 24 | 4-lane |

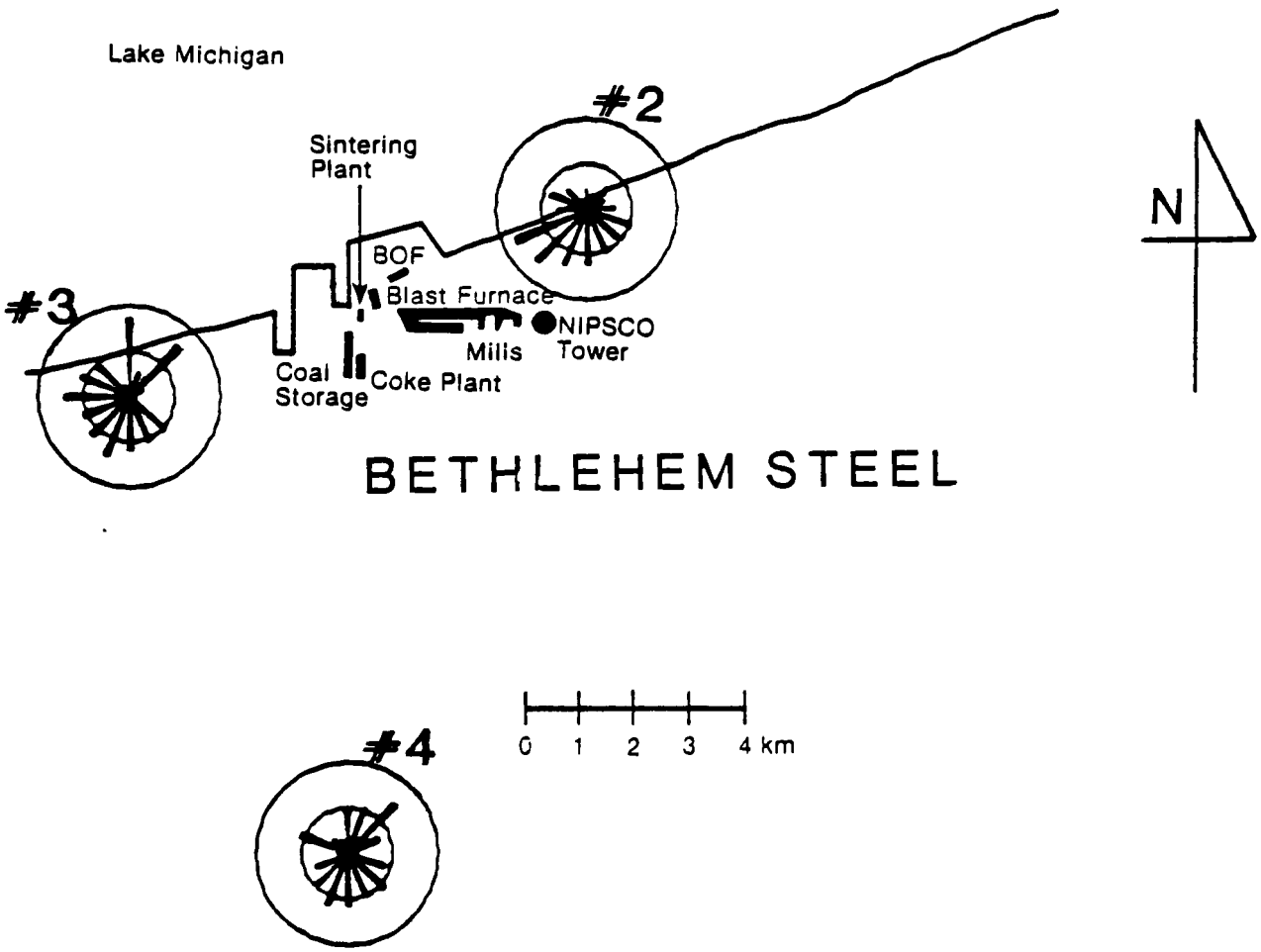
Key: U = Unavailable M = Moderate
L = Light H = Heavy

* Data from this station were included in the original 1973-1977 analysis; however, no strong mill impact on TSP was noted at this site. Based on the likelihood that this situation has not changed, data from this site were not employed in the 1978-1980 or the 1981-1982 updates.

Wind Data Representativeness

| Station # | Terrain | Distance | Rating |
|---|---|---|---|
| 2 | VI | A | E-VG |
| 3, 5, 6, 7 | VI | D | G |
| 4 | VII | F | U |

N.B. See Table 6 in Methodology section.

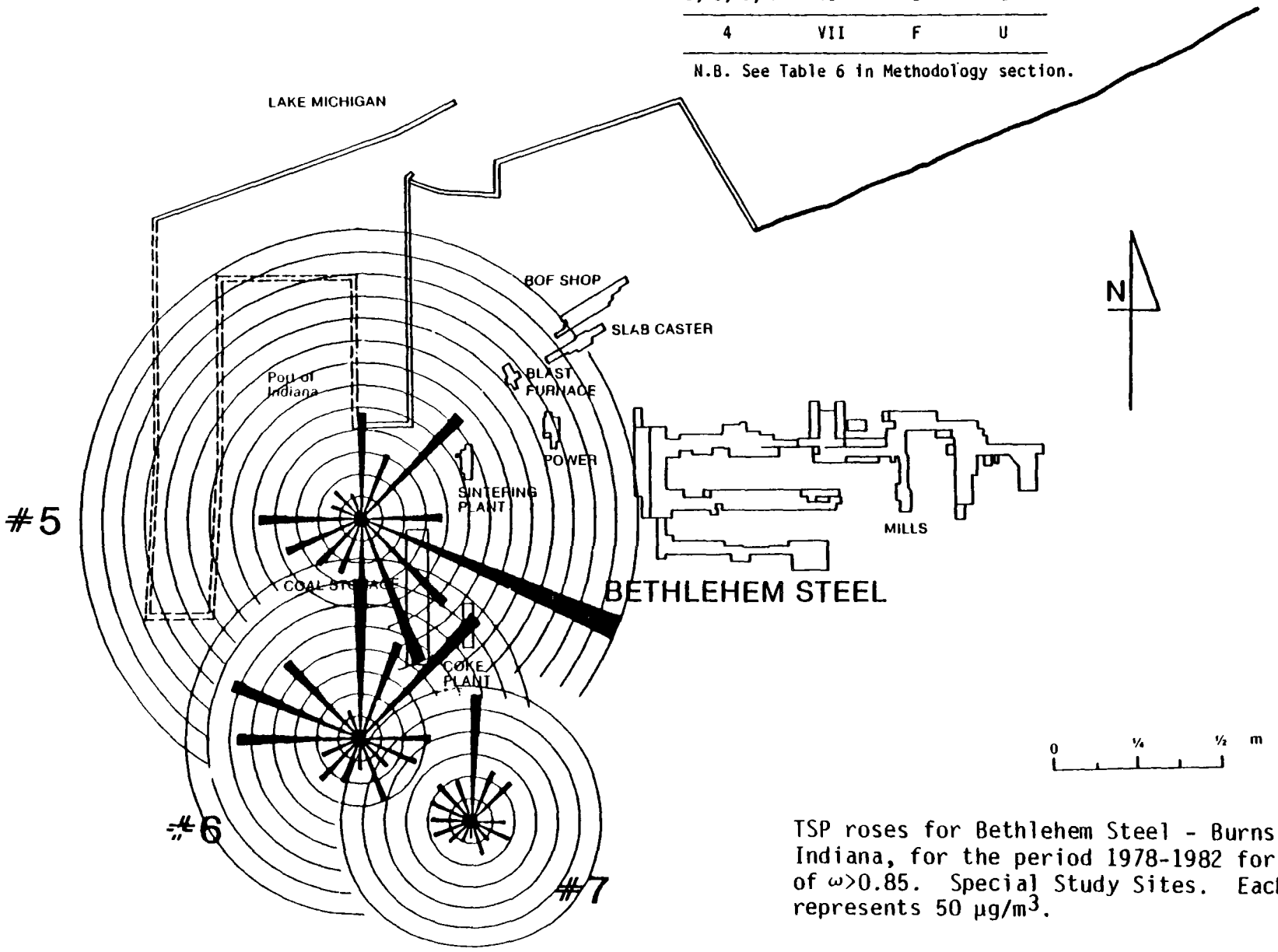



TSP roses for Bethlehem Steel - Burns Harbor, Indiana, for the period 1978-1982 for cases of $\omega>0.85$. Each circle represents 50 $\mu g/m^3$.

Wind Data Representativeness

| Station # | Terrain | Distance | Rating |
|---|---|---|---|
| 2 | VI | A | E-VG |
| 3, 5, 6, 7 | VI | D | G |
| 4 | VII | F | U |

N.B. See Table 6 in Methodology section.



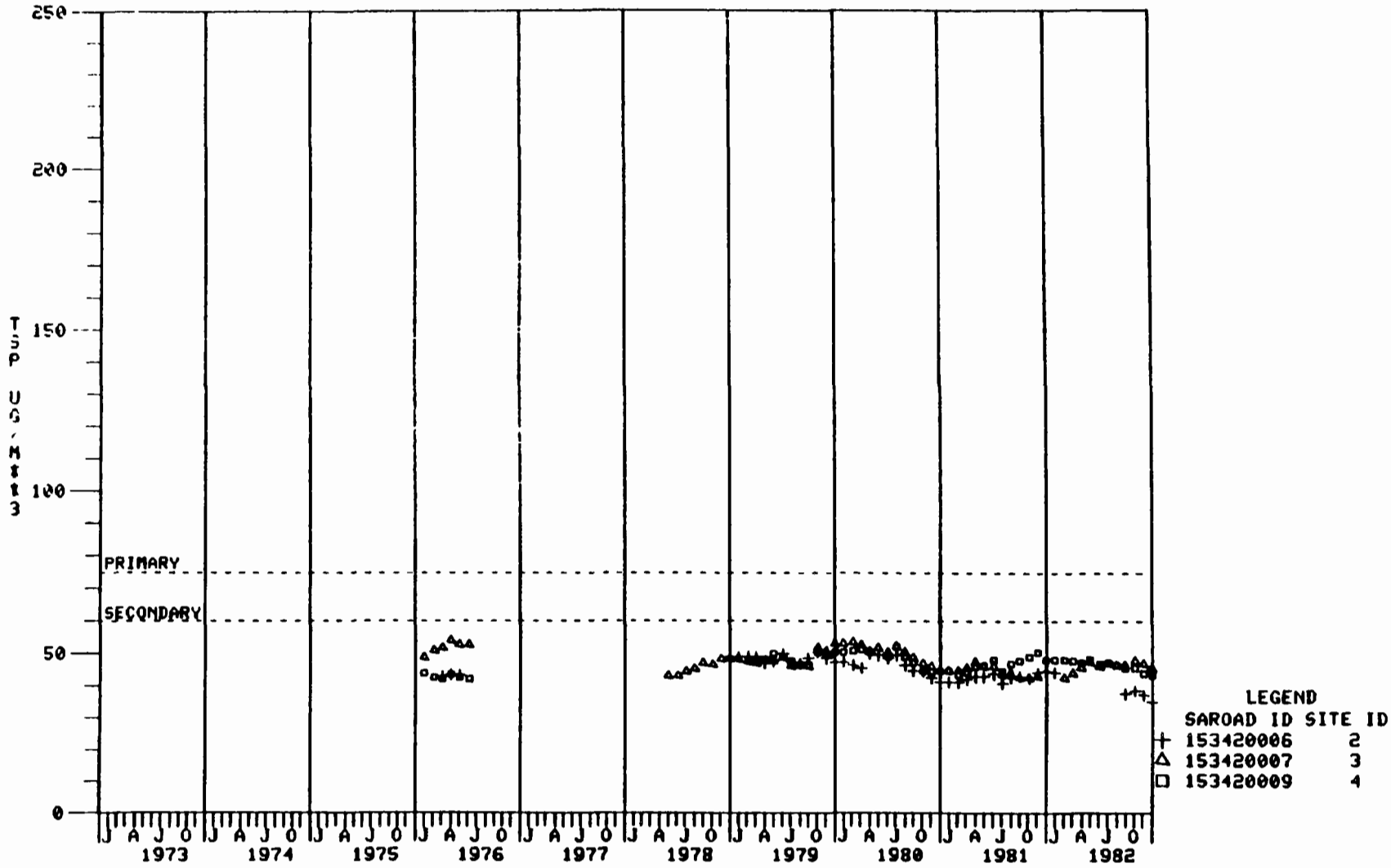

TSP roses for Bethlehem Steel - Burns Harbor, Indiana, for the period 1978-1982 for cases of $\omega>0.85$. Special Study Sites. Each circle represents 50 $\mu g/m^3$.

NUMBER OF TSP OBSERVATIONS USED IN POLLUTION ROSES

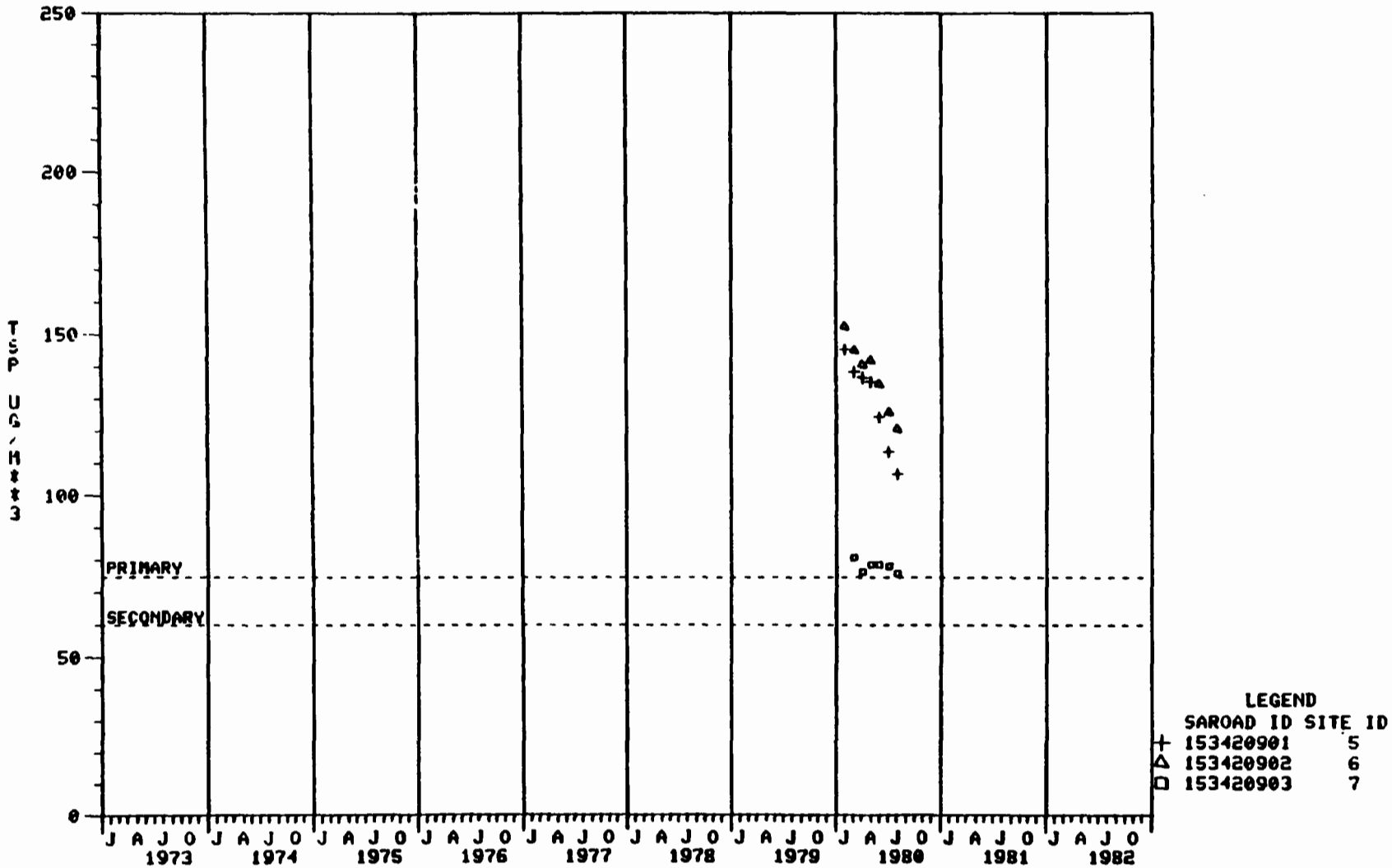
Bethlehem Steel--Burns Harbor, IN

| Wind Direction | Monitoring Site Numbers #2 | #3 | #4 | #5 | #6 | #7 |
|---|---|---|---|---|---|---|
| N | 3 | 3 | 4 | 2 | 2 | 1 |
| NNE | 9 | 3 | 6 | 4 | 4 | 2 |
| NE | 4 | 1 | 1 | 6 | 6 | 4 |
| ENE | 1 | 1 | 1 | 0 | 0 | 0 |
| E | 1 | 0 | 0 | 1 | 1 | 1 |
| ESE | 2 | 0 | 2 | 1 | 1 | 1 |
| SE | 7 | 5 | 3 | 2 | 3 | 1 |
| SSE | 9 | 2 | 1 | 3 | 2 | 2 |
| S | 18 | 12 | 10 | 7 | 11 | 8 |
| SSW | 19 | 10 | 8 | 18 | 16 | 9 |
| SW | 10 | 6 | 6 | 6 | 5 | 4 |
| WSW | 7 | 4 | 2 | 3 | 3 | 3 |
| W | 4 | 1 | 0 | 1 | 1 | 1 |
| WNW | 1 | 3 | 2 | 3 | 3 | 3 |
| NW | 3 | 1 | 1 | 3 | 3 | 2 |
| NNW | 2 | 1 | 1 | 2 | 1 | 2 |
| Total | 100 | 53 | 48 | 62 | 62 | 44 |

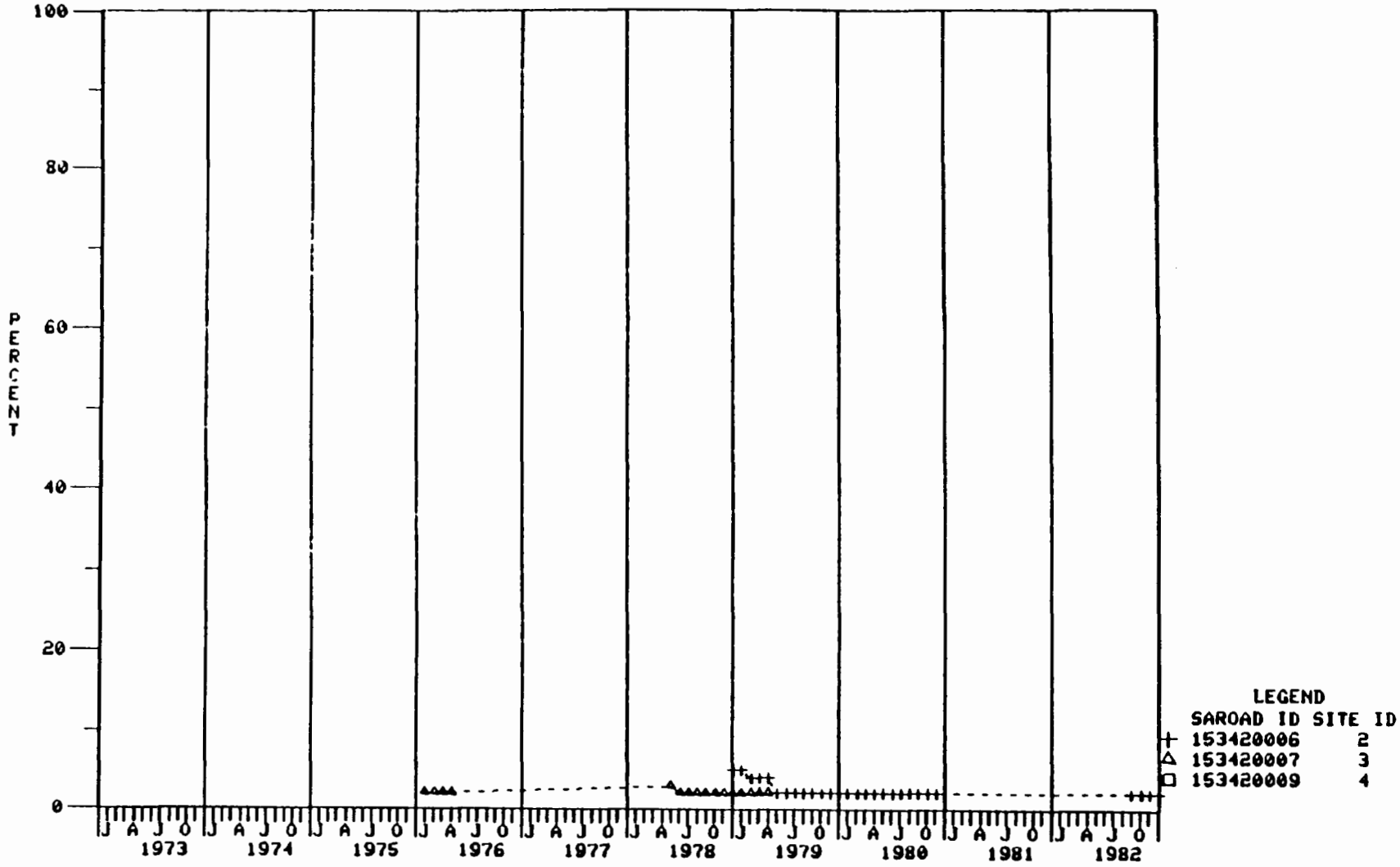
TSP 12 MONTH RUNNING GEOMETRIC MEANS (UG/M**3) FOR BETHLEHEM - BURNS HARBOR, IN



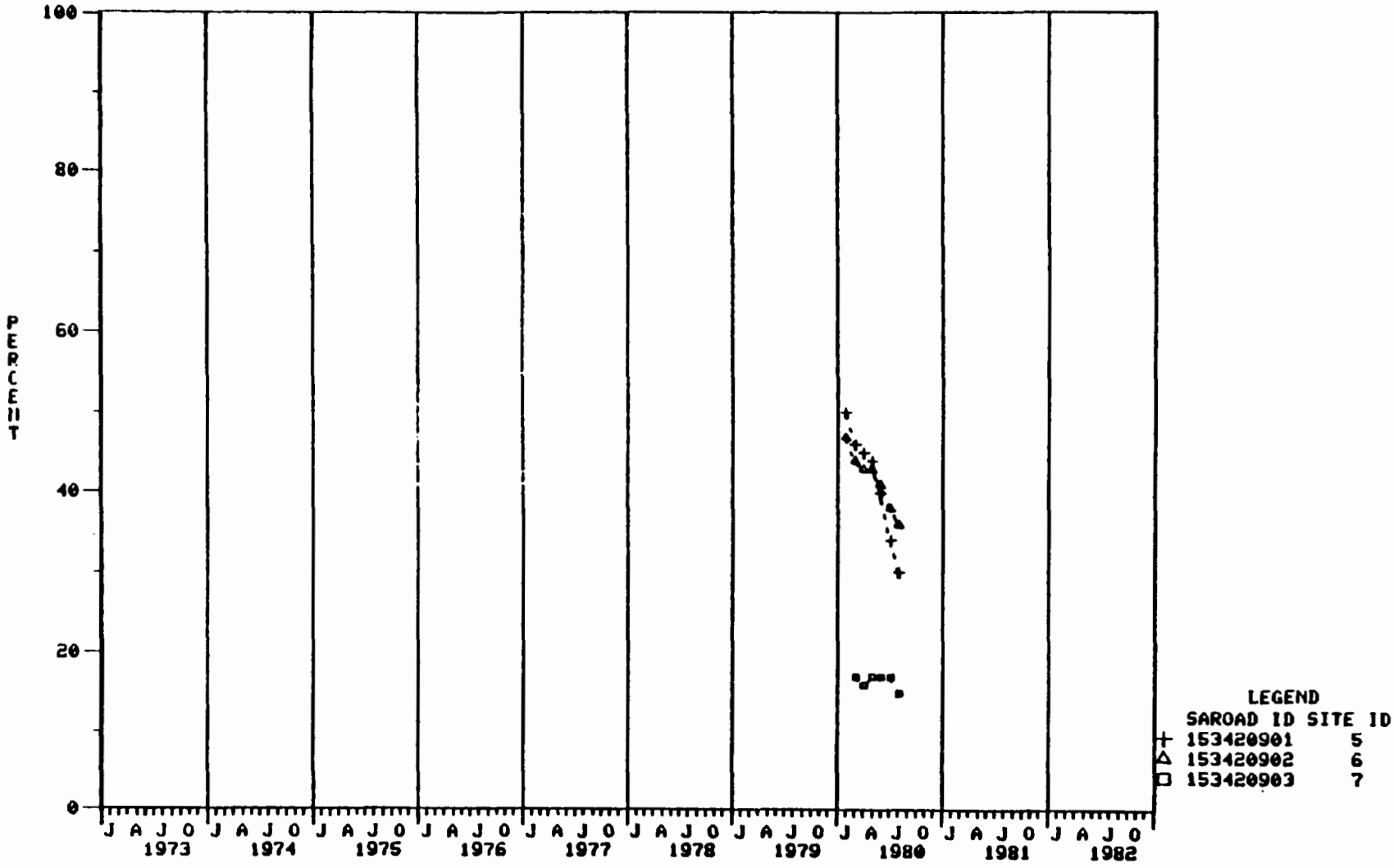
TSP 12 MONTH RUNNING GEOMETRIC MEANS (UG/M**3) FOR BETHLEHEM - BURNS HARBOR, IN



TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 150 (UG/M**3) FOR BETHLEHEM - BURNS HARBOR, IN



TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 150 (UG/M**3) FOR BETHLEHEM - BURNS HARBOR, IN



TSP DATA SUMMARY FOR BETHLEHEM - BURNS HARBOR, IN
SAROAD STATION # 153420006 SITE ID # 02
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 36 | 13 | 38 | 33 | 20 | 25 | 41 | 49 | 45 | 34 | 51 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | ****** | ****** | ****** | 49.1 | 47.5 | 41.3 | 44.6 | 35.4 |
| GEOMETRIC S.D.: | ****** | ****** | ****** | ****** | ****** | ****** | 2.4 | 2.0 | 1.8 | 1.9 | 1.8 |
| ARITHMETIC MEAN | ****** | ****** | ****** | ****** | ****** | ****** | 66.2 | 57.2 | 48.2 | 52.3 | 42.5 |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | ****** | ****** | ****** | 667.6 | 351.3 | 232.4 | 275.3 | 200.8 |
| 1ST HIGHEST: | 155.3 | 95.1 | 140.0 | 141.5 | 84.0 | 116.0 | 193.0 | 156.0 | 131.0 | 147.0 | 174.0 |
| DATE : | 720602 | 730727 | 740423 | 750518 | 760418 | 771127 | 781222 | 791229 | 800626 | 810615 | 820511 |
| 2ND HIGHEST: | 127.5 | 82.8 | 140.0 | 105.0 | 81.0 | 107.0 | 159.0 | 148.0 | 114.0 | 105.0 | 113.0 |
| DATE : | 720503 | 731106 | 740523 | 750804 | 760325 | 770706 | 780526 | 790807 | 800403 | 810522 | 820815 |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 1 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 30 | 10 | 29 | 26 | 16 | 22 | 23 | 33 | 37 | 25 | 44 |
| 66-130: | 5 | 3 | 7 | 6 | 4 | 3 | 15 | 14 | 7 | 8 | 6 |
| 131-195: | 1 | 0 | 2 | 1 | 0 | 0 | 3 | 2 | 1 | 1 | 1 |
| 196-260: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR BETHLEHEM - BURNS HARBOR, IN
SAROAD STATION # 153420007 SITE ID # 03
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 26 | 16 | 38 | 38 | 20 | 27 | 45 | 41 | 48 | 34 | 53 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | ****** | ****** | ****** | 48.1 | 53.0 | 44.8 | ****** | 45.8 |
| GEOMETRIC S.D.: | ****** | ****** | ****** | ****** | ****** | ****** | 2.1 | 1.7 | 1.7 | ****** | 1.6 |
| ARITHMETIC MEAN | ****** | ****** | ****** | ****** | ****** | ****** | 60.2 | 59.6 | 50.5 | ****** | 51.6 |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | ****** | ****** | ****** | 401.7 | 255.4 | 204.8 | ****** | 196.9 |
| 1ST HIGHEST: | 140.9 | 82.6 | 137.3 | 225.0 | 120.0 | 81.0 | 226.0 | 127.0 | 112.0 | 133.0 | 139.0 |
| DATE : | 720527 | 730721 | 740604 | 750518 | 760206 | 770706 | 780502 | 791229 | 800509 | 810504 | 820511 |
| 2ND HIGHEST: | 135.3 | 82.4 | 127.0 | 105.0 | 116.0 | 76.0 | 139.0 | 102.0 | 112.0 | 98.0 | 113.0 |
| DATE : | 720521 | 730709 | 740228 | 750810 | 760418 | 770624 | 780526 | 791018 | 800626 | 810522 | 820306 |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 18 | 10 | 24 | 26 | 11 | 22 | 29 | 24 | 35 | 28 | 42 |
| 66-130: | 5 | 6 | 13 | 11 | 9 | 5 | 13 | 17 | 13 | 5 | 10 |
| 131-195: | 3 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 1 |
| 196-260: | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR BETHLEHEM - BURNS HARBOR, IN
SAROAD STATION # 153420009 SITE ID # 04
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 38 | 9 | 37 | 37 | 20 | 21 | 40 | 42 | 46 | 40 | 58 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 50.3 | 44.6 | 48.2 | 43.4 |
| GEOMETRIC S.D.: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 1.6 | 1.6 | 1.6 | 1.6 |
| ARITHMETIC MEAN | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 55.7 | 49.6 | 53.9 | 48.3 |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 199.9 | 179.8 | 205.4 | 170.2 |
| 1ST HIGHEST: | 147.2 | 128.7 | 95.0 | 132.6 | 73.0 | 70.0 | 121.0 | 126.0 | 90.0 | 134.0 | 116.0 |
| DATE : | 720527 | 731106 | 740216 | 750518 | 760418 | 770922 | 780911 | 790912 | 800421 | 810615 | 820511 |
| 2ND HIGHEST: | 141.5 | 94.7 | 89.8 | 86.0 | 65.0 | 66.0 | 109.0 | 125.0 | 90.0 | 114.0 | 101.0 |
| DATE : | 720521 | 730709 | 740821 | 750717 | 760406 | 770706 | 780601 | 790720 | 800702 | 810504 | 820111 |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 27 | 7 | 26 | 29 | 19 | 19 | 28 | 31 | 32 | 30 | 44 |
| 66-130: | 9 | 2 | 11 | 7 | 1 | 2 | 12 | 11 | 14 | 9 | 14 |
| 131-195: | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 196-260: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR BETHLEHEM - BURNS HARBOR, IN
SAROAD STATION # 153420901 SITE ID # 05
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 105 | 42 | 0 | 0 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| GEOMETRIC S.D.: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| ARITHMETIC MEAN | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| 1ST HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 745.0 | 648.0 | ****** | ****** |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 790523 | 800312 | ****** | ****** |
| 2ND HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 743.0 | 609.0 | ****** | ****** |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 790530 | 800417 | ****** | ****** |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 23 | 5 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 54 | 10 | 0 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 11 | 0 | 0 |
| 66-130: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 31 | 18 | 0 | 0 |
| 131-195: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 25 | 6 | 0 | 0 |
| 196-260: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15 | 2 | 0 | 0 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 1 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 2 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 2 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR BETHLEHEM - BURNS HARBOR, IN
SAROAD STATION # 153420902 SITE ID # 06
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | 42 | 0 | 0 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| GEOMETRIC S.D.: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| ARITHMETIC MEAN | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| 1ST HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 591.0 | 566.0 | ****** | ****** |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 790712 | 800123 | ****** | ****** |
| 2ND HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 588.0 | 414.0 | ****** | ****** |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 790612 | 800310 | ****** | ****** |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 33 | 6 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 47 | 14 | 0 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 9 | 0 | 0 |
| 66-130: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 31 | 16 | 0 | 0 |
| 131-195: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 16 | 8 | 0 | 0 |
| 196-260: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 3 | 0 | 0 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14 | 1 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 3 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 1 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 1 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR BETHLEHEM - BURNS HARBOR, IN
SAROAD STATION # 153420903 SITE ID # 07
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 60 | 43 | 0 | 0 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| GEOMETRIC S.D.: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| ARITHMETIC MEAN | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| 1ST HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 515.0 | 473.0 | ****** | ****** |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 790913 | 800423 | ****** | ****** |
| 2ND HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 282.0 | 258.0 | ****** | ****** |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 790907 | 800225 | ****** | ****** |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 6 | 0 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 23 | 14 | 0 | 0 |
| 66-130: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 24 | 19 | 0 | 0 |
| 131-195: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 6 | 0 | 0 |
| 196-260: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 3 | 0 | 0 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

24-HR STANDARD EXCEEDANCE ROSE FOR
BETHLEHEM - BURNS HARBOR, IN
(ALL CASES > 260 UG/M**3)
X=0.850
COUNT/AVERAGE TSP OF PRIMARY EXCEEDANCES

| SAROAD # | 153420006 | | 153420007 | | 153420009 | | 153420901 | | 153420902 | | 153420903 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SITE ID # | 2 | | 3 | | 4 | | 5 | | 6 | | 7 | |
| DIRECTION | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X |
| N COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 2 | 2 | 1 | 1 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 328. | 303. | 355. | 345. | 282. | 515. |
| NNE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 3 | 0 | 1 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 308. | 272. | 326. | 430. | 0. | 262. |
| NE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 6 | 2 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 348. | 0. | 376. | 303. | 0. | 0. |
| ENE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 3 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 504. | 0. | 546. | 0. | 0. |
| E COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 651. | 0. | 372. | 0. | 0. |
| ESE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 648. | 743. | 0. | 560. | 0. | 0. |
| SE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 288. | 496. | 0. | 435. | 0. | 0. |
| SSE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 433. | 0. | 0. | 318. | 0. | 0. |
| S COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 264. | 0. | 0. | 0. | 0. | 0. |
| SSW COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 406. | 0. | 0. | 0. | 0. | 0. |
| SW COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 305. | 0. | 310. | 0. | 0. | 0. |
| WSW COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 444. | 293. | 0. | 0. | 0. | 0. |
| W COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 281. | 394. | 0. | 0. |
| WNW COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 422. | 317. | 0. | 0. |
| NW COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 517. | 296. | 0. | 0. |
| NNW COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 3 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 745. | 0. | 349. | 0. | 0. |
| ALL COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 15 | 11 | 15 | 21 | 1 | 2 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 373. | 483. | 371. | 398. | 282. | 389. |

24-HR STANDARD EXCEEDANCE ROSE FOR
BETHLEHEM - BURNS HARBOR, IN
(ALL CASES > 150 UG/M**3)
X=0.850
COUNT/AVERAGE TSP OF SECONDARY EXCEEDANCES

| SARCAD # | 153420006 | | 153420007 | | 153420009 | | 153420901 | | 153420902 | | 153420903 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SITE ID # | 2 | | 3 | | 4 | | 5 | | 6 | | 7 | |
| DIRECTION | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X |
| N COUNT: | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 3 | 2 | 3 | 1 | 1 |
| AVE TSP: | 0. | 0. | 226. | 0. | 0. | 0. | 328. | 272. | 355. | 297. | 282. | 515. |
| NNE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 2 | 3 | 1 | 2 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 308. | 246. | 326. | 430. | 159. | 226. |
| NE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 4 | 6 | 4 | 1 | 1 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 320. | 215. | 376. | 254. | 196. | 165. |
| ENE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 4 | 0 | 1 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 504. | 0. | 453. | 0. | 159. |
| E COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 185. | 651. | 161. | 372. | 0. | 0. |
| ESE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 1 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 648. | 483. | 0. | 560. | 0. | 0. |
| SE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 2 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 268. | 341. | 0. | 337. | 0. | 0. |
| SSE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 2 | 1 | 1 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 344. | 202. | 212. | 318. | 0. | 0. |
| S COUNT: | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 |
| AVE TSP: | 159. | 0. | 0. | 0. | 0. | 0. | 243. | 204. | 0. | 0. | 0. | 0. |
| SSW COUNT: | 0 | 1 | 0 | 0 | 0 | 0 | 7 | 2 | 2 | 1 | 0 | 1 |
| AVE TSP: | 0. | 174. | 0. | 0. | 0. | 0. | 216. | 186. | 186. | 180. | 0. | 158. |
| SW COUNT: | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 1 | 2 | 0 | 0 |
| AVE TSP: | 0. | 0. | 225. | 0. | 0. | 0. | 248. | 0. | 310. | 245. | 0. | 0. |
| WSW COUNT: | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 2 | 1 | 0 |
| AVE TSP: | 193. | 0. | 0. | 0. | 0. | 0. | 444. | 293. | 0. | 231. | 201. | 0. |
| W COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 2 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 236. | 0. | 281. | 394. | 0. | 0. |
| WNW COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 0 | 1 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 156. | 422. | 317. | 0. | 175. |
| NW COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 1 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 160. | 230. | 336. | 296. | 0. | 0. |
| NNW COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 5 | 0 | 3 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 368. | 0. | 276. | 0. | 204. |
| ALL COUNT: | 2 | 1 | 2 | 0 | 0 | 0 | 29 | 29 | 20 | 33 | 4 | 10 |
| AVE TSP: | 176. | 174. | 226. | 0. | 0. | 0. | 286. | 310. | 323. | 329. | 210. | 224. |

## AIR QUALITY EVALUATION - BETHLEHEM STEEL, BURNS HARBOR, INDIANA

Air quality trends:

All three regular stations consistently generated 12-month running geometric means below the secondary annual standard. Values were generally less than 50 $\mu g/m^{-3}$. Stations #2 and #3 indicated moderate downward trends (Spearman correlation coefficients of -0.66 and -0.42, respectively); station #4 indicated essentially no trend.

Stations #5, #6, and #7 were special study sites operated during 1979 and 1980. All three sites consistently generated geometric means in excess of the primary annual standard. Because they were part of a special source-oriented study, long term impact trends cannot be assessed. However, these sites do indicate a substantial impact very near the plant. Between 30 and 50 percent of the observations at stations #5 and #6 exceeded 150 $\mu g/m^3$, while almost 20 percent of the observations exceeded 150 $\mu g/m^3$ at station #7.

Standard exceedance status:

All of the long term stations indicate attainment of the primary and secondary standards. The special study sites indicate certain 24-hour primary standard nonattainment close to the mill.

Pollution roses:

Station #2 displays increased TSP levels under steady winds coming from the plant. The preponderance of southwesterly winds offers little opportunity for impacts at stations #3 and #4.

Pollution roses developed from the special study sites (stations #5, #6, and #7) display a strong local impact, particularly from the coking operations.

Standard exceedance roses:

Stations #2, #3, and #4 registered no excursions beyond the 24-hour primary standard. Additionally, no excursions beyond the 24-hour secondary standard were recorded at station #4. Secondary standard excursions at station #3 were extremely rare. Both occurred under winds that would not be expected to have involved the plant. Secondary excursions at station #2 were equally rare, but two of the three cases occurred with winds blowing from the plant.

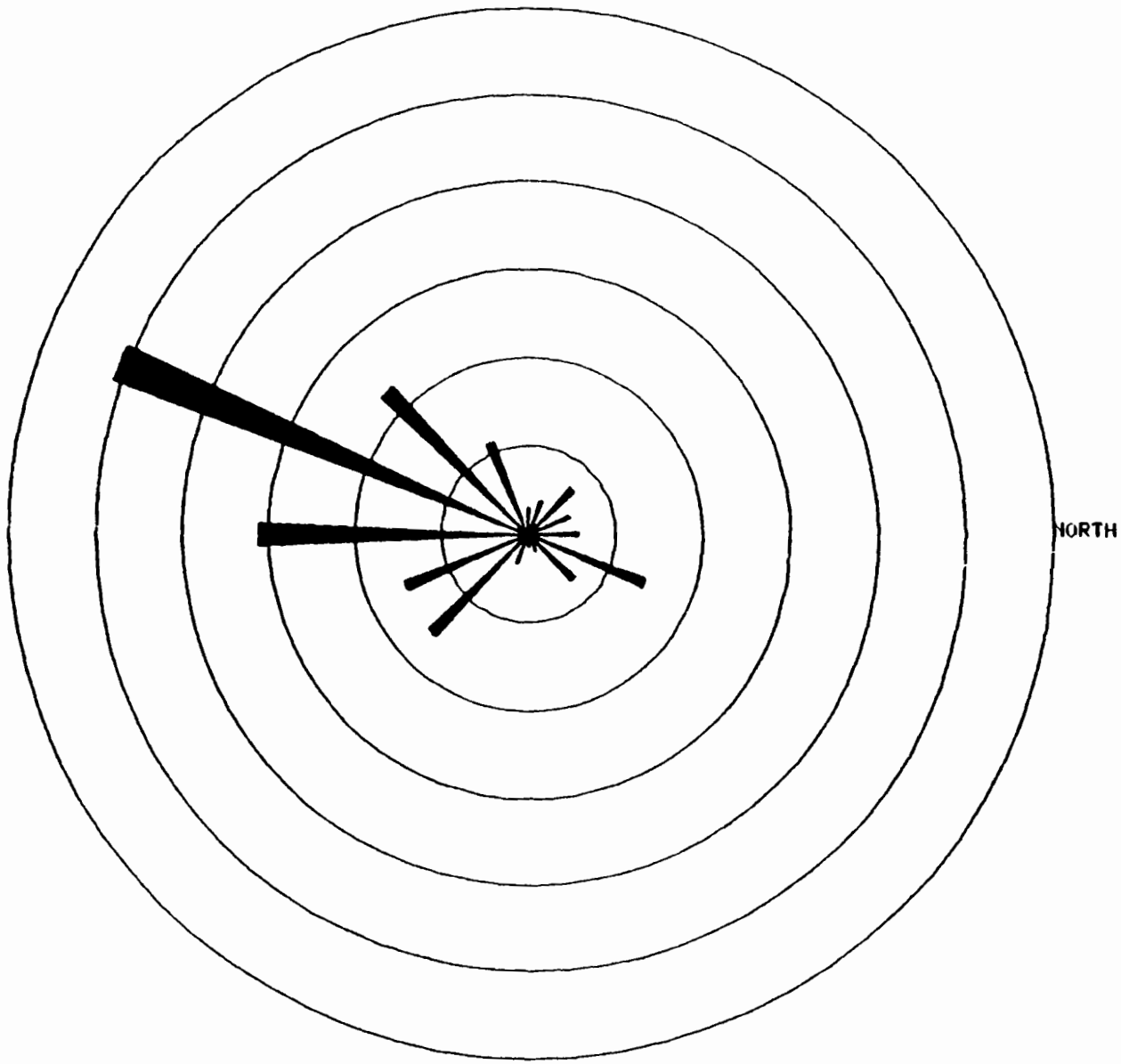
For stations #5, #6, and #7, excursions beyond primary and secondary 24-hour standards were a fairly routine event and reinforced the patterns developed through the pollution roses.

BaP:

As part of the special study conducted by EPA Region V, BaP was measured at stations #5 and #6 for 6 days in May 1979. The results were divided into "downwind," "with wind," and "background" categories. Downwind days were defined as having the 24-hour average wind direction within ± 10° of the station orientation from the plant. With wind days had four or more hours within ± 10°, while background days had winds away from the station for the entire day. The results are summarized below:

| | Downwind Station | With Wind Station | Background Station |
|---|---|---|---|
| Range ($ng/m^3$) | 2.9-981.0 | 64-196.0 | < 1.0-10.3 |
| Geometric Mean | 40.9 | 38.7 | 1.9 |

WIND ROSE
PERSISTENCE CLASS 0.95
WIND STATION 153420011



CF & I STEEL
Pueblo
Pueblo County
Colorado
EPA Region VIII

"ol Monitoring Sites--CF & I Steel, Pueblo, Colorado

| Site ID Number | SAROAD Number | Site Name and Address | Plant Location from Site: Facility/ Bearing (°) | Distance (km) | Elevation (m): Above Ground | Above MSL | Above Plant | Site Description | Nearest Roadway: Name | Direction | Distance (m) | Type and Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1* | 06-1820-001 | Pueblo City-County Health Department Pueblo, CO | Coke plant | 164 | 3.8 | 5 | 1,421 | -34 | Roof | Central Main St. | SE | 30 | M |
| | | | Blast furnace | 143 | 2.8 | | | | | | | |
| | | | Open hearth furnace | 126 | 3.0 | | | | | | | |
| | | | BOF | 113 | 3.1 | | | | | | | |
| 2 | 06-1820-003-F01 | Mesa & Evans Fire Station Pueblo, CO | Coke plant | 180 | 1.6 | 9 | 1,452 | -2 | Roof Center city-industrial | Mesa | N | 15 | 2-lane, M |
| | | | Blast furnace | 180 | 0.7 | | | | | | | |
| | | | Open hearth furnace | 168 | 1.2 | | | | | Evans | E | 15 | 2-lane, M |
| | | | BOF | 158 | 1.7 | | | | | | | |
| 3 | Reference #500 | CF & I--North Pueblo, CO | Coke plant | 205 | 1.7 | 3 | 1,445 | -9 | Vacant lot in residential area | U (station discontinued) | | | |
| | | | Blast furnace | 233 | 0.9 | | | | | | | |
| | | | Open hearth furnace | 193 | 0.7 | | | | | | | |
| | | | BOF | 147 | 0.7 | | | | | | | |
| 4 | Reference #100 | CF & I--East Pueblo, CO | Coke plant | 260 | 1.5 | 3 | 1,448 | -6 | Small hilltop | Residential St. | ENE | 250 | L |
| | | | Blast furnace | 295 | 1.7 | | | | | | | |
| | | | Open hearth furnace | 302 | 1.2 | | | | | | | |
| | | | BOF | 326 | 0.8 | | | | | | | |
| 5 | Reference #200 | CF & I--South Pueblo, CO | Coke plant | 358 | 2.2 | 3 | 1,470 | 15 | Open land on CF & I property | U | U | U | U |
| | | | Blast furnace | 358 | 3.1 | | | | | | | |
| | | | Open hearth furnace | 9 | 3.1 | | | | | | | |
| | | | BOF | 19 | 3.2 | | | | | | | |
| 6 | Reference #300 | CF & I--5 Pueblo, CO | Coke plant | 32 | 1.6 | 3 | 1,466 | 11 | Open grassy field | I-25 | SE | 100 | M |
| | | | Blast furnace | 20 | 2.4 | | | | | | | |
| | | | Open hearth furnace | 32 | 2.6 | | | | | | | |
| | | | BOF | 42 | 2.9 | | | | | | | |
| 7 | Reference #400 | CF & I--West Pueblo, CO | Coke plant | 118 | 1.1 | 6 | 1,459 | 5 | Roof | Lakeview | N | 8 | L |
| | | | Blast furnace | 59 | 1.2 | | | | | | | |
| | | | Open hearth furnace | 72 | 1.6 | | | | | | | |
| | | | BOF | 76 | 2.2 | | | | | | | |

(Continued)

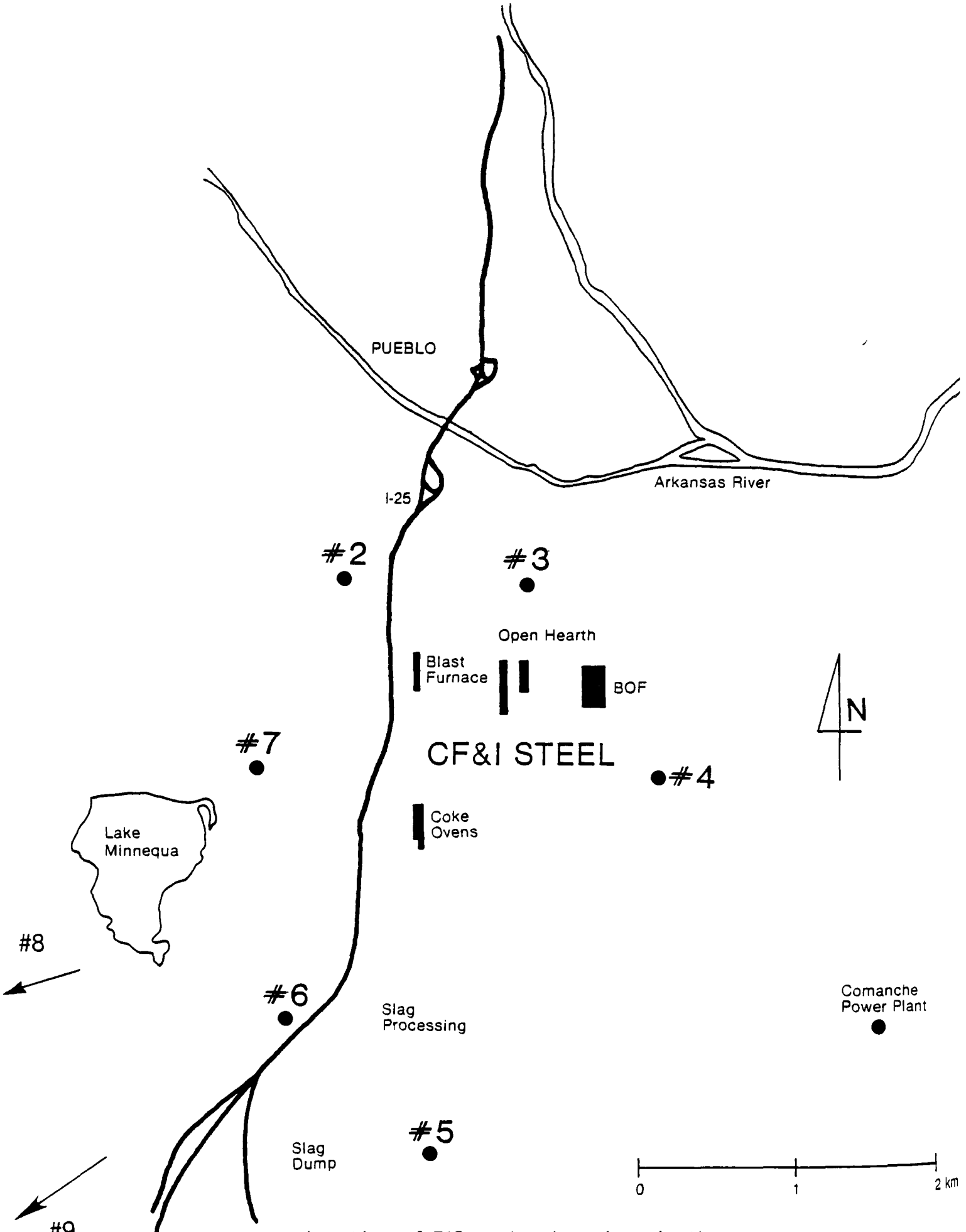
Key: U = Unavailable M = Moderate
L = Light H = Heavy

* Data from this station were included in the original 1973-1977 analysis; however, no strong mill impact on TSP was noted at this site. Based on the likelihood that this situation has not changed, data from this site were not employed in the 1978-1980 or the 1981-1982 updates.

Hi-Vol Monitoring Sites--CF & I Steel, Pueblo, Colorado (Concluded)

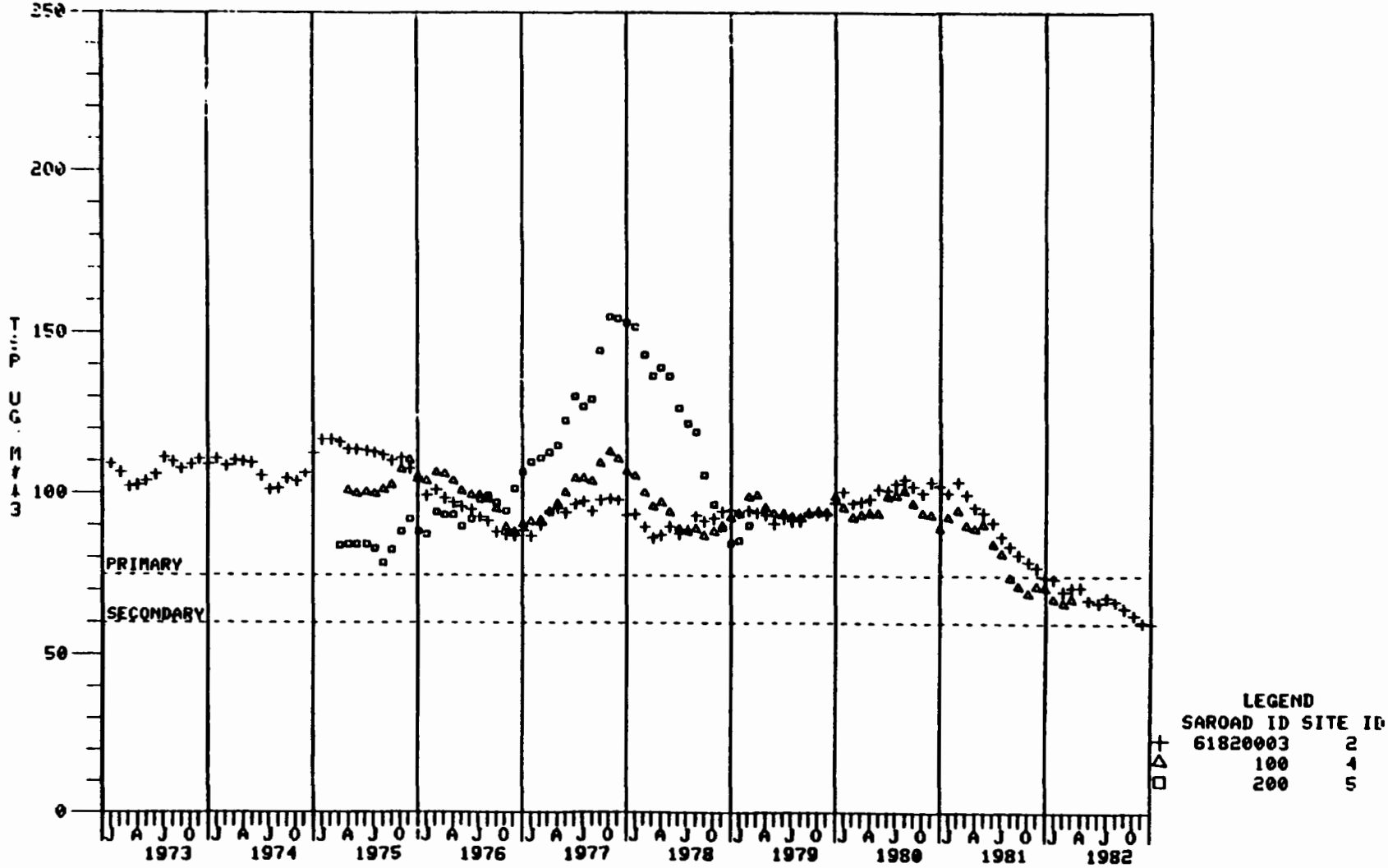
| Site ID Number | SAROAD Number | Site Name and Address | Plant Location from Site: Facility/ Bearing (°) | | Distance (km) | Elevation (m): Above Ground | Above MSL | Above Plant | Site Description | Nearest Roadway: Name | Direction | Distance (m) | Type and Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 06-1820-611-F05 | South Dump Site | Coke plant | 78 | 10.1 | 2.8 | 1,570 | 118 | Platform Rural-agricultural | Service Rd. | U | 900 | <3,000 ADT |
| | | | Blast furnace | 71 | 10.5 | | | | | | | | |
| | | | Open hearth furnace | 73 | 10.9 | | | | | Rt. 78 | U | 1,158 | 4,300 ADT |
| | | | BOF | 73 | 11.4 | | | | | | | | |
| 9 | Reference #600 | Burnt Mill (CF & I Site) | Coke plant | 39 | 14.8 | U | 1,578 | 134 | Rural | Burnt Mill & Little Burnt Mill Rds. | U | U | U |
| | | | Blast furnace | 36 | 15.7 | | | | | | | | |
| | | | Open hearth furnace | 38 | 15.9 | | | | | | | | |
| | | | BOF | 40 | 16.3 | | | | | | | | |

Key: U = Unavailable
ADT = Average daily traffic

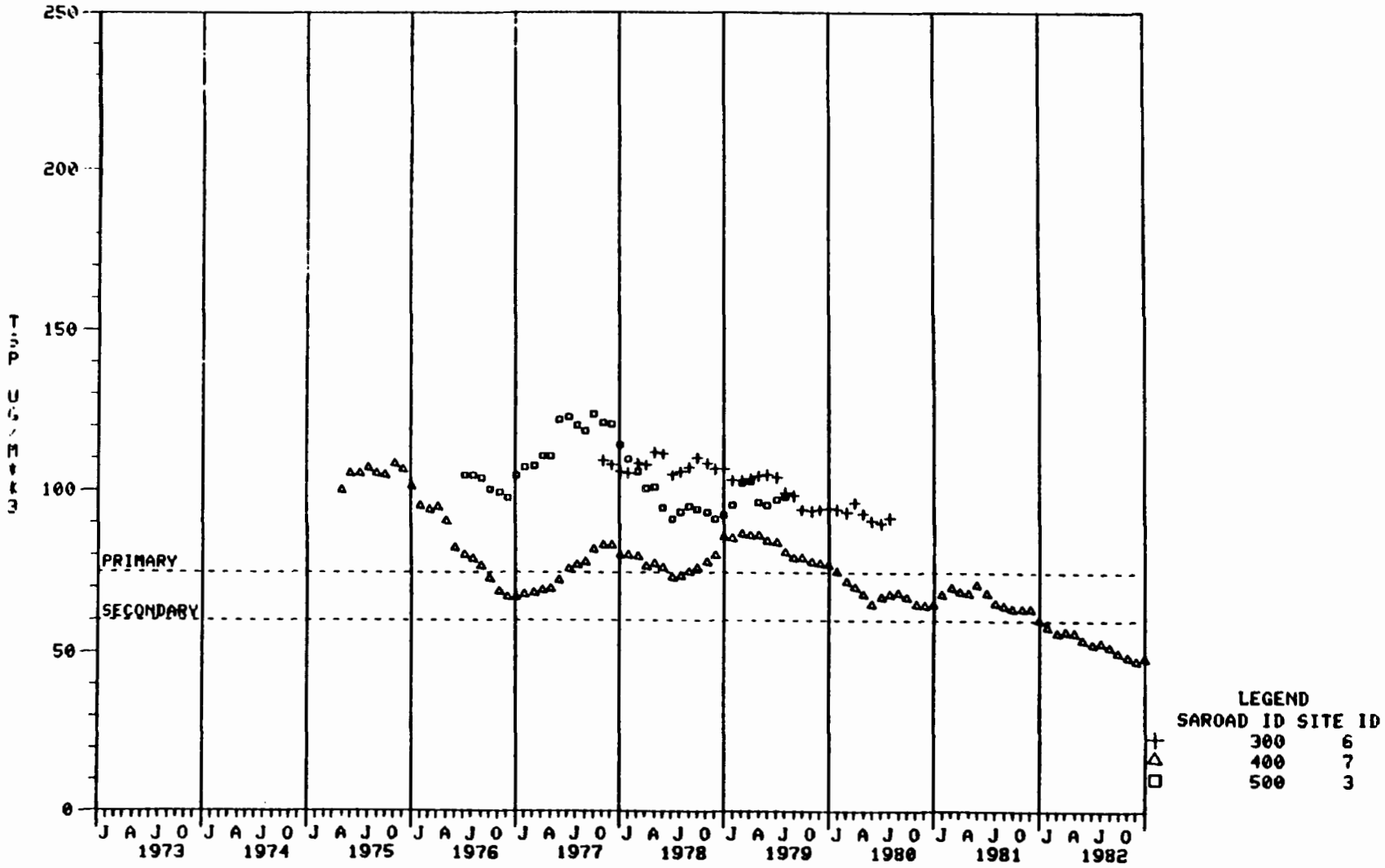


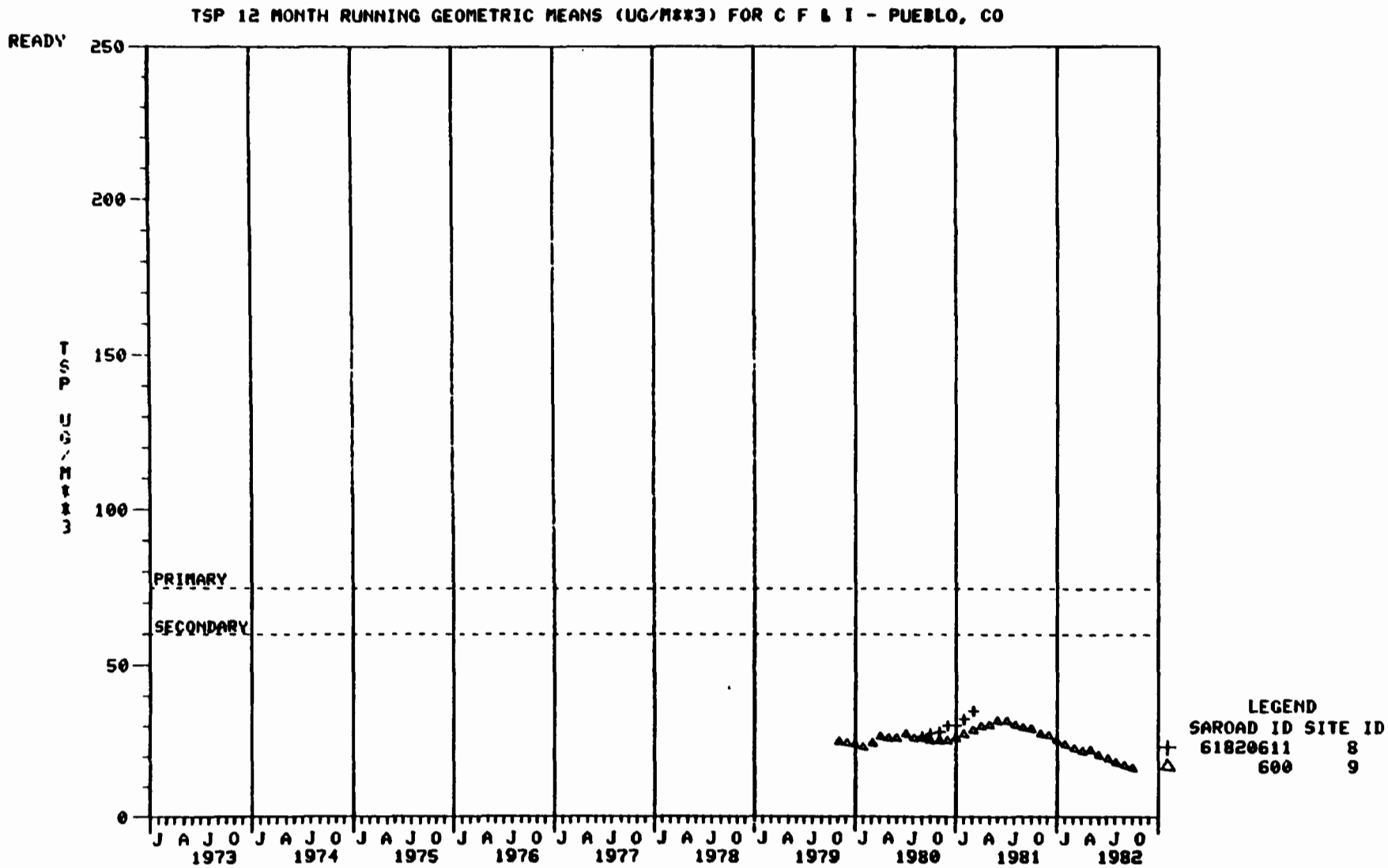

Location of TSP monitoring sites in the vicinity of C.F. & I. Steel - Pueblo, Colorado

TSP 12 MONTH RUNNING GEOMETRIC MEANS (UG/M**3) FOR C F & I - PUEBLO, CO

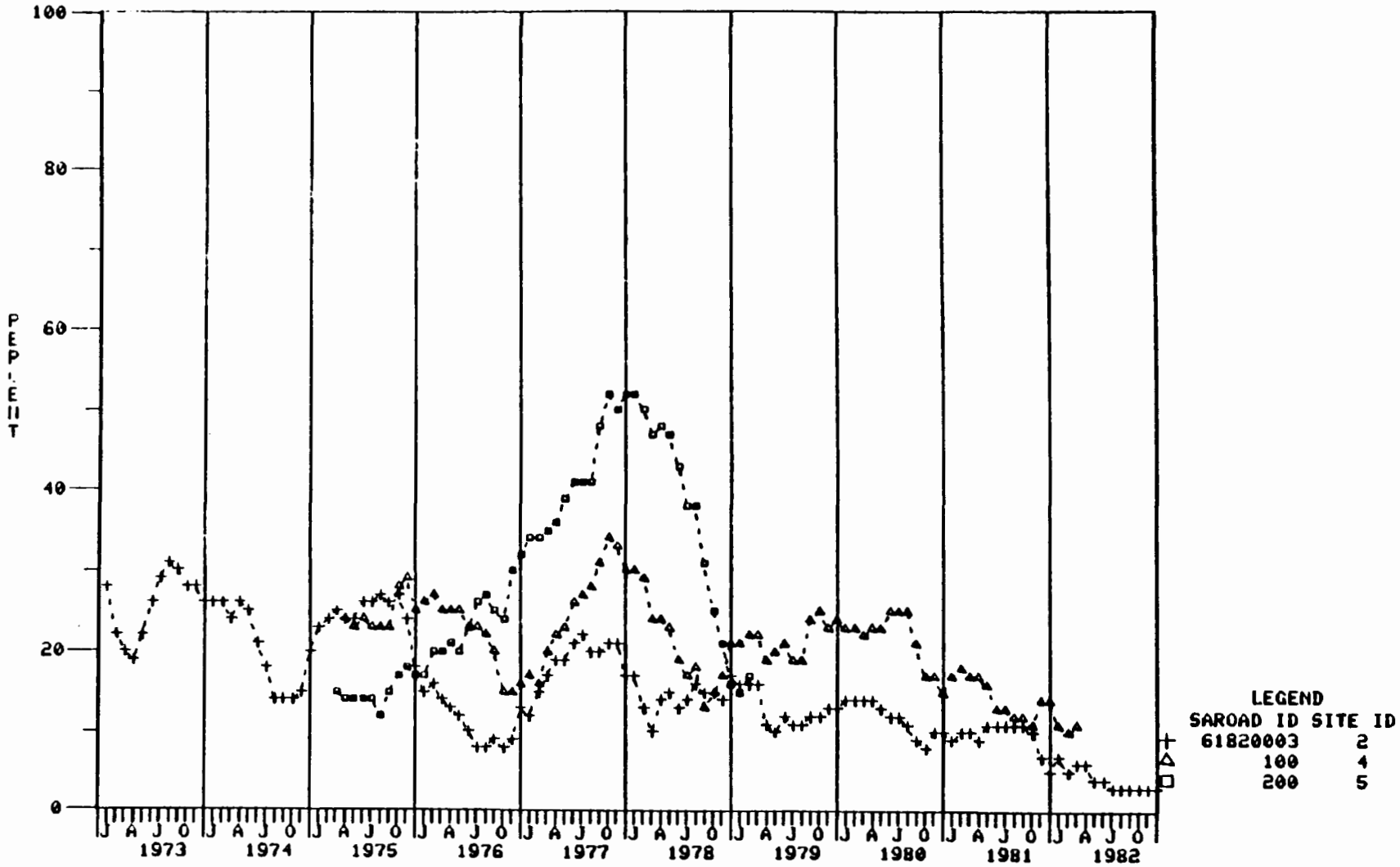


TSP 12 MONTH RUNNING GEOMETRIC MEANS (UG/M**3) FOR C F & I - PUEBLO, CO

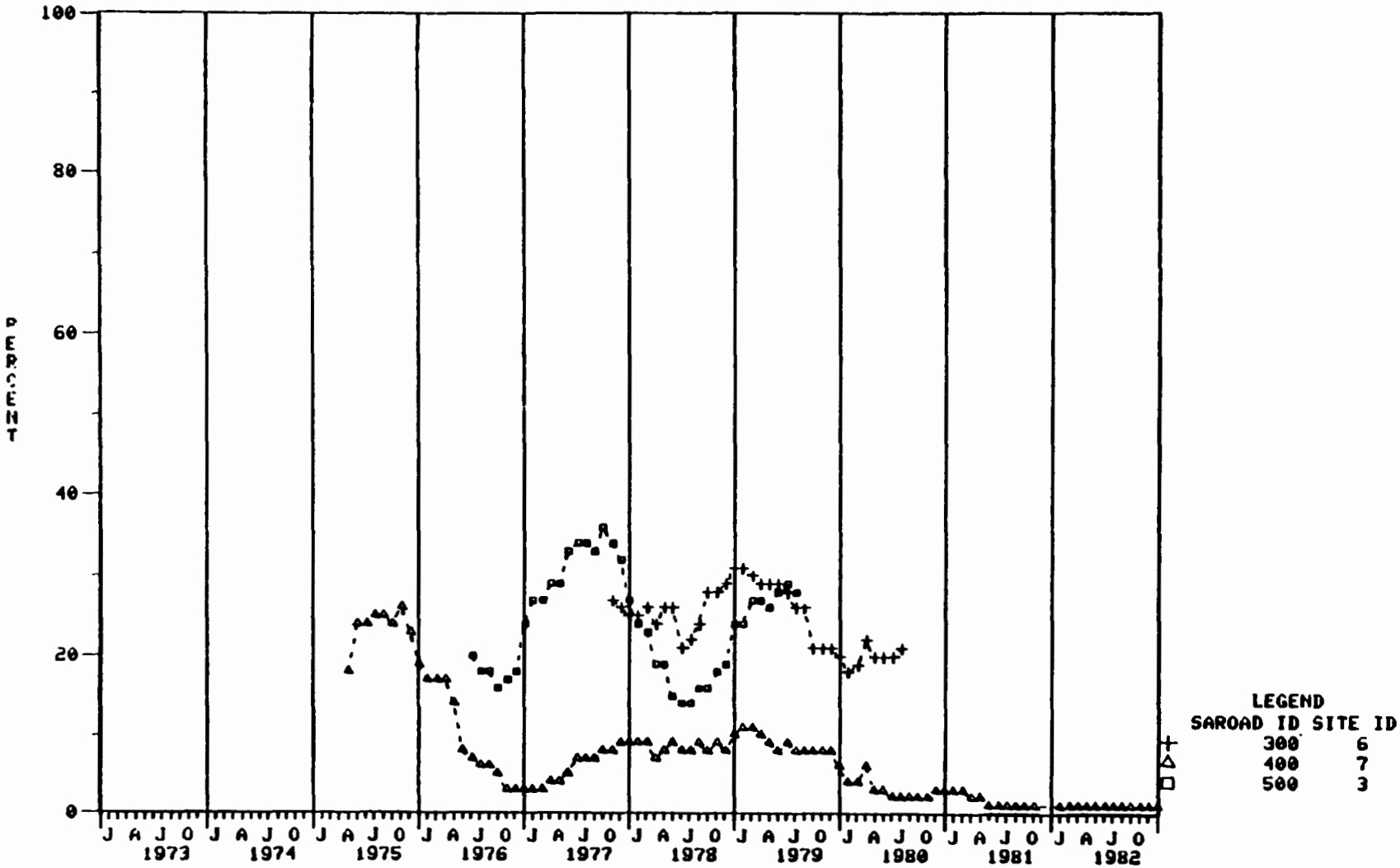


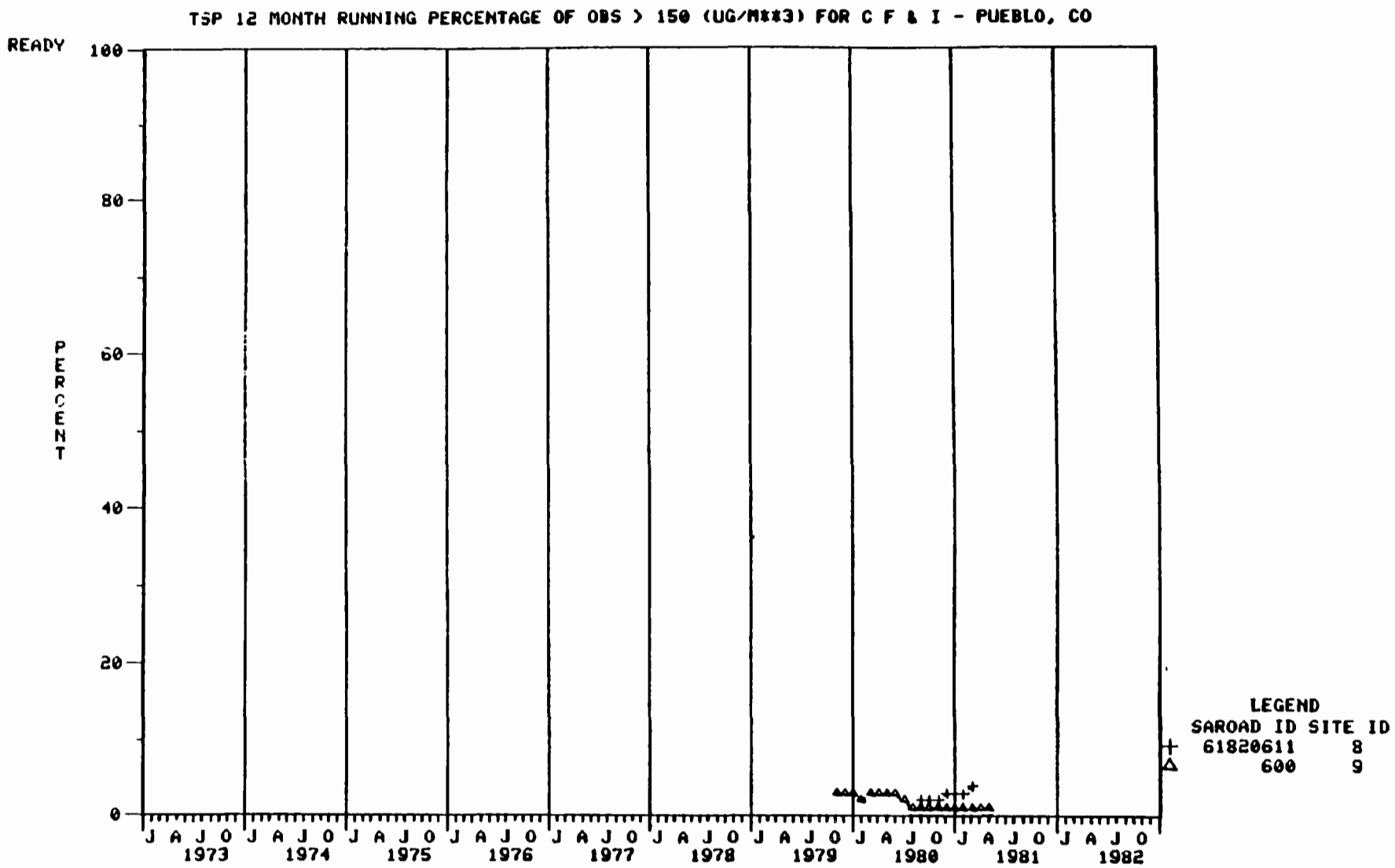

TSP 12 MONTH RUNNING GEOMETRIC MEANS (UG/M**3) FOR C F & I - PUEBLO, CO
READY
TSP UG/M**3
250
200
150
100
50
0
PRIMARY
SECONDARY
J A J O
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
LEGEND
SAROAD ID SITE ID
61820611 8
600 9

TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 150 (UG/M**3) FOR C F & I - PUEBLO, CO

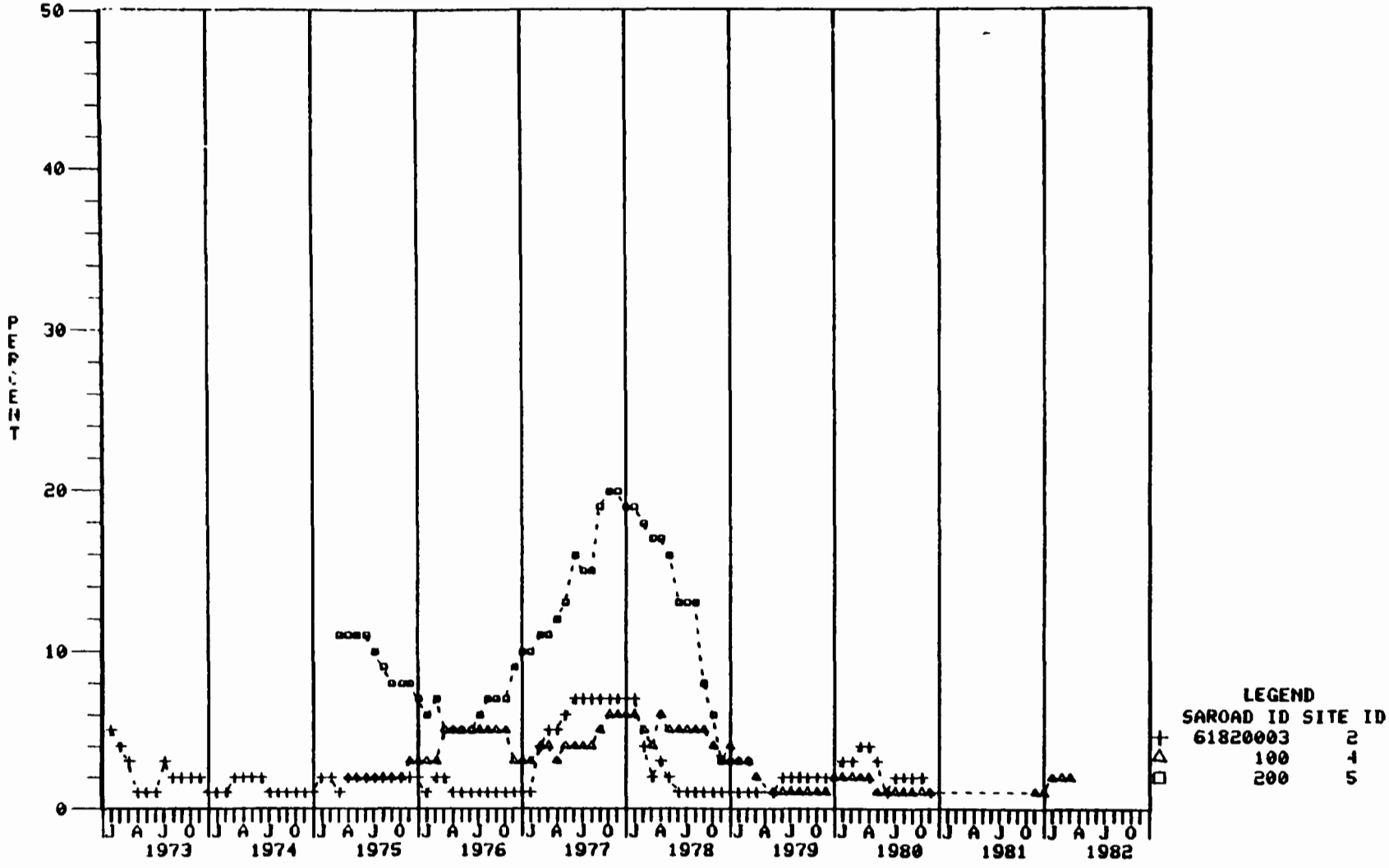


TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 150 (UG/M**3) FOR C F & I - PUEBLO, CO

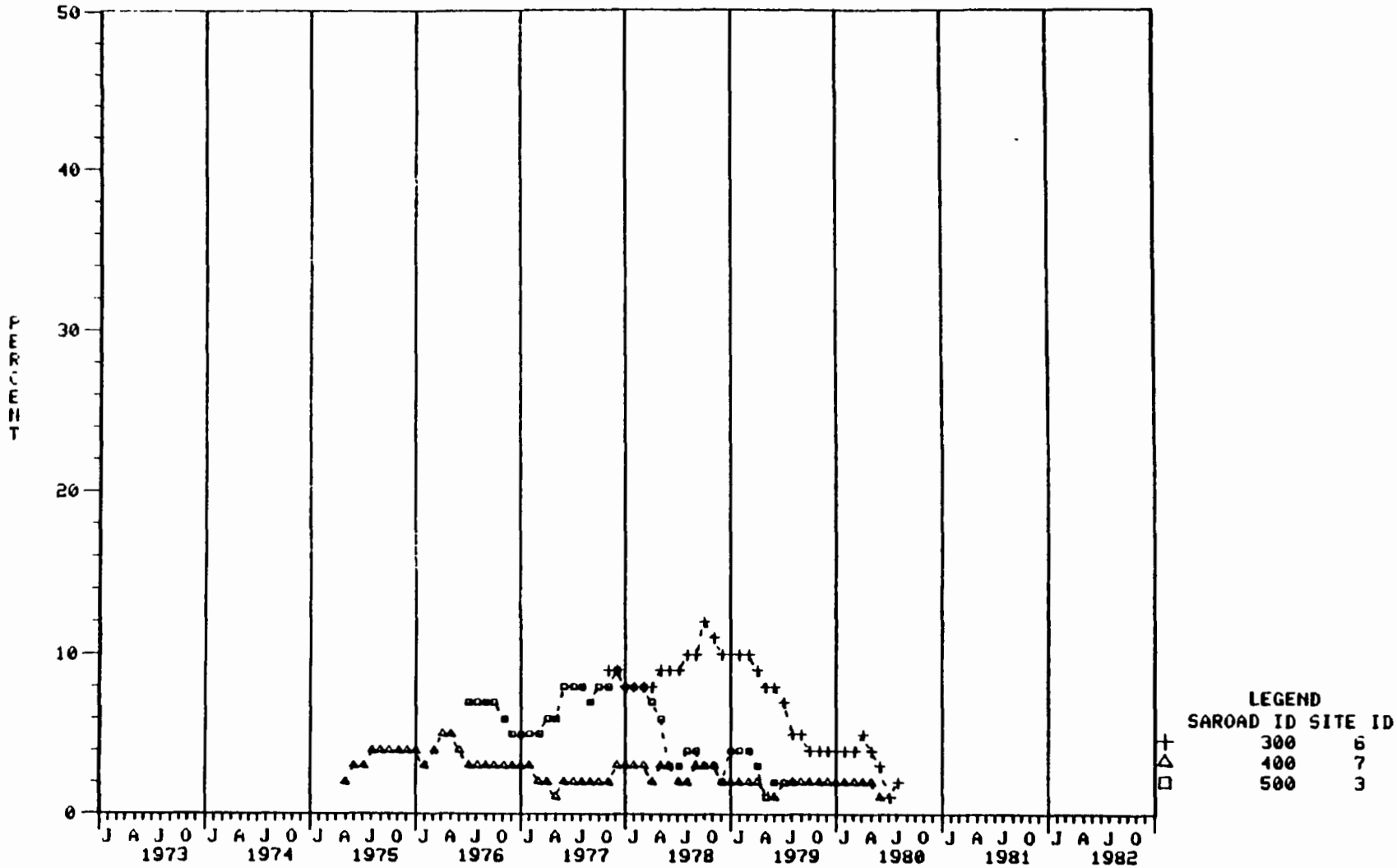


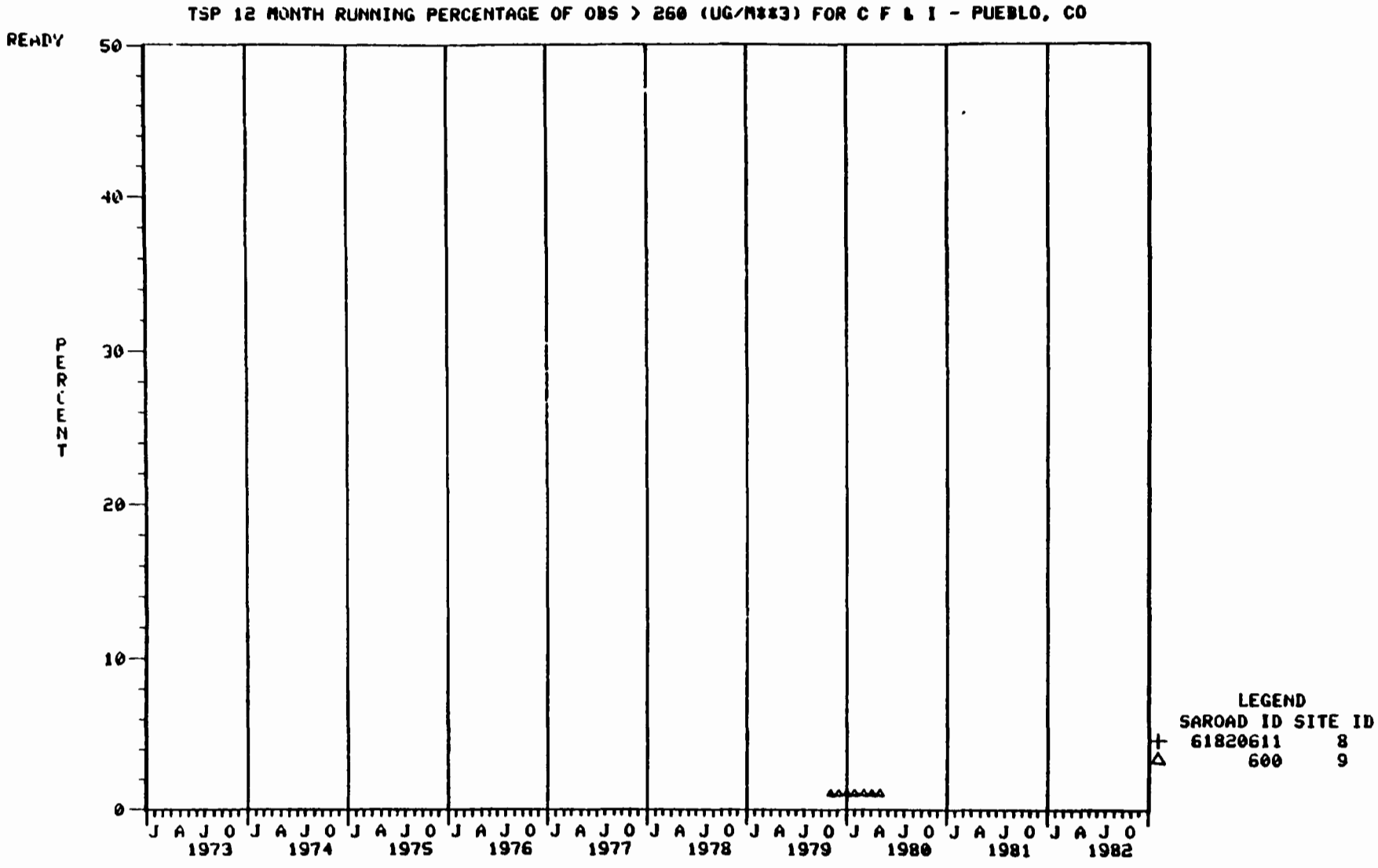

TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 150 (UG/M**3) FOR C F & I - PUEBLO, CO
READY
PERCENT
100
80
60
40
20
0
J A J O
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
LEGEND
SAROAD ID SITE ID
61820611 8
600 9

TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 260 (UG/M**3) FOR C F & I - PUEBLO, CO



TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 260 (UG/M**3) FOR C F & I - PUEBLO, CO




TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 260 (UG/M**3) FOR C F & I - PUEBLO, CO
READY
PERCENT
50
40
30
20
10
0
J A J O J A J O J A J O J A J O J A J O J A J O J A J O J A J O J A J O J A J O J A J O
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
LEGEND
SAROAD ID SITE ID
61820611 8
600 9

TSP DATA SUMMARY FOR C F & I - PUEBLO, CO
SAROAD STATION # 061820003 SITE ID # 02
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 64 | 88 | 86 | 87 | 85 | 87 | 72 | 89 | 67 | 88 | 86 |
| GEOMETRIC MEAN: | 111.8 | 109.3 | 112.6 | 103.8 | 88.6 | 93.6 | 95.1 | 97.3 | 102.4 | 74.4 | 60.0 |
| GEOMETRIC S.D.: | 1.7 | 1.5 | 1.4 | 1.5 | 1.5 | 1.7 | 1.6 | 1.6 | 1.5 | 1.5 | 1.6 |
| ARITHMETIC MEAN | 126.2 | 119.6 | 121.1 | 112.1 | 96.6 | 108.6 | 105.9 | 108.3 | 109.7 | 81.5 | 67.1 |
| HIGHEST BY LARSEN EXTRP: | 532.4 | 391.8 | 333.0 | 322.2 | 301.2 | 445.1 | 396.9 | 368.0 | 313.6 | 256.0 | 233.3 |
| 1ST HIGHEST: | 324.0 | 349.0 | 454.0 | 317.0 | 274.0 | 358.0 | 301.0 | 405.0 | 262.0 | 225.0 | 238.0 |
| DATE : | 720326 | 730719 | 740302 | 750426 | 760220 | 770310 | 780409 | 790507 | 800102 | 810213 | 820312 |
| 2ND HIGHEST: | 291.0 | 246.0 | 252.0 | 274.0 | 250.0 | 341.0 | 233.0 | 332.0 | 239.0 | 202.0 | 207.0 |
| DATE : | 721227 | 731116 | 741211 | 750128 | 761208 | 770222 | 780516 | 790628 | 801109 | 810524 | 820111 |
| # OF READINGS EXCEEDING 260 : | 3 | 1 | 1 | 2 | 1 | 6 | 1 | 2 | 1 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 18 | 23 | 17 | 16 | 9 | 15 | 11 | 12 | 7 | 4 | 3 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 8 | 12 | 7 | 8 | 14 | 20 | 12 | 15 | 6 | 34 | 51 |
| 66-130: | 28 | 41 | 51 | 56 | 57 | 45 | 42 | 56 | 46 | 45 | 30 |
| 131-195: | 21 | 30 | 23 | 18 | 12 | 14 | 14 | 13 | 12 | 7 | 3 |
| 196-260: | 4 | 4 | 4 | 3 | 1 | 2 | 3 | 3 | 2 | 2 | 2 |
| 261-325: | 3 | 0 | 0 | 2 | 1 | 4 | 1 | 0 | 1 | 0 | 0 |
| 326-390: | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR C F & I - PUEBLO, CO
SAROAD STATION # 100 SITE ID # 04
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 73 | 174 | 176 | 165 | 85 | 87 | 87 | 73 | 27 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | 105.1 | 90.5 | 106.8 | 92.8 | 99.1 | 89.3 | 70.7 | ****** |
| GEOMETRIC S.D.: | ****** | ****** | ****** | 1.7 | 1.9 | 1.9 | 1.9 | 1.9 | 1.8 | 2.0 | ****** |
| ARITHMETIC MEAN | ****** | ****** | ****** | 120.9 | 109.6 | 130.8 | 113.8 | 116.7 | 103.0 | 88.1 | ****** |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | 509.1 | 587.6 | 747.2 | 655.9 | 608.8 | 475.3 | 506.7 | ****** |
| 1ST HIGHEST: | ****** | ****** | 307.0 | 378.0 | 570.0 | 621.0 | 452.0 | 337.0 | 241.0 | 390.0 | 159.0 |
| DATE : | ****** | ****** | 741219 | 750323 | 760325 | 770222 | 780418 | 790507 | 801109 | 811124 | 821201 |
| 2ND HIGHEST: | ****** | ****** | 250.0 | 374.0 | 498.0 | 586.0 | 382.0 | 296.0 | 237.0 | 246.0 | 104.0 |
| DATE : | ****** | ****** | 741205 | 751130 | 760319 | 770328 | 780426 | 791217 | 801215 | 811218 | 821217 |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 1 | 6 | 5 | 10 | 3 | 2 | 0 | 1 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 16 | 43 | 27 | 49 | 18 | 20 | 13 | 10 | 1 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 16 | 32 | 42 | 35 | 24 | 19 | 22 | 31 | 16 |
| 66-130: | 0 | 0 | 31 | 81 | 92 | 61 | 37 | 40 | 39 | 29 | 10 |
| 131-195: | 0 | 0 | 21 | 39 | 29 | 46 | 15 | 17 | 21 | 10 | 1 |
| 196-260: | 0 | 0 | 4 | 16 | 8 | 13 | 6 | 9 | 5 | 2 | 0 |
| 261-325: | 0 | 0 | 1 | 3 | 0 | 5 | 0 | 1 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 3 | 2 | 0 | 2 | 1 | 0 | 1 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 3 | 4 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR C F & I - PUEBLO, CO
SAROAD STATION # 200 SITE ID # 05
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 87 | 114 | 166 | 159 | 79 | 0 | 0 | 0 | 0 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | 88.1 | 107.1 | 153.5 | 84.7 | ****** | ****** | ****** | ****** |
| GEOMETRIC S.D.: | ****** | ****** | ****** | 2.0 | 2.1 | 2.0 | 2.0 | ****** | ****** | ****** | ****** |
| ARITHMETIC MEAN | ****** | ****** | ****** | 122.5 | 149.9 | 200.2 | 108.6 | ****** | ****** | ****** | ****** |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | 667.3 | 974.0 | 1231.3 | 615.6 | ****** | ****** | ****** | ****** |
| 1ST HIGHEST: | ****** | ****** | 377.0 | 1414.0 | 1298.0 | 1657.0 | 678.0 | ****** | ****** | ****** | ****** |
| DATE : | ****** | ****** | 740714 | 750118 | 760220 | 770630 | 780418 | ****** | ****** | ****** | ****** |
| 2ND HIGHEST: | ****** | ****** | 360.0 | 943.0 | 1176.0 | 1098.0 | 660.0 | ****** | ****** | ****** | ****** |
| DATE : | ****** | ****** | 740809 | 750327 | 760715 | 770403 | 780617 | ****** | ****** | ****** | ****** |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 8 | 8 | 16 | 31 | 2 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 10 | 18 | 52 | 81 | 13 | 0 | 0 | 0 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 36 | 41 | 40 | 12 | 27 | 0 | 0 | 0 | 0 |
| 66-130: | 0 | 0 | 36 | 50 | 67 | 55 | 32 | 0 | 0 | 0 | 0 |
| 131-195: | 0 | 0 | 6 | 10 | 31 | 37 | 15 | 0 | 0 | 0 | 0 |
| 196-260: | 0 | 0 | 1 | 5 | 12 | 24 | 3 | 0 | 0 | 0 | 0 |
| 261-325: | 0 | 0 | 6 | 3 | 4 | 13 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 2 | 0 | 3 | 6 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 2 | 4 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 5 | 7 | 8 | 2 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR C F & I - PUEBLO, CO
SAROAD STATION # 300 SITE ID # 06
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 0 | 0 | 0 | 155 | 88 | 83 | 30 | 0 | 0 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | ****** | ****** | 105.6 | 107.0 | 95.0 | ****** | ****** | ****** |
| GEOMETRIC S.D.: | ****** | ****** | ****** | ****** | ****** | 1.8 | 1.8 | 1.8 | ****** | ****** | ****** |
| ARITHMETIC MEAN | ****** | ****** | ****** | ****** | ****** | 126.4 | 130.2 | 113.3 | ****** | ****** | ****** |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | ****** | ****** | 590.5 | 643.3 | 495.9 | ****** | ****** | ****** |
| 1ST HIGHEST: | ****** | ****** | ****** | ****** | ****** | 529.0 | 567.0 | 589.0 | 307.0 | ****** | ****** |
| DATE : | ****** | ****** | ****** | ****** | ****** | 771119 | 780707 | 790507 | 800306 | ****** | ****** |
| 2ND HIGHEST: | ****** | ****** | ****** | ****** | ****** | 498.0 | 441.0 | 391.0 | 221.0 | ****** | ****** |
| DATE : | ****** | ****** | ****** | ****** | ****** | 770630 | 780418 | 790417 | 800310 | ****** | ****** |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 0 | 13 | 9 | 3 | 1 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 0 | 0 | 0 | 38 | 27 | 16 | 4 | 0 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 0 | 0 | 0 | 29 | 20 | 20 | 10 | 0 | 0 |
| 66-130: | 0 | 0 | 0 | 0 | 0 | 79 | 37 | 40 | 14 | 0 | 0 |
| 131-195: | 0 | 0 | 0 | 0 | 0 | 23 | 18 | 15 | 3 | 0 | 0 |
| 196-260: | 0 | 0 | 0 | 0 | 0 | 11 | 4 | 5 | 2 | 0 | 0 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 6 | 6 | 0 | 1 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 5 | 1 | 1 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 1 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR C F & I - PUEBLO, CO
SAROAD STATION # 400 SITE ID # 07
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 77 | 106 | 182 | 176 | 86 | 89 | 89 | 75 | 82 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | 101.2 | 67.0 | 80.1 | 85.8 | 77.0 | 64.7 | 59.9 | 48.3 |
| GEOMETRIC S.D.: | ****** | ****** | ****** | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.4 | 1.6 |
| ARITHMETIC MEAN | ****** | ****** | ****** | 113.5 | 77.5 | 90.6 | 95.6 | 87.5 | 72.6 | 63.9 | 53.2 |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | 410.8 | 281.4 | 319.4 | 329.3 | 316.1 | 275.4 | 174.2 | 179.7 |
| 1ST HIGHEST: | ****** | ****** | 239.0 | 397.0 | 579.0 | 416.0 | 291.0 | 407.0 | 248.0 | 143.0 | 181.0 |
| DATE : | ****** | ****** | 740920 | 750118 | 760301 | 770310 | 780426 | 790507 | 801109 | 810128 | 820111 |
| 2ND HIGHEST: | ****** | ****** | 201.0 | 278.0 | 432.0 | 313.0 | 264.0 | 300.0 | 198.0 | 135.0 | 126.0 |
| DATE : | ****** | ****** | 741219 | 750424 | 760325 | 771119 | 780418 | 790628 | 800322 | 810520 | 820324 |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 4 | 5 | 5 | 2 | 2 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 14 | 20 | 6 | 15 | 9 | 5 | 3 | 0 | 1 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 9 | 15 | 100 | 55 | 24 | 35 | 43 | 45 | 66 |
| 66-130: | 0 | 0 | 51 | 62 | 72 | 98 | 46 | 45 | 42 | 28 | 15 |
| 131-195: | 0 | 0 | 15 | 18 | 5 | 14 | 12 | 6 | 2 | 2 | 1 |
| 196-260: | 0 | 0 | 2 | 7 | 0 | 4 | 2 | 1 | 2 | 0 | 0 |
| 261-325: | 0 | 0 | 0 | 3 | 1 | 4 | 2 | 1 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR C F & I - PUEBLO, CO
SAROAD STATION # 500 SITE ID # 03
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 0 | 81 | 147 | 175 | 79 | 23 | 0 | 0 | 0 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | ****** | 104.6 | 114.3 | 92.6 | ****** | ****** | ****** | ****** |
| GEOMETRIC S.D.: | ****** | ****** | ****** | ****** | 1.9 | 1.8 | 2.0 | ****** | ****** | ****** | ****** |
| ARITHMETIC MEAN | ****** | ****** | ****** | ****** | 129.0 | 136.8 | 116.7 | ****** | ****** | ****** | ****** |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | ****** | 676.4 | 627.0 | 758.8 | ****** | ****** | ****** | ****** |
| 1ST HIGHEST: | ****** | ****** | ****** | 607.0 | 789.0 | 657.0 | 649.0 | 241.0 | ****** | ****** | ****** |
| DATE : | ****** | ****** | ****** | 751009 | 760426 | 770314 | 780426 | 790409 | ****** | ****** | ****** |
| 2ND HIGHEST: | ****** | ****** | ****** | 441.0 | 742.0 | 542.0 | 417.0 | 240.0 | ****** | ****** | ****** |
| DATE : | ****** | ****** | ****** | 751011 | 760301 | 770411 | 780305 | 790111 | ****** | ****** | ****** |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 4 | 8 | 14 | 3 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 0 | 14 | 35 | 46 | 19 | 5 | 0 | 0 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 0 | 12 | 29 | 26 | 21 | 6 | 0 | 0 | 0 |
| 66-130: | 0 | 0 | 0 | 40 | 68 | 80 | 31 | 10 | 0 | 0 | 0 |
| 131-195: | 0 | 0 | 0 | 23 | 29 | 44 | 19 | 3 | 0 | 0 | 0 |
| 196-260: | 0 | 0 | 0 | 2 | 13 | 11 | 5 | 4 | 0 | 0 | 0 |
| 261-325: | 0 | 0 | 0 | 0 | 4 | 6 | 1 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 2 | 0 | 3 | 1 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 1 | 3 | 5 | 1 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR C F & I - PUEBLO, CO
SAROAD STATION # 061820611 SITE ID # 08
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 68 | 0 | 0 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 30.6 | ****** | ****** |
| GEOMETRIC S.D.: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 1.8 | ****** | ****** |
| ARITHMETIC MEAN | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 36.9 | ****** | ****** |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 166.0 | ****** | ****** |
| 1ST HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 36.0 | 192.0 | ****** | ****** |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 791229 | 801109 | ****** | ****** |
| 2ND HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 32.0 | 155.0 | ****** | ****** |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 791205 | 800521 | ****** | ****** |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 63 | 0 | 0 |
| 66-130: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 |
| 131-195: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 |
| 196-260: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR C F & I - PUEBLO, CO
SAROAD STATION # 600 SITE ID # 09
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 117 | 82 | 83 | 37 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 23.6 | 26.0 | 25.4 | ****** |
| GEOMETRIC S.D.: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 2.7 | 2.0 | 1.8 | ****** |
| ARITHMETIC MEAN | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 36.3 | 32.6 | 29.9 | ****** |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 418.0 | 204.7 | 141.2 | ****** |
| 1ST HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 366.0 | 153.0 | 83.0 | 44.0 |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 790507 | 800521 | 810512 | 820401 |
| 2ND HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 203.0 | 83.0 | 82.0 | 40.0 |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 790628 | 800720 | 810430 | 820511 |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 0 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 106 | 77 | 78 | 37 |
| 66-130: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 4 | 5 | 0 |
| 131-195: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |
| 196-260: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

## AIR QUALITY EVALUATION - CF & I STEEL, PUEBLO, COLORADO

Air quality trends:

All stations except #5 and #8 indicated moderate to strong downward trends in running geometric means, with Spearman rank correlation coefficients for the stations with the longest records being equal to -0.72, -0.67, and -0.79 for stations #2, #4, and #7, respectively. Station #6, which operated only from 1977 into 1980, displayed a coefficient of -0.90. Stations #2, #3, #4, #5, and #7 all show increasing geometric means through 1977 and a decreasing trend through 1978. The general downward trend continued during the 1979-1982 period at station #7, while the values at stations #2 and #4 went into a strong decline in 1981 and 1982. Because many of the stations demonstrate similar patterns, the air quality influences may be regional in nature, perhaps related to the strength of open dust source emissions. Station #5, which was located near a potential open dust source, the slag dump, displays the pattern more strongly than other stations.

The percentage of observations exceeding 150 $\mu g/m^3$ also indicated a substantial increase during 1977, followed by a sharp decline in 1978 and further decline in more recent years. The percentage at station #5 peaked at over 50 percent in late 1977, while the percentage exceeding 260 $\mu g/m^3$ reached 20 percent.

Standard exceedance status:

Violations of the primary annual standard occurred in the vicinity of the mill through 1980.

Pollution and standard exceedance roses:

New wind roses were not constructed because computer-compatible wind data were not available for 1978-1982.

Sampling days with three or more stations in operation, and at least one recording a value in excess of the primary 24-hour TSP standard, were inspected for multiple excursions. Results are tabulated below.

Pollution and standard exceedance roses (continued):

| Episode | # Stations Reporting | # Stations >Primary | # Stations >Secondary |
|---|---|---|---|
| 78/03/05 | 6 | 1 | 5 |
| 78/04/06 | 1 | 1 | 1 |
| 78/04/14 | 6 | 1 | 5 |
| 78/04/18 | 6 | 4 | 6 |
| 78/04/26 | 6 | 3 | 6 |
| 78/05/16 | 6 | 1 | 4 |
| 78/06/17 | 5 | 2 | 2 |
| 78/06/21 | 3 | 1 | 1 |
| 78/07/07 | 4 | 1 | 2 |
| 78/07/27 | 5 | 1 | 3 |
| 78/09/09 | 5 | 1 | 2 |
| 78/12/18 | 5 | 1 | 6 |
| 78/04/17 | 4 | 1 | 3 |
| 79/05/07 | 5 | 5 | 5 |
| 79/06/28 | 5 | 3 | 5 |
| 80/03/06 | 5 | 1 | 2 |

In 25 percent of the cases, more than half of the operating network was above the 24-hour standard. In nearly 70 percent of the cases, more than half of the operating network was above the secondary standard. Both of these factors point to a regional scale effect. There was only one exceedance of the 24-hour primary standard during 1981 and 1982; this occurred at station #4.

Inhalable particulate matter:

Station #1 sampled IP as part of the EPA IP Network. Data summarized for this site are as follows:

| Year | Instrument | # of Obs. | Arithmetic Mean | Highest | Second Highest | Standard Deviation |
|---|---|---|---|---|---|---|
| 1981 | SSI | 12 | 57.6 | 98.4 | 98.0 | 27.4 |
| 1981 | DICHOT | 19 | 34.5 | 112.7 | 67.6 | 23.5 |

CRUCIBLE STEEL
Midland
Beaver County
Pennsylvania
EPA Region III

Hi-Vol Monitoring Sites--Crucible Steel, Midland, Pennsylvania

| Site ID Number | SAROAD Number | Site Name and Address | Plant Location from Site | | Elevation (m) | | | Site Description | Nearest Roadway | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Bearing (°) | Distance (km) | Above Ground | Above MSL | Above Plant | | Name | Direction | Distance (m) | Type and Volume |
| 1 | 39-5740-509-F02 | Midland Post Office Midland, PA | 182-254 | 0.4-1.2 | 5 | 268 | 30 | Roof | U | NW | 6 | Paved, L |
| | | | | | | | | | U | NE | 12 | Paved, L |
| | | | | | | | | | Rt. 68 | SW | 9 | Paved, M |
| 2 | 39-5740-501-F01 | Midland Swimming Pool Midland, PA | 161-289 | 0.5-2.5 | 2 | 256 | 16 | Suburban-industrial | Virginia Ave. | NW | U | U |

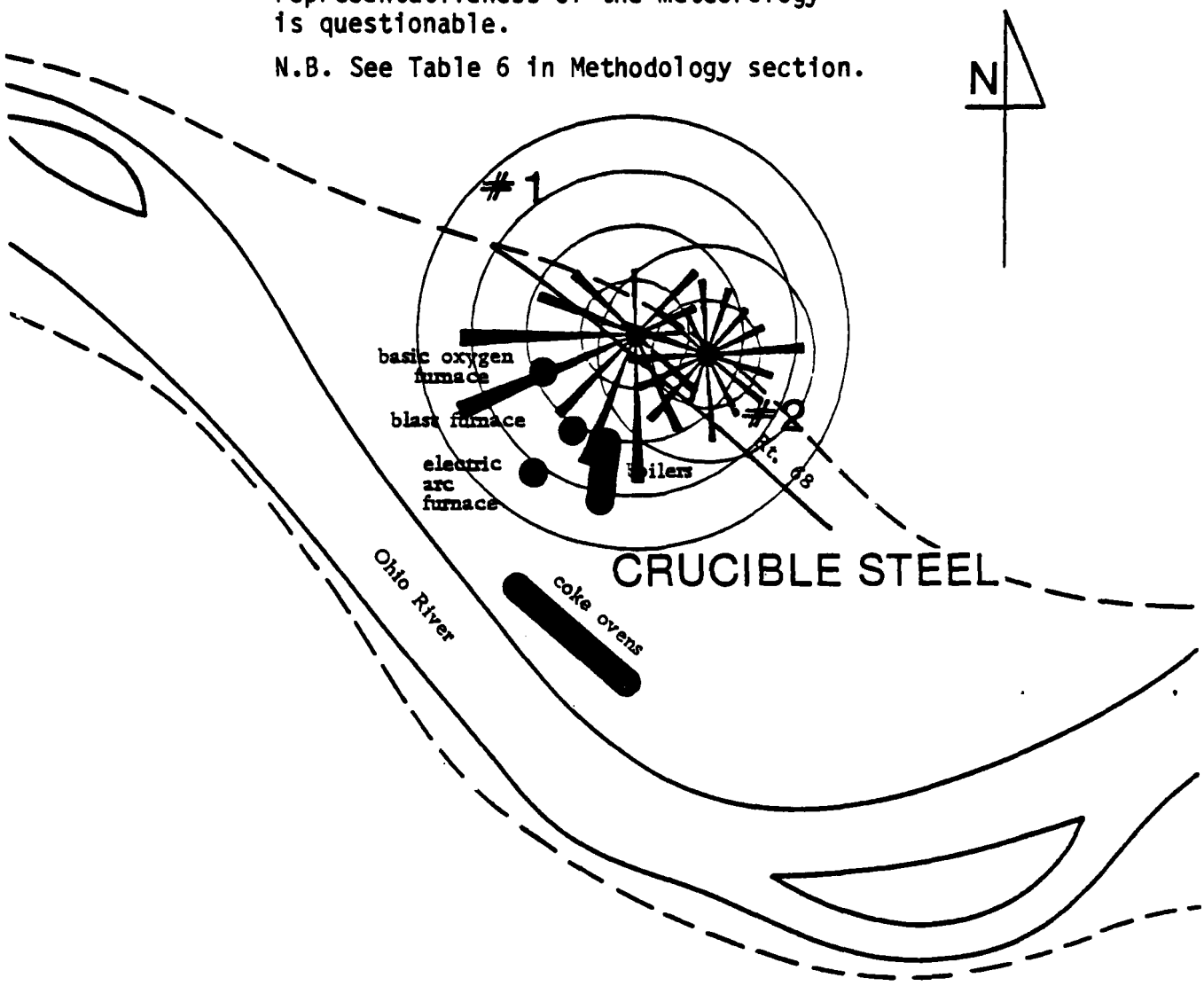
Key: U = Unavailable M = Moderate
L = Light H = Heavy

Wind Data Representativeness

| Station # | Terrain | Distance | Rating |
|---|---|---|---|
| 1, 2 | III | H | U |

Comment: At this distance the representativeness of the meteorology is questionable.

N.B. See Table 6 in Methodology section.




— — — Defines river valley

0 610 m

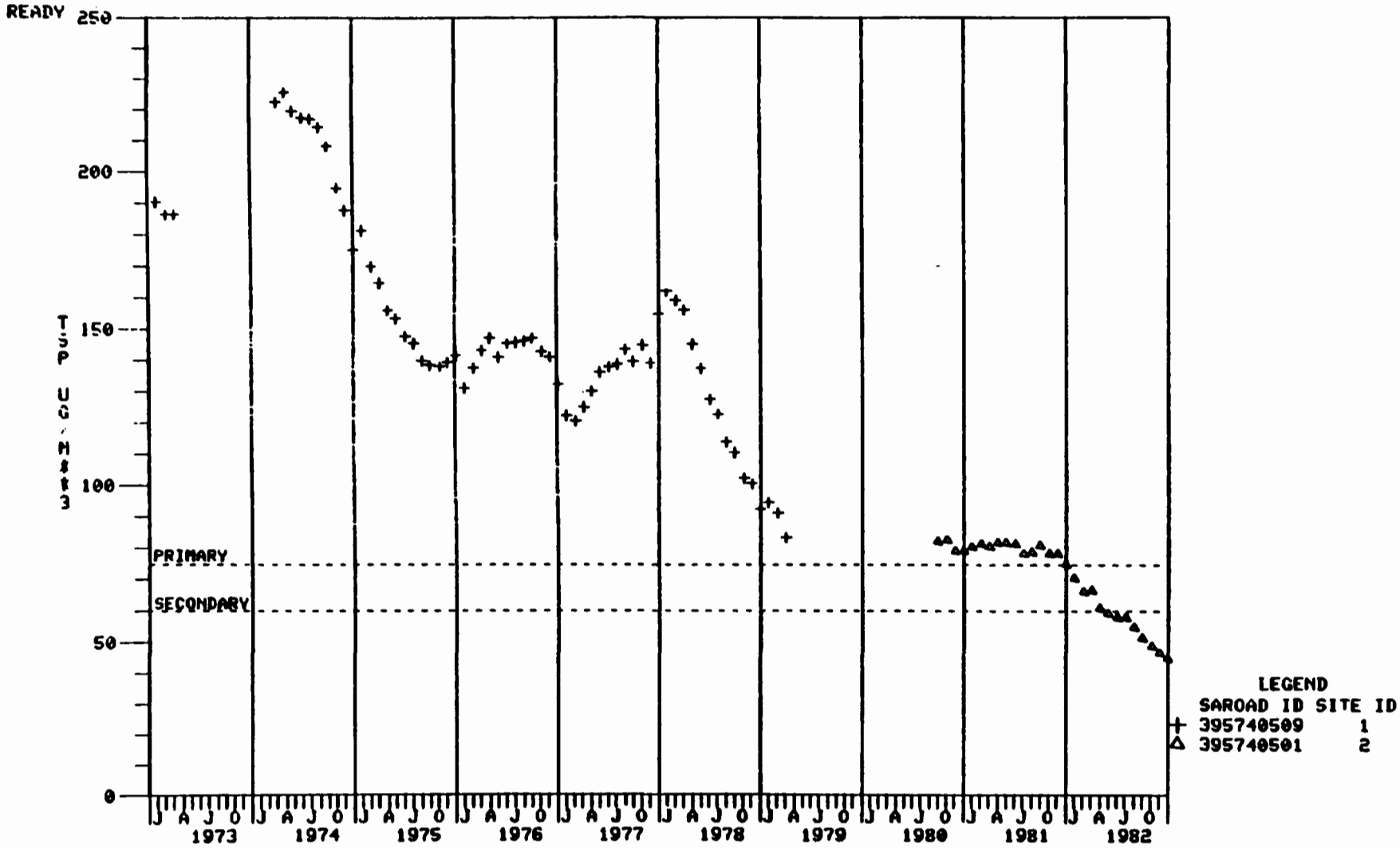
TSP roses for Crucible Steel - Midland, Pennsylvania, for the period 1978-1982 for cases of $\omega > 0.85$. Each circle represents 50 $\mu g/m^3$.

NUMBER OF TSP OBSERVATIONS USED IN POLLUTION ROSES

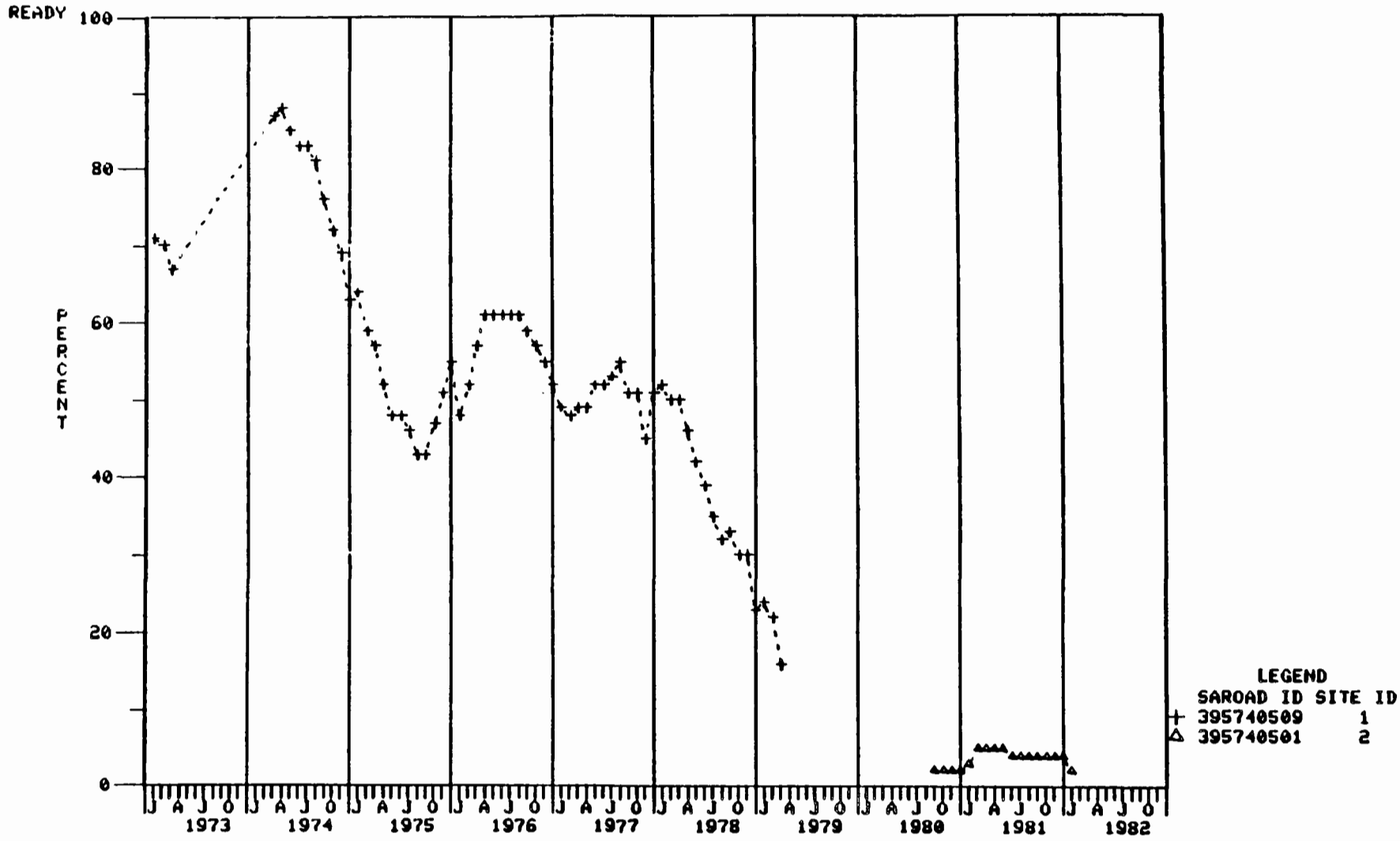
Crucible Steel--Midland, PA

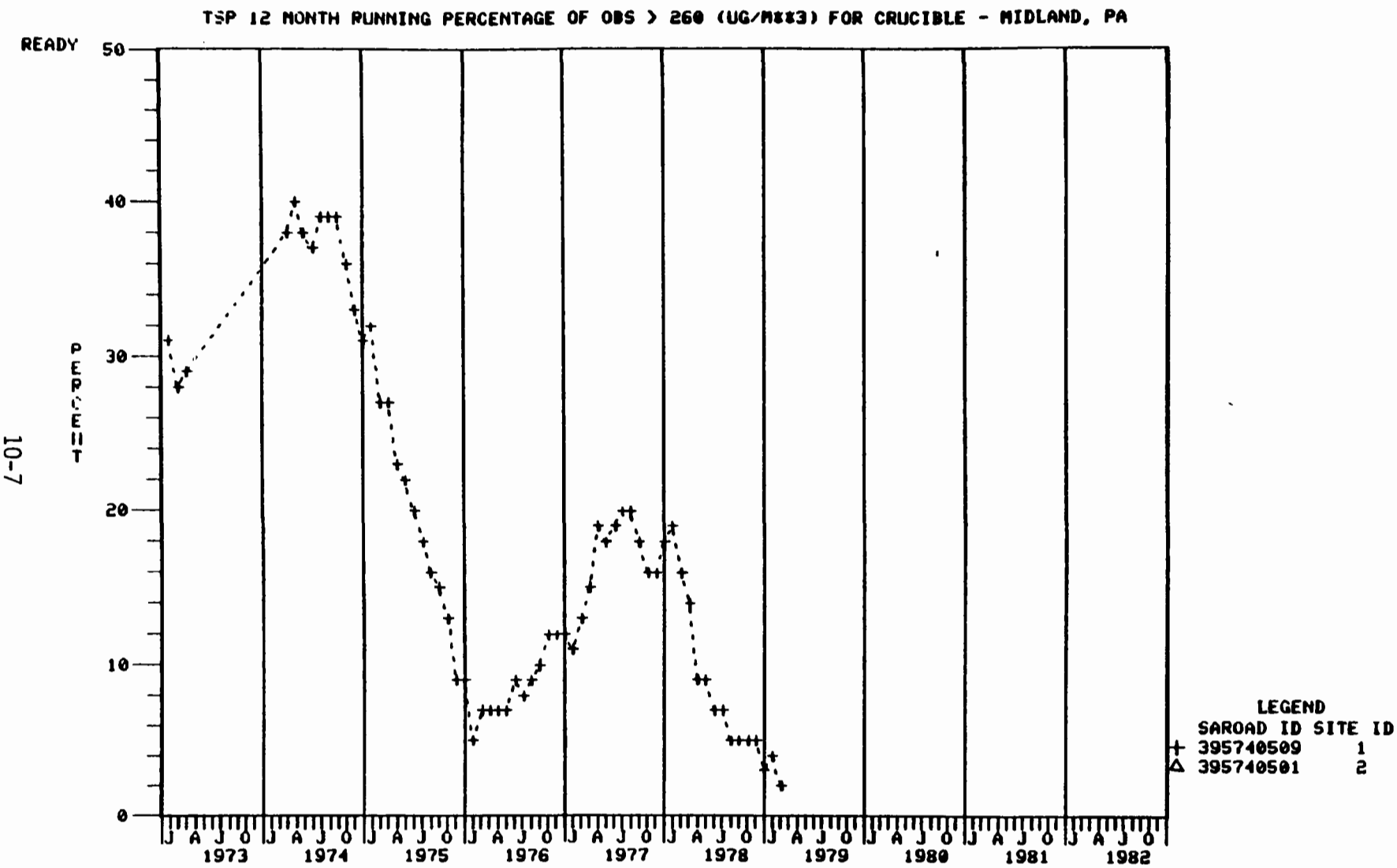
| Wind Direction | Monitoring Site Numbers #1 | #2 |
|---|---|---|
| N | 4 | 2 |
| NNE | 0 | 2 |
| NE | 5 | 2 |
| ENE | 1 | 6 |
| E | 1 | 1 |
| ESE | 0 | 7 |
| SE | 2 | 2 |
| SSE | 1 | 4 |
| S | 2 | 3 |
| SSW | 2 | 4 |
| SW | 4 | 12 |
| WSW | 4 | 12 |
| W | 7 | 13 |
| WNW | 1 | 8 |
| NW | 2 | 7 |
| NNW | 0 | 2 |
| Total | 36 | 87 |

TSP 12 MONTH RUNNING GEOMETRIC MEANS (UG/M**3) FOR CRUCIBLE - MIDLAND, PA



TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 150 (UG/M**3) FOR CRUCIBLE - MIDLAND, PA




TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 260 (UG/M**3) FOR CRUCIBLE - MIDLAND, PA
READY
PERCENT
50
40
30
20
10
0
J A J O
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
LEGEND
SAROAD ID SITE ID
395740509 1
395740501 2

TSP DATA SUMMARY FOR CRUCIBLE - MIDLAND, PA
SAROAD STATION # 395740509 SITE ID # 01
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 60 | 31 | 59 | 44 | 60 | 55 | 60 | 0 | 0 | 0 | 0 |
| GEOMETRIC MEAN: | 190.7 | ****** | 175.4 | 141.8 | 132.6 | 155.2 | 92.7 | ****** | ****** | ****** | ****** |
| GEOMETRIC S.D.: | 1.6 | ****** | 1.7 | 1.7 | 1.8 | 2.0 | 1.8 | ****** | ****** | ****** | ****** |
| ARITHMETIC MEAN | 212.5 | ****** | 201.0 | 160.6 | 154.2 | 195.9 | 109.0 | ****** | ****** | ****** | ****** |
| HIGHEST BY LARSEN EXTRP: | 786.8 | ****** | 884.3 | 653.0 | 742.7 | 1199.3 | 487.2 | ****** | ****** | ****** | ****** |
| 1ST HIGHEST: | 484.0 | 621.0 | 454.0 | 364.0 | 353.0 | 1123.0 | 373.0 | ****** | ****** | ****** | ****** |
| DATE : | 720807 | 731013 | 740827 | 750124 | 760611 | 770624 | 780321 | ****** | ****** | ****** | ****** |
| 2ND HIGHEST: | 418.0 | 427.0 | 442.0 | 344.0 | 341.0 | 589.0 | 302.0 | ****** | ****** | ****** | ****** |
| DATE : | 720608 | 731112 | 741101 | 750106 | 760909 | 770308 | 780225 | ****** | ****** | ****** | ****** |
| # OF READINGS EXCEEDING 260 : | 17 | 12 | 18 | 4 | 7 | 10 | 2 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 42 | 28 | 37 | 24 | 30 | 28 | 14 | 0 | 0 | 0 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 1 | 0 | 2 | 5 | 6 | 3 | 14 | 0 | 0 | 0 | 0 |
| 66-130: | 13 | 3 | 16 | 14 | 21 | 18 | 31 | 0 | 0 | 0 | 0 |
| 131-195: | 12 | 5 | 11 | 13 | 17 | 13 | 9 | 0 | 0 | 0 | 0 |
| 196-260: | 17 | 11 | 12 | 8 | 9 | 11 | 4 | 0 | 0 | 0 | 0 |
| 261-325: | 10 | 7 | 13 | 1 | 5 | 3 | 1 | 0 | 0 | 0 | 0 |
| 326-390: | 3 | 2 | 3 | 3 | 2 | 5 | 1 | 0 | 0 | 0 | 0 |
| 391-455: | 3 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 1 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR CRUCIBLE - MIDLAND, PA
SAROAD STATION # 395740501 SITE ID # 02
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 60 | 53 | 61 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 78.4 | 74.6 | 44.9 |
| GEOMETRIC S.D.: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 1.4 | 1.5 | 1.6 |
| ARITHMETIC MEAN | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 82.5 | 80.9 | 49.5 |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 205.7 | 246.1 | 173.6 |
| 1ST HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 154.0 | 190.0 | 121.0 |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 800626 | 810122 | 820716 |
| 2ND HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 143.0 | 190.0 | 105.0 |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 801030 | 810215 | 820330 |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 16 | 19 | 51 |
| 66-130: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 41 | 30 | 10 |
| 131-195: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 4 | 0 |
| 196-260: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

24-HR STANDARD EXCEEDANCE ROSE FOR
CRUCIBLE - MIDLAND, PA
(ALL CASES > 260 UG/M**3)
X=0.850
COUNT/AVERAGE TSP OF PRIMARY EXCEEDANCES

| SAROAD # | 395740509 | | 395740501 | |
|---|---|---|---|---|
| SITE ID # | 1 | | 2 | |
| DIRECTION | W>=X | W<X | W>=X | W<X |
| N COUNT: | 1 | 0 | 0 | 0 |
| AVE TSP: | 279. | 0. | 0. | 0. |
| NNE COUNT: | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. |
| NE COUNT: | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. |
| ENE COUNT: | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. |
| E COUNT: | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. |
| ESE COUNT: | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. |
| SE COUNT: | 1 | 0 | 0 | 0 |
| AVE TSP: | 269. | 0. | 0. | 0. |
| SSE COUNT: | 0 | 2 | 0 | 0 |
| AVE TSP: | 0. | 318. | 0. | 0. |
| S COUNT: | 1 | 3 | 0 | 0 |
| AVE TSP: | 292. | 280. | 0. | 0. |
| SSW COUNT: | 3 | 5 | 0 | 0 |
| AVE TSP: | 638. | 329. | 0. | 0. |
| SW COUNT: | 11 | 11 | 0 | 0 |
| AVE TSP: | 346. | 345. | 0. | 0. |
| WSW COUNT: | 5 | 2 | 0 | 0 |
| AVE TSP: | 351. | 328. | 0. | 0. |
| W COUNT: | 4 | 1 | 0 | 0 |
| AVE TSP: | 329. | 272. | 0. | 0. |
| WNW COUNT: | 0 | 2 | 0 | 0 |
| AVE TSP: | 0. | 277. | 0. | 0. |
| NW COUNT: | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. |
| NNW COUNT: | 1 | 0 | 0 | 0 |
| AVE TSP: | 286. | 0. | 0. | 0. |
| ALL COUNT: | 27 | 26 | 0 | 0 |
| AVE TSP: | 368. | 323. | 0. | 0. |

24-HR STANDARD EXCEEDANCE ROSE FOR
CRUCIBLE - MIDLAND, PA
(ALL CASES > 150 UG/M**3)
X=0.850
COUNT/AVERAGE TSP OF SECONDARY EXCEEDANCES

| SAROAD # | 395740509 | | 395740501 | |
|---|---|---|---|---|
| SITE ID # | 1 | | 2 | |
| DIRECTION | W>=X | W<X | W>=X | W<X |
| N COUNT: | 1 | 2 | 0 | 0 |
| AVE TSP: | 279. | 170. | 0. | 0. |
| NNE COUNT: | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. |
| NE COUNT: | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. |
| ENE COUNT: | 0 | 1 | 0 | 0 |
| AVE TSP: | 0. | 193. | 0. | 0. |
| E COUNT: | 1 | 2 | 0 | 0 |
| AVE TSP: | 164. | 226. | 0. | 0. |
| ESE COUNT: | 1 | 2 | 0 | 0 |
| AVE TSP: | 170. | 198. | 0. | 0. |
| SE COUNT: | 4 | 2 | 0 | 0 |
| AVE TSP: | 218. | 171. | 0. | 0. |
| SSE COUNT: | 1 | 4 | 0 | 1 |
| AVE TSP: | 255. | 258. | 0. | 190. |
| S COUNT: | 2 | 5 | 0 | 0 |
| AVE TSP: | 223. | 269. | 0. | 0. |
| SSW COUNT: | 11 | 11 | 0 | 0 |
| AVE TSP: | 314. | 255. | 0. | 0. |
| SW COUNT: | 21 | 17 | 0 | 1 |
| AVE TSP: | 286. | 293. | 0. | 154. |
| WSW COUNT: | 13 | 12 | 0 | 0 |
| AVE TSP: | 254. | 225. | 0. | 0. |
| W COUNT: | 13 | 11 | 1 | 0 |
| AVE TSP: | 239. | 228. | 190. | 0. |
| WNW COUNT: | 11 | 5 | 0 | 0 |
| AVE TSP: | 195. | 210. | 0. | 0. |
| NW COUNT: | 2 | 3 | 0 | 0 |
| AVE TSP: | 218. | 206. | 0. | 0. |
| NNW COUNT: | 2 | 1 | 0 | 0 |
| AVE TSP: | 245. | 169. | 0. | 0. |
| ALL COUNT: | 83 | 78 | 1 | 2 |
| AVE TSP: | 255. | 243. | 190. | 172. |

## AIR QUALITY EVALUATION - CRUCIBLE STEEL, MIDLAND, PENNSYLVANIA

Air quality trends:

Sharp declines in the running geometric means at station #1 occurred in 1974-1975 and 1978. Nonetheless, 12-month running geometric means at the end of station #1's service life continued above the primary annual standard. The Spearman correlation coefficient for station #1 over the period 1974-1978 was -0.78, indicating a strong negative trend. During the 1974-1978 period, the 12-month running percentage of observations exceeding 150 $\mu g/m^3$ declined from 88 to 18 percent.

Station #2 did not come into service until 1980. The annual geometric mean for that year was in excess of the primary annual standard, but during 1982 the values sharply declined to below the annual secondary standard (Spearman coefficient of -0.93).

Standard exceedance status:

Station #1 followed by station #2 indicated exceedance of the primary TSP standards through 1980. No primary standard violations were evident in 1981 and 1982.

Pollution roses:

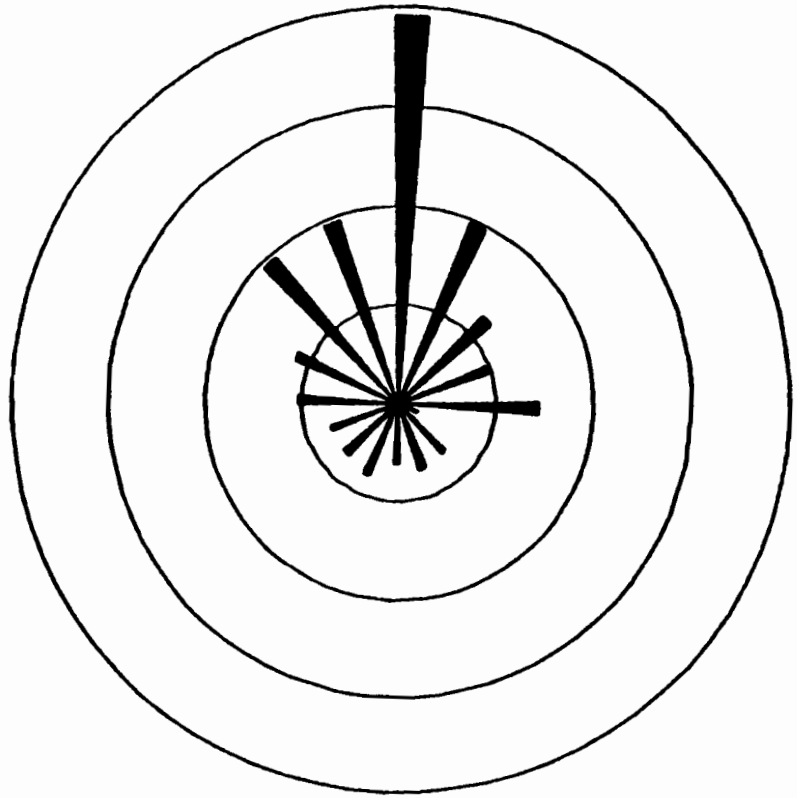
Largest average TSP levels generally came from directions containing plant activity. Station #1's rose contained information for 1978 only; station #2's rose contained data for 1980-1982. Even though the pattern remains essentially the same, 1978 values (station #1) are substantially smaller than those of 1974-1977, and the 1980-1982 values (station #2) are smaller still.

Standard exceedance roses:

In the years 1974-1978 (station #1), the great majority of excursions beyond the 24-hour primary standard that involved steady winds involved transport from directions containing plant activities. There was an equally large incidence of primary excursions involving variable winds. A similar pattern is evident regarding excursions beyond 24-hour secondary standard. Out of 83 secondary excursions under steady winds, 65 occurred under conditions that would involve plant emissions.

During 1980-1982 (station #2), there were only three excursions beyond the 24-hour secondary standard (but still below primary); two of the three cases involved winds blowing from plant directions.

WIND ROSE
PERSISTENCE CLASS 0.90
WIND STATION 94823



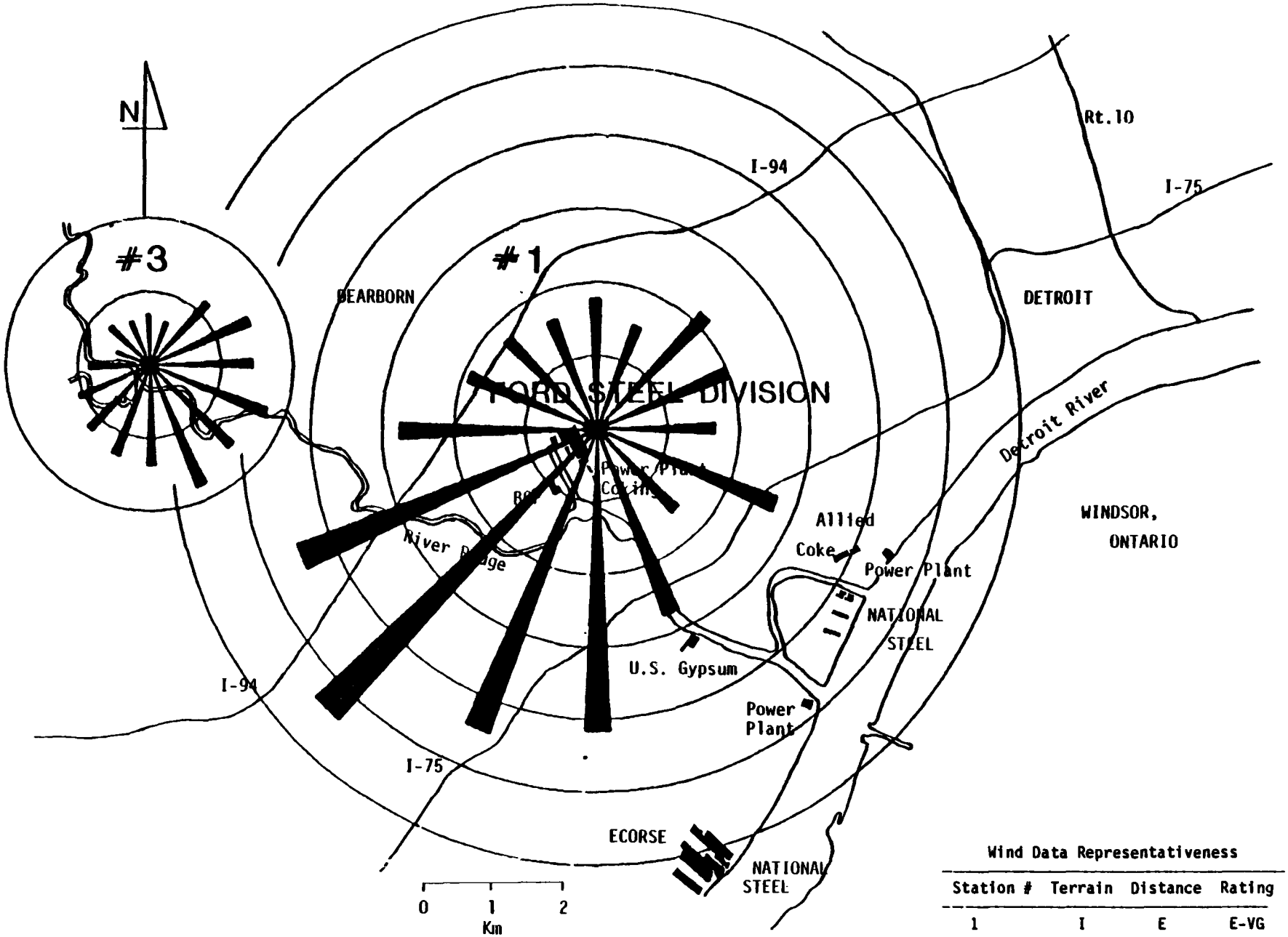
FORD MOTOR COMPANY
Dearborn
Wayne County
Michigan
EPA Region V

Hi-Vol Monitoring Sites--Ford Motor Company, Dearborn, Michigan

| Site ID Number | SAROAD Number | Site Name and Address | Plant Location from Site: Facility/ Bearing (°) | Plant Location from Site: Distance (km) | Elevation (m): Above Ground | Elevation (m): Above MSL | Elevation (m): Above Plant | Site Description | Nearest Roadway: Name | Nearest Roadway: Direction | Nearest Roadway: Distance (m) | Nearest Roadway: Type and Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 23-1140-002-G01 | Salina School<br>2683 Salina<br>Dearborn, MI | Sinter plant<br>Blast furnace<br>BOF<br>Coke plant<br>Power plant | 261<br>256<br>228<br>203<br>223 | 0.8<br>0.6<br>1.1<br>0.6<br>0.5 | 4 | 177 | 0 | Trailer top (across RR. tracks from plant)<br>Suburban-industrial | Lowery | SSE | 9 | 2-lane, L |
| 2* | 23-1140-001 | City Hall Annex<br>Michigan & Maple<br>Dearborn, MI | Sinter plant<br>Blast furnace<br>BOF<br>Coke plant<br>Power plant | 140<br>137<br>148<br>137<br>137 | 2.4<br>2.5<br>2.9<br>3.0<br>2.9 | 12 | 180 | 3 | Roof<br>Commercial | Maple | WSW | 20 | 2-lane, M |
| 3 | 23-1140-003-G01 | 4901 Evergreen<br>Dearborn, MI | Sinter plant<br>Blast furnace<br>BOF<br>Coke plant<br>Power plant | 99<br>99<br>105<br>102<br>101 | 6.1<br>6.3<br>6.2<br>6.7<br>6.6 | 4 | 180 | 3 | Trailer top (in River Rouge Park)<br>Suburban-commercial | Small gravel parking lot | U | 10 | L |
| 4* | 23-1180-015 | 6601 W. Fort<br>Detroit, MI | Sinter plant<br>Blast furnace<br>BOF<br>Coke plant<br>Power plant | 270<br>270<br>263<br>265<br>267 | 4.2<br>4.1<br>4.3<br>3.7<br>3.8 | 4 | 179 | 2 | Trailer top<br>Residential | Rademacher<br><br>W. Fort | ENE<br><br>NNW | 9<br><br>30 | 2-lane, L<br><br>4-lane, M |

Key: U = Unavailable M = Moderate
L = Light H = Heavy

* Data from this station were included in the original 1973-1977 analysis; however, no strong mill impact on TSP was noted at this site. Based on the likelihood that this situation has not changed, data from this site were not employed in the 1978-1980 or the 1981-1982 updates.




TSP roses for Ford Steel - Dearborn, Michigan, for the period 1978-1982 for cases of $\omega>0.90$. Each circle represents 50 $\mu g/m^3$.

Wind Data Representativeness

| Station # | Terrain | Distance | Rating |
|---|---|---|---|
| 1 | I | E | E-VG |
| 3 | I | F | VG |

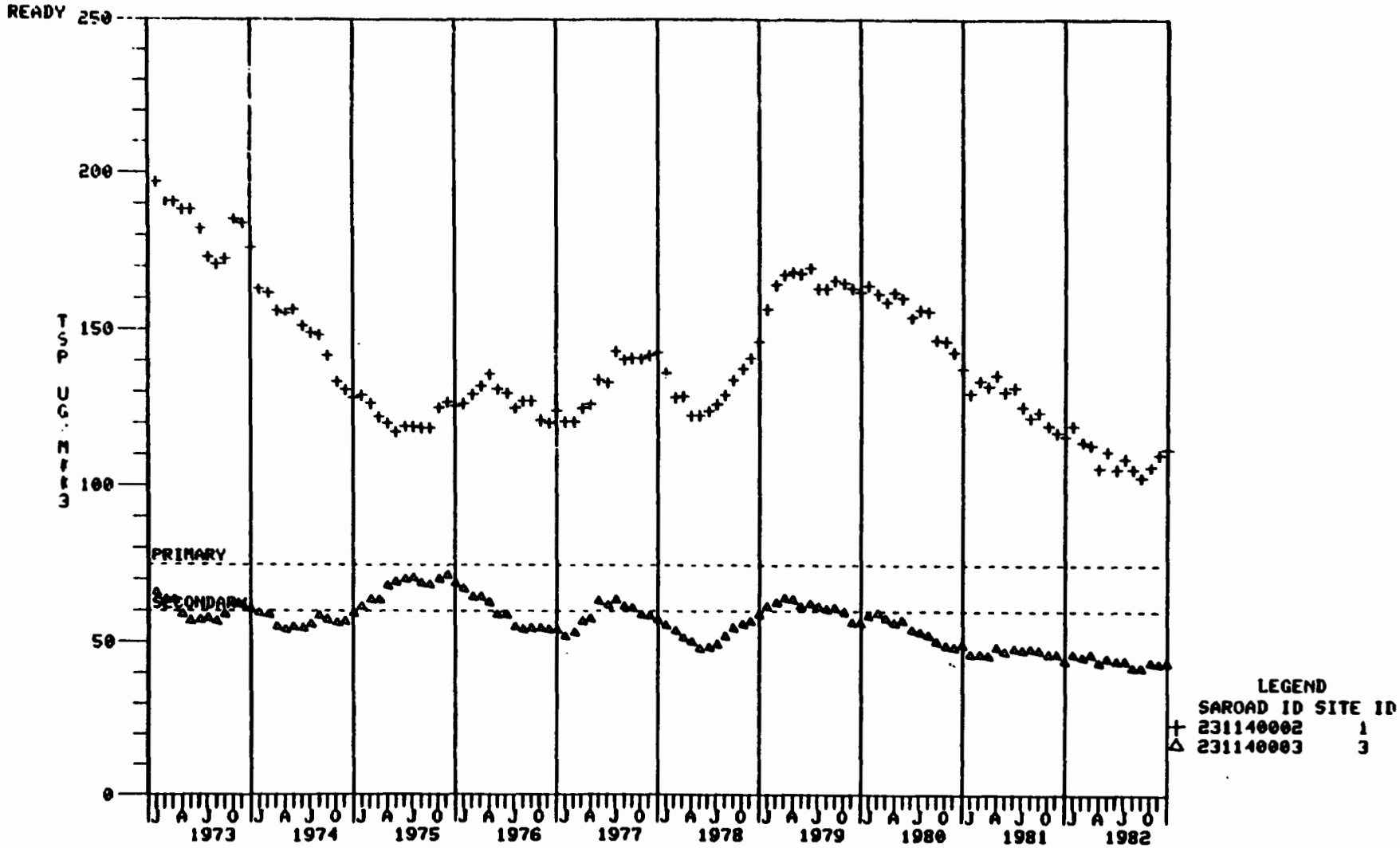
N.B. See Table 6 in Methodology section.

NUMBER OF TSP OBSERVATIONS USED IN POLLUTION ROSES

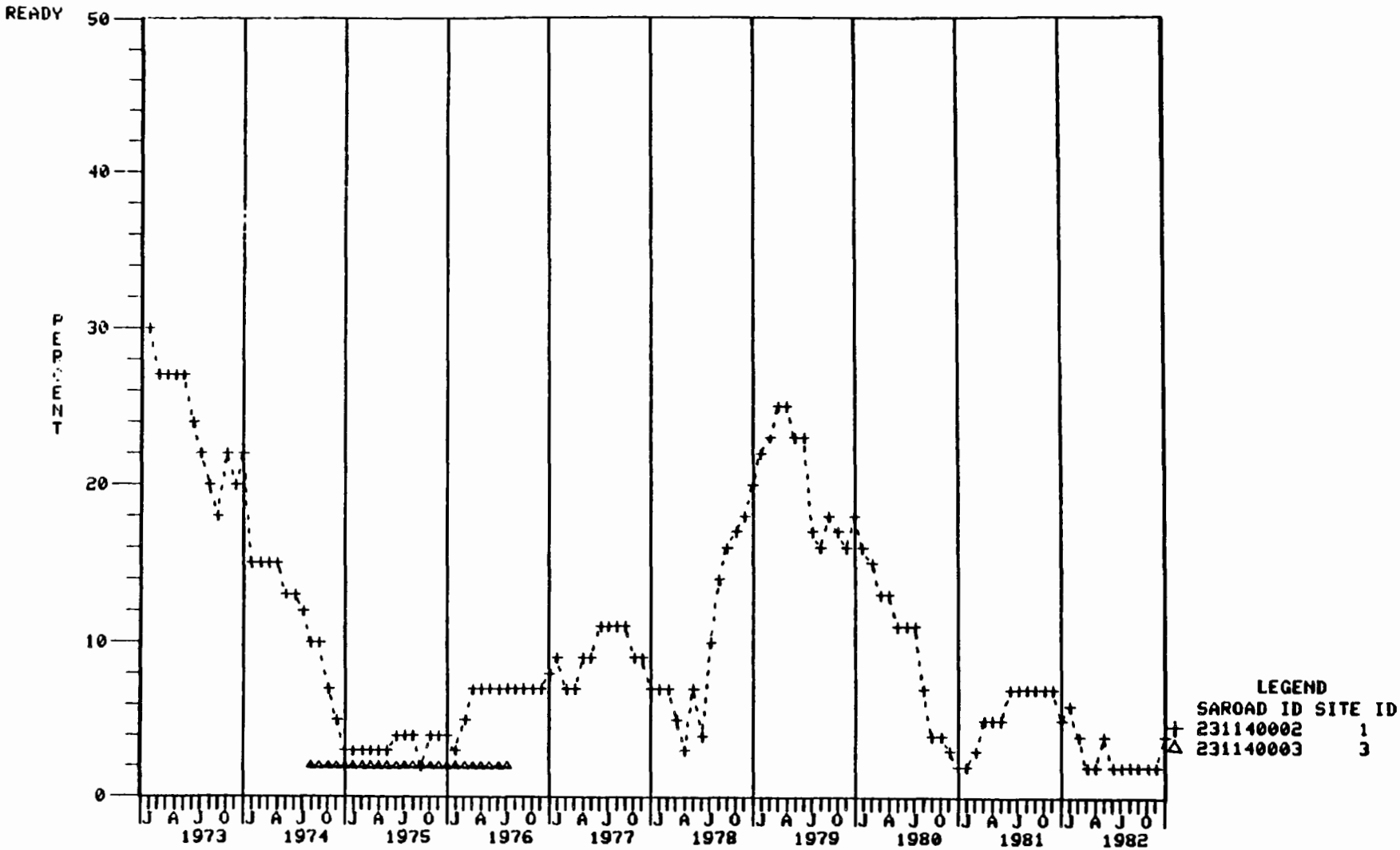
Ford Steel--Dearborn, MI

| Wind Direction | Monitoring Site Numbers #1 | #3 |
|---|---|---|
| N | 6 | 6 |
| NNE | 7 | 6 |
| NE | 5 | 5 |
| ENE | 3 | 4 |
| E | 6 | 7 |
| ESE | 3 | 3 |
| SE | 2 | 2 |
| SSE | 5 | 5 |
| S | 16 | 14 |
| SSW | 10 | 10 |
| SW | 19 | 21 |
| WSW | 14 | 16 |
| W | 15 | 16 |
| WNW | 12 | 12 |
| NW | 5 | 7 |
| NNW | 2 | 3 |
| Total | 130 | 137 |

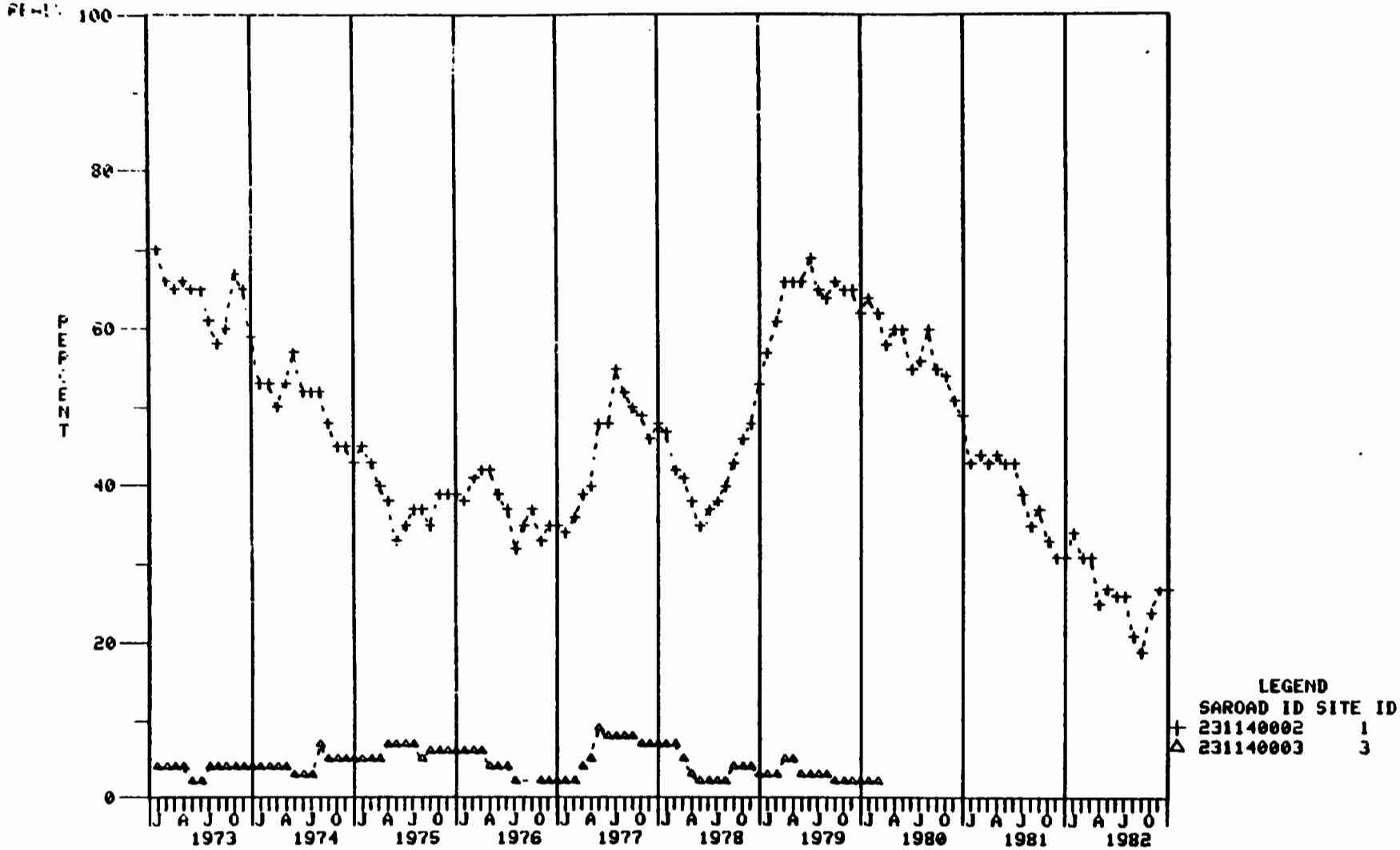
TSP 12 MONTH RUNNING GEOMETRIC MEANS (UG/M**3) FOR FORD MOTOR CO. - DEARBORN, MI



TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 260 (UG/M**3) FOR FORD MOTOR CO. - DEARBORN, MI



TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 150 (UG/M**3) FOR FORD MOTOR CO. - DEARBORN, MI



TSP DATA SUMMARY FOR FORD MOTOR CO. - DEARBORN, MI
SAROAD STATION # 231140002 SITE ID # 01
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 58 | 51 | 61 | 56 | 60 | 54 | 60 | 55 | 61 | 58 | 49 |
| GEOMETRIC MEAN: | 188.8 | 176.0 | 128.1 | 125.7 | 124.2 | 142.9 | 146.5 | 162.2 | 137.8 | 116.3 | 112.2 |
| GEOMETRIC S.D.: | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.9 | 1.7 | 1.6 | 1.6 | 1.6 |
| ARITHMETIC MEAN | 215.9 | 196.3 | 140.6 | 140.2 | 140.5 | 158.5 | 175.7 | 185.0 | 151.0 | 129.1 | 124.4 |
| HIGHEST BY LARSEN EXTRP: | 789.3 | 699.1 | 473.5 | 532.7 | 535.4 | 594.3 | 977.2 | 750.1 | 523.7 | 439.3 | 429.6 |
| 1ST HIGHEST: | 1085.0 | 492.0 | 321.0 | 306.0 | 345.0 | 323.0 | 449.0 | 417.0 | 279.0 | 287.0 | 341.0 |
| DATE : | 720720 | 730110 | 740926 | 751003 | 760319 | 770419 | 780911 | 791211 | 801217 | 810615 | 821213 |
| 2ND HIGHEST: | 513.0 | 400.0 | 304.0 | 260.0 | 325.0 | 302.0 | 389.0 | 407.0 | 255.0 | 286.0 | 267.0 |
| DATE : | 720608 | 730808 | 740610 | 750623 | 761214 | 770630 | 781104 | 790813 | 800122 | 810329 | 820511 |
| # OF READINGS EXCEEDING 260 : | 13 | 11 | 2 | 1 | 5 | 4 | 12 | 10 | 1 | 3 | 2 |
| # OF READINGS EXCEEDING 150 : | 40 | 30 | 26 | 22 | 21 | 26 | 32 | 33 | 30 | 17 | 13 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 4 | 6 | 6 | 4 | 9 | 2 | 5 | 6 | 6 |
| 66-130: | 14 | 14 | 24 | 20 | 28 | 18 | 14 | 19 | 20 | 30 | 24 |
| 131-195: | 17 | 14 | 25 | 21 | 10 | 17 | 17 | 12 | 21 | 13 | 13 |
| 196-260: | 14 | 12 | 6 | 8 | 11 | 11 | 8 | 12 | 14 | 6 | 4 |
| 261-325: | 9 | 6 | 2 | 1 | 4 | 4 | 5 | 3 | 1 | 3 | 1 |
| 326-390: | 1 | 3 | 0 | 0 | 1 | 0 | 6 | 5 | 0 | 0 | 1 |
| 391-455: | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 0 |
| >455: | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR FORD MOTOR CO. - DEARBORN, MI
SAROAD STATION # 231140003 SITE ID # 03
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 52 | 53 | 58 | 48 | 57 | 60 | 58 | 59 | 59 | 59 | 56 |
| GEOMETRIC MEAN: | 67.0 | 60.3 | 59.2 | 68.9 | 53.9 | 56.9 | 58.6 | 55.9 | 49.2 | 44.0 | 43.4 |
| GEOMETRIC S.D.: | 1.6 | 1.7 | 1.8 | 1.7 | 1.6 | 1.8 | 1.7 | 1.8 | 1.6 | 1.7 | 1.7 |
| ARITHMETIC MEAN | 74.2 | 68.6 | 70.7 | 79.0 | 60.1 | 67.8 | 66.9 | 64.7 | 54.8 | 50.3 | 49.6 |
| HIGHEST BY LARSEN EXTRP: | 261.6 | 265.6 | 328.9 | 319.4 | 211.6 | 332.8 | 275.9 | 293.7 | 206.0 | 225.2 | 200.1 |
| 1ST HIGHEST: | 157.0 | 178.0 | 307.0 | 260.0 | 165.0 | 208.0 | 217.0 | 174.0 | 113.0 | 143.0 | 129.0 |
| DATE : | 720527 | 730709 | 740809 | 750816 | 761015 | 770419 | 780911 | 790322 | 801205 | 810703 | 821026 |
| 2ND HIGHEST: | 155.0 | 152.0 | 212.0 | 179.0 | 142.0 | 175.0 | 156.0 | 134.0 | 98.0 | 102.0 | 122.0 |
| DATE : | 720912 | 730925 | 740815 | 750430 | 760605 | 770531 | 780526 | 791018 | 800110 | 810404 | 820505 |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 2 | 2 | 3 | 3 | 1 | 4 | 2 | 1 | 0 | 0 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 21 | 31 | 33 | 20 | 38 | 35 | 32 | 34 | 40 | 44 | 41 |
| 66-130: | 27 | 18 | 20 | 24 | 16 | 20 | 24 | 22 | 19 | 14 | 15 |
| 131-195: | 4 | 4 | 3 | 3 | 3 | 4 | 1 | 3 | 0 | 1 | 0 |
| 196-260: | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| 261-325: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

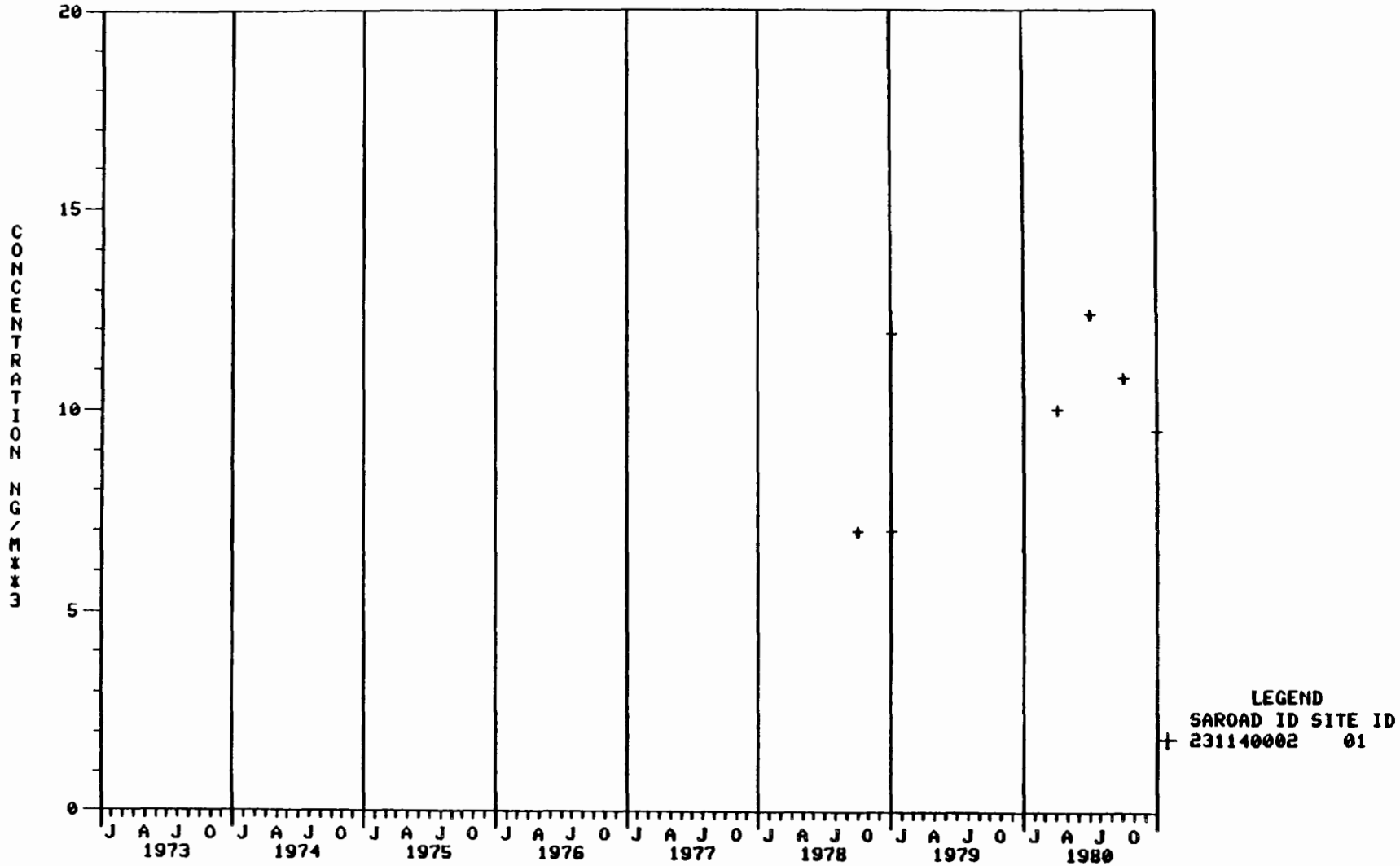
24-HR STANDARD EXCEEDANCE ROSE FOR
FORD MOTOR CO. - DEARBORN, MI
(ALL CASES > 260 UG/M**3)
X=0.900
COUNT/AVERAGE TSP OF PRIMARY EXCEEDANCES

| SAROAD # | 231140002 | | 231140003 | |
|---|---|---|---|---|
| SITE ID # | 1 | | 3 | |
| DIRECTION | W>=X | W<X | W>=X | W<X |
| N COUNT: | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. |
| NNE COUNT: | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. |
| NE COUNT: | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. |
| ENE COUNT: | 0 | 0 | 0 | 1 |
| AVE TSP: | 0. | 0. | 0. | 307. |
| E COUNT: | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. |
| ESE COUNT: | 1 | 0 | 0 | 0 |
| AVE TSP: | 262. | 0. | 0. | 0. |
| SE COUNT: | 0 | 1 | 0 | 0 |
| AVE TSP: | 0. | 277. | 0. | 0. |
| SSE COUNT: | 0 | 1 | 0 | 0 |
| AVE TSP: | 0. | 351. | 0. | 0. |
| S COUNT: | 5 | 3 | 0 | 0 |
| AVE TSP: | 293. | 286. | 0. | 0. |
| SSW COUNT: | 7 | 2 | 0 | 0 |
| AVE TSP: | 345. | 291. | 0. | 0. |
| SW COUNT: | 15 | 8 | 0 | 0 |
| AVE TSP: | 408. | 308. | 0. | 0. |
| WSW COUNT: | 10 | 2 | 0 | 0 |
| AVE TSP: | 335. | 294. | 0. | 0. |
| W COUNT: | 4 | 4 | 0 | 0 |
| AVE TSP: | 309. | 330. | 0. | 0. |
| WNW COUNT: | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. |
| NW COUNT: | 0 | 1 | 0 | 0 |
| AVE TSP: | 0. | 283. | 0. | 0. |
| NNW COUNT: | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. |
| ALL COUNT: | 42 | 22 | 0 | 1 |
| AVE TSP: | 353. | 306. | 0. | 307. |

24-HR STANDARD EXCEEDANCE ROSE FOR
FORD MOTOR CO. - DEARBORN, MI
(ALL CASES > 150 UG/M**3)
X=0.900
COUNT/AVERAGE TSP OF SECONDARY EXCEEDANCES

| SAROAD # | 231140002 | | 231140003 | |
|---|---|---|---|---|
| SITE ID # | 1 | | 3 | |
| DIRECTION | W>=X | W<X | W>=X | W<X |
| N COUNT: | 1 | 2 | 0 | 0 |
| AVE TSP: | 229. | 196. | 0. | 0. |
| NNE COUNT: | 1 | 0 | 0 | 0 |
| AVE TSP: | 161. | 0. | 0. | 0. |
| NE COUNT: | 2 | 2 | 0 | 1 |
| AVE TSP: | 197. | 213. | 0. | 178. |
| ENE COUNT: | 1 | 1 | 0 | 2 |
| AVE TSP: | 218. | 190. | 0. | 284. |
| E COUNT: | 0 | 7 | 0 | 3 |
| AVE TSP: | 0. | 163. | 0. | 164. |
| ESE COUNT: | 5 | 1 | 2 | 1 |
| AVE TSP: | 197. | 215. | 166. | 166. |
| SE COUNT: | 0 | 8 | 0 | 3 |
| AVE TSP: | 0. | 193. | 0. | 162. |
| SSE COUNT: | 2 | 15 | 0 | 2 |
| AVE TSP: | 192. | 194. | 0. | 184. |
| S COUNT: | 28 | 22 | 0 | 1 |
| AVE TSP: | 221. | 203. | 0. | 176. |
| SSW COUNT: | 22 | 24 | 0 | 0 |
| AVE TSP: | 250. | 209. | 0. | 0. |
| SW COUNT: | 34 | 24 | 0 | 1 |
| AVE TSP: | 299. | 237. | 0. | 208. |
| WSW COUNT: | 25 | 16 | 1 | 1 |
| AVE TSP: | 256. | 208. | 217. | 165. |
| W COUNT: | 11 | 19 | 0 | 0 |
| AVE TSP: | 235. | 223. | 0. | 0. |
| WNW COUNT: | 4 | 8 | 0 | 0 |
| AVE TSP: | 196. | 201. | 0. | 0. |
| NW COUNT: | 1 | 4 | 0 | 0 |
| AVE TSP: | 205. | 209. | 0. | 0. |
| NNW COUNT: | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. |
| ALL COUNT: | 137 | 153 | 3 | 15 |
| AVE TSP: | 250. | 209. | 183. | 187. |

BAP QUARTERLY COMPOSITE (NG/M**3) FOR FORD MOTOR CO. - DEARBORN, MI



## AIR QUALITY EVALUATION - FORD MOTOR COMPANY, DEARBORN, MICHIGAN

Air quality trends:

Graphs of the running 12-month geometric means for stations #1 and #3 are generally in phase, with values for station #1 substantially above those for station #3. A brief decline in early 1978 is followed by an uptrend that peaks in early 1979. Values decline from this peak through the end of 1982. Moderate overall downward trends are apparent at both stations (Spearman coefficient of -0.39 for station #1 and -0.66 for station #3).

The percentage of observations exceeding 150 $\mu g/m^3$ at station #1 fell from the vicinity of 70 percent in 1973 to 30 percent in 1975 and 1976, only to rise again to the 70 percent level in 1979. A continuous decline in the percentage then occurred from 1979 through 1982. A similar pattern is demonstrated in the percentage of observations exceeding 260 $\mu g/m^3$ at station #1.

Standard exceedance status:

Station #1 exceeded the primary standards for all years through 1982. Station #3 has not demonstrated any exceedances of the primary standards.

Pollution roses:

The pollution roses developed for stations #1 and #3 for 1978-1982 demonstrate substantial impact of plant emissions. Station #1 shows average TSP readings for one plant direction (southwest) exceeding 250 $\mu g/m^3$.

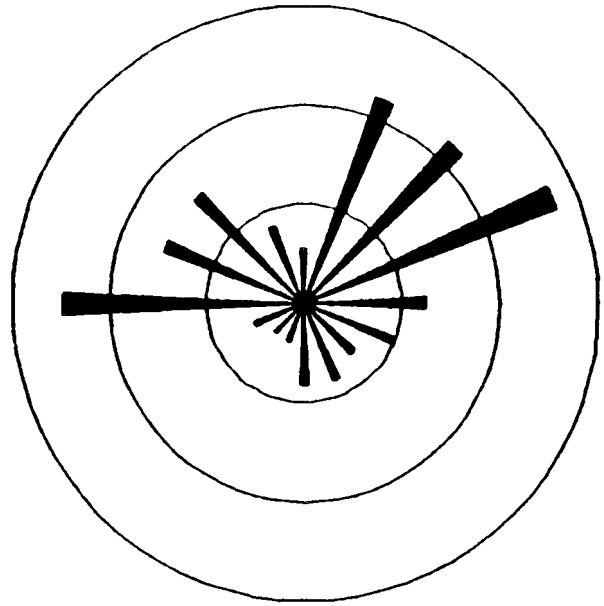
Standard exceedance roses:

All but one of the excursions beyond primary 24-hour standards under persistent winds at station #1 occurred under conditions that would transport plant emissions to the hi-vol. The only excursion beyond the 24-hour primary standard at station #3 occurred under variable winds.

BaP:

BaP was sampled at station #1 from 1978 through 1980. No values were reported for 1979. Quarterly composite concentrations were moderately high, ranging between 5 and 12 $ng/m^3$.

WIND ROSE
PERSISTENCE CLASS 0.95
WIND STATION 10200001



INLAND STEEL
East Chicago
Lake County
Indiana
EPA Region V

Hi-Vol Monitoring Sites--Inland Steel, East Chicago, Indiana

| Site ID Number | SAROAD Number | Site Name and Address | Plant Location from Site: Facility/ Bearing (°) | | Distance (km) | Elevation (m): Above Ground | Above MSL | Above Plant | Site Description | Nearest Roadway: Name | Direction | Distance (m) | Type and Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 15-1180-001-H02 | Central Fire Station 405 E. Columbus Dr. E. Chicago, IN | Coke ovens 6-10 | 44 | 3.4 | 10 | 180 | 0 | Roof Center city-commercial | E. Columbus Dr. | S | 30 | 2-lane, H |
| | | | Blast furnaces 1-6 | 44 | 3.4 | | | | | | | | |
| | | | Sinter plant | 44 | 3.4 | | | | | | | | |
| | | | BOF #2 | 44 | 3.4 | | | | | | | | |
| | | | C battery | 42 | 2.5 | | | | | | | | |
| | | | A & B blast furnaces | 42 | 2.5 | | | | | | | | |
| | | | Coke oven 11 | 42 | 5.5 | | | | | | | | |
| | | | BOF #4 | 42 | 5.5 | | | | | | | | |
| 2* | 15-1180-003 | Broad & Pine (Marktown) E. Chicago, IN | Coke ovens 6-10 | 84 | 2.4 | 4 | 180 | 0 | Roof | Broad St. | E | 12 | 2-lane, M |
| | | | Blast furnaces 1-6 | 84 | 2.4 | | | | | Pine Ave. | SE | 12 | 2-lane, M |
| | | | Sinter plant | 84 | 2.4 | | | | | | | | |
| | | | BOF #2 | 84 | 2.4 | | | | | | | | |
| | | | C battery | 102 | 1.7 | | | | | | | | |
| | | | A & B blast furnaces | 102 | 1.7 | | | | | | | | |
| | | | Coke oven 11 | 62 | 4.0 | | | | | | | | |
| | | | BOF #4 | 62 | 4.0 | | | | | | | | |
| 3 | 15-1180-004-H02 | Field School Block and James E. Chicago, IN | Coke ovens 6-10 | 0 | 1.5 | 9 | 180 | 0 | Roof Center city-industrial | Block Ave. | SW | 76 | 2-lane, M |
| | | | Blast furnaces 1-6 | 0 | 1.5 | | | | | | | | |
| | | | Sinter plant | 0 | 1.5 | | | | | | | | |
| | | | BOF #2 | 0 | 1.5 | | | | | | | | |
| | | | C battery | 310 | 1.2 | | | | | | | | |
| | | | A & B blast furnaces | 310 | 1.2 | | | | | | | | |
| | | | Coke oven 11 | 18 | 3.0 | | | | | | | | |
| | | | BOF #4 | 18 | 3.0 | | | | | | | | |
| 4 | 15-1180-006-H02 | Franklin School Alder & 142d E. Chicago, IN | Coke ovens 6-10 | 355 | 2.9 | 9 | 180 | 0 | Roof Suburban-residential | Franklin St. | W | 24 | 2-lane, M |
| | | | Blast furnaces 1-6 | 355 | 2.9 | | | | | | | | |
| | | | Sinter plant | 355 | 2.9 | | | | | | | | |
| | | | BOF #2 | 355 | 2.9 | | | | | | | | |
| | | | C battery | 340 | 2.5 | | | | | | | | |
| | | | A & B blast furnaces | 340 | 2.5 | | | | | | | | |
| | | | Coke oven 11 | 13 | 4.5 | | | | | | | | |
| | | | BOF #4 | 13 | 4.5 | | | | | | | | |

(Continued)

Key: U = Unavailable M = Moderate
L = Light H = Heavy

* Data from this station were included in the original 1973-1977 analysis; however, no strong mill impact on TSP was noted at this site. Based on the likelihood that this situation has not changed, data from this site were not employed in the 1978-1980 or the 1981-1982 updates.

Hi-Vol Monitoring Sites--Inland Steel, East Chicago, Indiana (Continued)

| Site ID Number | SAROAD Number | Site Name and Address | Plant Location from Site: Facility/ Bearing (°) | Distance (km) | Elevation (m): Above Ground | Above MSL | Above Plant | Site Description | Nearest Roadway: Name | Direction | Distance (m) | Type and Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5* | 15-1180-007 | Roxanna & Walsh<br>E. Chicago, IN | Coke ovens 6-10 38 | 6.5 | 4 | 180 | 0 | Roof<br>Suburban-residential | Roxanna Dr. | S | 15 | 2-lane, M |
| | | | Blast furnaces 1-6 38 | 6.5 | | | | | | | | |
| | | | Sinter plant 38 | 6.5 | | | | | | | | |
| | | | BOF #2 38 | 6.5 | | | | | | | | |
| | | | C battery 38 | 5.5 | | | | | | | | |
| | | | A & B blast furnaces 38 | 5.5 | | | | | | | | |
| | | | Coke oven 11 38 | 8.5 | | | | | | | | |
| | | | BOF #4 38 | 8.5 | | | | | | | | |
| 6* | 15-1780-001 | Goldblotts<br>5206 Hohman Ave.<br>Hammond, IN | Coke ovens 6-10 56 | 7.0 | 15 | 180 | 0 | Roof | Hohman Ave. | E | 15 | 2-lane, H |
| | | | Blast furnaces 1-6 56 | 7.0 | | | | | | | | |
| | | | Sinter plant 56 | 7.0 | | | | | | | | |
| | | | BOF #2 56 | 7.0 | | | | | | | | |
| | | | C battery 56 | 8.0 | | | | | | | | |
| | | | A & B blast furnaces 56 | 8.0 | | | | | | | | |
| | | | Coke oven 11 54 | 10.0 | | | | | | | | |
| | | | BOF #4 54 | 10.0 | | | | | | | | |
| 7* | 15-1780-002 | City Hall<br>5935 Calumet Ave.<br>Hammond, IN | Coke ovens 6-10 44 | 8.3 | 11 | 181 | 2 | Roof | Calumet Ave. | W | 24 | 4-lane, H |
| | | | Blast furnaces 1-6 44 | 8.3 | | | | | | | | |
| | | | Sinter plant 44 | 8.3 | | | | | | | | |
| | | | BOF #2 44 | 8.3 | | | | | | | | |
| | | | C battery 40 | 7.4 | | | | | | | | |
| | | | A & B blast furnaces 40 | 7.4 | | | | | | | | |
| | | | Coke oven 11 40 | 10.5 | | | | | | | | |
| | | | BOF #4 40 | 10.5 | | | | | | | | |
| 8* | 15-1780-004 | Purdue Univ. (Calumet Campus)<br>2233 171st St.<br>Hammond, IN | Coke ovens 6-10 18 | 8.9 | 9 | 184 | 5 | Roof | Woodmar Ave. | W | 76 | 2-lane, M |
| | | | Blast furnaces 1-6 18 | 8.9 | | | | | 171st St. | S | 46 | 2-lane, M |
| | | | Sinter plant 18 | 8.9 | | | | | | | | |
| | | | BOF #2 18 | 8.9 | | | | | | | | |
| | | | C battery 16 | 8.1 | | | | | | | | |
| | | | A & B blast furnaces 16 | 8.1 | | | | | | | | |
| | | | Coke oven 11 22 | 10.6 | | | | | | | | |
| | | | BOF #4 22 | 10.6 | | | | | | | | |

(Continued)

Key: U = Unavailable M = Moderate
L = Light H = Heavy

* Data from this station were included in the original 1973-1977 analysis; however, no strong mill impact on TSP was noted at this site. Based on the likelihood that this situation has not changed, data from this site were not employed in the 1978-1980 or the 1981-1982 updates.

Hi-Vol Monitoring Sites--Inland Steel, East Chicago, Indiana (Continued)

| Site ID Number | SAROAD Number | Site Name and Address | Plant Location from Site: Facility/ Bearing (°) | Distance (km) | Elevation (m): Above Ground | Above MSL | Above Plant | Site Description | Nearest Roadway: Name | Direction | Distance (m) | Type and Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9* | 15-1780-005 | Police & Fire Station<br>2211 Calumet Ave.<br>Hammond, IN | Coke ovens 6-10 | 109 | 5.7 | 5 | 180 | 0 | Roof | Calumet Ave. | W | 15 | 4-lane, H |
| | | | Blast furnaces 1-6 | 109 | 5.7 | | | | | | | |
| | | | Sinter plant | 109 | 5.7 | | | | | | | |
| | | | BOF #2 | 109 | 5.7 | | | | | | | |
| | | | C battery | 116 | 5.4 | | | | | | | |
| | | | A & B blast furnaces | 116 | 5.4 | | | | | | | |
| | | | Coke oven 11 | 90 | 6.7 | | | | | | | |
| | | | BOF #4 | 90 | 6.7 | | | | | | | |
| 10* | 15-1780-006 | Hessville Fire Station<br>3323 165th St.<br>Hammond, IN | Coke ovens 6-10 | 3 | 7.2 | 5 | 181 | 2 | Roof | 165th St. | S | 30 | 2-lane, M |
| | | | Blast furnaces 1-6 | 3 | 7.2 | | | | | | | |
| | | | Sinter plant | 3 | 7.2 | | | | | | | |
| | | | BOF #2 | 3 | 7.2 | | | | | | | |
| | | | C battery | 358 | 6.7 | | | | | | | |
| | | | A & B blast furnaces | 358 | 6.7 | | | | | | | |
| | | | Coke oven 11 | 10 | 9.0 | | | | | | | |
| | | | BOF #4 | 10 | 9.0 | | | | | | | |
| 11* | 15-1780-007 | GSA Bldg.<br>3200 Sheffield<br>Hammond, IN | Coke ovens 6-10 | 80 | 6.0 | 3 | 180 | 0 | Roof | Paved rd. | E | 12 | 2-lane, L |
| | | | Blast furnaces 1-6 | 80 | 6.0 | | | | | | | |
| | | | Sinter plant | 80 | 6.0 | | | | | | | |
| | | | BOF #2 | 80 | 6.0 | | | | | | | |
| | | | C battery | 86 | 5.4 | | | | | | | |
| | | | A & B blast furnaces | 86 | 5.4 | | | | | | | |
| | | | Coke oven 11 | 70 | 7.8 | | | | | | | |
| | | | BOF #4 | 70 | 7.8 | | | | | | | |
| 12* | 15-1780-008 | 1300 141st St.<br>Hammond, IN | Coke ovens 6-10 | 65 | 5.5 | 5 | 178 | -2 | Roof | 141st St. | N | 15 | 2-lane, M |
| | | | Blast furnaces 1-6 | 65 | 5.5 | | | | | | | |
| | | | Sinter plant | 65 | 5.5 | | | | | | | |
| | | | BOF #2 | 65 | 5.5 | | | | | | | |
| | | | C battery | 68 | 4.6 | | | | | | | |
| | | | A & B blast furnace | 68 | 4.6 | | | | | | | |
| | | | Coke oven 11 | 58 | 7.4 | | | | | | | |
| | | | BOF #4 | 58 | 7.4 | | | | | | | |

(Continued)

Key: U = Unavailable M = Moderate
L = Light H = Heavy

* Data from this station were included in the original 1973-1977 analysis; however, no strong mill impact on TSP was noted at this site. Based on the likelihood that this situation has not changed, data from this site were not employed in the 1978-1980 or the 1981-1982 updates.

Hi-Vol Monitoring Sites--Inland Steel, East Chicago, Indiana (Concluded)

| Site ID Number | SAROAD Number | Site Name and Address | Plant Location from Site | | | Elevation (m) | | | Site Description | Nearest Roadway | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Facility/ Bearing (°) | | Distance (km) | Above Ground | Above MSL | Above Plant | | Name | Direc- tion | Distance (m) | Type and Volume |
| 13 | Reference #13000 | Park Maintenance Bldg. Marktown E. Chicago, IN | | 64 | 1.8 | 4.5 | 180 | 0 | Roof Residential | Pine Ave. | E | 17 | U |
| 14 | Reference #14000 | Mill Gate Inn E. Chicago, IN | Coke plant #2 | 255 | 0.9 | 4.3 | 179 | -1 | Scaffold | Dickey Rd. | NE | 14 | U |
| 15 | Reference #15000 | Wayne Adams Buick Dealer Car Wash E. Chicago, IN | Battery C | 145 | 0.3 | 5.2 | U | U | Roof | Watling St. | SE | 65 | U |
| 16 | Reference #1600 | Field Elem. School E. Chicago, IN | Plant #2 | 355 | 1.2 | 9.0 | 180 | 0 | Roof | Block<br>James | SW<br>U | 76<br>U | U<br>U |

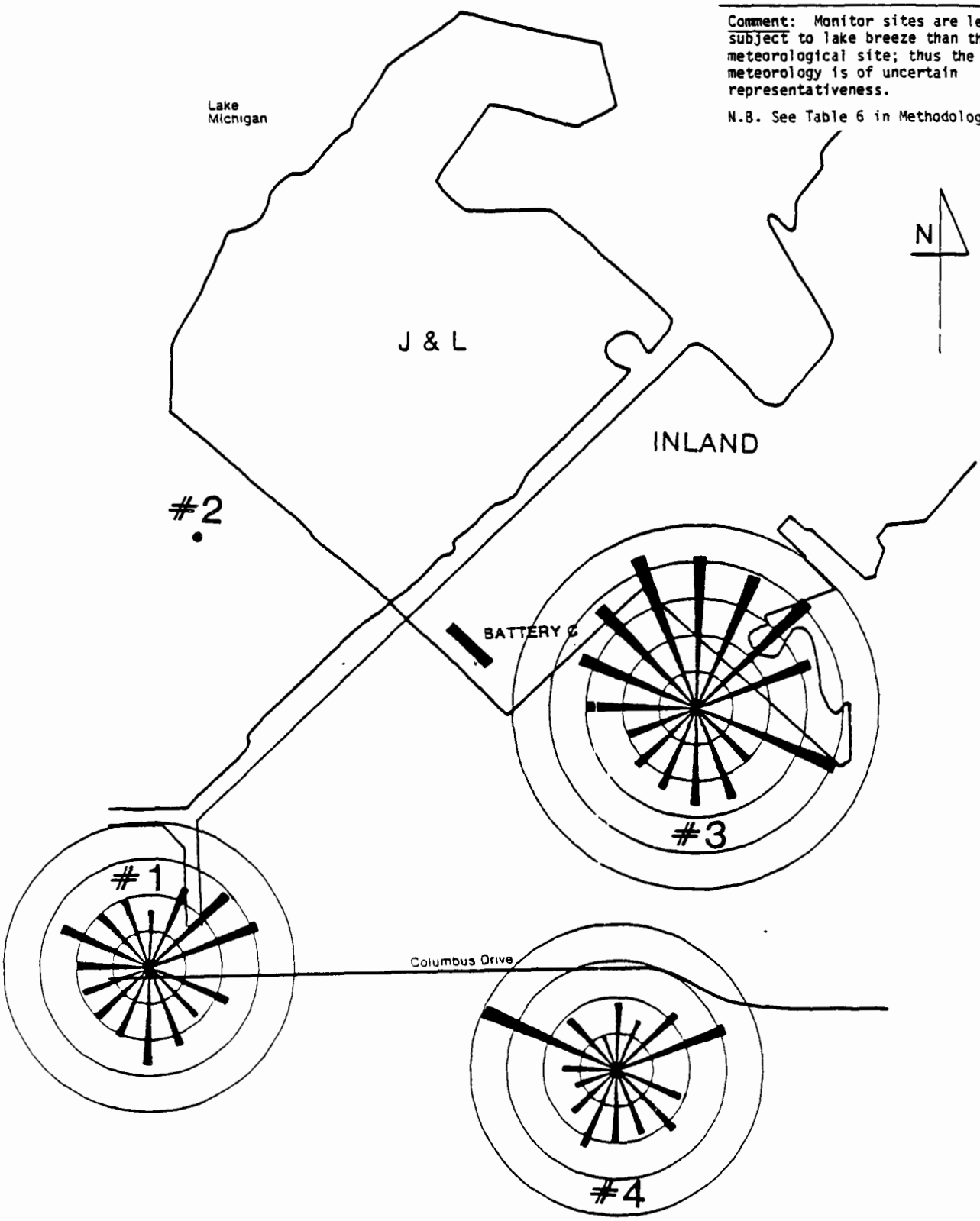
Key: U = Unavailable M = Moderate
L = Light H = Heavy

Wind Data Representativeness

| Station # | Terrain | Distance | Rating |
|---|---|---|---|
| 1, 3, 4, 13<br>14, 15, 16 | VI | G | U |

Comment: Monitor sites are less subject to lake breeze than the meteorological site; thus the meteorology is of uncertain representativeness.

N.B. See Table 6 in Methodology section.



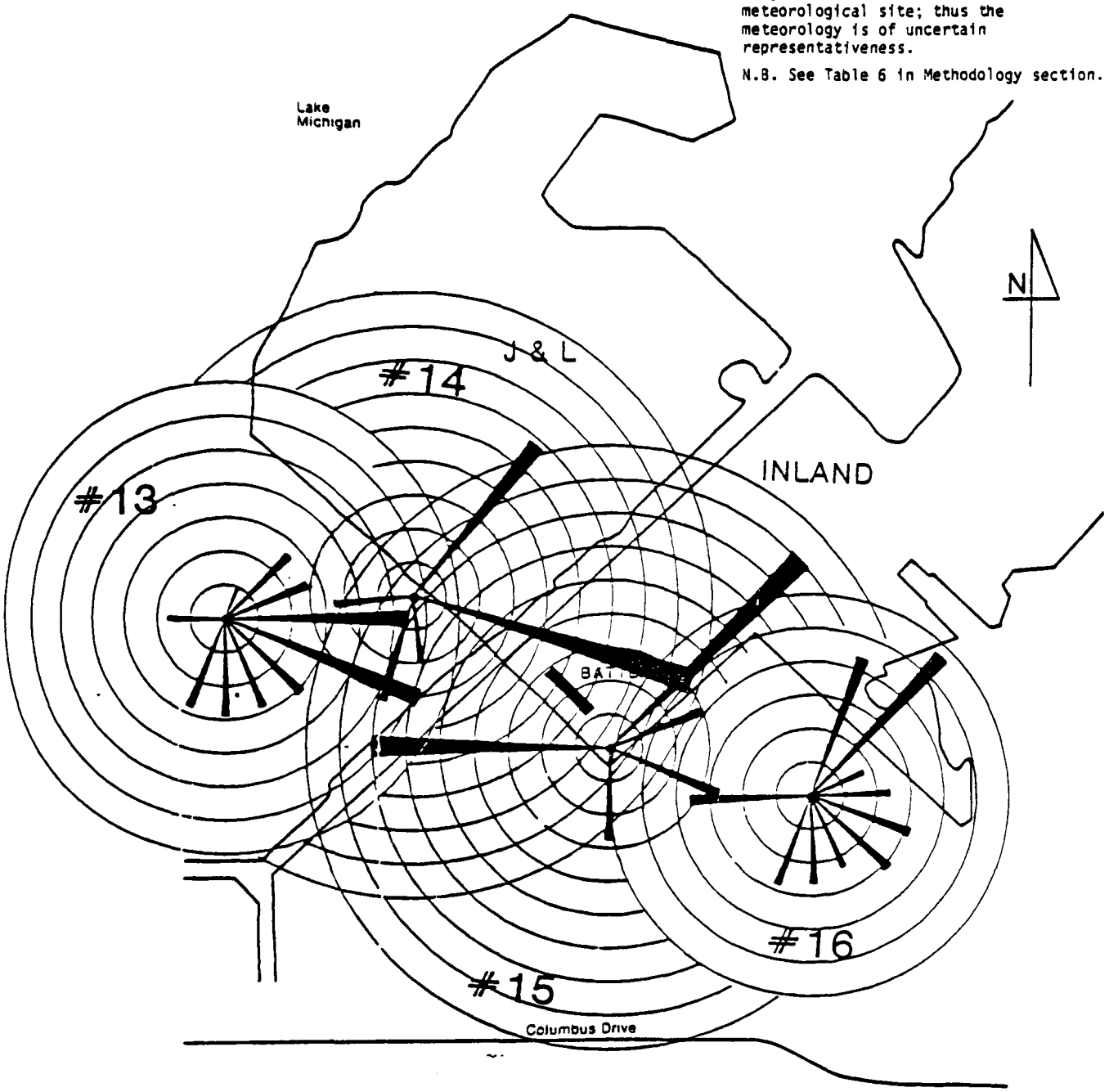

TSP roses for Inland Steel - East Chicago, Indiana, for the period 1978-1982 for cases of $\omega$>0.90. Each circle represents 50 $\mu g/m^3$.

Wind Data Representativeness

| Station # | Terrain | Distance | Rating |
|---|---|---|---|
| 1, 3, 4, 13<br>14, 15, 16 | VI | G | U |

Comment: Monitor sites are less subject to lake breeze than the meteorological site; thus the meteorology is of uncertain representativeness.

N.B. See Table 6 in Methodology section.



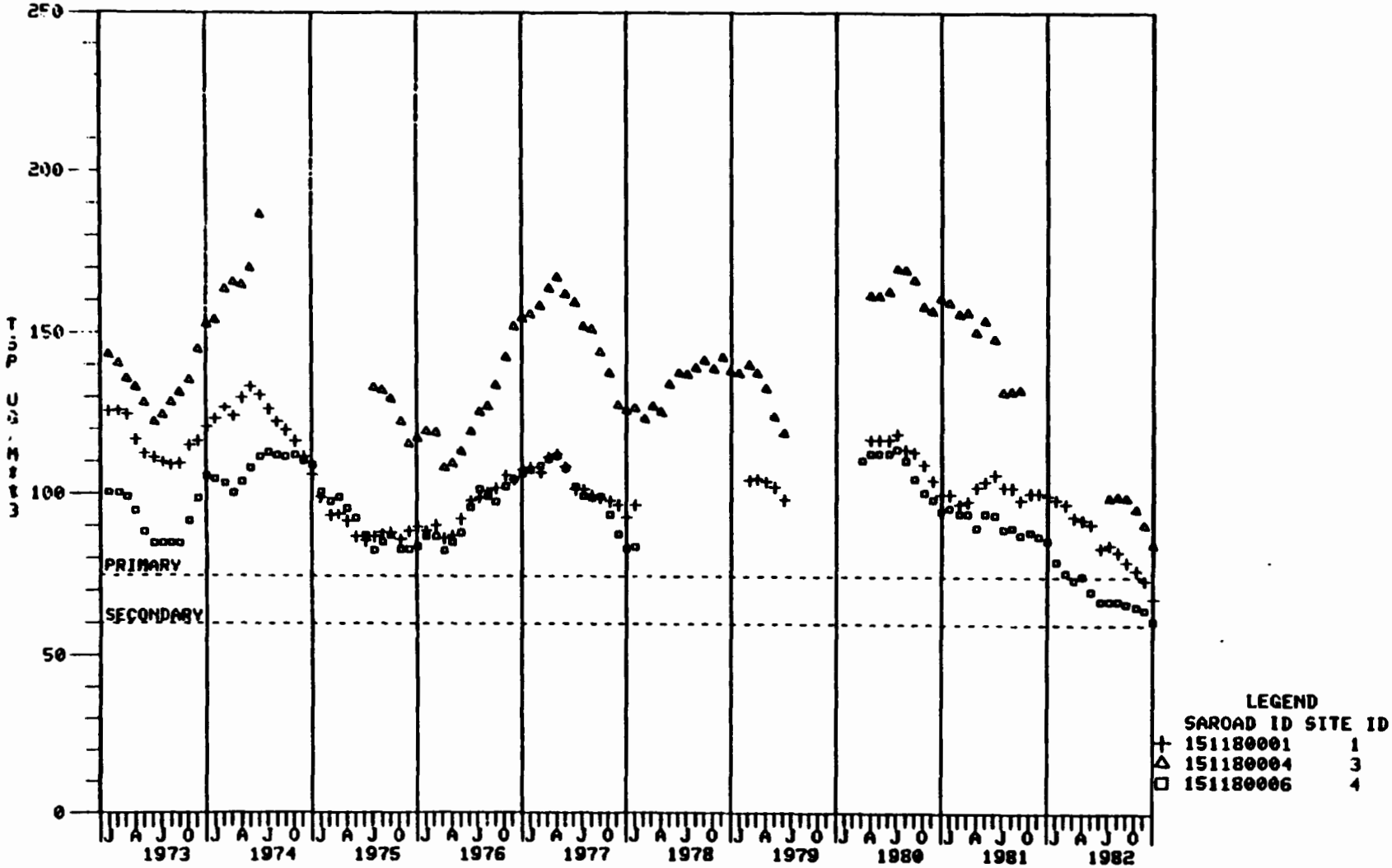

TSP roses for Inland Steel - East Chicago, Indiana, for the period 1978-1982 for cases of $\omega > 0.85$. Special Study Sites. Each circle represents 50 $\mu g/m^3$.

NUMBER OF TSP OBSERVATIONS USED IN POLLUTION ROSES

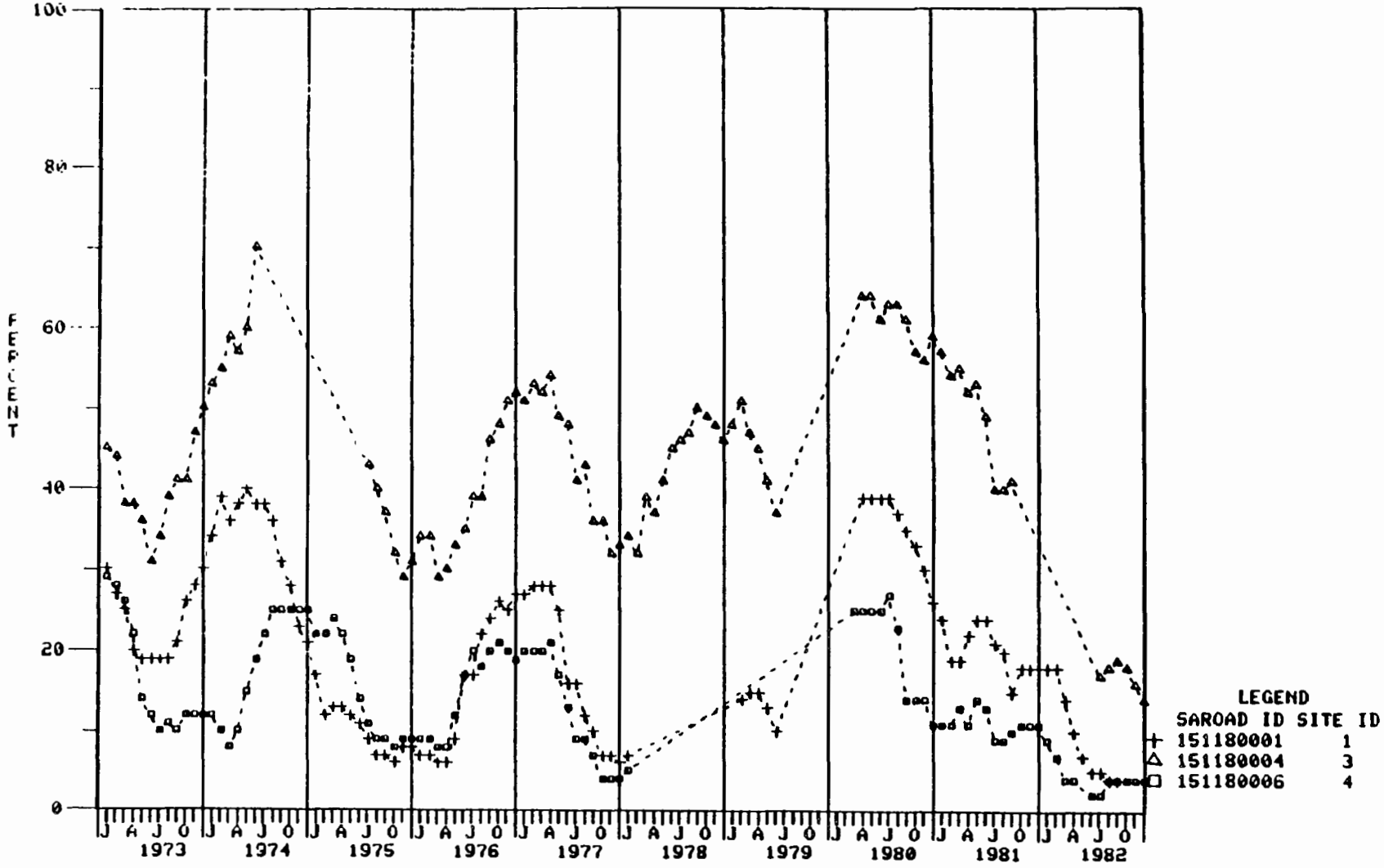
Inland Steel--East Chicago, IN

| Wind Direction | Monitoring Site Numbers | | | | | | |
|---|---|---|---|---|---|---|---|
| | #1 | #3 | #4 | #13 | #14 | #15 | #16 |
| N | 7 | 5 | 5 | 0 | 0 | 0 | 0 |
| NNE | 5 | 7 | 5 | 1 | 0 | 0 | 1 |
| NE | 3 | 7 | 2 | 4 | 3 | 4 | 4 |
| ENE | 3 | 3 | 2 | 1 | 0 | 1 | 1 |
| E | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| ESE | 3 | 4 | 3 | 1 | 1 | 1 | 1 |
| SE | 3 | 1 | 1 | 2 | 0 | 0 | 2 |
| SSE | 10 | 10 | 9 | 2 | 0 | 0 | 2 |
| S | 23 | 21 | 22 | 2 | 1 | 2 | 2 |
| SSW | 17 | 18 | 17 | 1 | 1 | 0 | 1 |
| SW | 13 | 13 | 13 | 0 | 0 | 0 | 0 |
| WSW | 8 | 6 | 4 | 0 | 0 | 0 | 0 |
| W | 8 | 11 | 7 | 1 | 1 | 1 | 1 |
| WNW | 2 | 1 | 2 | 0 | 0 | 0 | 0 |
| NW | 6 | 7 | 6 | 0 | 0 | 0 | 0 |
| NNW | 2 | 2 | 1 | 0 | 0 | 0 | 0 |
| Total | 113 | 116 | 99 | 16 | 7 | 9 | 16 |

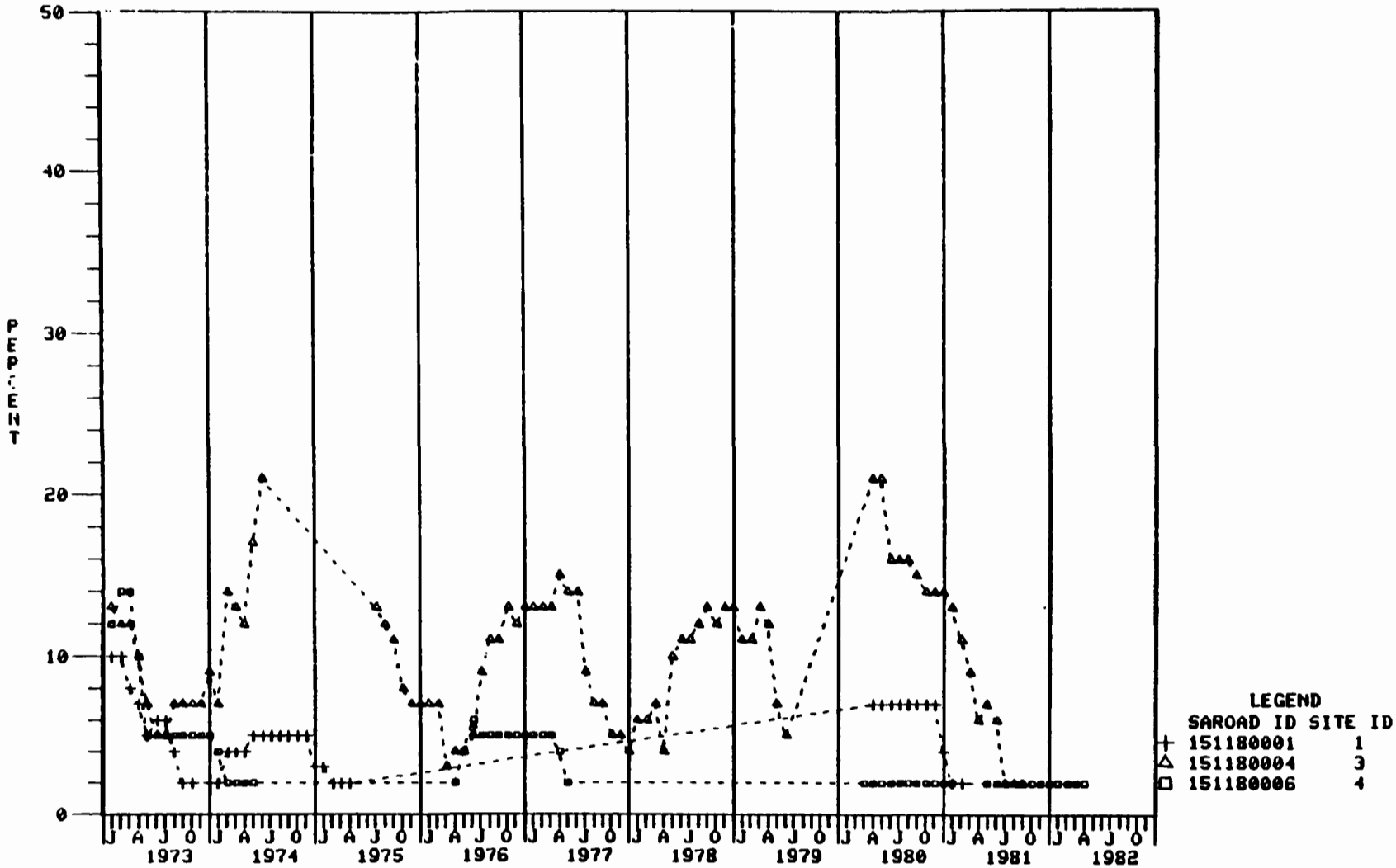
TSP 12 MONTH RUNNING GEOMETRIC MEANS (UG/M**3) FOR INLAND STEEL CO. - EAST CHICAGO, IN



TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 150 (UG/M**3) FOR INLAND STEEL CO, - EAST CHICAGO, IN



TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 260 (UG/M**3) FOR INLAND STEEL CO, - EAST CHICAGO, IN



TSP DATA SUMMARY FOR INLAND STEEL CO. - EAST CHICAGO, IN
SAROAD STATION # 151180001 SITE ID # 01
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 61 | 53 | 61 | 52 | 55 | 47 | 33 | 37 | 46 | 57 | 51 |
| GEOMETRIC MEAN: | 119.6 | 120.9 | 106.0 | 90.2 | 107.7 | 93.2 | ****** | ****** | 100.4 | 100.0 | 68.4 |
| GEOMETRIC S.D.: | 1.7 | 1.4 | 1.6 | 1.5 | 1.6 | 1.5 | ****** | ****** | 1.8 | 1.5 | 1.6 |
| ARITHMETIC MEAN | 136.3 | 129.3 | 118.1 | 96.7 | 117.8 | 100.0 | ****** | ****** | 117.4 | 108.3 | 75.9 |
| HIGHEST BY LARSEN EXTRP: | 525.8 | 353.9 | 424.5 | 271.8 | 395.2 | 289.7 | ****** | ****** | 540.3 | 328.3 | 280.5 |
| 1ST HIGHEST: | 415.0 | 313.0 | 313.0 | 210.0 | 240.0 | 191.0 | 223.0 | 290.0 | 376.0 | 221.0 | 139.0 |
| DATE : | 720521 | 731212 | 740529 | 750506 | 761015 | 771028 | 780619 | 791223 | 800110 | 810317 | 821026 |
| 2ND HIGHEST: | 344.0 | 231.0 | 269.0 | 194.0 | 220.0 | 172.0 | 212.0 | 229.0 | 265.0 | 213.0 | 135.0 |
| DATE : | 720831 | 731019 | 740228 | 750319 | 760605 | 770419 | 780830 | 790912 | 800328 | 811001 | 820123 |
| # OF READINGS EXCEEDING 260 : | 6 | 1 | 2 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 18 | 16 | 12 | 4 | 14 | 3 | 6 | 11 | 12 | 10 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 7 | 3 | 11 | 11 | 9 | 10 | 1 | 6 | 10 | 8 | 21 |
| 66-130: | 27 | 26 | 27 | 34 | 28 | 29 | 22 | 17 | 20 | 32 | 26 |
| 131-195: | 14 | 19 | 18 | 6 | 14 | 8 | 7 | 8 | 11 | 15 | 4 |
| 196-260: | 7 | 4 | 3 | 1 | 4 | 0 | 3 | 5 | 3 | 2 | 0 |
| 261-325: | 4 | 1 | 2 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |
| 326-390: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 391-455: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR INLAND STEEL CO, - EAST CHICAGO, IN
SAROAD STATION # 151180004 SITE ID # 03
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 60 | 58 | 29 | 58 | 54 | 48 | 56 | 36 | 80 | 38 | 56 |
| GEOMETRIC MEAN: | 142.2 | 152.7 | ****** | 117.4 | 155.0 | 126.0 | 138.1 | ****** | 160.7 | ****** | 84.6 |
| GEOMETRIC S.D.: | 1.8 | 1.6 | ****** | 1.8 | 1.6 | 1.5 | 1.7 | ****** | 1.6 | ****** | 1.7 |
| ARITHMETIC MEAN | 167.0 | 168.2 | ****** | 139.2 | 171.1 | 136.0 | 155.8 | ****** | 177.5 | ****** | 97.1 |
| HIGHEST BY LARSEN EXTRP: | 805.2 | 564.9 | ****** | 612.1 | 589.8 | 407.0 | 628.8 | ****** | 626.0 | ****** | 422.0 |
| 1ST HIGHEST: | 478.0 | 430.0 | 463.0 | 701.0 | 432.0 | 301.0 | 372.0 | 335.0 | 398.0 | 338.0 | 223.0 |
| DATE : | 720515 | 730128 | 740628 | 750319 | 761015 | 770425 | 780520 | 790918 | 800421 | 810516 | 820604 |
| 2ND HIGHEST: | 411.0 | 354.0 | 451.0 | 330.0 | 420.0 | 275.0 | 286.0 | 287.0 | 374.0 | 256.0 | 204.0 |
| DATE : | 720509 | 730814 | 740517 | 750307 | 760524 | 770413 | 780426 | 790310 | 800110 | 810305 | 820803 |
| # OF READINGS EXCEEDING 260 : | 8 | 5 | 10 | 4 | 7 | 2 | 7 | 3 | 11 | 1 | 0 |
| # OF READINGS EXCEEDING 150 : | 27 | 29 | 21 | 17 | 28 | 16 | 26 | 18 | 46 | 13 | 8 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 7 | 2 | 0 | 9 | 2 | 3 | 3 | 4 | 4 | 6 | 19 |
| 66-130: | 15 | 19 | 8 | 25 | 16 | 22 | 22 | 10 | 16 | 13 | 23 |
| 131-195: | 20 | 19 | 8 | 14 | 22 | 17 | 17 | 11 | 34 | 11 | 11 |
| 196-260: | 10 | 13 | 3 | 6 | 7 | 4 | 7 | 8 | 15 | 7 | 3 |
| 261-325: | 3 | 3 | 5 | 2 | 4 | 2 | 6 | 2 | 6 | 0 | 0 |
| 326-390: | 3 | 1 | 3 | 1 | 1 | 0 | 1 | 1 | 4 | 1 | 0 |
| 391-455: | 1 | 1 | 1 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 0 |
| >455: | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR INLAND STEEL CO, - EAST CHICAGO, IN
SAROAD STATION # 151180006 SITE ID # 04
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 59 | 57 | 59 | 53 | 57 | 45 | 37 | 33 | 44 | 45 | 50 |
| GEOMETRIC MEAN: | 98.2 | 105.5 | 109.2 | 83.9 | 106.5 | 83.3 | ****** | ****** | 95.4 | 86.3 | 61.1 |
| GEOMETRIC S.D.: | 1.9 | 1.5 | 1.6 | 1.6 | 1.6 | 1.5 | ****** | ****** | 1.6 | 1.5 | 1.7 |
| ARITHMETIC MEAN | 121.4 | 116.4 | 119.8 | 92.6 | 119.3 | 89.3 | ****** | ****** | 104.7 | 95.0 | 70.0 |
| HIGHEST BY LARSEN EXTRP: | 698.9 | 368.5 | 408.6 | 321.8 | 416.7 | 256.3 | ****** | ****** | 354.6 | 310.9 | 289.9 |
| 1ST HIGHEST: | 365.0 | 386.0 | 254.0 | 195.0 | 295.0 | 214.0 | 236.0 | 240.0 | 260.0 | 281.0 | 205.0 |
| DATE : | 720427 | 730110 | 740517 | 750512 | 760611 | 770413 | 780619 | 791229 | 800221 | 810516 | 820610 |
| 2ND HIGHEST: | 353.0 | 308.0 | 250.0 | 173.0 | 271.0 | 153.0 | 215.0 | 236.0 | 180.0 | 176.0 | 177.0 |
| DATE : | 720521 | 730609 | 740628 | 750822 | 760406 | 770425 | 780905 | 790825 | 800720 | 810522 | 820803 |
| # OF READINGS EXCEEDING 260 : | 6 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 1 | 0 |
| # OF READINGS EXCEEDING 150 : | 17 | 7 | 14 | 5 | 11 | 2 | 7 | 9 | 5 | 5 | 2 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 18 | 7 | 7 | 17 | 9 | 11 | 8 | 4 | 8 | 9 | 27 |
| 66-130: | 19 | 38 | 30 | 27 | 31 | 30 | 18 | 16 | 25 | 29 | 20 |
| 131-195: | 13 | 8 | 18 | 9 | 9 | 3 | 7 | 9 | 10 | 6 | 2 |
| 196-260: | 3 | 1 | 4 | 0 | 5 | 1 | 4 | 4 | 1 | 0 | 1 |
| 261-325: | 4 | 2 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 1 | 0 |
| 326-390: | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR INLAND STEEL CO, - EAST CHICAGO, IN
SAROAD STATION # 13000 SITE ID # 13
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 43 | 0 | 0 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| GEOMETRIC S.D.: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| ARITHMETIC MEAN | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| 1ST HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 384.0 | ****** | ****** |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 800709 | ****** | ****** |
| 2ND HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 309.0 | ****** | ****** |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 800624 | ****** | ****** |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 23 | 0 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 |
| 66-130: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 0 | 0 |
| 131-195: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 23 | 0 | 0 |
| 196-260: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR INLAND STEEL CO. - EAST CHICAGO, IN
SAROAD STATION # 14000 SITE ID # 14
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 23 | 0 | 0 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| GEOMETRIC S.D.: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| ARITHMETIC MEAN | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| 1ST HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 577.0 | ****** | ****** |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 800625 | ****** | ****** |
| 2ND HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 436.0 | ****** | ****** |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 800624 | ****** | ****** |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18 | 0 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 66-130: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 |
| 131-195: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 |
| 196-260: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 0 | 0 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR INLAND STEEL CO. - EAST CHICAGO, IN
SAROAD STATION # 15000 SITE ID # 15
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 34 | 0 | 0 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| GEOMETRIC S.D.: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| ARITHMETIC MEAN | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| 1ST HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 733.0 | ****** | ****** |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 800716 | ****** | ****** |
| 2ND HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 612.0 | ****** | ****** |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 800702 | ****** | ****** |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 17 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 28 | 0 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 66-130: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 |
| 131-195: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 0 | 0 |
| 196-260: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR INLAND STEEL CO. - EAST CHICAGO, IN
SAROAD STATION # 16000 SITE ID # 16
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 44 | 0 | 0 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| GEOMETRIC S.D.: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| ARITHMETIC MEAN | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| 1ST HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 371.0 | ****** | ****** |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 800716 | ****** | ****** |
| 2ND HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 346.0 | ****** | ****** |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 800627 | ****** | ****** |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 25 | 0 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 66-130: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 0 | 0 |
| 131-195: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20 | 0 | 0 |
| 196-260: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 0 | 0 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

24-HR STANDARD EXCEEDANCE ROSE FOR
INLAND STEEL CO. - EAST CHICAGO, IN
(ALL CASES > 260 UG/M**3)
X=0.900
COUNT/AVERAGE TSP OF PRIMARY EXCEEDANCES

| SAROAD # | 151180001 | | 151180004 | | 151180006 | | 13000 | | 14000 | | 15000 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SITE ID # | 1 | | 3 | | 4 | | 13 | | 14 | | 15 | |
| DIRECTION | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X |
| N COUNT: | 0 | 0 | 5 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 341. | 330. | 269. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| NNE COUNT: | 0 | 0 | 4 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 342. | 287. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| NE COUNT: | 1 | 1 | 3 | 6 | 1 | 2 | 0 | 0 | 1 | 1 | 2 | 2 |
| AVE TSP: | 265. | 313. | 311. | 298. | 300. | 276. | 0. | 0. | 309. | 337. | 589. | 392. |
| ENE COUNT: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 264. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| E COUNT: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 463. | 0. | 0. | 0. | 327. | 0. | 384. | 0. | 0. |
| ESE COUNT: | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 |
| AVE TSP: | 0. | 313. | 0. | 314. | 0. | 308. | 309. | 298. | 436. | 577. | 0. | 284. |
| SE COUNT: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 271. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| SSE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 312. |
| S COUNT: | 2 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| AVE TSP: | 333. | 0. | 374. | 385. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 569. |
| SSW COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 279. | 0. | 0. | 0. | 301. |
| SW COUNT: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| AVE TSP: | 0. | 0. | 0. | 0. | 386. | 0. | 0. | 0. | 0. | 0. | 0. | 283. |
| WSW COUNT: | 0 | 1 | 1 | 3 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 3 |
| AVE TSP: | 0. | 269. | 305. | 301. | 0. | 295. | 0. | 0. | 0. | 0. | 0. | 318. |
| W COUNT: | 0 | 0 | 1 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| AVE TSP: | 0. | 0. | 287. | 328. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 316. |
| WNW COUNT: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| AVE TSP: | 0. | 0. | 0. | 432. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 598. |
| NW COUNT: | 0 | 0 | 3 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 277. | 409. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| NNW COUNT: | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 |
| AVE TSP: | 0. | 0. | 286. | 342. | 0. | 0. | 0. | 265. | 0. | 352. | 0. | 341. |
| ALL COUNT: | 3 | 3 | 20 | 30 | 3 | 4 | 1 | 5 | 2 | 4 | 2 | 15 |
| AVE TSP: | 310. | 298. | 318. | 333. | 318. | 289. | 309. | 299. | 373. | 413. | 589. | 375. |

24-HR STANDARD EXCEEDANCE ROSE FOR
INLAND STEEL CO. - EAST CHICAGO, IN
(ALL CASES > 260 UG/M**3)
X=0.900
COUNT/AVEPAGE TSP OF PRIMARY EXCEEDANCES

SAROAD # 16000
SITE ID # 16

| DIRECTION | | W>=X | W<X |
|---|---|---|---|
| N | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| NNE | COUNT: | 0 | 1 |
| | AVE TSP: | 0. | 281. |
| NE | COUNT: | 2 | 1 |
| | AVE TSP: | 328. | 335. |
| ENE | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| E | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| ESE | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| SE | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| SSE | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| S | COUNT: | 0 | 1 |
| | AVE TSP: | 0. | 371. |
| SSW | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| SW | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| WSW | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| W | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| WNW | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| NW | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| NNW | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| ALL | COUNT: | 2 | 3 |
| | AVE TSP: | 328. | 329. |

24-HR STANDARD EXCEEDANCE ROSE FOR
INLAND STEEL CO. - EAST CHICAGO, IN
(ALL CASES > 150 UG/M**3)
X=0.900
COUNT/AVERAGE TSP OF SECONDARY EXCEEDANCES

| SAROAD # | 151180001 | | 151180004 | | 151180006 | | 13000 | | 14000 | | 15000 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SITE ID # | 1 | | 3 | | 4 | | 13 | | 14 | | 15 | |
| DIRECTION | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X |
| N COUNT: | 2 | 2 | 9 | 8 | 4 | 2 | 0 | 0 | 0 | 0 | 0 | 1 |
| AVE TSP: | 170. | 207. | 274. | 208. | 215. | 199. | 0. | 0. | 0. | 0. | 0. | 254. |
| NNE COUNT: | 5 | 2 | 12 | 10 | 2 | 4 | 0 | 0 | 0 | 1 | 0 | 0 |
| AVE TSP: | 193. | 159. | 249. | 244. | 211. | 166. | 0. | 0. | 0. | 210. | 0. | 0. |
| NE COUNT: | 2 | 7 | 7 | 10 | 1 | 7 | 1 | 0 | 2 | 2 | 3 | 3 |
| AVE TSP: | 228. | 192. | 252. | 266. | 300. | 218. | 193. | 0. | 266. | 268. | 443. | 324. |
| ENE COUNT: | 4 | 3 | 2 | 6 | 3 | 3 | 0 | 1 | 0 | 0 | 0 | 1 |
| AVE TSP: | 191. | 170. | 230. | 190. | 217. | 157. | 0. | 174. | 0. | 0. | 0. | 206. |
| E COUNT: | 0 | 2 | 0 | 6 | 0 | 4 | 0 | 3 | 0 | 2 | 0 | 0 |
| AVE TSP: | 0. | 179. | 0. | 258. | 0. | 210. | 0. | 276. | 0. | 298. | 0. | 0. |
| ESE COUNT: | 0 | 1 | 5 | 3 | 0 | 2 | 1 | 1 | 1 | 1 | 1 | 1 |
| AVE TSP: | 0. | 313. | 198. | 268. | 0. | 272. | 309. | 298. | 436. | 577. | 176. | 284. |
| SE COUNT: | 1 | 2 | 2 | 2 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| AVE TSP: | 183. | 200. | 240. | 234. | 0. | 166. | 0. | 168. | 0. | 0. | 0. | 0. |
| SSE COUNT: | 5 | 1 | 3 | 1 | 2 | 2 | 1 | 2 | 0 | 2 | 0 | 2 |
| AVE TSP: | 187. | 152. | 198. | 202. | 197. | 189. | 154. | 207. | 0. | 252. | 0. | 270. |
| S COUNT: | 9 | 3 | 8 | 8 | 3 | 2 | 1 | 4 | 0 | 2 | 1 | 3 |
| AVE TSP: | 220. | 193. | 219. | 247. | 176. | 208. | 192. | 187. | 0. | 223. | 163. | 451. |
| SSW COUNT: | 7 | 1 | 11 | 6 | 5 | 2 | 0 | 1 | 0 | 1 | 0 | 2 |
| AVE TSP: | 177. | 194. | 183. | 174. | 188. | 203. | 0. | 279. | 0. | 161. | 0. | 238. |
| SW COUNT: | 1 | 5 | 7 | 6 | 2 | 0 | 0 | 2 | 0 | 1 | 0 | 2 |
| AVE TSP: | 158. | 186. | 168. | 197. | 275. | 0. | 0. | 171. | 0. | 170. | 0. | 253. |
| WSW COUNT: | 3 | 5 | 6 | 10 | 2 | 2 | 0 | 1 | 0 | 1 | 0 | 3 |
| AVE TSP: | 185. | 196. | 208. | 233. | 183. | 225. | 0. | 164. | 0. | 174. | 0. | 318. |
| W COUNT: | 2 | 4 | 9 | 12 | 0 | 2 | 0 | 1 | 0 | 1 | 0 | 2 |
| AVE TSP: | 186. | 166. | 212. | 239. | 0. | 191. | 0. | 180. | 0. | 230. | 0. | 316. |
| WNW COUNT: | 1 | 1 | 6 | 8 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 1 |
| AVE TSP: | 204. | 240. | 198. | 222. | 197. | 232. | 0. | 0. | 0. | 0. | 0. | 598. |
| NW COUNT: | 0 | 4 | 7 | 14 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 181. | 238. | 251. | 0. | 170. | 0. | 0. | 0. | 0. | 0. | 0. |
| NNW COUNT: | 1 | 2 | 3 | 15 | 1 | 1 | 0 | 2 | 0 | 1 | 0 | 2 |
| AVE TSP: | 155. | 209. | 199. | 202. | 177. | 177. | 0. | 249. | 0. | 352. | 0. | 278. |
| ALL COUNT: | 43 | 45 | 97 | 125 | 27 | 40 | 4 | 19 | 3 | 15 | 5 | 23 |
| AVE TSP: | 193. | 190. | 219. | 229. | 207. | 199. | 212. | 215. | 323. | 264. | 334. | 319. |

24-HR STANDARD EXCEEDANCE ROSE FOR
INLAND STEEL CO. - EAST CHICAGO, IN
(ALL CASES > 150 UG/M**3)
X=0.900
COUNT/AVERAGE TSP OF SECONDARY EXCEEDANCES

SAROAD # 16000
SITE ID # 16

| DIRECTION | W>=X | W<X |
|---|---|---|
| N COUNT: | 0 | 1 |
| AVE TSP: | 0. | 175. |
| NNE COUNT: | 1 | 1 |
| AVE TSP: | 218. | 281. |
| NE COUNT: | 2 | 3 |
| AVE TSP: | 328. | 261. |
| ENE COUNT: | 0 | 1 |
| AVE TSP: | 0. | 184. |
| E COUNT: | 0 | 2 |
| AVE TSP: | 0. | 209. |
| ESE COUNT: | 1 | 1 |
| AVE TSP: | 156. | 256. |
| SE COUNT: | 0 | 1 |
| AVE TSP: | 0. | 197. |
| SSE COUNT: | 0 | 1 |
| AVE TSP: | 0. | 202. |
| S COUNT: | 1 | 1 |
| AVE TSP: | 163. | 371. |
| SSW COUNT: | 0 | 2 |
| AVE TSP: | 0. | 184. |
| SW COUNT: | 0 | 1 |
| AVE TSP: | 0. | 176. |
| WSW COUNT: | 0 | 2 |
| AVE TSP: | 0. | 208. |
| W COUNT: | 0 | 2 |
| AVE TSP: | 0. | 212. |
| WNW COUNT: | 0 | 1 |
| AVE TSP: | 0. | 248. |
| NW COUNT: | 0 | 0 |
| AVE TSP: | 0. | 0. |
| NNW COUNT: | 0 | 0 |
| AVE TSP: | 0. | 0. |
| ALL COUNT: | 5 | 20 |
| AVE TSP: | 239. | 225. |

## AIR QUALITY EVALUATION - INLAND STEEL, EAST CHICAGO, INDIANA

Air quality trends:

Where concurrent records are available, the graphs of the running 12-month geometric means for stations #1, #3, and #4 exhibit similar long-term fluctuations. Station #3 consistently displays much higher values than stations #1 and #4. The Spearman correlation coefficient for station #3 indicates no long-term trend, and the coefficients for stations #1 and #4 (-0.48 and -0.36) indicate moderately negative trends.

Station #13, #14, #15, and #16 were special study sites that were not in service sufficiently long to generate suitable graphs.

- Substantial declines in geometric means and percentage of observations exceeding 150 $\mu g/m^3$ were evident at stations #1, #3, and #4 from mid-1980 through 1982. Part of the decline in 1982 may be attributed to the installation of sample sample savers on the hivols in August 1982.

Standard exceedance status:

Stations #1 and #4 exceeded the primary TSP standards for all years except 1982. Station #3 continued to violate the primary annual standard through 1982. All four special study sites indicated exceedances of the 24-hour primary standard in 1980.

Pollution roses:

Pollution roses for stations #1 and #3 offer recognizable impacts from plant emissions. The pollution rose for station #4 does not indicate as strong an impact. All three of these stations must rely upon relatively infrequent wind sectors to demonstrate plant impacts.

Pollution roses for stations #13, #14, #15, and #16 were constructed from less than a year's worth of data, but indicate substantial impacts. The roses for these four stations allow more reasonable separation between Inland and J&L impacts.

Standard exceedance roses:

For station #3, 17 of the 20 excursions beyond the 24-hour primary standard that occurred under steady winds involved wind directions that contained the Inland facility alone or the Inland facility plus the J&L facility. Stations #1 and #4 rarely suffered primary excursions that would involve steady transport of emissions from either or both of these facilities.

The majority of the exceedances of the 24-hour secondary standard at stations #1 and #4 that occurred with steady winds did not involve directions containing the plant.

Stations #13, #14, 15, and #16 were in operation only a short time, but all 24-hour primary excursions under steady winds involved directions that contained at least one of the steel facilities.

BaP:

As part of the special study conducted by EPA Region V, BaP was measured at stations #13, #14, #15, and #16 for 5 days in July 1979. The results were divided into "downwind," "with wind," and "background" categories. Downwind days were defined as having the 24-hour average wind direction within $\pm$ 10° of the station orientation from the plant. With wind days had four or more hours within $\pm$ 10°, while background days had winds away from the station for the entire day. The results are summarized below:

| | Downwind Station | With Wind Station | Background Station |
|---|---|---|---|
| Range ($ng/m^3$) | 1.0-13.1 | 0.4-2.7 | 0.1-1.6 |
| Geometric mean | 4.4 | 1.4 | 0.3 |

INTERLAKE STEEL
Chicago
Cook County
Illinois
EPA Region V

Hi-Vol Monitoring Sites--Interlake Steel, Chicago, Illinois

| Site ID Number | SAROAD Number | Site Name and Address | Plant Location from Site: Facility/ Bearing (°) | Plant Location from Site: Distance (km) | Elevation (m): Above Ground | Elevation (m): Above MSL | Elevation (m): Above Plant | Site Description | Nearest Roadway: Name | Nearest Roadway: Direction | Nearest Roadway: Distance (m) | Nearest Roadway: Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 14-1220-010-H01 | Fenger High School<br>11220 S. Wallace Ave.<br>Chicago, IL | Blast furnace<br>Coke plant<br>BOF | 91<br>91<br>163 | 7.5<br>6.5<br>3.8 | 15 | 187 | 9 | Roof<br>Center city-residential | 112th St.<br>113th St.<br>Wallace St. | N<br>S<br>E | 60<br>60<br>30 | M<br>M<br>M |
| 2 | 14-1220-018-H01 | Carver High School<br>801 E. 133d St.<br>Chicago, IL | Blast furnace<br>Coke plant<br>BOF | 42<br>35<br>269 | 5.7<br>5.3<br>3.1 | 15 | 179 | 1 | Roof<br>Center city-industrial | Paved rd. | W | 60 | L |
| 3 | 14-1220-022-H01 | Washington High School<br>3500 E. 114th St.<br>Chicago, IL | Blast furnace<br>Coke plant<br>BOF | 320<br>275<br>243 | 1.5<br>2.0<br>8.2 | 9 | 178 | 0 | Roof<br>Center city-industrial | 114th St.<br>S. Ave. O | N<br>W | 60<br>60 | M<br>H |
| 4 | 14-1220-031-H01 | Addams Elem.<br>10810 S. Ave. H<br>Chicago, IL | Blast furnace<br>Coke plant<br>BOF | 263<br>242<br>238 | 1.5<br>2.5<br>9.1 | 10 | 178 | 0 | Roof<br>Center city-industrial | 108th St.<br>S. Ave. H | N<br>W | 45<br>30 | H<br>M |
| 5* | 15-1780-005 | Police & Fire Station<br>2211 Calumet Ave.<br>Hammond, IN | Blast furnace<br>Coke plant<br>BOF | 303<br>288<br>255 | 4.0<br>4.6<br>10.2 | 5 | 178 | 0 | Roof | Calumet Ave. | W | 15 | H |
| 6* | 14-1220-016 | Calumet High School<br>8131 S. May Ave.<br>Chicago, IL | Blast furnace<br>Coke plant<br>BOF | 123<br>130<br>163 | 10.3<br>10.0<br>10.2 | 15 | 183 | 5 | Roof | May Ave. | W | 30 | M |
| 7* | 15-1780-001 | Goldblotts<br>5206 Hohman Ave.<br>Hammond, IN | Blast furnace<br>Coke plant<br>BOF | 345<br>338<br>295 | 8.7<br>8.5<br>9.7 | 18 | 180 | 2 | Roof | Hohman Ave. | E | 15 | H |

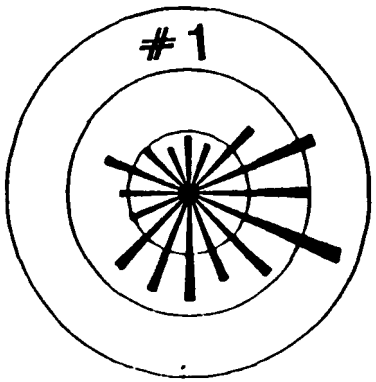
Key: U = Unavailable M = Moderate
L = Light H = Heavy

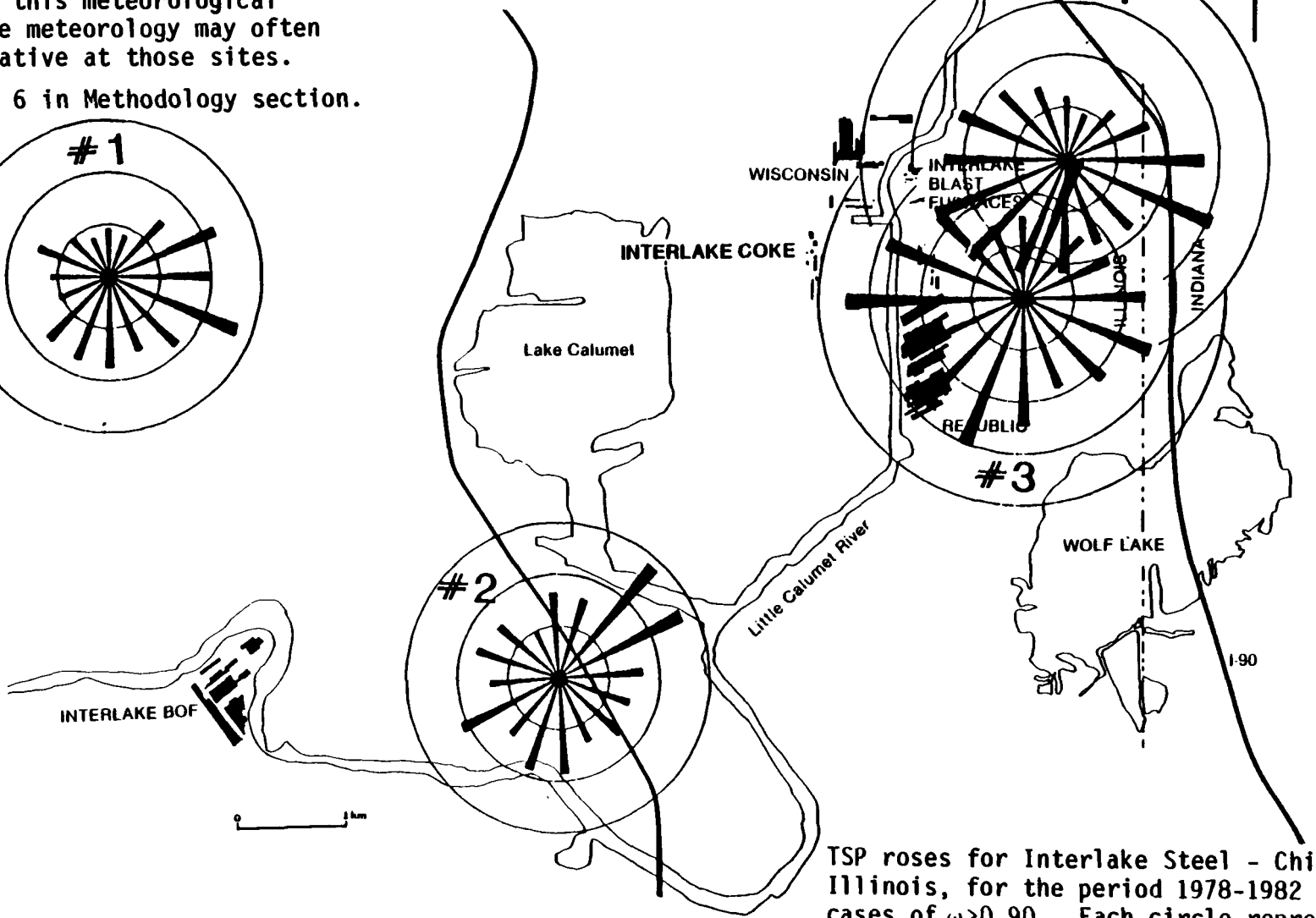
* Data from this station were included in the original 1973-1977 analysis; however, no strong mill impact on TSP was noted at this site. Based on the likelihood that this situation has not changed, data from this site were not employed in the 1978-1980 or the 1981-1982 updates.

| Station # | Terrain | Distance | Rating |
|---|---|---|---|
| 1 | I | F | VG |
| 2 | I | G | VG-G |
| 3, 4 | VII | G | U |

Comment: Lake breezes influence monitor sites #3 and #4 more than they influence this meteorological station, so the meteorology may often be unrepresentative at those sites.

N.B. See Table 6 in Methodology section.



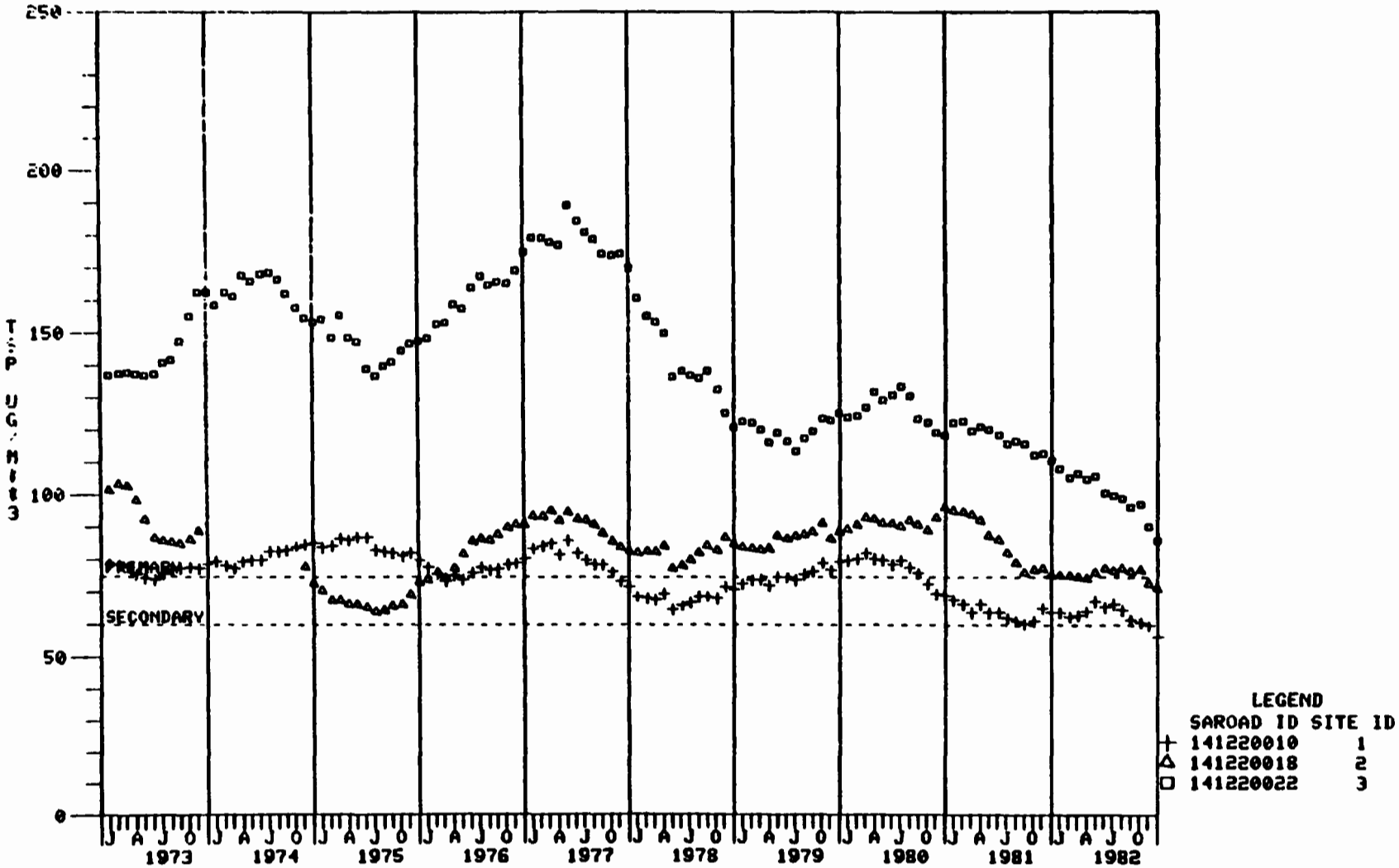

TSP roses for Interlake Steel - Chicago, Illinois, for the period 1978-1982 for cases of $\omega > 0.90$. Each circle represents 50 $\mu g/m^3$.

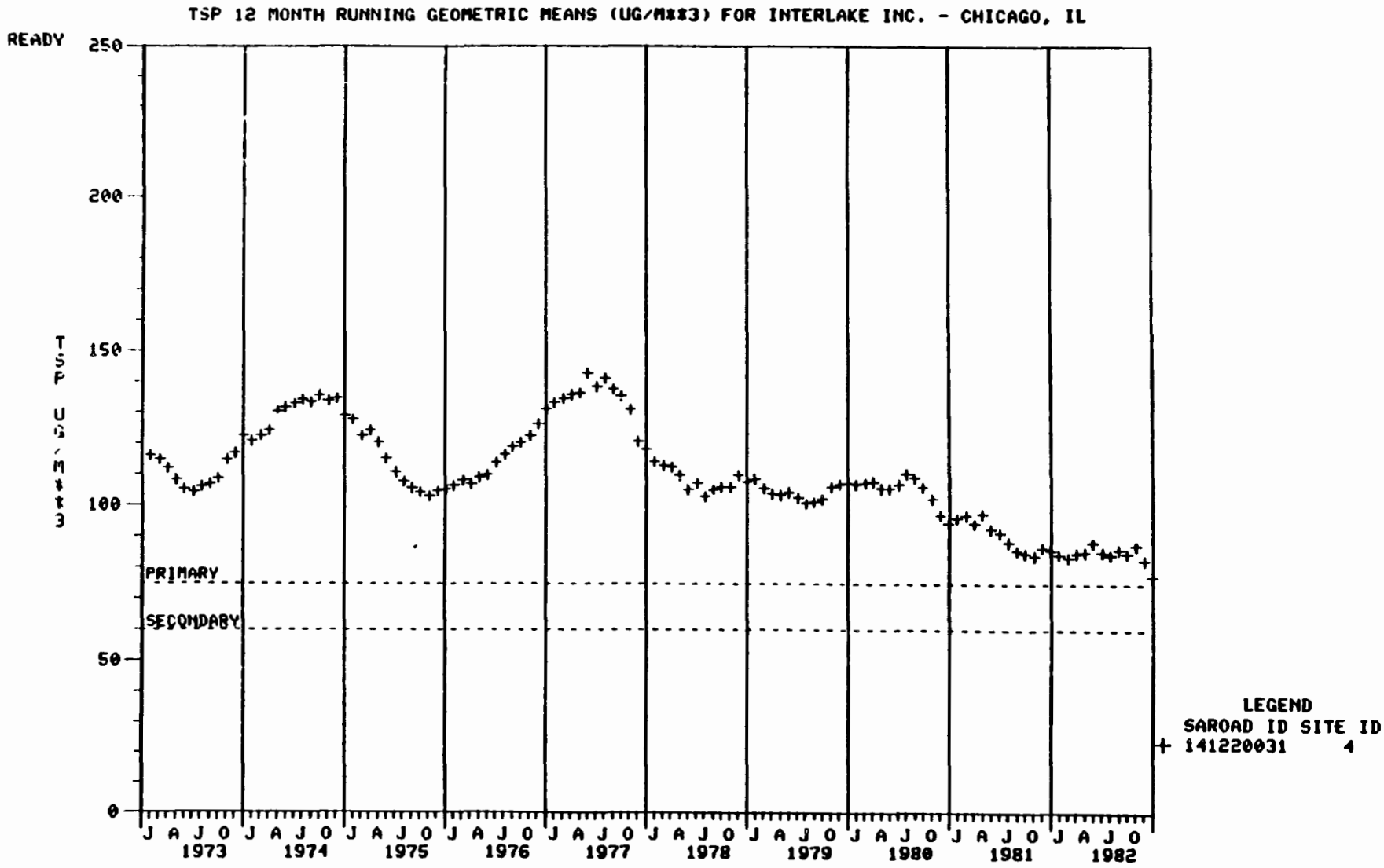
NUMBER OF TSP OBSERVATIONS USED IN POLLUTION ROSES

Interlake Steel--Chicago, IL

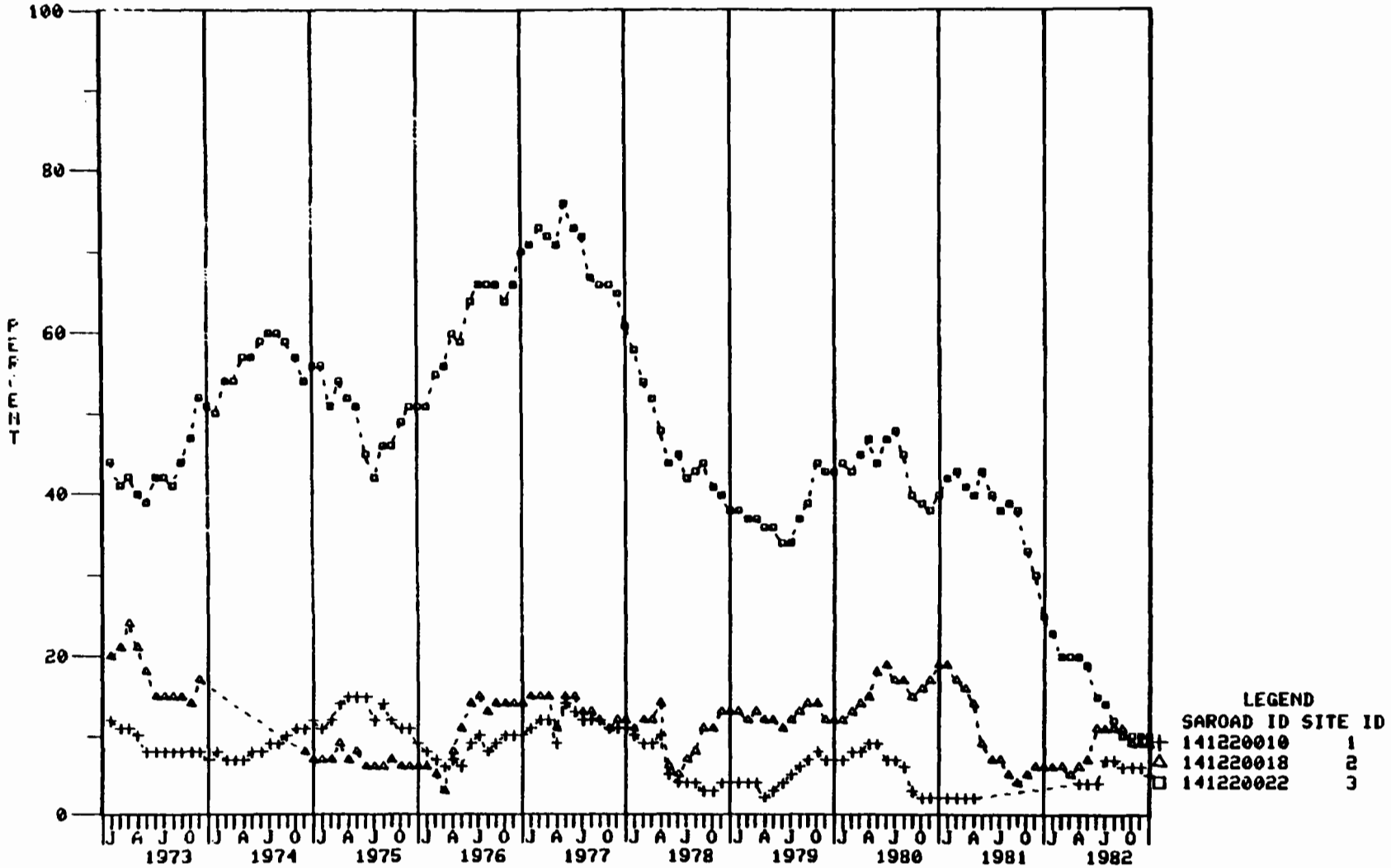
| Wind Direction | Monitoring Site Numbers #1 | #2 | #3 | #4 |
|---|---|---|---|---|
| N | 9 | 8 | 10 | 9 |
| NNE | 5 | 8 | 7 | 6 |
| NE | 7 | 7 | 8 | 7 |
| ENE | 8 | 9 | 5 | 8 |
| E | 1 | 2 | 2 | 2 |
| ESE | 1 | 3 | 3 | 3 |
| SE | 4 | 4 | 3 | 4 |
| SSE | 6 | 7 | 8 | 8 |
| S | 44 | 43 | 36 | 41 |
| SSW | 21 | 20 | 18 | 21 |
| SW | 14 | 15 | 12 | 14 |
| WSW | 7 | 6 | 7 | 7 |
| W | 20 | 20 | 21 | 20 |
| WNW | 6 | 6 | 6 | 6 |
| NW | 9 | 9 | 8 | 7 |
| NNW | 4 | 4 | 4 | 3 |
| Total | 166 | 171 | 158 | 166 |

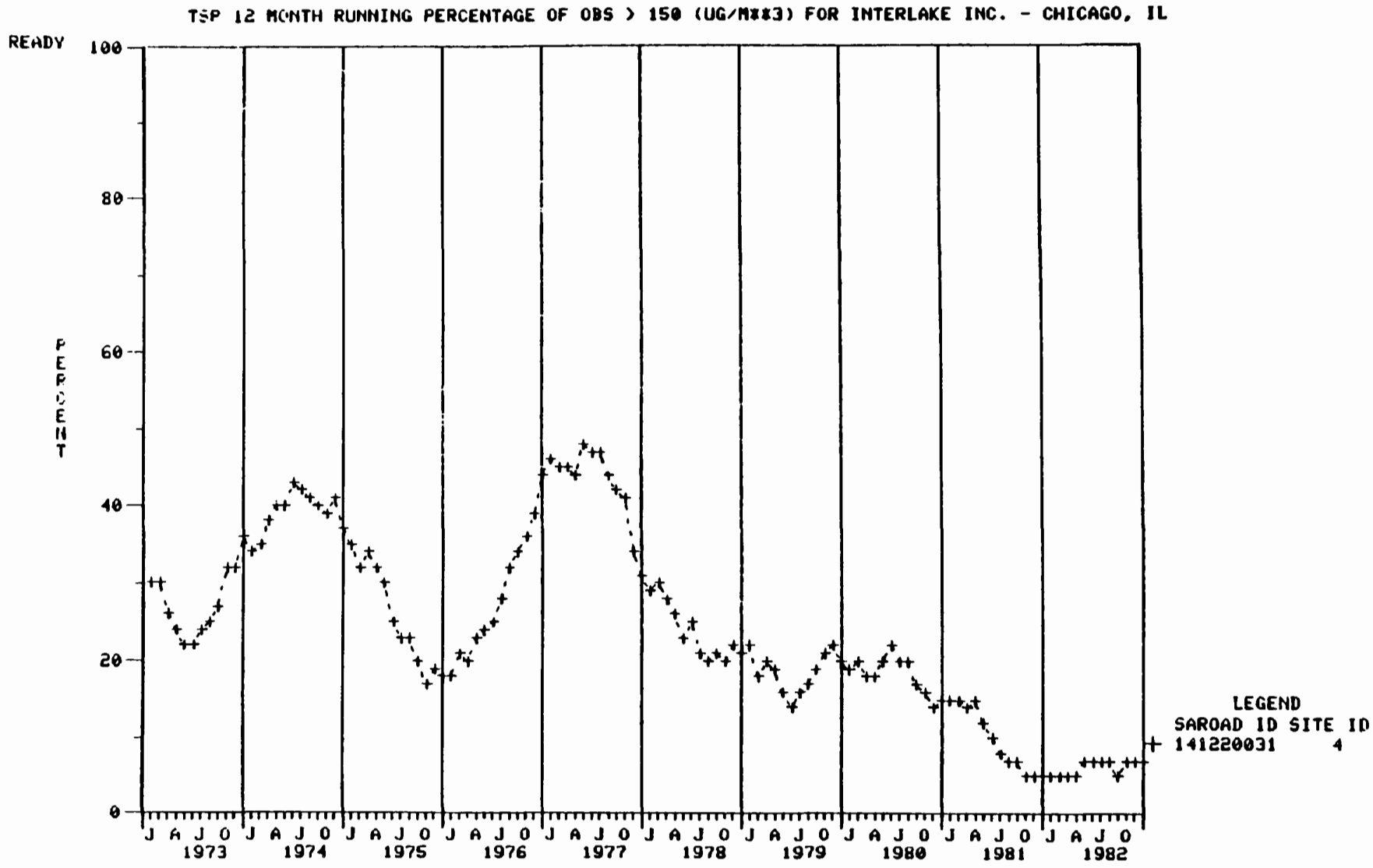
TSP 12 MONTH RUNNING GEOMETRIC MEANS (UG/M**3) FOR INTERLAKE INC. - CHICAGO, IL



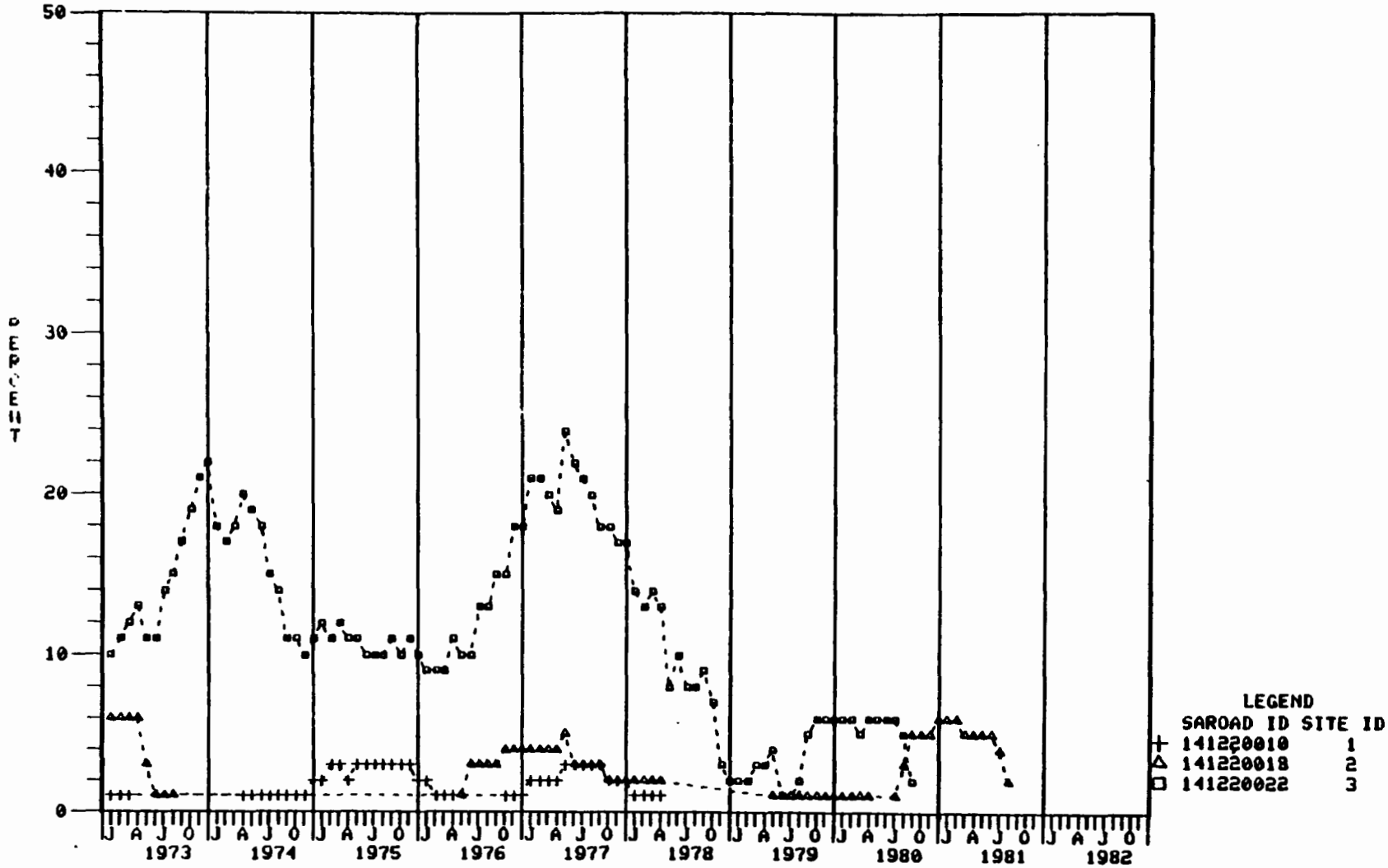

TSP 12 MONTH RUNNING GEOMETRIC MEANS (UG/M**3) FOR INTERLAKE INC. - CHICAGO, IL
READY
TSP UG/M**3
250
200
150
100
50
0
PRIMARY
SECONDARY
J A J O
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
LEGEND
SAROAD ID SITE ID
141220031 4

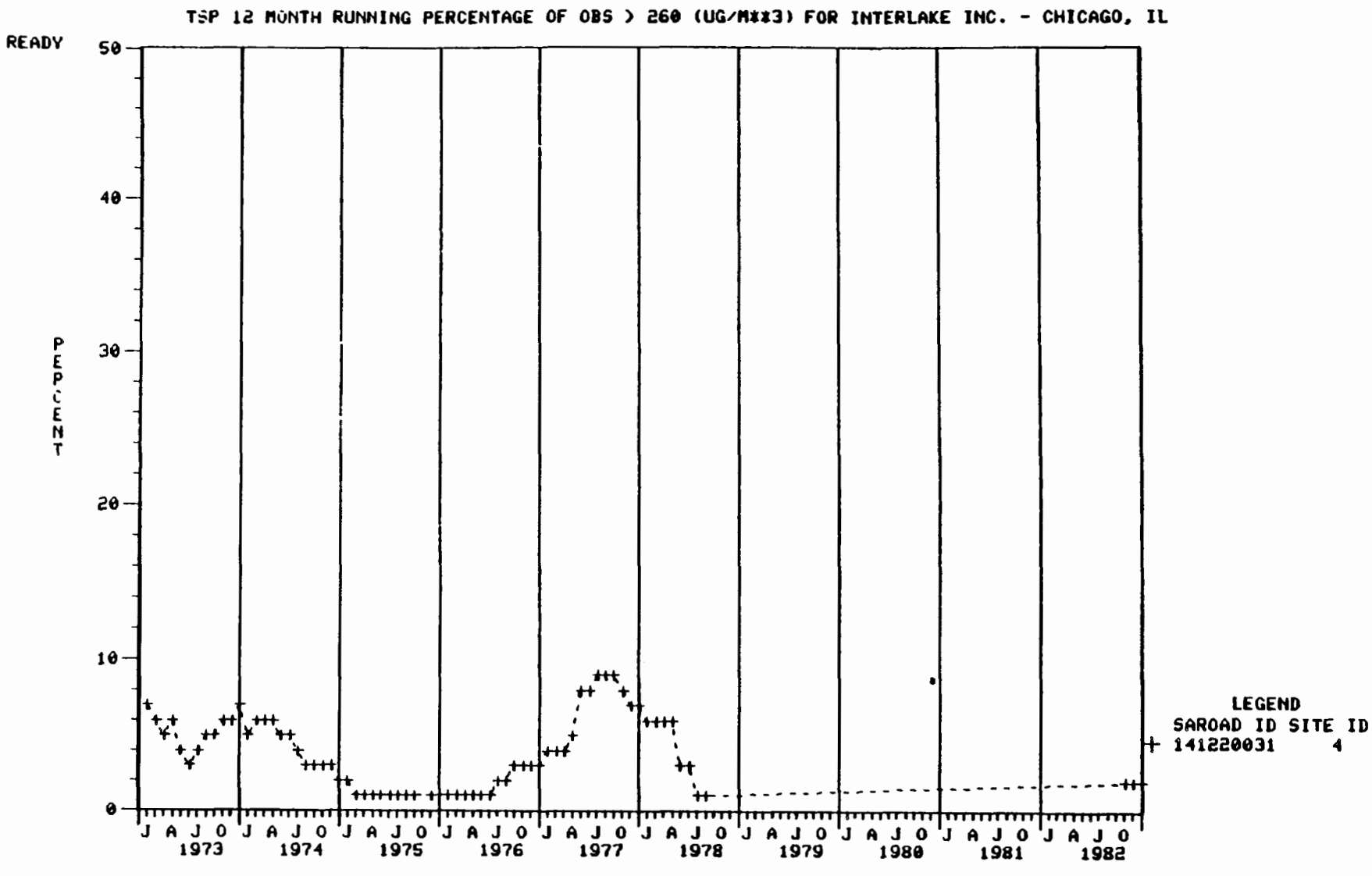
TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 150 (UG/M**3) FOR INTERLAKE INC. - CHICAGO, IL




TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 150 (UG/M**3) FOR INTERLAKE INC. - CHICAGO, IL
READY
PERCENT
100
80
60
40
20
0
J A J O
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
LEGEND
SAROAD ID SITE ID
141220031 4

TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 260 (UG/M**3) FOR INTERLAKE INC. - CHICAGO, IL




TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 260 (UG/M**3) FOR INTERLAKE INC. - CHICAGO, IL
READY
PERCENT
50
40
30
20
10
0
J A J O
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
LEGEND
SAROAD ID SITE ID
141220031 4

TSP DATA SUMMARY FOR INTERLAKE INC. - CHICAGO, IL
SAROAD STATION # 141220010 SITE ID # 01
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 137 | 113 | 116 | 103 | 113 | 106 | 102 | 108 | 53 | 45 | 57 |
| GEOMETRIC MEAN: | 79.0 | 78.9 | 85.1 | 80.0 | 80.5 | 71.7 | 70.9 | 79.4 | 69.3 | 63.8 | 56.6 |
| GEOMETRIC S.D.: | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.7 | 1.6 | 1.6 | 1.7 | 1.5 | 1.7 |
| ARITHMETIC MEAN | 89.2 | 86.9 | 95.3 | 88.8 | 91.2 | 82.5 | 79.0 | 87.5 | 77.8 | 69.1 | 66.8 |
| HIGHEST BY LARSEN EXTRP: | 323.3 | 292.2 | 335.3 | 307.6 | 343.7 | 314.9 | 284.9 | 295.5 | 335.3 | 214.8 | 291.3 |
| 1ST HIGHEST: | 270.0 | 234.0 | 350.0 | 284.0 | 310.0 | 291.0 | 209.0 | 240.0 | 180.0 | 131.0 | 230.0 |
| DATE : | 720427 | 730224 | 740426 | 750518 | 761015 | 770128 | 780405 | 790608 | 800527 | 810404 | 820411 |
| 2ND HIGHEST: | 246.0 | 196.0 | 297.0 | 272.0 | 236.0 | 277.0 | 191.0 | 200.0 | 149.0 | 125.0 | 211.0 |
| DATE : | 720518 | 730715 | 741213 | 750214 | 760512 | 770522 | 780417 | 790720 | 800310 | 810522 | 820423 |
| # OF READINGS EXCEEDING 260 : | 1 | 0 | 2 | 2 | 1 | 2 | 0 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 17 | 8 | 12 | 8 | 11 | 12 | 4 | 6 | 1 | 0 | 3 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 54 | 38 | 41 | 27 | 36 | 51 | 50 | 35 | 21 | 22 | 37 |
| 66-130: | 63 | 58 | 51 | 65 | 57 | 41 | 40 | 60 | 27 | 22 | 15 |
| 131-195: | 14 | 15 | 20 | 9 | 13 | 9 | 11 | 11 | 5 | 1 | 3 |
| 196-260: | 5 | 2 | 2 | 0 | 6 | 3 | 1 | 2 | 0 | 0 | 2 |
| 261-325: | 1 | 0 | 1 | 2 | 1 | 2 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR INTERLAKE INC. - CHICAGO, IL
SAROAD STATION # 141220018 SITE ID # 02
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 136 | 54 | 82 | 86 | 103 | 108 | 104 | 110 | 53 | 54 | 58 |
| GEOMETRIC MEAN: | 100.9 | ****** | 72.5 | 73.0 | 90.7 | 82.8 | 84.7 | 88.7 | 95.9 | 75.3 | 71.2 |
| GEOMETRIC S.D.: | 1.7 | ****** | 1.7 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.8 | 1.5 | 1.7 |
| ARITHMETIC MEAN | 116.4 | ****** | 82.4 | 81.2 | 103.0 | 93.9 | 93.2 | 99.4 | 115.2 | 81.7 | 80.8 |
| HIGHEST BY LARSEN EXTRP: | 457.8 | ****** | 334.1 | 290.8 | 390.6 | 341.4 | 308.3 | 362.9 | 552.2 | 249.3 | 321.8 |
| 1ST HIGHEST: | 454.0 | 254.0 | 257.0 | 170.0 | 360.0 | 292.0 | 250.0 | 272.0 | 377.0 | 166.0 | 203.0 |
| DATE : | 720523 | 730206 | 740601 | 750518 | 761015 | 770522 | 780628 | 790530 | 800801 | 811031 | 820429 |
| 2ND HIGHEST: | 366.0 | 245.0 | 211.0 | 167.0 | 317.0 | 285.0 | 199.0 | 248.0 | 373.0 | 164.0 | 193.0 |
| DATE : | 720521 | 730227 | 740628 | 750319 | 760512 | 770519 | 780417 | 790322 | 800906 | 810404 | 820628 |
| # OF READINGS EXCEEDING 260 : | 8 | 0 | 0 | 0 | 4 | 2 | 0 | 1 | 3 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 25 | 10 | 6 | 5 | 14 | 13 | 12 | 13 | 10 | 3 | 4 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 26 | 15 | 34 | 37 | 26 | 40 | 29 | 31 | 14 | 21 | 23 |
| 66-130: | 73 | 27 | 38 | 38 | 57 | 51 | 57 | 56 | 24 | 27 | 29 |
| 131-195: | 20 | 9 | 8 | 11 | 12 | 9 | 15 | 15 | 9 | 6 | 5 |
| 196-260: | 9 | 3 | 2 | 0 | 4 | 6 | 3 | 7 | 3 | 0 | 1 |
| 261-325: | 5 | 0 | 0 | 0 | 3 | 2 | 0 | 1 | 1 | 0 | 0 |
| 326-390: | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 0 |
| 391-455: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR INTERLAKE INC. - CHICAGO, IL
SAROAD STATION # 141220022 SITE ID # 03
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 136 | 87 | 84 | 98 | 115 | 113 | 88 | 84 | 52 | 60 | 59 |
| GEOMETRIC MEAN: | 134.0 | 162.8 | 153.4 | 148.0 | 175.1 | 170.4 | 121.2 | 125.6 | 118.5 | 110.7 | 86.3 |
| GEOMETRIC S.D.: | 1.6 | 1.6 | 1.7 | 1.6 | 1.6 | 1.7 | 1.7 | 1.6 | 1.5 | 1.5 | 1.6 |
| ARITHMETIC MEAN | 149.4 | 184.2 | 176.0 | 163.0 | 193.9 | 201.2 | 136.5 | 138.5 | 129.1 | 120.0 | 95.7 |
| HIGHEST BY LARSEN EXTRP: | 562.4 | 700.6 | 750.0 | 562.0 | 710.5 | 837.8 | 540.9 | 480.1 | 419.2 | 379.2 | 344.4 |
| 1ST HIGHEST: | 397.0 | 463.0 | 540.0 | 381.0 | 474.0 | 1106.0 | 517.0 | 325.0 | 231.0 | 254.0 | 209.0 |
| DATE : | 720601 | 730510 | 740613 | 751105 | 760714 | 771118 | 780613 | 790310 | 801006 | 810603 | 820511 |
| 2ND HIGHEST: | 320.0 | 422.0 | 506.0 | 367.0 | 452.0 | 688.0 | 278.0 | 294.0 | 226.0 | 229.0 | 198.0 |
| DATE : | 720817 | 730718 | 740228 | 750226 | 761223 | 771031 | 780601 | 790906 | 800310 | 810522 | 820111 |
| # OF READINGS EXCEEDING 260 : | 9 | 19 | 9 | 10 | 21 | 19 | 2 | 5 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 59 | 44 | 47 | 50 | 79 | 68 | 33 | 36 | 20 | 15 | 6 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 11 | 2 | 7 | 4 | 5 | 4 | 12 | 7 | 6 | 6 | 16 |
| 66-130: | 47 | 27 | 21 | 37 | 19 | 27 | 33 | 33 | 23 | 34 | 33 |
| 131-195: | 50 | 28 | 27 | 27 | 45 | 47 | 31 | 34 | 16 | 15 | 8 |
| 196-260: | 19 | 11 | 20 | 20 | 25 | 16 | 10 | 5 | 7 | 5 | 2 |
| 261-325: | 8 | 10 | 2 | 8 | 13 | 6 | 1 | 5 | 0 | 0 | 0 |
| 326-390: | 0 | 5 | 3 | 2 | 4 | 3 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 1 | 3 | 2 | 0 | 3 | 3 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 1 | 2 | 0 | 1 | 7 | 1 | 0 | 0 | 0 | 0 |

***** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR INTERLAKE INC. - CHICAGO, IL
SAROAD STATION # 141220031 SITE ID # 04
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 136 | 98 | 97 | 97 | 117 | 114 | 92 | 104 | 55 | 60 | 58 |
| GEOMETRIC MEAN: | 115.5 | 122.4 | 129.1 | 105.4 | 131.2 | 118.2 | 107.9 | 107.3 | 94.4 | 85.7 | 77.5 |
| GEOMETRIC S.D.: | 1.6 | 1.7 | 1.5 | 1.5 | 1.7 | 1.7 | 1.5 | 1.5 | 1.6 | 1.5 | 1.6 |
| ARITHMETIC MEAN | 129.0 | 138.4 | 139.4 | 114.8 | 148.3 | 134.2 | 116.3 | 116.2 | 103.9 | 92.6 | 89.1 |
| HIGHEST BY LARSEN EXTRP: | 490.8 | 556.5 | 411.8 | 379.1 | 575.4 | 546.0 | 345.6 | 369.2 | 362.3 | 291.0 | 333.7 |
| 1ST HIGHEST: | 332.0 | 342.0 | 357.0 | 282.0 | 681.0 | 385.0 | 249.0 | 230.0 | 212.0 | 185.0 | 460.0 |
| DATE : | 720525 | 731209 | 740228 | 751105 | 760912 | 770715 | 780908 | 790310 | 800626 | 810404 | 821026 |
| 2ND HIGHEST: | 309.0 | 299.0 | 318.0 | 229.0 | 494.0 | 351.0 | 244.0 | 220.0 | 188.0 | 177.0 | 189.0 |
| DATE : | 720222 | 731025 | 741026 | 750304 | 761129 | 770531 | 780309 | 790927 | 800930 | 810522 | 820423 |
| # OF READINGS EXCEEDING 260 : | 7 | 7 | 2 | 1 | 4 | 8 | 0 | 0 | 0 | 0 | 1 |
| # OF READINGS EXCEEDING 150 : | 40 | 34 | 35 | 17 | 51 | 34 | 19 | 21 | 8 | 3 | 4 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 16 | 9 | 5 | 10 | 10 | 10 | 10 | 10 | 9 | 11 | 22 |
| 66-130: | 61 | 42 | 41 | 54 | 42 | 58 | 50 | 60 | 32 | 41 | 31 |
| 131-195: | 43 | 26 | 39 | 29 | 44 | 28 | 28 | 29 | 13 | 8 | 4 |
| 196-260: | 9 | 14 | 10 | 3 | 17 | 10 | 4 | 5 | 1 | 0 | 0 |
| 261-325: | 6 | 6 | 1 | 1 | 1 | 4 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 1 | 1 | 1 | 0 | 1 | 4 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 1 |

****** INDICATES MISSING OR INSUFFICIENT DATA

24-HR STANDARD EXCEEDANCE ROSE FOR
INTERLAKE INC. - CHICAGO, IL
(ALL CASES > 260 UG/M**3)
X=0.900
COUNT/AVERAGE TSP OF PRIMARY EXCEEDANCES

| SARCAD # | 141220010 | | 141220018 | | 141220022 | | 141220031 | |
|---|---|---|---|---|---|---|---|---|
| SITE ID # | 1 | | 2 | | 3 | | 4 | |
| DIRECTION | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X |
| N COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 342. |
| NNE COUNT: | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 1 |
| AVE TSP: | 0. | 0. | 0. | 0. | 482. | 0. | 0. | 297. |
| NE COUNT: | 0 | 0 | 1 | 1 | 1 | 3 | 0 | 0 |
| AVE TSP: | 0. | 0. | 304. | 373. | 342. | 387. | 0. | 0. |
| ENE COUNT: | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 272. | 0. | 275. | 0. | 0. |
| E COUNT: | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 272. | 0. | 317. | 0. | 0. | 0. | 0. |
| ESE COUNT: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 293. | 0. | 0. |
| SE COUNT: | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 1 |
| AVE TSP: | 0. | 350. | 0. | 0. | 0. | 320. | 0. | 279. |
| SSE COUNT: | 0 | 1 | 0 | 0 | 1 | 2 | 0 | 0 |
| AVE TSP: | 0. | 297. | 0. | 0. | 688. | 329. | 0. | 0. |
| S COUNT: | 0 | 0 | 0 | 0 | 3 | 0 | 1 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 285. | 0. | 681. | 0. |
| SSW COUNT: | 1 | 0 | 1 | 1 | 8 | 6 | 2 | 2 |
| AVE TSP: | 277. | 0. | 292. | 285. | 324. | 362. | 289. | 371. |
| SW COUNT: | 1 | 0 | 0 | 0 | 9 | 2 | 2 | 1 |
| AVE TSP: | 284. | 0. | 0. | 0. | 320. | 357. | 284. | 299. |
| WSW COUNT: | 0 | 0 | 1 | 2 | 14 | 6 | 3 | 4 |
| AVE TSP: | 0. | 0. | 377. | 275. | 345. | 376. | 286. | 341. |
| W COUNT: | 2 | 0 | 1 | 0 | 9 | 5 | 4 | 1 |
| AVE TSP: | 301. | 0. | 360. | 0. | 377. | 363. | 359. | 351. |
| WNW COUNT: | 0 | 0 | 0 | 0 | 6 | 2 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 435. | 299. | 0. | 0. |
| NW COUNT: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 269. | 0. | 0. |
| NNW COUNT: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 601. | 0. | 0. | 0. |
| ALL COUNT: | 4 | 3 | 4 | 6 | 54 | 31 | 12 | 11 |
| AVE TSP: | 291. | 306. | 333. | 299. | 366. | 350. | 343. | 334. |

24-HR STANDARD EXCEEDANCE ROSE FOR
INTERLAKE INC. - CHICAGO, IL
(ALL CASES > 150 UG/M**3)
X=0.900
COUNT/AVERAGE TSP OF SECONDARY EXCEEDANCES

| SAROAD # | 141220010 | | 141220018 | | 141220022 | | 141220031 | |
|---|---|---|---|---|---|---|---|---|
| SITE ID # | 1 | | 2 | | 3 | | 4 | |
| DIRECTION | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X |
| N COUNT: | 0 | 0 | 1 | 2 | 2 | 4 | 0 | 3 |
| AVE TSP: | 0. | 0. | 221. | 252. | 171. | 212. | 0. | 239. |
| NNE COUNT: | 0 | 1 | 1 | 2 | 4 | 4 | 2 | 2 |
| AVE TSP: | 0. | 196. | 162. | 184. | 324. | 193. | 162. | 225. |
| NE COUNT: | 0 | 3 | 4 | 8 | 2 | 9 | 1 | 6 |
| AVE TSP: | 0. | 171. | 208. | 206. | 287. | 257. | 158. | 175. |
| ENE COUNT: | 4 | 4 | 7 | 9 | 1 | 7 | 1 | 6 |
| AVE TSP: | 187. | 188. | 200. | 214. | 201. | 201. | 159. | 186. |
| E COUNT: | 0 | 10 | 0 | 9 | 0 | 13 | 2 | 10 |
| AVE TSP: | 0. | 190. | 0. | 211. | 0. | 196. | 194. | 184. |
| ESE COUNT: | 0 | 4 | 0 | 2 | 1 | 9 | 1 | 6 |
| AVE TSP: | 0. | 199. | 0. | 190. | 195. | 182. | 205. | 177. |
| SE COUNT: | 0 | 4 | 2 | 1 | 3 | 7 | 3 | 3 |
| AVE TSP: | 0. | 223. | 157. | 151. | 185. | 224. | 163. | 241. |
| SSE COUNT: | 0 | 3 | 1 | 2 | 4 | 6 | 2 | 4 |
| AVE TSP: | 0. | 217. | 164. | 177. | 311. | 230. | 163. | 173. |
| S COUNT: | 2 | 3 | 4 | 2 | 26 | 15 | 13 | 6 |
| AVE TSP: | 165. | 192. | 172. | 163. | 197. | 175. | 219. | 163. |
| SSW COUNT: | 5 | 2 | 6 | 2 | 41 | 30 | 28 | 8 |
| AVE TSP: | 188. | 162. | 203. | 246. | 212. | 217. | 192. | 235. |
| SW COUNT: | 3 | 1 | 3 | 2 | 22 | 25 | 22 | 18 |
| AVE TSP: | 226. | 168. | 162. | 162. | 252. | 216. | 213. | 199. |
| WSW COUNT: | 2 | 3 | 3 | 3 | 19 | 29 | 18 | 17 |
| AVE TSP: | 169. | 210. | 262. | 247. | 310. | 242. | 219. | 222. |
| W COUNT: | 3 | 4 | 2 | 5 | 29 | 20 | 12 | 12 |
| AVE TSP: | 252. | 196. | 288. | 177. | 254. | 243. | 248. | 206. |
| WNW COUNT: | 0 | 2 | 1 | 3 | 13 | 20 | 5 | 9 |
| AVE TSP: | 0. | 207. | 156. | 175. | 304. | 194. | 182. | 176. |
| NW COUNT: | 0 | 2 | 1 | 2 | 7 | 13 | 2 | 3 |
| AVE TSP: | 0. | 180. | 246. | 182. | 212. | 193. | 185. | 184. |
| NNW COUNT: | 0 | 0 | 0 | 0 | 5 | 8 | 0 | 1 |
| AVE TSP: | 0. | 0. | 0. | 0. | 267. | 183. | 0. | 166. |
| ALL COUNT: | 19 | 46 | 36 | 54 | 179 | 219 | 112 | 114 |
| AVE TSP: | 199. | 195. | 201. | 202. | 245. | 213. | 207. | 199. |

## AIR QUALITY EVALUATION - INTERLAKE STEEL, CHICAGO, ILLINOIS

Air quality trends:

Stations #3 and #4 are in phase to substantial detail; values at station #3 are consistently larger than those at station #4. The Spearman correlation coefficients for these records (-0.73 for #3, -0.71 for #4) indicate negative trends for the long term.

The trend graphs for stations #1 and #2 are everywhere much lower than those of stations #3 and #4. The Spearman correlation coefficients for these stations (-0.66 for #1, -0.01 for #2) indicate a moderate downtrend and a negligible trend, respectively.

The highest percentage of observations exceeding 150 $\mu g/m^3$ was over 75 percent, occurring in 1977 at station #3. The percentage fell to near 10 percent by the end of 1982. A similar pattern with lower percentages is shown for station #4. Approximately 25 percent of the observations exceeded 260 $\mu g/m^3$ at station #3 in mid-1977; this percentage fell to zero by 1980.

Standard exceedance status:

Stations #3 and #4 continued to violate the annual primary TSP standard through 1982. No primary standard violations occurred since 1979 at station #1 and 1981 at station #2.

Pollution roses:

Pollution roses for stations #1, #2, #3, and #4 indicate that the largest average TSP values under steady winds come from directions containing the facility. Little impact of the Interlake BOF shop can be detected since there are no stations within close proximity.

Standard exceedance roses:

Stations #3 and #4 received the largest number of excursions past the 24-hour primary standard under steady winds during 1973-1982. Roughly half of the exceedance cases at station #4 occurred with wind directions that would have transported Interlake emissions to these stations; the other half occurred with wind directions from the Republic mill. Approximately one third of the primary standard exceedances at station #4 appear to be associated with wind directions likely to transport emissions from the Interlake facilities to the station. Most of the

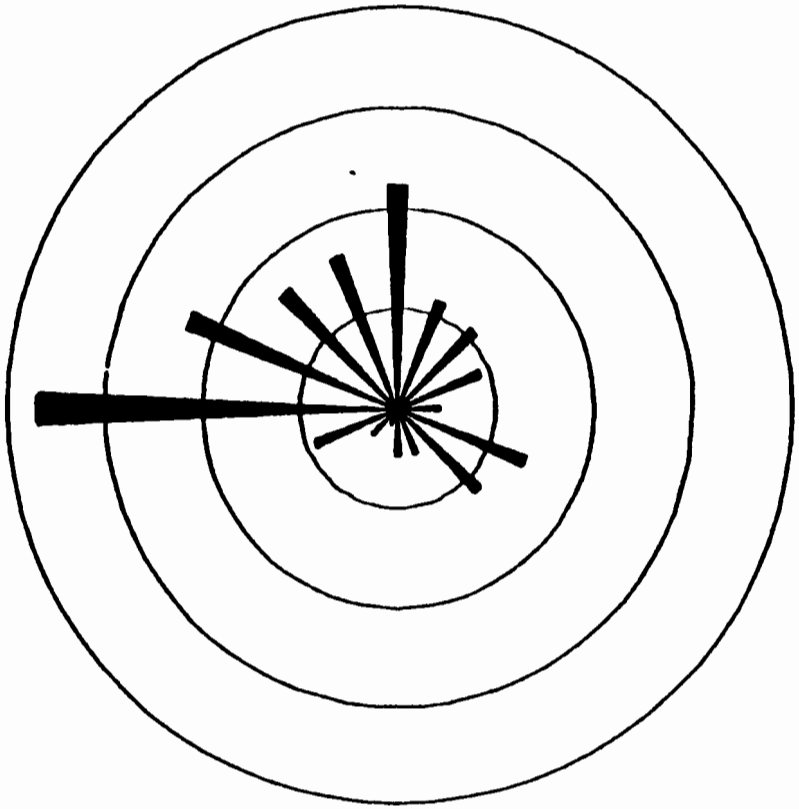
remaining two-thirds of the cases are more likely associated with Republic plant emissions. Stations #1 and #2 suffered a much lower frequency of primary excursions under steady winds (4 each), and station #2 recorded only one such excursion that may have involved plant emissions; station #1 recorded none out of its four. Both of these stations are much farther from the Interlake facilities than #3 or #4.

Inhalable particulate matter:

Station #3 samples IP as part of the EPA IP Network. Data summarized for this site are as follows:

| Year | Instrument | # of Obs. | Arithmetic Mean | Highest | Second Highest | Standard Deviation |
|---|---|---|---|---|---|---|
| 1981 | SSI | 29 | 92.6 | 289.0 | 217.9 | 53.0 |
| 1981 | DICHOT | 40 | 58.5 | 120.1 | 109.5 | 23.8 |
| 1982 | DICHOT | 12 | 47.1 | 74.6 | 83.0 | 21.2 |

WIND ROSE
PERSISTENCE CLASS 0.90
WIND STATION 94846

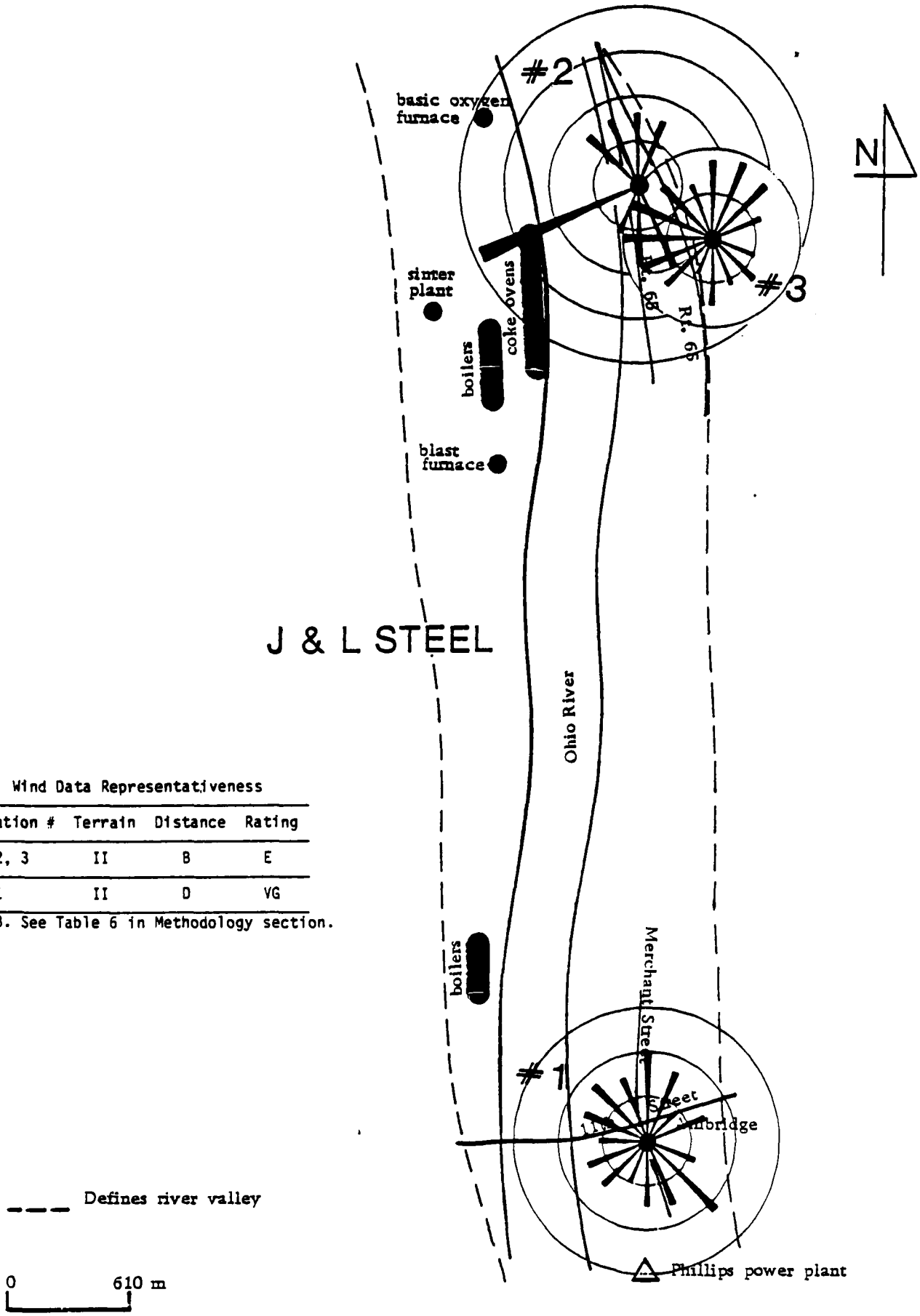


JONES & LAUGHLIN STEEL
Aliquippa
Beaver County
Pennsylvania
EPA Region III

Hi-Vol Monitoring Sites--Jones & Laughlin Steel, Aliquippa, Pennsylvania

| Site ID Number | SAROAD Number | Site Name and Address | Plant Location from Site | | | Elevation (m) | | | Site Description | Nearest Roadway | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Facility/ Bearing (°) | | Distance (km) | Above Ground | Above MSL | Above Plant | | Name | Direc- tion | Distance (m) | Volume |
| 1 | 39-0180-507-F01 | Ambridge Post Office 1020 Merchant St. Ambridge, PA | Boilers | 316 | 1.2 | 5 | 226 | 0 | Roof (gravel) | Merchant St. | WSW | 9 | M |
| | | | Rest of plant | 348-353 | 3.4-5.1 | | | | Suburban-commercial | Paved rd. | SE | 6 | L |
| | | | | | | | | | | Paved rd. | NE | 55 | L |
| | | | | | | | | | | 11th St. | NNW | 122 | M |
| 2 | 39-0440-004-F01 | U.S. 65 & Holmes Ave. Baden, PA | Boilers | 192 | 3.9 | 1 | 229 | 3 | Small gravel plot | Paved rd. | SSE | 9 | L |
| | | | Rest of plant | 207-298 | 1.0-1.5 | | | | | Rt. 65 | W | 8 | H |
| | | | | | | | | | | Rt. 65 | ENE | 122 | H |
| 3 | 39-0440-509-F02 | Baden Elem. School Harmony & State Sts. Baden, PA | Boilers | 203 | 3.6 | 5 | 232 | 6 | Roof | Harmony St. | N | 84 | U |
| | | | Rest of plant | 230-310 | 1.5-1.6 | | | | Suburban-industrial | State St. | E | 152 | U |

Key: U = Unavailable M = Moderate
L = Light H = Heavy




Wind Data Representativeness

| Station # | Terrain | Distance | Rating |
|---|---|---|---|
| 2, 3 | II | B | E |
| 1 | II | D | VG |

N.B. See Table 6 in Methodology section.

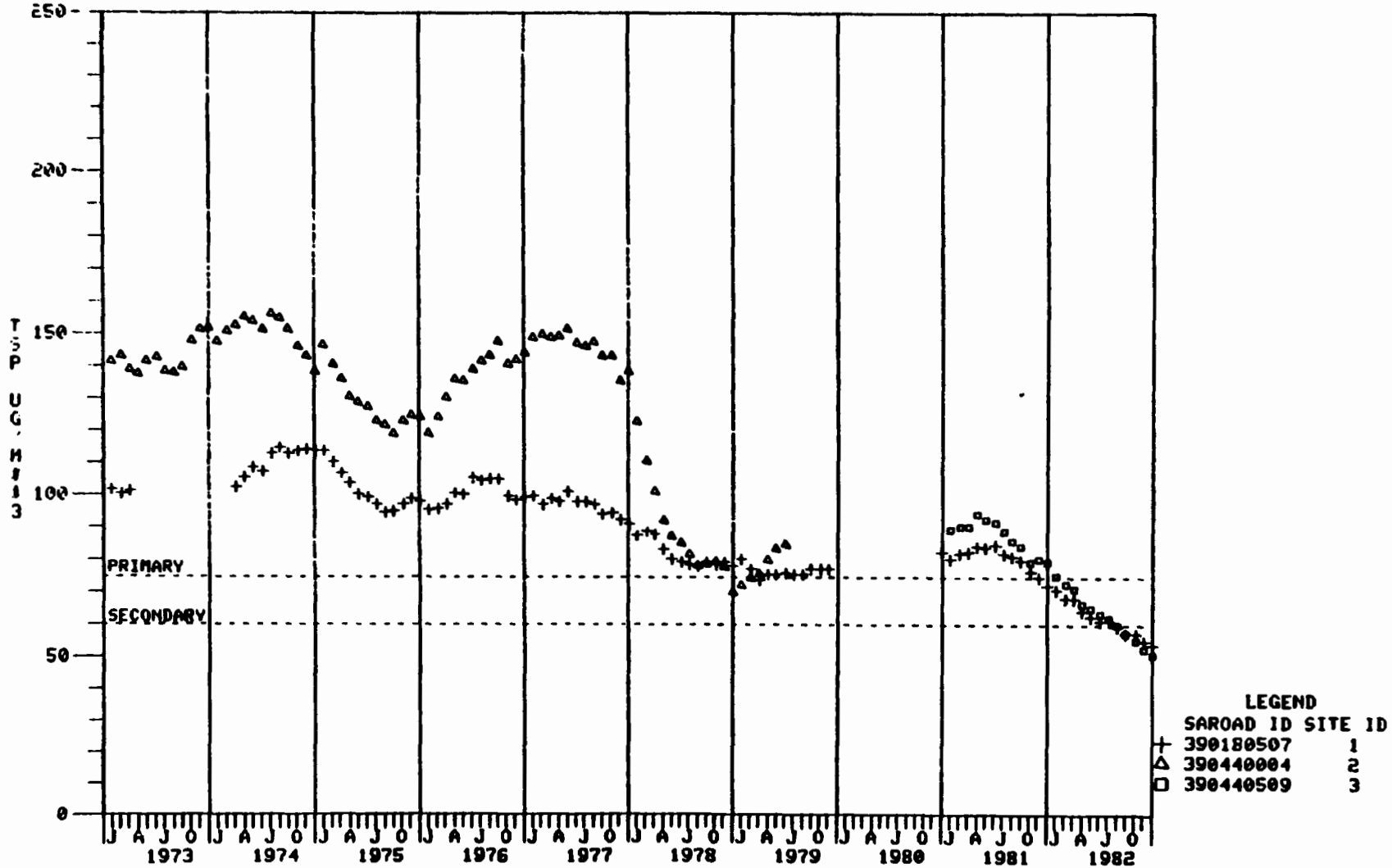
TSP roses for Jones & Laughlin Steel - Aliquippa, Pennsylvania, for the period 1978-1982 for cases of $\omega$>0.85. Each circle represents 50 $\mu g/m^3$.

NUMBER OF TSP OBSERVATIONS USED IN POLLUTION ROSES

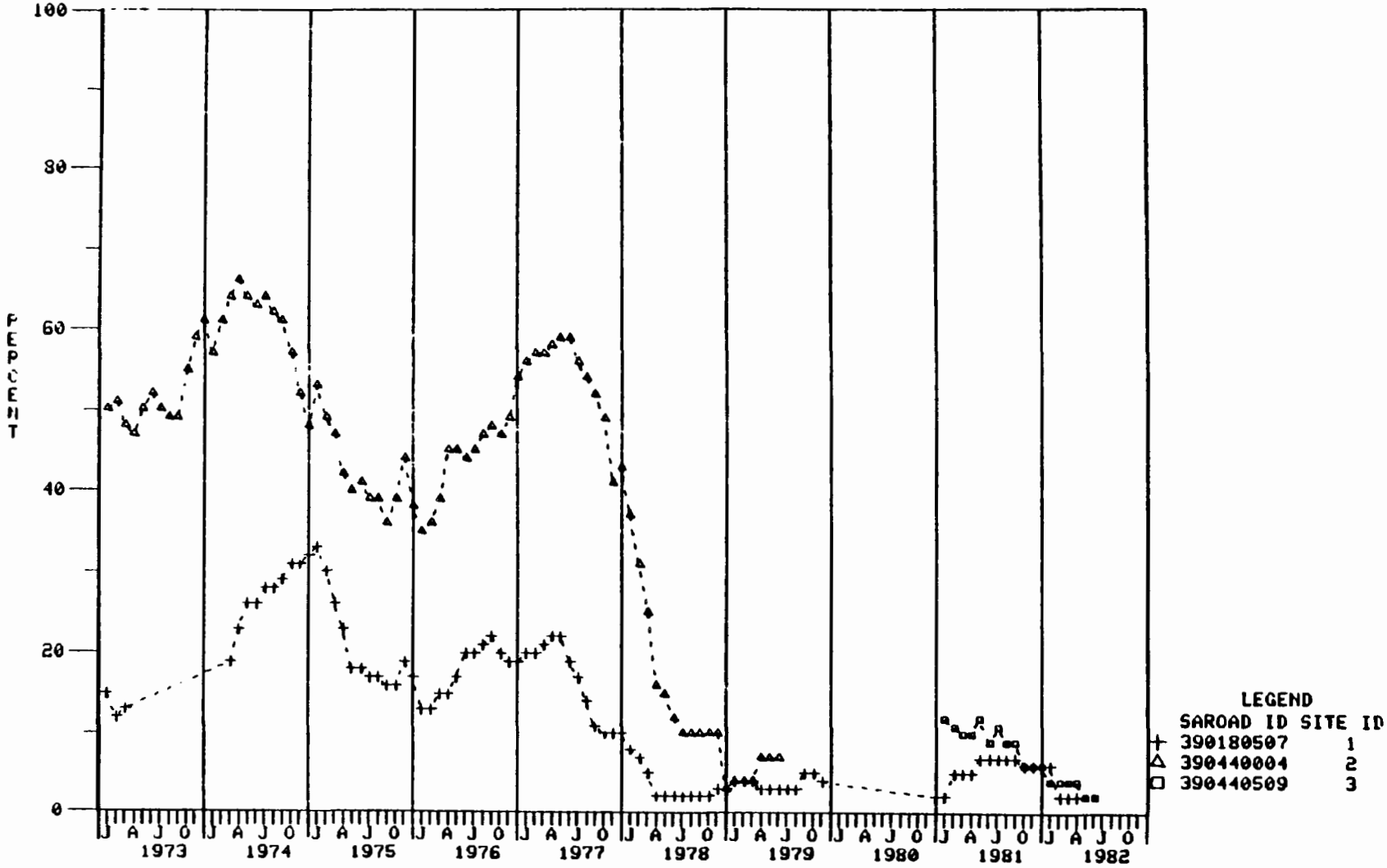
Jones & Laughlin Steel--Aliquippa, PA

| Wind Direction | Monitoring Site Numbers #1 | #2 | #3 |
|---|---|---|---|
| N | 12 | 7 | 4 |
| NNE | 50 | 41 | 9 |
| NE | 3 | 0 | 3 |
| ENE | 6 | 0 | 6 |
| E | 0 | 0 | 0 |
| ESE | 4 | 0 | 5 |
| SE | 2 | 0 | 1 |
| SSE | 7 | 2 | 4 |
| S | 6 | 1 | 5 |
| SSW | 5 | 1 | 4 |
| SW | 9 | 0 | 9 |
| WSW | 13 | 1 | 12 |
| W | 14 | 0 | 14 |
| WNW | 8 | 0 | 5 |
| NW | 8 | 2 | 5 |
| NNW | 5 | 3 | 3 |
| Total | 152 | 58 | 89 |

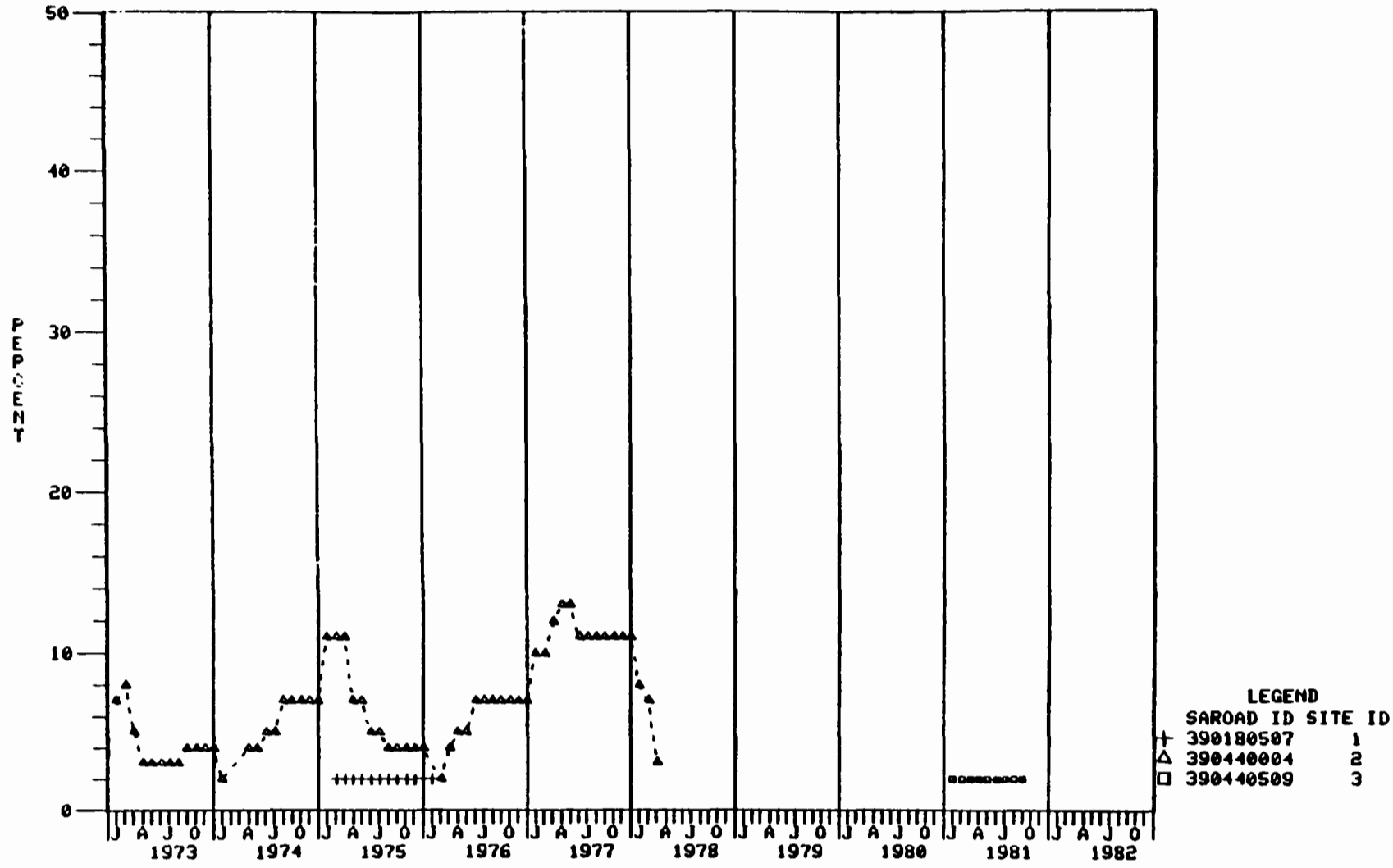
TSP 12 MONTH RUNNING GEOMETRIC MEANS (UG/M**3) FOR J & L STEEL - ALIQUIPPA, PA



TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 150 (UG/M**3) FOR J & L STEEL - ALIQUIPPA, PA



TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 260 (UG/M**3) FOR J & L STEEL - ALIQUIPPA, PA



TSP DATA SUMMARY FOR J & L STEEL - ALIQUIPPA, PA
SAROAD STATION # 390180507 SITE ID # 01
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 59 | 29 | 59 | 42 | 59 | 61 | 60 | 45 | 46 | 54 | 60 |
| GEOMETRIC MEAN: | 104.2 | ****** | 114.0 | 98.4 | 99.7 | 91.3 | 78.2 | ****** | 82.5 | 72.2 | 54.0 |
| GEOMETRIC S.D.: | 1.5 | ****** | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | ****** | 1.4 | 1.5 | 1.6 |
| ARITHMETIC MEAN | 112.1 | ****** | 122.7 | 106.8 | 108.1 | 98.4 | 85.1 | ****** | 87.4 | 77.9 | 60.1 |
| HIGHEST BY LARSEN EXTRP: | 336.1 | ****** | 365.0 | 310.8 | 324.7 | 278.9 | 268.0 | ****** | 233.4 | 234.5 | 222.6 |
| 1ST HIGHEST: | 206.0 | 184.0 | 245.0 | 290.0 | 234.0 | 256.0 | 208.0 | 185.0 | 159.0 | 163.0 | 128.0 |
| DATE : | 720104 | 730808 | 740228 | 750205 | 760623 | 770119 | 781104 | 790930 | 801030 | 810215 | 820505 |
| 2ND HIGHEST: | 182.0 | 175.0 | 201.0 | 226.0 | 222.0 | 232.0 | 184.0 | 151.0 | .147.0 | 158.0 | 126.0 |
| DATE : | 720110 | 731025 | 740105 | 751003 | 760418 | 770419 | 780526 | 790509 | 801123 | 810227 | 820423 |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 10 | 2 | 18 | 7 | 11 | 6 | 2 | 2 | 1 | 3 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 8 | 4 | 4 | 5 | 10 | 14 | 18 | 12 | 12 | 19 | 37 |
| 66-130: | 31 | 21 | 32 | 26 | 34 | 39 | 36 | 29 | 32 | 31 | 23 |
| 131-195: | 19 | 4 | 19 | 9 | 12 | 6 | 5 | 4 | 2 | 4 | 0 |
| 196-260: | 1 | 0 | 4 | 1 | 3 | 2 | 1 | 0 | 0 | 0 | 0 |
| 261-325: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR J & L STEEL - ALIQUIPPA, PA
SAROAD STATION # 390440004 SITE ID # 02
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 58 | 56 | 58 | 55 | 59 | 61 | 60 | 15 | 0 | 0 | 0 |
| GEOMETRIC MEAN: | 146.2 | 151.8 | 138.2 | 124.5 | 144.4 | 138.6 | 69.9 | ****** | ****** | ****** | ****** |
| GEOMETRIC S.D.: | 1.6 | 1.4 | 1.6 | 1.5 | 1.6 | 1.6 | 1.7 | ****** | ****** | ****** | ****** |
| ARITHMETIC MEAN | 162.1 | 161.0 | 153.2 | 135.8 | 162.4 | 152.8 | 78.8 | ****** | ****** | ****** | ****** |
| HIGHEST BY LARSEN EXTRP: | 556.2 | 450.0 | 585.7 | 427.1 | 612.9 | 517.6 | 304.9 | ****** | ****** | ****** | ****** |
| 1ST HIGHEST: | 393.0 | 289.0 | 285.0 | 328.0 | 440.0 | 359.0 | 192.0 | 182.0 | ****** | ****** | ****** |
| DATE : | 720116 | 730110 | 740429 | 750106 | 760611 | 770218 | 780824 | 790421 | ****** | ****** | ****** |
| 2ND HIGHEST: | 358.0 | 267.0 | 270.0 | 279.0 | 422.0 | 316.0 | 154.0 | 157.0 | ****** | ****** | ****** |
| DATE : | 720310 | 730227 | 740610 | 750118 | 760319 | 770131 | 780520 | 790509 | ****** | ****** | ****** |
| # OF READINGS EXCEEDING 260 : | 5 | 2 | 3 | 2 | 4 | 7 | 0 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 28 | 33 | 27 | 20 | 32 | 26 | 2 | 2 | 0 | 0 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 3 | 3 | 3 | 6 | 3 | 4 | 27 | 1 | 0 | 0 | 0 |
| 66-130: | 21 | 12 | 20 | 21 | 19 | 22 | 25 | 12 | 0 | 0 | 0 |
| 131-195: | 16 | 26 | 19 | 22 | 23 | 24 | 8 | 2 | 0 | 0 | 0 |
| 196-260: | 13 | 13 | 13 | 4 | 10 | 4 | 0 | 0 | 0 | 0 | 0 |
| 261-325: | 1 | 2 | 3 | 1 | 0 | 6 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 3 | 0 | 0 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR J & L STEEL - ALIQUIPPA, PA
SAROAD STATION # 390440509 SITE ID # 03
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14 | 39 | 51 | 61 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 79.6 | 50.7 |
| GEOMETRIC S.D.: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 1.4 | 1.5 |
| ARITHMETIC MEAN | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 84.7 | 55.1 |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 226.6 | 175.0 |
| 1ST HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 147.0 | 306.0 | 154.0 | 116.0 |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 790212 | 801030 | 810116 | 820505 |
| 2ND HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 145.0 | 171.0 | 152.0 | 112.0 |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 790224 | 800801 | 810709 | 820324 |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 2 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 8 | 17 | 45 |
| 66-130: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 27 | 29 | 16 |
| 131-195: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 3 | 5 | 0 |
| 196-260: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

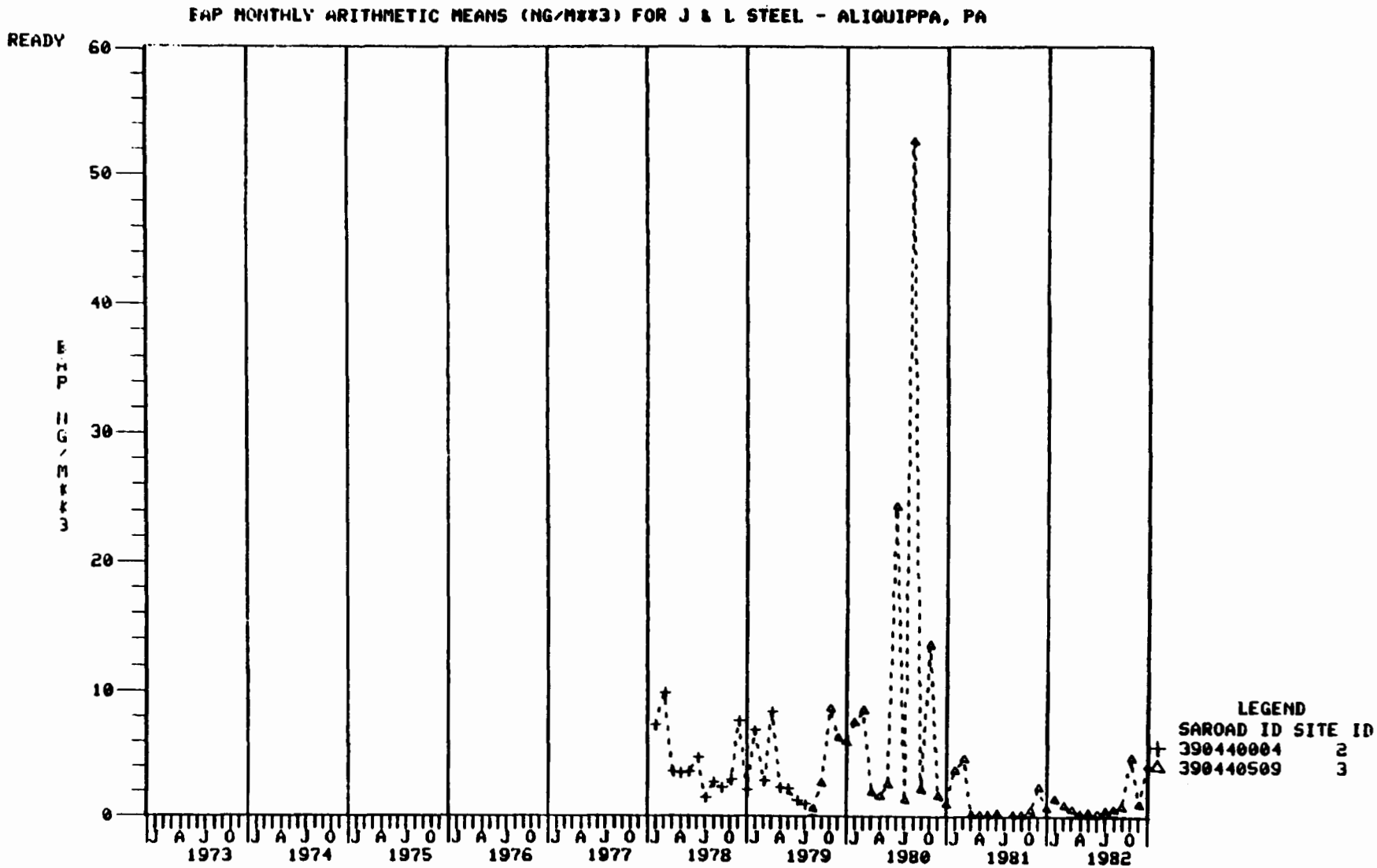
****** INDICATES MISSING OR INSUFFICIENT DATA

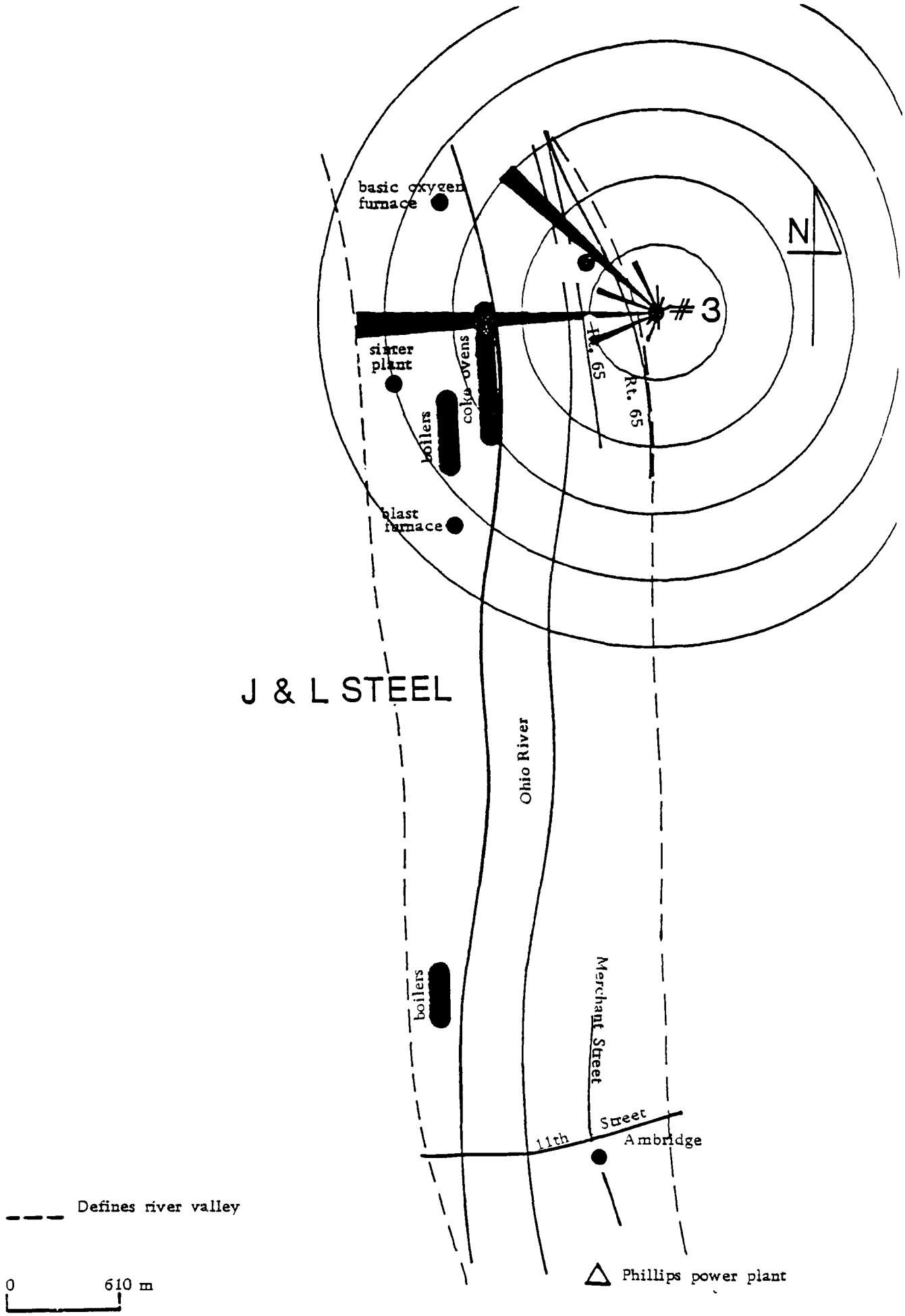
24-HR STANDARD EXCEEDANCE ROSE FOR
J & L STEEL - ALIQUIPPA, PA
(ALL CASES > 260 UG/M**3)
X=0.850
COUNT/AVERAGE TSP OF PRIMARY EXCEEDANCES

| SAROAD # | 390180507 | | 390440004 | | 390440509 | |
|---|---|---|---|---|---|---|
| SITE ID # | 1 | | 2 | | 3 | |
| DIRECTION | W>=X | W<X | W>=X | W<X | W>=X | W<X |
| N COUNT: | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. |
| NNE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. |
| NE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. |
| ENE COUNT: | 0 | 0 | 1 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 267. | 0. | 0. | 0. |
| E COUNT: | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. |
| ESE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. |
| SE COUNT: | 0 | 1 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 290. | 0. | 0. | 0. | 0. |
| SSE COUNT: | 0 | 0 | 1 | 1 | 0 | 0 |
| AVE TSP: | 0. | 0. | 267. | 328. | 0. | 0. |
| S COUNT: | 0 | 0 | 3 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 375. | 0. | 0. | 0. |
| SSW COUNT: | 0 | 0 | 1 | 3 | 0 | 0 |
| AVE TSP: | 0. | 0. | 270. | 287. | 0. | 0. |
| SW COUNT: | 0 | 0 | 2 | 2 | 0 | 0 |
| AVE TSP: | 0. | 0. | 298. | 307. | 0. | 0. |
| WSW COUNT: | 0 | 0 | 2 | 0 | 1 | 0 |
| AVE TSP: | 0. | 0. | 278. | 0. | 306. | 0. |
| W COUNT: | 0 | 0 | 2 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 372. | 0. | 0. | 0. |
| WNW COUNT: | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. |
| NW COUNT: | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. |
| NNW COUNT: | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. |
| ALL COUNT: | 0 | 1 | 12 | 6 | 1 | 0 |
| AVE TSP: | 0. | 290. | 319. | 301. | 306. | 0. |

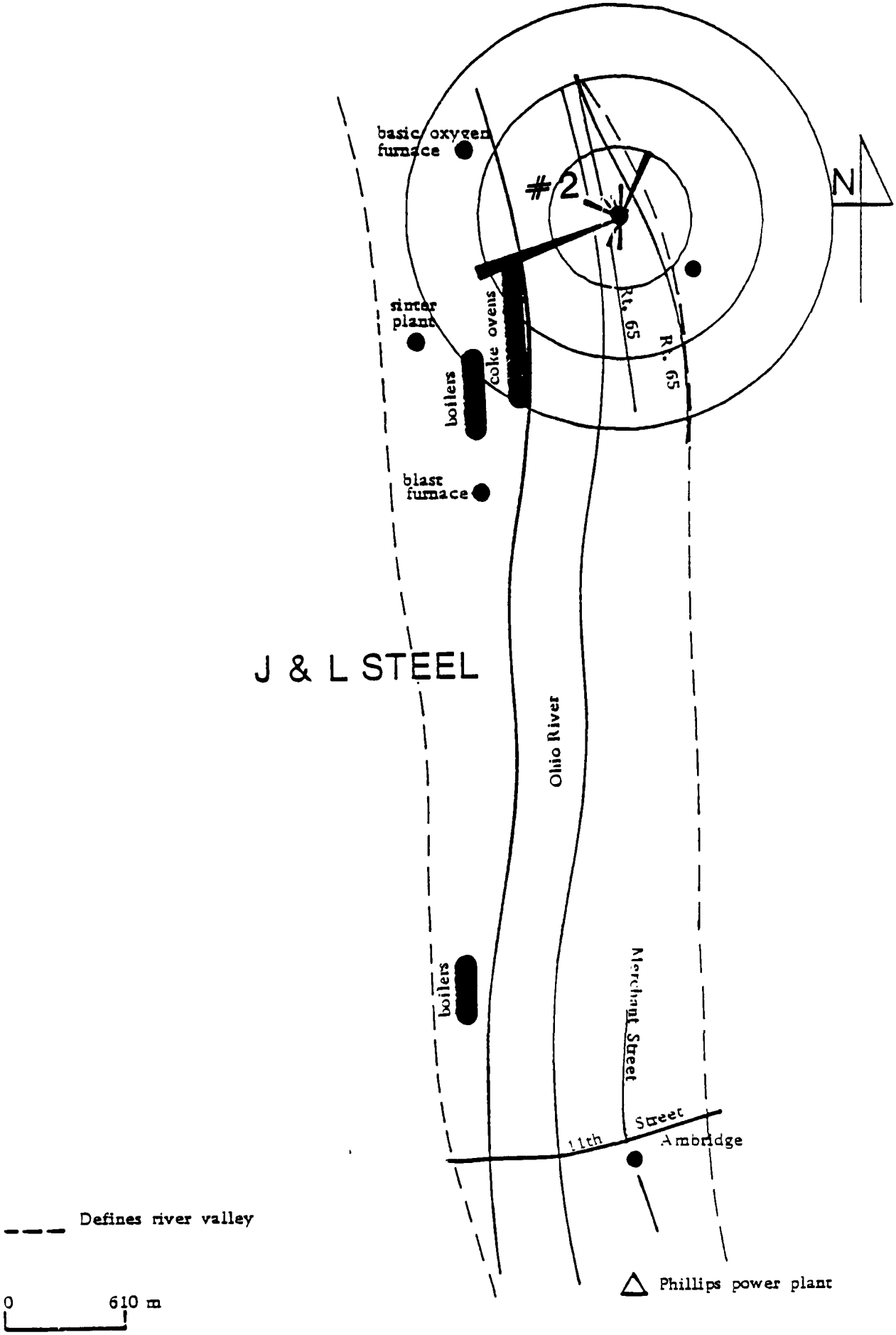
24-HR STANDARD EXCEEDANCE ROSE FOR
J & L STEEL - ALIQUIPPA, PA
(ALL CASES > 150 UG/M**3)
X=0.850
COUNT/AVERAGE TSP OF SECONDARY EXCEEDANCES

| SAROAD # | 390180507 | | 390440004 | | 390440509 | |
|---|---|---|---|---|---|---|
| SITE ID # | 1 | | 2 | | 3 | |
| DIRECTION | W>=X | W<X | W>=X | W<X | W>=X | W<X |
| N COUNT: | 2 | 1 | 0 | 0 | 0 | 0 |
| AVE TSP: | 185. | 160. | 0. | 0. | 0. | 0. |
| NNE COUNT: | 1 | 0 | 1 | 0 | 0 | 0 |
| AVE TSP: | 208. | 0. | 154. | 0. | 0. | 0. |
| NE COUNT: | 1 | 0 | 1 | 1 | 0 | 0 |
| AVE TSP: | 189. | 0. | 186. | 156. | 0. | 0. |
| ENE COUNT: | 0 | 1 | 1 | 1 | 0 | 0 |
| AVE TSP: | 0. | 158. | 267. | 151. | 0. | 0. |
| E COUNT: | 0 | 1 | 0 | 1 | 0 | 0 |
| AVE TSP: | 0. | 159. | 0. | 216. | 0. | 0. |
| ESE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. |
| SE COUNT: | 1 | 1 | 2 | 0 | 0 | 0 |
| AVE TSP: | 182. | 290. | 207. | 0. | 0. | 0. |
| SSE COUNT: | 2 | 4 | 3 | 4 | 0 | 0 |
| AVE TSP: | 192. | 163. | 214. | 218. | 0. | 0. |
| S COUNT: | 4 | 3 | 8 | 8 | 0 | 0 |
| AVE TSP: | 185. | 182. | 282. | 180. | 0. | 0. |
| SSW COUNT: | 0 | 5 | 7 | 14 | 0 | 1 |
| AVE TSP: | 0. | 183. | 200. | 207. | 0. | 160. |
| SW COUNT: | 6 | 8 | 16 | 22 | 0 | 0 |
| AVE TSP: | 194. | 175. | 208. | 199. | 0. | 0. |
| WSW COUNT: | 2 | 1 | 13 | 7 | 1 | 0 |
| AVE TSP: | 193. | 201. | 218. | 193. | 306. | 0. |
| W COUNT: | 2 | 1 | 8 | 9 | 2 | 1 |
| AVE TSP: | 185. | 176. | 226. | 176. | 153. | 171. |
| WNW COUNT: | 1 | 0 | 7 | 3 | 0 | 0 |
| AVE TSP: | 155. | 0. | 185. | 183. | 0. | 0. |
| NW COUNT: | 1 | 1 | 1 | 2 | 1 | 0 |
| AVE TSP: | 155. | 188. | 154. | 165. | 157. | 0. |
| NNW COUNT: | 1 | 1 | 0 | 2 | 0 | 0 |
| AVE TSP: | 172. | 168. | 0. | 224. | 0. | 0. |
| ALL COUNT: | 24 | 28 | 68 | 74 | 4 | 2 |
| AVE TSP: | 186. | 179. | 217. | 194. | 192. | 166. |


BAP MONTHLY ARITHMETIC MEANS (NG/M**3) FOR J & L STEEL - ALIQUIPPA, PA
READY
BAP NG/M**3
60
50
40
30
20
10
0
J A J O
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
LEGEND
SAROAD ID SITE ID
390440004 2
390440509 3




BaP roses for Jones & Laughlin Steel - Aliquippa, Pennsylvania, for the period 1978-1982 for cases of $\omega$>0.80. Each circle represents 5 ng/m$^3$.




BaP roses for Jones & Laughlin Steel - Aliquippa, Pennsylvania, for the period 1978-1982 for cases of $\omega$>0.80. Each circle represents 5 ng/m$^3$.

## AIR QUALITY EVALUATION - J&L STEEL, ALIQUIPPA, PENNSYLVANIA

Air quality trends:

The cyclic pattern in running 12-month geometric means established earlier changed abruptly in early 1978. Values at site #2 declined rapidly throughout 1978 to meet those recorded at site #1. Station #3 came on line in 1980, and geometric means declined steadily from mid-1981 through 1982.

The Spearman correlation coefficient for station #1 was -0.91, indicating a strong long-term negative trend. Station #2 indicated a moderate negative trend. Its Spearman correlation coefficient was -0.57. A strong downtrend was implied at station #3, with a coefficient of -0.97.

The dramatic decline in TSP during 1977 and 1978 at station #2 was clearly evident as the percentage of observations exceeding 150 $\mu g/m^3$ fell from 60 percent to 5 percent.

Standard exceedance status:

Station #1 showed no further primary standard exceedances after 1980, while station #3 indicated a violation of the primary annual standard in 1981 but not in 1982.

Pollution roses:

Impacts from plant emissions are most readily discerned from the station #2 rose which employs data from 1978-1979. TSP levels from nonplant directions are not very different from those for any direction at site #1. The station #3 rose, which employs data primarily from 1980-1982, demonstrates much less well-defined impacts than did station #2.

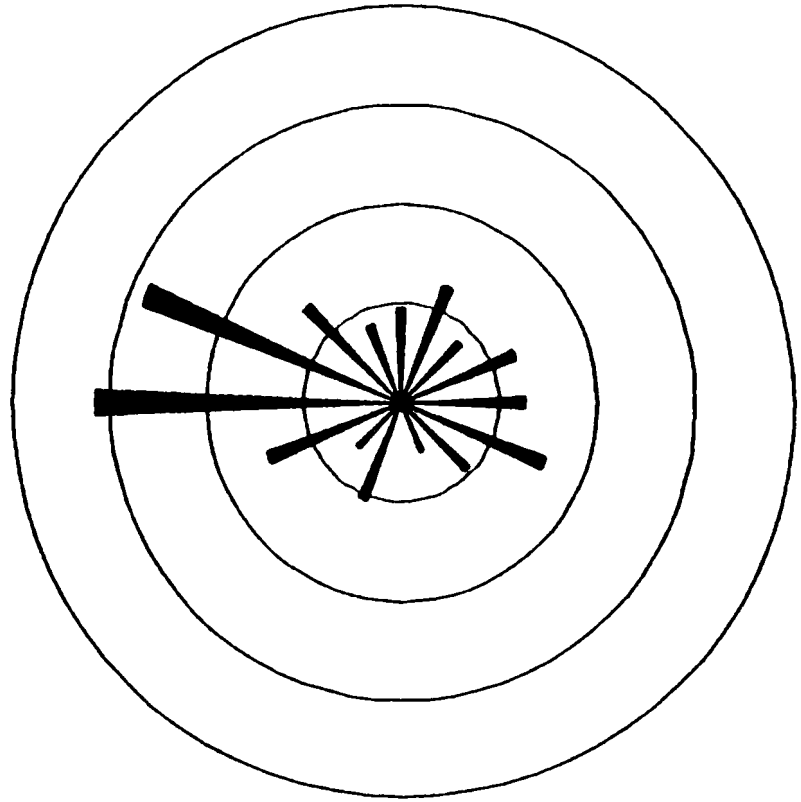
Standard exceedance roses:

Two-thirds of the primary 24-hour standard exceedance cases at station #2 occurred with winds carrying mill emissions toward the station. The sole cases of primary standard exceedance at station #3 occurred with persistent winds blowing from the direction of the coke ovens.

BaP:

BaP was sampled at station #2 (1978-1979) and station #3 (1979-1982). Monthly averages were relatively high, especially for station #3 which demonstrated values in excess of 20 $ng/m^3$ during 1980. The BaP pollution roses for stations #2 and #3 indicate largest contributions from the J&L coking facility.

WIND ROSE
PERSISTENCE CLASS 0.75
WIND STATION 390440004



JONES & LAUGHLIN STEEL
East Chicago
Lake County
Indiana
EPA Region V

Hi-Vol Monitoring Sites--Jones & Laughlin Steel, East Chicago, Indiana

| Site ID Number | SAROAD Number | Site Name and Address | Plant Location from Site | | Elevation (m) | | | Site Description | Nearest Roadway | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Bearing (°) | Distance (km) | Above Ground | Above MSL | Above Plant | | Name | Direction | Distance (m) | Type and Volume |
| 1 | 15-1180-001-H02 | Central Fire Station<br>405 E. Columbus Dr.<br>E. Chicago, IN | 29 | 3.4 | 10 | 180 | 0 | Roof<br>Center city-commercial | E. Columbus Dr. | S | 30 | 2-lane, H |
| 2 | 15-1180-003-H02 | Broad & Pine Sts.<br>(Marktown)<br>E. Chicago, IN | 64 | 1.8 | 4 | 180 | 0 | Roof<br>Center city-industrial | Broad St.<br>Pine St. | E<br>SE | 12<br>12 | 2-lane, M<br>2-lane, M |
| 3 | 15-1180-004-H02 | Field School<br>Block & James<br>E. Chicago, IN | 330 | 2.0 | 9 | 180 | 0 | Roof<br>Center city-industrial | Block Ave. | SW | 75 | 2-lane, M |
| 4 | 15-1180-006-H02 | Franklin School<br>Alder & 142d<br>E. Chicago, IN | 345 | 5.5 | 9 | 180 | 0 | Roof<br>Suburban-residential | Franklin | W | 25 | 2-lane, M |
| 5* | 15-1180-007 | Roxanna & Walsh<br>E. Chicago, IN | 30 | 6.4 | 4 | 180 | 0 | Roof | Roxanna Dr. | S | 15 | 2-lane, M |
| 6* | 15-1780-001 | Goldblotts<br>5206 Hohman Ave.<br>Hammond, IN | 51 | 7.5 | 15 | 180 | 0 | Roof | Hohman Ave. | E | 15 | 2-lane, H |
| 7* | 15-1780-002 | City Hall<br>5935 Calumet Ave.<br>Hammond, IN | 35 | 8.2 | 11 | 181 | 2 | Roof | Calumet Ave. | W | 25 | 2-lane, H |
| 8* | 15-1780-004 | Purdue Univ.<br>2233 171st St.<br>Hammond, IN | 12 | 9.2 | 10 | 184 | 3 | Roof | Woodmar Ave.<br>171st St. | W<br>S | 75<br>45 | 2-lane, M<br>2-lane, M |
| 9* | 15-1780-005 | Police & Fire Station<br>2211 Calumet Ave.<br>Hammond, IN | 105 | 6.8 | 5 | 180 | 0 | Roof | Calumet Ave. | W | 15 | 2-lane, H |
| 10* | 15-1780-006 | Hessville Fire Station<br>3323 165th St.<br>Hammond, IN | 358 | 7.8 | 5 | 181 | 2 | Roof | 165th St. | S | 30 | 2-lane, M |
| 11* | 15-1780-007 | GSA Bldg.<br>3200 Sheffield<br>Hammond, IN | 73 | 5.5 | 3 | 180 | 0 | Roof | Paved rd. | E | 12 | 2-lane, L |
| 12* | 15-1780-008 | 1300 141st St.<br>Hammond, IN | 55 | 5.2 | 5 | 178 | -2 | Roof | 141st St. | N | 15 | 2-lane, M |

(Continued)

Key: U = Unavailable M = Moderate
L = Light H = Heavy

* Data from this station were included in the original 1973-1977 analysis; however, no strong mill impact on TSP was noted at this site. Based on the likelihood that this situation has not changed, data from this site were not employed in the 1978-1980 or the 1981-1982 updates.

Hi-Vol Monitoring Sites--Jones & Laughlin Steel, East Chicago, Indiana (Concluded)

| Site ID Number | SAROAD Number | Site Name and Address | Plant Location from Site | | | Elevation (m) | | | Site Description | Nearest Roadway | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Facility/ Bearing (°) | | Distance (km) | Above Ground | Above MSL | Above Plant | | Name | Direc- tion | Distance (m) | Volume |
| 13 | Reference #13000 | Park Maintenance Bldg. E. Chicago, IN | Coke plant | 75 | 1.5 | 4.5 | 55 | 0 | Roof Residential | Pine Ave. | E | 17 | U |
| 14 | Reference #14000 | Mill Gate Inn E. Chicago, IN | Coke plant | 235 | 1.6 | 4.3 | 179 | 1.5 | Scaffold | Dickey Rd. | NE | 14 | U |
| 15 | Reference #15000 | Wayne Adams Buick Dealer Car Wash E. Chicago, IN | U | U | U | 5.2 | U | U | Roof | Wetling St. | SE | 65 | U |
| 16 | Reference #16000 | Field Elem. School E. Chicago, IN | Coke plant | 137 | 1.5 | 9 | 180 | 0 | Roof | Block Ave. | SW | 76 | U |

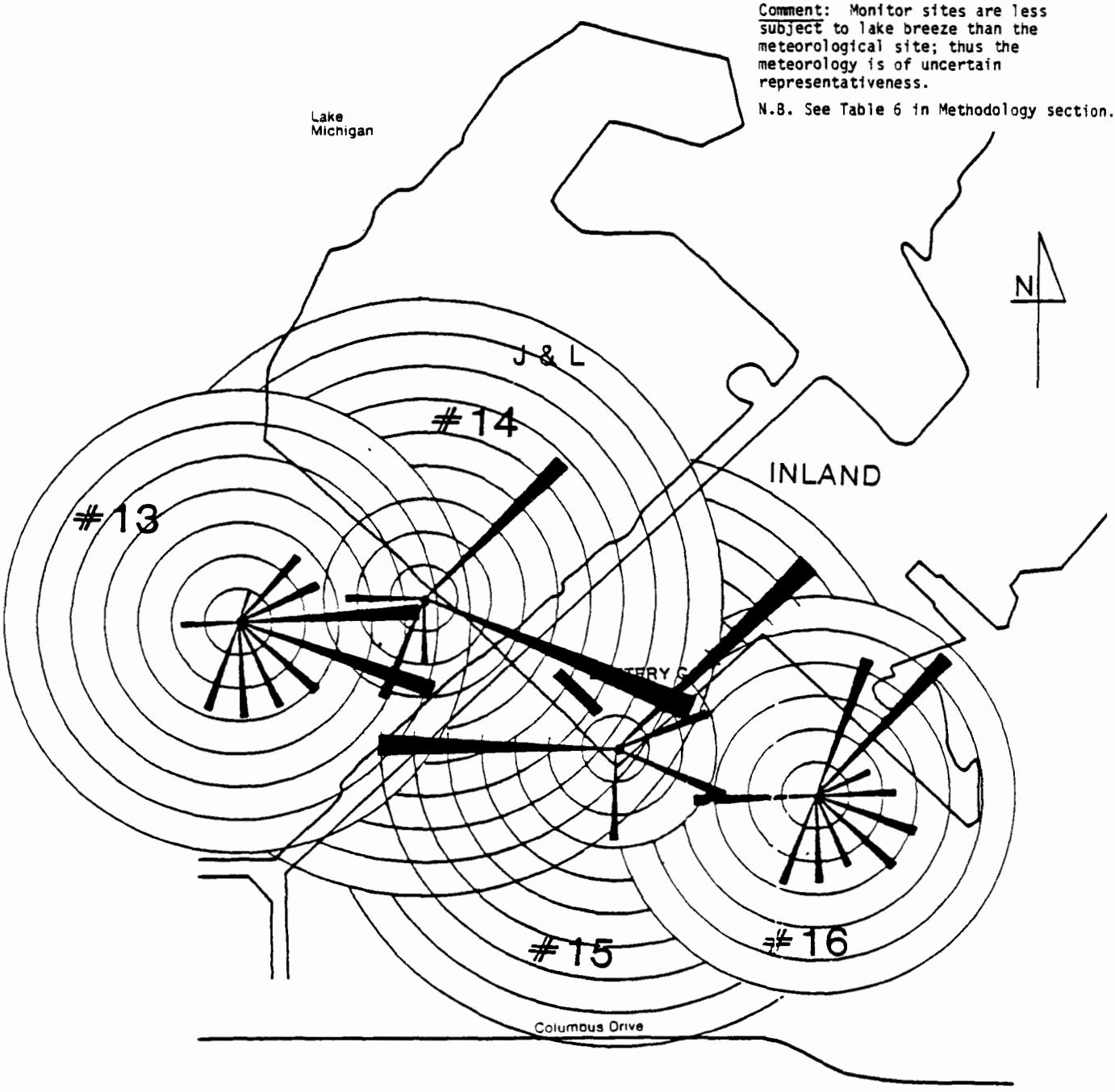
Key: U = Unavailable M = Moderate
L = Light H = Heavy

Wind Data Representativeness

| Station # | Terrain | Distance | Rating |
|---|---|---|---|
| 1, 2, 3, 4, 13, 14, 15, 16 | VI | G | U |

Comment: Monitor sites are less subject to lake breeze than the meteorological site; thus the meteorology is of uncertain representativeness.

N.B. See Table 6 in Methodology section.



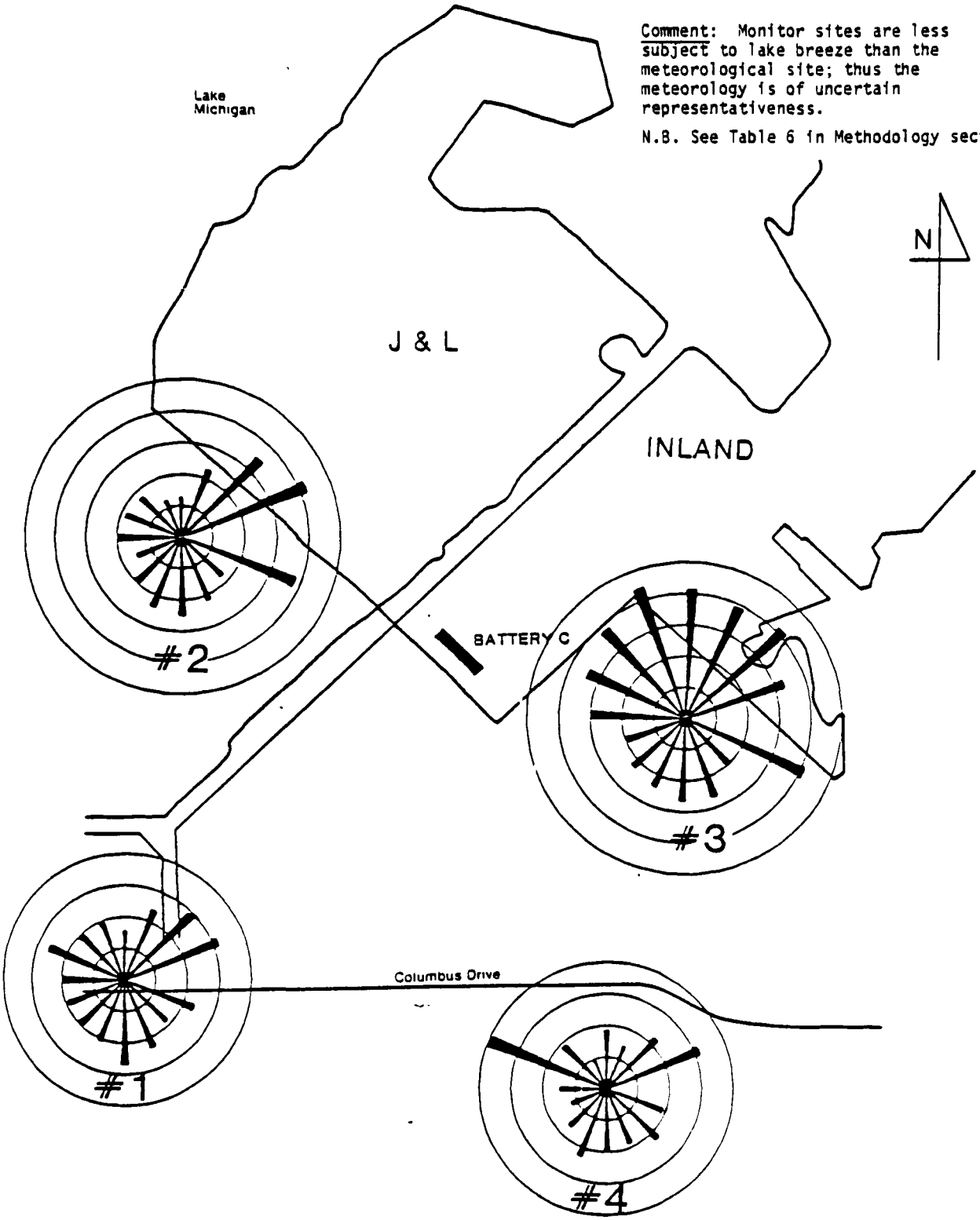

TSP roses for Jones & Laughlin Steel - East Chicago, Indiana, for the period 1978-1982 for cases of $\omega$>0.85. Special Study Sites. Each circle represents 50 $\mu g/m^3$.

Wind Data Representativeness

| Station # | Terrain | Distance | Rating |
|---|---|---|---|
| 1, 2, 3, 4, 13, 14, 15, 16 | VI | G | U |

Comment: Monitor sites are less subject to lake breeze than the meteorological site; thus the meteorology is of uncertain representativeness.

N.B. See Table 6 in Methodology section.



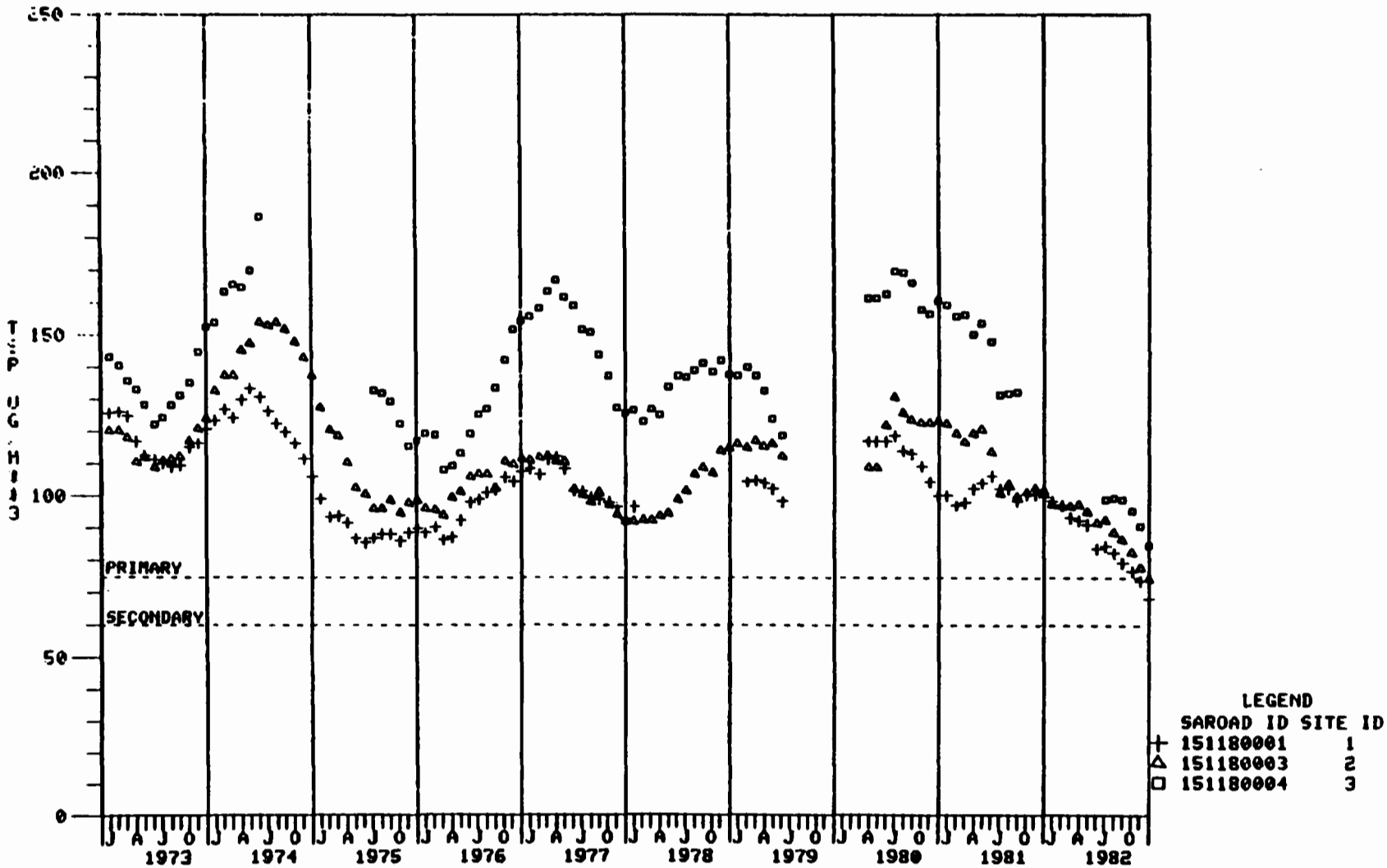

TSP roses for Jones & Laughlin Steel - East Chicago, Indiana, for the period 1978-1982 for cases of $\omega$>0.90. Each circle represents 50 $\mu g/m^3$.

NUMBER OF TSP OBSERVATIONS USED IN POLLUTION ROSES

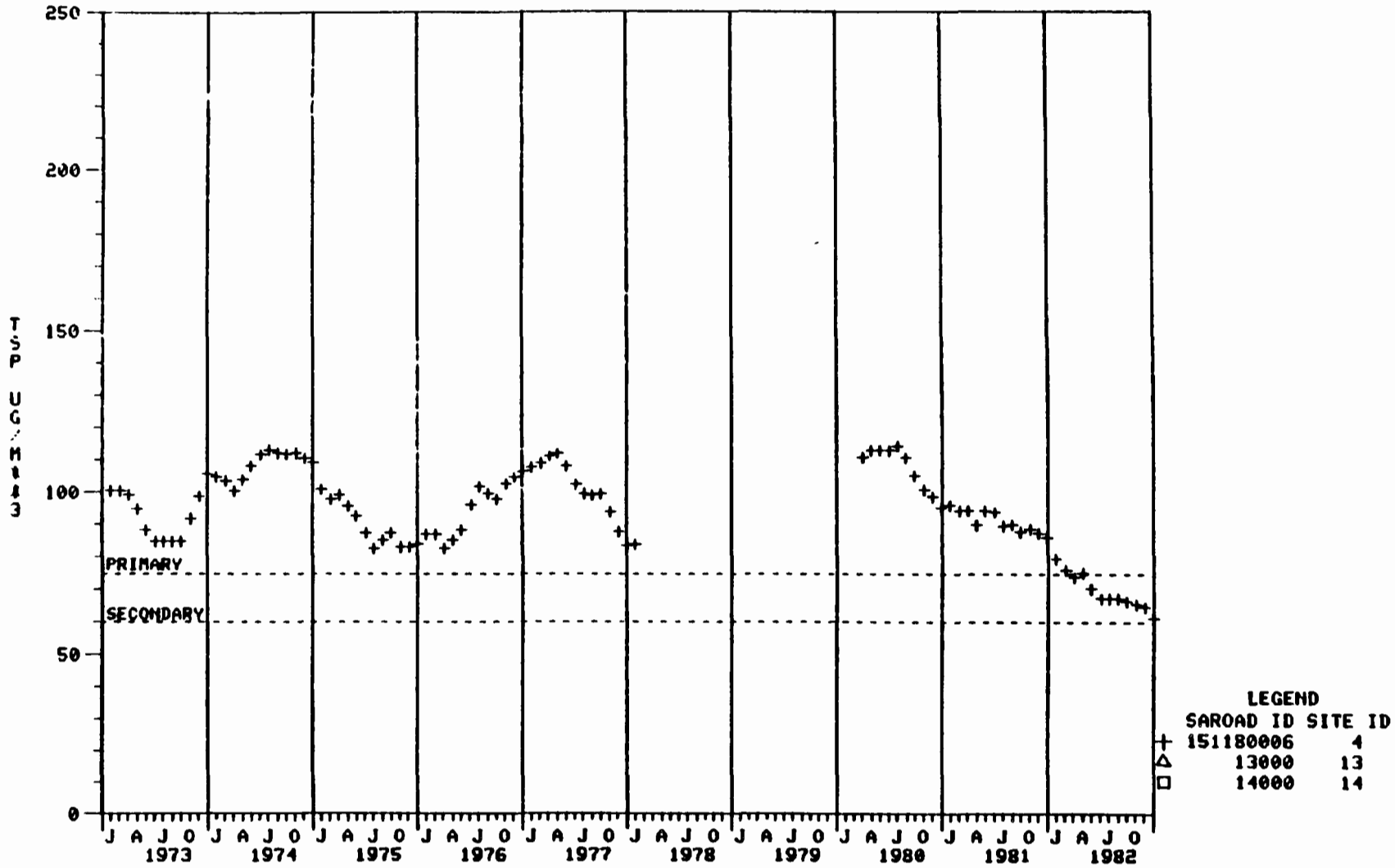
Jones & Laughlin Steel--East Chicago, IN

| Wind Direction | Monitoring Site Numbers | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | #1 | #2 | #3 | #4 | #13 | #14 | #15 | #16 |
| N | 7 | 7 | 5 | 5 | 0 | 0 | 0 | 0 |
| NNE | 5 | 7 | 7 | 5 | 1 | 0 | 0 | 1 |
| NE | 3 | 7 | 7 | 2 | 4 | 3 | 4 | 4 |
| ENE | 3 | 4 | 3 | 2 | 1 | 0 | 1 | 1 |
| E | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| ESE | 3 | 4 | 4 | 3 | 1 | 1 | 1 | 1 |
| SE | 3 | 3 | 1 | 1 | 2 | 0 | 0 | 2 |
| SSE | 10 | 12 | 10 | 9 | 2 | 0 | 0 | 2 |
| S | 23 | 25 | 21 | 22 | 2 | 1 | 2 | 2 |
| SSW | 17 | 19 | 18 | 17 | 1 | 1 | 0 | 1 |
| SW | 13 | 15 | 13 | 13 | 0 | 0 | 0 | 0 |
| WSW | 8 | 8 | 6 | 4 | 0 | 0 | 0 | 0 |
| W | 8 | 13 | 11 | 7 | 1 | 1 | 1 | 1 |
| WNW | 2 | 1 | 1 | 2 | 0 | 0 | 0 | 0 |
| NW | 6 | 8 | 7 | 6 | 0 | 0 | 0 | 0 |
| NNW | 2 | 3 | 2 | 1 | 0 | 0 | 0 | 0 |
| Total | 113 | 136 | 116 | 99 | 16 | 7 | 9 | 16 |

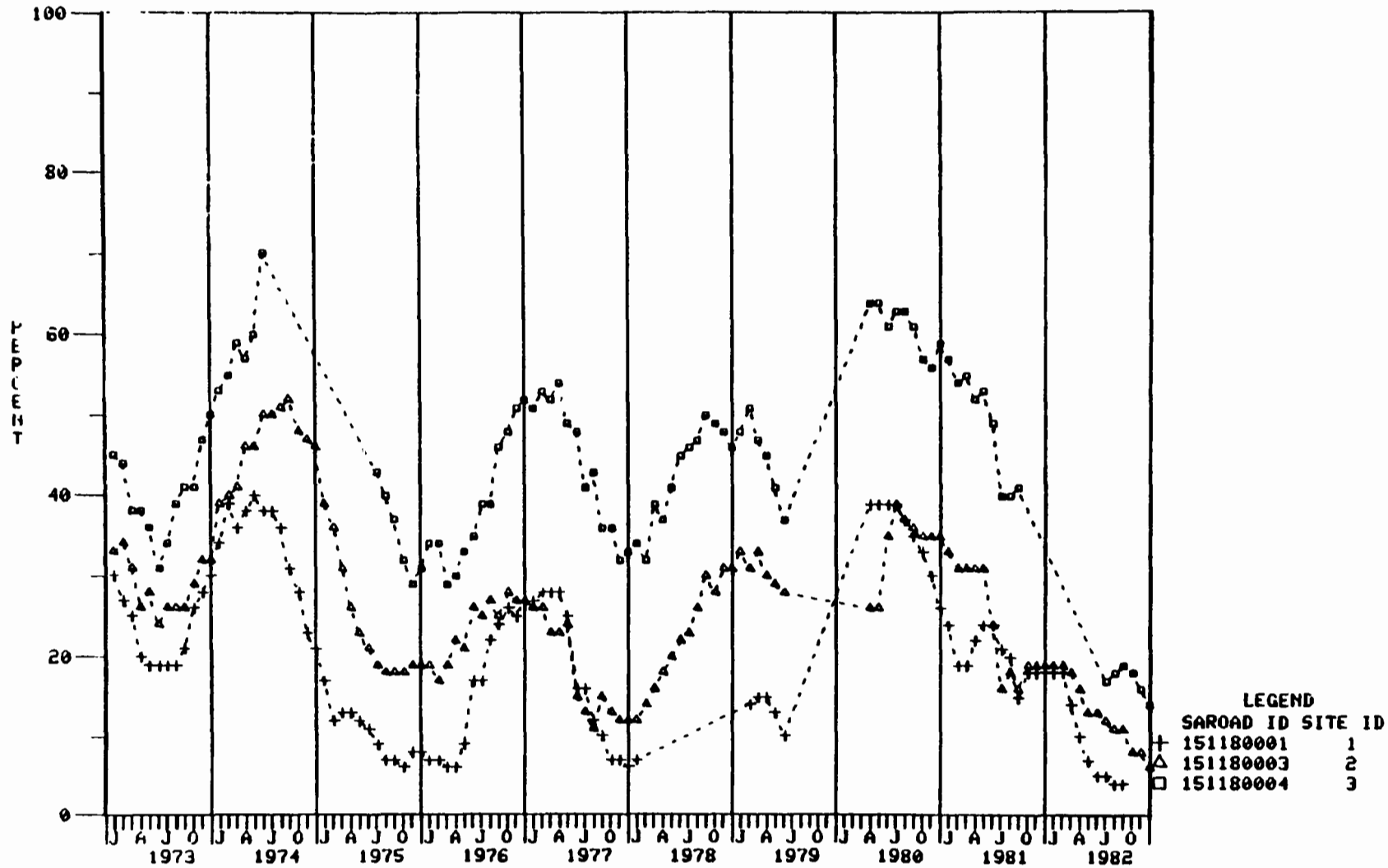
TSP 12 MONTH RUNNING GEOMETRIC MEANS (UG/M**3) FOR J & L STEEL - EAST CHICAGO, IL



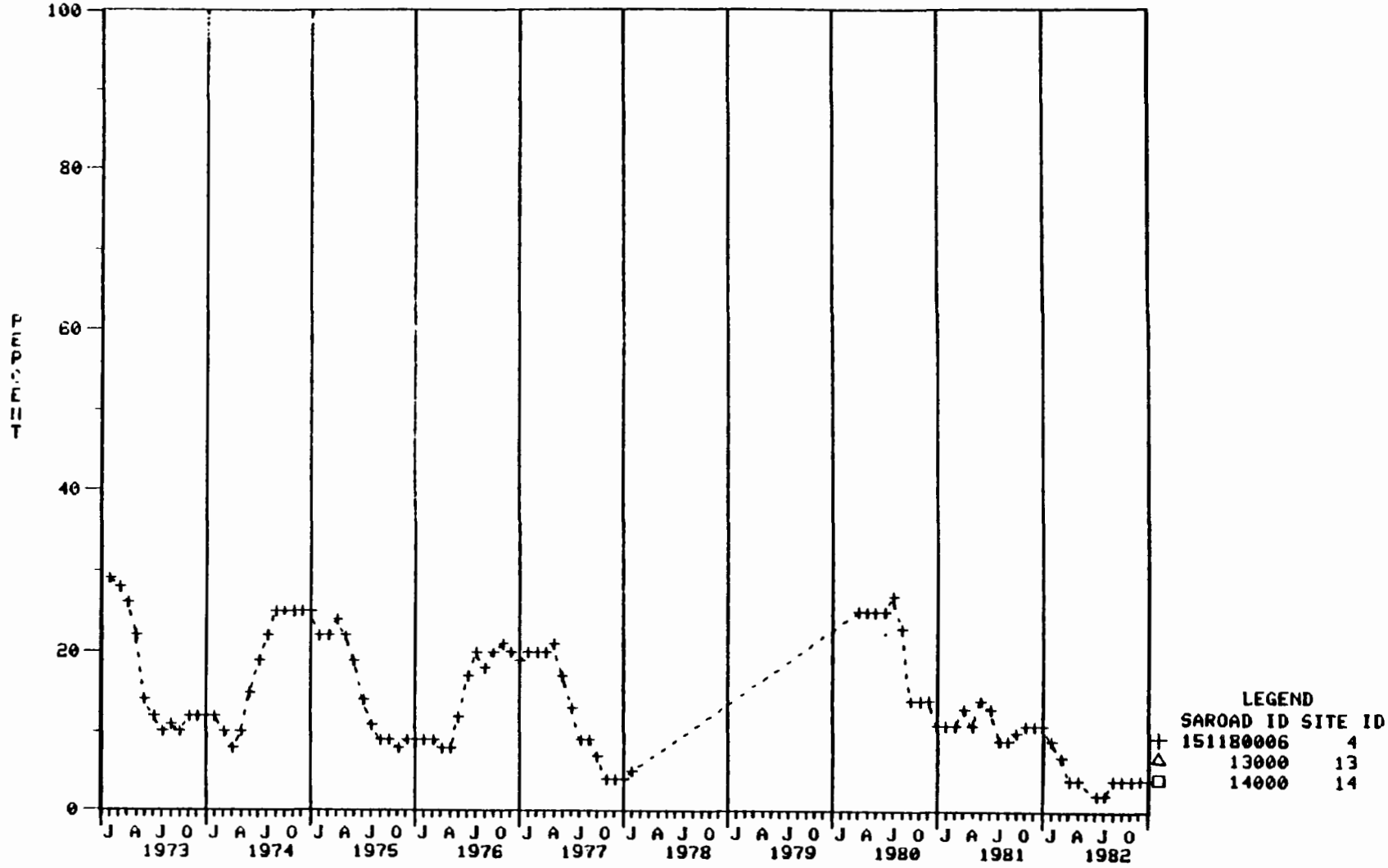
TSP 12 MONTH RUNNING GEOMETRIC MEANS (UG/M**3) FOR J & L STEEL - EAST CHICAGO, IL



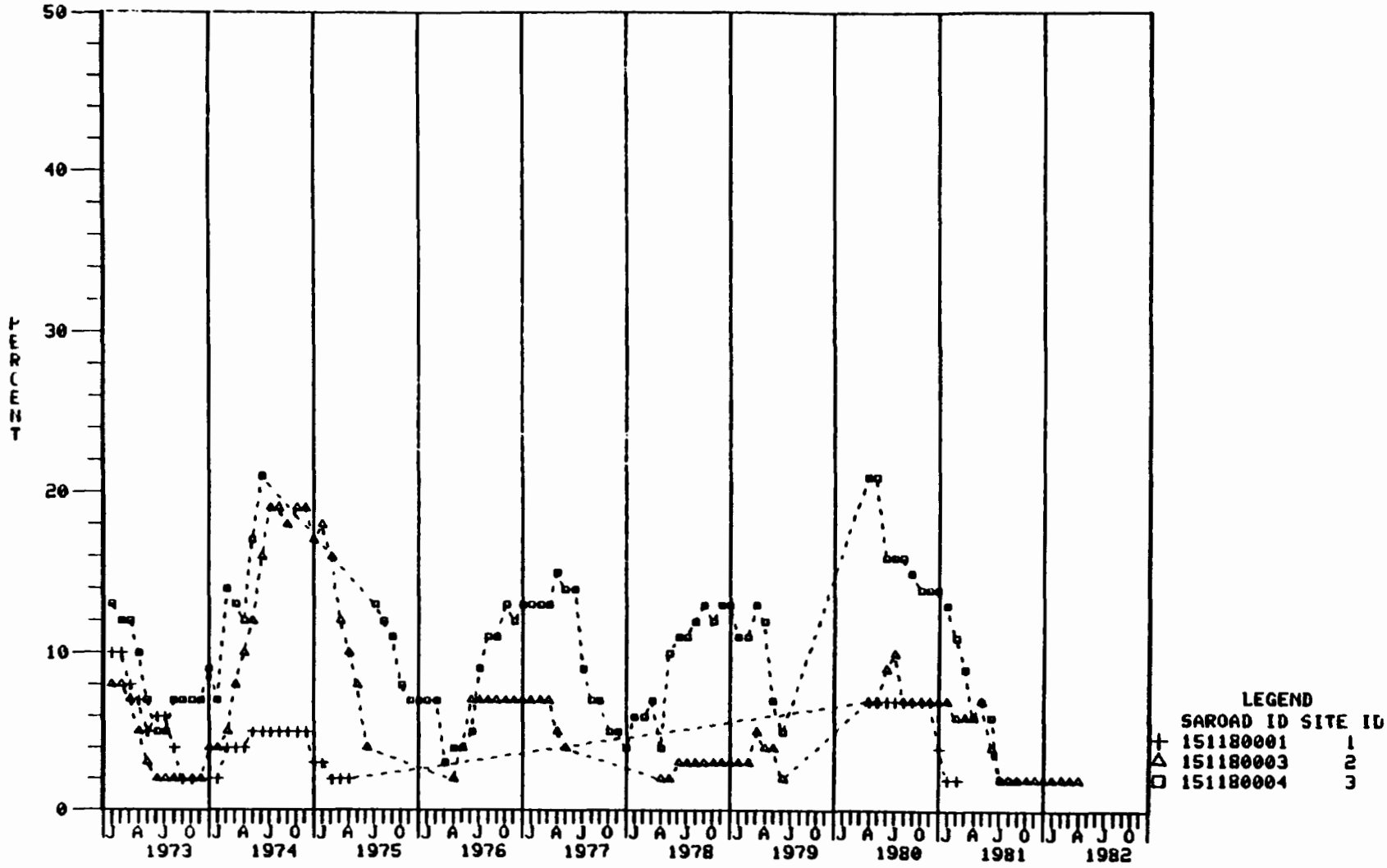
TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 150 (UG/M**3) FOR J & L STEEL - EAST CHICAGO, IL



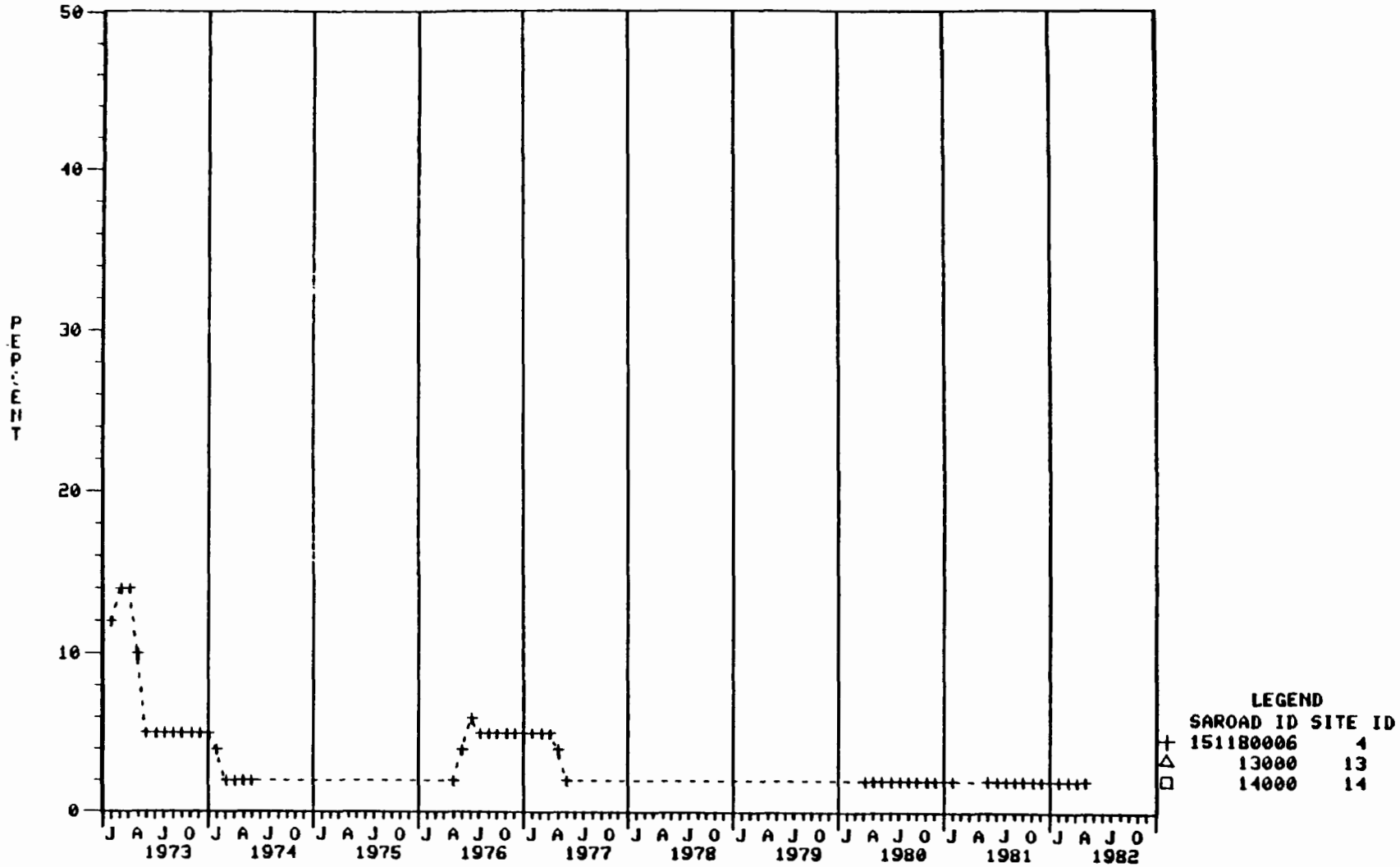
TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 150 (UG/M**3) FOR J & L STEEL - EAST CHICAGO, IL



TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 260 (UG/M**3) FOR J & L STEEL - EAST CHICAGO, IL



TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 260 (UG/M**3) FOR J & L STEEL - EAST CHICAGO, IL



TSP DATA SUMMARY FOR J & L STEEL - EAST CHICAGO, IL
SAROAD STATION # 151180001 SITE ID # 01
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 61 | 53 | 61 | 52 | 55 | 47 | 33 | 37 | 46 | 57 | 51 |
| GEOMETRIC MEAN: | 119.6 | 120.9 | 106.0 | 90.2 | 107.7 | 93.2 | ****** | ****** | 100.4 | 100.0 | 68.4 |
| GEOMETRIC S.D.: | 1.7 | 1.4 | 1.6 | 1.5 | 1.6 | 1.5 | ****** | ****** | 1.8 | 1.5 | 1.6 |
| ARITHMETIC MEAN | 136.3 | 129.3 | 118.1 | 96.7 | 117.8 | 100.0 | ****** | ****** | 117.4 | 108.3 | 75.9 |
| HIGHEST BY LARSEN EXTRP: | 525.8 | 353.9 | 424.5 | 271.8 | 395.2 | 289.7 | ****** | ****** | 540.3 | 328.3 | 280.5 |
| 1ST HIGHEST: | 415.0 | 313.0 | 313.0 | 210.0 | 240.0 | 191.0 | 223.0 | 290.0 | 376.0 | 221.0 | 139.0 |
| DATE : | 720521 | 731212 | 740529 | 750506 | 761015 | 771028 | 780619 | 791223 | 800110 | 810317 | 821026 |
| 2ND HIGHEST: | 344.0 | 231.0 | 269.0 | 194.0 | 220.0 | 172.0 | 212.0 | 229.0 | 265.0 | 213.0 | 135.0 |
| DATE : | 720831 | 731019 | 740228 | 750319 | 760605 | 770419 | 780830 | 790912 | 800328 | 811001 | 820123 |
| # OF READINGS EXCEEDING 260 : | 6 | 1 | 2 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 18 | 16 | 12 | 4 | 14 | 3 | 6 | 11 | 12 | 10 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 7 | 3 | 11 | 11 | 9 | 10 | 1 | 6 | 10 | 8 | 21 |
| 66-130: | 27 | 26 | 27 | 34 | 28 | 29 | 22 | 17 | 20 | 32 | 26 |
| 131-195: | 14 | 19 | 18 | 6 | 14 | 8 | 7 | 8 | 11 | 15 | 4 |
| 196-260: | 7 | 4 | 3 | 1 | 4 | 0 | 3 | 5 | 3 | 2 | 0 |
| 261-325: | 4 | 1 | 2 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |
| 326-390: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 391-455: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR J & L STEEL - EAST CHICAGO, IL
SAROAD STATION # 151180003 SITE ID # 02
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 60 | 57 | 52 | 53 | 56 | 50 | 61 | 39 | 84 | 58 | 49 |
| GEOMETRIC MEAN: | 119.3 | 123.8 | 137.4 | 98.8 | 111.9 | 92.0 | 115.3 | ****** | 123.4 | 101.7 | 74.2 |
| GEOMETRIC S.D.: | 1.7 | 1.6 | 1.9 | 1.7 | 1.7 | 1.5 | 1.7 | ****** | 1.7 | 1.6 | 1.7 |
| ARITHMETIC MEAN | 136.3 | 138.9 | 164.5 | 112.0 | 130.1 | 99.5 | 130.3 | ****** | 138.5 | 113.7 | 84.7 |
| HIGHEST BY LARSEN EXTRP: | 524.9 | 498.2 | 860.1 | 437.6 | 530.1 | 301.6 | 517.0 | ****** | 539.3 | 403.8 | 350.2 |
| 1ST HIGHEST: | 488.0 | 388.0 | 412.0 | 258.0 | 445.0 | 206.0 | 393.0 | 375.0 | 329.0 | 333.0 | 219.0 |
| DATE : | 720427 | 731212 | 740710 | 750729 | 760611 | 770419 | 780619 | 790322 | 800624 | 810522 | 820610 |
| 2ND HIGHEST: | 342.0 | 383.0 | 358.0 | 257.0 | 376.0 | 193.0 | 296.0 | 298.0 | 301.0 | 239.0 | 193.0 |
| DATE : | 720328 | 730913 | 740716 | 750909 | 760605 | 770401 | 780408 | 790825 | 800221 | 811001 | 820716 |
| # OF READINGS EXCEEDING 260 : | 5 | 2 | 9 | 0 | 3 | 0 | 2 | 3 | 6 | 1 | 0 |
| # OF READINGS EXCEEDING 150 : | 21 | 18 | 23 | 10 | 14 | 5 | 19 | 9 | 29 | 11 | 3 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 4 | 4 | 6 | 12 | 7 | 10 | 11 | 8 | 10 | 10 | 19 |
| 66-130: | 33 | 30 | 16 | 30 | 30 | 29 | 23 | 18 | 28 | 28 | 23 |
| 131-195: | 16 | 13 | 12 | 4 | 11 | 10 | 19 | 8 | 35 | 14 | 6 |
| 196-260: | 2 | 8 | 9 | 7 | 5 | 1 | 6 | 2 | 5 | 5 | 1 |
| 261-325: | 3 | 0 | 5 | 0 | 0 | 0 | 1 | 2 | 5 | 0 | 0 |
| 326-390: | 1 | 2 | 3 | 0 | 2 | 0 | 0 | 1 | 1 | 1 | 0 |
| 391-455: | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| >455: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR J & L STEEL - EAST CHICAGO, IL
SAROAD STATION # 151180004 SITE ID # 03
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 60 | 58 | 29 | 58 | 54 | 48 | 56 | 36 | 80 | 38 | 56 |
| GEOMETRIC MEAN: | 142.2 | 152.7 | ****** | 117.4 | 155.0 | 126.0 | 138.1 | ****** | 160.7 | ****** | 84.6 |
| GEOMETRIC S.D.: | 1.8 | 1.6 | ****** | 1.8 | 1.6 | 1.5 | 1.7 | ****** | 1.6 | ****** | 1.7 |
| ARITHMETIC MEAN | 167.0 | 168.2 | ****** | 139.2 | 171.1 | 136.0 | 155.8 | ****** | 177.5 | ****** | 97.1 |
| HIGHEST BY LARSEN EXTRP: | 805.2 | 564.9 | ****** | 612.1 | 589.8 | 407.0 | 628.8 | ****** | 626.0 | ****** | 422.0 |
| 1ST HIGHEST: | 478.0 | 430.0 | 463.0 | 701.0 | 432.0 | 301.0 | 372.0 | 335.0 | 398.0 | 338.0 | 223.0 |
| DATE : | 720515 | 730128 | 740628 | 750319 | 761015 | 770425 | 780520 | 790918 | 800421 | 810516 | 820604 |
| 2ND HIGHEST: | 411.0 | 354.0 | 451.0 | 330.0 | 420.0 | 275.0 | 286.0 | 287.0 | 374.0 | 256.0 | 204.0 |
| DATE : | 720509 | 730814 | 740517 | 750307 | 760524 | 770413 | 780426 | 790310 | 800110 | 810305 | 820803 |
| # OF READINGS EXCEEDING 260 : | 8 | 5 | 10 | 4 | 7 | 2 | 7 | 3 | 11 | 1 | 0 |
| # OF READINGS EXCEEDING 150 : | 27 | 29 | 21 | 17 | 28 | 16 | 26 | 18 | 46 | 13 | 8 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 7 | 2 | 0 | 9 | 2 | 3 | 3 | 4 | 4 | 6 | 19 |
| 66-130: | 15 | 19 | 8 | 25 | 16 | 22 | 22 | 10 | 16 | 13 | 23 |
| 131-195: | 20 | 19 | 8 | 14 | 22 | 17 | 17 | 11 | 34 | 11 | 11 |
| 196-260: | 10 | 13 | 3 | 6 | 7 | 4 | 7 | 8 | 15 | 7 | 3 |
| 261-325: | 3 | 3 | 5 | 2 | 4 | 2 | 6 | 2 | 6 | 0 | 0 |
| 326-390: | 3 | 1 | 3 | 1 | 1 | 0 | 1 | 1 | 4 | 1 | 0 |
| 391-455: | 1 | 1 | 1 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 0 |
| >455: | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR J & L STEEL - EAST CHICAGO, IL
SAROAD STATION # 151180006 SITE ID # 04
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 59 | 57 | 59 | 53 | 57 | 45 | 37 | 33 | 44 | 45 | 50 |
| GEOMETRIC MEAN: | 98.2 | 105.5 | 109.2 | 83.9 | 106.5 | 83.3 | ****** | ****** | 95.4 | 86.3 | 61.1 |
| GEOMETRIC S.D.: | 1.9 | 1.5 | 1.6 | 1.6 | 1.6 | 1.5 | ****** | ****** | 1.6 | 1.5 | 1.7 |
| ARITHMETIC MEAN | 121.4 | 116.4 | 119.8 | 92.6 | 119.3 | 89.3 | ****** | ****** | 104.7 | 95.0 | 70.0 |
| HIGHEST BY LARSEN EXTRP: | 698.9 | 368.5 | 408.6 | 321.8 | 416.7 | 256.3 | ****** | ****** | 354.6 | 310.9 | 289.9 |
| 1ST HIGHEST: | 365.0 | 386.0 | 254.0 | 195.0 | 295.0 | 214.0 | 236.0 | 240.0 | 260.0 | 281.0 | 205.0 |
| DATE : | 720427 | 730110 | 740517 | 750512 | 760611 | 770413 | 780619 | 791229 | 800221 | 810516 | 820610 |
| 2ND HIGHEST: | 353.0 | 308.0 | 250.0 | 173.0 | 271.0 | 153.0 | 215.0 | 236.0 | 180.0 | 176.0 | 177.0 |
| DATE : | 720521 | 730609 | 740628 | 750822 | 760406 | 770425 | 780905 | 790825 | 800720 | 810522 | 820803 |
| # OF READINGS EXCEEDING 260 : | 6 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 1 | 0 |
| # OF READINGS EXCEEDING 150 : | 17 | 7 | 14 | 5 | 11 | 2 | 7 | 9 | 5 | 5 | 2 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 18 | 7 | 7 | 17 | 9 | 11 | 8 | 4 | 8 | 9 | 27 |
| 66-130: | 19 | 38 | 30 | 27 | 31 | 30 | 18 | 16 | 25 | 29 | 20 |
| 131-195: | 13 | 8 | 18 | 9 | 9 | 3 | 7 | 9 | 10 | 6 | 2 |
| 196-260: | 3 | 1 | 4 | 0 | 5 | 1 | 4 | 4 | 1 | 0 | 1 |
| 261-325: | 4 | 2 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 1 | 0 |
| 326-390: | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR J & L STEEL - EAST CHICAGO, IL
SAROAD STATION # 13000 SITE ID # 13
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 43 | 0 | 0 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| GEOMETRIC S.D.: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| ARITHMETIC MEAN | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| 1ST HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 384.0 | ****** | ****** |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 800709 | ****** | ****** |
| 2ND HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 309.0 | ****** | ****** |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 800624 | ****** | ****** |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 23 | 0 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 |
| 66-130: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 0 | 0 |
| 131-195: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 23 | 0 | 0 |
| 196-260: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR J & L STEEL - EAST CHICAGO, IL
SAROAD STATION # 14000 SITE ID # 14
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 23 | 0 | 0 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| GEOMETRIC S.D.: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| ARITHMETIC MEAN | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| 1ST HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 577.0 | ****** | ****** |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 800625 | ****** | ****** |
| 2ND HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 436.0 | ****** | ****** |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 800624 | ****** | ****** |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18 | 0 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 66-130: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 |
| 131-195: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 |
| 196-260: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 0 | 0 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR J & L STEEL - EAST CHICAGO, IL
SAROAD STATION # 15000 SITE ID # 15
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 34 | 0 | 0 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| GEOMETRIC S.D.: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| ARITHMETIC MEAN | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| 1ST HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 733.0 | ****** | ****** |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 800716 | ****** | ****** |
| 2ND HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 612.0 | ****** | ****** |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 800702 | ****** | ****** |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 17 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 28 | 0 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 66-130: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 |
| 131-195: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 0 | 0 |
| 196-260: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR J & L STEEL - EAST CHICAGO, IL
SAROAD STATION # 16000 SITE ID # 16
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 44 | 0 | 0 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| GEOMETRIC S.D.: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| ARITHMETIC MEAN | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| 1ST HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 371.0 | ****** | ****** |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 800716 | ****** | ****** |
| 2ND HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 346.0 | ****** | ****** |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 800627 | ****** | ****** |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 25 | 0 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 66-130: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 0 | 0 |
| 131-195: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20 | 0 | 0 |
| 196-260: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 0 | 0 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

24-HR STANDARD EXCEEDANCE ROSE FOR
J & L STEEL - EAST CHICAGO, IL
(ALL CASES > 260 UG/M**3)
X=0.900
COUNT/AVERAGE TSP OF PRIMARY EXCEEDANCES

| SARCAD # | 151180001 | | 151180003 | | 151180004 | | 151180006 | | 13000 | | 14000 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SITE ID # | 1 | | 2 | | 3 | | 4 | | 13 | | 14 | |
| DIRECTION | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X |
| N COUNT: | 0 | 0 | 0 | 0 | 5 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 341. | 330. | 269. | 0. | 0. | 0. | 0. | 0. |
| NNE COUNT: | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 342. | 287. | 0. | 0. | 0. | 0. | 0. | 0. |
| NE COUNT: | 1 | 1 | 2 | 2 | 3 | 6 | 1 | 2 | 0 | 0 | 1 | 1 |
| AVE TSP: | 265. | 313. | 302. | 346. | 311. | 298. | 300. | 276. | 0. | 0. | 309. | 337. |
| ENE COUNT: | 0 | 0 | 3 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 316. | 375. | 264. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| E COUNT: | 0 | 0 | 0 | 5 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 1 |
| AVE TSP: | 0. | 0. | 0. | 344. | 0. | 463. | 0. | 0. | 0. | 327. | 0. | 384. |
| ESE COUNT: | 0 | 1 | 1 | 3 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 1 |
| AVE TSP: | 0. | 313. | 329. | 328. | 0. | 314. | 0. | 308. | 309. | 298. | 436. | 577. |
| SE COUNT: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 271. | 0. | 0. | 0. | 0. | 0. | 0. |
| SSE COUNT: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 349. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S COUNT: | 2 | 0 | 0 | 1 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 333. | 0. | 0. | 393. | 374. | 385. | 0. | 0. | 0. | 0. | 0. | 0. |
| SSW COUNT: | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| AVE TSP: | 0. | 0. | 333. | 279. | 0. | 0. | 0. | 0. | 0. | 279. | 0. | 0. |
| SW COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 386. | 0. | 0. | 0. | 0. | 0. |
| WSW COUNT: | 0 | 1 | 0 | 1 | 1 | 3 | 0 | 1 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 269. | 0. | 445. | 305. | 301. | 0. | 295. | 0. | 0. | 0. | 0. |
| W COUNT: | 0 | 0 | 0 | 0 | 1 | 4 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 287. | 328. | 0. | 0. | 0. | 0. | 0. | 0. |
| WNW COUNT: | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 295. | 0. | 0. | 432. | 0. | 0. | 0. | 0. | 0. | 0. |
| NW COUNT: | 0 | 0 | 1 | 1 | 3 | 4 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 276. | 266. | 277. | 409. | 0. | 0. | 0. | 0. | 0. | 0. |
| NNW COUNT: | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 1 |
| AVE TSP: | 0. | 0. | 0. | 265. | 286. | 342. | 0. | 0. | 0. | 265. | 0. | 352. |
| ALL COUNT: | 3 | 3 | 10 | 16 | 20 | 30 | 3 | 4 | 1 | 5 | 2 | 4 |
| AVE TSP: | 310. | 298. | 313. | 339. | 318. | 333. | 318. | 289. | 309. | 299. | 373. | 413. |

24-HR STANDARD EXCEEDANCE ROSE FOR
J & L STEEL - EAST CHICAGO, IL
(ALL CASES > 260 UG/M**3)
X=0.900
COUNT/AVERAGE TSP OF PRIMARY EXCEEDANCES

| SAROAD # | 15000 | | 16000 | |
|---|---|---|---|---|
| SITE ID # | 15 | | 16 | |
| DIRECTION | W>=X | W<X | W>=X | W<X |
| N COUNT: | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. |
| NNE COUNT: | 0 | 0 | 0 | 1 |
| AVE TSP: | 0. | 0. | 0. | 281. |
| NE COUNT: | 2 | 2 | 2 | 1 |
| AVE TSP: | 589. | 392. | 328. | 335. |
| ENE COUNT: | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. |
| E COUNT: | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. |
| ESE COUNT: | 0 | 1 | 0 | 0 |
| AVE TSP: | 0. | 284. | 0. | 0. |
| SE COUNT: | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. |
| SSE COUNT: | 0 | 1 | 0 | 0 |
| AVE TSP: | 0. | 312. | 0. | 0. |
| S COUNT: | 0 | 2 | 0 | 1 |
| AVE TSP: | 0. | 569. | 0. | 371. |
| SSW COUNT: | 0 | 1 | 0 | 0 |
| AVE TSP: | 0. | 301. | 0. | 0. |
| SW COUNT: | 0 | 1 | 0 | 0 |
| AVE TSP: | 0. | 283. | 0. | 0. |
| WSW COUNT: | 0 | 3 | 0 | 0 |
| AVE TSP: | 0. | 318. | 0. | 0. |
| W COUNT: | 0 | 2 | 0 | 0 |
| AVE TSP: | 0. | 316. | 0. | 0. |
| WNW COUNT: | 0 | 1 | 0 | 0 |
| AVE TSP: | 0. | 598. | 0. | 0. |
| NW COUNT: | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. |
| NNW COUNT: | 0 | 1 | 0 | 0 |
| AVE TSP: | 0. | 341. | 0. | 0. |
| ALL COUNT: | 2 | 15 | 2 | 3 |
| AVE TSP: | 589. | 375. | 328. | 329. |

24-HR STANDARD EXCEEDANCE ROSE FOR
J & L STEEL - EAST CHICAGO, IL
(ALL CASES > 150 UG/M**3)
X=0.900
COUNT/AVERAGE TSP OF SECONDARY EXCEEDANCES

| SAROAD # | 151180001 | | 151180003 | | 151180004 | | 151180006 | | 13000 | | 14000 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SITE ID # | 1 | | 2 | | 3 | | 4 | | 13 | | 14 | |
| DIRECTION | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X |
| N COUNT: | 2 | 2 | 0 | 5 | 9 | 8 | 4 | 2 | 0 | 0 | 0 | 0 |
| AVE TSP: | 170. | 207. | 0. | 185. | 274. | 208. | 215. | 199. | 0. | 0. | 0. | 0. |
| NNE COUNT: | 5 | 2 | 2 | 1 | 12 | 10 | 2 | 4 | 0 | 0 | 0 | 1 |
| AVE TSP: | 193. | 159. | 195. | 178. | 249. | 244. | 211. | 166. | 0. | 0. | 0. | 210. |
| NE COUNT: | 2 | 7 | 7 | 9 | 7 | 10 | 1 | 7 | 1 | 0 | 2 | 2 |
| AVE TSP: | 228. | 192. | 221. | 230. | 252. | 266. | 300. | 218. | 193. | 0. | 266. | 268. |
| ENE COUNT: | 4 | 3 | 5 | 6 | 2 | 6 | 3 | 3 | 0 | 1 | 0 | 0 |
| AVE TSP: | 191. | 170. | 285. | 235. | 230. | 190. | 217. | 157. | 0. | 174. | 0. | 0. |
| E COUNT: | 0 | 2 | 0 | 11 | 0 | 6 | 0 | 4 | 0 | 3 | 0 | 2 |
| AVE TSP: | 0. | 179. | 0. | 273. | 0. | 258. | 0. | 210. | 0. | 276. | 0. | 298. |
| ESE COUNT: | 0 | 1 | 1 | 5 | 5 | 3 | 0 | 2 | 1 | 1 | 1 | 1 |
| AVE TSP: | 0. | 313. | 329. | 271. | 198. | 268. | 0. | 272. | 309. | 298. | 436. | 577. |
| SE COUNT: | 1 | 2 | 4 | 4 | 2 | 2 | 0 | 1 | 0 | 1 | 0 | 0 |
| AVE TSP: | 183. | 200. | 186. | 209. | 240. | 234. | 0. | 166. | 0. | 168. | 0. | 0. |
| SSE COUNT: | 5 | 1 | 5 | 4 | 3 | 1 | 2 | 2 | 1 | 2 | 0 | 2 |
| AVE TSP: | 187. | 152. | 208. | 199. | 198. | 202. | 197. | 189. | 154. | 207. | 0. | 252. |
| S COUNT: | 9 | 3 | 11 | 11 | 8 | 8 | 3 | 2 | 1 | 4 | 0 | 2 |
| AVE TSP: | 220. | 193. | 199. | 203. | 219. | 247. | 176. | 208. | 192. | 187. | 0. | 223. |
| SSW COUNT: | 7 | 1 | 10 | 4 | 11 | 6 | 5 | 2 | 0 | 1 | 0 | 1 |
| AVE TSP: | 177. | 194. | 213. | 235. | 183. | 174. | 188. | 203. | 0. | 279. | 0. | 161. |
| SW COUNT: | 1 | 5 | 4 | 6 | 7 | 6 | 2 | 0 | 0 | 2 | 0 | 1 |
| AVE TSP: | 158. | 186. | 169. | 183. | 168. | 197. | 275. | 0. | 0. | 171. | 0. | 170. |
| WSW COUNT: | 3 | 5 | 2 | 4 | 6 | 10 | 2 | 2 | 0 | 1 | 0 | 1 |
| AVE TSP: | 185. | 196. | 196. | 249. | 208. | 233. | 183. | 225. | 0. | 164. | 0. | 174. |
| W COUNT: | 2 | 4 | 3 | 3 | 9 | 12 | 0 | 2 | 0 | 1 | 0 | 1 |
| AVE TSP: | 186. | 166. | 199. | 188. | 212. | 239. | 0. | 191. | 0. | 180. | 0. | 230. |
| WNW COUNT: | 1 | 1 | 1 | 3 | 6 | 8 | 2 | 2 | 0 | 0 | 0 | 0 |
| AVE TSP: | 204. | 240. | 295. | 204. | 198. | 222. | 197. | 232. | 0. | 0. | 0. | 0. |
| NW COUNT: | 0 | 4 | 1 | 3 | 7 | 14 | 0 | 4 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 181. | 276. | 235. | 238. | 251. | 0. | 170. | 0. | 0. | 0. | 0. |
| NNW COUNT: | 1 | 2 | 1 | 5 | 3 | 15 | 1 | 1 | 0 | 2 | 0 | 1 |
| AVE TSP: | 155. | 209. | 232. | 213. | 198. | 202. | 177. | 177. | 0. | 249. | 0. | 352. |
| ALL COUNT: | 43 | 45 | 57 | 84 | 97 | 125 | 27 | 40 | 4 | 19 | 3 | 15 |
| AVE TSP: | 193. | 190. | 215. | 224. | 219. | 229. | 207. | 199. | 212. | 215. | 323. | 264. |

24-HR STANDARD EXCEEDANCE ROSE FOR
J & L STEEL - EAST CHICAGO, IL
(ALL CASES > 150 UG/M**3)
X=0.900
COUNT/AVERAGE TSP OF SECONDARY EXCEEDANCES

| SAROAD # | 15000 | | 16000 | |
|---|---|---|---|---|
| SITE ID # | 15 | | 16 | |
| DIRECTION | W>=X | W<X | W>=X | W<X |
| N COUNT: | 0 | 1 | 0 | 1 |
| AVE TSP: | 0. | 254. | 0. | 175. |
| NNE COUNT: | 0 | 0 | 1 | 1 |
| AVE TSP: | 0. | 0. | 218. | 281. |
| NE COUNT: | 3 | 3 | 2 | 3 |
| AVE TSP: | 443. | 324. | 328. | 261. |
| ENE COUNT: | 0 | 1 | 0 | 1 |
| AVE TSP: | 0. | 206. | 0. | 184. |
| E COUNT: | 0 | 0 | 0 | 2 |
| AVE TSP: | 0. | 0. | 0. | 209. |
| ESE COUNT: | 1 | 1 | 1 | 1 |
| AVE TSP: | 176. | 284. | 156. | 256. |
| SE COUNT: | 0 | 0 | 0 | 1 |
| AVE TSP: | 0. | 0. | 0. | 197. |
| SSE COUNT: | 0 | 2 | 0 | 1 |
| AVE TSP: | 0. | 270. | 0. | 202. |
| S COUNT: | 1 | 3 | 1 | 1 |
| AVE TSP: | 163. | 451. | 163. | 371. |
| SSW COUNT: | 0 | 2 | 0 | 2 |
| AVE TSP: | 0. | 238. | 0. | 184. |
| SW COUNT: | 0 | 2 | 0 | 1 |
| AVE TSP: | 0. | 253. | 0. | 176. |
| WSW COUNT: | 0 | 3 | 0 | 2 |
| AVE TSP: | 0. | 318. | 0. | 208. |
| W COUNT: | 0 | 2 | 0 | 2 |
| AVE TSP: | 0. | 316. | 0. | 212. |
| WNW COUNT: | 0 | 1 | 0 | 1 |
| AVE TSP: | 0. | 598. | 0. | 248. |
| NW COUNT: | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. |
| NNW COUNT: | 0 | 2 | 0 | 0 |
| AVE TSP: | 0. | 278. | 0. | 0. |
| ALL COUNT: | 5 | 23 | 5 | 20 |
| AVE TSP: | 334. | 319. | 239. | 225. |

## AIR QUALITY EVALUATION - J&L STEEL, EAST CHICAGO, INDIANA

Air quality trends:

The curves of geometric means for stations #1, #2, #3, and #4 are essentially in phase, with a general tendency for station #3 to have highest values. Substantial declines from mid-1980 through 1982 were evident at all four sites. Part of the decline in 1982 may be attributed to the installation of sample savers on the hivols in August 1982.

Stations #1, #2, and #4 evidenced moderate negative overall trends (Spearman correlation coefficients of -0.48 and -0.39, and -0.36, respectively). Station #3 had essentially no long-term trend.

Stations #13, #14, #15, and #16 were not in service sufficiently long to generate suitable data to evaluate trends.

The graphs of the percentage of observations exceeding 150 $\mu g/m^3$ are also in phase with substantial declines in the percentage occurring from 1980 through 1982.

Standard exceedance status:

Stations #1, #2, and #4 indicated exceedances of the primary TSP standards through 1981, while station #3 also showed a violation of the annual standard in 1982. Stations #13, #14, #15, and #16, despite their short period of record, also indicate nonattainment of the primary 24-hour standard.

Pollution roses:

Among the continuing monitors, station #2 appears to be best situated to isolate contributions from the J&L facility. Stations #13 and #14 are also well placed to depict this impact. However, strict isolation depends upon relatively infrequent wind directions.

Standard exceedance roses:

Of 123 recorded excursions beyond primary 24-hour TSP standards at the stations discussed above, only 43 occurred under wind conditions deemed to be steady. At station #2, 10 primary excursions occurred under steady winds. Five of these were associated with wind directions that largely involved the J & L facility; an additional excursion occurred under conditions that would involve the Inland Steel facility.

Of the special study sites, station #14 best differentiates the impacts of the two mills. One excursion at this site largely involved the J & L facility; the other excursion under steady winds largely involved the Inland Steel facility.

BaP:

As part of the special study conducted by EPA Region V, BaP was measured at stations #13, #14, #15, and #16 for 5 days in July 1979. The results were divided into "downwind," "with wind," and "background" categories. Downwind days were defined as having the 24-hour average wind direction within ± 10° of the station orientation from the plant. With wind days had four or more hours within ± 10°, while background days had winds away from the station for the entire day. The results are summarized below:

| | Downwind Station | With Wind Station | Background Station |
|---|---|---|---|
| Range ($ng/m^3$) | 1.0-13.1 | 0.4-2.7 | 0.1-1.6 |
| Geometric Mean | 4.4 | 1.4 | 0.3 |

JONES & LAUGHLIN STEEL
Pittsburgh
Allegheny County
Pennsylvania
EPA Region III

Hi-Vol Monitoring Sites--Jones & Laughlin Steel, Pittsburgh, Pennsylvania

| Site ID Number | SAROAD Number | Site Name and Address | Plant Location from Site: Facility/ Bearing (°) | Plant Location from Site: Distance (km) | Elevation (m): Above Ground | Elevation (m): Above MSL | Elevation (m): Above Plant | Site Description | Nearest Roadway: Name | Nearest Roadway: Direction | Nearest Roadway: Distance (m) | Nearest Roadway: Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 39-7260-006-G01 | Oakland (old site) Pittsburgh, PA | Rest of plant 160-198 | 1.2-3.0 | 13 | 280 | 50 | Roof (gravel) | McKee Pl. | NNE | 153 | M |
| | | | | | | | | | Forbes Ave. | ESE | 6 | M |
| | | | | | | | | | 5th Ave. | NW | 116 | M |
| | | | Blast furnaces 160 | 1.4 | | | | | Blvd. of Allies | S | 366 | H |
| | | | | | | | | | Parkway E. | SSW | 610 | H |
| 2 | 39-7260-027-G01 | Oakland 3 3333 Forbes Ave. Pittsburgh, PA | Rest of plant 159-197 | 1.1-2.9 | 16 | 280 | 50 | Roof (gravel) Center city-commercial | Paved dr. | NE | 5 | L |
| | | | | | | | | | Forbes Ave. | SE | 9 | M |
| | | | | | | | | | Paved dr. | NW | 11 | L |
| | | | Blast furnaces 159 | 1.3 | | | | | 5th Ave. | NW | 92 | M |
| | | | | | | | | | Blvd. of Allies | S | 275 | H |
| | | | | | | | | | Parkway E. | SSW | 488 | H |
| 3 | 39-7260-012-G01 | Hazelwood (old site) Hazelwood & Second Aves. Pittsburgh, PA | Coke ovens 292 | 0.5 | 10 | 226 | -4 | Roof | Hazelwood Ave. | N | 8 | L |
| | | | Open hearth furnaces 315 | 2.0 | | | | | Second Ave. | W | 3 | M |
| | | | Mechanical scarfer 317 | 2.7 | | | | | | | | |
| | | | Blast furnaces 332 | 2.1 | | | | | | | | |
| 4 | 39-7260-004-G01 | Hazelwood (new site) 5001 Second Ave. Pittsburgh, PA | Coke ovens 320 | 0.7 | 4 | 226 | -4 | Roof | Paved rd. | SW | 15 | L |
| | | | Open hearth furnaces 320 | 2.3 | | | | | Second Ave. | ENE | 31 | M |
| | | | Mechanical scarfer 320 | 3.0 | | | | | | | | |
| | | | Blast furnaces 334 | 2.4 | | | | | | | | |
| 5 | 39-7260-022-G01 | Hazelwood 2 Gladstone High School 327 Hazelwood Ave. Pittsburgh, PA | Coke ovens 265 | 0.9 | 4.5 | 291 | 61 | Roof Center city-industrial | Hazelwood Ave. | U | 91 | U |
| | | | Open hearth furnaces 300 | 1.9 | | | | | | | | |
| | | | Mechanical scarfer 316 | 2.4 | | | | | | | | |
| | | | Blast furnaces 317 | 1.8 | | | | | | | | |
| 6 | 39-7260-026-G01 | Oakland 4 Semple St. Pittsburgh, PA | Coke ovens 173 | 2.8 | 8 | 282 | 52 | Center city-industrial County Site ID #5709 | Semple St. | E | 34 | M |
| | | | Open hearth furnaces 198 | 1.5 | | | | | Bates | N | 79 | H |
| | | | Mechanical scarfer 240 | 0.9 | | | | | Ward | S | 37 | L |
| | | | Blast furnaces 188 | 4.1 | | | | | | | | |

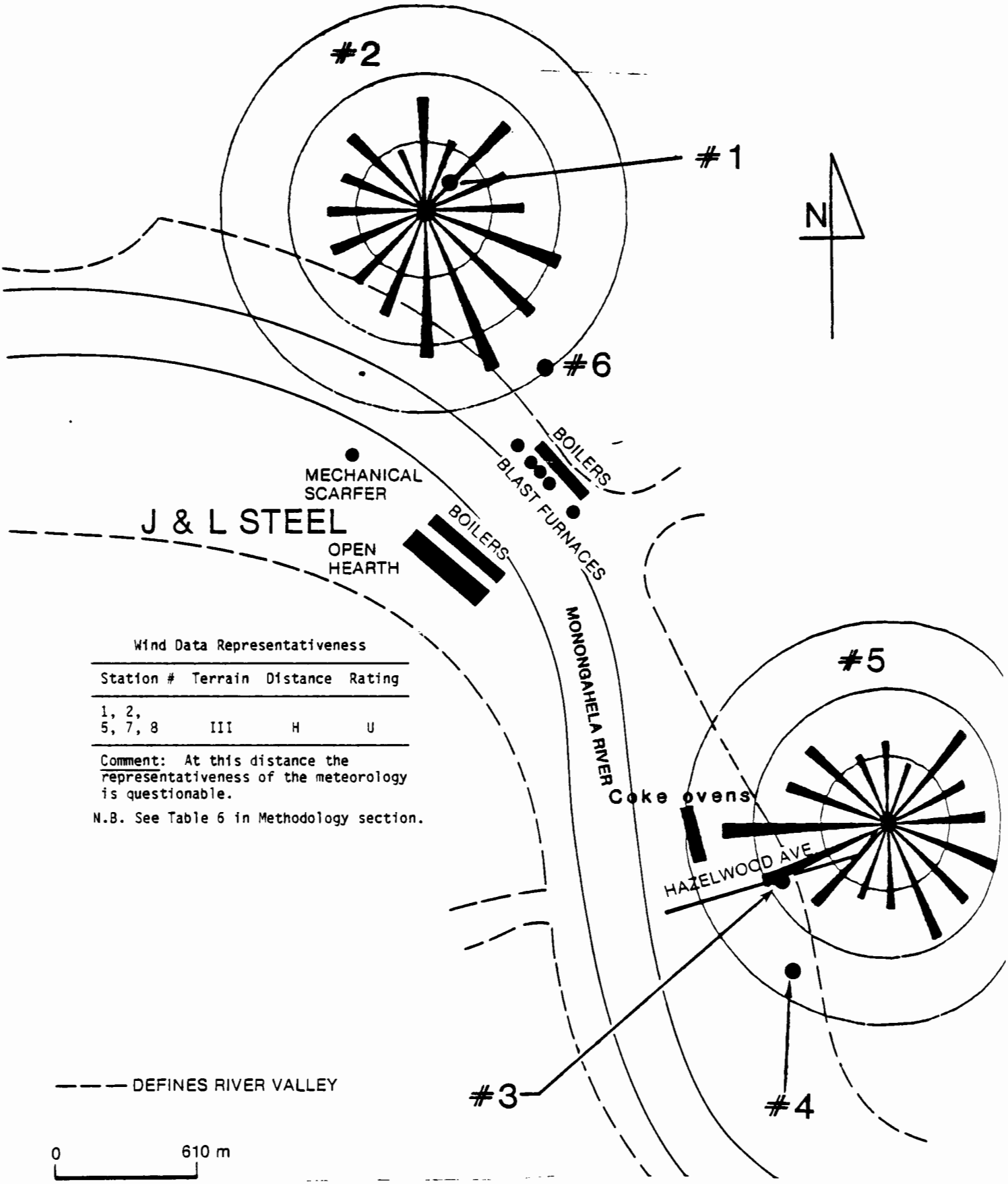
(Continued)

Key: U = Unavailable M = Moderate
L = Light H = Heavy

Hi-Vol Monitoring Sites--Jones & Laughlin Steel, Pittsburgh, Pennsylvania (Concluded)

| Site ID Number | SAROAD Number | Site Name and Address | Plant Location from Site: Facility/ Bearing (°) | | Plant Location from Site: Distance (km) | Elevation (m): Above Ground | Elevation (m): Above MSL | Elevation (m): Above Plant | Site Description | Nearest Roadway: Name | Nearest Roadway: Direction | Nearest Roadway: Distance (m) | Nearest Roadway: Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7 | County ID #6909 | Hazelwood 4 | Coke ovens | 300 | 0.7 | 10.7 | 242 | 12 | Roof | Gertrude | S | 15 | L |
| | | Fire House #13 | Open hearth furnaces | 320 | 2.1 | | | | Urban-commercial | Flowers Ave. | N | 27 | L |
| | | Flowers Ave. | | | | | | | | | | | |
| | | Pittsburgh, PA | Mechanical scarfer | 325 | 3.0 | | | | | | | | |
| | | | Blast furnaces | 330 | 2.3 | | | | | | | | |
| 8 | County ID #6910 | Glen Hazel | Coke ovens | 302 | 1.5 | 30.5 | 320 | 90 | Roof | Johnston | SW | 76 | L |
| | | 945 Rosie Court | Open hearth furnaces | 314 | 2.9 | | | | Suburban-residential | | | | |
| | | Pittsburgh, PA | Mechanical scarfer | 321 | 2.9 | | | | | | | | |
| | | | Blast furnaces | 323 | 3.0 | | | | | | | | |

Key: U = Unavailable M = Moderate
L = Light H = Heavy




Wind Data Representativeness

| Station # | Terrain | Distance | Rating |
|---|---|---|---|
| 1, 2, 5, 7, 8 | III | H | U |

Comment: At this distance the representativeness of the meteorology is questionable.

N.B. See Table 6 in Methodology section.

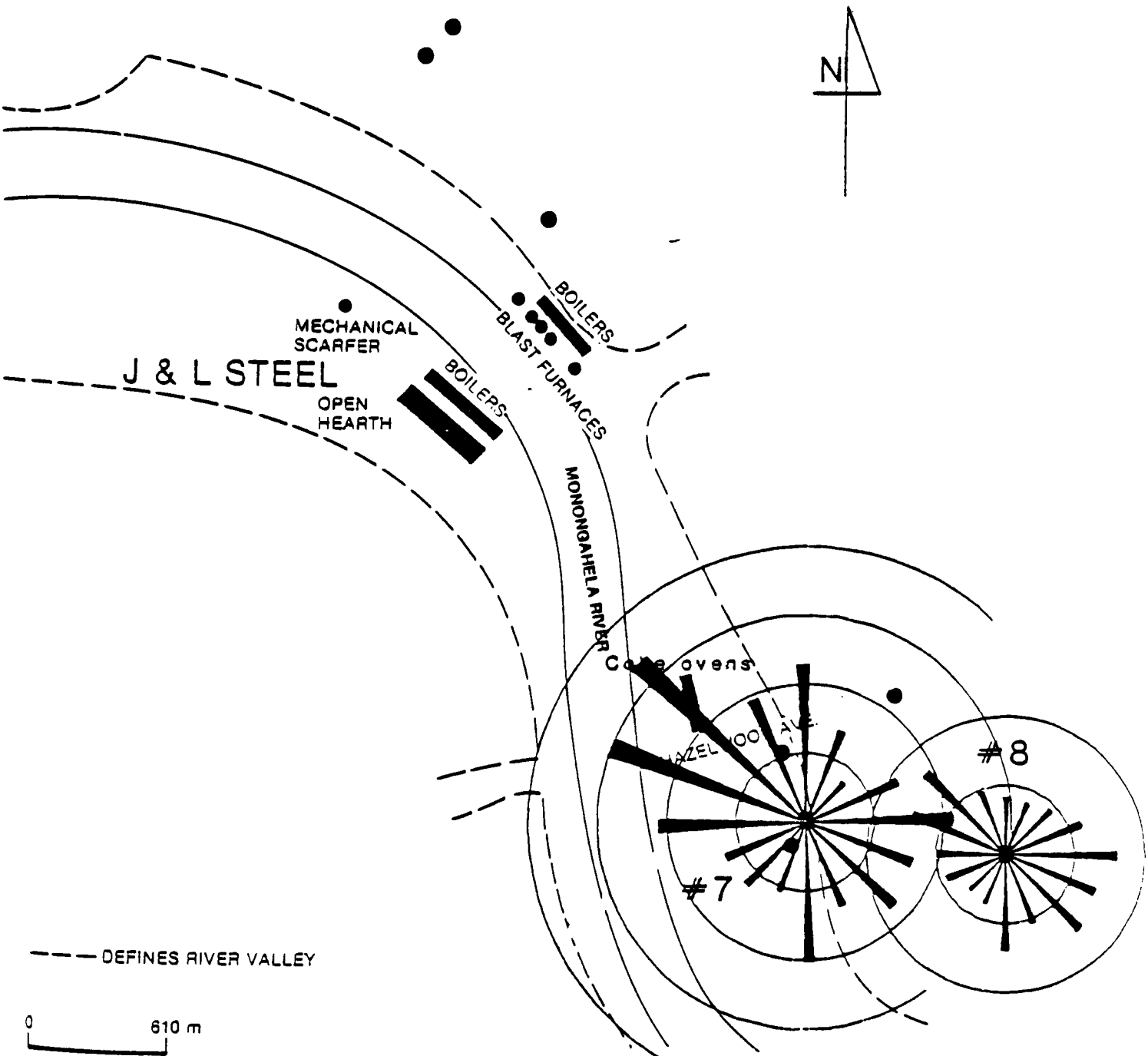
TSP roses for Jones & Laughlin Steel - Pittsburgh, Pennsylvania, for the period 1978-1982 for cases of $\omega > 0.90$. Each circle represents 50 $\mu g/m^3$.

Wind Data Representativeness

| Station # | Terrain | Distance | Rating |
|---|---|---|---|
| 1, 2, 5, 7, 8 | III | H | U |

Comment: At this distance the representativeness of the meteorology is questionable.

N.B. See Table 6 in Methodology section.



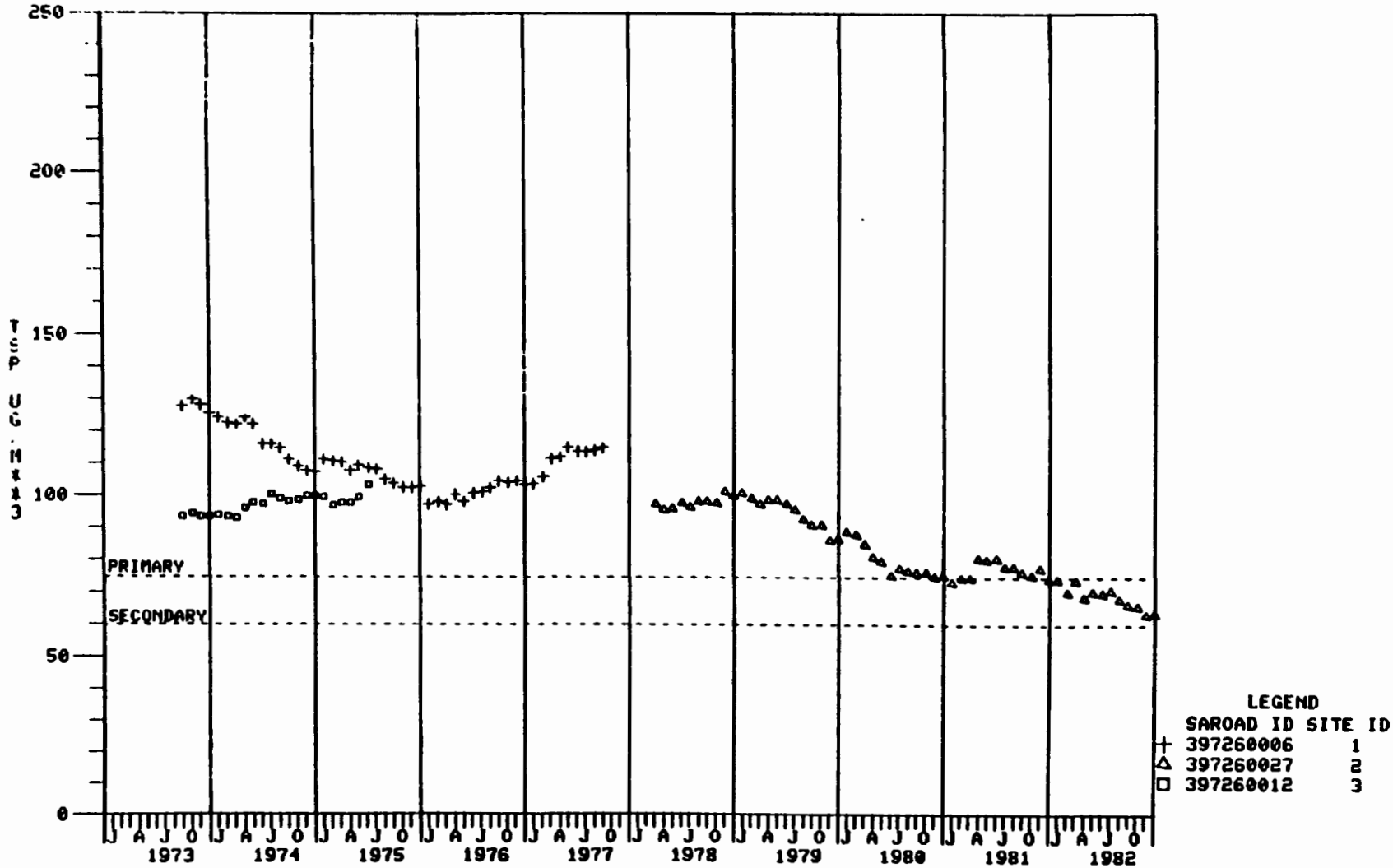

TSP roses for Jones & Laughlin Steel Pittsburgh, Pennsylvania, for the period 1978-1982 for cases of $\omega > 0.90$. Each circle represents 50 $\mu g/m^3$.

NUMBER OF TSP OBSERVATIONS USED IN POLLUTION ROSES

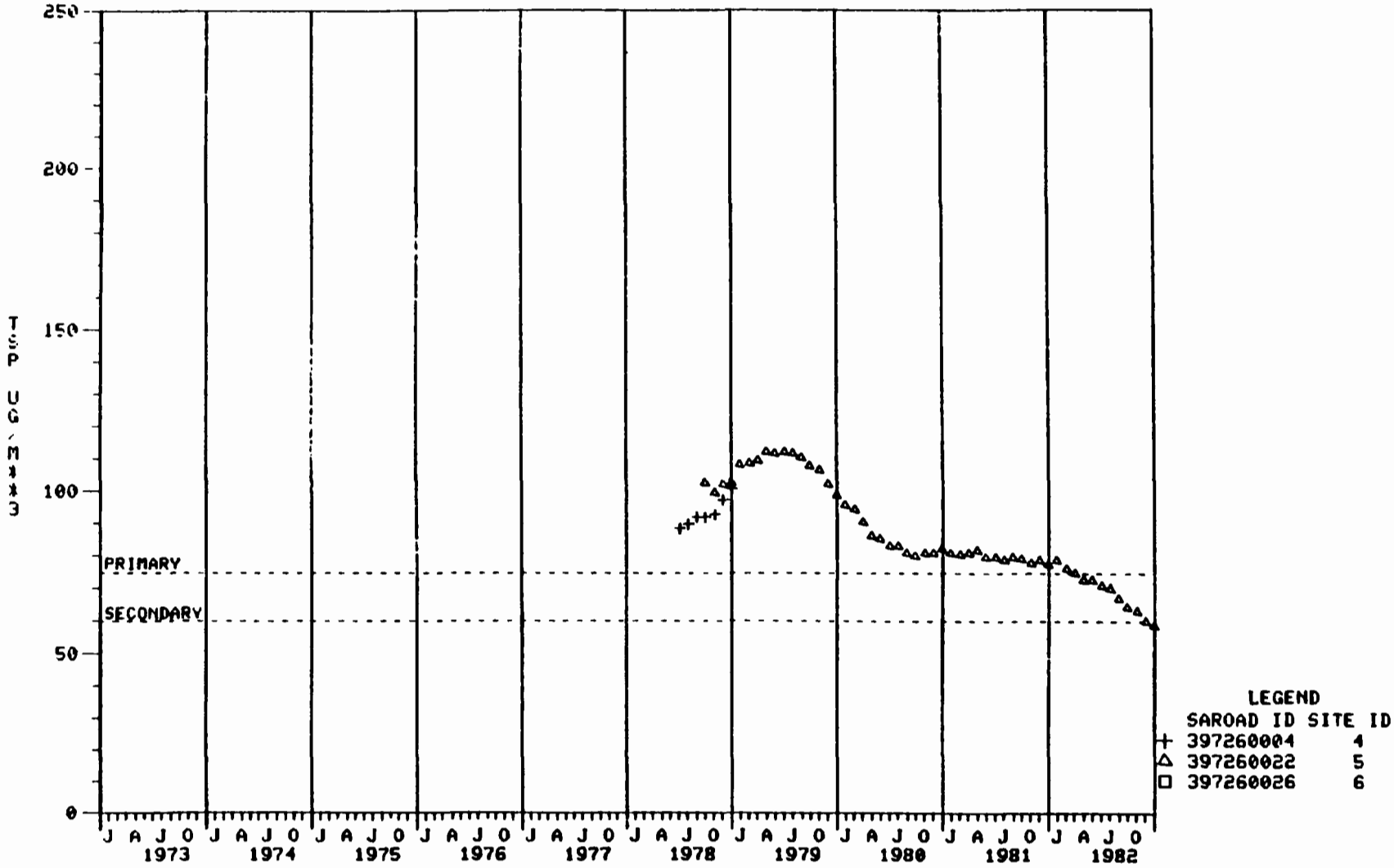
Jones & Laughlin Steel--Pittsburgh, PA

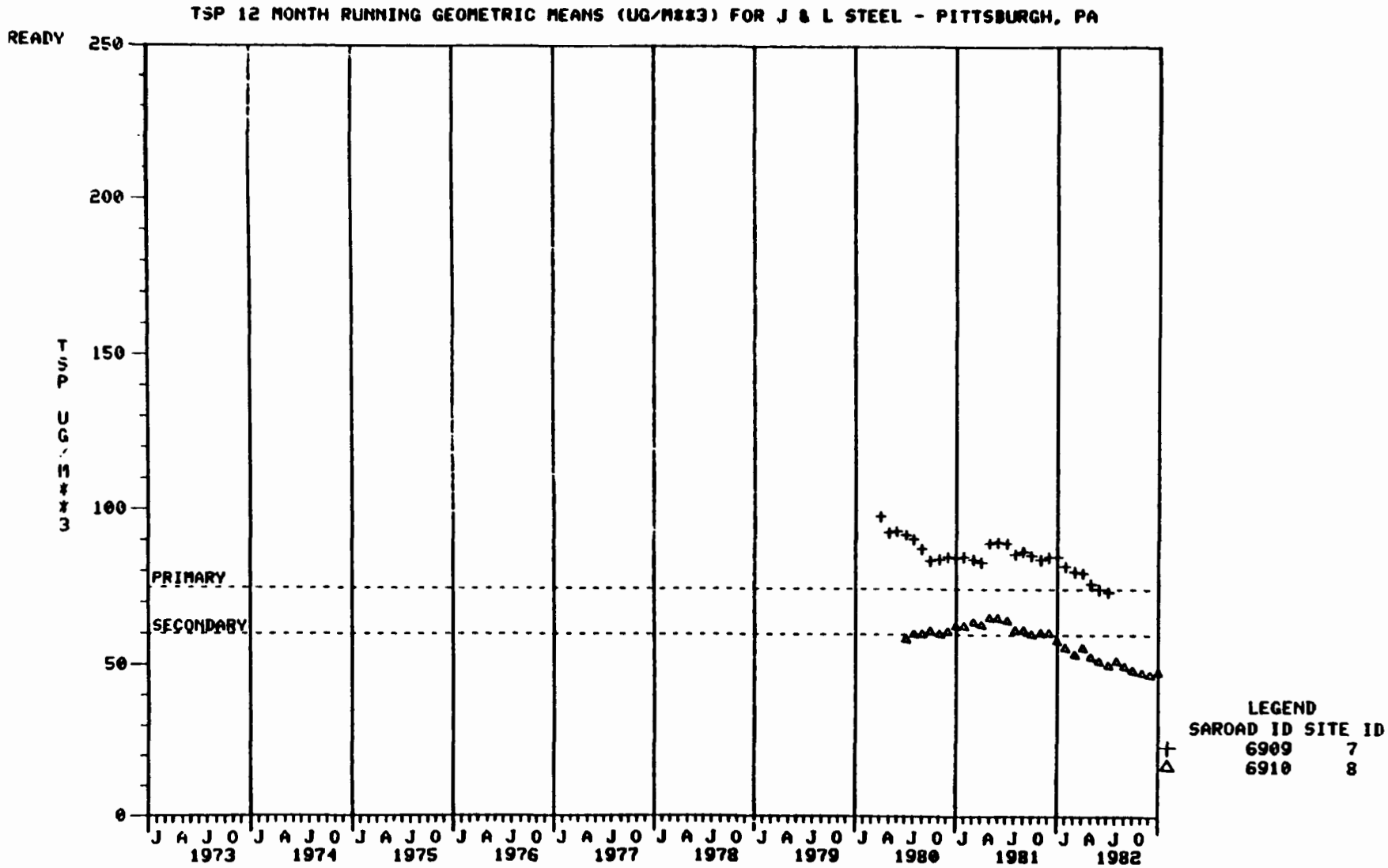
| Wind Direction | Monitoring Site Numbers #2 | #5 | #7 | #8 |
|---|---|---|---|---|
| N | 6 | 14 | 2 | 1 |
| NNE | 1 | 3 | 1 | 1 |
| NE | 6 | 6 | 1 | 1 |
| ENE | 5 | 5 | 3 | 5 |
| E | 2 | 6 | 1 | 2 |
| ESE | 6 | 10 | 5 | 6 |
| SE | 7 | 7 | 3 | 2 |
| SSE | 9 | 10 | 4 | 4 |
| S | 4 | 12 | 1 | 2 |
| SSW | 10 | 13 | 3 | 6 |
| SW | 12 | 15 | 5 | 6 |
| WSW | 16 | 18 | 10 | 8 |
| W | 26 | 42 | 9 | 14 |
| WNW | 10 | 19 | 7 | 12 |
| NW | 9 | 14 | 4 | 6 |
| NNW | 3 | 9 | 1 | 3 |
| Total | 132 | 203 | 60 | 79 |

TSP 12 MONTH RUNNING GEOMETRIC MEANS (UG/M**3) FOR J & L STEEL - PITTSBURGH, PA

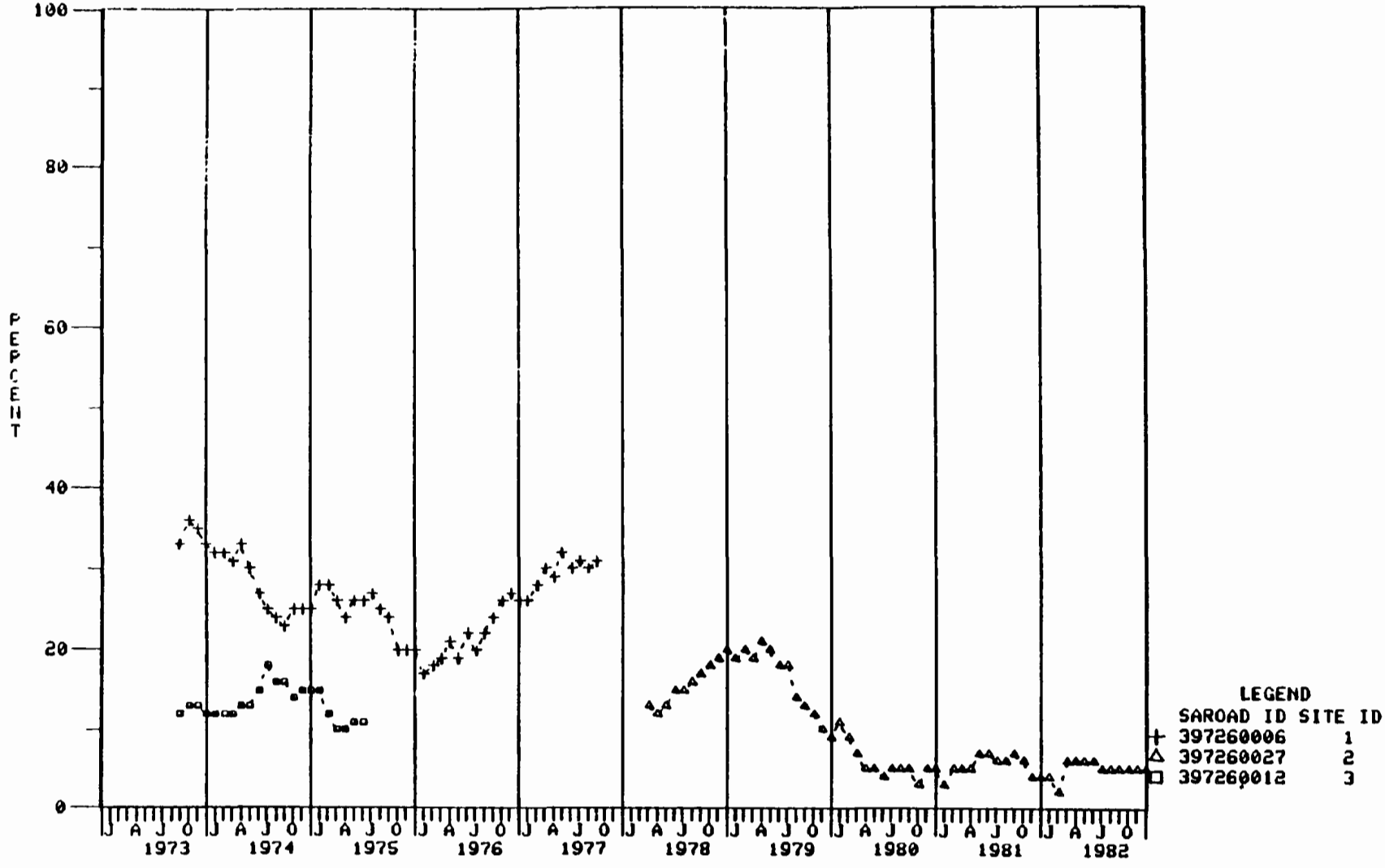


TSP 12 MONTH RUNNING GEOMETRIC MEANS (UG/M**3) FOR J & L STEEL - PITTSBURGH, PA

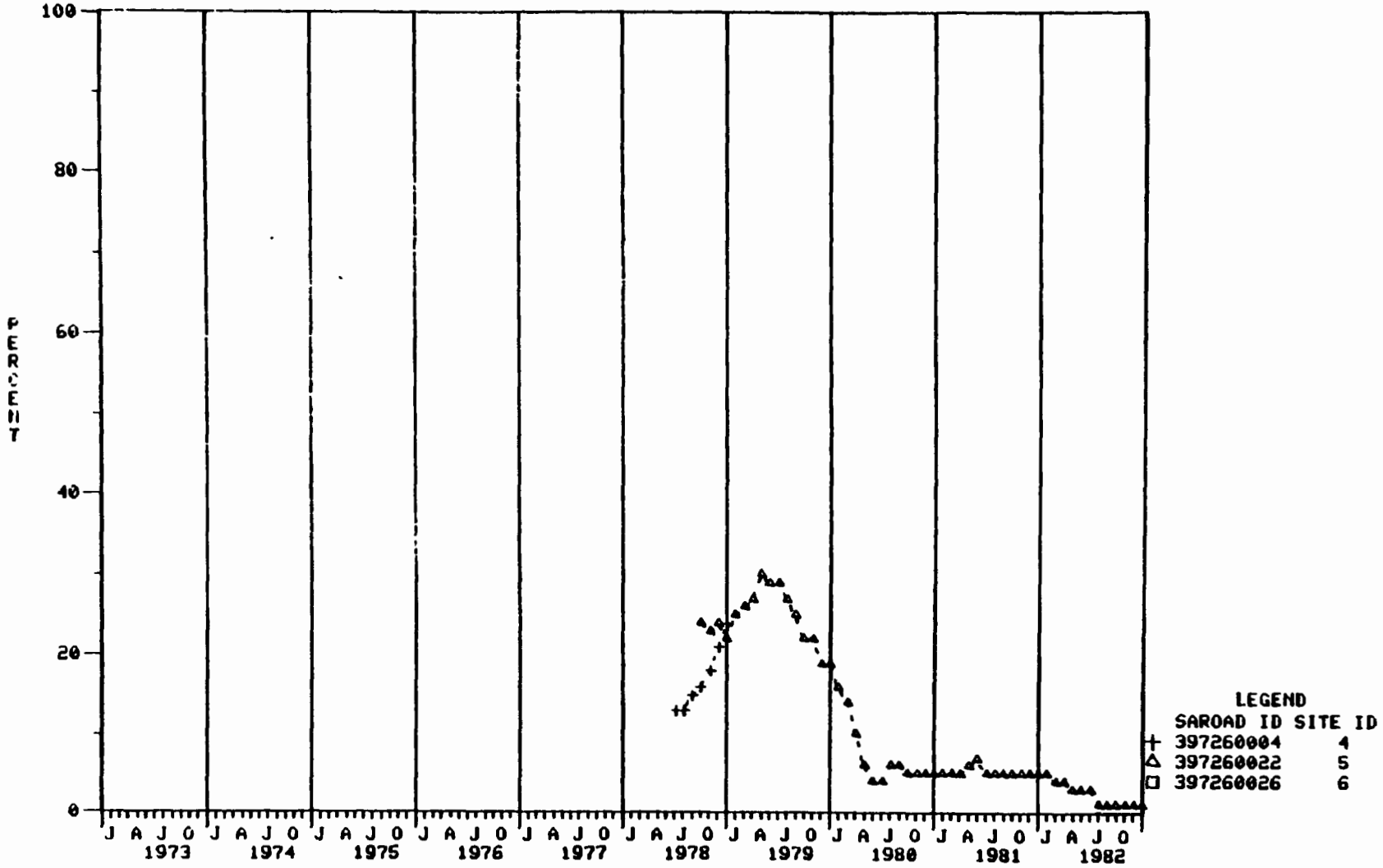


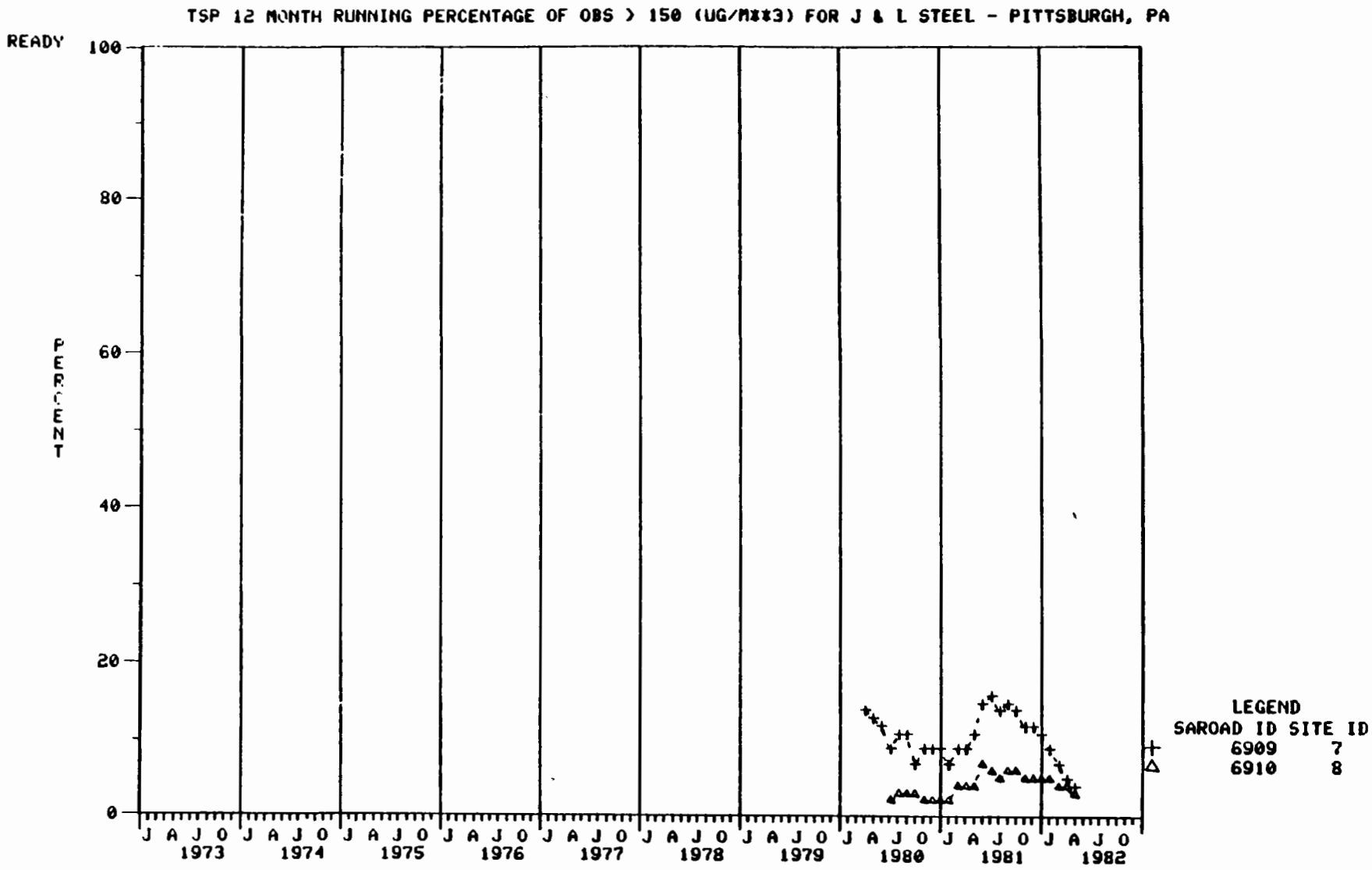

TSP 12 MONTH RUNNING GEOMETRIC MEANS (UG/M**3) FOR J & L STEEL - PITTSBURGH, PA
READY
TSP UG/M**3
250
200
150
100
50
0
PRIMARY
SECONDARY
J A J O
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
LEGEND
SAROAD ID SITE ID
6909 7
6910 8

TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 150 (UG/M**3) FOR J & L STEEL - PITTSBURGH, PA



TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 150 (UG/M**3) FOR J & L STEEL - PITTSBURGH, PA




TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 150 (UG/M**3) FOR J & L STEEL - PITTSBURGH, PA
READY
PERCENT
100
80
60
40
20
0
J A J O
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
LEGEND
SAROAD ID SITE ID
6909 7
6910 8

TSP DATA SUMMARY FOR J & L STEEL - PITTSBURGH, PA
SAROAD STATION # 397260006 SITE ID # 01
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 57 | 77 | 113 | 116 | 48 | 0 | 0 | 0 | 0 | 0 |
| GEOMETRIC MEAN: | ****** | 125.7 | 107.3 | 102.9 | 103.6 | ****** | ****** | ****** | ****** | ****** | ****** |
| GEOMETRIC S.D.: | ****** | 1.5 | 1.5 | 1.5 | 1.5 | ****** | ****** | ****** | ****** | ****** | ****** |
| ARITHMETIC MEAN | ****** | 134.3 | 117.4 | 111.5 | 113.1 | ****** | ****** | ****** | ****** | ****** | ****** |
| HIGHEST BY LARSEN EXTRP: | ****** | 386.6 | 373.1 | 326.9 | 358.4 | ****** | ****** | ****** | ****** | ****** | ****** |
| 1ST HIGHEST: | ****** | 249.0 | 327.0 | 386.0 | 263.0 | 347.0 | ****** | ****** | ****** | ****** | ****** |
| DATE : | ****** | 731025 | 740411 | 750109 | 760415 | 770418 | ****** | ****** | ****** | ****** | ****** |
| 2ND HIGHEST: | ****** | 225.0 | 279.0 | 229.0 | 250.0 | 326.0 | ****** | ****** | ****** | ****** | ****** |
| DATE : | ****** | 730719 | 741011 | 750801 | 760418 | 770212 | ****** | ****** | ****** | ****** | ****** |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 2 | 1 | 1 | 5 | 0 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 18 | 19 | 23 | 29 | 15 | 0 | 0 | 0 | 0 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 4 | 11 | 13 | 17 | 4 | 0 | 0 | 0 | 0 | 0 |
| 66-130: | 0 | 24 | 43 | 73 | 61 | 21 | 0 | 0 | 0 | 0 | 0 |
| 131-195: | 0 | 23 | 19 | 20 | 33 | 14 | 0 | 0 | 0 | 0 | 0 |
| 196-260: | 0 | 6 | 2 | 6 | 4 | 4 | 0 | 0 | 0 | 0 | 0 |
| 261-325: | 0 | 0 | 1 | 0 | 1 | 3 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 1 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR J & L STEEL - PITTSBURGH, PA
SAROAD STATION # 397260027 SITE ID # 02
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 0 | 0 | 0 | 62 | 115 | 57 | 61 | 46 | 59 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | ****** | ****** | ****** | 100.0 | 86.4 | 75.1 | 74.1 | 63.4 |
| GEOMETRIC S.D.: | ****** | ****** | ****** | ****** | ****** | ****** | 1.6 | 1.5 | 1.5 | 1.6 | 1.5 |
| ARITHMETIC MEAN | ****** | ****** | ****** | ****** | ****** | ****** | 111.2 | 94.5 | 82.0 | 81.9 | 69.4 |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | ****** | ****** | ****** | 405.0 | 298.7 | 267.7 | 286.9 | 222.0 |
| 1ST HIGHEST: | ****** | ****** | ****** | ****** | ****** | 242.0 | 267.0 | 249.0 | 168.0 | 182.0 | 168.0 |
| DATE : | ****** | ****** | ****** | ****** | ****** | 770715 | 780228 | 790220 | 801123 | 810215 | 820330 |
| 2ND HIGHEST: | ****** | ****** | ****** | ****** | ****** | 199.0 | 259.0 | 213.0 | 162.0 | 152.0 | 162.0 |
| DATE : | ****** | ****** | ****** | ****** | ****** | 771025 | 781104 | 790322 | 800726 | 810522 | 820324 |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 0 | 0 | 0 | 8 | 23 | 5 | 2 | 2 | 3 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 0 | 0 | 0 | 11 | 23 | 14 | 22 | 16 | 33 |
| 66-130: | 0 | 0 | 0 | 0 | 0 | 35 | 61 | 34 | 33 | 26 | 22 |
| 131-195: | 0 | 0 | 0 | 0 | 0 | 14 | 23 | 6 | 6 | 4 | 4 |
| 196-260: | 0 | 0 | 0 | 0 | 0 | 2 | 7 | 3 | 0 | 0 | 0 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR J & L STEEL - PITTSBURGH, PA
SAROAD STATION # 397260012 SITE ID # 03
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 244 | 98 | 18 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| GEOMETRIC MEAN: | ****** | 93.7 | 100.1 | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| GEOMETRIC S.D.: | ****** | 1.5 | 1.5 | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| ARITHMETIC MEAN | ****** | 102.8 | 109.7 | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| HIGHEST BY LARSEN EXTRP: | ****** | 322.6 | 336.5 | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| 1ST HIGHEST: | ****** | 331.0 | 402.0 | 211.0 | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| DATE : | ****** | 731023 | 740216 | 750307 | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| 2ND HIGHEST: | ****** | 305.0 | 278.0 | 183.0 | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| DATE : | ****** | 730904 | 741110 | 750124 | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| # OF READINGS EXCEEDING 260 : | 0 | 4 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 29 | 15 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 48 | 14 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 66-130: | 0 | 147 | 59 | 13 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 131-195: | 0 | 36 | 21 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 196-260: | 0 | 9 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 261-325: | 0 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR J & L STEEL - PITTSBURGH, PA
SAROAD STATION # 397260004 SITE ID # 04
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 12 | 0 | 0 | 29 | 54 | 0 | 0 | 0 | 0 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | ****** | ****** | ****** | 100.8 | ****** | ****** | ****** | ****** |
| GEOMETRIC S.D.: | ****** | ****** | ****** | ****** | ****** | ****** | 1.5 | ****** | ****** | ****** | ****** |
| ARITHMETIC MEAN | ****** | ****** | ****** | ****** | ****** | ****** | 110.2 | ****** | ****** | ****** | ****** |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | ****** | ****** | ****** | 360.8 | ****** | ****** | ****** | ****** |
| 1ST HIGHEST: | ****** | ****** | 196.0 | ****** | ****** | 116.0 | 215.0 | ****** | ****** | ****** | ****** |
| DATE : | ****** | ****** | 740403 | ****** | ****** | 771230 | 780228 | ****** | ****** | ****** | ****** |
| 2ND HIGHEST: | ****** | ****** | 188.0 | ****** | ****** | 114.0 | 210.0 | ****** | ****** | ****** | ****** |
| DATE : | ****** | ****** | 740410 | ****** | ****** | 771025 | 780429 | ****** | ****** | ****** | ****** |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 4 | 0 | 0 | 0 | 12 | 0 | 0 | 0 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 1 | 0 | 0 | 7 | 10 | 0 | 0 | 0 | 0 |
| 66-130: | 0 | 0 | 5 | 0 | 0 | 22 | 26 | 0 | 0 | 0 | 0 |
| 131-195: | 0 | 0 | 5 | 0 | 0 | 0 | 16 | 0 | 0 | 0 | 0 |
| 196-260: | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR J & L STEEL - PITTSBURGH, PA
SAROAD STATION # 397260022 SITE ID # 05
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 0 | 0 | 0 | 0 | 96 | 116 | 111 | 113 | 108 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | ****** | ****** | ****** | 102.4 | 98.7 | 82.2 | 77.5 | 58.8 |
| GEOMETRIC S.D.: | ****** | ****** | ****** | ****** | ****** | ****** | 1.6 | 1.5 | 1.4 | 1.5 | 1.5 |
| ARITHMETIC MEAN | ****** | ****** | ****** | ****** | ****** | ****** | 113.7 | 107.8 | 87.1 | 83.5 | 64.1 |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | ****** | ****** | ****** | 385.0 | 346.5 | 226.6 | 236.3 | 202.1 |
| 1ST HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | 343.0 | 285.0 | 182.0 | 202.0 | 159.0 |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | 781104 | 790322 | 800726 | 810215 | 820324 |
| 2ND HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | 315.0 | 220.0 | 165.0 | 198.0 | 128.0 |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | 780908 | 790421 | 800623 | 810522 | 820505 |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 1 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 0 | 0 | 0 | 0 | 21 | 21 | 4 | 6 | 1 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 0 | 0 | 0 | 0 | 15 | 20 | 30 | 39 | 66 |
| 66-130: | 0 | 0 | 0 | 0 | 0 | 0 | 56 | 69 | 71 | 64 | 41 |
| 131-195: | 0 | 0 | 0 | 0 | 0 | 0 | 20 | 23 | 10 | 8 | 1 |
| 196-260: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 0 | 2 | 0 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR J & L STEEL - PITTSBURGH, PA
SAROAD STATION # 397260026 SITE ID # 06
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 30 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| GEOMETRIC S.D.: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| ARITHMETIC MEAN | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| 1ST HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 115.0 |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 820716 |
| 2ND HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 101.0 |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 821026 |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 25 |
| 66-130: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| 131-195: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 196-260: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR J & L STEEL - PITTSBURGH, PA
SAROAD STATION # 6909 SITE ID # 07
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 29 | 55 | 54 | 19 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 85.0 | 85.2 | ****** |
| GEOMETRIC S.D.: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 1.5 | 1.6 | ****** |
| ARITHMETIC MEAN | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 94.1 | 95.3 | ****** |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 300.0 | 332.6 | ****** |
| 1ST HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 171.0 | 381.0 | 239.0 | 136.0 |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 790602 | 801030 | 810404 | 820324 |
| 2ND HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 164.0 | 173.0 | 226.0 | 128.0 |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 790906 | 800322 | 810522 | 820129 |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 5 | 6 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 13 | 17 | 9 |
| 66-130: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18 | 33 | 28 | 9 |
| 131-195: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 8 | 5 | 1 |
| 196-260: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR J & L STEEL - PITTSBURGH, PA
SAROAD STATION # 6910 SITE ID # 08
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 25 | 96 | 56 | 48 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 62.6 | 58.0 | 48.0 |
| GEOMETRIC S.D.: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 1.5 | 1.5 | 1.5 |
| ARITHMETIC MEAN | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 67.1 | 64.5 | 52.5 |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 186.6 | 203.2 | 159.9 |
| 1ST HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 159.0 | 165.0 | 217.0 | 138.0 |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 791018 | 800623 | 810504 | 820324 |
| 2ND HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 108.0 | 158.0 | 209.0 | 119.0 |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 791120 | 800726 | 810215 | 820505 |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 3 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 19 | 50 | 38 | 38 |
| 66-130: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 44 | 15 | 9 |
| 131-195: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 1 |
| 196-260: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

24-HR STANDARD EXCEEDANCE ROSE FOR
J & L STEEL - PITTSBURGH, PA
(ALL CASES > 260 UG/M**3)
X=0.900
COUNT/AVERAGE TSP OF PRIMARY EXCEEDANCES

| SAROAD # | 397260006 | | 397260027 | | 397260012 | | 397260004 | | 397260022 | | 397260026 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SITE ID # | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | |
| DIRECTION | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X |
| N COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| NNE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| NE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| ENE COUNT: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 292. | 0. | 0. | 0. | 0. | 0. | 0. |
| E COUNT: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 402. | 0. | 0. | 0. | 0. | 0. | 0. |
| ESE COUNT: | 0 | 2 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 1 | 0 | 0 |
| AVE TSP: | 0. | 334. | 0. | 0. | 0. | 285. | 0. | 0. | 0. | 285. | 0. | 0. |
| SE COUNT: | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| AVE TSP: | 0. | 327. | 0. | 0. | 0. | 331. | 0. | 0. | 0. | 291. | 0. | 0. |
| SSE COUNT: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 267. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S COUNT: | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| AVE TSP: | 0. | 314. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 290. | 0. | 0. |
| SSW COUNT: | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 279. | 0. | 0. | 0. | 270. | 0. | 0. | 0. | 0. | 0. | 0. |
| SW COUNT: | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 273. | 263. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| WSW COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| W COUNT: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| AVE TSP: | 0. | 386. | 0. | 0. | 0. | 0. | 0. | 0. | 315. | 0. | 0. | 0. |
| WNW COUNT: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 267. | 0. | 0. | 0. | 0. | 0. | 0. |
| NW COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 343. | 0. | 0. |
| NNW COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| ALL COUNT: | 1 | 8 | 0 | 1 | 0 | 8 | 0 | 0 | 1 | 4 | 0 | 0 |
| AVE TSP: | 273. | 319. | 0. | 267. | 0. | 302. | 0. | 0. | 315. | 302. | 0. | 0. |

24-HR STANDARD EXCEEDANCE ROSE FOR
J & L STEEL - PITTSBURGH, PA
(ALL CASES > 260 UG/M**3)
X=0.900
COUNT/AVERAGE TSP OF PRIMARY EXCEEDANCES

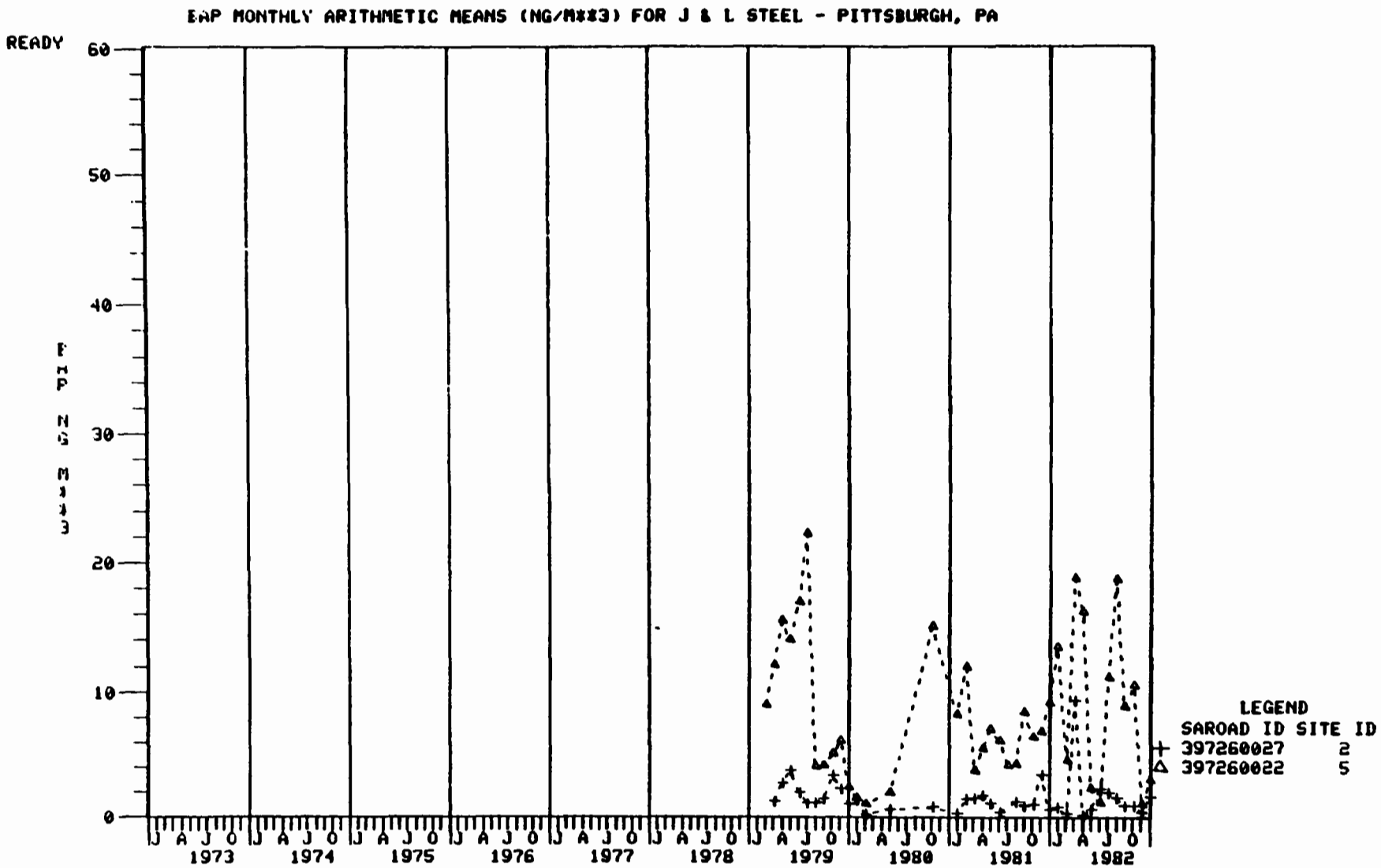
| SAROAD # | 6909 | | 6910 | |
|---|---|---|---|---|
| SITE ID # | 7 | | 8 | |
| DIRECTION | W>=X | W<X | W>=X | W<X |
| N COUNT: | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. |
| NNE COUNT: | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. |
| NE COUNT: | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. |
| ENE COUNT: | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. |
| E COUNT: | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. |
| ESE COUNT: | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. |
| SE COUNT: | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. |
| SSE COUNT: | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. |
| S COUNT: | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. |
| SSW COUNT: | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. |
| SW COUNT: | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. |
| WSW COUNT: | 1 | 0 | 0 | 0 |
| AVE TSP: | 381. | 0. | 0. | 0. |
| W COUNT: | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. |
| WNW COUNT: | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. |
| NW COUNT: | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. |
| NNW COUNT: | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. |
| ALL COUNT: | 1 | 0 | 0 | 0 |
| AVE TSP: | 381. | 0. | 0. | 0. |

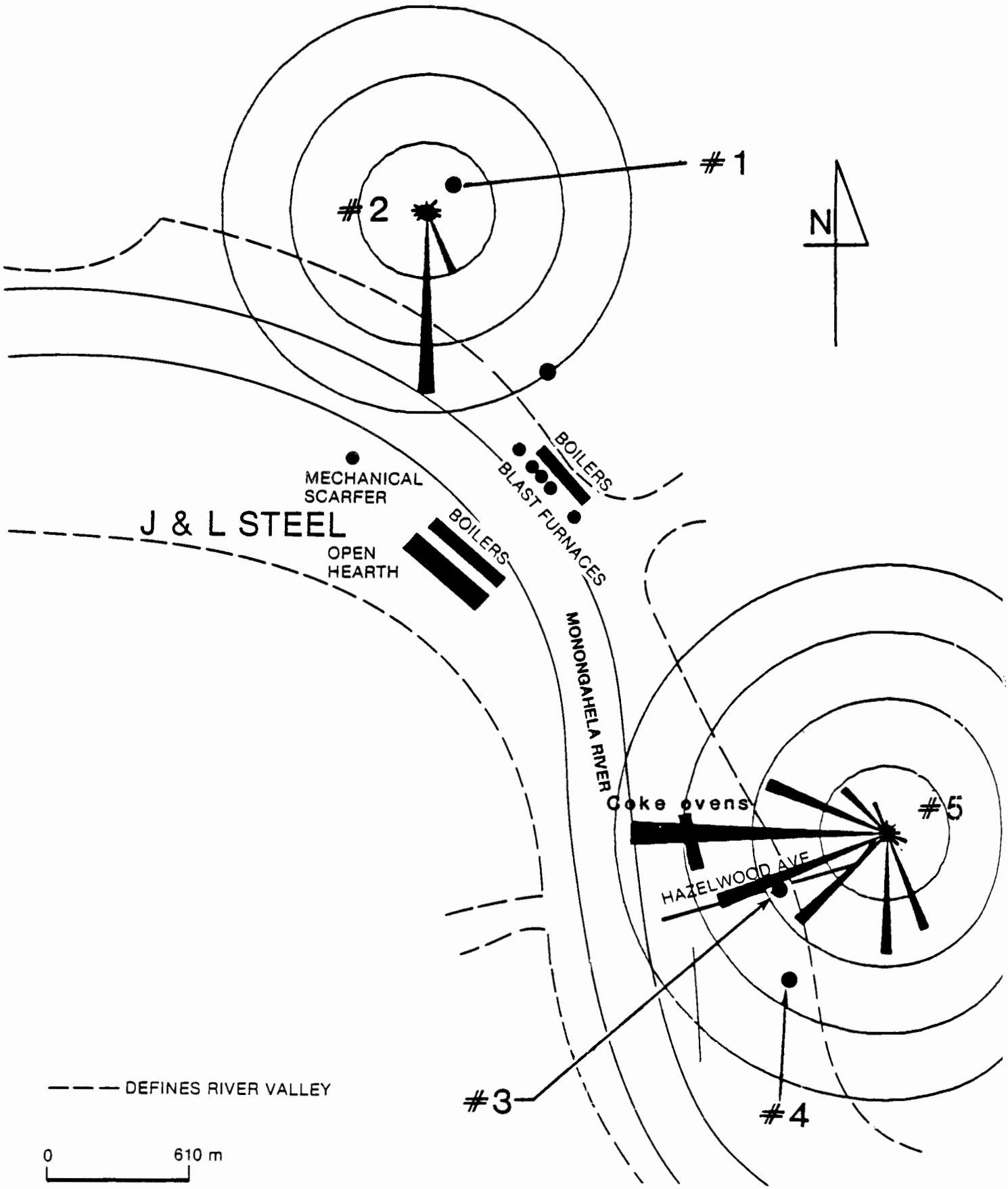
24-HR STANDARD EXCEEDANCE ROSE FOR
J & L STEEL - PITTSBURGH, PA
(ALL CASES > 150 UG/M**3)
X=0.900
COUNT/AVERAGE TSP OF SECONDARY EXCEEDANCES

| SAROAD # | 397260006 | | 397260027 | | 397260012 | | 397260004 | | 397260022 | | 397260026 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SITE ID # | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | |
| DIRECTION | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X |
| N COUNT: | 0 | 2 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |
| AVE TSP: | 0. | 191. | 192. | 199. | 0. | 0. | 0. | 169. | 0. | 161. | 0. | 0. |
| NNE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| NE COUNT: | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 154. | 0. | 161. | 0. | 0. | 178. | 0. | 0. | 0. |
| ENE COUNT: | 0 | 3 | 0 | 1 | 0 | 3 | 0 | 1 | 0 | 1 | 0 | 0 |
| AVE TSP: | 0. | 178. | 0. | 197. | 0. | 203. | 0. | 164. | 0. | 163. | 0. | 0. |
| E COUNT: | 0 | 4 | 0 | 1 | 0 | 4 | 0 | 0 | 1 | 3 | 0 | 0 |
| AVE TSP: | 0. | 166. | 0. | 156. | 0. | 241. | 0. | 0. | 179. | 175. | 0. | 0. |
| ESE COUNT: | 1 | 7 | 0 | 2 | 1 | 4 | 0 | 0 | 1 | 3 | 0 | 0 |
| AVE TSP: | 190. | 231. | 0. | 211. | 235. | 258. | 0. | 0. | 161. | 198. | 0. | 0. |
| SE COUNT: | 2 | 5 | 2 | 2 | 0 | 2 | 0 | 1 | 0 | 3 | 0 | 0 |
| AVE TSP: | 202. | 204. | 164. | 191. | 0. | 249. | 0. | 196. | 0. | 208. | 0. | 0. |
| SSE COUNT: | 1 | 3 | 3 | 5 | 0 | 1 | 0 | 1 | 2 | 3 | 0 | 0 |
| AVE TSP: | 217. | 196. | 210. | 194. | 0. | 179. | 0. | 215. | 169. | 193. | 0. | 0. |
| S COUNT: | 1 | 13 | 4 | 4 | 0 | 3 | 0 | 1 | 0 | 4 | 0 | 0 |
| AVE TSP: | 163. | 192. | 183. | 198. | 0. | 177. | 0. | 180. | 0. | 206. | 0. | 0. |
| SSW COUNT: | 2 | 15 | 0 | 5 | 0 | 3 | 0 | 1 | 0 | 5 | 0 | 0 |
| AVE TSP: | 161. | 193. | 0. | 175. | 0. | 209. | 0. | 185. | 0. | 173. | 0. | 0. |
| SW COUNT: | 7 | 8 | 1 | 3 | 0 | 3 | 1 | 0 | 1 | 5 | 0 | 0 |
| AVE TSP: | 191. | 206. | 158. | 163. | 0. | 231. | 177. | 0. | 173. | 159. | 0. | 0. |
| WSW COUNT: | 4 | 10 | 0 | 2 | 1 | 3 | 0 | 2 | 0 | 5 | 0 | 0 |
| AVE TSP: | 174. | 175. | 0. | 162. | 248. | 187. | 0. | 173. | 0. | 180. | 0. | 0. |
| W COUNT: | 3 | 3 | 2 | 1 | 0 | 1 | 2 | 0 | 8 | 2 | 0 | 0 |
| AVE TSP: | 203. | 242. | 174. | 178. | 0. | 186. | 164. | 0. | 201. | 170. | 0. | 0. |
| WNW COUNT: | 1 | 4 | 0 | 0 | 1 | 4 | 1 | 1 | 1 | 0 | 0 | 0 |
| AVE TSP: | 153. | 171. | 0. | 0. | 192. | 191. | 155. | 167. | 152. | 0. | 0. | 0. |
| NW COUNT: | 1 | 3 | 1 | 1 | 5 | 1 | 0 | 3 | 1 | 2 | 0 | 0 |
| AVE TSP: | 163. | 182. | 152. | 259. | 175. | 174. | 0. | 188. | 198. | 263. | 0. | 0. |
| NNW COUNT: | 1 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 170. | 0. | 0. | 0. | 191. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| ALL COUNT: | 24 | 80 | 14 | 29 | 12 | 34 | 4 | 12 | 16 | 37 | 0 | 0 |
| AVE TSP: | 184. | 194. | 181. | 186. | 193. | 210. | 165. | 182. | 187. | 186. | 0. | 0. |

24-HR STANDARD EXCEEDANCE ROSE FOR
J & L STEEL - PITTSBURGH, PA
(ALL CASES > 150 UG/M**3)
X=0.900
COUNT/AVERAGE TSP OF SECONDARY EXCEEDANCES

| SAROAD # | 6909 | | 6910 | |
|---|---|---|---|---|
| SITE ID # | 7 | | 8 | |
| DIRECTION | W>=X | W<X | W>=X | W<X |
| N COUNT: | 1 | 0 | 0 | 0 |
| AVE TSP: | 159. | 0. | 0. | 0. |
| NNE COUNT: | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. |
| NE COUNT: | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. |
| ENE COUNT: | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. |
| E COUNT: | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. |
| ESE COUNT: | 1 | 0 | 0 | 0 |
| AVE TSP: | 163. | 0. | 0. | 0. |
| SE COUNT: | 0 | 0 | 0 | 1 |
| AVE TSP: | 0. | 0. | 0. | 165. |
| SSE COUNT: | 0 | 1 | 0 | 2 |
| AVE TSP: | 0. | 205. | 0. | 184. |
| S COUNT: | 0 | 1 | 0 | 1 |
| AVE TSP: | 0. | 163. | 0. | 158. |
| SSW COUNT: | 0 | 1 | 0 | 0 |
| AVE TSP: | 0. | 239. | 0. | 0. |
| SW COUNT: | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. |
| WSW COUNT: | 1 | 0 | 0 | 0 |
| AVE TSP: | 381. | 0. | 0. | 0. |
| W COUNT: | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. |
| WNW COUNT: | 3 | 1 | 1 | 0 |
| AVE TSP: | 186. | 164. | 217. | 0. |
| NW COUNT: | 3 | 1 | 1 | 0 |
| AVE TSP: | 185. | 171. | 164. | 0. |
| NNW COUNT: | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. |
| ALL COUNT: | 9 | 5 | 2 | 4 |
| AVE TSP: | 202. | 188. | 191. | 173. |


BAP MONTHLY ARITHMETIC MEANS (NG/M**3) FOR J & L STEEL - PITTSBURGH, PA
READY
BAP NG M**3
60
50
40
30
20
10
0
J A J O
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
LEGEND
SAROAD ID SITE ID
397260027 2
397260022 5




BaP roses for Jones & Laughlin Steel - Pittsburgh, Pennsylvania, for the period 1978-1982 for cases of $\omega > 0.85$. Each circle represents 5 $ng/m^3$.

## AIR QUALITY EVALUATION - J&L STEEL, PITTSBURGH, PENNSYLVANIA

Air quality trends:

Stations #2 and #5 have available the longest periods of record. Strong downward trends are noted at both of these sites (Spearman rank correlation coefficients of -0.92 and -0.96, respectively). Relatively strong downward trends are also evident at both stations #7 and #8 between 1980 and 1982 (coefficients of -0.73 and -0.74, respectively). Station #5 experienced the most dramatic decline in the frequency of exceedance of 150 $\mu g/m^3$. Part of the decline in TSP values that occurred in 1980 may be attributed to the installation of sample savers on the hi-vols during that year.

Standard exceedance status:

Primary annual standard exceedances were evident at station #2 through 1980 and at stations #5 and #7 through 1981.

Pollution roses:

Stations #2 and #6 indicate impacts of the blast furnace and boiler complex, while stations #4, #5, #7, and #8 indicate strong impacts of the coke ovens.

Standard exceedance roses:

At station #2, the one excursion over the primary 24-hour standard occurred with a south-southeast wind that blows from the mill toward the station. However, the wind on this day was not highly persistent from this direction. Two of the five excursions over the primary standard at station #5 occurred with winds blowing from the mill to the station.

BaP:

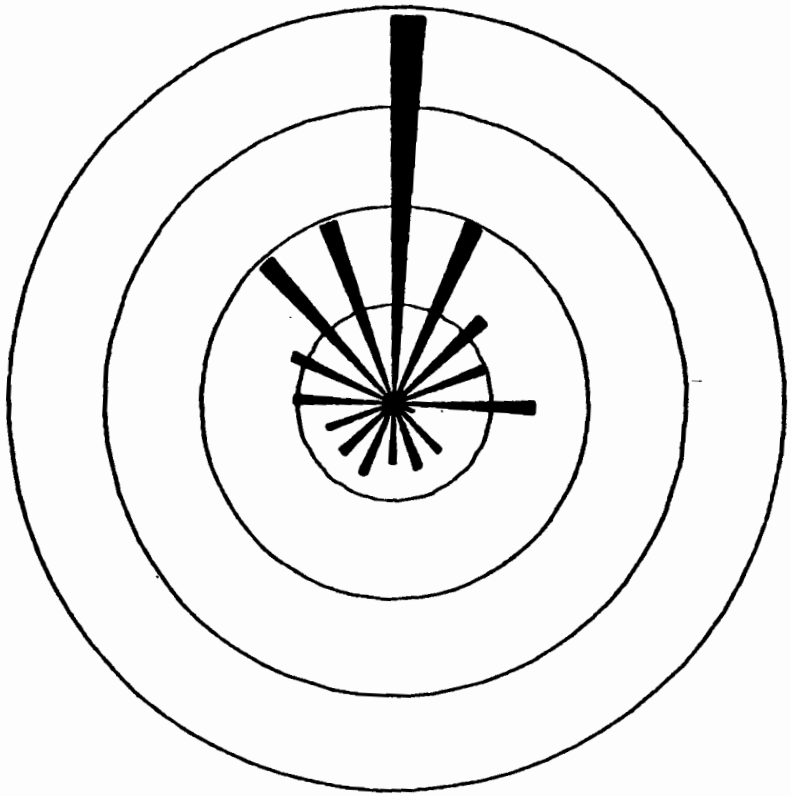
BaP was sampled at stations #2 and #5. Monthly values for station #2 were generally lower than those for station #5. The BaP pollution rose for station #5 indicates that the highest contributions came from the direction of the J&L coking operation. Station #2 also indicates distinct impact from the plant, but at somewhat lower concentrations.

Inhalable particulate matter:

Station #2, operated by the Allegheny County Health Department, samples IP; this site is not part of the EPA IP Network. Data for this site are summarized below:

| Year | Instrument | # of Obs. | Arithmetic Mean | Highest | Second Highest | Standard Deviation |
|---|---|---|---|---|---|---|
| 1981 | DICHOT | 42 | 51 | 114 | 109 | -- |
| 1982 | DICHOT | 56 | 45 | 114 | 96 | -- |

WIND ROSE
PERSISTENCE CLASS 0.90
WIND STATION 94823



NORTH

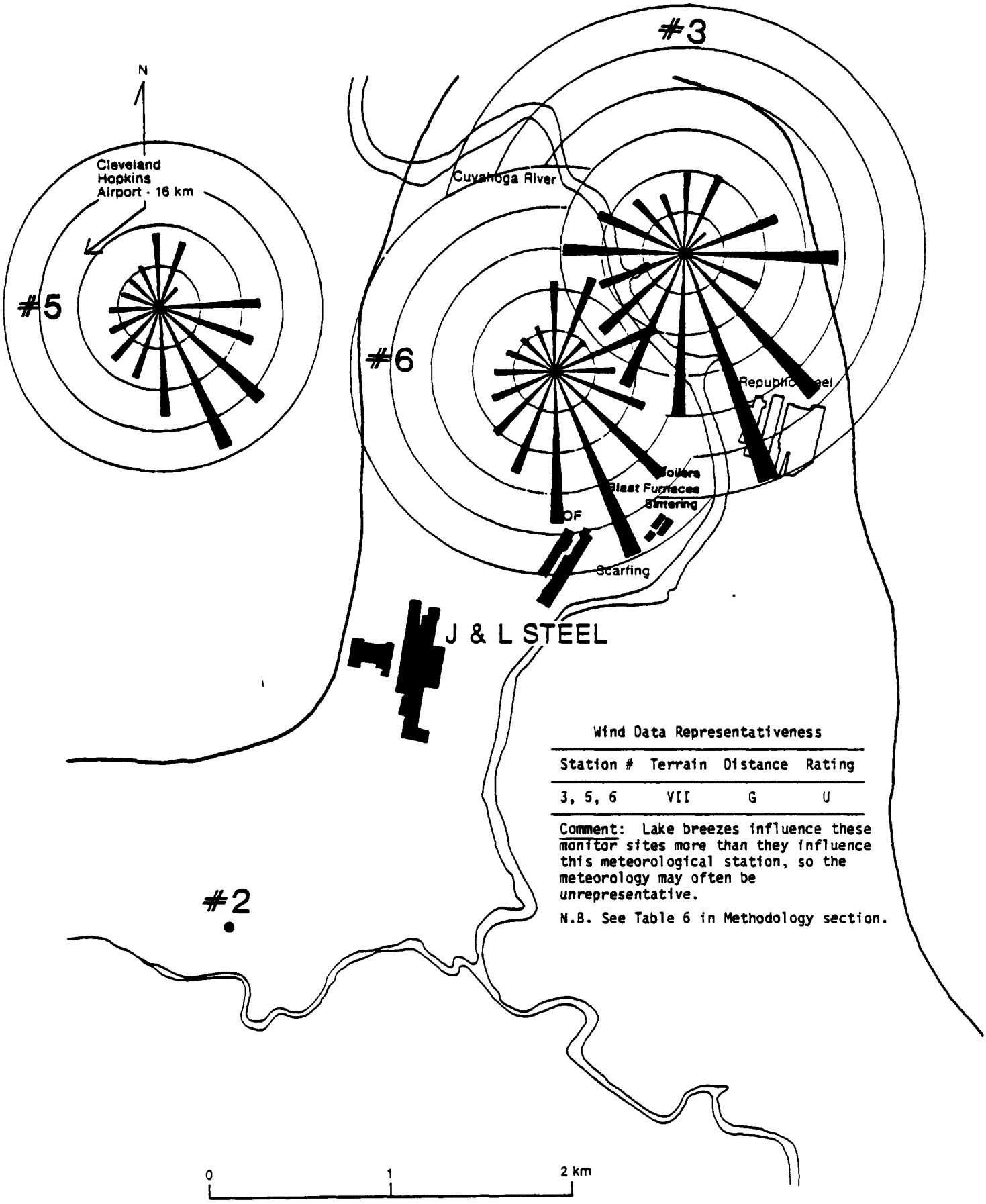
JONES & LAUGHLIN STEEL
Cleveland
Cuyahoga County
Ohio
EPA Region V

Hi-Vol Monitoring Sites--Jones & Laughlin Steel, Cleveland, Ohio

| Site ID Number | SAROAD Number | Site Name and Address | Plant Location from Site: Facility/ Bearing (°) | Distance (km) | Elevation (m): Above Ground | Above MSL | Above Plant | Site Description | Nearest Roadway: Name | Direction | Distance (m) | Type and Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1* | 36-1300-008-H01 | Fire Station #13<br>4749 Broadway Ave.<br>Cleveland, OH | BOF 251<br>Scarfer 242<br>Blast furnaces 248<br>Sinter plant 248<br>Boilers 248 | 2.1<br>2.2<br>1.4<br>1.4<br>1.4 | 12 | 221 | 38 | Roof<br>Urban<br>Commercial | Broadway Ave. | SW | 9 | 2-lane,<br>M to H |
| 2 | 36-1300-009-H01 | Brooklyn YMCA<br>3881 W. 25th St.<br>Cleveland, OH | BOF 40<br>Scarfer 48<br>Blast furnaces 48<br>Sinter plant 48<br>Boilers 48 | 2.6<br>2.4<br>3.2<br>3.2<br>3.2 | 15 before 1/11/75<br>4.5 after 4/11/75 | 222<br>212 | 40<br>29 | Roof<br>Urban<br>Commercial<br>Industrial | W. 25th St. | W | 30 | 4-lane,<br>M to H |
| 3 | 36-1300-013-H01 | Air Pollution Control Laboratory<br>2785 Broadway Ave.<br>Cleveland, OH | BOF 203<br>Scarfer 198<br>Blast furnaces 182<br>Sinter plant 182<br>Boilers 182 | 1.9<br>2.2<br>1.6<br>1.6<br>1.6 | 6 | 186 | 3 | Roof<br>Center city-industrial | Broadway Ave.<br>RR. | S&W<br>N | 30<br>152 | 2-lane,<br>M to H<br>2 tracks |
| 4* | 36-1300-026-H01 | Harvard Yards<br>4150 E. 49th St.<br>Cleveland, OH | BOF 326<br>Scarfer 322<br>Blast furnaces 340<br>Sinter plant 340<br>Boilers 340 | 2.9<br>2.6<br>2.7<br>2.7<br>2.7 | 4.5 | 218 | 35 | Elevated platform<br>Parking lot<br>Commercial | RR. | S | 122 | 2 tracks |
| 5 | 36-1300-027-H01 | Paul L. Dunbar Elem. School<br>2200 W. 28th St.<br>Cleveland, OH | BOF 123<br>Scarfer 129<br>Blast furnaces 113<br>Sinter plant 113<br>Boilers 113 | 2.5<br>2.8<br>3.0<br>3.0<br>3.0 | 7.5 | 215 | 32.5 | Roof<br>Urban<br>Residential | RR. | SE | 350 | Multiple tracks between steel mills and monitoring location |
| 6 | 36-1300-038-H01 | St. Theodosius Church<br>2547 St. Tikhon Ave.<br>Cleveland, OH | BOF 180<br>Scarfer 177<br>Blast furnaces 143<br>Sinter plant 143<br>Boilers 143 | 1.1<br>1.5<br>1.2<br>1.2<br>1.2 | 4.5 | 210 | 27 | Roof<br>Urban<br>Residential | No major nearby roadways. Site overlooks steel facilities to the South and East | | | |
| 7* | 36-1300-041-H01 | Washington Park Horticultural School<br>3875 Washington Park<br>Cleveland, OH | BOF 311<br>Scarfer 303<br>Blast furnaces 328<br>Sinter plant 328<br>Boilers 328 | 2.3<br>2.0<br>2.0<br>2.0<br>2.0 | 7.5 | 216 | 33.5 | Roof<br>Residential | Willow Freeway | E | 300 | 4-lane,<br>M to H |

Key: U = Unavailable M = Moderate
L = Light H = Heavy

* Data from this station were included in the original 1973-1977 analysis; however, no strong mill impact on TSP was noted at this site. Based on the likelihood that this situation has not changed, data from this site were not employed in the 1978-1980 or the 1981-1982 updates.




Wind Data Representativeness

| Station # | Terrain | Distance | Rating |
|---|---|---|---|
| 3, 5, 6 | VII | G | U |

Comment: Lake breezes influence these monitor sites more than they influence this meteorological station, so the meteorology may often be unrepresentative.

N.B. See Table 6 in Methodology section.

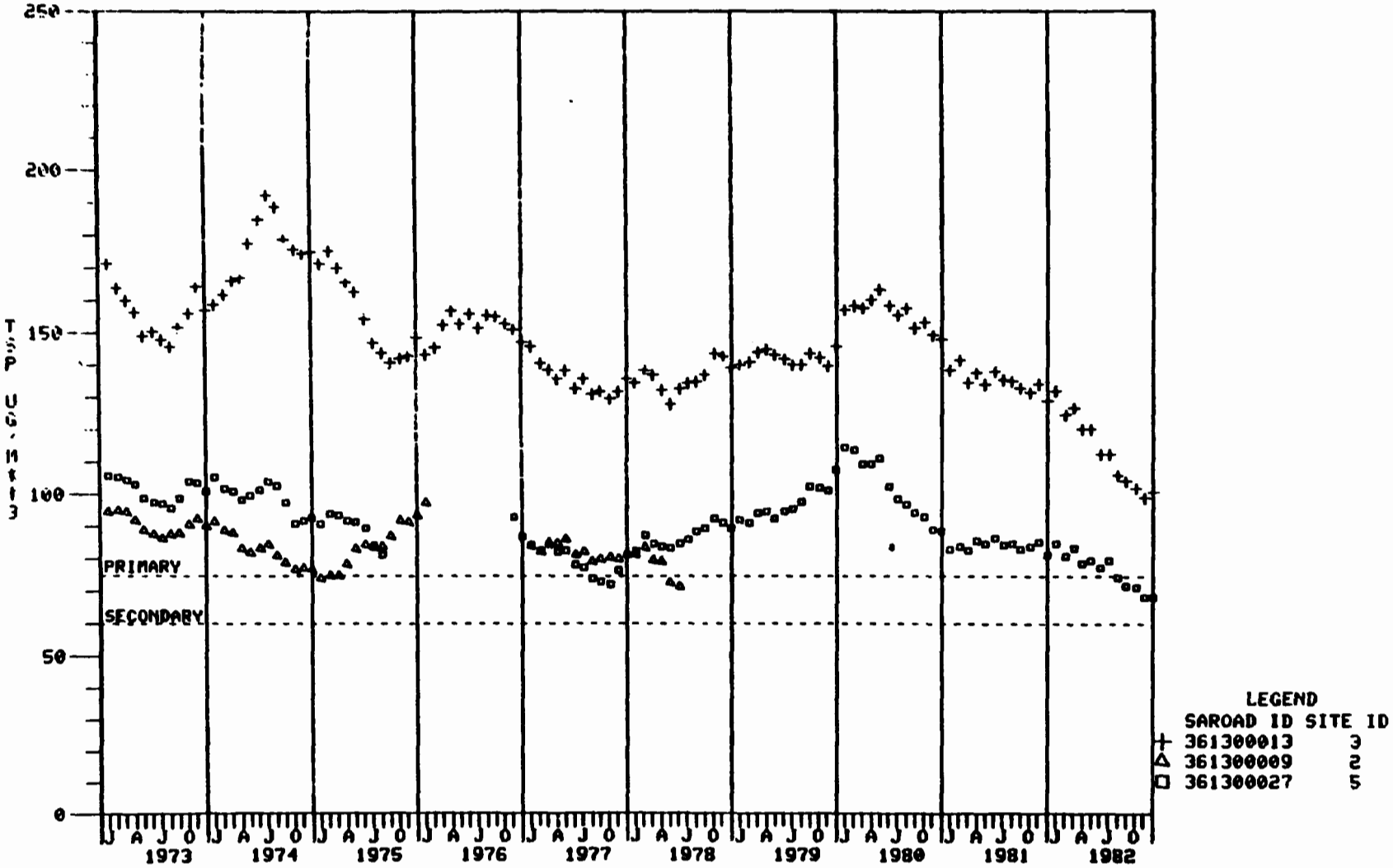
TSP roses for Jones & Laughlin Steel - Cleveland, Ohio, for the period 1978-1982 for cases of $\omega>0.85$. Each circle represents 50 $\mu g/m^3$.

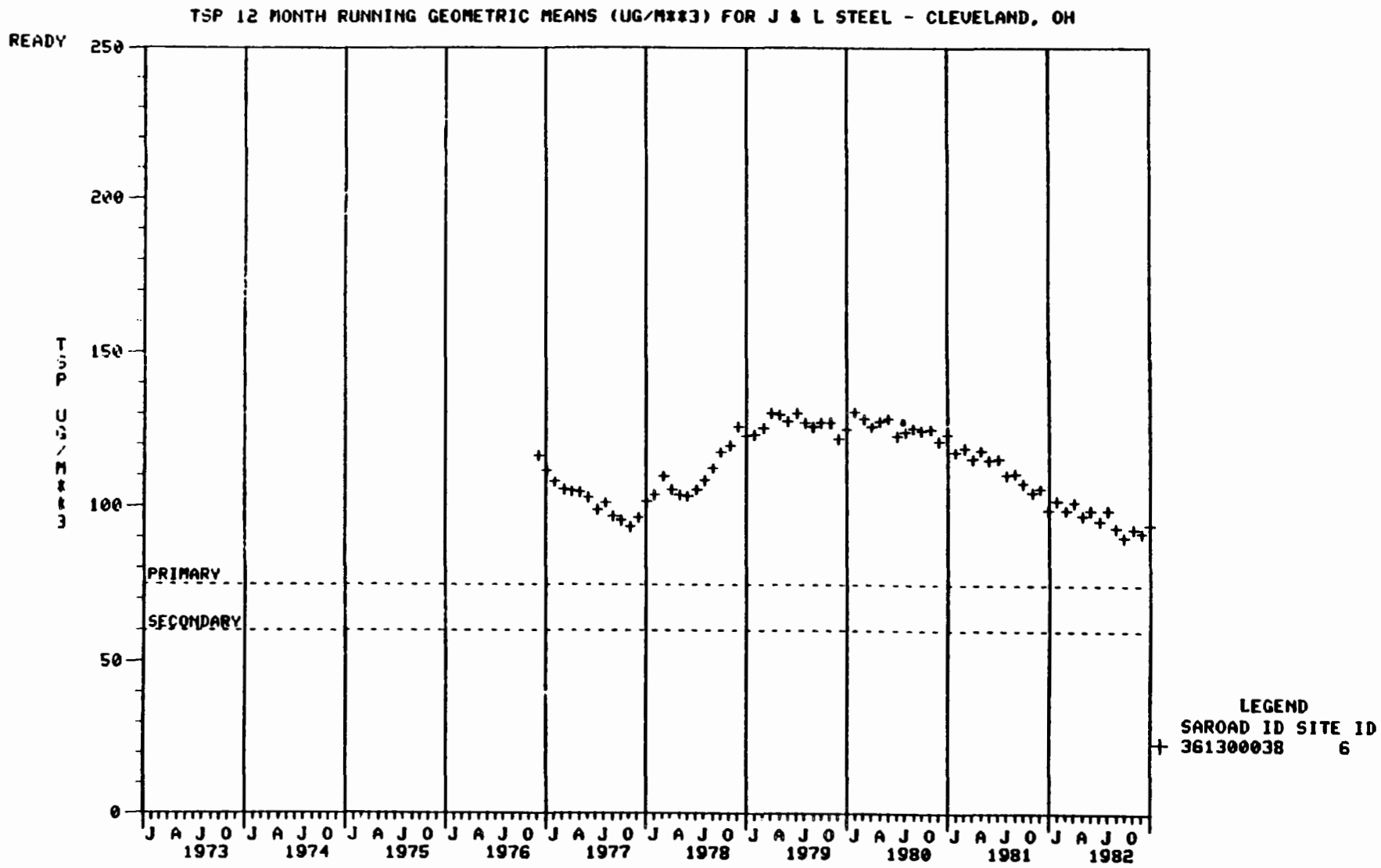
NUMBER OF TSP OBSERVATIONS USED IN POLLUTION ROSES

Jones & Laughlin Steel--Cleveland, OH

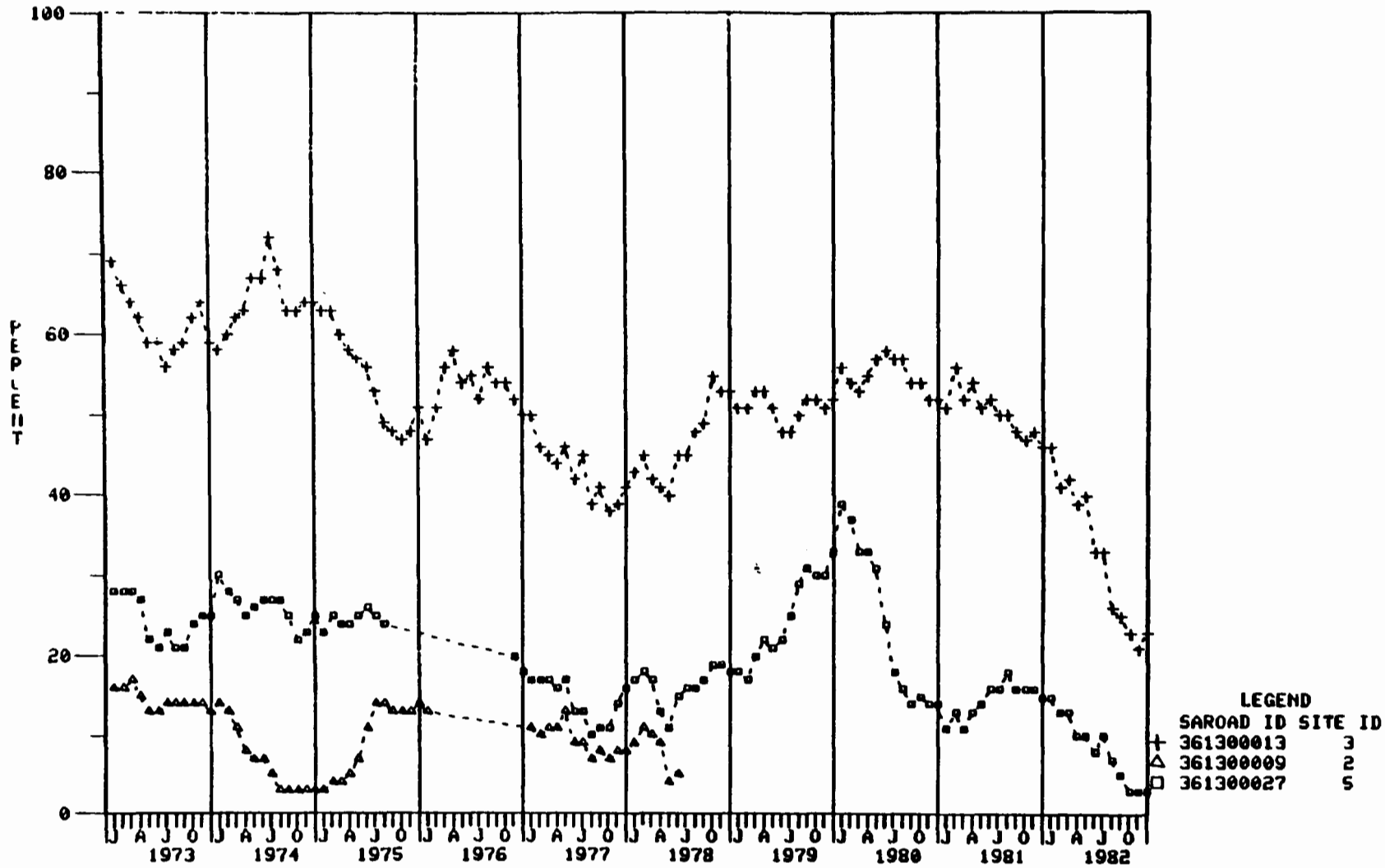
| Wind Direction | Monitoring Site Numbers #3 | #5 | #6 |
|---|---|---|---|
| N | 9 | 8 | 8 |
| NNE | 7 | 8 | 8 |
| NE | 1 | 1 | 1 |
| ENE | 2 | 0 | 2 |
| E | 1 | 1 | 1 |
| ESE | 1 | 1 | 1 |
| SE | 4 | 4 | 4 |
| SSE | 11 | 10 | 11 |
| S | 33 | 30 | 31 |
| SSW | 23 | 20 | 23 |
| SW | 32 | 29 | 31 |
| WSW | 15 | 14 | 14 |
| W | 7 | 6 | 7 |
| WNW | 7 | 8 | 8 |
| NW | 4 | 4 | 4 |
| NNW | 7 | 6 | 7 |
| Total | 164 | 150 | 161 |

TSP 12 MONTH RUNNING GEOMETRIC MEANS (UG/M**3) FOR J & L STEEL - CLEVELAND, OH

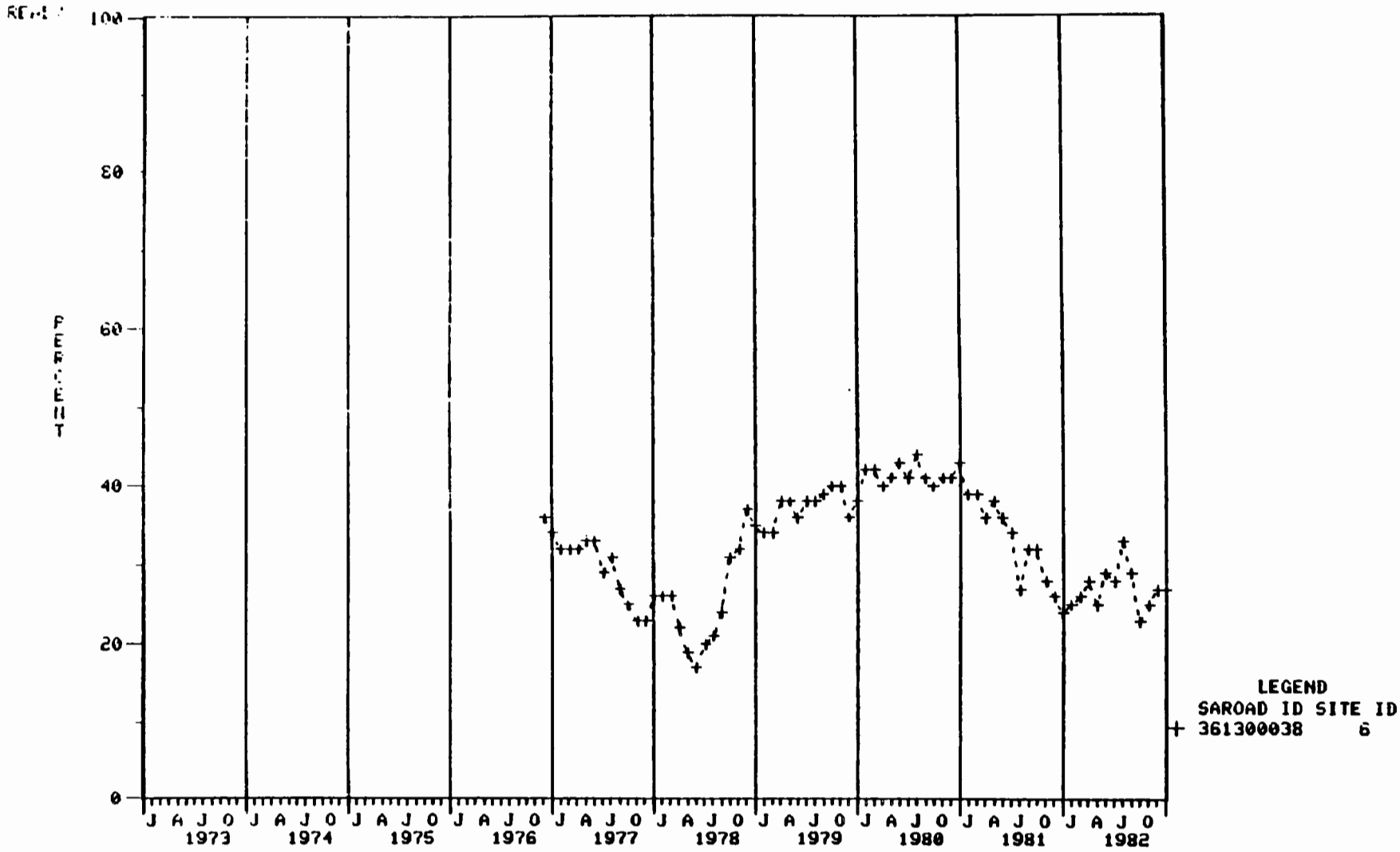



TSP 12 MONTH RUNNING GEOMETRIC MEANS (UG/M**3) FOR J & L STEEL - CLEVELAND, OH
READY
TSP UG/M**3
250
200
150
100
50
0
PRIMARY
SECONDARY
J A J O
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
LEGEND
SAROAD ID SITE ID
361300038 6

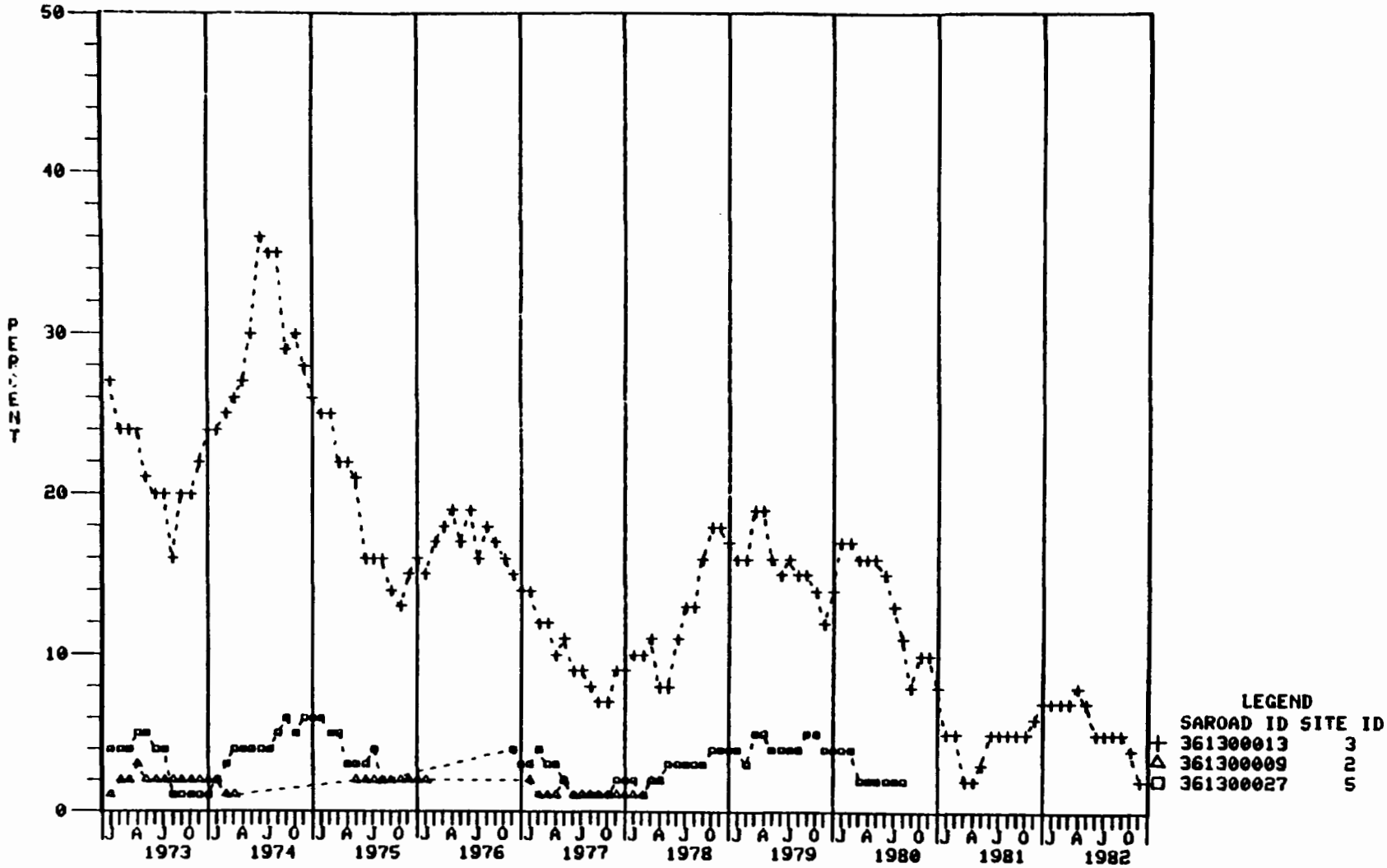
TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 150 (UG/M**3) FOR J & L STEEL - CLEVELAND, OH

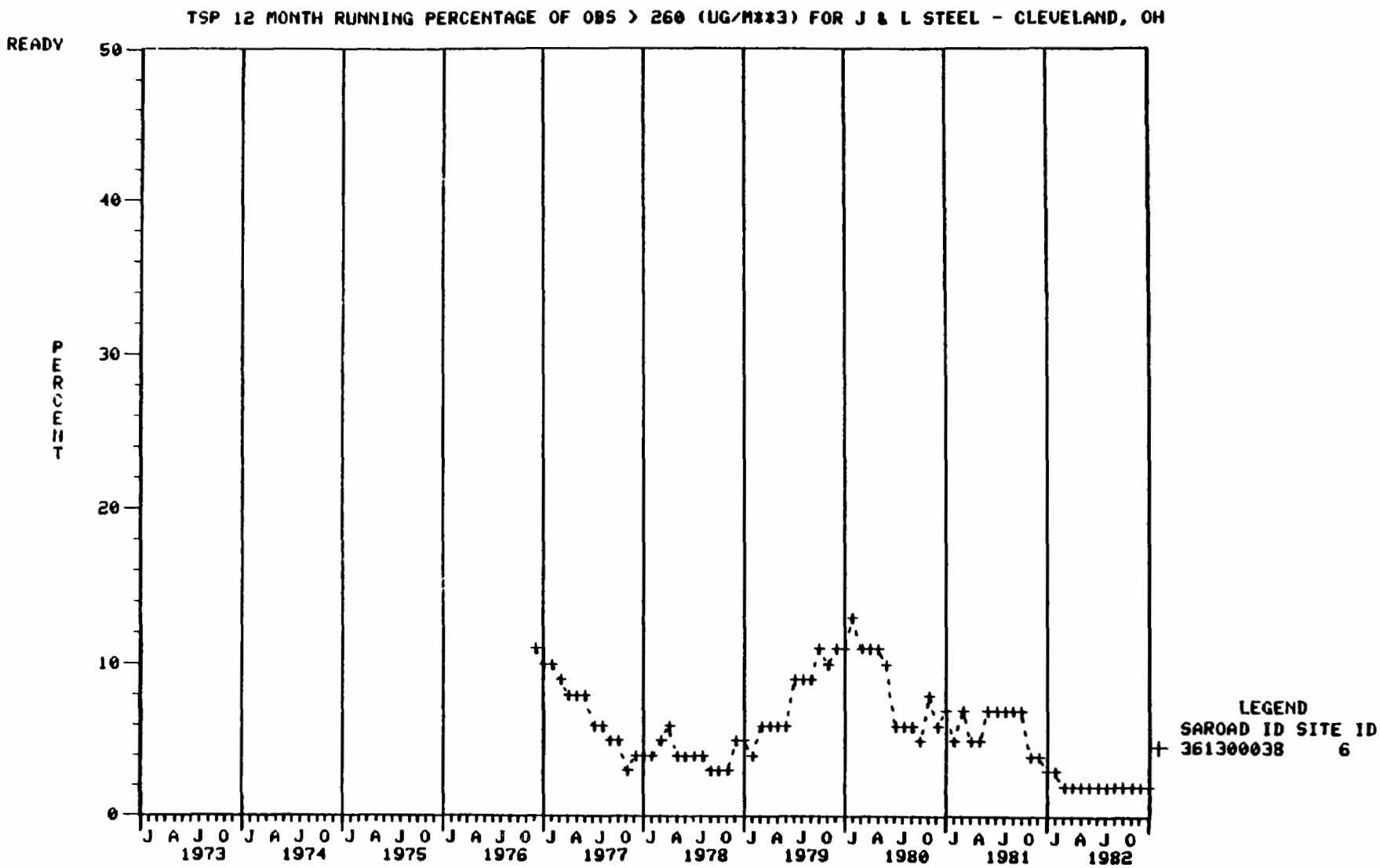


TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 150 (UG/M**3) FOR J & L STEEL - CLEVELAND, OH



TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 260 (UG/M**3) FOR J & L STEEL - CLEVELAND, OH




TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 260 (UG/M**3) FOR J & L STEEL - CLEVELAND, OH
READY
PERCENT
50
40
30
20
10
0
J A J O J A J O J A J O J A J O J A J O J A J O J A J O J A J O J A J O J A J O J A J O
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
LEGEND
SAROAD ID SITE ID
361300038 6

TSP DATA SUMMARY FOR J & L STEEL - CLEVELAND, OH
SAROAD STATION # 361300013 SITE ID # 03
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 75 | 76 | 72 | 67 | 179 | 85 | 64 | 64 | 61 | 61 | 57 |
| GEOMETRIC MEAN: | 169.9 | 157.1 | 174.9 | 148.8 | 147.2 | 135.9 | 139.6 | 146.0 | 148.3 | 129.1 | 100.7 |
| GEOMETRIC S.D.: | 1.7 | 1.8 | 1.8 | 1.7 | 1.7 | 1.7 | 1.9 | 1.7 | 1.6 | 1.7 | 1.6 |
| ARITHMETIC MEAN | 192.5 | 183.4 | 201.9 | 168.3 | 166.6 | 157.8 | 168.9 | 165.6 | 166.9 | 149.0 | 112.0 |
| HIGHEST BY LARSEN EXTRP: | 854.0 | 900.7 | 943.7 | 690.3 | 668.4 | 677.5 | 964.1 | 663.1 | 617.9 | 643.7 | 398.4 |
| 1ST HIGHEST: | 407.0 | 592.0 | 534.0 | 383.0 | 618.0 | 660.0 | 473.0 | 368.0 | 694.0 | 383.0 | 272.0 |
| DATE : | 720506 | 730416 | 740529 | 751208 | 760322 | 770531 | 780526 | 790918 | 801024 | 811130 | 820429 |
| 2ND HIGHEST: | 353.0 | 353.0 | 509.0 | 340.0 | 379.0 | 350.0 | 384.0 | 352.0 | 347.0 | 373.0 | 255.0 |
| DATE : | 720527 | 730925 | 740606 | 750617 | 760608 | 770823 | 781011 | 790620 | 800110 | 811013 | 820505 |
| # OF READINGS EXCEEDING 260 : | 19 | 18 | 19 | 11 | 23 | 8 | 11 | 9 | 5 | 4 | 1 |
| # OF READINGS EXCEEDING 150 : | 50 | 44 | 46 | 34 | 90 | 35 | 34 | 33 | 31 | 28 | 11 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 6 | 5 | 4 | 5 | 11 | 9 | 7 | 3 | 4 | 7 | 9 |
| 66-130: | 12 | 21 | 18 | 22 | 62 | 34 | 19 | 25 | 19 | 22 | 30 |
| 131-195: | 22 | 19 | 10 | 17 | 49 | 15 | 13 | 16 | 22 | 15 | 14 |
| 196-260: | 16 | 13 | 21 | 12 | 34 | 19 | 14 | 11 | 11 | 13 | 3 |
| 261-325: | 15 | 15 | 11 | 7 | 16 | 3 | 6 | 4 | 3 | 2 | 1 |
| 326-390: | 3 | 2 | 5 | 4 | 6 | 4 | 4 | 5 | 1 | 2 | 0 |
| 391-455: | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 1 | 2 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR J & L STEEL - CLEVELAND, OH
SAROAD STATION # 361300009 SITE ID # 02
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 93 | 85 | 68 | 51 | 115 | 89 | 13 | 0 | 0 | 0 | 0 |
| GEOMETRIC MEAN: | 94.7 | 90.2 | 76.4 | 93.4 | ****** | 81.2 | ****** | ****** | ****** | ****** | ****** |
| GEOMETRIC S.D.: | 1.6 | 1.6 | 1.5 | 1.6 | ****** | 1.6 | ****** | ****** | ****** | ****** | ****** |
| ARITHMETIC MEAN | 106.5 | 101.7 | 83.4 | 104.0 | ****** | 90.3 | ****** | ****** | ****** | ****** | ****** |
| HIGHEST BY LARSEN EXTRP: | 406.2 | 369.3 | 276.1 | 389.6 | ****** | 310.1 | ****** | ****** | ****** | ****** | ****** |
| 1ST HIGHEST: | 309.0 | 359.0 | 159.0 | 284.0 | 406.0 | 276.0 | 227.0 | ****** | ****** | ****** | ****** |
| DATE : | 720524 | 730227 | 740517 | 750524 | 760602 | 770531 | 780309 | ****** | ****** | ****** | ****** |
| 2ND HIGHEST: | 238.0 | 292.0 | 155.0 | 194.0 | 269.0 | 212.0 | 159.0 | ****** | ****** | ****** | ****** |
| DATE : | 720412 | 730416 | 740105 | 750512 | 760622 | 770326 | 780219 | ****** | ****** | ****** | ****** |
| # OF READINGS EXCEEDING 260 : | 1 | 2 | 0 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 15 | 11 | 2 | 7 | 14 | 7 | 2 | 0 | 0 | 0 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 26 | 21 | 21 | 9 | 34 | 31 | 7 | 0 | 0 | 0 | 0 |
| 66-130: | 43 | 47 | 38 | 30 | 60 | 44 | 4 | 0 | 0 | 0 | 0 |
| 131-195: | 18 | 12 | 9 | 11 | 17 | 10 | 1 | 0 | 0 | 0 | 0 |
| 196-260: | 5 | 3 | 0 | 0 | 2 | 3 | 1 | 0 | 0 | 0 | 0 |
| 261-325: | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR J & L STEEL - CLEVELAND, OH
SAROAD STATION # 361300027 SITE ID # 05
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 62 | 84 | 69 | 29 | 147 | 89 | 55 | 51 | 63 | 60 | 61 |
| GEOMETRIC MEAN: | 108.8 | 101.0 | 92.4 | ****** | 87.1 | 81.5 | 89.6 | 107.8 | 88.8 | 81.4 | 68.2 |
| GEOMETRIC S.D.: | 1.7 | 1.8 | 1.9 | ****** | 1.9 | 1.8 | 1.7 | 1.7 | 1.7 | 1.8 | 1.8 |
| ARITHMETIC MEAN | 125.3 | 118.5 | 113.4 | ****** | 104.7 | 96.4 | 102.9 | 122.4 | 101.4 | 94.6 | 79.1 |
| HIGHEST BY LARSEN EXTRP: | 544.9 | 587.4 | 633.6 | ****** | 539.3 | 443.3 | 421.2 | 483.2 | 424.5 | 429.0 | 361.0 |
| 1ST HIGHEST: | 279.0 | 284.0 | 321.0 | 374.0 | 344.0 | 307.0 | 311.0 | 272.0 | 235.0 | 231.0 | 212.0 |
| DATE : | 720822 | 730407 | 740821 | 750128 | 760622 | 771109 | 780526 | 790322 | 800110 | 810504 | 820505 |
| 2ND HIGHEST: | 276.0 | 253.0 | 300.0 | 236.0 | 333.0 | 262.0 | 275.0 | 267.0 | 230.0 | 213.0 | 157.0 |
| DATE : | 720831 | 730913 | 740411 | 750524 | 760420 | 770218 | 781104 | 790912 | 800328 | 811013 | 820716 |
| # OF READINGS EXCEEDING 260 : | 3 | 1 | 4 | 1 | 5 | 2 | 2 | 2 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 19 | 21 | 17 | 8 | 27 | 14 | 9 | 17 | 9 | 8 | 2 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 13 | 21 | 24 | 11 | 48 | 31 | 16 | 9 | 19 | 21 | 26 |
| 66-130: | 25 | 31 | 24 | 9 | 57 | 39 | 25 | 23 | 28 | 26 | 27 |
| 131-195: | 14 | 18 | 11 | 7 | 30 | 10 | 12 | 12 | 13 | 9 | 7 |
| 196-260: | 7 | 13 | 6 | 1 | 7 | 7 | 0 | 5 | 3 | 4 | 1 |
| 261-325: | 3 | 1 | 4 | 0 | 3 | 2 | 2 | 2 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR J & L STEEL - CLEVELAND, OH
SAROAD STATION # 361300038 SITE ID # 06
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 3 | 28 | 145 | 74 | 66 | 65 | 61 | 59 | 56 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | ****** | 111.8 | 101.7 | 122.9 | 125.2 | 123.3 | 99.2 | 94.3 |
| GEOMETRIC S.D.: | ****** | ****** | ****** | ****** | 1.9 | 1.8 | 1.7 | 1.7 | 1.7 | 1.8 | 1.7 |
| ARITHMETIC MEAN | ****** | ****** | ****** | ****** | 134.1 | 120.6 | 139.8 | 146.1 | 141.6 | 116.2 | 106.8 |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | ****** | 687.5 | 577.0 | 544.5 | 637.9 | 614.5 | 525.6 | 435.0 |
| 1ST HIGHEST: | ****** | ****** | 207.0 | 402.0 | 392.0 | 378.0 | 444.0 | 403.0 | 357.0 | 339.0 | 270.0 |
| DATE : | ****** | ****** | 741231 | 750617 | 760513 | 770531 | 780526 | 790322 | 801024 | 810215 | 820505 |
| 2ND HIGHEST: | ****** | ****** | 140.0 | 337.0 | 369.0 | 303.0 | 369.0 | 335.0 | 302.0 | 326.0 | 190.0 |
| DATE : | ****** | ****** | 741219 | 750524 | 760820 | 770330 | 781104 | 790620 | 800110 | 810504 | 820716 |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 4 | 15 | 3 | 3 | 7 | 4 | 2 | 1 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 1 | 11 | 49 | 19 | 23 | 25 | 25 | 14 | 14 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 1 | 2 | 27 | 18 | 8 | 9 | 9 | 16 | 14 |
| 66-130: | 0 | 0 | 0 | 11 | 55 | 31 | 32 | 28 | 19 | 22 | 23 |
| 131-195: | 0 | 0 | 1 | 9 | 39 | 13 | 12 | 11 | 20 | 13 | 18 |
| 196-260: | 0 | 0 | 1 | 2 | 9 | 9 | 11 | 10 | 9 | 6 | 0 |
| 261-325: | 0 | 0 | 0 | 2 | 10 | 2 | 1 | 5 | 3 | 0 | 1 |
| 326-390: | 0 | 0 | 0 | 1 | 4 | 1 | 1 | 1 | 1 | 2 | 0 |
| 391-455: | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

24-HR STANDARD EXCEEDANCE ROSE FOR
J & L STEEL - CLEVELAND, OH
(ALL CASES > 260 UG/M**3)
X=0.850
COUNT/AVERAGE TSP OF PRIMARY EXCEEDANCES

| SARDAD # | 361300013 | | 361300009 | | 361300027 | | 361300038 | |
|---|---|---|---|---|---|---|---|---|
| SITE ID # | 3 | | 2 | | 5 | | 6 | |
| DIRECTION | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X |
| N COUNT: | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 1 |
| AVE TSP: | 0. | 295. | 0. | 0. | 0. | 0. | 0. | 269. |
| NNE COUNT: | 1 | 3 | 1 | 0 | 0 | 3 | 0 | 2 |
| AVE TSP: | 305. | 316. | 359. | 0. | 0. | 282. | 0. | 370. |
| NE COUNT: | 1 | 1 | 1 | 0 | 2 | 1 | 0 | 2 |
| AVE TSP: | 277. | 272. | 406. | 0. | 311. | 270. | 0. | 323. |
| ENE COUNT: | 0 | 3 | 0 | 1 | 0 | 0 | 0 | 2 |
| AVE TSP: | 0. | 280. | 0. | 284. | 0. | 0. | 0. | 310. |
| E COUNT: | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 |
| AVE TSP: | 0. | 473. | 0. | 0. | 0. | 311. | 0. | 444. |
| ESE COUNT: | 2 | 2 | 0 | 0 | 0 | 1 | 0 | 0 |
| AVE TSP: | 301. | 332. | 0. | 0. | 0. | 374. | 0. | 0. |
| SE COUNT: | 2 | 1 | 0 | 0 | 0 | 0 | 1 | 0 |
| AVE TSP: | 338. | 281. | 0. | 0. | 0. | 0. | 321. | 0. |
| SSE COUNT: | 14 | 4 | 0 | 1 | 4 | 1 | 4 | 2 |
| AVE TSP: | 340. | 301. | 0. | 269. | 293. | 344. | 329. | 322. |
| S COUNT: | 15 | 2 | 1 | 1 | 2 | 0 | 9 | 3 |
| AVE TSP: | 335. | 488. | 292. | 276. | 292. | 0. | 317. | 339. |
| SSW COUNT: | 16 | 4 | 0 | 0 | 0 | 1 | 3 | 3 |
| AVE TSP: | 304. | 306. | 0. | 0. | 0. | 275. | 295. | 333. |
| SW COUNT: | 8 | 5 | 0 | 0 | 0 | 1 | 0 | 3 |
| AVE TSP: | 315. | 321. | 0. | 0. | 0. | 262. | 0. | 289. |
| WSW COUNT: | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 2 |
| AVE TSP: | 0. | 308. | 0. | 0. | 0. | 0. | 0. | 289. |
| W COUNT: | 2 | 5 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 290. | 368. | 0. | 0. | 0. | 0. | 0. | 0. |
| WNW COUNT: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 349. | 0. | 0. | 0. | 0. | 0. | 0. |
| NW COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| NNW COUNT: | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 1 |
| AVE TSP: | 0. | 500. | 0. | 0. | 0. | 0. | 0. | 292. |
| ALL COUNT: | 61 | 48 | 3 | 3 | 8 | 9 | 17 | 22 |
| AVE TSP: | 321. | 332. | 352. | 276. | 297. | 298. | 316. | 323. |

24-HR STANDARD EXCEEDANCE ROSE FOR
J & L STEEL - CLEVELAND, OH
(ALL CASES > 150 UG/M**3)
X=0.850
COUNT/AVERAGE TSP OF SECONDARY EXCEEDANCES

| SAROAD # | 361300013 | | 361300009 | | 361300027 | | 361300038 | |
|---|---|---|---|---|---|---|---|---|
| SITE ID # | 3 | | 2 | | 5 | | 6 | |
| DIRECTION | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X |
| N COUNT: | 2 | 10 | 1 | 1 | 1 | 4 | 3 | 4 |
| AVE TSP: | 173. | 236. | 183. | 191. | 180. | 218. | 184. | 228. |
| NNE COUNT: | 5 | 12 | 4 | 7 | 2 | 9 | 4 | 8 |
| AVE TSP: | 200. | 233. | 219. | 200. | 199. | 228. | 177. | 238. |
| NE COUNT: | 2 | 6 | 2 | 2 | 3 | 2 | 1 | 7 |
| AVE TSP: | 218. | 215. | 322. | 170. | 279. | 217. | 153. | 213. |
| ENE COUNT: | 1 | 8 | 0 | 3 | 0 | 8 | 1 | 10 |
| AVE TSP: | 155. | 220. | 0. | 202. | 0. | 209. | 195. | 214. |
| E COUNT: | 1 | 4 | 0 | 0 | 0 | 4 | 0 | 4 |
| AVE TSP: | 191. | 268. | 0. | 0. | 0. | 215. | 0. | 252. |
| ESE COUNT: | 2 | 5 | 0 | 0 | 2 | 7 | 1 | 3 |
| AVE TSP: | 301. | 263. | 0. | 0. | 223. | 220. | 187. | 223. |
| SE COUNT: | 5 | 4 | 0 | 0 | 4 | 3 | 3 | 0 |
| AVE TSP: | 262. | 234. | 0. | 0. | 203. | 209. | 262. | 0. |
| SSE COUNT: | 24 | 10 | 0 | 1 | 19 | 10 | 12 | 6 |
| AVE TSP: | 286. | 257. | 0. | 269. | 224. | 212. | 244. | 255. |
| S COUNT: | 46 | 19 | 2 | 3 | 16 | 6 | 30 | 12 |
| AVE TSP: | 253. | 229. | 222. | 221. | 199. | 208. | 234. | 236. |
| SSW COUNT: | 48 | 19 | 4 | 0 | 5 | 4 | 22 | 9 |
| AVE TSP: | 244. | 207. | 182. | 0. | 173. | 196. | 209. | 244. |
| SW COUNT: | 37 | 22 | 0 | 3 | 3 | 6 | 11 | 9 |
| AVE TSP: | 222. | 229. | 0. | 169. | 178. | 202. | 184. | 221. |
| WSW COUNT: | 15 | 27 | 0 | 4 | 0 | 5 | 3 | 7 |
| AVE TSP: | 191. | 239. | 0. | 174. | 0. | 183. | 170. | 214. |
| W COUNT: | 5 | 16 | 0 | 2 | 0 | 4 | 1 | 3 |
| AVE TSP: | 244. | 241. | 0. | 160. | 0. | 195. | 183. | 160. |
| WNW COUNT: | 5 | 11 | 0 | 2 | 0 | 3 | 0 | 3 |
| AVE TSP: | 172. | 199. | 0. | 194. | 0. | 160. | 0. | 168. |
| NW COUNT: | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 1 |
| AVE TSP: | 0. | 194. | 0. | 0. | 0. | 0. | 0. | 187. |
| NNW COUNT: | 1 | 5 | 0 | 2 | 0 | 2 | 0 | 3 |
| AVE TSP: | 168. | 334. | 0. | 191. | 0. | 183. | 0. | 222. |
| ALL COUNT: | 199 | 187 | 13 | 30 | 55 | 77 | 92 | 89 |
| AVE TSP: | 239. | 232. | 221. | 192. | 209. | 207. | 216. | 225. |

## AIR QUALITY EVALUATION - J&L STEEL, CLEVELAND, OHIO

Air quality trends:

Moderate downward trends in TSP levels were observed at all of the stations except station #6. The long-term Spearman rank correlation coefficients for stations #3 and #5 are -0.68 and -0.46, respectively. At station #6, which most clearly displays mill impact, the coefficient is -0.12, indicating essentially no long-term trend since the station started in 1976. Stations #3, #5, and #6 all display significant downtrends beginning in early 1980 and continuing through 1982.

The frequency of exceedance of 150 $\mu g/m^3$ has demonstrated a long-term decline particularly at station #3, falling from 70 percent in 1973 and 1974 to near 20 percent by 1982. The decline in this percentage was the most pronounced from 1980 through 1982, at both stations #3 and #5.

Standard exceedance status:

Stations #3 and #6 continued to demonstrate primary annual standard violations through 1982. Station #5 did not show a violation beyond 1981.

Pollution roses:

Well-defined impact of the mill is indicated by stations #3, #5, and #6. Station #3 indicates a stronger influence of the Republic plant than of the J&L mill.

Standard exceedance roses:

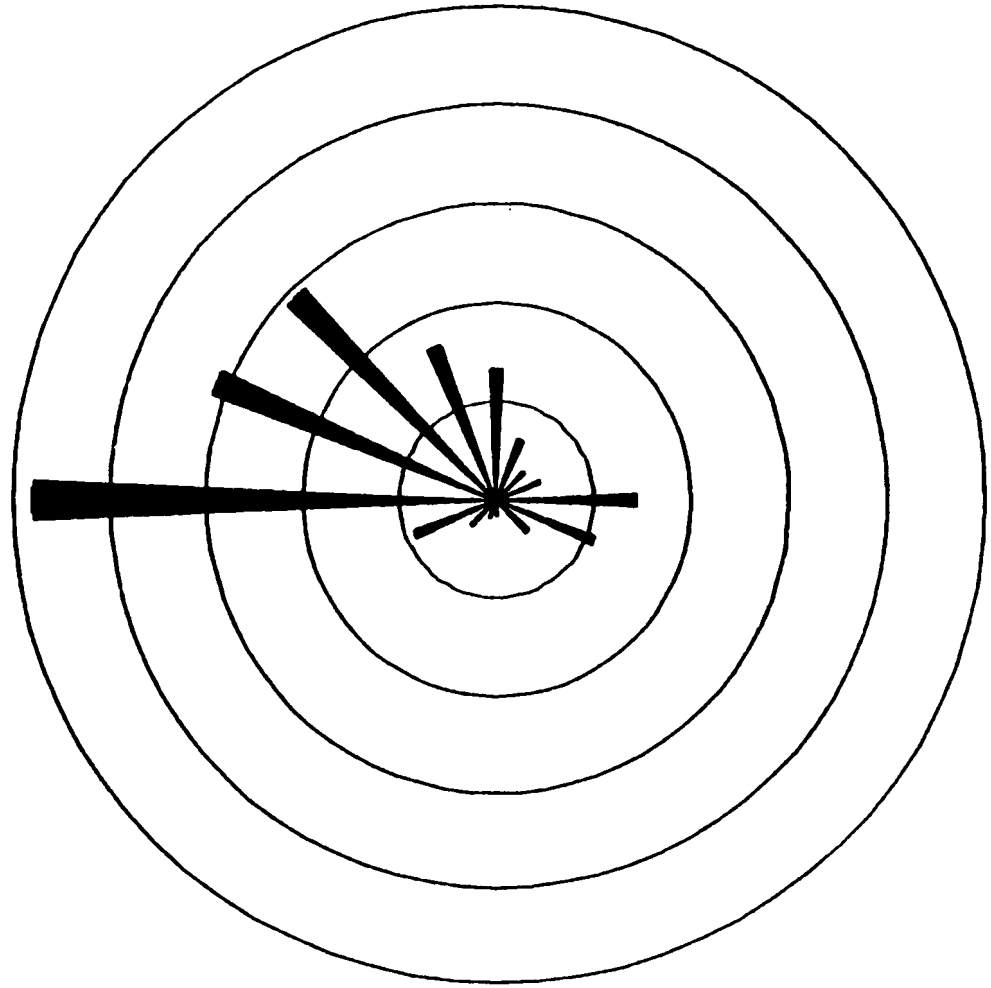
At station #3, the cases of primary 24-hour standard exceedances occurred most frequently from the directions south-southeast, south, and south-southwest, which includes all of the J&L mill as well as the Republic plant. Primary standard exceedances occur most frequently at station #6 when the wind blows from the south-southeast and south, directions which include the BOF shop, scarfer, and sintering plant.

Inhalable particulate matter:

Station #3 samples IP as part of the EPA IP Network. Data for this site are summarized below:

| Year | Instrument | # of Obs. | Arithmetic Mean | Highest | Second Highest | Standard Deviation |
|---|---|---|---|---|---|---|
| 1980 | SSI | 10 | 90.4 | 143.6 | 134.2 | 41.8 |
| 1980 | DICHOT | 25 | 76.4 | 135.9 | 133.9 | 34.3 |
| 1981 | SSI | 16 | 89.6 | 170.1 | 145.9 | 39.2 |
| 1981 | DICHOT | 39 | 68.3 | 223.4 | 135.8 | 44.3 |
| 1982 | DICHOT | 17 | 61.3 | 177.2 | 87.1 | 35.9 |

WIND ROSE
PERSISTENCE CLASS 0.90
WIND STATION 14820



JONES & LAUGHLIN STEEL
Youngstown
Mahoning County
Ohio
EPA Region V

Hi-Vol Monitoring Sites--Jones & Laughlin Steel, Brier Hill Works, Youngstown, Ohio

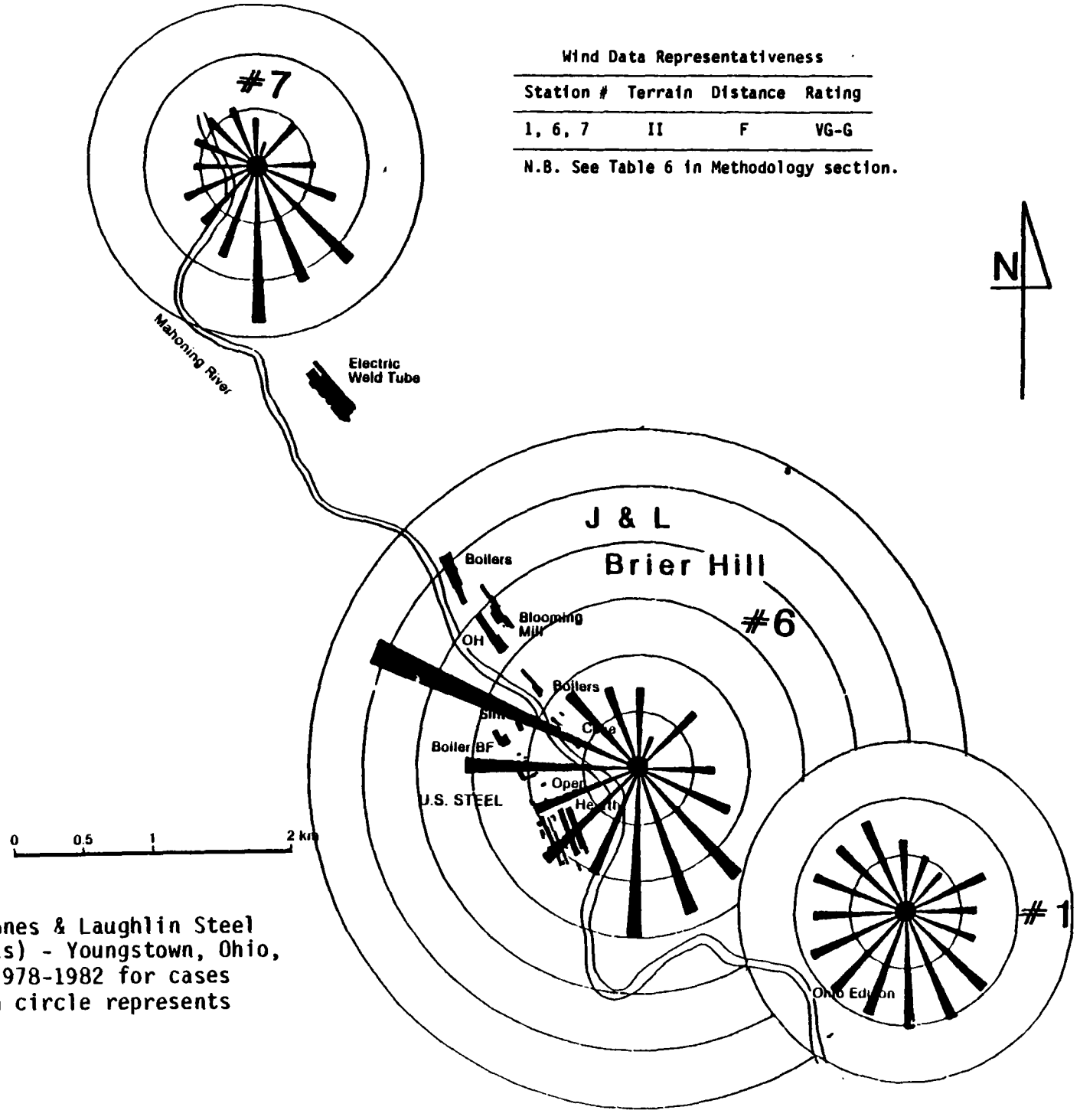
| Site ID Number | SAROAD Number | Site Name and Address | Plant Location from Site | | Elevation (m) | | | Site Description | Nearest Roadway | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Bearing (°) | Distance (km) | Above Ground | Above MSL | Above Plant | | Name | Direction | Distance (m) | Type and Volume |
| 1 | 36-7760-005-I09 I01 | Fire Station #7<br>145 Madison<br>Youngstown, OH | 305 | 3.7 | 10.5 | 300 | 29 | Roof<br>Center city-residential | Elm St. | W | 9 | 2-lane, M |
| 3 | 36-7760-003-I01 | Fire Station #13<br>641 Sherwood Ave.<br>Youngstown, OH | 352 | 5.9 | 9 | 329 | 58 | Roof<br>Suburban-residential | Glenwood Ave. | W | 30 | 2-lane, L |
| | | | | | | | | | Sherwood Ave. | N | 20 | 2-lane, L |
| 6 | 36-7760-006-I02 | Fire Station #5<br>1524 Oakland Avenue<br>Youngstown, OH | 315 | 1.6 | 4.5 | 294 | 23 | Roof<br>Center city-industrial | W. Federal St. | SW | 100 | 2-lane, M |
| | | | | | | | | | Oakland Ave. | SW | 30 | 4-lane, H |
| 7 | 36-2480-001-I01 | Girard City Hall<br>100 W. Main St.<br>Girard, OH | 153 | 3.5 | 8 | 277 | 6 | Roof<br>Center city-commercial | W. Main St. | S | 20 | 2-lane, M |
| | | | | | | | | | State St. | E | 150 | 4-lane, H |
| | | | | | | | | | RR. | W | 100 | Multiple tracks |

Key: U = Unavailable M = Moderate
L = Light H = Heavy

Wind Data Representativeness

| Station # | Terrain | Distance | Rating |
|---|---|---|---|
| 1, 6, 7 | II | F | VG-G |

N.B. See Table 6 in Methodology section.




TSP roses for Jones & Laughlin Steel (Brier Hill Works) - Youngstown, Ohio, for the period 1978-1982 for cases of $\omega > 0.90$. Each circle represents 50 $\mu g/m^3$.

NUMBER OF TSP OBSERVATIONS USED IN POLLUTION ROSES

Jones & Laughlin Steel (Brier Hill Works)--Youngstown, OH

| Wind Direction | Monitoring Site Numbers | | |
|---|---|---|---|
| | #1 | #6 | #7 |
| N | 23 | 1 | 1 |
| NNE | 13 | 1 | 1 |
| NE | 10 | 3 | 3 |
| ENE | 4 | 0 | 0 |
| E | 14 | 5 | 4 |
| ESE | 14 | 4 | 4 |
| SE | 24 | 12 | 11 |
| SSE | 17 | 5 | 5 |
| S | 36 | 9 | 9 |
| SSW | 46 | 13 | 13 |
| SW | 44 | 10 | 11 |
| WSW | 34 | 13 | 13 |
| W | 45 | 14 | 15 |
| WNW | 28 | 8 | 9 |
| NW | 26 | 7 | 7 |
| NNW | 23 | 8 | 4 |
| Total | 401 | 143 | 110 |

Hi-Vol Monitoring Sites--Jones & Laughlin Steel, Campbell Works, Youngstown, Ohio

| Site ID Number | SAROAD Number | Site Name and Address | Plant Location from Site: Facility/ Bearing (°) | Plant Location from Site: Distance (km) | Elevation (m): Above Ground | Elevation (m): Above MSL | Elevation (m): Above Plant | Site Description | Nearest Roadway: Name | Nearest Roadway: Direction | Nearest Roadway: Distance (m) | Nearest Roadway: Type and Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 36-7760-005-109<br>101 | Fire Station #7<br>145 Madison<br>Youngstown, OH | Open hearth furnaces<br>Boilers<br>Coke plant | 139<br>135<br>137 | 6.0<br>6.5<br>7.0 | 10.5 | 300 | 44 | Roof<br>Center city-residential | Elm St. | W | 9 | 2-lane, M |
| 2 | 36-7760-004-101 | Fire Station #9<br>1900 Midlothian<br>Youngstown, OH | Open hearth furnaces<br>Boilers<br>Coke plant | 73<br>80<br>90 | 1.8<br>2.3<br>2.4 | 7.5 | 326 | 70 | Roof<br>Suburban-commercial | Midlothian | S | 15 | 2-lane, M |
| 3* | 36-7760-003-101 | Fire Station #13<br>641 Sherwood Ave.<br>Youngstown, OH | Open hearth furnaces<br>Boilers<br>Coke plant | 98<br>98<br>101 | 6.2<br>6.8<br>7.0 | 9 | 329 | 73 | Roof<br>Residential | Glenwood Ave.<br>Sherwood Ave. | W<br>N | 30<br>20 | 2-lane, L<br>2-lane, L |
| 4 | 36-6480-001-101 | Struthers City Hall<br>6 Elm St.<br>Struthers, OH | Open hearth furnaces<br>Boilers<br>Coke plant | 326<br>352<br>2 | 1.2<br>0.9<br>0.5 | 6 | 274 | 18 | Roof<br>Center city-industrial | No major roadways | | | |
| 5 | 36-0960-001-101 | Campbell City Hall<br>351 Tenny St.<br>Campbell, OH | Open hearth furnaces<br>Boilers<br>Coke plant | 203<br>176<br>172 | 1.2<br>1.3<br>1.7 | 9 | 326 | 70 | Roof<br>Center city-industrial | No major roadways | | | |

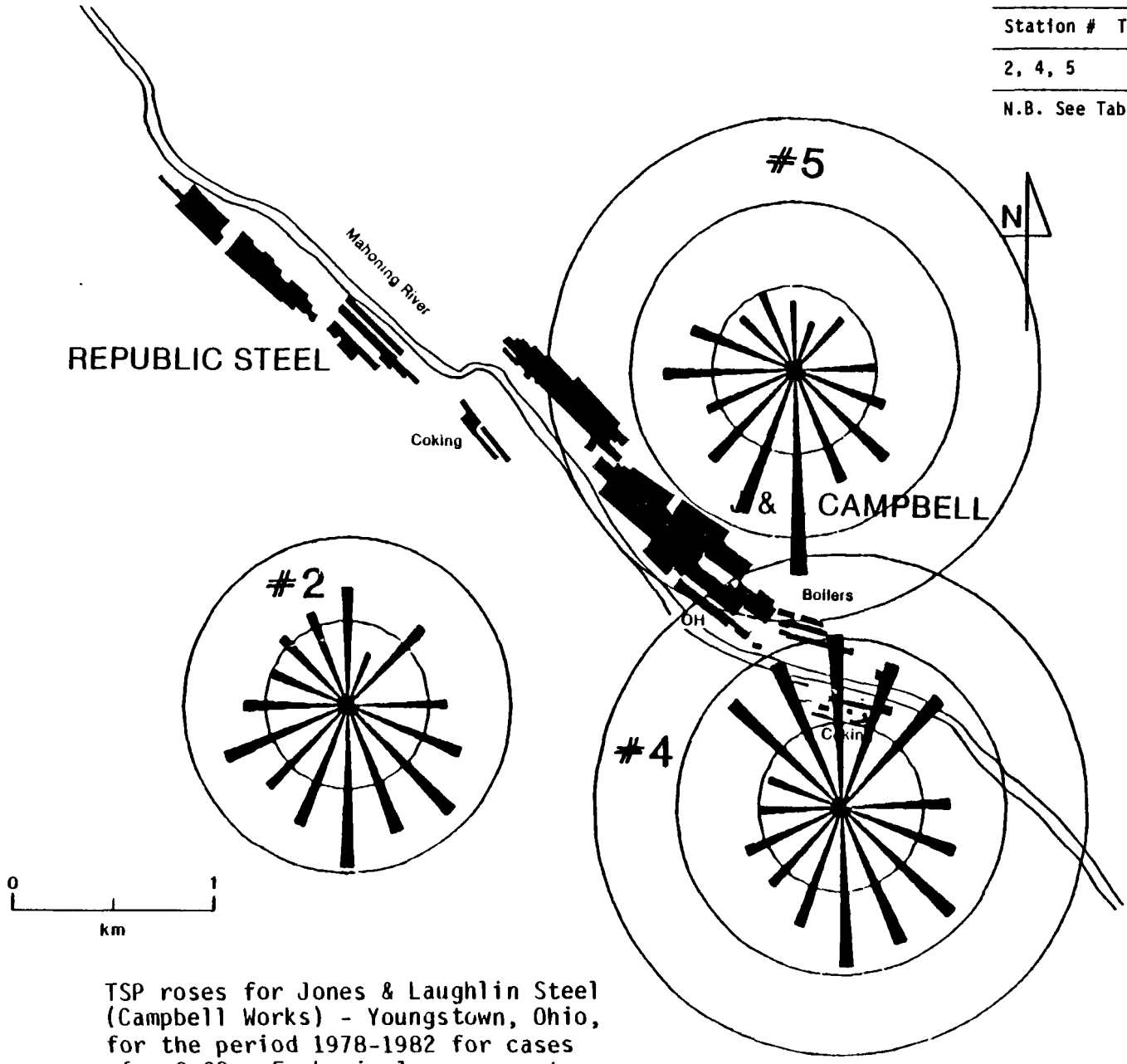
Key: U = Unavailable M = Moderate
L = Light H = Heavy

* Data from this station were included in the original 1973-1977 analysis; however, no strong mill impact on TSP was noted at this site. Based on the likelihood that this situation has not changed, data from this site were not employed in the 1978-1980 or the 1981-1982 updates.

Wind Data Representativeness

| Station # | Terrain | Distance | Rating |
|---|---|---|---|
| 2, 4, 5 | II | G | G |

N.B. See Table 6 in Methodology section.



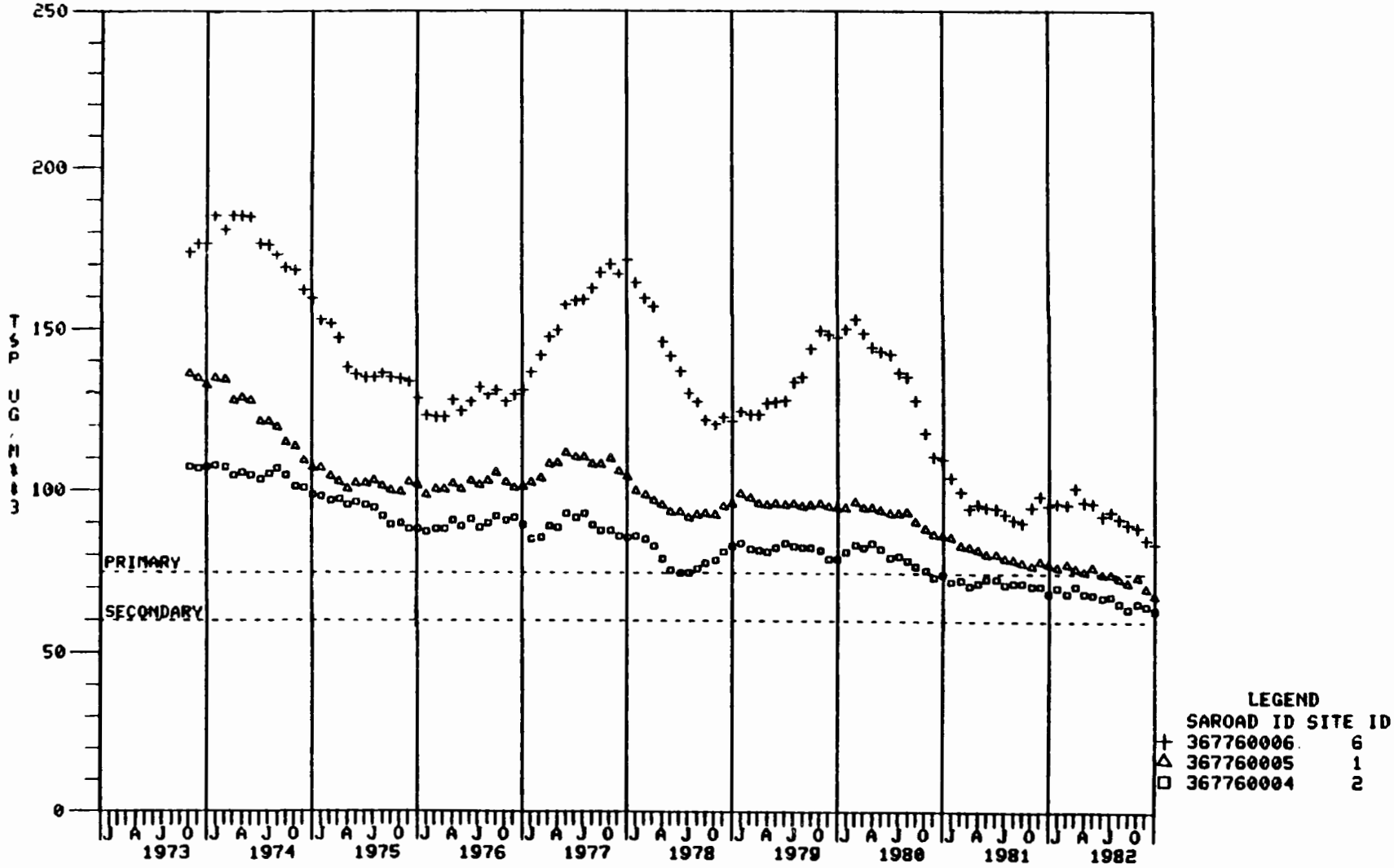

TSP roses for Jones & Laughlin Steel (Campbell Works) - Youngstown, Ohio, for the period 1978-1982 for cases of $\omega>0.90$. Each circle represents 50 $\mu g/m^3$.

NUMBER OF TSP OBSERVATIONS USED IN POLLUTION ROSES

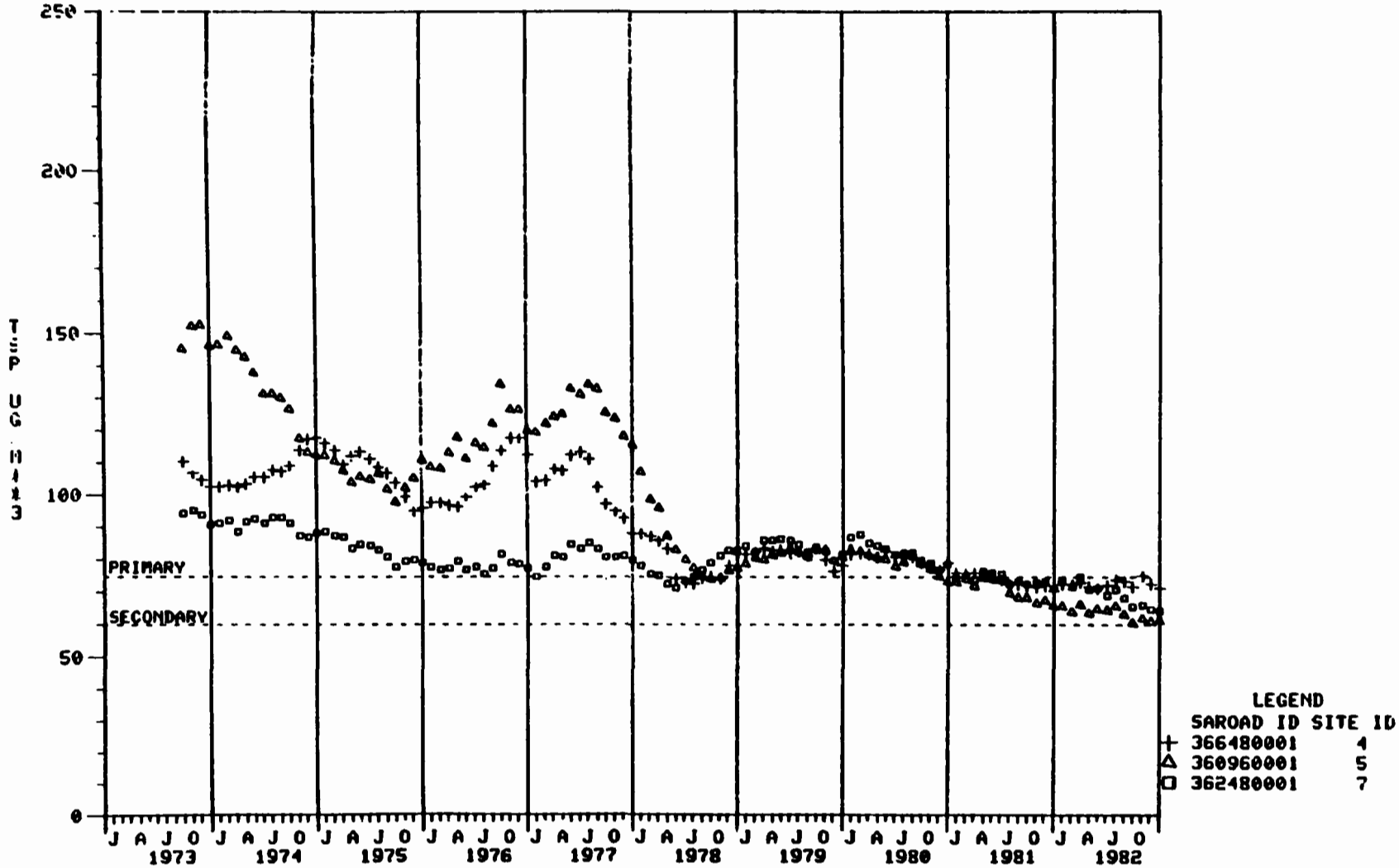
Jones & Laughlin Steel (Campbell Works)--Youngstown, OH

| Wind Direction | Monitoring Site Numbers | | |
|---|---|---|---|
| | #2 | #4 | #5 |
| N | 1 | 1 | 1 |
| NNE | 1 | 1 | 1 |
| NE | 3 | 3 | 3 |
| ENE | 0 | 0 | 0 |
| E | 4 | 5 | 5 |
| ESE | 4 | 4 | 4 |
| SE | 12 | 11 | 11 |
| SSE | 5 | 5 | 5 |
| S | 8 | 8 | 9 |
| SSW | 13 | 13 | 12 |
| SW | 12 | 12 | 12 |
| WSW | 13 | 14 | 12 |
| W | 14 | 15 | 14 |
| WNW | 8 | 9 | 9 |
| NW | 7 | 7 | 7 |
| NNW | 5 | 5 | 5 |
| Total | 110 | 113 | 110 |

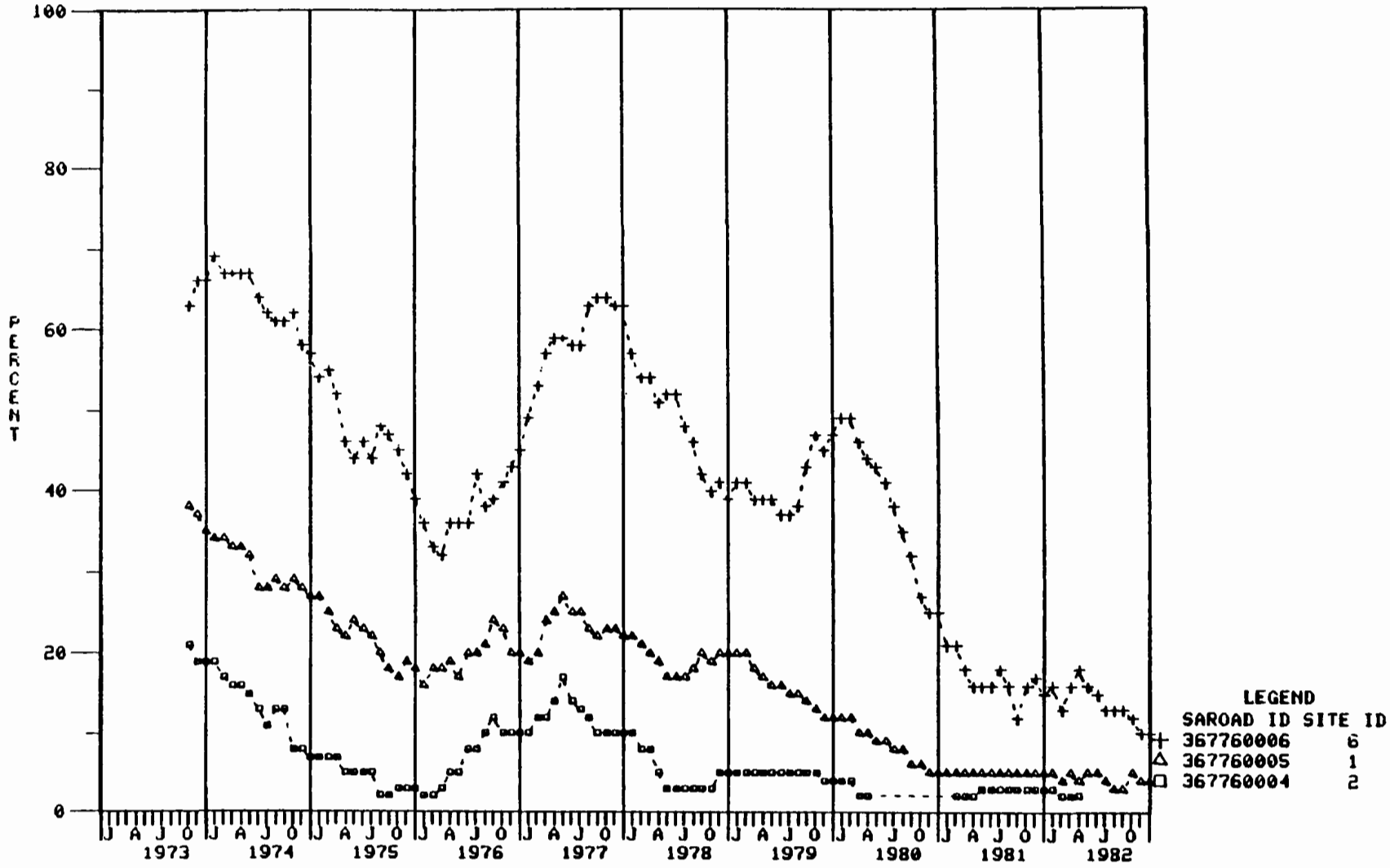
TSP 12 MONTH RUNNING GEOMETRIC MEANS (UG/M**3) FOR J & L STEEL - YOUNGSTOWN, OH



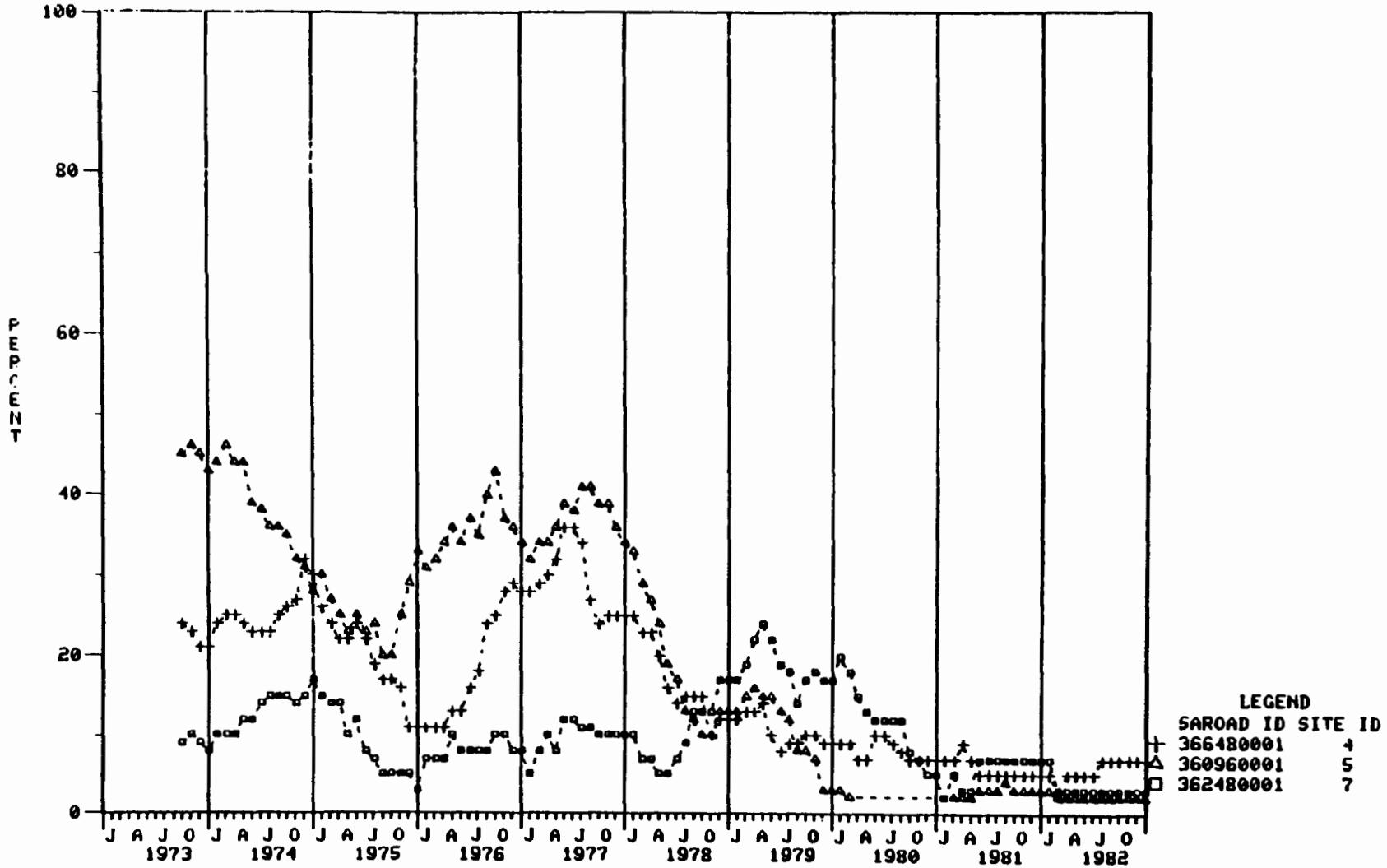
TSP 12 MONTH RUNNING GEOMETRIC MEANS (UG/M**3) FOR J & L STEEL - YOUNGSTOWN, OH



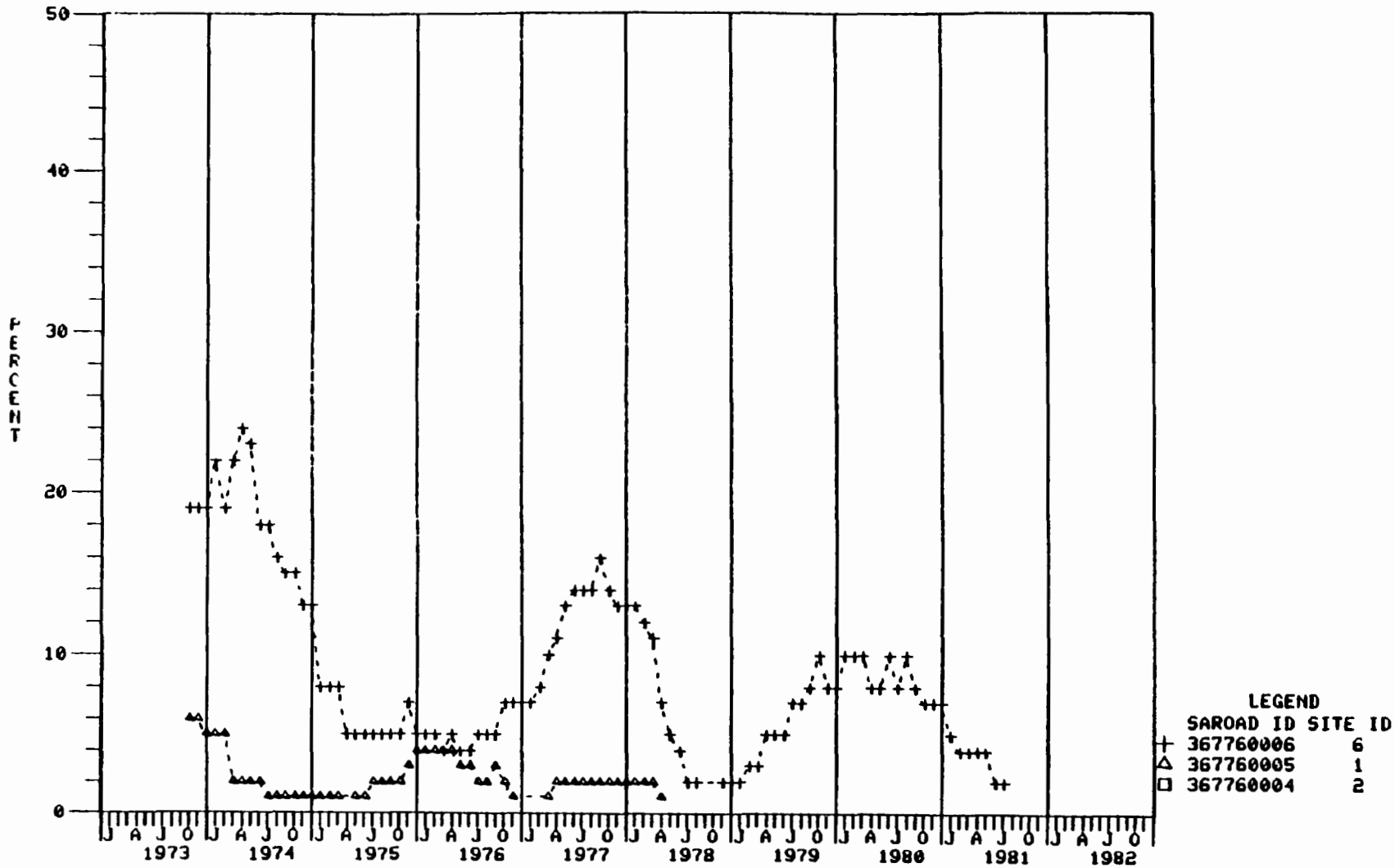
TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 150 (UG/M**3) FOR J & L STEEL - YOUNGSTOWN, OH



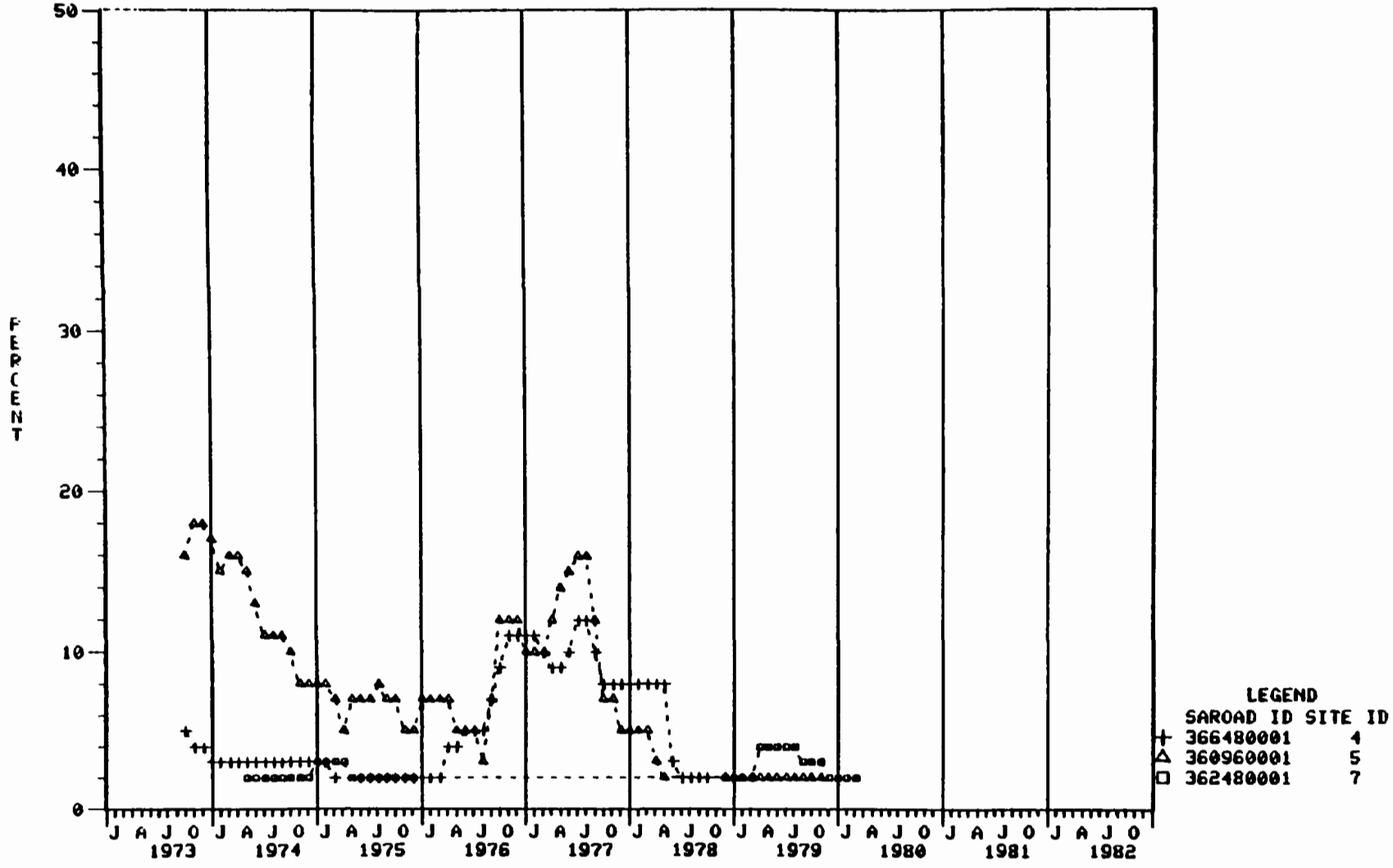
TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 150 (UG/M**3) FOR J & L STEEL - YOUNGSTOWN, OH



TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 260 (UG/M**3) FOR J & L STEEL - YOUNGSTOWN, OH



TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 260 (UG/M**3) FOR J & L STEEL - YOUNGSTOWN, OH



TSP DATA SUMMARY FOR J & L STEEL - YOUNGSTOWN, OH
SAROAD STATION # 367760006 SITE ID # 06
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 58 | 61 | 59 | 56 | 62 | 59 | 60 | 59 | 59 | 61 |
| GEOMETRIC MEAN: | ****** | 176.3 | 159.7 | 128.6 | 131.2 | 171.8 | 121.8 | 148.0 | 110.0 | 95.7 | 84.1 |
| GEOMETRIC S.D.: | ****** | 1.6 | 1.6 | 1.5 | 1.7 | 1.6 | 1.6 | 1.6 | 1.7 | 1.5 | 1.6 |
| ARITHMETIC MEAN | ****** | 193.2 | 176.7 | 138.5 | 147.7 | 193.3 | 135.2 | 164.0 | 125.1 | 105.4 | 93.2 |
| HIGHEST BY LARSEN EXTRP: | ****** | 655.8 | 615.8 | 395.1 | 589.7 | 702.1 | 486.2 | 567.0 | 490.6 | 339.2 | 334.6 |
| 1ST HIGHEST: | ****** | 409.0 | 390.0 | 368.0 | 309.0 | 602.0 | 354.0 | 497.0 | 387.0 | 247.0 | 194.0 |
| DATE : | ****** | 730428 | 741207 | 750301 | 760418 | 770513 | 781104 | 790702 | 800203 | 810215 | 820423 |
| 2ND HIGHEST: | ****** | 365.0 | 387.0 | 279.0 | 297.0 | 460.0 | 251.0 | 428.0 | 302.0 | 235.0 | 189.0 |
| DATE : | ****** | 731106 | 740318 | 750512 | 761120 | 770302 | 780327 | 790906 | 800128 | 810709 | 820505 |
| # OF READINGS EXCEEDING 260 : | 0 | 11 | 8 | 3 | 4 | 8 | 1 | 5 | 4 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 38 | 35 | 22 | 25 | 38 | 22 | 28 | 15 | 9 | 6 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 2 | 2 | 2 | 8 | 1 | 6 | 2 | 8 | 9 | 17 |
| 66-130: | 0 | 9 | 16 | 29 | 16 | 15 | 24 | 21 | 31 | 36 | 34 |
| 131-195: | 0 | 22 | 24 | 22 | 21 | 20 | 20 | 21 | 14 | 10 | 10 |
| 196-260: | 0 | 14 | 11 | 3 | 7 | 18 | 8 | 11 | 2 | 4 | 0 |
| 261-325: | 0 | 6 | 2 | 2 | 4 | 1 | 0 | 2 | 3 | 0 | 0 |
| 326-390: | 0 | 4 | 6 | 1 | 0 | 3 | 1 | 1 | 1 | 0 | 0 |
| 391-455: | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR J & L STEEL - YOUNGSTOWN, OH
SAROAD STATION # 367760005 SITE ID # 01
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 58 | 153 | 244 | 240 | 247 | 244 | 242 | 233 | 242 | 222 |
| GEOMETRIC MEAN: | ****** | 132.1 | 106.9 | 101.6 | 101.1 | 104.3 | 96.3 | 94.6 | 86.3 | 77.3 | 67.8 |
| GEOMETRIC S.D.: | ****** | 1.5 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.5 | 1.5 | 1.5 | 1.6 |
| ARITHMETIC MEAN | ****** | 142.8 | 119.0 | 112.3 | 111.2 | 115.5 | 107.1 | 102.4 | 92.6 | 82.9 | 74.6 |
| HIGHEST BY LARSEN EXTRP: | ****** | 426.2 | 449.5 | 376.5 | 378.4 | 396.8 | 395.9 | 316.6 | 268.2 | 232.8 | 251.5 |
| 1ST HIGHEST: | ****** | 335.0 | 365.0 | 383.0 | 281.0 | 320.0 | 257.0 | 228.0 | 228.0 | 220.0 | 214.0 |
| DATE : | ****** | 730301 | 741028 | 751119 | 760609 | 771024 | 780309 | 790930 | 800203 | 811104 | 821006 |
| 2ND HIGHEST: | ****** | 287.0 | 241.0 | 295.0 | 244.0 | 319.0 | 241.0 | 226.0 | 205.0 | 183.0 | 192.0 |
| DATE : | ****** | 730302 | 740105 | 750514 | 760513 | 770329 | 781102 | 790306 | 801120 | 810401 | 820505 |
| # OF READINGS EXCEEDING 260 : | 0 | 3 | 1 | 8 | 1 | 6 | 0 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 20 | 38 | 45 | 46 | 53 | 48 | 28 | 11 | 12 | 8 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 3 | 23 | 45 | 42 | 34 | 48 | 44 | 45 | 85 | 98 |
| 66-130: | 0 | 23 | 70 | 136 | 124 | 135 | 126 | 147 | 157 | 136 | 114 |
| 131-195: | 0 | 22 | 48 | 47 | 59 | 60 | 58 | 44 | 29 | 20 | 9 |
| 196-260: | 0 | 7 | 11 | 8 | 14 | 12 | 12 | 7 | 2 | 1 | 1 |
| 261-325: | 0 | 2 | 0 | 7 | 1 | 6 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR J & L STEEL - YOUNGSTOWN, OH
SAROAD STATION # 367760004 SITE ID # 02
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 54 | 60 | 58 | 59 | 60 | 60 | 55 | 57 | 61 | 60 |
| GEOMETRIC MEAN: | ****** | 107.5 | 98.7 | 88.2 | 89.4 | 85.6 | 83.0 | 79.1 | 74.4 | 68.8 | 63.3 |
| GEOMETRIC S.D.: | ****** | 1.4 | 1.4 | 1.4 | 1.5 | 1.5 | 1.5 | 1.5 | 1.4 | 1.5 | 1.5 |
| ARITHMETIC MEAN | ****** | 113.7 | 104.5 | 92.3 | 97.0 | 93.8 | 89.6 | 85.6 | 78.6 | 73.9 | 68.2 |
| HIGHEST BY LARSEN EXTRP: | ****** | 292.1 | 270.5 | 215.9 | 292.2 | 300.7 | 261.1 | 250.2 | 204.8 | 209.6 | 198.2 |
| 1ST HIGHEST: | ****** | 229.0 | 223.0 | 159.0 | 246.0 | 212.0 | 209.0 | 229.0 | 138.0 | 194.0 | 140.0 |
| DATE : | ****** | 730227 | 740105 | 751027 | 760822 | 770302 | 780526 | 790316 | 800116 | 810215 | 820505 |
| 2ND HIGHEST: | ****** | 185.0 | 187.0 | 150.0 | 211.0 | 194.0 | 202.0 | 211.0 | 130.0 | 150.0 | 125.0 |
| DATE : | ****** | 731212 | 740821 | 750124 | 760418 | 770531 | 781104 | 790509 | 800403 | 810504 | 820716 |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 10 | 4 | 1 | 6 | 6 | 3 | 2 | 0 | 1 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 4 | 6 | 7 | 13 | 18 | 17 | 16 | 17 | 23 | 32 |
| 66-130: | 0 | 33 | 40 | 44 | 37 | 30 | 36 | 34 | 39 | 34 | 27 |
| 131-195: | 0 | 16 | 13 | 7 | 7 | 11 | 5 | 3 | 1 | 4 | 1 |
| 196-260: | 0 | 1 | 1 | 0 | 2 | 1 | 2 | 2 | 0 | 0 | 0 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR J & L STEEL - YOUNGSTOWN, OH
SAROAD STATION # 366480001 SITE ID # 04
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 59 | 61 | 54 | 57 | 60 | 60 | 58 | 58 | 59 | 59 |
| GEOMETRIC MEAN: | ****** | 102.3 | 117.9 | 95.9 | 112.8 | 88.4 | 81.8 | 78.3 | 79.0 | 70.4 | 71.1 |
| GEOMETRIC S.D.: | ****** | 1.6 | 1.6 | 1.5 | 1.8 | 2.0 | 1.6 | 1.6 | 1.5 | 1.6 | 1.6 |
| ARITHMETIC MEAN | ****** | 118.1 | 133.6 | 105.6 | 136.8 | 115.2 | 92.0 | 86.5 | 86.3 | 77.2 | 79.1 |
| HIGHEST BY LARSEN EXTRP: | ****** | 439.7 | 505.6 | 347.7 | 680.5 | 727.7 | 349.7 | 294.5 | 283.6 | 258.5 | 281.5 |
| 1ST HIGHEST: | ****** | 611.0 | 448.0 | 287.0 | 511.0 | 419.0 | 234.0 | 219.0 | 196.0 | 199.0 | 185.0 |
| DATE : | ****** | 730323 | 740312 | 750512 | 760524 | 770507 | 781104 | 790322 | 800421 | 810323 | 820505 |
| 2ND HIGHEST: | ****** | 334.0 | 306.0 | 245.0 | 484.0 | 419.0 | 200.0 | 166.0 | 173.0 | 174.0 | 183.0 |
| DATE : | ****** | 730227 | 740204 | 750313 | 760518 | 770525 | 780526 | 790720 | 800527 | 810227 | 820722 |
| # OF READINGS EXCEEDING 260 : | 0 | 2 | 2 | 1 | 6 | 5 | 0 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 12 | 18 | 6 | 16 | 15 | 7 | 5 | 4 | 3 | 4 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 11 | 8 | 10 | 10 | 21 | 17 | 21 | 17 | 25 | 25 |
| 66-130: | 0 | 33 | 29 | 32 | 24 | 22 | 33 | 29 | 35 | 30 | 26 |
| 131-195: | 0 | 11 | 13 | 9 | 13 | 8 | 7 | 7 | 5 | 3 | 8 |
| 196-260: | 0 | 2 | 9 | 2 | 4 | 4 | 3 | 1 | 1 | 1 | 0 |
| 261-325: | 0 | 0 | 1 | 1 | 3 | 2 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 1 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR J & L STEEL - YOUNGSTOWN, OH
SAROAD STATION # 360960001 SITE ID # 05
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 61 | 60 | 58 | 59 | 59 | 61 | 59 | 60 | 59 | 59 |
| GEOMETRIC MEAN: | ****** | 146.3 | 112.0 | 110.7 | 119.8 | 115.6 | 77.2 | 80.7 | 73.2 | 65.6 | 61.4 |
| GEOMETRIC S.D.: | ****** | 1.8 | 1.8 | 1.8 | 1.9 | 1.7 | 1.8 | 1.5 | 1.5 | 1.5 | 1.5 |
| ARITHMETIC MEAN | ****** | 174.2 | 132.9 | 129.3 | 145.5 | 133.0 | 91.1 | 86.4 | 78.3 | 71.1 | 66.7 |
| HIGHEST BY LARSEN EXTRP: | ****** | 825.8 | 619.1 | 587.8 | 740.7 | 578.1 | 430.0 | 243.5 | 223.2 | 215.8 | 205.5 |
| 1ST HIGHEST: | ****** | 668.0 | 485.0 | 367.0 | 494.0 | 366.0 | 294.0 | 182.0 | 130.0 | 174.0 | 163.0 |
| DATE : | ****** | 731019 | 740306 | 751214 | 760909 | 770419 | 781104 | 790220 | 800801 | 810215 | 820505 |
| 2ND HIGHEST: | ****** | 469.0 | 376.0 | 314.0 | 398.0 | 302.0 | 214.0 | 150.0 | 127.0 | 166.0 | 135.0 |
| DATE : | ****** | 730416 | 741119 | 750418 | 760903 | 770531 | 780414 | 790322 | 800726 | 810522 | 820716 |
| # OF READINGS EXCEEDING 260 : | 0 | 10 | 5 | 4 | 6 | 3 | 1 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 27 | 17 | 19 | 20 | 19 | 8 | 1 | 0 | 2 | 1 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 4 | 8 | 10 | 10 | 7 | 23 | 18 | 22 | 29 | 30 |
| 66-130: | 0 | 21 | 29 | 27 | 24 | 25 | 26 | 34 | 38 | 28 | 27 |
| 131-195: | 0 | 14 | 13 | 10 | 9 | 15 | 9 | 7 | 0 | 2 | 2 |
| 196-260: | 0 | 12 | 5 | 7 | 10 | 9 | 2 | 0 | 0 | 0 | 0 |
| 261-325: | 0 | 6 | 2 | 3 | 1 | 2 | 1 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 1 | 2 | 1 | 3 | 1 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR J & L STEEL - YOUNGSTOWN, OH
SAROAD STATION # 362480001 SITE ID # 07
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 60 | 60 | 59 | 60 | 61 | 53 | 60 | 59 | 61 | 60 |
| GEOMETRIC MEAN: | ****** | 90.4 | 88.4 | 79.0 | 77.4 | 80.0 | 82.9 | 81.8 | 78.5 | 71.4 | 64.3 |
| GEOMETRIC S.D.: | ****** | 1.5 | 1.6 | 1.5 | 1.6 | 1.6 | 1.7 | 1.7 | 1.6 | 1.6 | 1.7 |
| ARITHMETIC MEAN | ****** | 98.8 | 99.8 | 85.8 | 86.0 | 90.0 | 95.9 | 94.4 | 86.2 | 79.5 | 72.6 |
| HIGHEST BY LARSEN EXTRP: | ****** | 319.2 | 376.9 | 255.7 | 297.7 | 333.5 | 424.3 | 398.4 | 289.9 | 272.4 | 284.0 |
| 1ST HIGHEST: | ****** | 233.0 | 274.0 | 227.0 | 203.0 | 242.0 | 289.0 | 272.0 | 170.0 | 234.0 | 192.0 |
| DATE : | ****** | 731025 | 741207 | 751120 | 760915 | 770212 | 781104 | 790322 | 800110 | 810215 | 820505 |
| 2ND HIGHEST: | ****** | 197.0 | 263.0 | 182.0 | 176.0 | 225.0 | 173.0 | 209.0 | 167.0 | 182.0 | 155.0 |
| DATE : | ****** | 730416 | 740411 | 750512 | 760418 | 770419 | 780309 | 790316 | 800116 | 810504 | 820511 |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 5 | 9 | 2 | 5 | 6 | 7 | 9 | 3 | 4 | 2 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 15 | 13 | 22 | 25 | 23 | 19 | 22 | 19 | 26 | 27 |
| 66-130: | 0 | 30 | 34 | 30 | 24 | 29 | 21 | 25 | 33 | 29 | 27 |
| 131-195: | 0 | 13 | 10 | 6 | 10 | 6 | 12 | 9 | 7 | 5 | 6 |
| 196-260: | 0 | 2 | 1 | 1 | 1 | 3 | 0 | 3 | 0 | 1 | 0 |
| 261-325: | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

24-HR STANDARD EXCEEDANCE ROSE FOR
J & L STEEL - YOUNGSTOWN, OH
(ALL CASES > 260 UG/M**3)
X=0.900
COUNT/AVERAGE TSP OF PRIMARY EXCEEDANCES

| SAROAD # | 367760006 | | 367760005 | | 367760004 | | 366480001 | | 360960001 | | 362480001 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SITE ID # | 6 | | 1 | | 2 | | 4 | | 5 | | 7 | |
| DIRECTION | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X |
| N COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 515. | 290. | 0. | 0. | 0. | 0. |
| NNE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 397. | 419. | 0. | 0. | 0. | 0. |
| NE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 397. | 334. | 0. | 0. | 0. | 0. |
| ENE COUNT: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 267. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| E COUNT: | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 281. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| ESE COUNT: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| AVE TSP: | 0. | 0. | 312. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 272. |
| SE COUNT: | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| AVE TSP: | 390. | 0. | 263. | 267. | 0. | 0. | 0. | 0. | 0. | 0. | 274. | 0. |
| SSE COUNT: | 2 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 3 | 3 | 1 | 0 |
| AVE TSP: | 270. | 0. | 0. | 324. | 0. | 0. | 0. | 0. | 314. | 346. | 263. | 0. |
| S COUNT: | 0 | 3 | 2 | 1 | 0 | 0 | 0 | 0 | 2 | 4 | 0 | 1 |
| AVE TSP: | 0. | 310. | 278. | 383. | 0. | 0. | 0. | 0. | 408. | 311. | 0. | 289. |
| SSW COUNT: | 1 | 2 | 2 | 1 | 0 | 0 | 0 | 1 | 7 | 2 | 0 | 0 |
| AVE TSP: | 287. | 326. | 327. | 261. | 0. | 0. | 0. | 287. | 383. | 387. | 0. | 0. |
| SW COUNT: | 0 | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 5 | 2 | 0 | 0 |
| AVE TSP: | 0. | 301. | 280. | 0. | 0. | 0. | 0. | 0. | 335. | 274. | 0. | 0. |
| WSW COUNT: | 5 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 353. | 298. | 0. | 281. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| W COUNT: | 6 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 332. | 361. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| WNW COUNT: | 7 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 353. | 381. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| NW COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| NNW COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 4 | 0 | 1 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 484. | 304. | 0. | 338. | 0. | 0. |
| ALL COUNT: | 22 | 22 | 9 | 10 | 0 | 0 | 7 | 9 | 17 | 12 | 2 | 2 |
| AVE TSP: | 339. | 347. | 292. | 299. | 0. | 0. | 443. | 315. | 360. | 328. | 269. | 281. |

24-HR STANDARD EXCEEDANCE ROSE FOR
J & L STEEL - YOUNGSTOWN, OH
(ALL CASES > 150 UG/M**3)
X=0.900
COUNT/AVERAGE TSP OF SECONDARY EXCEEDANCES

| SARCAD # | 367760006 | | 367760005 | | 367760004 | | 366480001 | | 360960001 | | 362480001 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SITE ID # | 6 | | 1 | | 2 | | 4 | | 5 | | 7 | |
| DIRECTION | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X |
| N COUNT: | 0 | 3 | 0 | 2 | 0 | 0 | 2 | 7 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 182. | 0. | 170. | 0. | 0. | 515. | 226. | 0. | 0. | 0. | 0. |
| NNE COUNT: | 1 | 3 | 0 | 1 | 0 | 1 | 3 | 6 | 0 | 0 | 0 | 1 |
| AVE TSP: | 205. | 212. | 0. | 248. | 0. | 209. | 325. | 233. | 0. | 0. | 0. | 171. |
| NE COUNT: | 0 | 1 | 0 | 3 | 0 | 1 | 2 | 4 | 0 | 0 | 0 | 1 |
| AVE TSP: | 0. | 166. | 0. | 167. | 0. | 229. | 397. | 222. | 0. | 0. | 0. | 173. |
| ENE COUNT: | 0 | 1 | 0 | 5 | 0 | 1 | 0 | 4 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 227. | 0. | 187. | 0. | 173. | 0. | 177. | 0. | 0. | 0. | 0. |
| E COUNT: | 0 | 1 | 2 | 4 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 |
| AVE TSP: | 0. | 217. | 156. | 246. | 0. | 186. | 0. | 188. | 0. | 0. | 0. | 173. |
| ESE COUNT: | 2 | 3 | 4 | 8 | 0 | 1 | 0 | 2 | 0 | 1 | 0 | 2 |
| AVE TSP: | 176. | 191. | 228. | 189. | 0. | 173. | 0. | 202. | 0. | 163. | 0. | 232. |
| SE COUNT: | 6 | 7 | 11 | 17 | 0 | 1 | 0 | 4 | 0 | 0 | 4 | 6 |
| AVE TSP: | 223. | 195. | 195. | 180. | 0. | 187. | 0. | 163. | 0. | 0. | 194. | 182. |
| SSE COUNT: | 9 | 12 | 10 | 26 | 2 | 3 | 3 | 2 | 6 | 9 | 4 | 5 |
| AVE TSP: | 202. | 191. | 187. | 201. | 171. | 172. | 183. | 190. | 254. | 240. | 200. | 187. |
| S COUNT: | 6 | 17 | 12 | 29 | 3 | 4 | 4 | 7 | 6 | 16 | 4 | 10 |
| AVE TSP: | 222. | 203. | 194. | 191. | 183. | 188. | 174. | 182. | 259. | 222. | 218. | 186. |
| SSW COUNT: | 10 | 13 | 18 | 26 | 1 | 2 | 2 | 3 | 14 | 10 | 2 | 4 |
| AVE TSP: | 195. | 213. | 201. | 186. | 178. | 190. | 174. | 215. | 302. | 246. | 195. | 175. |
| SW COUNT: | 7 | 18 | 23 | 17 | 1 | 1 | 0 | 3 | 14 | 13 | 1 | 1 |
| AVE TSP: | 181. | 205. | 192. | 183. | 155. | 211. | 0. | 178. | 252. | 210. | 170. | 176. |
| WSW COUNT: | 17 | 17 | 13 | 11 | 5 | 1 | 1 | 0 | 5 | 9 | 2 | 1 |
| AVE TSP: | 241. | 200. | 190. | 191. | 181. | 153. | 166. | 0. | 207. | 192. | 183. | 171. |
| W COUNT: | 17 | 17 | 5 | 21 | 1 | 0 | 0 | 2 | 2 | 3 | 0 | 1 |
| AVE TSP: | 249. | 249. | 183. | 170. | 162. | 0. | 0. | 189. | 194. | 209. | 0. | 163. |
| WNW COUNT: | 11 | 17 | 6 | 11 | 0 | 1 | 0 | 6 | 0 | 2 | 0 | 0 |
| AVE TSP: | 298. | 283. | 162. | 181. | 0. | 162. | 0. | 215. | 0. | 165. | 0. | 0. |
| NW COUNT: | 1 | 12 | 4 | 8 | 0 | 1 | 1 | 5 | 0 | 2 | 0 | 1 |
| AVE TSP: | 186. | 188. | 163. | 199. | 0. | 152. | 171. | 190. | 0. | 180. | 0. | 180. |
| NNW COUNT: | 1 | 5 | 2 | 5 | 0 | 1 | 6 | 9 | 0 | 1 | 0 | 0 |
| AVE TSP: | 166. | 177. | 172. | 182. | 0. | 246. | 248. | 240. | 0. | 338. | 0. | 0. |
| ALL COUNT: | 88 | 147 | 110 | 194 | 13 | 20 | 24 | 65 | 47 | 66 | 17 | 34 |
| AVE TSP: | 230. | 214. | 190. | 188. | 176. | 196. | 259. | 207. | 261. | 219. | 199. | 184. |

## AIR QUALITY EVALUATION - J&L STEEL, YOUNGSTOWN, OHIO

Air quality trends:

Stations #2, #4, and #5, in the vicinity of the J&L Campbell Works, all had Spearman rank correlation coefficients (-0.95, -0.87, and -0.89, respectively) that indicated strong downward trends in TSP levels. In the vicinity of the Brier Hill Works, station #1 has a Spearman rank correlation coefficient of -0.92, indicating a long-term downtrend. Station #6 has had a series of downward and upward trends, yielding a coefficient of -0.74. Since 1980, station #6 has experienced the greatest decline in TSP levels among the six stations. Station #6 has also experienced the most dramatic decline in the percentage of observations exceeding 150 $\mu g/m^3$.

Standard exceedance status:

Stations #2 and #5 last indicated primary standard violations in 1979; stations #4 and #7 last violated primary standards in 1980, while station #1 had a violation through 1981. Station #6 remained in violation of the primary annual standard through 1982.

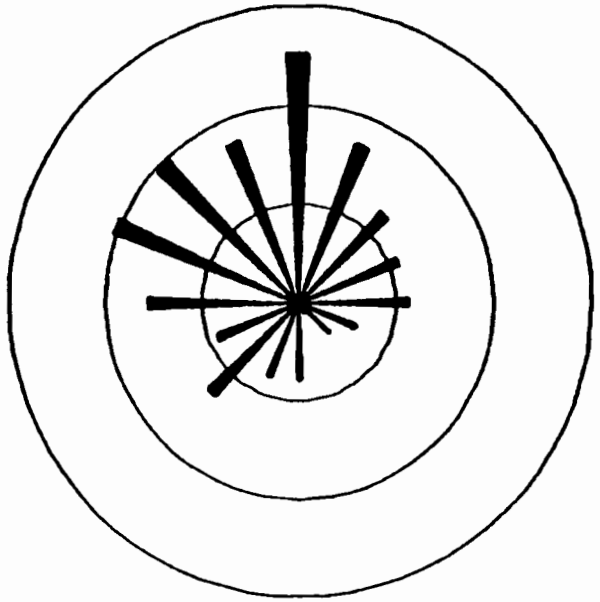
Pollution roses:

Roses for stations #4 and #5 indicate impacts of the J&L Campbell Works, while the rose for station #6 most clearly represents impact of the Brier Hill Works.

Standard exceedance roses:

Primary standard exceedances associated with persistent winds most frequently occur with winds from the west and west-northwest at station #6; these directions include the Brier Hill coke ovens and the U.S. Steel boilers, sinter, and blast furnaces. Continuing impacts from the U.S. Steel facility are not likely because the mill closed at the end of 1977. The vast majority of the primary exceedance cases at stations #4 and #5 occurred with wind directions from the Campbell Works; in fact, 17 out of the 29 cases occurred with persistent winds ($\omega$>0.90) from these directions (south-southeast through southwest) at station #5.

WIND ROSE
PERSISTENCE CLASS 0.90
WIND STATION 14852



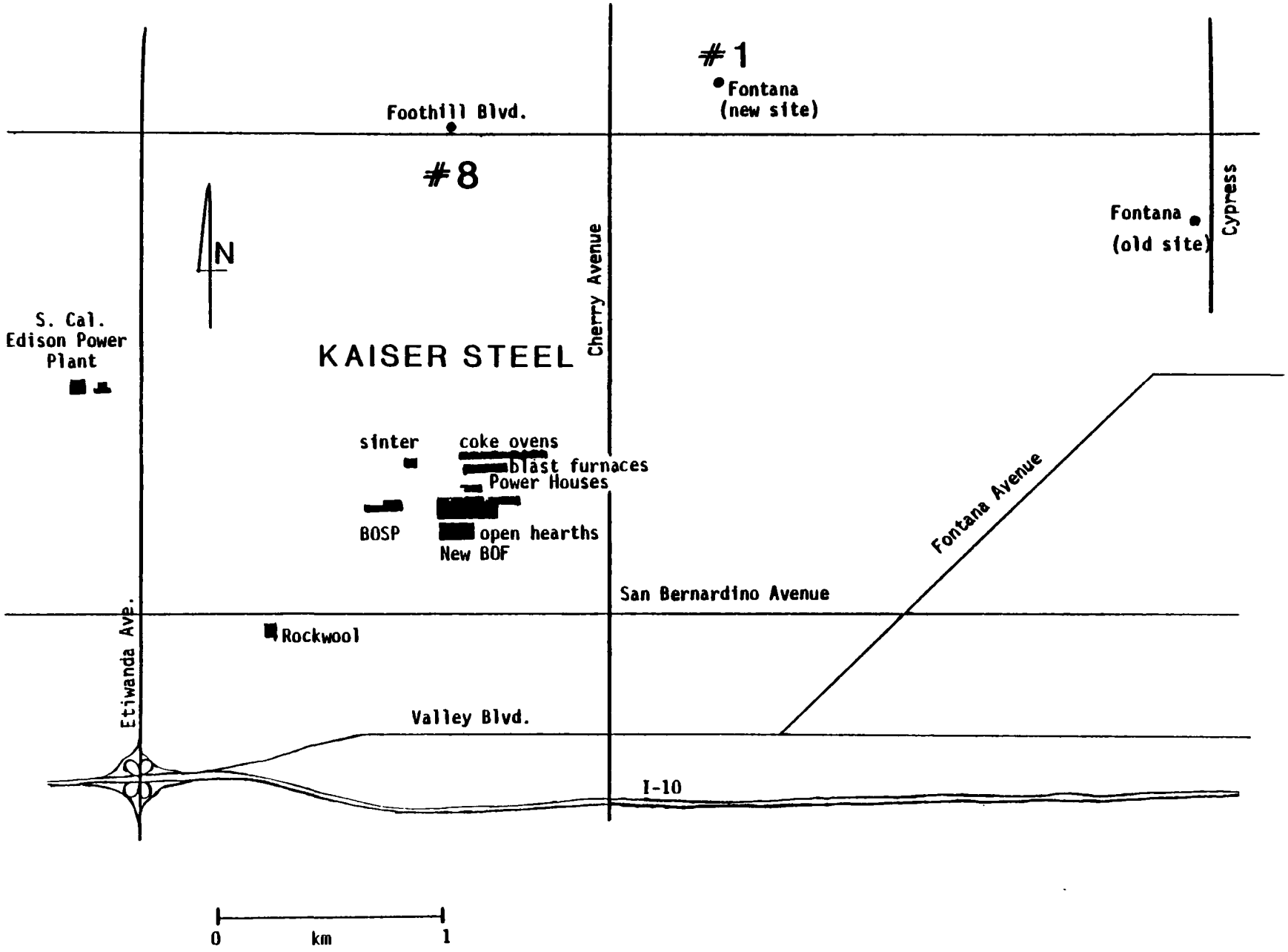
KAISER STEEL
Fontana
San Bernardino County
California
EPA Region IX

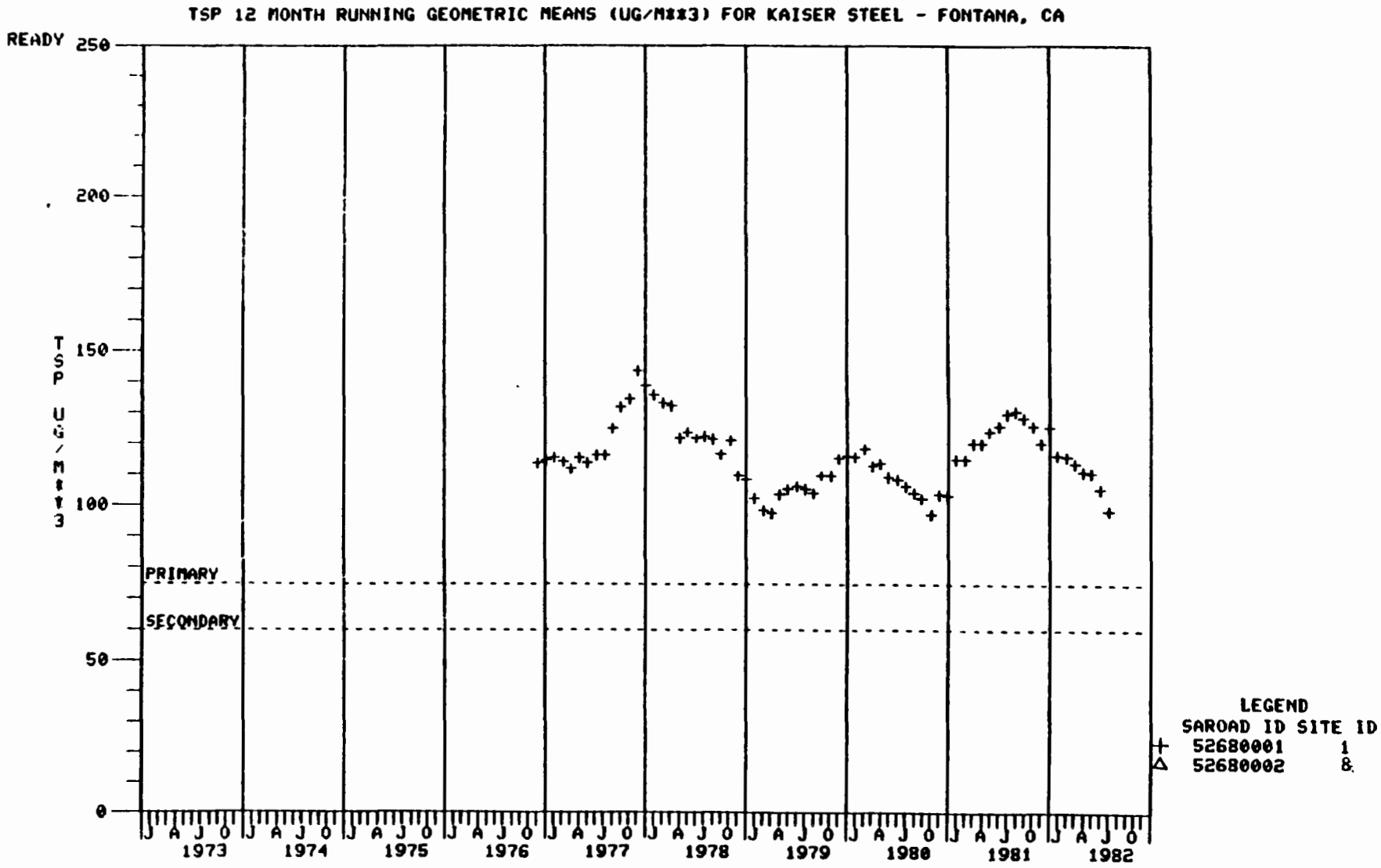
Hi-Vol Monitoring Sites--Kaiser Steel, Fontana, California

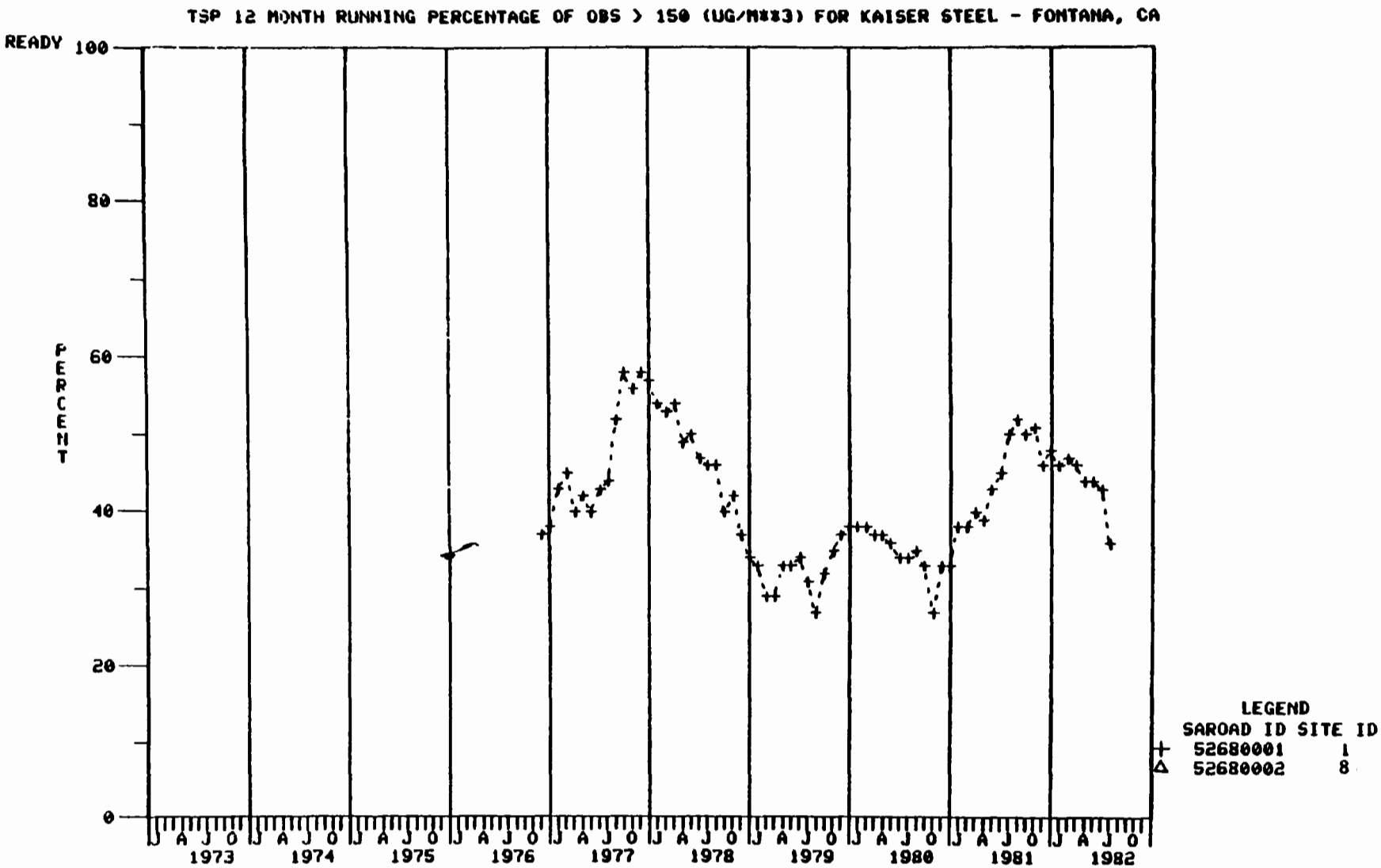
| Site ID Number | SAROAD Number | Site Name and Address | Plant Location from Site | | Elevation (m) | | | Site Description | Nearest Roadway | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Bearing (°) | Distance (km) | Above Ground | Above MSL | Above Plant | | Name | Direction | Distance (m) | Type and Volume |
| 1 | 05-2680-001-I01 | 14838 Foothill Blvd.<br>Fontana, CA | 210-221 | 2.9-3.6 | 3 | 446 | 111 | Roof<br>Rural-industrial | Foothill Blvd. | S | 350 | 4-lane, M |
| | | 8384 Cypress<br>Fontana, CA<br>(before 6/73) | 249-255 | 5.0-5.9 | 4 | 448 | 113 | Roof | Cypress | E | 60 | 2-lane L |
| 2* | 05-5380-001 | Ontario International Airport<br>Ontario, CA | 74-77 | 10.2-11.1 | U | 291 | -44 | U | U | U | U | U |
| 3* | 05-6535-001 | Riverside Co. Bldg.<br>5888 Mission Blvd.<br>Rubidoux, CA | 317-321 | 12.2 | 4 | 244 | -91 | Roof | Mission Blvd. | NE | 38 | 6-lane H |
| 4* | 05-6680-001 | City Hall<br>172 W. 3d St.<br>San Bernardino, CA | 263 | 19.9 | 28 | 316 | -19 | Roof | 3d St.<br>4th St.<br>Arrowhead<br>Mountain View | S<br>N<br>W<br>E | 75<br>75<br>75<br>75 | M<br>M<br>M<br>M |
| 5* | 05-8440-003 | Civic Center<br>155 D St.<br>Upland, CA | 95 | 13.8 | 4 | 380 | 45 | Roof | D St. | S | 22 | 2-lane, L |
| 6* | 05-8440-004 | Post Office<br>3d St. & Arrow Hwy.<br>Upland, CA | 95 | 13.5 | 6 | 383 | 48 | Roof | Arrow Hwy.<br>3d St. | S<br>W | 45<br>15 | 4-lane, M<br>2-lane, M |
| 7* | State site 36-166 | Municipal Airport<br>Rialto, CA | 241-245 | 9.9 | 1 | 433 | 98 | Ground level at edge of airplane parking area | Miro Way | S | 12 | 2-lane, L |
| 8 | 05-2680-002-I01 | 14360 Arrow Blvd.<br>Fontana, CA | 150-195 | 1.5-2.5 | 5 | 386 | 51 | Suburban-industrial | Arrow Blvd. | U | U | U |

Key: U = Unavailable M = Moderate
L = Light H = Heavy

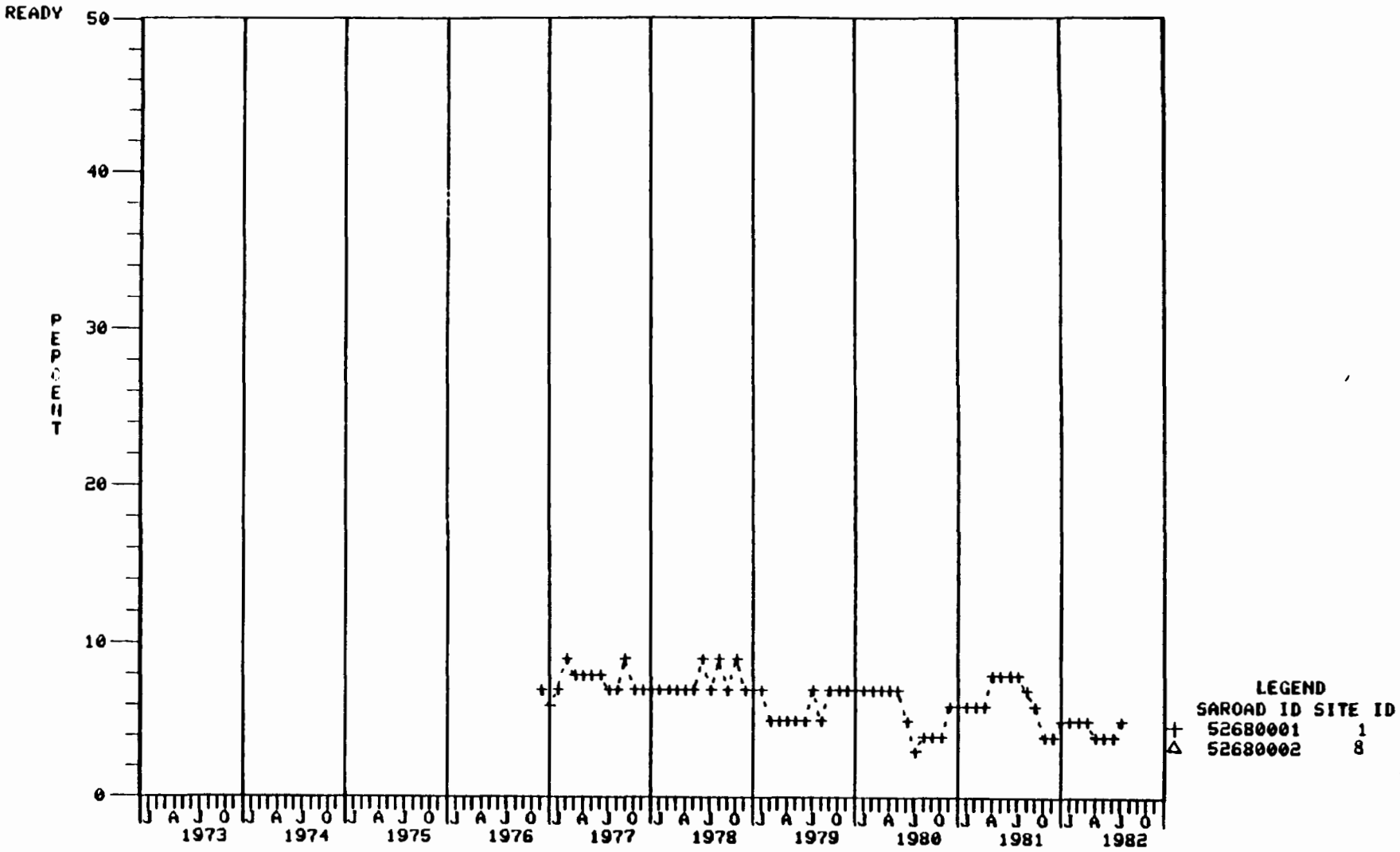
* Data from this station were included in the original 1973-1977 analysis; however, no strong mill impact on TSP was noted at this site. Based on the likelihood that this situation has not changed, data from this site were not employed in the 1978-1980 or the 1981-1982 updates.


#1
Fontana
(new site)
Foothill Blvd.
#8
N
Fontana
(old site)
Cypress
Cherry Avenue
S. Cal.
Edison Power
Plant
KAISER STEEL
sinter
coke ovens
blast furnaces
Power Houses
BOSP
open hearths
New BOF
Fontana Avenue
San Bernardino Avenue
Rockwool
Etiwanda Ave.
Valley Blvd.
I-10
0
km
1


TSP 12 MONTH RUNNING GEOMETRIC MEANS (UG/M**3) FOR KAISER STEEL - FONTANA, CA
READY
250
200
150
100
50
0
TSP UG/M**3
PRIMARY
SECONDARY
J A J O
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
LEGEND
SAROAD ID SITE ID
52680001 1
52680002 8


TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 150 (UG/M**3) FOR KAISER STEEL - FONTANA, CA
READY
PERCENT
100
80
60
40
20
0
J A J O
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
LEGEND
SAROAD ID SITE ID
52680001 1
52680002 8

TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 260 (UG/M**3) FOR KAISER STEEL - FONTANA, CA



TSP DATA SUMMARY FOR KAISER STEEL - FONTANA, CA
SAROAD STATION # 052680001 SITE ID # 01
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 0 | 0 | 47 | 54 | 58 | 60 | 51 | 56 | 20 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | ****** | 115.0 | 139.2 | 108.7 | 116.4 | 103.3 | 125.8 | ****** |
| GEOMETRIC S.D.: | ****** | ****** | ****** | ****** | 1.7 | 1.8 | 2.0 | 2.0 | 2.0 | 1.8 | ****** |
| ARITHMETIC MEAN | ****** | ****** | ****** | ****** | 132.3 | 159.7 | 135.0 | 139.3 | 129.3 | 143.6 | ****** |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | ****** | 580.7 | 844.6 | 868.3 | 885.0 | 800.9 | 663.8 | ****** |
| 1ST HIGHEST: | ****** | ****** | ****** | ****** | 338.0 | 288.6 | 379.0 | 320.0 | 417.0 | 372.0 | 212.0 |
| DATE : | ****** | ****** | ****** | ****** | 761003 | 770218 | 781005 | 790912 | 801006 | 811124 | 820517 |
| 2ND HIGHEST: | ****** | ****** | ****** | ****** | 319.0 | 276.0 | 325.0 | 279.0 | 385.0 | 311.0 | 198.0 |
| DATE : | ****** | ****** | ****** | ****** | 760717 | 771103 | 780201 | 790626 | 801105 | 811212 | 820222 |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 3 | 4 | 4 | 4 | 3 | 2 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 0 | 0 | 18 | 31 | 19 | 23 | 17 | 27 | 3 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 0 | 0 | 6 | 5 | 12 | 9 | 13 | 6 | 9 |
| 66-130: | 0 | 0 | 0 | 0 | 20 | 14 | 19 | 21 | 17 | 17 | 7 |
| 131-195: | 0 | 0 | 0 | 0 | 16 | 19 | 13 | 14 | 11 | 24 | 2 |
| 196-260: | 0 | 0 | 0 | 0 | 2 | 12 | 10 | 12 | 7 | 7 | 2 |
| 261-325: | 0 | 0 | 0 | 0 | 2 | 4 | 3 | 4 | 0 | 1 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 2 | 1 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR KAISER STEEL - FONTANA, CA
SAROAD STATION # 052680002 SITE ID # 08
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 31 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| GEOMETRIC S.D.: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| ARITHMETIC MEAN | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| 1ST HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 272.0 |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 820716 |
| 2ND HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 238.0 |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 820722 |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 |
| 66-130: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| 131-195: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 |
| 196-260: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

## AIR QUALITY EVALUATION - KAISER STEEL, FONTANA, CALIFORNIA

Air quality trends:

Station #1, with a Spearman rank correlation coefficient of -0.17, displays only a very slight overall downtrend in 12-month running geometric means. The graph could best be described as cyclical. The percentage of observations exceeding 150 $\mu g/m^3$ remained as high as 40 to 50 percent in 1981 and early 1982.

Standard exceedance status:

Station #1 continued to show exceedance of the primary annual and 24-hour standards through its last full year of service, 1981.

Pollution roses:

None were generated due to lack of appropriate wind data.

Standard exceedance roses:

None were generated due to lack of appropriate wind data.

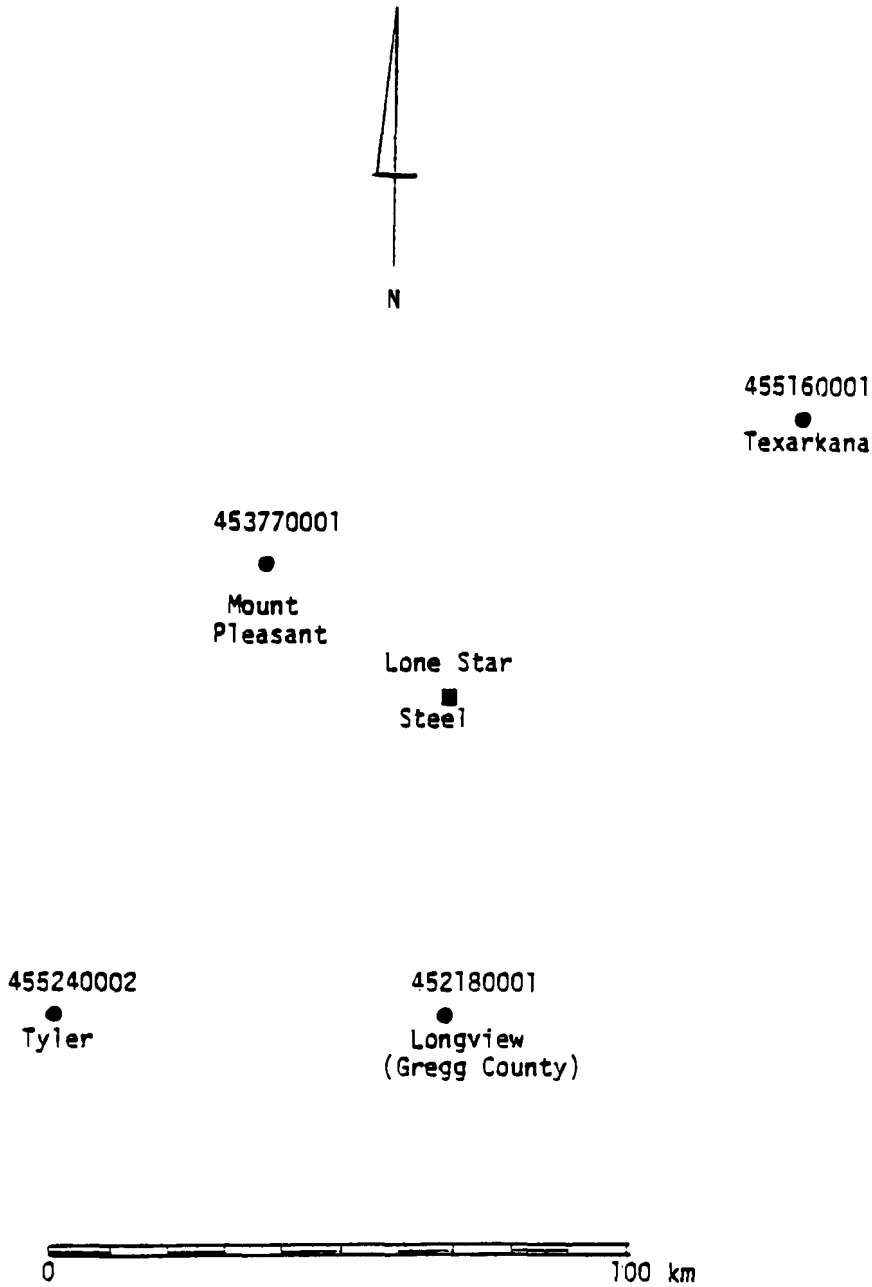
LONE STAR STEEL
Lone Star
Morris County
Texas
EPA Region VI

Hi-Vol Monitoring Sites--Lone Star Steel, Lone Star, Texas

| Site ID Number | SAROAD Number | Site Name and Address | Plant Location from Site | | Elevation (m) | | | Site Description | Nearest Roadway | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Bearing (°) | Distance (km) | Above Ground | Above MSL | Above Plant | | Name | Direc-tion | Distance (m) | Volume |
| 1* | 45-3740-001-F01 | S. Shore Dr. Lone Star, TX | 160-183 | 1.5-2.5 | 0 | 82.3 | -7 | Fishing pier Remote-residential | S. Shore Dr. | U | 46 | L |

Key: U = Unavailable M = Moderate
L = Light H = Heavy

* Site began operation in December 1982.




TSP Monitors in Relation to Lone Star Steel - Lone Star, Texas

## AIR QUALITY EVALUATION - LONE STAR STEEL, LONE STAR, TEXAS

A TSP monitoring site was installed in the vicinity of the Lone Star plant in December, 1982. Otherwise, the nearest monitor is 40 km distant. No data analysis is currently possible.

NATIONAL STEEL
Weirton
Hancock County
West Virginia
EPA Region III

Hi-Vol Monitoring Sites--National Steel, Weirton, West Virginia

| Site ID Number | SAROAD Number | Site Name and Address | Plant Location from Site: Facility/ Bearing (°) | Distance (km) | Elevation (m): Above Ground | Above MSL | Above Plant | Site Description | Nearest Roadway: Name | Direction | Distance (m) | Type and Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 50-2000-003-F02 | Weirton Fire Station<br>Main St.<br>Weirton, WV | Browns Island<br>Coke plant | 325 3.0 | 9 | 218 | -4.5 | Roof<br>Urban-commercial | Main St. | W | 150 | 4-lane, H |
| | | | | | | | | | Cove Rd. | N | 120 | 2-lane, M |
| | | | Mainland<br>Coke plant | 333 2.8 | | | | | RR. | S&E | 120 | 2-3 tracks, RR. yard to S. |
| | | | Blast furnaces | 345 2.4 | | | | | | | | |
| | | | BOF | 4 1.4 | | | | | | | | |
| | | | Sinter plant | 342 2.1 | | | | | | | | |
| 2 | 50-2000-002-F02 | Weirton Library<br>3443 Main St.<br>Weirton, WV | NOTE: Library site is approximately 100 m west of Weirton Fire Station (Site #1). Library site discontinued and moved to Fire Station, July 1975. No significant location change relative to plant point sources. This SAROAD# is now assigned to Millsop Community Center, which is approximately 75 m N. of the library. | | 10.5 | 221 | -1.5 | Roof<br>Urban-commercial | Main St. | W | 45 | 4-lane, H |
| | | | | | | | | | Cove Rd. | N | 90 | 2-lane, M |
| | | | | | | | | | RR. | E | 230 | 2-3 tracks |
| 2 | 50-2000-002-F02 | Millsop Community Center<br>Main St. and Rt. 22<br>Weirton, WV | | | 10.5 | 221 | -1.5 | Roof<br>Urban-commercial | Main St. | W | 20 | 4-lane, H |
| | | | | | | | | | Cove Rd. | N | 30 | 2-lane, M |
| | | | | | | | | | RR. | E | 250 | 2-3 tracks |
| 3 | 36-6620-003-I01 | SC Dennis School<br>Toronto, OH | Browns Island<br>Coke plant | 173 3.4 | 7.5 | 245 | 23 | Roof<br>Residential | Rt. 7 | W | 250 | 4-lane, M to H |
| | | | Mainland<br>Coke plant | 165 3.5 | | | | | | | | |
| | | | Blast furnaces | 156 3.9 | | | | | | | | |
| | | | BOF | 152 5.0 | | | | | | | | |
| | | | Sinter plant | 158 4.1 | | | | | | | | |
| 4* | 36-6420-004-I02 | Garfield School<br>936 N. 5th St.<br>Steubenville, OH | Browns Island<br>Coke plant | 1.5 5.6 | 9 | 218 | -4.5 | Roof<br>Urban-residential | Rt. 7 | E | 30 | 4-lane, H |
| | | | Mainland<br>Coke plant | 6 5.6 | | | | | RR. | E | 45 | 2 tracks |
| | | | Blast furnaces | 13 5.6 | | | | | Ohio River | E | 90 | Barge traffic, M |
| | | | BOF | 23 5.0 | | | | | | | | |
| | | | Sinter plant | 17 5.5 | | | | | | | | |

(Continued)

Key: U = Unavailable M = Moderate
L = Light H = Heavy

* Data from this station were included in the original 1973-1977 analysis; however, no strong mill impact on TSP was noted at this site. Based on the likelihood that this situation has not changed, data from this site were not employed in the 1978-1980 or the 1981-1982 updates.

Hi-Vol Monitoring Sites--National Steel, Weirton, West Virginia (Concluded)

| Site ID Number | SAROAD Number | Site Name and Address | Plant Location from Site: Facility/ Bearing (°) | Distance (km) | Elevation (m): Above Ground | Above MSL | Above Plant | Site Description | Nearest Roadway: Name | Direction | Distance (m) | Type and Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5 | 50-2000-005-F01 | Marland Heights<br>Weirton, WV | Browns Island | | | | | | | | | |
| | | | Coke plant 355 | 3.1 | | | | Suburban-residential | Brightway Ave. | NW | 21 | 15,000 ADT |
| | | | Mainland | | | | | | | | | |
| | | | Coke plant 5 | 3.0 | 10 | 317 | 94 | | | | | |
| | | | Blast furnaces 18 | 2.9 | | | | | | | | |
| | | | BOF 44 | 2.5 | | | | | | | | |
| | | | Sinter plant 28 | 2.6 | | | | | | | | |
| 6 | 36-6620-001 | Fire Department<br>6025 4th St.<br>Toronto, OH | Browns Island | | | | | | | | | |
| | | | Coke plant 189 | 4.4 | | | | | | | | |
| | | | Mainland | | | | | | | | | |
| | | | Coke plant 182 | 5.5 | 8.2 | 220 | -2 | Roof | 4th St. | W | U | U |
| | | | Blast furnaces 175 | 5.6 | | | | | | | | |
| | | | BOF 168 | 7.0 | | | | | | | | |
| | | | Sinter plant 171 | 6.4 | | | | | | | | |
| 7 | 50-2000-004-F02 | Oak St.<br>Weirton, WV | Browns Island | | | | | | | | | |
| | | | Coke plant 280 | 2.4 | | | | Suburban-residential | Owings | NE | 27 | <1,000 ADT |
| | | | Mainland | | | | | | | | | |
| | | | Coke plant 282 | 1.6 | 10 | 357 | 134 | | | | | |
| | | | Blast furnaces 271 | 1.1 | | | | | | | | |
| | | | BOF 196 | 1.0 | | | | | | | | |
| | | | Sinter plant 242 | 0.9 | | | | | | | | |

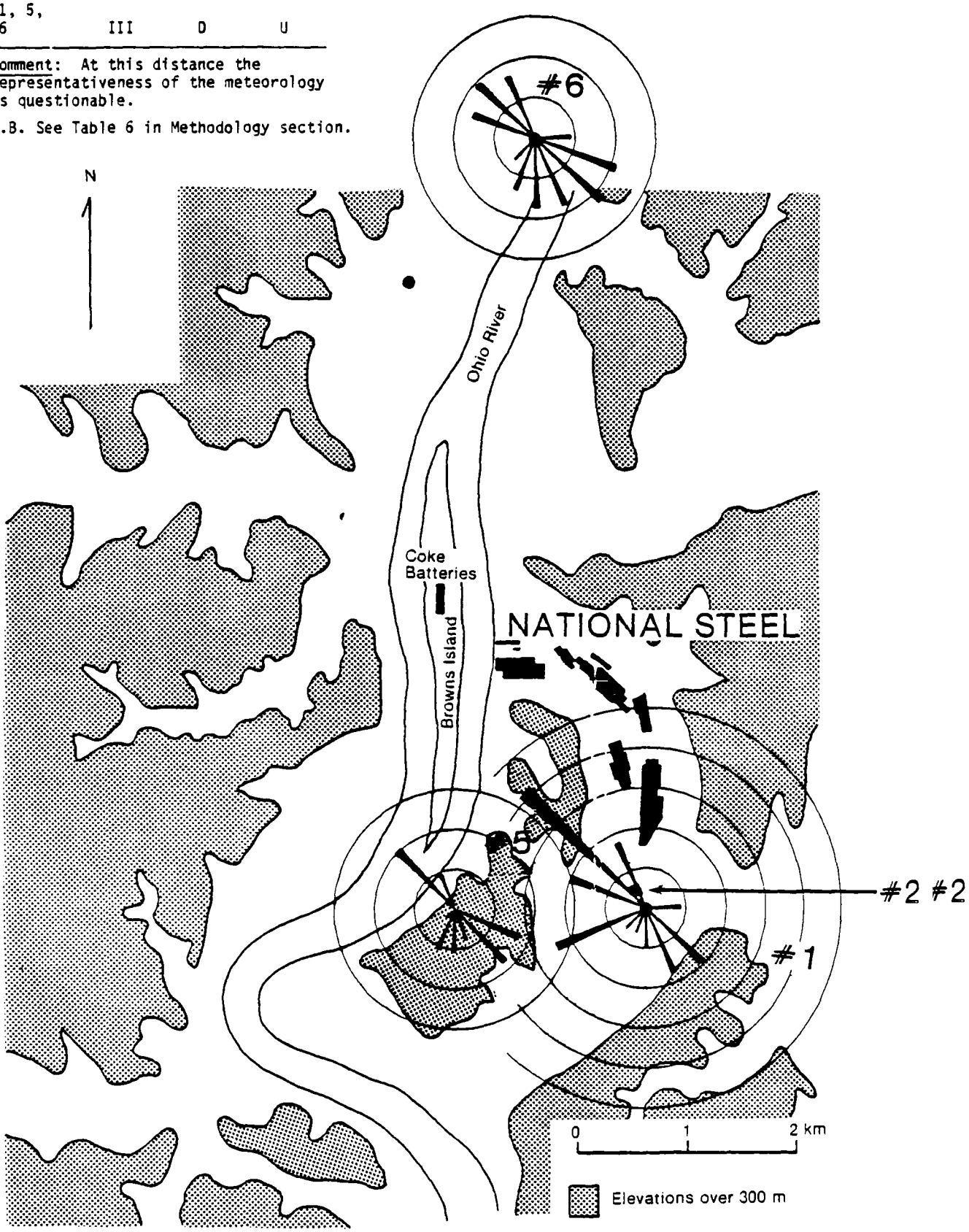
Key: U = Unavailable M = Moderate ADT = Average daily traffic
L = Light H = Heavy

Wird Data Representativeness

| Station # | Terrain | Distance | Rating |
|---|---|---|---|
| 1, 5, 6 | III | D | U |

Comment: At this distance the representativeness of the meteorology is questionable.

N.B. See Table 6 in Methodology section.



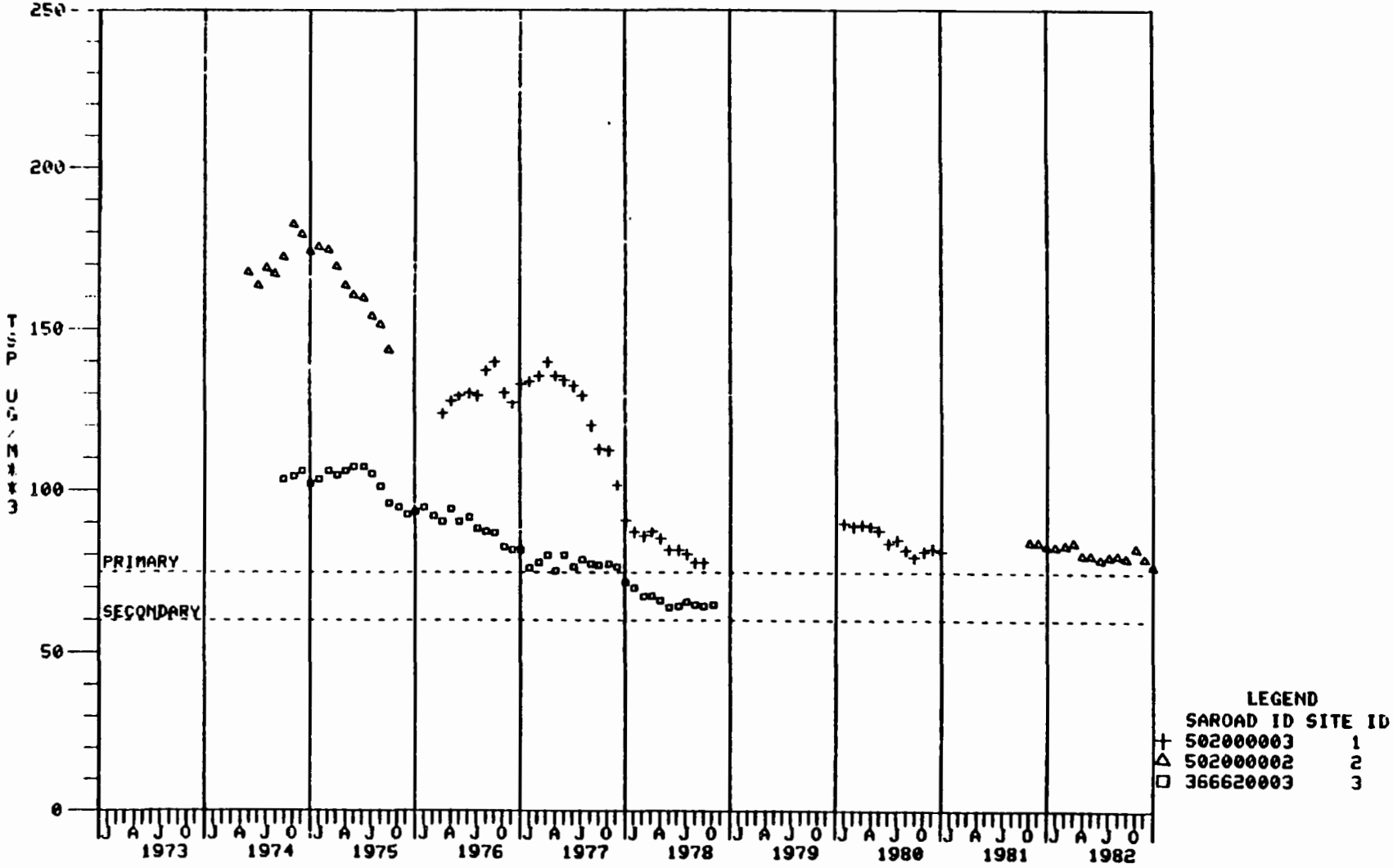

TSP roses for National Steel - Weirton, West Virginia, for the period 1978-1982 for cases of $\omega$>0.85. Each circle represents 50 $\mu g/m^3$.

NUMBER OF TSP OBSERVATIONS USED IN POLLUTION ROSES

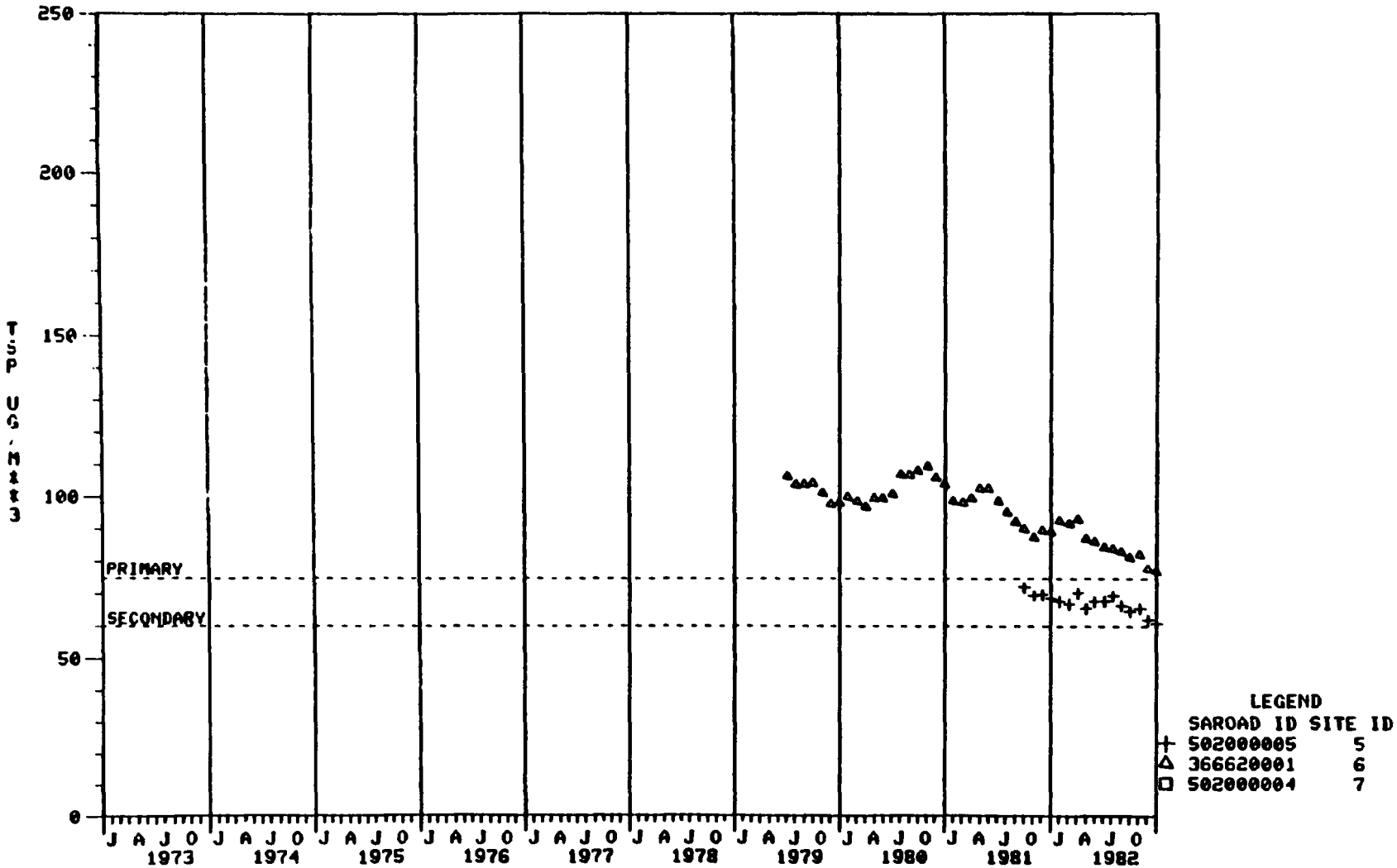
National Steel--Weirton, WV

| Wind Direction | Monitoring Site Numbers #1 | #5 | #6 |
|---|---|---|---|
| N | 0 | 0 | 0 |
| NNE | 0 | 0 | 0 |
| NE | 0 | 0 | 0 |
| ENE | 0 | 0 | 0 |
| E | 1 | 0 | 1 |
| ESE | 0 | 3 | 3 |
| SE | 8 | 8 | 21 |
| SSE | 5 | 4 | 9 |
| S | 2 | 1 | 1 |
| SSW | 1 | 2 | 3 |
| SW | 2 | 1 | 3 |
| WSW | 1 | 0 | 0 |
| W | 0 | 0 | 0 |
| WNW | 2 | 0 | 2 |
| NW | 1 | 1 | 2 |
| NNW | 3 | 1 | 4 |
| Total | 26 | 21 | 49 |

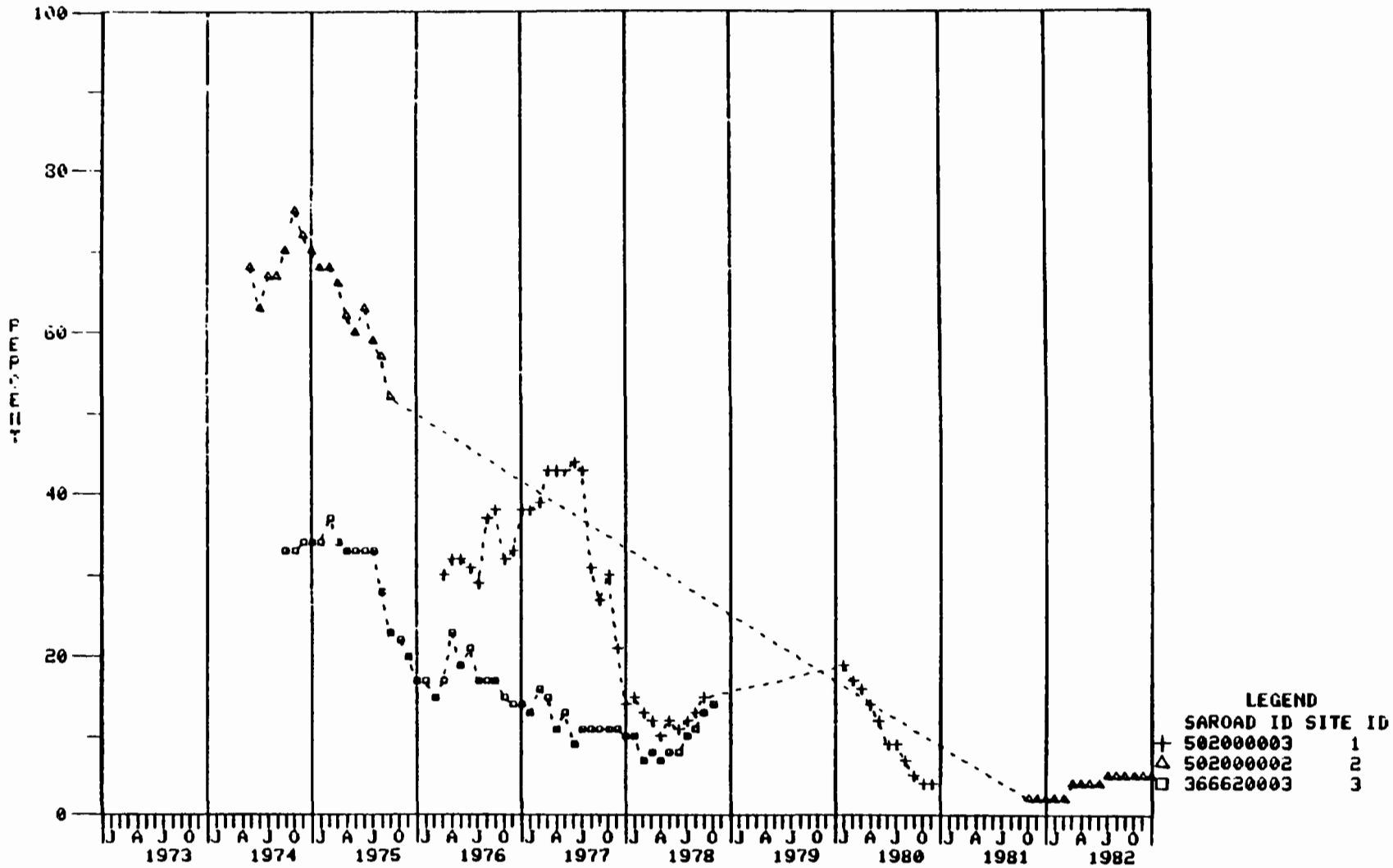
TSP 12 MONTH RUNNING GEOMETRIC MEANS (UG/M**3) FOR NATIONAL STEEL - WEIRTON, WV



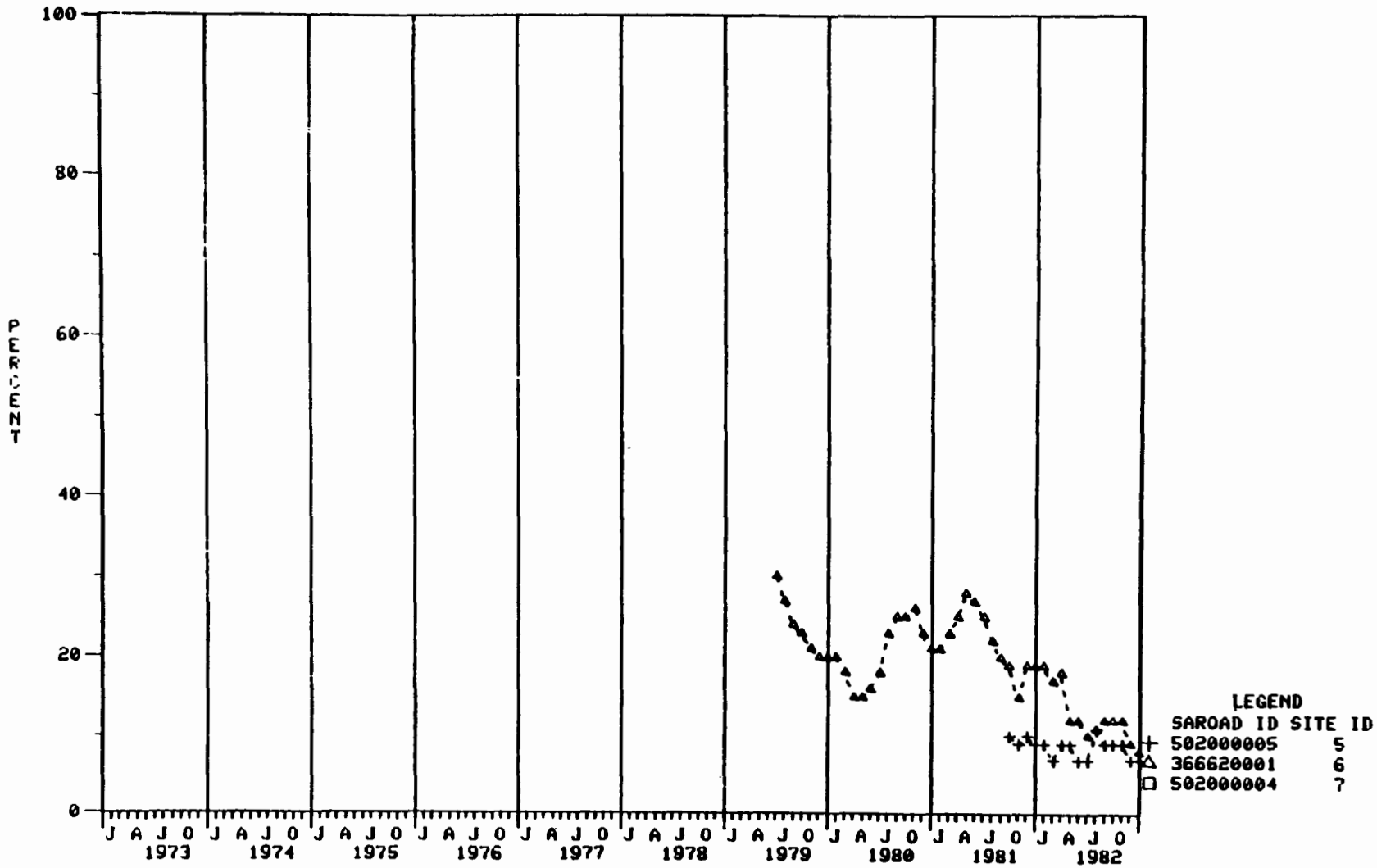
TSP 12 MONTH RUNNING GEOMETRIC MEANS (UG/M**3) FOR NATIONAL STEEL - WEIRTON, WV



TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 150 (UG/M**3) FOR NATIONAL STEEL - WEIRTON, WV



TSF 12 MONTH RUNNING PERCENTAGE OF OBS > 150 (UG/M**3) FOR NATIONAL STEEL - WEIRTON, WV



TSP DATA SUMMARY FOR NATIONAL STEEL - WEIRTON, WV
SAROAD STATION # 502000003 SITE ID # 01
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 0 | 36 | 65 | 37 | 27 | 38 | 43 | 0 | 0 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | ****** | 133.0 | 90.7 | ****** | ****** | 81.1 | ****** | ****** |
| GEOMETRIC S.D.: | ****** | ****** | ****** | ****** | 1.7 | 1.6 | ****** | ****** | 1.3 | ****** | ****** |
| ARITHMETIC MEAN | ****** | ****** | ****** | ****** | 150.5 | 100.5 | ****** | ****** | 84.6 | ****** | ****** |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | ****** | 587.6 | 349.3 | ****** | ****** | 194.1 | ****** | ****** |
| 1ST HIGHEST: | ****** | ****** | ****** | 377.0 | 366.0 | 237.0 | 208.0 | 202.0 | 135.0 | ****** | ****** |
| DATE : | ****** | ****** | ****** | 751119 | 760907 | 770413 | 780408 | 790509 | 800515 | ****** | ****** |
| 2ND HIGHEST: | ****** | ****** | ****** | 344.0 | 361.0 | 194.0 | 185.0 | 167.0 | 133.0 | ****** | ****** |
| DATE : | ****** | ****** | ****** | 751118 | 760413 | 770531 | 780601 | 791018 | 800626 | ****** | ****** |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 6 | 7 | 0 | 0 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 0 | 12 | 25 | 5 | 5 | 7 | 0 | 0 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 0 | 4 | 7 | 12 | 7 | 8 | 12 | 0 | 0 |
| 66-130: | 0 | 0 | 0 | 14 | 25 | 17 | 12 | 20 | 29 | 0 | 0 |
| 131-195: | 0 | 0 | 0 | 10 | 18 | 7 | 7 | 9 | 2 | 0 | 0 |
| 196-260: | 0 | 0 | 0 | 2 | 8 | 1 | 1 | 1 | 0 | 0 | 0 |
| 261-325: | 0 | 0 | 0 | 4 | 5 | 0 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR NATIONAL STEEL - WEIRTON, WV
SAROAD STATION # 502000002 SITE ID # 02
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 38 | 20 | 57 | 28 | 0 | 0 | 0 | 0 | 0 | 53 | 55 |
| GEOMETRIC MEAN: | ****** | ****** | 174.0 | ****** | ****** | ****** | ****** | ****** | ****** | 82.7 | 76.6 |
| GEOMETRIC S.D.: | ****** | ****** | 1.5 | ****** | ****** | ****** | ****** | ****** | ****** | 1.4 | 1.5 |
| ARITHMETIC MEAN | ****** | ****** | 186.8 | ****** | ****** | ****** | ****** | ****** | ****** | 87.9 | 83.2 |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | 554.9 | ****** | ****** | ****** | ****** | ****** | ****** | 235.8 | 256.8 |
| 1ST HIGHEST: | 307.0 | 278.0 | 370.0 | 450.0 | ****** | ****** | ****** | ****** | ****** | 207.0 | 179.0 |
| DATE : | 720607 | 730910 | 740909 | 750220 | ****** | ****** | ****** | ****** | ****** | 810522 | 820324 |
| 2ND HIGHEST: | 295.0 | 234.0 | 345.0 | 351.0 | ****** | ****** | ****** | ****** | ****** | 138.0 | 177.0 |
| DATE : | 720824 | 730827 | 740708 | 750123 | ****** | ****** | ****** | ****** | ****** | 810422 | 820716 |
| # OF READINGS EXCEEDING 260 : | 4 | 1 | 6 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 18 | 11 | 40 | 15 | 0 | 0 | 0 | 0 | 0 | 1 | 3 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 3 | 1 | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 13 | 20 |
| 66-130: | 12 | 5 | 13 | 8 | 0 | 0 | 0 | 0 | 0 | 37 | 32 |
| 131-195: | 15 | 5 | 16 | 9 | 0 | 0 | 0 | 0 | 0 | 2 | 3 |
| 196-260: | 4 | 8 | 20 | 6 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 261-325: | 4 | 1 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR NATIONAL STEEL - WEIRTON, WV
SAROAD STATION # 366620003 SITE ID # 03
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 60 | 52 | 56 | 61 | 33 | 0 | 0 | 0 | 0 |
| GEOMETRIC MEAN: | ****** | ****** | 101.3 | 93.6 | 81.9 | 71.6 | ****** | ****** | ****** | ****** | ****** |
| GEOMETRIC S.D.: | ****** | ****** | 1.7 | 1.7 | 1.8 | 1.7 | ****** | ****** | ****** | ****** | ****** |
| ARITHMETIC MEAN | ****** | ****** | 118.1 | 107.1 | 96.2 | 83.3 | ****** | ****** | ****** | ****** | ****** |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | 521.7 | 429.5 | 439.0 | 364.0 | ****** | ****** | ****** | ****** | ****** |
| 1ST HIGHEST: | ****** | ****** | 440.0 | 289.0 | 263.0 | 227.0 | 211.0 | ****** | ****** | ****** | ****** |
| DATE : | ****** | ****** | 740803 | 750723 | 760418 | 770419 | 780520 | ****** | ****** | ****** | ****** |
| 2ND HIGHEST: | ****** | ****** | 266.0 | 266.0 | 252.0 | 205.0 | 203.0 | ****** | ****** | ****** | ****** |
| DATE : | ****** | ****** | 740920 | 750717 | 760406 | 770212 | 780713 | ****** | ****** | ****** | ****** |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 2 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 18 | 9 | 8 | 6 | 6 | 0 | 0 | 0 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 11 | 13 | 20 | 25 | 17 | 0 | 0 | 0 | 0 |
| 66-130: | 0 | 0 | 26 | 28 | 22 | 28 | 9 | 0 | 0 | 0 | 0 |
| 131-195: | 0 | 0 | 16 | 6 | 10 | 5 | 4 | 0 | 0 | 0 | 0 |
| 196-260: | 0 | 0 | 5 | 3 | 3 | 3 | 3 | 0 | 0 | 0 | 0 |
| 261-325: | 0 | 0 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR NATIONAL STEEL - WEIRTON, WV
SAROAD STATION # 502000005 SITE ID # 05
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 54 | 59 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 67.4 | 61.0 |
| GEOMETRIC S.D.: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 1.8 | 1.8 |
| ARITHMETIC MEAN | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 79.8 | 71.4 |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 366.8 | 328.6 |
| 1ST HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 248.0 | 181.0 |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 810215 | 820716 |
| 2ND HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 185.0 | 173.0 |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 810504 | 820505 |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 4 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 27 | 33 |
| 66-130: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 17 | 19 |
| 131-195: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 7 |
| 196-260: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR NATIONAL STEEL - WEIRTON, WV
SAROAD STATION # 366620001 SITE ID # 06
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 0 | 0 | 0 | 0 | 15 | 61 | 61 | 58 | 59 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 98.3 | 103.7 | 89.1 | 77.1 |
| GEOMETRIC S.D.: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 1.7 | 1.6 | 1.7 | 1.6 |
| ARITHMETIC MEAN | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 112.4 | 114.8 | 101.2 | 84.6 |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 461.3 | 392.0 | 419.6 | 284.9 |
| 1ST HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | 464.0 | 329.0 | 299.0 | 257.0 | 181.0 |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | 781104 | 790220 | 800620 | 810522 | 820505 |
| 2ND HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | 180.0 | 285.0 | 258.0 | 194.0 | 167.0 |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | 781023 | 790509 | 800912 | 810422 | 820716 |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 12 | 13 | 11 | 4 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 13 | 10 | 14 | 17 |
| 66-130: | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 29 | 33 | 27 | 35 |
| 131-195: | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 13 | 11 | 16 | 7 |
| 196-260: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 6 | 1 | 0 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR NATIONAL STEEL - WEIRTON, WV
SAROAD STATION # 502000004 SITE ID # 07
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 27 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| GEOMETRIC S.D.: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| ARITHMETIC MEAN | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** |
| 1ST HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 237.0 |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 820716 |
| 2ND HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 179.0 |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 820710 |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 |
| 66-130: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 |
| 131-195: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| 196-260: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

24-HR STANDARD EXCEEDANCE ROSE FOR
NATIONAL STEEL - WEIRTON, WV
(ALL CASES > 260 UG/M**3)
X=0.850
COUNT/AVERAGE TSP OF PRIMARY EXCEEDANCES

| SAROAD # | 502000003 | | 502000002 | | 366620003 | | 502000005 | | 366620001 | | 502000004 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SITE ID # | 1 | | 2 | | 3 | | 5 | | 6 | | 7 | |
| DIRECTION | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X |
| N COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| NNE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| NE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| ENE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 464. | 0. | 0. |
| E COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| ESE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| SE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 329. | 0. | 0. |
| SSE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| SSW COUNT: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 440. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| SW COUNT: | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 320. | 370. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| WSW COUNT: | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 300. | 0. | 0. | 266. | 0. | 0. | 0. | 0. | 0. | 0. |
| W COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 299. | 0. | 0. |
| WNW COUNT: | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 304. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| NW COUNT: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 281. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| NNW COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| ALL COUNT: | 0 | 0 | 3 | 3 | 1 | 1 | 0 | 0 | 0 | 3 | 0 | 0 |
| AVE TSP: | 0. | 0. | 300. | 326. | 440. | 266. | 0. | 0. | 0. | 364. | 0. | 0. |

24-HR STANDARD EXCEEDANCE ROSE FOR
NATIONAL STEEL - WEIRTON, WV
(ALL CASES > 150 UG/M**3)
X=0.850
COUNT/AVERAGE TSP OF SECONDARY EXCEEDANCES

| SARCAD # | 502000003 | | 502000002 | | 366620003 | | 502000005 | | 366620001 | | 502000004 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SITE ID # | 1 | | 2 | | 3 | | 5 | | 6 | | 7 | |
| DIRECTION | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X |
| N COUNT: | 0 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 |
| AVE TSP: | 0. | 174. | 0. | 184. | 0. | 160. | 0. | 176. | 0. | 173. | 0. | 0. |
| NNE COUNT: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 249. | 0. | 0. | 0. | 0. | 0. | 232. | 0. | 0. |
| NE COUNT: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 180. | 0. | 0. | 0. | 0. | 0. | 156. | 0. | 0. |
| ENE COUNT: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 160. | 0. | 0. | 0. | 464. | 0. | 179. |
| E COUNT: | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 174. | 0. | 156. | 0. | 0. | 0. | 0. | 0. | 0. |
| ESE COUNT: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 7 | 0 | 1 |
| AVE TSP: | 0. | 0. | 0. | 177. | 0. | 0. | 0. | 215. | 0. | 191. | 0. | 237. |
| SE COUNT: | 3 | 3 | 1 | 0 | 4 | 4 | 0 | 1 | 6 | 7 | 0 | 0 |
| AVE TSP: | 168. | 172. | 211. | 0. | 189. | 191. | 0. | 185. | 175. | 202. | 0. | 0. |
| SSE COUNT: | 0 | 2 | 0 | 1 | 1 | 2 | 0 | 1 | 1 | 3 | 0 | 0 |
| AVE TSP: | 0. | 174. | 0. | 179. | 227. | 191. | 0. | 151. | 192. | 180. | 0. | 0. |
| S COUNT: | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 3 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 168. | 176. | 0. | 174. | 0. | 156. | 0. | 0. |
| SSW COUNT: | 0 | 1 | 3 | 7 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 237. | 201. | 207. | 440. | 176. | 0. | 0. | 0. | 0. | 0. | 0. |
| SW COUNT: | 0 | 0 | 4 | 3 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| AVE TSP: | 0. | 0. | 234. | 262. | 155. | 0. | 0. | 0. | 0. | 174. | 0. | 0. |
| WSW COUNT: | 0 | 0 | 4 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 237. | 183. | 217. | 266. | 0. | 0. | 0. | 0. | 0. | 0. |
| W COUNT: | 1 | 0 | 0 | 3 | 0 | 2 | 0 | 1 | 0 | 2 | 0 | 0 |
| AVE TSP: | 151. | 0. | 0. | 210. | 0. | 190. | 0. | 168. | 0. | 278. | 0. | 0. |
| WNW COUNT: | 1 | 0 | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 2 | 0 | 0 |
| AVE TSP: | 152. | 0. | 0. | 304. | 0. | 165. | 0. | 0. | 0. | 169. | 0. | 0. |
| NW COUNT: | 1 | 1 | 4 | 1 | 3 | 0 | 0 | 2 | 0 | 2 | 0 | 1 |
| AVE TSP: | 208. | 164. | 216. | 247. | 178. | 0. | 0. | 170. | 0. | 167. | 0. | 157. |
| NNW COUNT: | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 |
| AVE TSP: | 0. | 0. | 168. | 170. | 0. | 0. | 0. | 0. | 0. | 176. | 0. | 0. |
| ALL COUNT: | 6 | 9 | 17 | 25 | 12 | 17 | 0 | 9 | 7 | 33 | 0 | 3 |
| AVE TSP: | 169. | 179. | 219. | 216. | 208. | 184. | 0. | 180. | 177. | 198. | 0. | 191. |

AIR QUALITY EVALUATION - NATIONAL STEEL, WEIRTON, WEST VIRGINIA

Air quality trends:

All six stations indicate downward trends in geometric means of TSP. Due to their close proximity, stations #1 and #2 can be treated as one site; the largest portion of the decline at this location occurred between 1975 and 1978, with only a slight decline having occurred between 1980 and 1982. Spearman rank correlation coefficients ranged from -0.97 for station #3 to -0.81 for station #6.

Substantial decreases in the percentage of observations exceeding 150 $\mu g/m^3$ are evident at stations #1, #2, #3, and #6.

Standard exceedance status:

The station #1/#2 combination remained in violation of the primary annual TSP standard through 1982. Station #3 indicated no violations of the primary annual standard in 1977, but the station was shut down in 1978. However, station #6, which replaced #3, indicated violation of the primary annual standard in 1979 through 1982.

Pollution roses:

The only stations indicating mill impacts are stations #2 and #7. It is uncertain whether the mill actually has little impact on other stations or whether the roses show this result due to complex wind flow in the valley regime in which the mill and stations are located.

Standard exceedance roses:

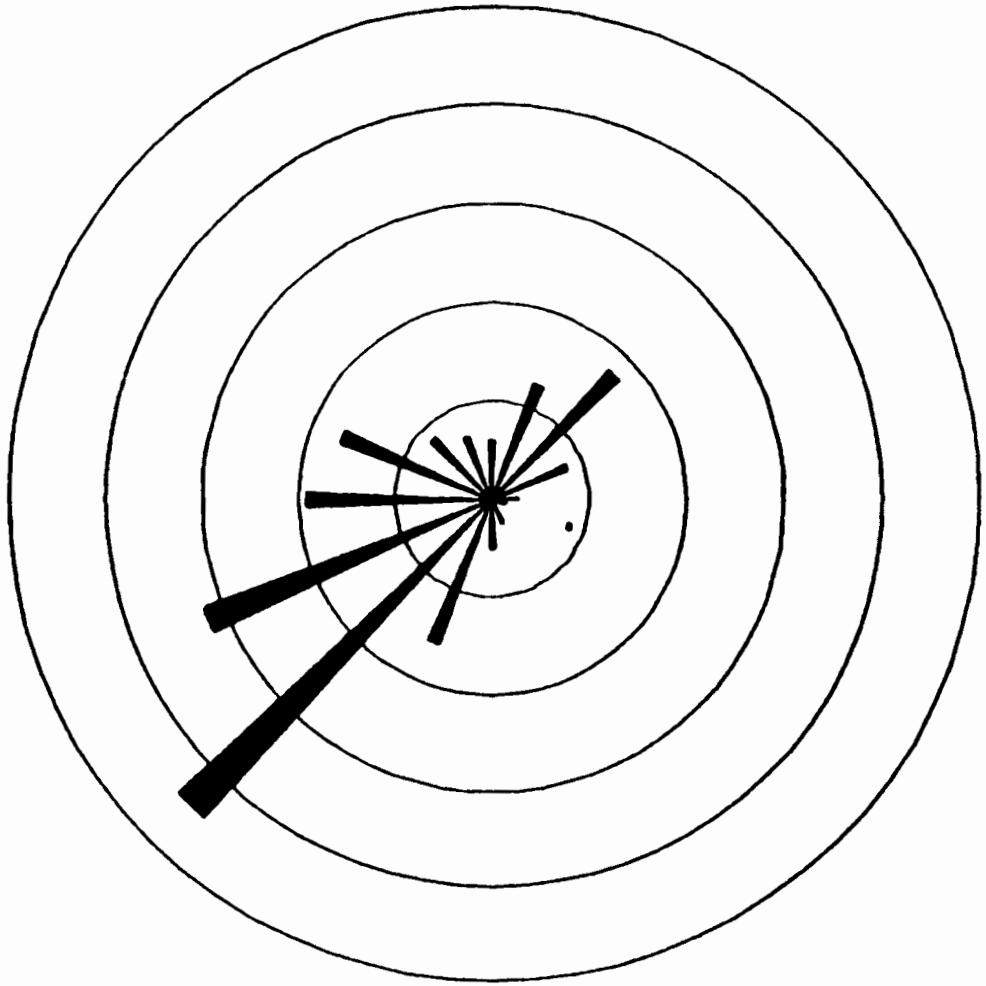
One case of primary 24-hour standard exceedance at each of stations #2 and #3 can be directly related to the mill based on wind direction.

Inhalable particulate matter:

Station #2 samples IP as part of the EPA IP Network. Data for this site are summarized below:

| Year | Instrument | # of Obs. | Arithmetic Mean | Highest | Second Highest | Standard Deviation |
|---|---|---|---|---|---|---|
| 1981 | DICHOT | 18 | 41.1 | 72.6 | 67.6 | 19.7 |
| 1982 | DICHOT | 36 | 52.1 | 130.0 | 92.2 | 21.3 |

WIND ROSE
PERSISTENCE CLASS 0.75
WIND STATION 366420012



NATIONAL STEEL
Granite City
Madison County
Illinois
EPA Region V

Hi-Vol Monitoring Sites--National Steel, Granite City, Illinois

| Site ID Number | SAROAD Number | Site Name and Address | Plant Location from Site: Facility/ Bearing (°) | Plant Location from Site: Distance (km) | Elevation (m): Above Ground | Elevation (m): Above MSL | Elevation (m): Above Plant | Site Description | Nearest Roadway: Name | Nearest Roadway: Direction | Nearest Roadway: Distance (m) | Nearest Roadway: Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 14-2960-006 | City Hall<br>2000 Edison Ave.<br>Granite City, IL | Coke plant 106<br>Blast furnaces 115<br>Sinter plant 125<br>BOF 140 | 2.3<br>2.0<br>1.9<br>1.2 | 8 | 130 | 3 | Roof | Edison Ave. | SE | 15 | H |
| 2 | 14-2960-007-F01 | Fire Station #1<br>23d & Madison<br>Granite City, IL | Coke plant 120<br>Blast furnaces 140<br>Sinter plant 152<br>BOF 186 | 1.7<br>1.5<br>1.5<br>1.2 | 8 | 126 | 2 | Roof<br>Center city-industrial | 23d St.<br>Madison Ave. | SW<br>NW | 15<br>15 | M<br>H |
| 3* | 14-2960-008 | Lake School<br>2301 E. 23d St.<br>Granite City, IL | Coke plant 230<br>Blast furnaces 230<br>Sinter plant 230<br>BOF 248 | 1.0<br>1.5<br>2.0<br>2.5 | 4 | 126 | 0 | Roof | 23d St. | SW | 30 | H |
| 4 | 14-2960-009-F01 | Dallas Residence<br>2001 E. 20th St.<br>Granite City, IL | Coke plant 85<br>Blast furnaces 95<br>Sinter plant 115<br>BOF 180-270 | 1.6<br>1.3<br>0.8<br>0.1 | 5 | 126 | 0 | Roof<br>Center city-industrial | 20th St. | NW | 9 | M |
| 5 | 14-2960-010-F01 | Air Products<br>15th & Madison<br>Granite City, IL | Coke plant 85<br>Blast furnaces 90<br>Sinter plant 98<br>BOF 90 | 2.7<br>2.3<br>2.0<br>1.2 | 8 | 126 | 0 | Roof<br>Center city-industrial | 15th St.<br>Madison Ave. | SW<br>SE | 30<br>30 | L<br>H |
| 6* | 14-2960-011 | Fire Station #2<br>Roosevelt Ave. &<br>Rock Rd.<br>Granite City, IL | Coke plant 118<br>Blast furnaces 123<br>Sinter plant 130<br>BOF 90 | 3.6<br>3.5<br>3.4<br>1.2 | 3 | 126 | 0 | Roof | Roosevelt Ave.<br>Rock Rd. | U | U | U |
| 7 | 14-2960-014-F02 | Switchman's Shack<br>Norfolk & Western RR.<br>Yard<br>Granite City, IL | Coke plant 20<br>Blast furnaces 330<br>Sinter plant 270<br>BOF 285 | 0.6<br>0.3<br>0.4<br>2.5 | 3 | 126 | 0 | Roof<br>Rural-industrial | Dirt rd. | W | 15 | L |
| 8* | 14-2960-015 | Frohardt School<br>Johnson Ave.<br>Granite City, IL | Coke plant 196<br>Blast furnaces 200<br>Sinter plant 202<br>BOF 214 | 2.9<br>3.3<br>3.6<br>3.8 | 5 | 128 | 5 | Roof | Johnson Ave. | N | 25 | L |
| 9 | 14-2960-016-F01 | Fruit Stand of Nameoki<br>23d St. & Nameoki Rd.<br>Granite City, IL | Coke plant 190<br>Blast furnaces 215<br>Sinter plant 215<br>BOF 245 | 0.5<br>1.0<br>1.5<br>1.8 | 5 | 126 | 0 | Roof<br>Center city-industrial | 23d St.<br>Nameoki Rd. | N<br>W | 120<br>120 | M<br>M |
| 10 | 14-2960-019-F05 | 20th & Adams<br>Granite City, IL | Coke plant 108<br>Blast furnaces 117<br>Sinter plant 125<br>BOF 138 | 2.8<br>2.5<br>2.5<br>1.5 | 6.4 | 129.5 | 3 | Roof<br>Center city-industrial | Adams St.<br>20th St. | SE<br>NE | 35<br>45 | 1,000 ADT<br>7,000 ADT |

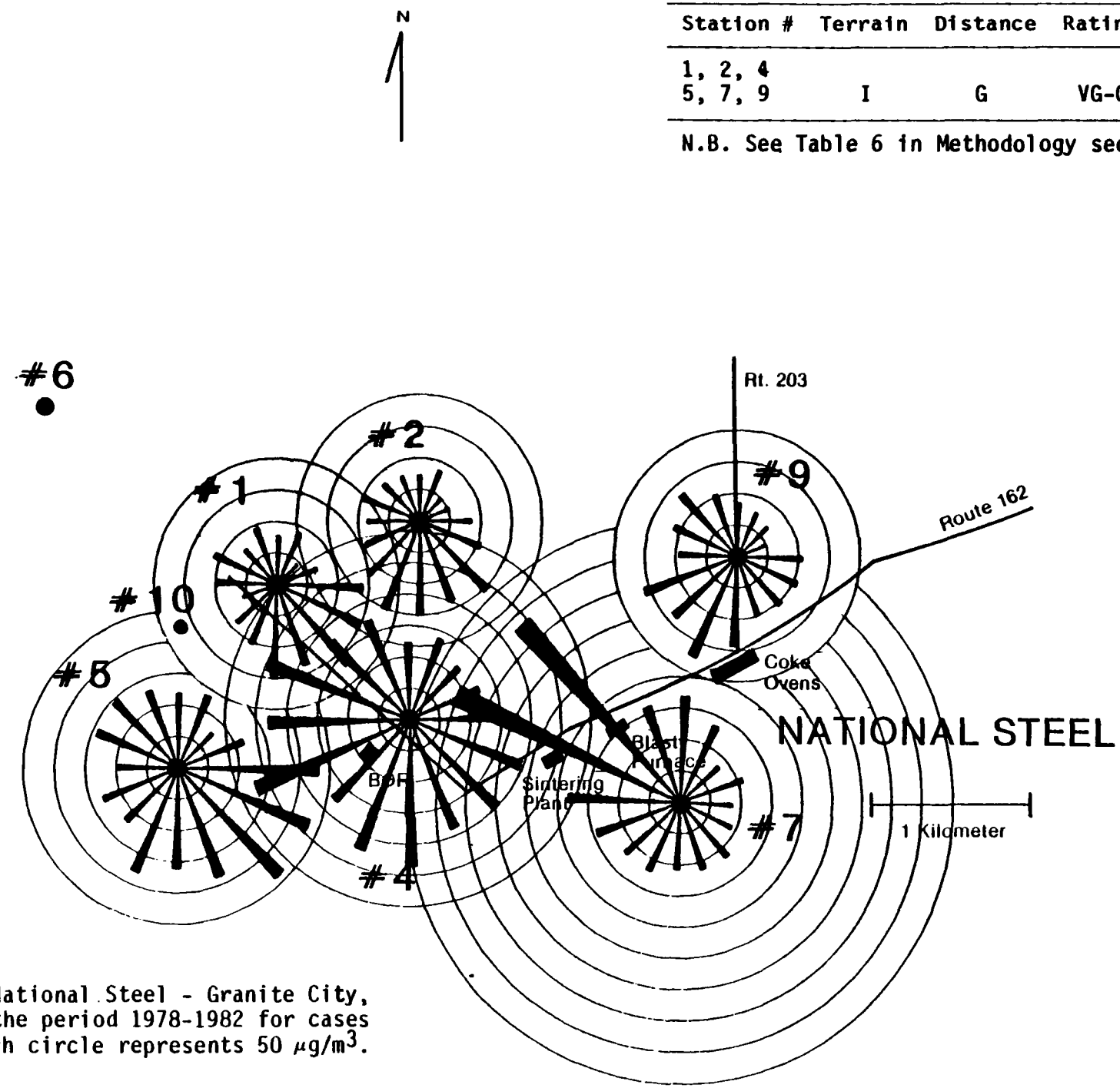
Key: U = Unavailable M = Moderate ADT = Average daily traffic
L = Light H = Heavy

* Data from this station were included in the original 1973-1977 analysis; however, no strong mill impact on TSP was noted at this site. Based on the likelihood that this situation has not changed, data from this site were not employed in the 1978-1980 or the 1981-1982 updates.

Wind Data Representativeness

| Station # | Terrain | Distance | Rating |
|---|---|---|---|
| 1, 2, 4<br>5, 7, 9 | I | G | VG-G |

N.B. See Table 6 in Methodology section.



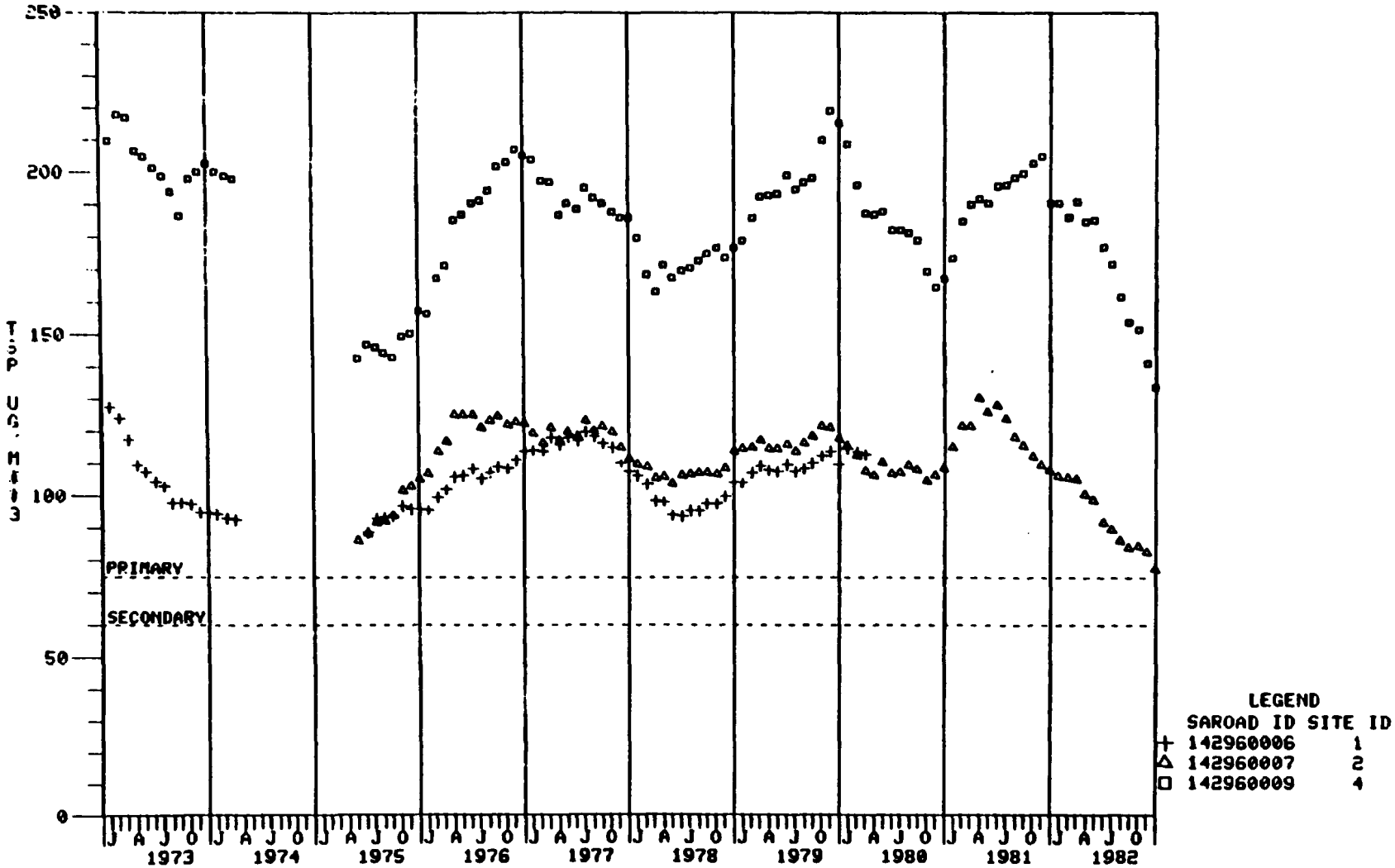

TSP roses for National Steel - Granite City, Illinois, for the period 1978-1982 for cases of $\omega>0.85$. Each circle represents 50 $\mu g/m^3$.

NUMBER OF TSP OBSERVATIONS USED IN POLLUTION ROSES

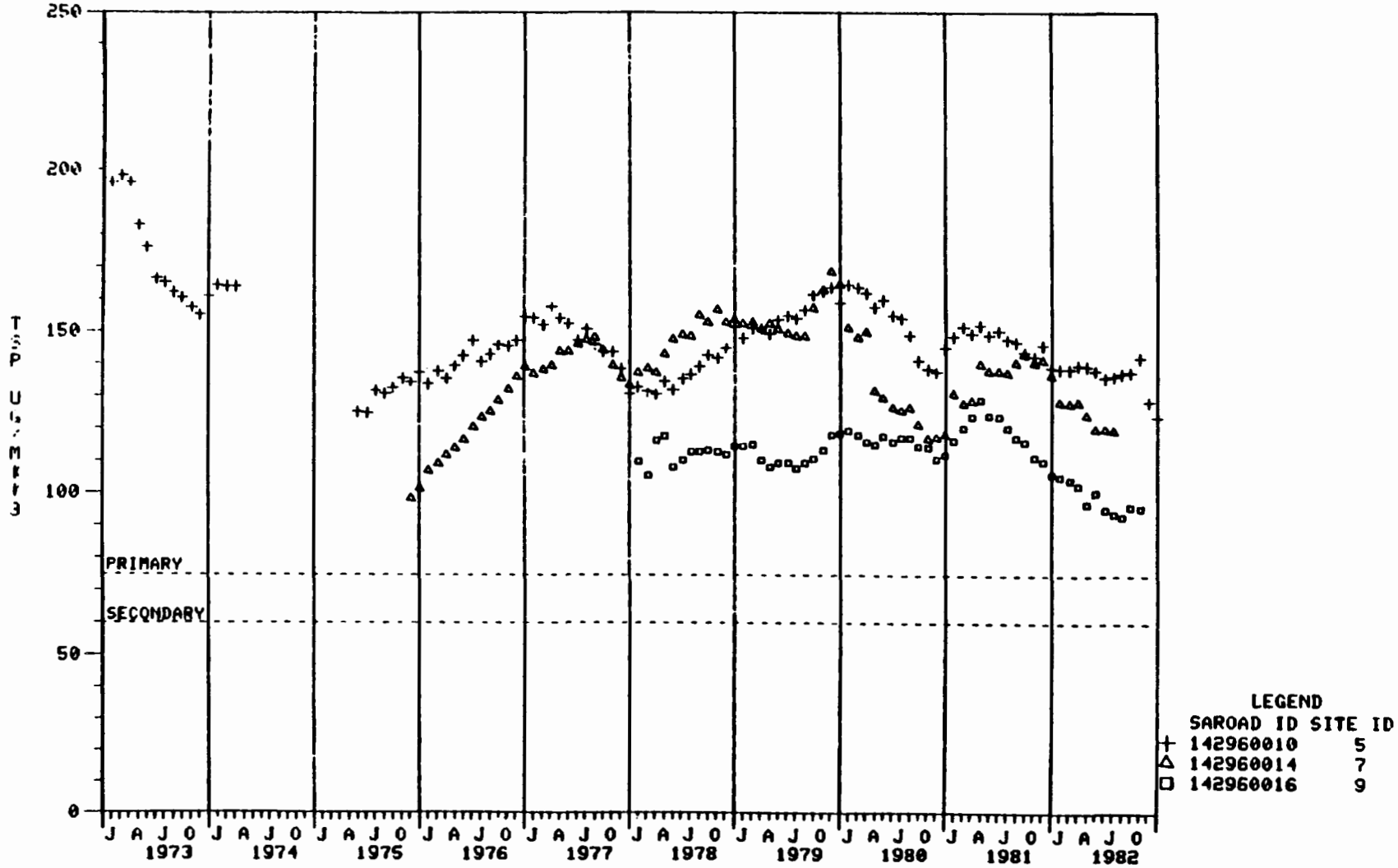
National Steel--Granite City, IL

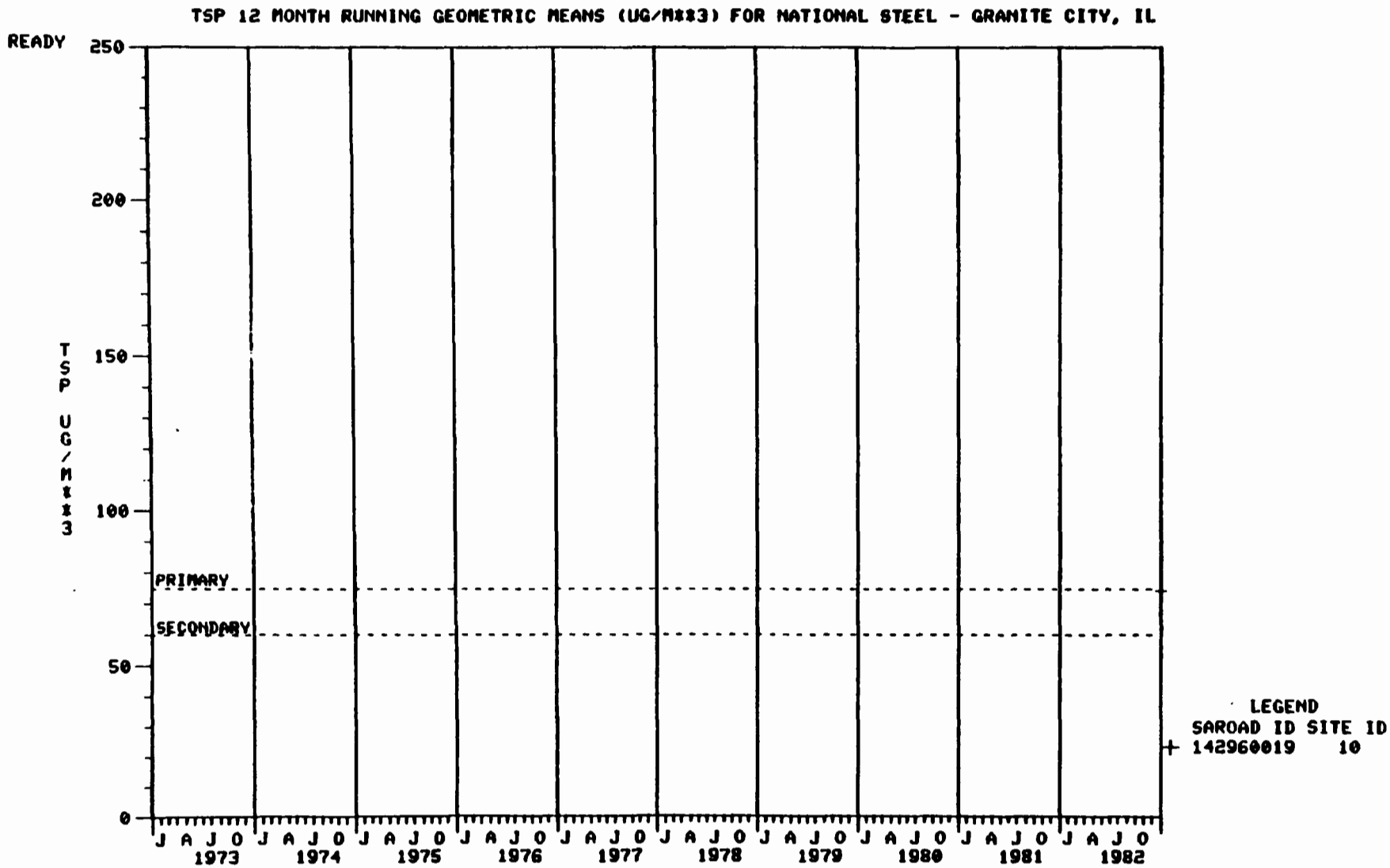
| Wind Direction | Monitoring Site Numbers | | | | | | |
|---|---|---|---|---|---|---|---|
| | #1 | #2 | #4 | #5 | #7 | #9 | #10 |
| N | 3 | 10 | 15 | 12 | 10 | 11 | 2 |
| NNE | 1 | 7 | 10 | 7 | 5 | 5 | 2 |
| NE | 2 | 2 | 4 | 2 | 2 | 2 | 0 |
| ENE | 2 | 2 | 3 | 2 | 2 | 2 | 0 |
| E | 1 | 4 | 6 | 4 | 4 | 5 | 1 |
| ESE | 4 | 7 | 14 | 9 | 9 | 10 | 1 |
| SE | 8 | 18 | 18 | 17 | 15 | 15 | 2 |
| SSE | 5 | 24 | 31 | 25 | 18 | 20 | 7 |
| S | 7 | 33 | 39 | 34 | 24 | 30 | 7 |
| SSW | 2 | 5 | 7 | 6 | 6 | 6 | 1 |
| SW | 2 | 4 | 3 | 4 | 4 | 4 | 0 |
| WSW | 1 | 4 | 5 | 4 | 4 | 5 | 0 |
| W | 3 | 14 | 20 | 14 | 11 | 11 | 3 |
| WNW | 8 | 16 | 21 | 17 | 16 | 17 | 1 |
| NW | 8 | 11 | 17 | 11 | 7 | 12 | 2 |
| NNW | 2 | 5 | 6 | 4 | 5 | 5 | 1 |
| Total | 59 | 166 | 219 | 172 | 142 | 160 | 30 |

TSP 12 MONTH RUNNING GEOMETRIC MEANS (UG/M**3) FOR NATIONAL STEEL - GRANITE CITY, IL

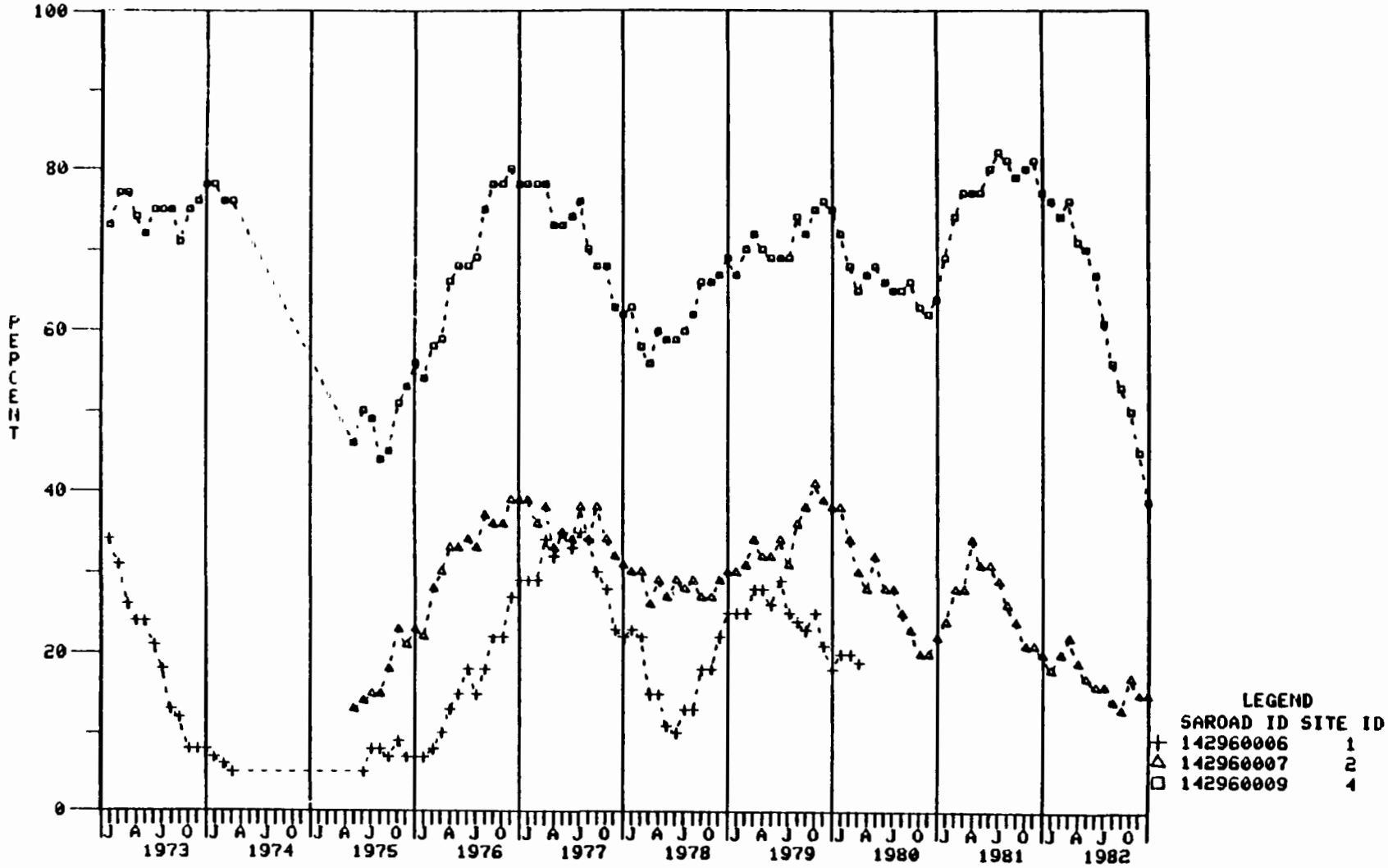


TSP 12 MONTH RUNNING GEOMETRIC MEANS (UG/M**3) FOR NATIONAL STEEL - GRANITE CITY, IL

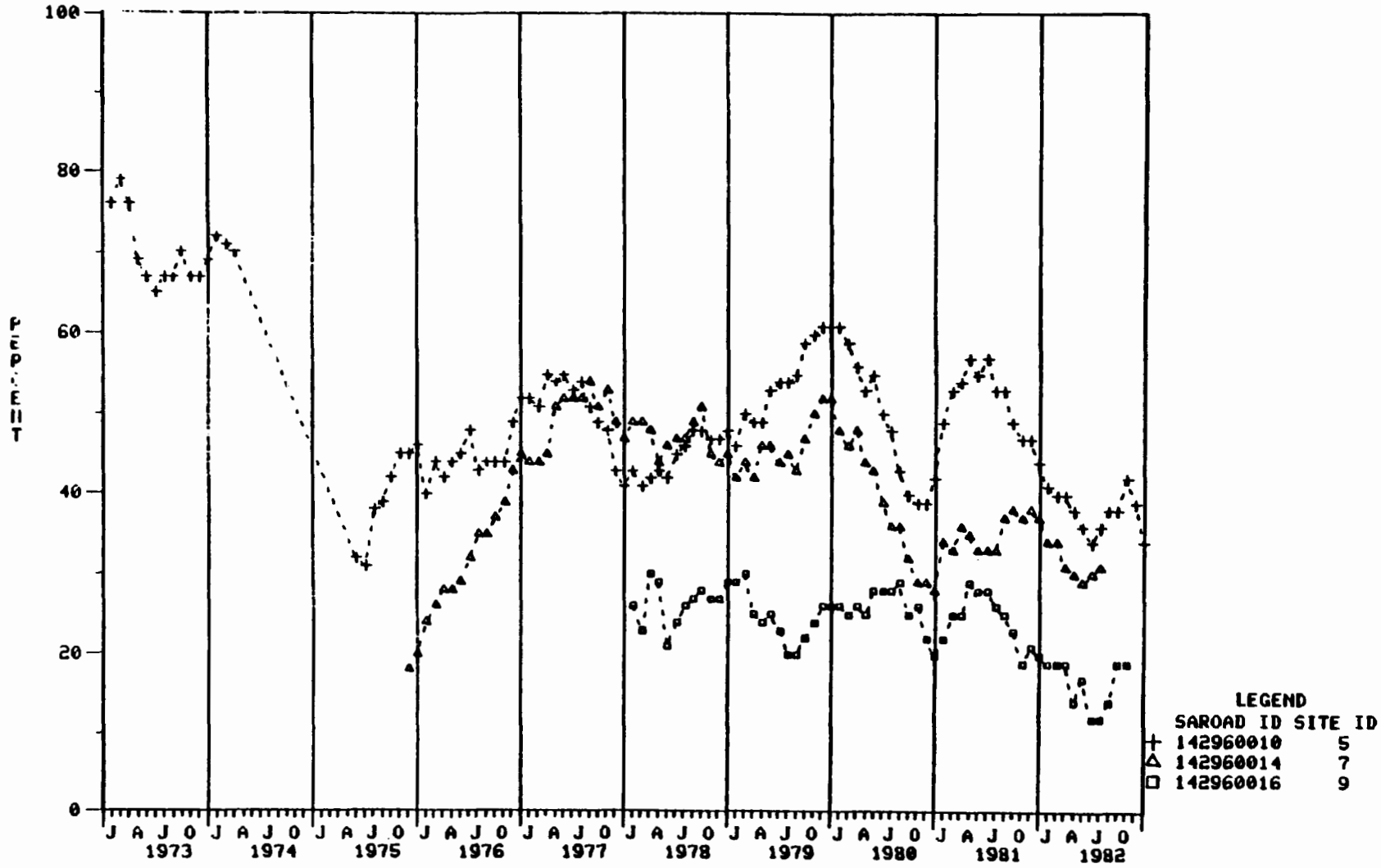



TSP 12 MONTH RUNNING GEOMETRIC MEANS (UG/M**3) FOR NATIONAL STEEL - GRANITE CITY, IL
READY
TSP UG/M**3
250
200
150
100
50
0
PRIMARY
SECONDARY
J A J O
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
LEGEND
SAROAD ID SITE ID
142960019 10

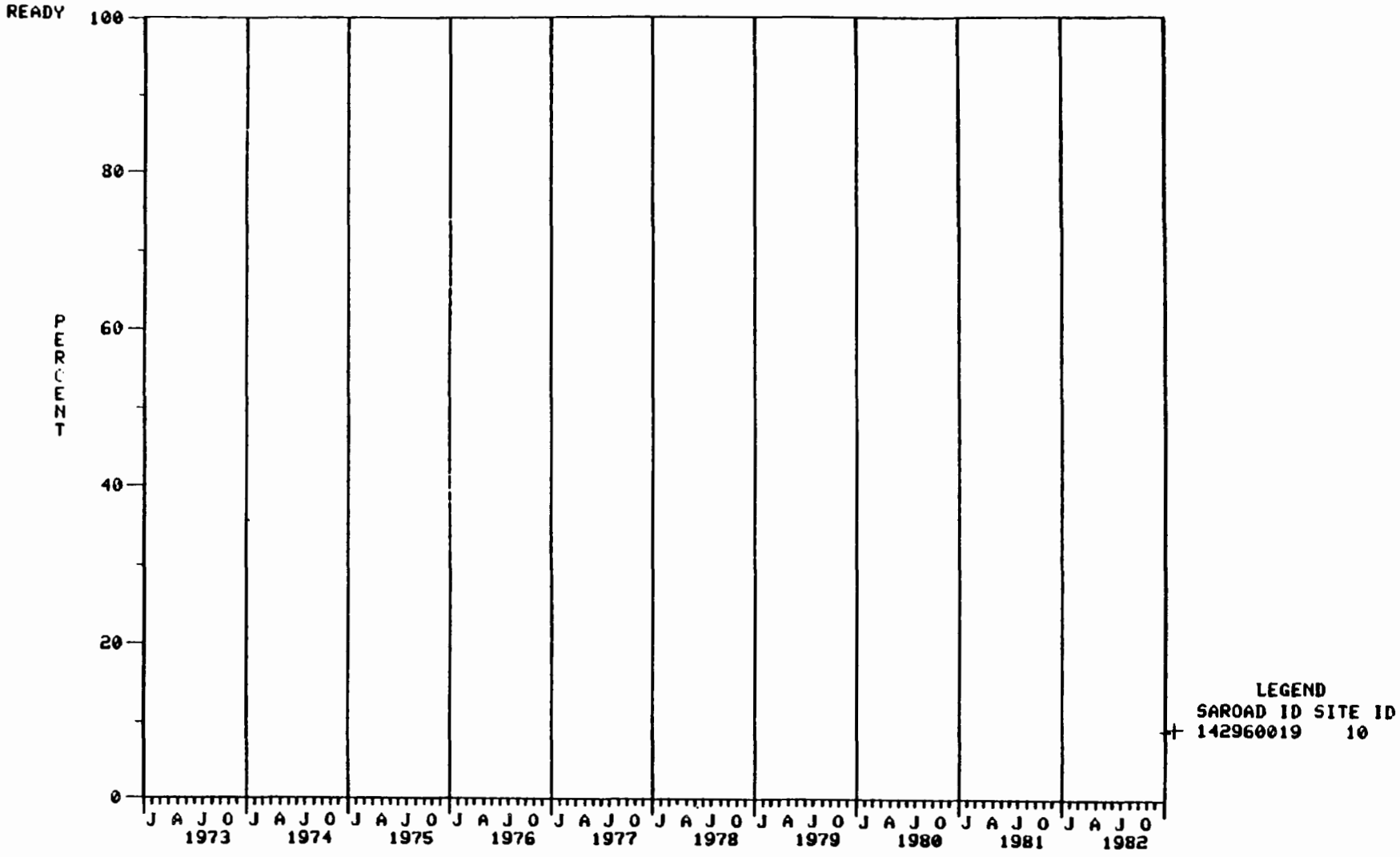
TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 150 (UG/M**3) FOR NATIONAL STEEL - GRANITE CITY, IL



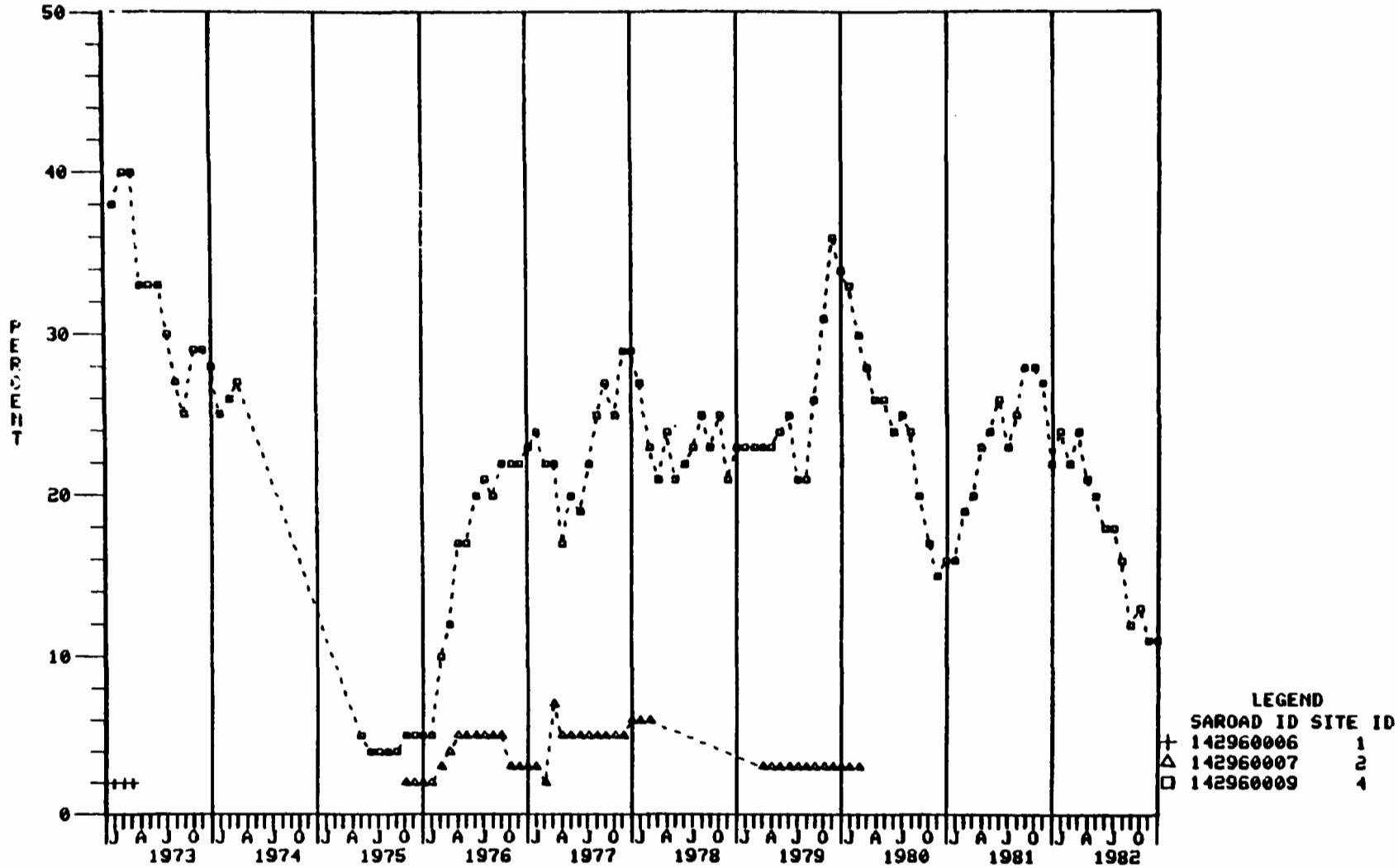
TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 150 (UG/M**3) FOR NATIONAL STEEL - GRANITE CITY, IL



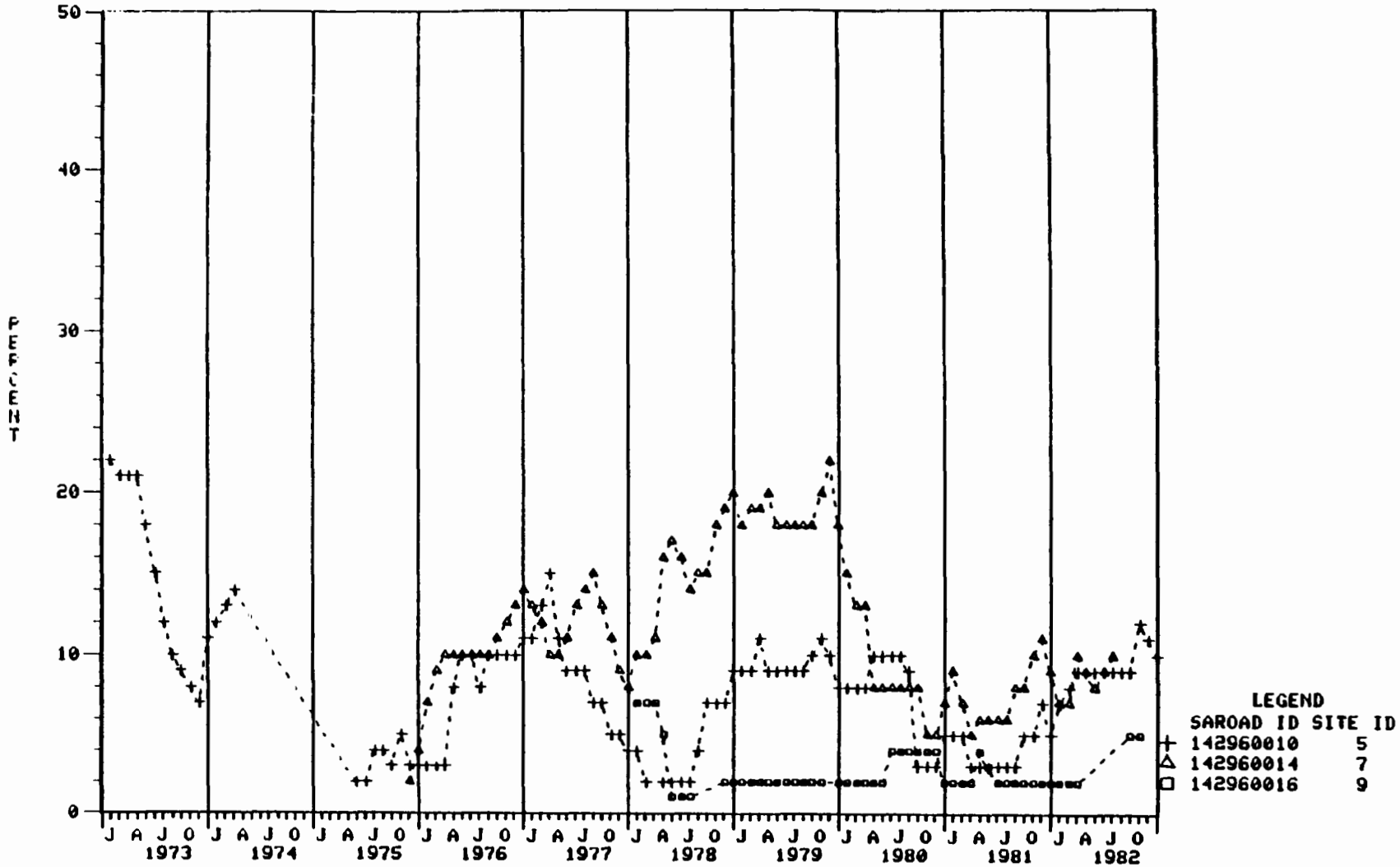
TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 150 (UG/M**3) FOR NATIONAL STEEL - GRANITE CITY, IL



TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 260 (UG/M**3) FOR NATIONAL STEEL - GRANITE CITY, IL

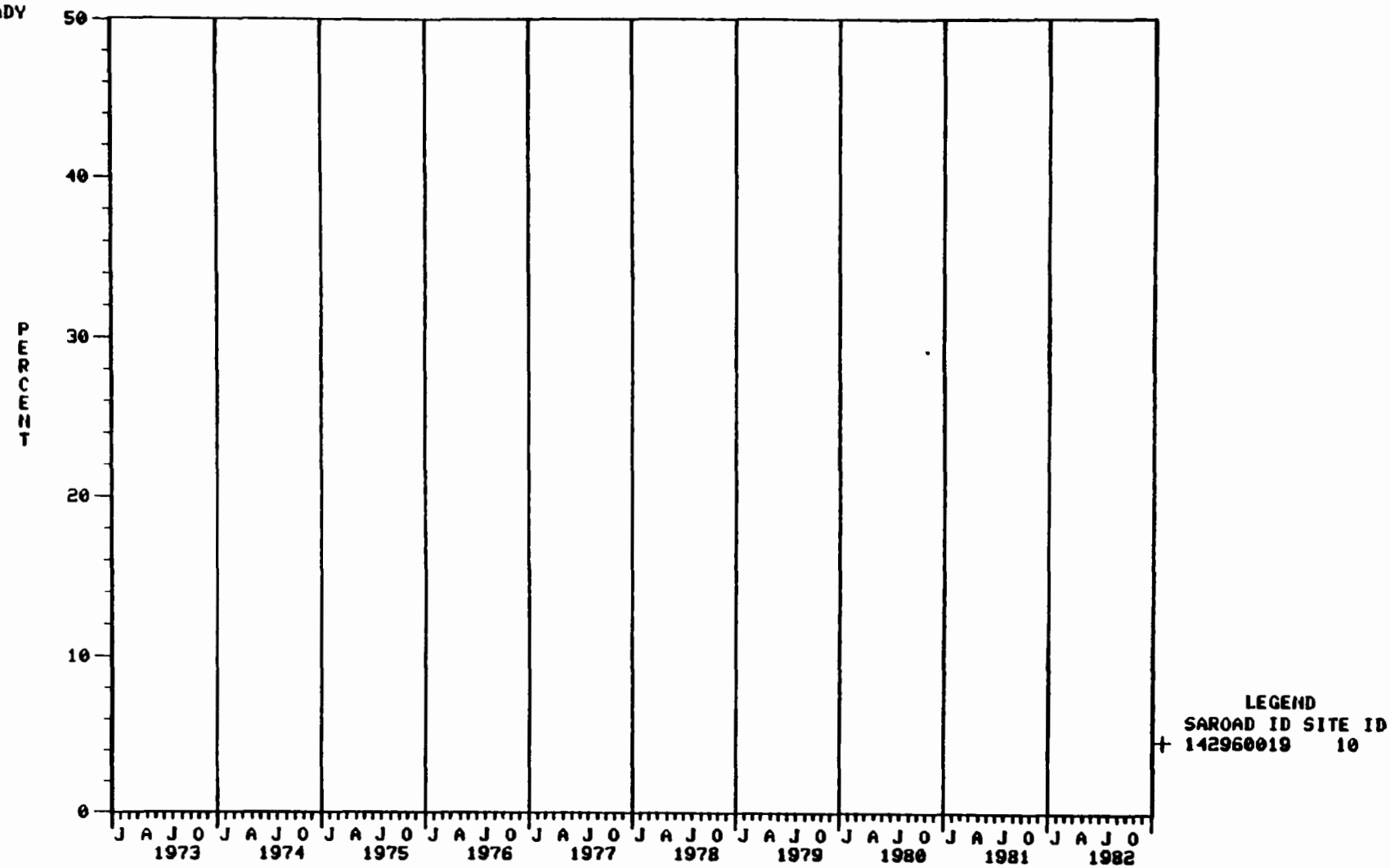


TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 260 (UG/M**3) FOR NATIONAL STEEL - GRANITE CITY, IL



TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 260 (UG/M**3) FOR NATIONAL STEEL - GRANITE CITY, IL

READY



TSP DATA SUMMARY FOR NATIONAL STEEL - GRANITE CITY, IL
SAROAD STATION # 142960006 SITE ID # 01
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 58 | 59 | 17 | 56 | 59 | 59 | 55 | 56 | 0 | 0 | 0 |
| GEOMETRIC MEAN: | 127.9 | 95.0 | ****** | 96.1 | 113.9 | 107.8 | 104.5 | 109.8 | ****** | ****** | ****** |
| GEOMETRIC S.D.: | 1.5 | 1.4 | ****** | 1.5 | 1.5 | 1.5 | 1.6 | 1.5 | ****** | ****** | ****** |
| ARITHMETIC MEAN | 137.1 | 99.8 | ****** | 103.2 | 121.7 | 115.9 | 114.1 | 118.1 | ****** | ****** | ****** |
| HIGHEST BY LARSEN EXTRP: | 391.3 | 241.1 | ****** | 307.8 | 341.6 | 337.0 | 380.6 | 341.1 | ****** | ****** | ****** |
| 1ST HIGHEST: | 282.0 | 196.0 | 219.0 | 199.0 | 225.0 | 238.0 | 197.0 | 239.0 | ****** | ****** | ****** |
| DATE : | 720427 | 730709 | 741008 | 751003 | 760430 | 770308 | 780408 | 790912 | ****** | ****** | ****** |
| 2ND HIGHEST: | 257.0 | 184.0 | 168.0 | 177.0 | 221.0 | 231.0 | 192.0 | 222.0 | ****** | ****** | ****** |
| DATE : | 720831 | 730116 | 741107 | 751009 | 761015 | 770314 | 780526 | 790316 | ****** | ****** | ****** |
| # OF READINGS EXCEEDING 260 : | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 20 | 5 | 2 | 4 | 17 | 13 | 13 | 10 | 0 | 0 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 4 | 9 | 6 | 10 | 5 | 5 | 8 | 5 | 0 | 0 | 0 |
| 66-130: | 25 | 42 | 6 | 34 | 30 | 35 | 29 | 33 | 0 | 0 | 0 |
| 131-195: | 23 | 7 | 4 | 11 | 20 | 16 | 17 | 12 | 0 | 0 | 0 |
| 196-260: | 5 | 1 | 1 | 1 | 4 | 3 | 1 | 6 | 0 | 0 | 0 |
| 261-325: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR NATIONAL STEEL - GRANITE CITY, IL
SAROAD STATION # 142960007 SITE ID # 02
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 20 | 53 | 59 | 54 | 61 | 61 | 50 | 61 | 53 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | 105.4 | 122.8 | 111.6 | 114.1 | 117.9 | 108.7 | 107.7 | 77.6 |
| GEOMETRIC S.D.: | ****** | ****** | ****** | 1.6 | 1.6 | 1.7 | 1.5 | 1.6 | 1.5 | 1.5 | 1.6 |
| ARITHMETIC MEAN | ****** | ****** | ****** | 116.7 | 135.2 | 128.2 | 123.9 | 129.7 | 118.6 | 116.2 | 87.4 |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | 405.0 | 454.7 | 539.1 | 393.4 | 445.4 | 378.1 | 340.1 | 319.1 |
| 1ST HIGHEST: | ****** | ****** | 182.0 | 306.0 | 322.0 | 385.0 | 229.0 | 282.0 | 242.0 | 251.0 | 218.0 |
| DATE : | ****** | ****** | 741107 | 751003 | 760224 | 770302 | 781228 | 790322 | 800527 | 810404 | 820204 |
| 2ND HIGHEST: | ****** | ****** | 154.0 | 241.0 | 271.0 | 276.0 | 219.0 | 270.0 | 219.0 | 215.0 | 178.0 |
| DATE : | ****** | ****** | 740821 | 751021 | 760406 | 770308 | 780719 | 790316 | 800825 | 810925 | 820505 |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 1 | 2 | 3 | 0 | 2 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 2 | 12 | 23 | 17 | 18 | 23 | 11 | 12 | 8 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 4 | 9 | 5 | 9 | 8 | 8 | 8 | 6 | 24 |
| 66-130: | 0 | 0 | 12 | 23 | 27 | 24 | 28 | 23 | 22 | 36 | 18 |
| 131-195: | 0 | 0 | 4 | 18 | 16 | 11 | 19 | 24 | 15 | 14 | 10 |
| 196-260: | 0 | 0 | 0 | 2 | 9 | 7 | 6 | 4 | 5 | 5 | 1 |
| 261-325: | 0 | 0 | 0 | 1 | 2 | 2 | 0 | 2 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR NATIONAL STEEL - GRANITE CITY, IL
SARCAD STATION # 142960009 SITE ID # 04
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 50 | 60 | 17 | 59 | 60 | 55 | 61 | 93 | 122 | 60 | 57 |
| GEOMETRIC MEAN: | 205.2 | 202.3 | ****** | 157.5 | 205.3 | 186.0 | 177.0 | 215.4 | 167.6 | 190.5 | 134.1 |
| GEOMETRIC S.D.: | 1.7 | 1.5 | ****** | 1.4 | 1.5 | 1.7 | 1.6 | 1.7 | 1.6 | 1.5 | 1.7 |
| ARITHMETIC MEAN | 234.8 | 221.2 | ****** | 166.7 | 224.9 | 214.0 | 196.7 | 245.6 | 183.2 | 205.2 | 154.5 |
| HIGHEST BY LARSEN EXTRP: | 945.9 | 716.5 | ****** | 441.7 | 675.5 | 881.3 | 760.1 | 1020.2 | 624.3 | 628.5 | 663.4 |
| 1ST HIGHEST: | 754.0 | 577.0 | 233.0 | 353.0 | 753.0 | 592.0 | 430.0 | 936.0 | 375.0 | 391.0 | 417.0 |
| DATE : | 720614 | 731019 | 740827 | 751021 | 760224 | 771221 | 781222 | 791205 | 801108 | 810615 | 820222 |
| 2ND HIGHEST: | 551.0 | 547.0 | 222.0 | 307.0 | 527.0 | 485.0 | 398.0 | 661.0 | 362.0 | 341.0 | 365.0 |
| DATE : | 720712 | 730516 | 740920 | 750325 | 760319 | 770308 | 780414 | 790620 | 800310 | 810919 | 820429 |
| # OF READINGS EXCEEDING 260 : | 17 | 17 | 0 | 3 | 14 | 16 | 13 | 32 | 18 | 13 | 6 |
| # OF READINGS EXCEEDING 150 : | 36 | 47 | 8 | 33 | 47 | 34 | 42 | 70 | 78 | 46 | 22 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 2 | 3 | 1 | 8 |
| 66-130: | 10 | 7 | 7 | 12 | 9 | 15 | 14 | 11 | 28 | 9 | 18 |
| 131-195: | 12 | 17 | 5 | 29 | 22 | 15 | 17 | 18 | 40 | 14 | 17 |
| 196-260: | 11 | 18 | 5 | 14 | 15 | 9 | 16 | 30 | 33 | 23 | 8 |
| 261-325: | 9 | 10 | 0 | 2 | 7 | 8 | 10 | 13 | 14 | 8 | 3 |
| 326-390: | 3 | 5 | 0 | 1 | 2 | 2 | 0 | 11 | 4 | 4 | 2 |
| 391-455: | 2 | 0 | 0 | 0 | 3 | 2 | 3 | 3 | 0 | 1 | 1 |
| >455: | 3 | 2 | 0 | 0 | 2 | 4 | 0 | 5 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR NATIONAL STEEL - GRANITE CITY, IL
SAROAD STATION # 142960010 SITE ID # 05
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 39 | 55 | 19 | 61 | 61 | 54 | 56 | 59 | 59 | 61 | 58 |
| GEOMETRIC MEAN: | 199.5 | 160.9 | ****** | 137.6 | 154.7 | 130.9 | 151.8 | 159.0 | 145.1 | 139.3 | 124.1 |
| GEOMETRIC S.D.: | 1.6 | 1.5 | ****** | 1.5 | 1.5 | 1.5 | 1.6 | 1.6 | 1.5 | 1.5 | 1.8 |
| ARITHMETIC MEAN | 220.7 | 172.6 | ****** | 147.7 | 167.7 | 143.4 | 168.6 | 177.9 | 156.9 | 150.0 | 144.9 |
| HIGHEST BY LARSEN EXTRP: | 741.7 | 498.4 | ****** | 436.0 | 522.8 | 456.8 | 594.4 | 660.2 | 479.5 | 431.5 | 646.4 |
| 1ST HIGHEST: | 522.0 | 344.0 | 276.0 | 326.0 | 314.0 | 323.0 | 416.0 | 448.0 | 323.0 | 357.0 | 462.0 |
| DATE : | 720830 | 731218 | 741107 | 750729 | 760430 | 770308 | 780905 | 790912 | 800421 | 811118 | 821026 |
| 2ND HIGHEST: | 500.0 | 308.0 | 257.0 | 312.0 | 310.0 | 265.0 | 341.0 | 410.0 | 301.0 | 298.0 | 332.0 |
| DATE : | 720426 | 731212 | 740821 | 751003 | 760512 | 770218 | 780824 | 790831 | 801223 | 810925 | 820129 |
| # OF READINGS EXCEEDING 260 : | 9 | 6 | 1 | 2 | 7 | 2 | 5 | 5 | 3 | 3 | 6 |
| # OF READINGS EXCEEDING 150 : | 29 | 35 | 5 | 28 | 32 | 22 | 25 | 36 | 25 | 26 | 20 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 1 | 3 | 4 | 2 | 2 | 1 | 3 | 3 | 1 | 6 |
| 66-130: | 8 | 14 | 8 | 17 | 16 | 27 | 22 | 17 | 22 | 28 | 25 |
| 131-195: | 8 | 25 | 5 | 31 | 24 | 14 | 12 | 18 | 19 | 19 | 13 |
| 196-260: | 14 | 9 | 2 | 7 | 12 | 9 | 16 | 16 | 12 | 10 | 8 |
| 261-325: | 5 | 5 | 1 | 1 | 7 | 2 | 3 | 1 | 3 | 2 | 3 |
| 326-390: | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 2 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 4 | 0 | 0 | 0 |
| >455: | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR NATIONAL STEEL - GRANITE CITY, IL
SAROAD STATION # 142960014 SITE ID # 07
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 0 | 106 | 113 | 74 | 56 | 61 | 58 | 46 | 21 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | 101.0 | 139.0 | 133.5 | 154.0 | 164.9 | 118.1 | 136.7 | ****** |
| GEOMETRIC S.D.: | ****** | ****** | ****** | 1.7 | 1.7 | 1.7 | 1.9 | 1.8 | 2.1 | 1.7 | ****** |
| ARITHMETIC MEAN | ****** | ****** | ****** | 114.1 | 161.4 | 152.2 | 194.7 | 200.2 | 140.2 | 165.6 | ****** |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | 441.7 | 707.0 | 633.9 | 1013.0 | 941.1 | 1120.2 | 707.5 | ****** |
| 1ST HIGHEST: | ****** | ****** | ****** | 305.0 | 432.0 | 408.0 | 837.0 | 845.0 | 464.0 | 889.0 | 279.0 |
| DATE : | ****** | ****** | ****** | 751025 | 761014 | 770131 | 780418 | 790121 | 800227 | 810116 | 820324 |
| 2ND HIGHEST: | ****** | ****** | ****** | 288.0 | 396.0 | 363.0 | 702.0 | 679.0 | 447.0 | 534.0 | 221.0 |
| DATE : | ****** | ****** | ****** | 751209 | 761216 | 770525 | 780216 | 791006 | 800310 | 811106 | 820105 |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 3 | 16 | 6 | 11 | 11 | 4 | 4 | 1 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 0 | 21 | 51 | 34 | 25 | 32 | 16 | 17 | 6 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 0 | 18 | 10 | 7 | 4 | 1 | 3 | 3 | 3 |
| 66-130: | 0 | 0 | 0 | 55 | 46 | 26 | 23 | 21 | 29 | 18 | 12 |
| 131-195: | 0 | 0 | 0 | 22 | 21 | 25 | 11 | 17 | 19 | 17 | 3 |
| 196-260: | 0 | 0 | 0 | 8 | 20 | 10 | 7 | 11 | 3 | 4 | 2 |
| 261-325: | 0 | 0 | 0 | 3 | 10 | 2 | 5 | 4 | 2 | 0 | 1 |
| 326-390: | 0 | 0 | 0 | 0 | 4 | 3 | 1 | 2 | 0 | 2 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 2 | 1 | 1 | 0 | 1 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 1 | 2 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR NATIONAL STEEL - GRANITE CITY, IL
SAROAD STATION # 142960016 SITE ID # 09
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 0 | 0 | 0 | 68 | 66 | 57 | 55 | 56 | 41 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | ****** | ****** | ****** | 114.7 | 118.8 | 112.2 | 105.9 | ****** |
| GEOMETRIC S.D.: | ****** | ****** | ****** | ****** | ****** | ****** | 1.6 | 1.6 | 1.4 | 1.5 | ****** |
| ARITHMETIC MEAN | ****** | ****** | ****** | ****** | ****** | ****** | 126.5 | 129.8 | 120.0 | 114.4 | ****** |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | ****** | ****** | ****** | 431.2 | 432.7 | 329.9 | 337.2 | ****** |
| 1ST HIGHEST: | ****** | ****** | ****** | ****** | ****** | 417.0 | 261.0 | 272.0 | 302.0 | 288.0 | 331.0 |
| DATE : | ****** | ****** | ****** | ****** | ****** | 770513 | 781104 | 791205 | 800602 | 810404 | 820902 |
| 2ND HIGHEST: | ****** | ****** | ****** | ****** | ****** | 351.0 | 252.0 | 254.0 | 217.0 | 219.0 | 271.0 |
| DATE : | ****** | ****** | ****** | ****** | ****** | 770805 | 780911 | 790620 | 800930 | 810428 | 820920 |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 0 | 5 | 1 | 1 | 1 | 1 | 2 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 0 | 0 | 0 | 19 | 19 | 15 | 10 | 11 | 7 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 0 | 0 | 0 | 10 | 8 | 6 | 4 | 5 | 11 |
| 66-130: | 0 | 0 | 0 | 0 | 0 | 34 | 35 | 23 | 31 | 32 | 21 |
| 131-195: | 0 | 0 | 0 | 0 | 0 | 13 | 14 | 23 | 18 | 16 | 6 |
| 196-260: | 0 | 0 | 0 | 0 | 0 | 6 | 8 | 4 | 1 | 2 | 1 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 1 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR NATIONAL STEEL - GRANITE CITY, IL
SARCAD STATION # 142960019 SITE ID # 10
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 46 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 74.1 |
| GEOMETRIC S.D.: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 1.6 |
| ARITHMETIC MEAN | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 83.0 |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 293.4 |
| 1ST HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 223.0 |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 820423 |
| 2ND HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 191.0 |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 820505 |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 22 |
| 66-130: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 17 |
| 131-195: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| 196-260: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

24-HR STANDARD EXCEEDANCE ROSE FOR
NATIONAL STEEL - GRANITE CITY, IL
(ALL CASES > 260 UG/M**3)
X=0.850
COUNT/AVERAGE TSP OF PRIMARY EXCEEDANCES

| SAROAD # | 142960006 | | 142960007 | | 142960009 | | 142960010 | | 142960014 | | 142960016 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SITE ID # | 1 | | 2 | | 4 | | 5 | | 7 | | 9 | |
| DIRECTION | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X |
| N COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 455. | 363. | 0. | 0. |
| NNE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 269. | 0. | 0. | 0. |
| NE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 359. | 0. | 0. |
| ENE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 300. | 0. | 0. | 0. | 0. |
| E COUNT: | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 398. | 0. | 294. | 0. | 0. | 0. | 0. | 0. |
| ESE COUNT: | 0 | 0 | 1 | 0 | 1 | 0 | 4 | 1 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 385. | 0. | 365. | 0. | 337. | 304. | 0. | 0. | 0. | 0. |
| SE COUNT: | 0 | 0 | 3 | 0 | 2 | 2 | 8 | 2 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 274. | 0. | 388. | 308. | 357. | 357. | 0. | 0. | 0. | 0. |
| SSE COUNT: | 0 | 0 | 3 | 0 | 13 | 1 | 6 | 0 | 2 | 0 | 1 | 0 |
| AVE TSP: | 0. | 0. | 300. | 0. | 348. | 285. | 298. | 0. | 407. | 0. | 341. | 0. |
| S COUNT: | 0 | 0 | 1 | 0 | 20 | 8 | 1 | 3 | 0 | 0 | 1 | 1 |
| AVE TSP: | 0. | 0. | 276. | 0. | 336. | 293. | 323. | 360. | 0. | 0. | 340. | 261. |
| SSW COUNT: | 0 | 0 | 0 | 0 | 4 | 4 | 0 | 1 | 0 | 3 | 2 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 299. | 394. | 0. | 301. | 0. | 455. | 327. | 0. |
| SW COUNT: | 0 | 0 | 0 | 0 | 1 | 13 | 0 | 0 | 0 | 1 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 478. | 337. | 0. | 0. | 0. | 274. | 0. | 0. |
| WSW COUNT: | 0 | 0 | 0 | 0 | 6 | 11 | 0 | 3 | 0 | 0 | 0 | 2 |
| AVE TSP: | 0. | 0. | 0. | 0. | 361. | 390. | 0. | 272. | 0. | 0. | 0. | 280. |
| W COUNT: | 0 | 0 | 0 | 0 | 14 | 7 | 0 | 2 | 4 | 6 | 1 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 348. | 367. | 0. | 275. | 337. | 359. | 417. | 0. |
| WNW COUNT: | 0 | 0 | 0 | 0 | 12 | 5 | 0 | 3 | 15 | 7 | 0 | 2 |
| AVE TSP: | 0. | 0. | 0. | 0. | 360. | 304. | 0. | 285. | 463. | 354. | 0. | 310. |
| NW COUNT: | 0 | 0 | 0 | 0 | 5 | 1 | 0 | 2 | 11 | 1 | 1 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 314. | 358. | 0. | 289. | 365. | 542. | 271. | 0. |
| NNW COUNT: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 2 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 287. | 0. | 281. | 0. | 309. | 0. | 0. |
| ALL COUNT: | 0 | 0 | 8 | 0 | 79 | 53 | 21 | 19 | 34 | 22 | 6 | 5 |
| AVE TSP: | 0. | 0. | 298. | 0. | 347. | 344. | 329. | 304. | 407. | 371. | 337. | 288. |

24-HR STANDARD EXCEEDANCE ROSE FOR
NATIONAL STEEL - GRANITE CITY, IL
(ALL CASES > 150 UG/M**3)
X=0.850
COUNT/AVERAGE TSP OF SECONDARY EXCEEDANCES

| SAROAD # | 142960006 | | 142960007 | | 142960009 | | 142960010 | | 142960014 | | 142960016 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SITE ID # | 1 | | 2 | | 4 | | 5 | | 7 | | 9 | |
| DIRECTION | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X |
| N COUNT: | 0 | 1 | 0 | 0 | 7 | 9 | 4 | 4 | 8 | 7 | 1 | 2 |
| AVE TSP: | 0. | 156. | 0. | 0. | 214. | 202. | 190. | 203. | 217. | 200. | 152. | 181. |
| NNE COUNT: | 0 | 0 | 1 | 1 | 4 | 1 | 2 | 1 | 4 | 1 | 0 | 0 |
| AVE TSP: | 0. | 0. | 164. | 170. | 211. | 220. | 189. | 192. | 201. | 155. | 0. | 0. |
| NE COUNT: | 0 | 0 | 0 | 0 | 0 | 6 | 1 | 3 | 0 | 3 | 0 | 1 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 198. | 153. | 187. | 0. | 251. | 0. | 171. |
| ENE COUNT: | 0 | 0 | 0 | 0 | 5 | 1 | 5 | 1 | 2 | 1 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 178. | 153. | 196. | 300. | 185. | 169. | 0. | 0. |
| E COUNT: | 1 | 0 | 0 | 0 | 3 | 3 | 5 | 2 | 1 | 0 | 0 | 0 |
| AVE TSP: | 153. | 0. | 0. | 0. | 256. | 181. | 224. | 219. | 159. | 0. | 0. | 0. |
| ESE COUNT: | 5 | 0 | 3 | 1 | 15 | 4 | 12 | 3 | 2 | 2 | 1 | 0 |
| AVE TSP: | 170. | 0. | 242. | 154. | 209. | 192. | 256. | 233. | 203. | 171. | 167. | 0. |
| SE COUNT: | 13 | 1 | 17 | 3 | 22 | 14 | 21 | 6 | 3 | 1 | 2 | 1 |
| AVE TSP: | 181. | 217. | 195. | 197. | 220. | 219. | 262. | 268. | 227. | 170. | 182. | 217. |
| SSE COUNT: | 7 | 2 | 17 | 9 | 29 | 13 | 27 | 10 | 6 | 3 | 6 | 2 |
| AVE TSP: | 191. | 173. | 218. | 176. | 271. | 214. | 228. | 204. | 249. | 176. | 217. | 173. |
| S COUNT: | 6 | 5 | 21 | 9 | 46 | 28 | 30 | 14 | 7 | 7 | 15 | 7 |
| AVE TSP: | 182. | 191. | 192. | 191. | 264. | 228. | 201. | 232. | 172. | 186. | 199. | 199. |
| SSW COUNT: | 1 | 0 | 6 | 8 | 10 | 15 | 7 | 12 | 2 | 6 | 5 | 5 |
| AVE TSP: | 161. | 0. | 174. | 176. | 245. | 258. | 201. | 196. | 201. | 320. | 254. | 191. |
| SW COUNT: | 2 | 1 | 1 | 4 | 7 | 23 | 3 | 7 | 3 | 5 | 2 | 1 |
| AVE TSP: | 185. | 170. | 189. | 193. | 240. | 278. | 162. | 199. | 179. | 204. | 162. | 230. |
| WSW COUNT: | 0 | 5 | 1 | 10 | 10 | 29 | 1 | 13 | 2 | 12 | 3 | 6 |
| AVE TSP: | 0. | 174. | 159. | 175. | 310. | 271. | 228. | 205. | 218. | 204. | 189. | 224. |
| W COUNT: | 2 | 1 | 2 | 0 | 24 | 24 | 5 | 9 | 15 | 17 | 3 | 5 |
| AVE TSP: | 188. | 161. | 197. | 0. | 291. | 248. | 199. | 198. | 244. | 257. | 252. | 196. |
| WNW COUNT: | 4 | 4 | 3 | 4 | 28 | 13 | 10 | 11 | 22 | 14 | 3 | 5 |
| AVE TSP: | 163. | 191. | 182. | 190. | 266. | 235. | 208. | 215. | 380. | 288. | 192. | 243. |
| NW COUNT: | 1 | 2 | 0 | 2 | 13 | 10 | 7 | 9 | 16 | 15 | 3 | 0 |
| AVE TSP: | 166. | 195. | 0. | 186. | 243. | 204. | 203. | 205. | 319. | 221. | 240. | 0. |
| NNW COUNT: | 0 | 0 | 1 | 2 | 3 | 8 | 1 | 8 | 3 | 12 | 1 | 1 |
| AVE TSP: | 0. | 0. | 175. | 185. | 213. | 213. | 236. | 212. | 223. | 226. | 157. | 155. |
| ALL COUNT: | 42 | 22 | 73 | 53 | 226 | 201 | 141 | 113 | 96 | 106 | 45 | 36 |
| AVE TSP: | 179. | 183. | 198. | 182. | 254. | 238. | 220. | 212. | 271. | 232. | 208. | 205. |

24-HR STANDARD EXCEEDANCE ROSE FOR
NATIONAL STEEL - GRANITE CITY, IL
(ALL CASES > 260 UG/M**3)
X=0.850
COUNT/AVERAGE TSP OF PRIMARY EXCEEDANCES

SAROAD # 142960019
SITE ID # 10

| DIRECTION | W>=X | W<X |
|---|---|---|
| N COUNT: | 0 | 0 |
| AVE TSP: | 0. | 0. |
| NNE COUNT: | 0 | 0 |
| AVE TSP: | 0. | 0. |
| NE COUNT: | 0 | 0 |
| AVE TSP: | 0. | 0. |
| ENE COUNT: | 0 | 0 |
| AVE TSP: | 0. | 0. |
| E COUNT: | 0 | 0 |
| AVE TSP: | 0. | 0. |
| ESE COUNT: | 0 | 0 |
| AVE TSP: | 0. | 0. |
| SE COUNT: | 0 | 0 |
| AVE TSP: | 0. | 0. |
| SSE COUNT: | 0 | 0 |
| AVE TSP: | 0. | 0. |
| S COUNT: | 0 | 0 |
| AVE TSP: | 0. | 0. |
| SSW COUNT: | 0 | 0 |
| AVE TSP: | 0. | 0. |
| SW COUNT: | 0 | 0 |
| AVE TSP: | 0. | 0. |
| WSW COUNT: | 0 | 0 |
| AVE TSP: | 0. | 0. |
| W COUNT: | 0 | 0 |
| AVE TSP: | 0. | 0. |
| WNW COUNT: | 0 | 0 |
| AVE TSP: | 0. | 0. |
| NW COUNT: | 0 | 0 |
| AVE TSP: | 0. | 0. |
| NNW COUNT: | 0 | 0 |
| AVE TSP: | 0. | 0. |
| ALL COUNT: | 0 | 0 |
| AVE TSP: | 0. | 0. |

24-HR STANDARD EXCEEDANCE ROSE FOR
NATIONAL STEEL - GRANITE CITY, IL
(ALL CASES > 150 UG/M**3)
X=0.850
COUNT/AVERAGE TSP OF SECONDARY EXCEEDANCES

SAROAD # 142960019
SITE ID # 10

| DIRECTION | | W>=X | W<X |
|---|---|---|---|
| N | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| NNE | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| NE | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| ENE | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| E | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| ESE | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| SE | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| SSE | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| S | COUNT: | 2 | 0 |
| | AVE TSP: | 172. | 0. |
| SSW | COUNT: | 1 | 0 |
| | AVE TSP: | 223. | 0. |
| SW | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| WSW | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| W | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| WNW | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| NW | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| NNW | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| ALL | COUNT: | 3 | 0 |
| | AVE TSP: | 189. | 0. |

## AIR QUALITY EVALUATION - NATIONAL STEEL, GRANITE CITY, ILLINOIS

Air quality trends:

None of the stations exhibits major long-term positive or negative trends, as the Spearman rank correlation coefficients range from +0.28 to -0.23. Trends in TSP at all of the stations indicate gradual increases in 1978 and 1979, a rather sharp decline in 1980, a slight rise in 1981, and another sharp decline in 1982. Decreases in geometric means late in 1982 at stations #2, #4, and #5 attributable to the installation of sample savers on these hi-vols in October, 1982. A similar pattern is displayed for the percentages of observations exceeding 150 $\mu g/m^3$. Station #4 shows a decrease in this percentage from over 80 percent in 1981 to approximately 40 percent in 1982.

Standard exceedance status:

Stations #2, #4, and #5 continued to show violations of the primary standards through 1982. Stations #7 and #9 violated the primary annual standard in 1981, but had insufficient data in 1982.

Pollution roses:

Roses for all stations #4, #5, #7, and #9 demonstrate the greatest impacts of the mill. Stations #7 and #9 show greater impact of the blast furnace and sinter plant than of the coke ovens.

Standard exceedance roses:

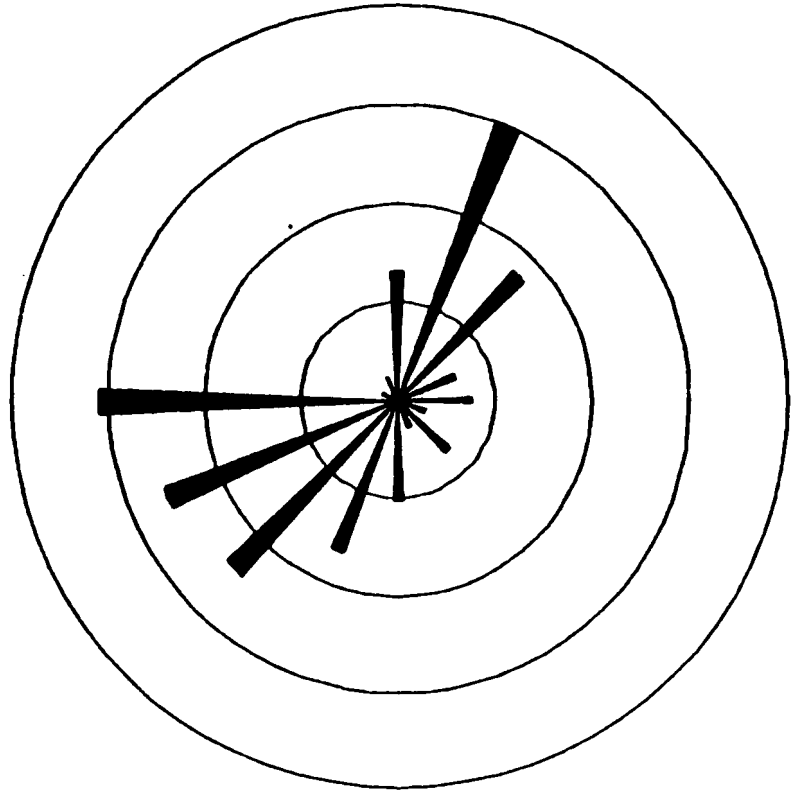
The greatest number of primary standard exceedances occurred at stations #4 and #7. Many of the exceedances at station #4 are likely due to emissions from the BOF and from the nearby roadway running between the station and the BOF. At station #7, the exceedances are concentrated in the directions from the sinter and blast furnaces.

Inhalable particulate matter:

Stations #2 and #4 report IP data to the Illinois Environmental Protection Agency. These sites are not part of the EPA IP Network. Data are summarized below for these sites.

| Year | Instrument | # of Obs. | Arithmetic Mean | Highest | Second Highest |
|---|---|---|---|---|---|
| Station #2 | | | | | |
| 1981 | SSI | 29 | 74.0 | 142 | 109 |
| 1982 | SSI | 57 | 57.3 | 141 | 126 |
| Station #4 | | | | | |
| 1981 | SSI | 16 | 136.6 | 282 | 255 |
| 1982 | SSI | 57 | 86.6 | 210 | 195 |

WIND ROSE
PERSISTENCE CLASS 0.95
WIND STATION 13994



NATIONAL STEEL
Detroit
Wayne County
Michigan
EPA Region V

Hi-Vol Monitoring Sites--National Steel, Detroit, Michigan

| Site ID Number | SAROAD Number | Site Name and Address | Plant Location from Site: Facility/ Bearing (°) | Plant Location from Site: Distance (km) | Elevation (m): Above Ground | Elevation (m): Above MSL | Elevation (m): Above Plant | Site Description | Nearest Roadway: Name | Nearest Roadway: Direction | Nearest Roadway: Distance (m) | Nearest Roadway: Type and Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 23-4420-005-G01 | 315 Genesee<br>River Rouge, MI | Blast furnaces, boilers 42<br>Coke plant 45<br>BOF #1 180<br>BOF #2 158<br>Open hearth furnace 163<br>Electric arc furnace 176 | 3.0<br>2.7<br>1.9<br>1.6<br>1.4<br>2.0 | 4 | 178 | 1 | Trailer top<br>Residential<br>Suburban-industrial | Genesee | NW | 6 | 2-lane, L |
| 2 | 23-1180-015-G01 | 6601 W. Fort<br>Detroit, MI | Blast furnaces, boilers 179<br>Coke plant 184<br>BOF #1, BOF #2, open hearth furnace, electric arc furnace 195-200 | 1.9<br>2.2<br>6.0 | 4 | 179 | 2 | Trailer top<br>Residential | Rademacher<br>W. Fort | ENE<br>NNW | 9<br>30 | 2-lane, L<br>4-lane, M |
| 3 | 12032 | Morton Dock<br>Windsor, Ontario | Blast furnaces, boilers 338<br>Coke plant 330<br>BOF #1, BOF #2 237<br>Electric arc furnace 233<br>Open hearth furnace 241 | 2.3<br>2.0<br>3.2<br>3.5<br>2.9 | 4 | 177 | 0 | Trailer top | Morton | S | 300 | U |
| 4 | 12015 | Hwy. 18 & Prospect<br>Windsor, Ontario | Blast furnaces, boilers 281<br>Coke plant 270<br>BOF #1, BOF #2, electric arc furnace, open hearth furnace 223-227 | 1.7<br>1.9<br>5.0 | 6 | 178 | 1 | Roof | U | U | 11 | U |
| 5 | 12016 | College & South Sts.<br>Windsor, Ontario | Blast furnaces, boilers 258<br>Coke plant 252<br>BOF #1, BOF #2, electric arc furnace, open hearth furnace 224-227 | 2.8<br>3.1<br>6.5 | 4 | 180 | 3 | Trailer top<br>Residential | U | U | 12 | L |

(Continued)

Key: U = Unavailable M = Moderate
L = Light H = Heavy

Hi-Vol Monitoring Sites--National Steel, Detroit, Michigan (Concluded)

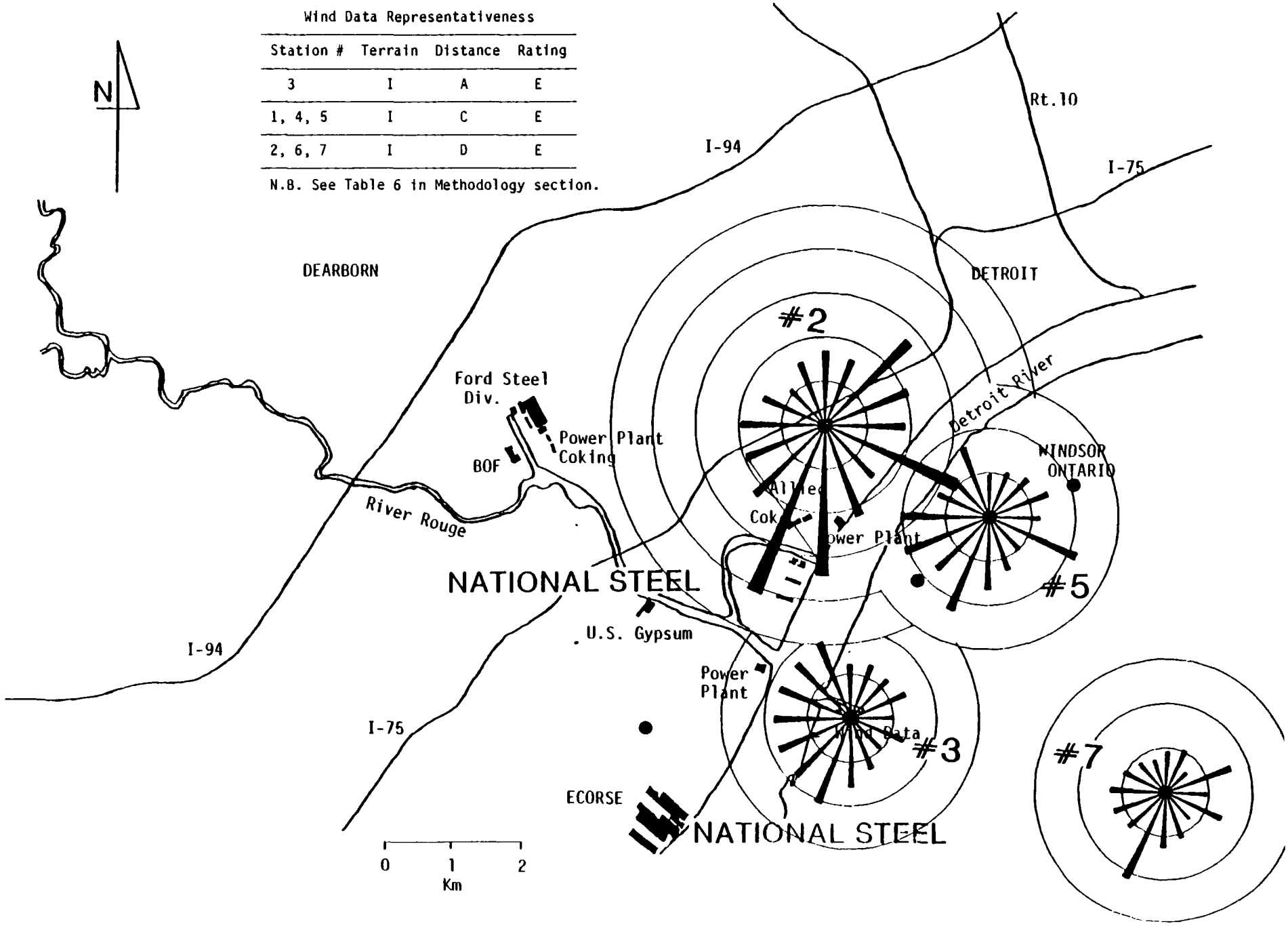
| Site ID Number | SAROAD Number | Site Name and Address | Plant Location from Site: Facility/ Bearing (°) | Plant Location from Site: Distance (km) | Elevation (m): Above Ground | Elevation (m): Above MSL | Elevation (m): Above Plant | Site Description | Nearest Roadway: Name | Nearest Roadway: Direction | Nearest Roadway: Distance (m) | Nearest Roadway: Type and Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 | 12014 | College & California Sts. Windsor, Ontario | Blast furnaces, boilers 253<br>Coke plant 249<br>BOF #1, BOF #2, electric arc furnace, open hearth furnace 228-231 | 4.5<br>4.8<br>8.1 | 1 | 181 | 4 | Ground level on grassy field | U | U | 9 | L |
| 7 | 12037 | St. Hubert's School Windsor, Ontario | Blast furnaces, boilers, coke plant, 294-297<br>BOF #1, BOF #2, electric arc furnace, open hearth furnace 261-266 | 6.6<br>7.7 | 4 | 182 | 5 | Roof | U | U | 30 | H |

Key: U = Unavailable M = Moderate
L = Light H = Heavy

Wind Data Representativeness

| Station # | Terrain | Distance | Rating |
|---|---|---|---|
| 3 | I | A | E |
| 1, 4, 5 | I | C | E |
| 2, 6, 7 | I | D | E |

N.B. See Table 6 in Methodology section.

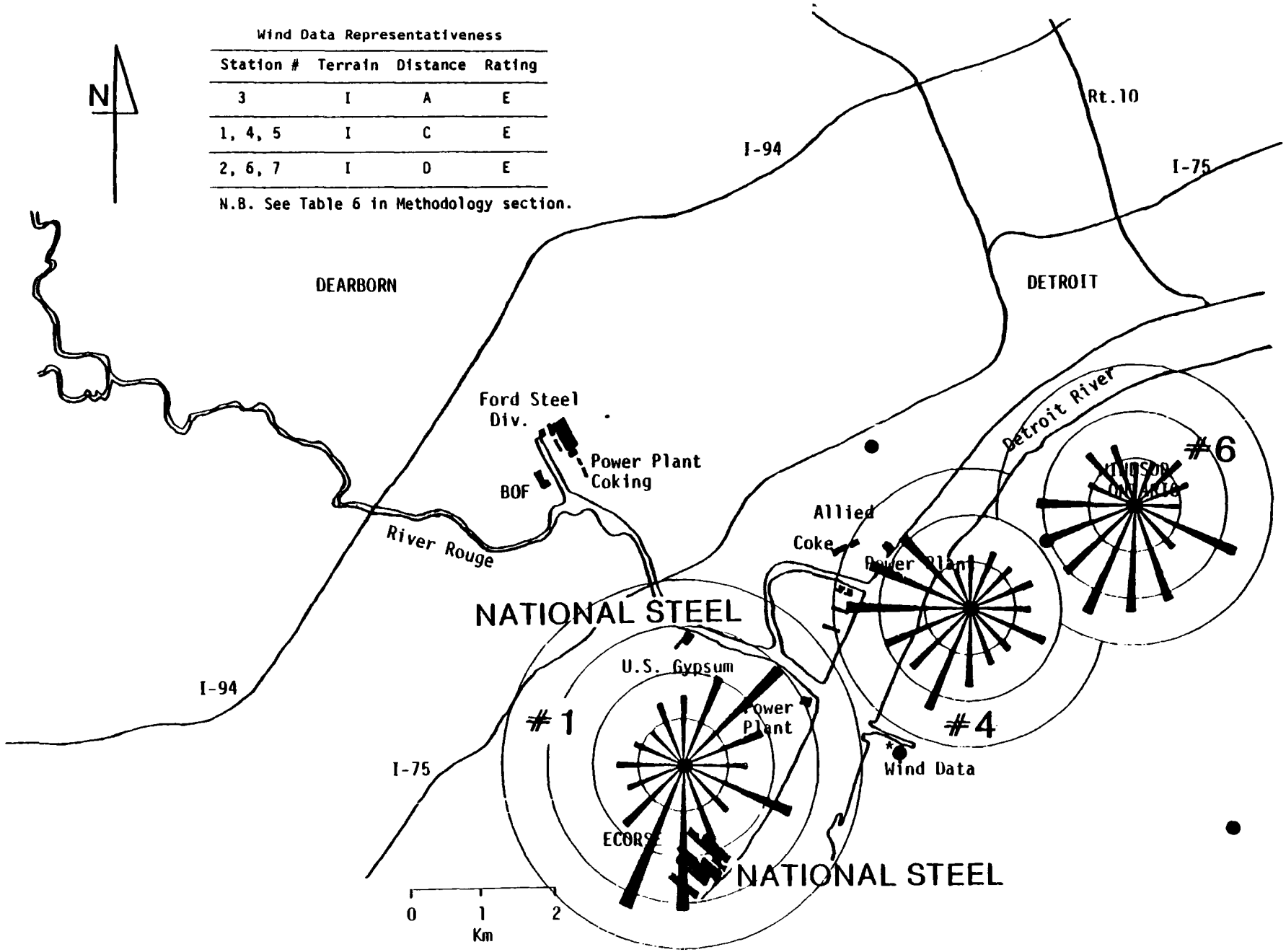



TSP roses for National Steel - Detroit, Michigan, for the period 1978-1982 for cases of $\omega>0.90$. Each circle represents 50 $\mu g/m^3$.

Wind Data Representativeness

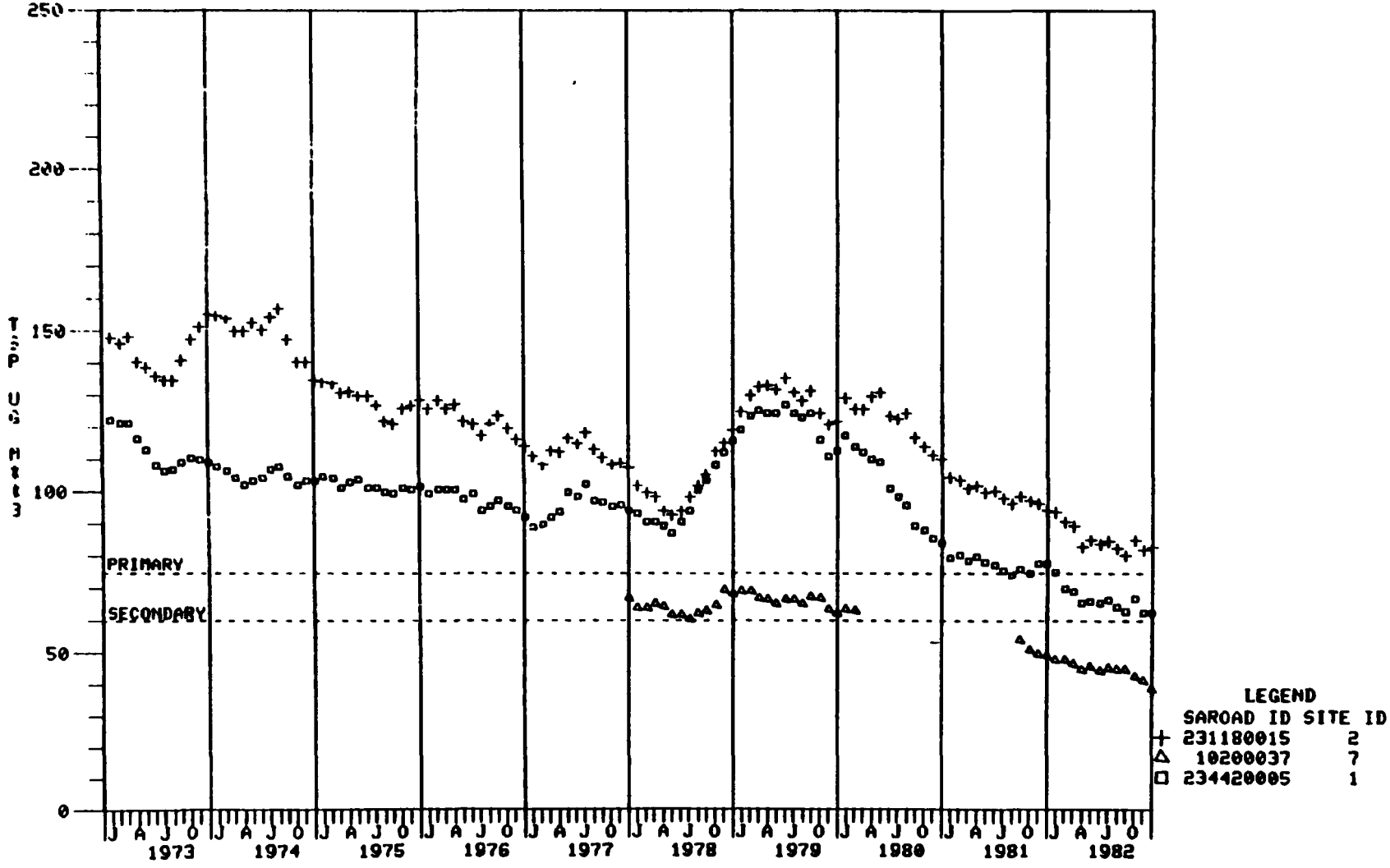
| Station # | Terrain | Distance | Rating |
|---|---|---|---|
| 3 | I | A | E |
| 1, 4, 5 | I | C | E |
| 2, 6, 7 | I | D | E |

N.B. See Table 6 in Methodology section.

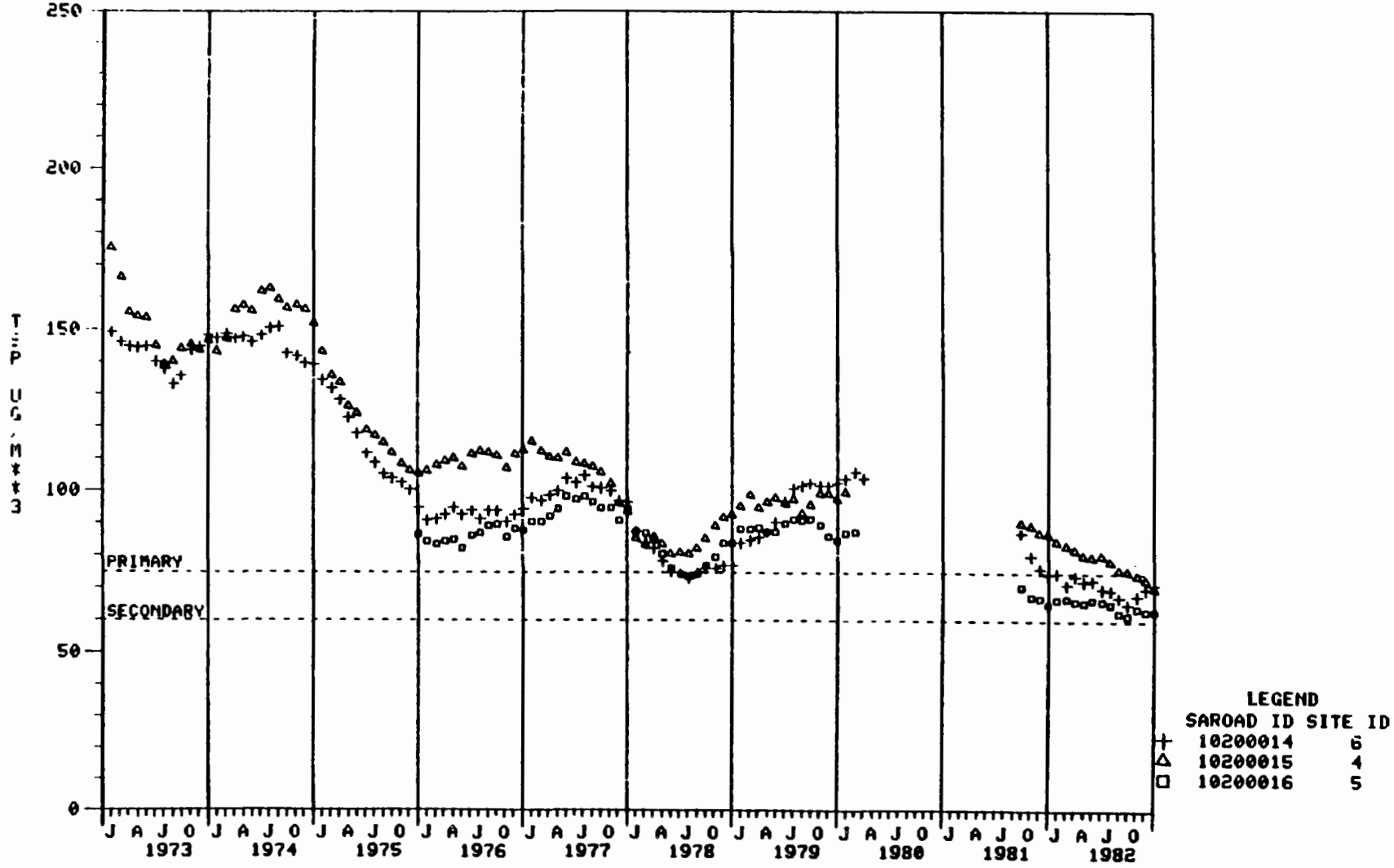


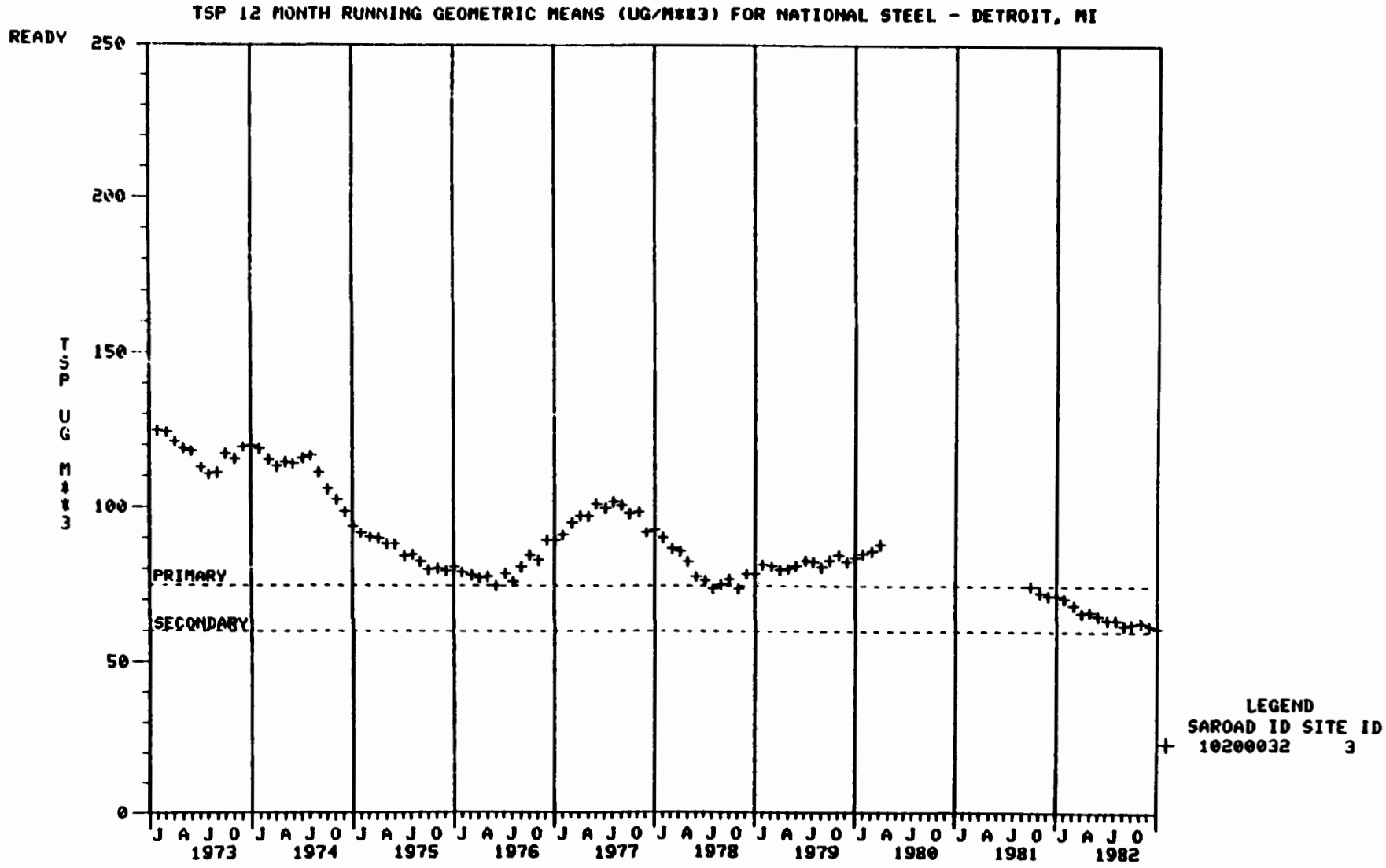

TSP roses for National Steel - Detroit, Michigan, for the period 1978-1982 for cases of $\omega$>0.90. Each circle represents 50 $\mu g/m^3$.

TSP 12 MONTH RUNNING GEOMETRIC MEANS (UG/M**3) FOR NATIONAL STEEL - DETROIT, MI

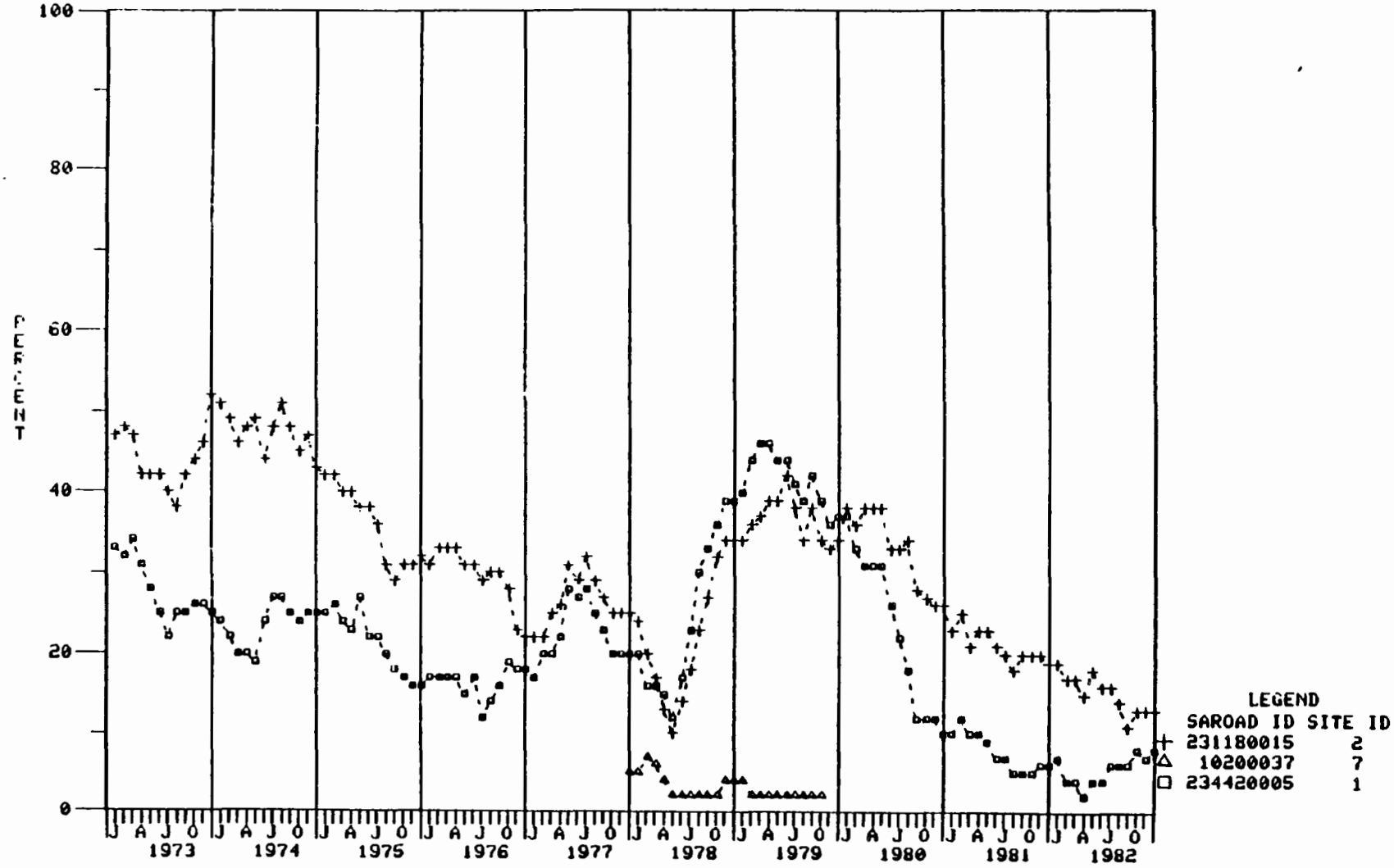


TSP 12 MONTH RUNNING GEOMETRIC MEANS (UG/M**3) FOR NATIONAL STEEL - DETROIT, MI

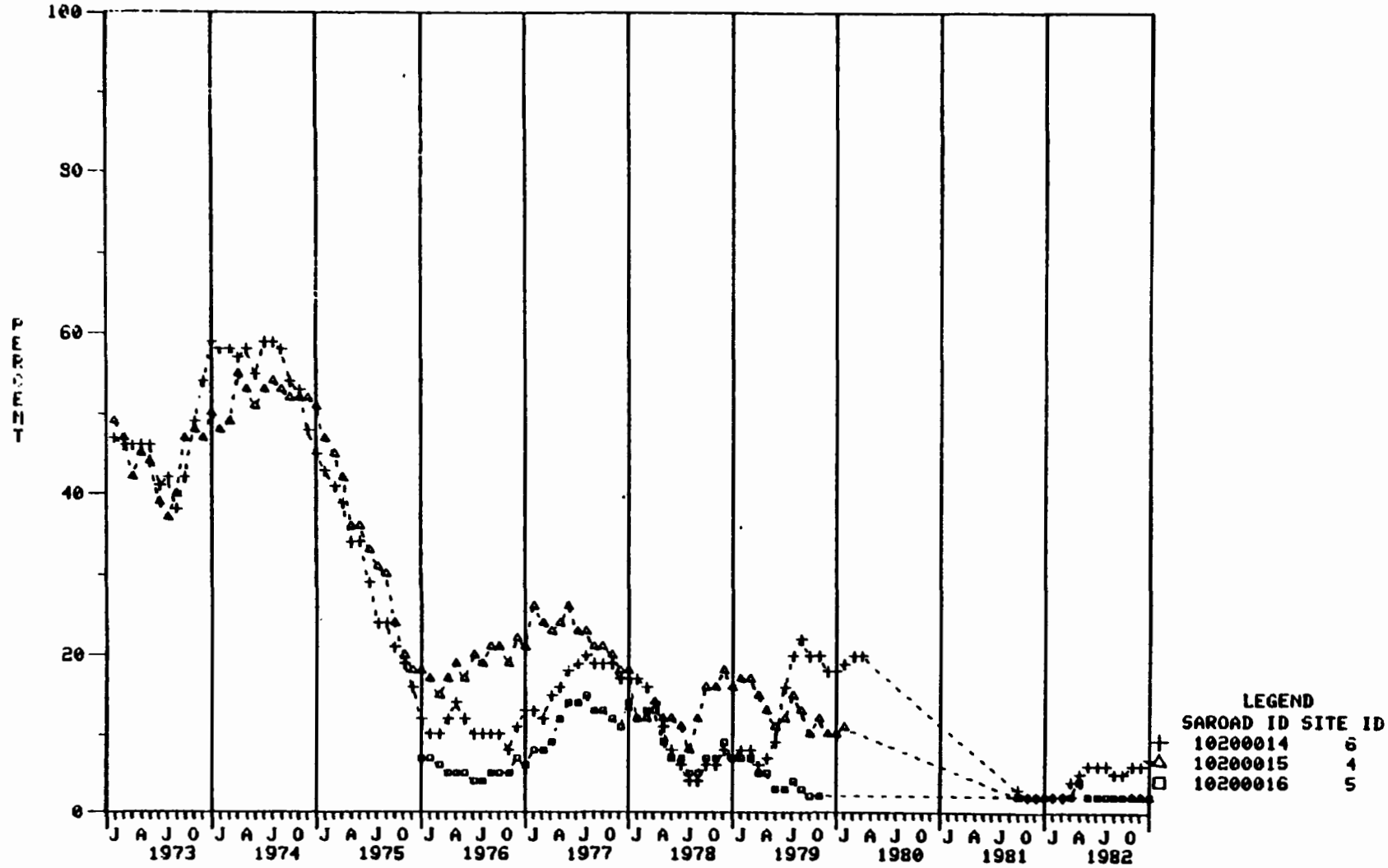



TSP 12 MONTH RUNNING GEOMETRIC MEANS (UG/M**3) FOR NATIONAL STEEL - DETROIT, MI
READY
250
200
150
100
50
0
TSP UG M**3
PRIMARY
SECONDARY
J A J O J A J O J A J O J A J O J A J O J A J O J A J O J A J O J A J O J A J O
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
LEGEND
SAROAD ID SITE ID
10200032 3

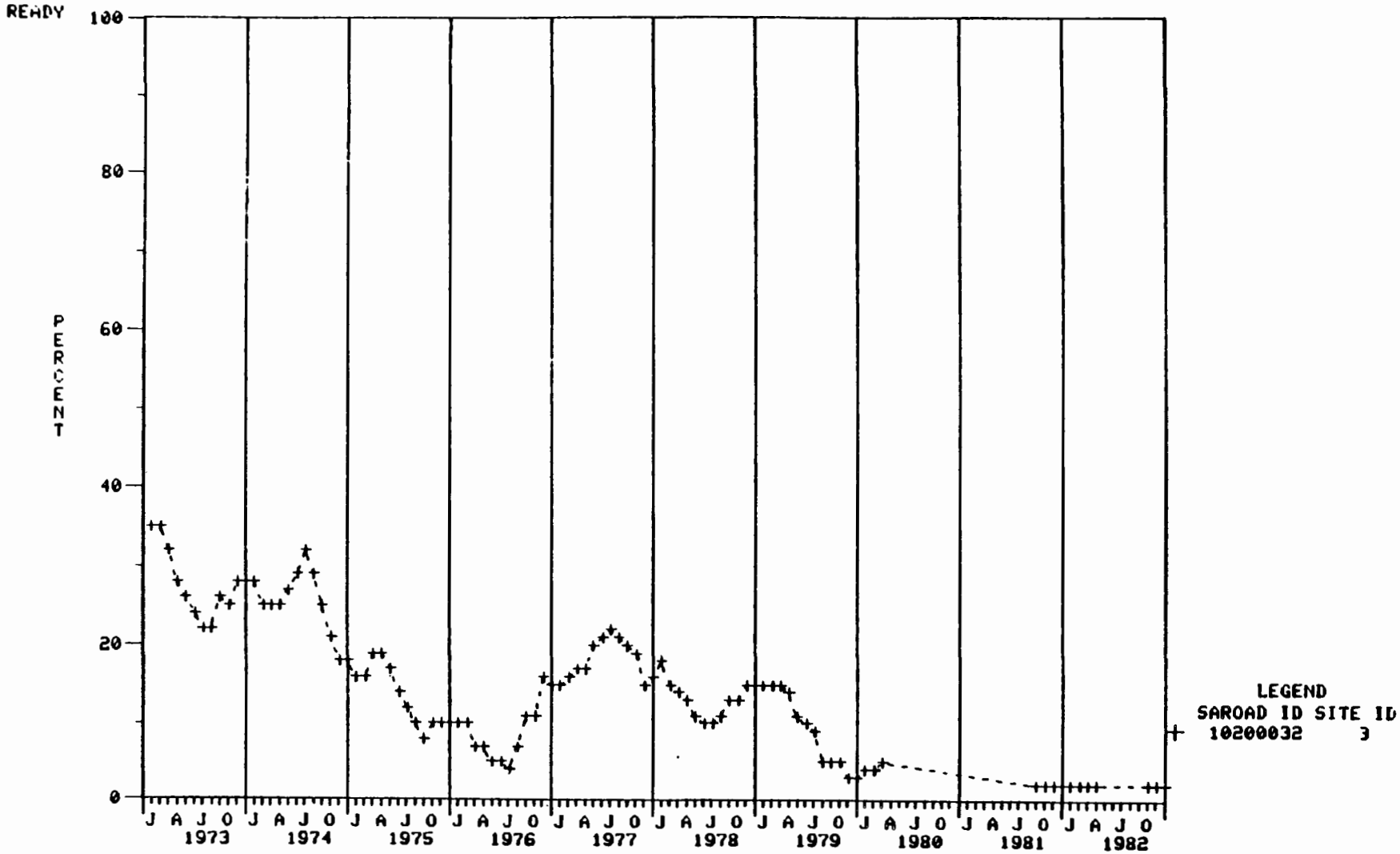
TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 150 (UG/M**3) FOR NATIONAL STEEL - DETROIT, MI



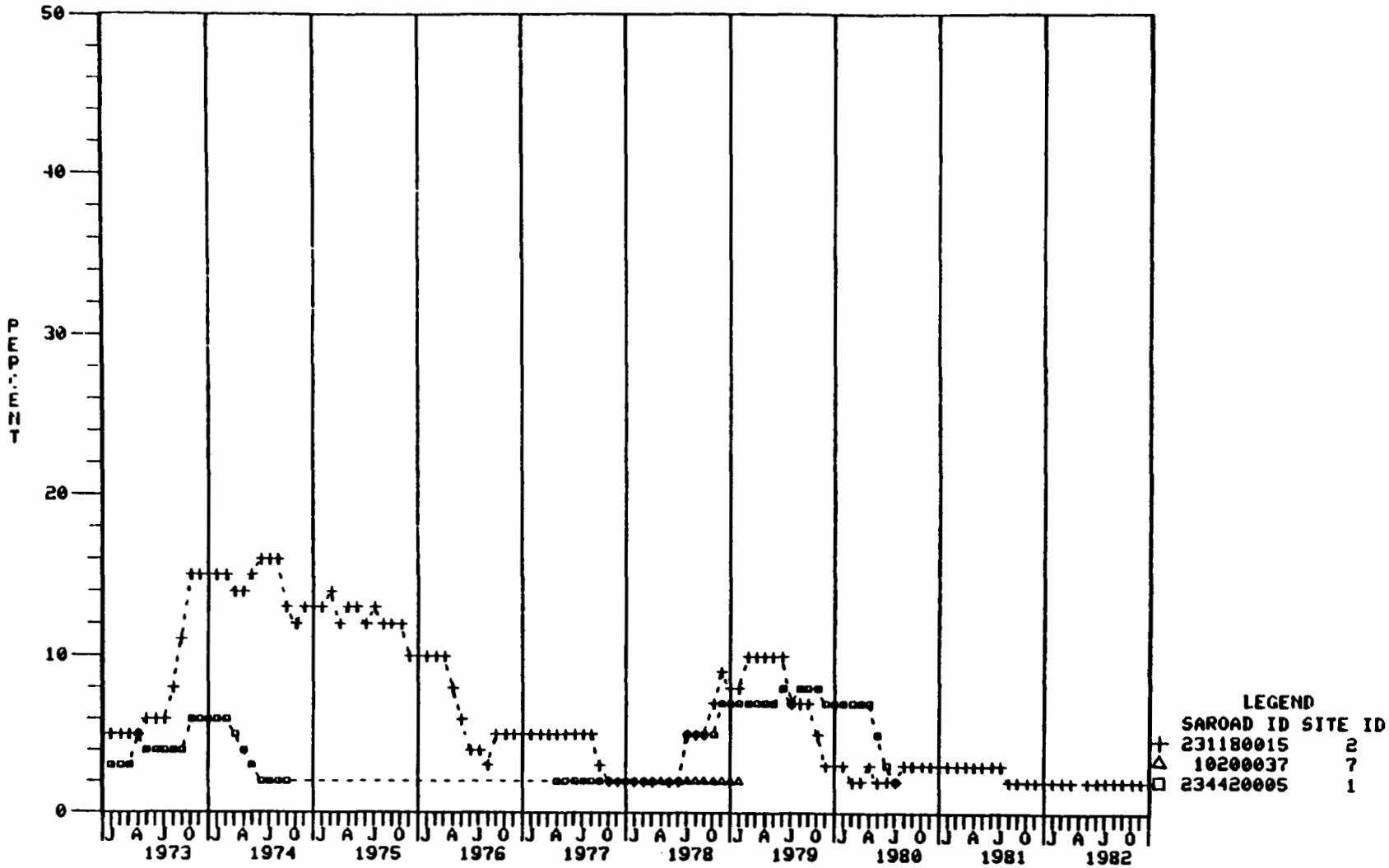
TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 150 (UG/M**3) FOR NATIONAL STEEL - DETROIT, MI



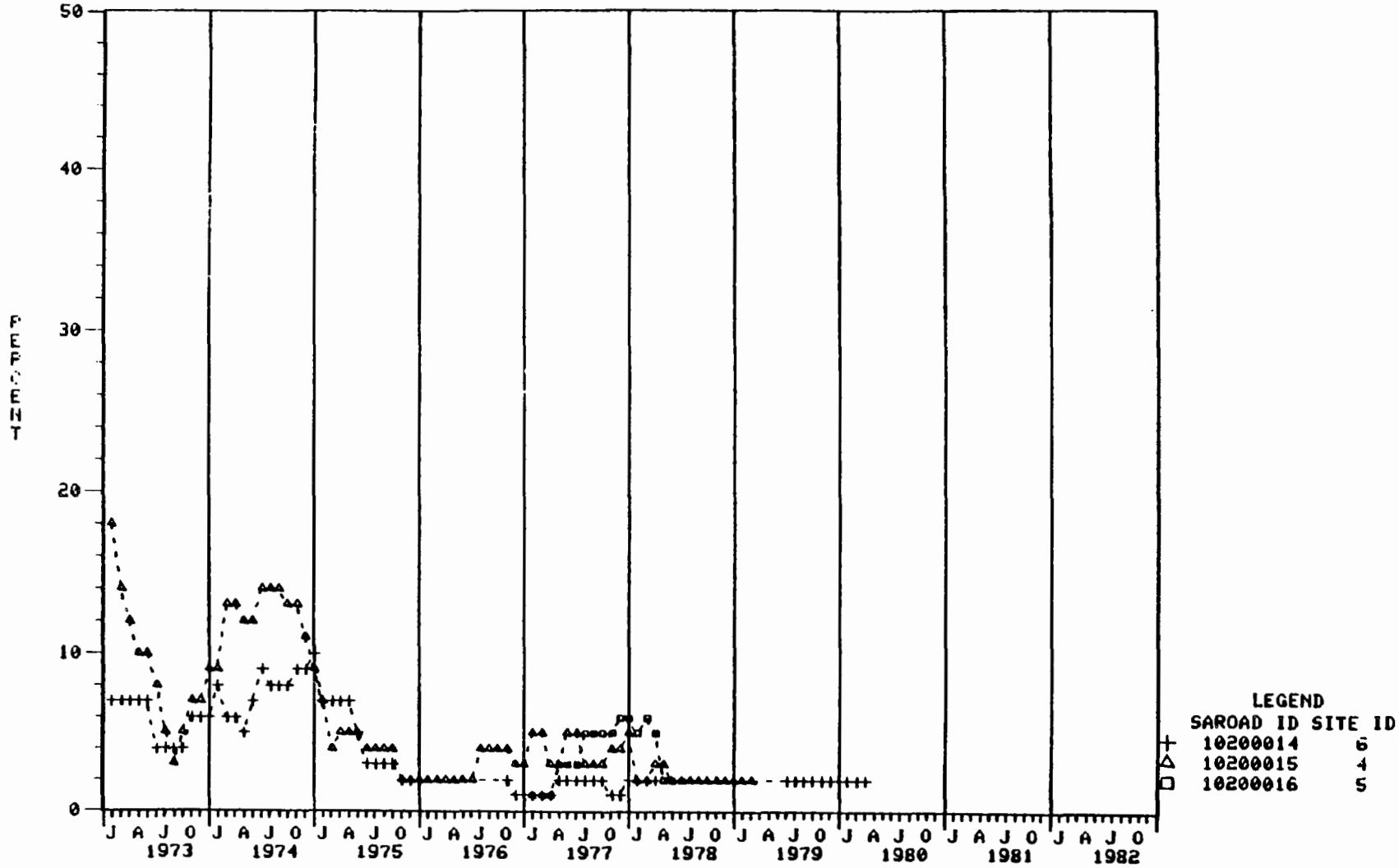
TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 150 (UG/M**3) FOR NATIONAL STEEL - DETROIT, MI

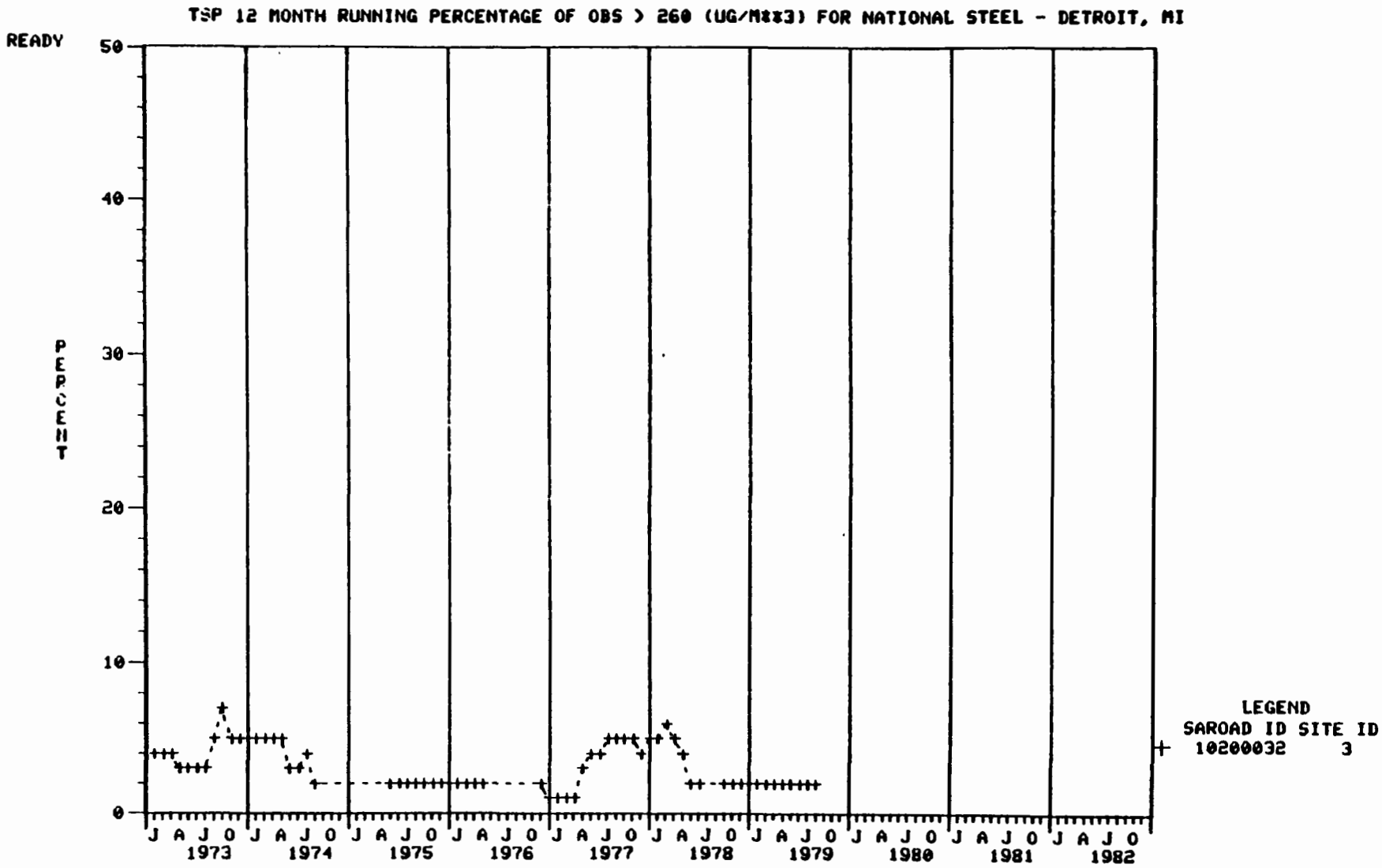


TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 260 (UG/M**3) FOR NATIONAL STEEL - DETROIT, MI



TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 260 (UG/M**3) FOR NATIONAL STEEL - DETROIT, MI




TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 260 (UG/M**3) FOR NATIONAL STEEL - DETROIT, MI
READY
PERCENT
50
40
30
20
10
0
J A J O J A J O J A J O J A J O J A J O J A J O J A J O J A J O J A J O J A J O J A J O
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
LEGEND
SAROAD ID SITE ID
10200032 3

TSP DATA SUMMARY FOR NATIONAL STEEL - DETROIT, MI
SAROAD STATION # 231180015 SITE ID # 02
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 56 | 54 | 61 | 50 | 60 | 59 | 59 | 58 | 61 | 59 | 56 |
| GEOMETRIC MEAN: | 152.8 | 155.3 | 134.9 | 128.6 | 114.3 | 107.9 | 119.6 | 122.3 | 110.6 | 94.2 | 83.1 |
| GEOMETRIC S.D.: | 1.5 | 1.5 | 1.6 | 1.5 | 1.5 | 1.6 | 1.8 | 1.6 | 1.6 | 1.6 | 1.7 |
| ARITHMETIC MEAN | 168.9 | 170.6 | 152.8 | 141.6 | 126.5 | 120.1 | 139.7 | 136.0 | 121.6 | 105.0 | 96.1 |
| HIGHEST BY LARSEN EXTRP: | 554.2 | 547.8 | 587.2 | 462.1 | 406.0 | 434.4 | 663.5 | 496.0 | 408.7 | 358.9 | 394.5 |
| 1ST HIGHEST: | 554.0 | 373.0 | 423.0 | 307.0 | 385.0 | 303.0 | 386.0 | 327.0 | 272.0 | 277.0 | 403.0 |
| DATE : | 720421 | 730925 | 740523 | 751027 | 760903 | 770419 | 780707 | 790509 | 800421 | 810410 | 820505 |
| 2ND HIGHEST: | 460.0 | 357.0 | 357.0 | 304.0 | 298.0 | 244.0 | 354.0 | 288.0 | 262.0 | 249.0 | 223.0 |
| DATE : | 720122 | 731025 | 740411 | 750617 | 760418 | 770624 | 781104 | 790220 | 800819 | 810522 | 820511 |
| # OF READINGS EXCEEDING 260 : | 3 | 8 | 7 | 4 | 3 | 1 | 5 | 2 | 2 | 1 | 1 |
| # OF READINGS EXCEEDING 150 : | 27 | 28 | 24 | 16 | 13 | 15 | 18 | 20 | 16 | 11 | 7 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 3 | 0 | 7 | 4 | 3 | 7 | 7 | 5 | 5 | 10 | 17 |
| 66-130: | 15 | 21 | 20 | 23 | 39 | 34 | 26 | 28 | 34 | 36 | 32 |
| 131-195: | 24 | 17 | 19 | 15 | 11 | 11 | 14 | 13 | 16 | 8 | 4 |
| 196-260: | 11 | 8 | 8 | 4 | 4 | 6 | 7 | 10 | 4 | 4 | 2 |
| 261-325: | 0 | 5 | 3 | 4 | 2 | 1 | 3 | 1 | 2 | 1 | 0 |
| 326-390: | 1 | 3 | 3 | 0 | 1 | 0 | 2 | 1 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| >455: | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR NATIONAL STEEL - DETROIT, MI
SAROAD STATION # 10200037 SITE ID # 07
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 0 | 0 | 0 | 40 | 52 | 52 | 0 | 55 | 50 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | ****** | ****** | 66.7 | 68.2 | 62.0 | ****** | 49.2 | 38.8 |
| GEOMETRIC S.D.: | ****** | ****** | ****** | ****** | ****** | 1.6 | 1.7 | 1.5 | ****** | 1.5 | 2.0 |
| ARITHMETIC MEAN | ****** | ****** | ****** | ****** | ****** | 74.2 | 77.7 | 66.5 | ****** | 53.4 | 46.8 |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | ****** | ****** | 266.4 | 301.8 | 190.8 | ****** | 161.4 | 310.1 |
| 1ST HIGHEST: | ****** | ****** | ****** | ****** | ****** | 186.0 | 281.0 | 131.0 | ****** | 146.0 | 126.0 |
| DATE : | ****** | ****** | ****** | ****** | ****** | 770513 | 780201 | 790906 | ****** | 810522 | 820511 |
| 2ND HIGHEST: | ****** | ****** | ****** | ****** | ****** | 173.0 | 150.0 | 113.0 | ****** | 90.0 | 114.0 |
| DATE : | ****** | ****** | ****** | ****** | ****** | 770419 | 781116 | 790509 | ****** | 810404 | 821026 |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 0 | 0 | 0 | 20 | 24 | 30 | 0 | 38 | 42 |
| 66-130: | 0 | 0 | 0 | 0 | 0 | 16 | 21 | 21 | 0 | 16 | 8 |
| 131-195: | 0 | 0 | 0 | 0 | 0 | 4 | 6 | 1 | 0 | 1 | 0 |
| 196-260: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR NATIONAL STEEL - DETROIT, MI
SAROAD STATION # 234420005 SITE ID # 01
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 58 | 53 | 60 | 57 | 60 | 61 | 61 | 59 | 60 | 47 | 60 |
| GEOMETRIC MEAN: | 124.7 | 109.0 | 103.5 | 101.6 | 92.2 | 94.4 | 115.9 | 113.1 | 84.3 | 78.0 | 62.8 |
| GEOMETRIC S.D.: | 1.5 | 1.6 | 1.6 | 1.5 | 1.5 | 1.7 | 1.7 | 1.8 | 1.6 | 1.6 | 1.7 |
| ARITHMETIC MEAN | 136.8 | 123.3 | 113.6 | 109.1 | 100.5 | 108.4 | 132.9 | 132.3 | 92.9 | 87.1 | 72.3 |
| HIGHEST BY LARSEN EXTRP: | 439.5 | 441.2 | 376.4 | 310.9 | 306.9 | 448.1 | 575.7 | 606.3 | 321.2 | 324.2 | 305.7 |
| 1ST HIGHEST: | 420.0 | 356.0 | 253.0 | 217.0 | 250.0 | 323.0 | 316.0 | 403.0 | 197.0 | 202.0 | 178.0 |
| DATE : | 720620 | 730416 | 740306 | 750729 | 760418 | 770419 | 780526 | 790509 | 800521 | 810522 | 820716 |
| 2ND HIGHEST: | 293.0 | 347.0 | 230.0 | 214.0 | 184.0 | 243.0 | 280.0 | 310.0 | 173.0 | 179.0 | 166.0 |
| DATE : | 720521 | 731025 | 740610 | 750518 | 761003 | 770525 | 781104 | 790813 | 800328 | 810410 | 820511 |
| # OF READINGS EXCEEDING 260 : | 2 | 3 | 0 | 0 | 0 | 1 | 4 | 4 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 19 | 13 | 15 | 9 | 11 | 12 | 24 | 22 | 5 | 3 | 5 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 5 | 6 | 12 | 7 | 15 | 12 | 11 | 12 | 17 | 18 | 30 |
| 66-130: | 26 | 32 | 27 | 35 | 30 | 34 | 22 | 22 | 31 | 22 | 23 |
| 131-195: | 19 | 8 | 18 | 13 | 14 | 8 | 20 | 15 | 11 | 6 | 7 |
| 196-260: | 6 | 4 | 3 | 2 | 1 | 6 | 4 | 6 | 1 | 1 | 0 |
| 261-325: | 1 | 1 | 0 | 0 | 0 | 1 | 4 | 3 | 0 | 0 | 0 |
| 326-390: | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR NATIONAL STEEL - DETROIT, MI
SAROAD STATION # 10200014 SITE ID # 06
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 53 | 54 | 58 | 57 | 80 | 66 | 54 | 56 | 0 | 54 | 44 |
| GEOMETRIC MEAN: | 152.3 | 148.2 | 139.1 | 94.6 | 94.4 | 96.5 | 77.1 | 102.6 | ****** | 74.5 | 71.3 |
| GEOMETRIC S.D.: | 1.5 | 1.6 | 1.7 | 1.5 | 1.5 | 1.6 | 1.7 | 1.6 | ****** | 1.5 | 1.5 |
| ARITHMETIC MEAN | 165.2 | 164.8 | 157.4 | 101.8 | 103.0 | 106.7 | 87.4 | 112.9 | ****** | 81.4 | 78.5 |
| HIGHEST BY LARSEN EXTRP: | 505.2 | 577.9 | 629.7 | 294.3 | 330.5 | 367.2 | 350.6 | 373.2 | ****** | 263.6 | 254.6 |
| 1ST HIGHEST: | 321.0 | 604.0 | 462.0 | 202.0 | 264.0 | 263.0 | 210.0 | 273.0 | ****** | 220.0 | 186.0 |
| DATE : | 720127 | 730110 | 741225 | 750206 | 761015 | 770413 | 780321 | 790614 | ****** | 810522 | 820511 |
| 2ND HIGHEST: | 313.0 | 279.0 | 366.0 | 192.0 | 211.0 | 257.0 | 185.0 | 241.0 | ****** | 134.0 | 181.0 |
| DATE : | 720111 | 730209 | 741026 | 751015 | 761116 | 770302 | 781104 | 790626 | ****** | 810913 | 820423 |
| # OF READINGS EXCEEDING 260 : | 5 | 3 | 6 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 25 | 32 | 26 | 7 | 10 | 11 | 4 | 10 | 0 | 1 | 3 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 1 | 2 | 4 | 10 | 18 | 12 | 19 | 10 | 0 | 20 | 20 |
| 66-130: | 18 | 14 | 19 | 35 | 47 | 39 | 26 | 30 | 0 | 31 | 19 |
| 131-195: | 18 | 23 | 22 | 11 | 13 | 10 | 8 | 11 | 0 | 2 | 5 |
| 196-260: | 11 | 12 | 7 | 1 | 1 | 4 | 1 | 4 | 0 | 1 | 0 |
| 261-325: | 5 | 2 | 4 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR NATIONAL STEEL - DETROIT, MI
SAROAD STATION # 10200015 SITE ID # 04
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 56 | 56 | 55 | 55 | 76 | 65 | 55 | 49 | 0 | 55 | 51 |
| GEOMETRIC MEAN: | 182.9 | 146.6 | 151.7 | 105.1 | 112.7 | 93.4 | 92.8 | 97.6 | ****** | 86.6 | 70.1 |
| GEOMETRIC S.D.: | 1.7 | 1.7 | 1.4 | 1.4 | 1.5 | 1.8 | 1.7 | 1.5 | ****** | 1.3 | 1.5 |
| ARITHMETIC MEAN | 212.9 | 167.9 | 161.4 | 111.8 | 122.8 | 109.0 | 105.0 | 106.6 | ****** | 90.6 | 75.4 |
| HIGHEST BY LARSEN EXTRP: | 854.5 | 656.5 | 429.3 | 288.0 | 372.7 | 492.7 | 406.8 | 333.3 | ****** | 208.5 | 217.6 |
| 1ST HIGHEST: | 644.0 | 759.0 | 324.0 | 267.0 | 385.0 | 322.0 | 295.0 | 239.0 | ****** | 166.0 | 186.0 |
| DATE : | 720204 | 730110 | 740228 | 750301 | 760307 | 770513 | 780321 | 790906 | ****** | 810110 | 821026 |
| 2ND HIGHEST: | 550.0 | 417.0 | 323.0 | 199.0 | 313.0 | 283.0 | 237.0 | 238.0 | ****** | 149.0 | 138.0 |
| DATE : | 720119 | 731206 | 740123 | 750112 | 760711 | 770115 | 780526 | 790720 | ****** | 810522 | 820511 |
| # OF READINGS EXCEEDING 260 : | 13 | 5 | 5 | 1 | 2 | 3 | 1 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 28 | 27 | 27 | 9 | 15 | 12 | 9 | 5 | 0 | 1 | 1 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 3 | 1 | 4 | 6 | 15 | 13 | 10 | 0 | 11 | 21 |
| 66-130: | 16 | 19 | 13 | 35 | 44 | 35 | 28 | 26 | 0 | 38 | 27 |
| 131-195: | 19 | 22 | 31 | 13 | 20 | 8 | 10 | 10 | 0 | 6 | 3 |
| 196-260: | 8 | 7 | 5 | 2 | 4 | 4 | 3 | 3 | 0 | 0 | 0 |
| 261-325: | 4 | 3 | 5 | 1 | 1 | 3 | 1 | 0 | 0 | 0 | 0 |
| 326-390: | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 5 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR NATIONAL STEEL - DETROIT, MI
SAROAD STATION # 10200016 SITE ID # 05
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 0 | 41 | 79 | 64 | 57 | 55 | 0 | 56 | 55 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | 87.6 | 87.9 | 94.5 | 83.8 | 84.9 | ****** | 65.3 | 63.2 |
| GEOMETRIC S.D.: | ****** | ****** | ****** | 1.4 | 1.5 | 1.6 | 1.6 | 1.4 | ****** | 1.4 | 1.5 |
| ARITHMETIC MEAN | ****** | ****** | ****** | 93.9 | 95.6 | 107.2 | 93.4 | 90.4 | ****** | 69.6 | 69.4 |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | 261.1 | 299.5 | 397.1 | 333.8 | 246.3 | ****** | 181.9 | 227.2 |
| 1ST HIGHEST: | ****** | ****** | ****** | 218.0 | 240.0 | 288.0 | 245.0 | 141.0 | ****** | 177.0 | 204.0 |
| DATE : | ****** | ****** | ****** | 750810 | 761116 | 770706 | 781104 | 790316 | ****** | 810522 | 820423 |
| 2ND HIGHEST: | ****** | ****** | ****** | 163.0 | 210.0 | 285.0 | 222.0 | 141.0 | ****** | 144.0 | 145.0 |
| DATE : | ****** | ****** | ****** | 750623 | 761015 | 770419 | 780526 | 790714 | ****** | 810814 | 821026 |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 0 | 3 | 4 | 9 | 4 | 0 | 0 | 1 | 1 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 0 | 9 | 17 | 13 | 15 | 14 | 0 | 31 | 30 |
| 66-130: | 0 | 0 | 0 | 26 | 47 | 39 | 34 | 35 | 0 | 23 | 22 |
| 131-195: | 0 | 0 | 0 | 5 | 13 | 5 | 5 | 6 | 0 | 2 | 2 |
| 196-260: | 0 | 0 | 0 | 1 | 2 | 3 | 3 | 0 | 0 | 0 | 1 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR NATIONAL STEEL - DETROIT, MI
SAROAD STATION # 10200032 SITE ID # 03
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 53 | 61 | 56 | 58 | 71 | 63 | 54 | 58 | 0 | 57 | 55 |
| GEOMETRIC MEAN: | 126.2 | 120.1 | 94.0 | 80.9 | 89.5 | 92.9 | 78.6 | 84.0 | ****** | 71.8 | 61.5 |
| GEOMETRIC S.D.: | 1.6 | 1.5 | 1.6 | 1.6 | 1.7 | 1.6 | 1.7 | 1.4 | ****** | 1.4 | 1.5 |
| ARITHMETIC MEAN | 138.9 | 129.3 | 103.1 | 90.1 | 100.4 | 106.3 | 91.4 | 89.7 | ****** | 76.4 | 66.2 |
| HIGHEST BY LARSEN EXTRP: | 479.4 | 376.6 | 340.9 | 303.9 | 397.9 | 398.3 | 395.9 | 246.6 | ****** | 201.0 | 187.5 |
| 1ST HIGHEST: | 287.0 | 319.0 | 210.0 | 266.0 | 284.0 | 412.0 | 279.0 | 206.0 | ****** | 188.0 | 173.0 |
| DATE : | 720521 | 730907 | 740920 | 750518 | 761112 | 770513 | 780905 | 790906 | ****** | 810522 | 821026 |
| 2ND HIGHEST: | 263.0 | 272.0 | 207.0 | 205.0 | 228.0 | 287.0 | 245.0 | 164.0 | ****** | 132.0 | 133.0 |
| DATE : | 721016 | 730828 | 740523 | 750319 | 760915 | 770413 | 780824 | 790918 | ****** | 810504 | 820423 |
| # OF READINGS EXCEEDING 260 : | 2 | 3 | 0 | 1 | 1 | 3 | 1 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 20 | 16 | 10 | 6 | 10 | 10 | 8 | 2 | 0 | 1 | 1 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 5 | 5 | 11 | 18 | 16 | 15 | 18 | 14 | 0 | 23 | 34 |
| 66-130: | 24 | 30 | 32 | 30 | 41 | 33 | 28 | 37 | 0 | 32 | 19 |
| 131-195: | 15 | 23 | 10 | 8 | 12 | 10 | 5 | 6 | 0 | 2 | 2 |
| 196-260: | 7 | 0 | 3 | 1 | 1 | 2 | 2 | 1 | 0 | 0 | 0 |
| 261-325: | 2 | 3 | 0 | 1 | 1 | 2 | 1 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

24-HR STANDARD EXCEEDANCE ROSE FOR
NATIONAL STEEL - DETROIT, MI
(ALL CASES > 260 UG/M**3)
X=0.900
COUNT/AVERAGE TSP OF PRIMARY EXCEEDANCES

| SAROAD # | 231180015 | | 10200037 | | 234420005 | | 10200014 | | 10200015 | | 10200016 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SITE ID # | 2 | | 7 | | 1 | | 6 | | 4 | | 5 | |
| DIRECTION | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X |
| N COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| NNE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 302. | 0. | 0. |
| NE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| ENE COUNT: | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 |
| AVE TSP: | 295. | 0. | 0. | 0. | 0. | 293. | 0. | 0. | 447. | 0. | 0. | 0. |
| E COUNT: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 554. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| ESE COUNT: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 266. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| SE COUNT: | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 365. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| SSE COUNT: | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| AVE TSP: | 0. | 403. | 0. | 0. | 0. | 280. | 0. | 0. | 0. | 340. | 0. | 0. |
| S COUNT: | 6 | 3 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 308. | 293. | 0. | 0. | 264. | 316. | 0. | 0. | 0. | 0. | 0. | 0. |
| SSW COUNT: | 6 | 6 | 1 | 0 | 4 | 3 | 0 | 1 | 0 | 0 | 0 | 0 |
| AVE TSP: | 312. | 313. | 281. | 0. | 285. | 350. | 0. | 273. | 0. | 0. | 0. | 0. |
| SW COUNT: | 4 | 4 | 0 | 0 | 1 | 2 | 3 | 1 | 4 | 2 | 1 | 1 |
| AVE TSP: | 319. | 360. | 0. | 0. | 403. | 335. | 387. | 275. | 452. | 315. | 264. | 285. |
| WSW COUNT: | 1 | 1 | 0 | 0 | 0 | 0 | 3 | 3 | 3 | 4 | 1 | 1 |
| AVE TSP: | 423. | 271. | 0. | 0. | 0. | 0. | 317. | 280. | 372. | 364. | 288. | 273. |
| W COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 6 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 339. | 279. | 359. | 0. | 0. | 0. |
| WNW COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 5 | 2 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 306. | 321. | 347. | 388. | 0. | 0. |
| NW COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 385. | 0. | 0. | 0. |
| NNW COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| ALL COUNT: | 19 | 18 | 1 | 0 | 6 | 8 | 10 | 7 | 20 | 10 | 2 | 2 |
| AVE TSP: | 330. | 326. | 281. | 0. | 301. | 326. | 344. | 284. | 382. | 350. | 276. | 279. |

24-HR STANDARD EXCEEDANCE ROSE FOR
NATIONAL STEEL - DETROIT, MI
(ALL CASES > 260 UG/M**3)
X=0.900
COUNT/AVERAGE TSP OF PRIMARY EXCEEDANCES

SAROAD # 10200032
SITE ID # 3

| DIRECTION | | W>=X | W<X |
|---|---|---|---|
| N | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| NNE | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| NE | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| ENE | COUNT: | 0 | 1 |
| | AVE TSP: | 0. | 287. |
| E | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| ESE | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| SE | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| SSE | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| S | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| SSW | COUNT: | 0 | 1 |
| | AVE TSP: | 0. | 266. |
| SW | COUNT: | 1 | 0 |
| | AVE TSP: | 263. | 0. |
| WSW | COUNT: | 1 | 3 |
| | AVE TSP: | 283. | 277. |
| W | COUNT: | 1 | 0 |
| | AVE TSP: | 284. | 0. |
| WNW | COUNT: | 2 | 1 |
| | AVE TSP: | 296. | 412. |
| NW | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| NNW | COUNT: | 0 | 0 |
| | AVE TSP: | 0. | 0. |
| ALL | COUNT: | 5 | 6 |
| | AVE TSP: | 284. | 300. |

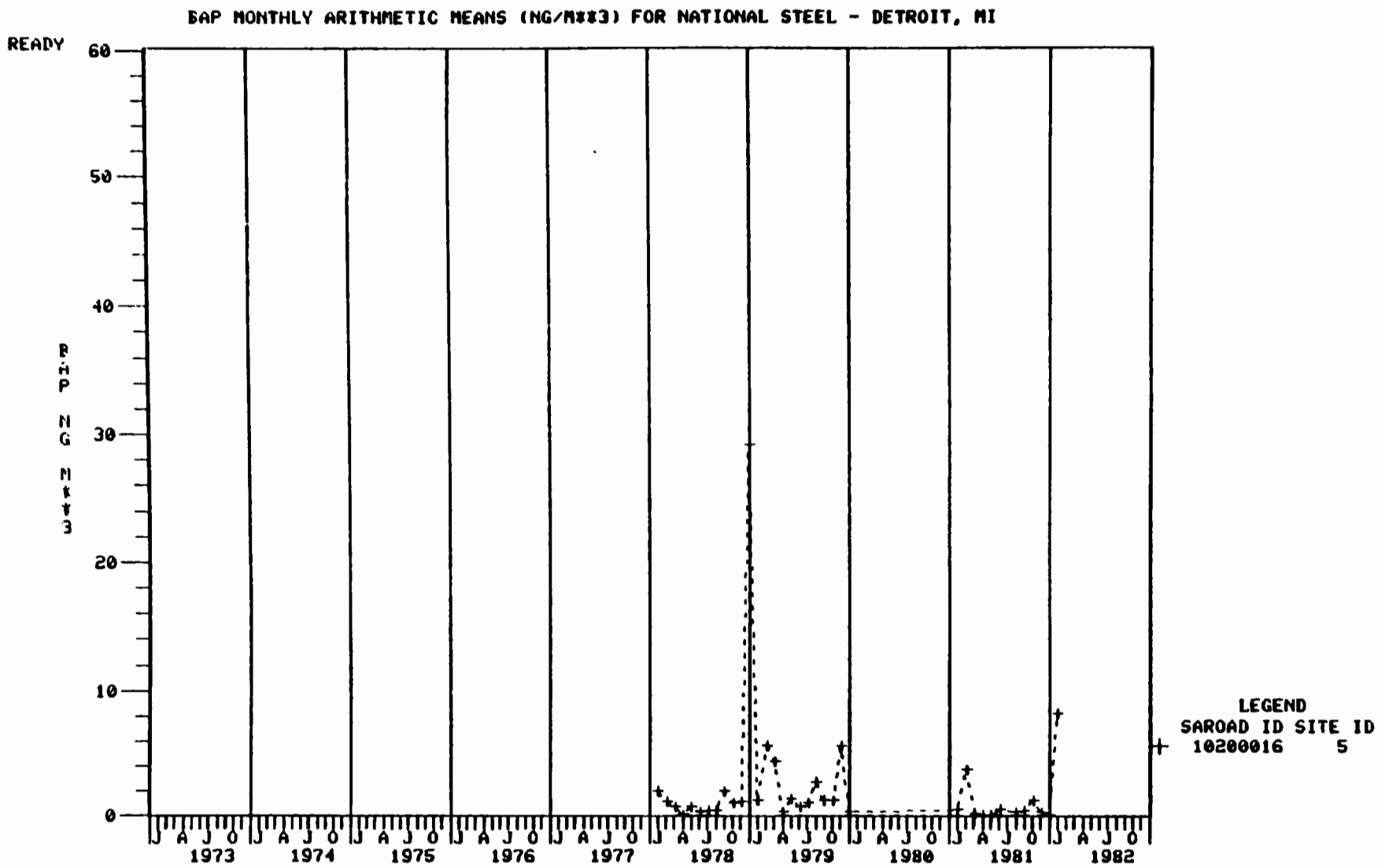
24-HR STANDARD EXCEEDANCE ROSE FOR
NATIONAL STEEL - DETROIT, MI
(ALL CASES > 150 UG/M**3)
X=0.900
COUNT/AVERAGE TSP OF SECONDARY EXCEEDANCES

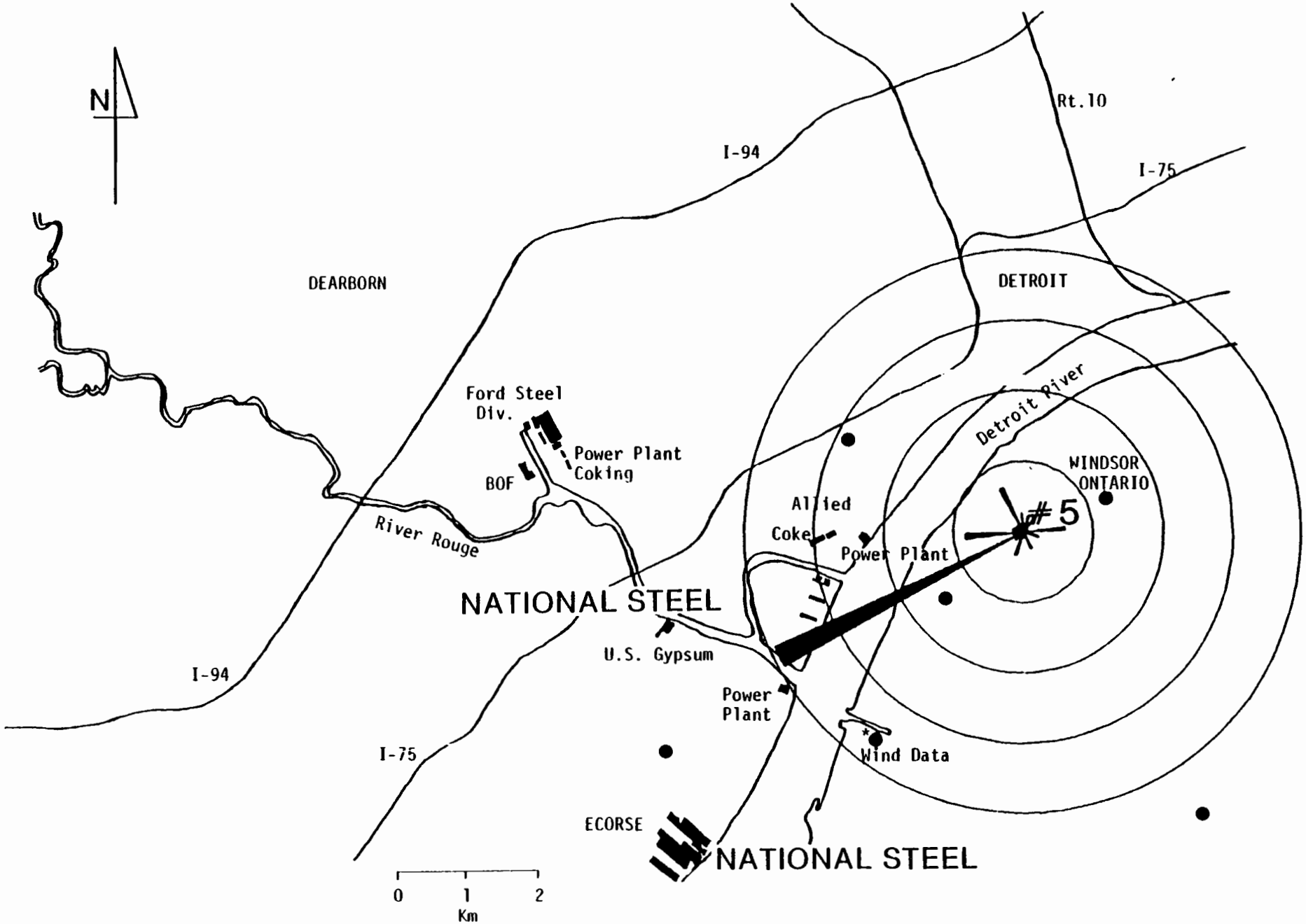
| SAROAD # | 231180015 | | 10200037 | | 234420005 | | 10200014 | | 10200015 | | 10200016 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SITE ID # | 2 | | 7 | | 1 | | 6 | | 4 | | 5 | |
| DIRECTION | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X |
| N COUNT: | 1 | 3 | 0 | 0 | 1 | 4 | 1 | 0 | 1 | 2 | 0 | 0 |
| AVE TSP: | 236. | 206. | 0. | 0. | 157. | 162. | 186. | 0. | 178. | 160. | 0. | 0. |
| NNE COUNT: | 0 | 2 | 0 | 0 | 2 | 3 | 0 | 1 | 1 | 3 | 0 | 0 |
| AVE TSP: | 0. | 180. | 0. | 0. | 176. | 194. | 0. | 171. | 169. | 230. | 0. | 0. |
| NE COUNT: | 3 | 3 | 0 | 0 | 6 | 2 | 1 | 1 | 1 | 1 | 0 | 1 |
| AVE TSP: | 192. | 187. | 0. | 0. | 180. | 218. | 214. | 165. | 153. | 172. | 0. | 235. |
| ENE COUNT: | 3 | 5 | 0 | 0 | 4 | 3 | 0 | 1 | 2 | 1 | 0 | 0 |
| AVE TSP: | 206. | 194. | 0. | 0. | 182. | 225. | 0. | 190. | 306. | 222. | 0. | 0. |
| E COUNT: | 3 | 4 | 0 | 0 | 0 | 6 | 1 | 2 | 0 | 0 | 0 | 0 |
| AVE TSP: | 334. | 193. | 0. | 0. | 0. | 179. | 206. | 200. | 0. | 0. | 0. | 0. |
| ESE COUNT: | 3 | 1 | 0 | 0 | 3 | 1 | 0 | 1 | 1 | 1 | 0 | 0 |
| AVE TSP: | 186. | 266. | 0. | 0. | 170. | 166. | 0. | 164. | 191. | 176. | 0. | 0. |
| SE COUNT: | 0 | 6 | 0 | 0 | 0 | 5 | 0 | 1 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 255. | 0. | 0. | 0. | 168. | 0. | 156. | 0. | 0. | 0. | 0. |
| SSE COUNT: | 1 | 11 | 0 | 0 | 0 | 6 | 0 | 6 | 1 | 7 | 0 | 1 |
| AVE TSP: | 165. | 216. | 0. | 0. | 0. | 192. | 0. | 205. | 167. | 211. | 0. | 174. |
| S COUNT: | 25 | 17 | 0 | 0 | 20 | 14 | 10 | 8 | 2 | 4 | 0 | 1 |
| AVE TSP: | 221. | 221. | 0. | 0. | 196. | 199. | 178. | 181. | 168. | 206. | 0. | 222. |
| SSW COUNT: | 14 | 19 | 1 | 0 | 13 | 11 | 7 | 7 | 8 | 3 | 1 | 0 |
| AVE TSP: | 250. | 233. | 281. | 0. | 227. | 234. | 179. | 199. | 203. | 160. | 245. | 0. |
| SW COUNT: | 14 | 15 | 0 | 1 | 6 | 8 | 13 | 15 | 10 | 13 | 4 | 2 |
| AVE TSP: | 230. | 236. | 0. | 173. | 234. | 211. | 241. | 191. | 291. | 202. | 205. | 226. |
| WSW COUNT: | 9 | 9 | 0 | 0 | 2 | 8 | 16 | 9 | 12 | 12 | 3 | 4 |
| AVE TSP: | 206. | 207. | 0. | 0. | 169. | 169. | 229. | 206. | 255. | 257. | 236. | 203. |
| W COUNT: | 4 | 9 | 0 | 0 | 2 | 4 | 9 | 6 | 14 | 9 | 1 | 0 |
| AVE TSP: | 172. | 181. | 0. | 0. | 157. | 178. | 243. | 234. | 253. | 202. | 204. | 0. |
| WNW COUNT: | 5 | 4 | 0 | 1 | 0 | 3 | 5 | 8 | 10 | 9 | 0 | 4 |
| AVE TSP: | 159. | 200. | 0. | 186. | 0. | 192. | 226. | 204. | 277. | 227. | 0. | 198. |
| NW COUNT: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 4 | 0 | 0 |
| AVE TSP: | 0. | 177. | 0. | 0. | 0. | 0. | 0. | 0. | 385. | 183. | 0. | 0. |
| NNW COUNT: | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| AVE TSP: | 0. | 199. | 0. | 0. | 0. | 161. | 0. | 0. | 0. | 191. | 0. | 0. |
| ALL COUNT: | 85 | 110 | 1 | 2 | 59 | 79 | 63 | 66 | 64 | 70 | 9 | 13 |
| AVE TSP: | 220. | 217. | 281. | 180. | 199. | 195. | 218. | 198. | 251. | 212. | 220. | 207. |

24-HR STANDARD EXCEEDANCE ROSE FOR
NATIONAL STEEL - DETROIT, MI
(ALL CASES > 150 UG/M**3)
X=0.900
COUNT/AVERAGE TSP OF SECONDARY EXCEEDANCES

SAROAD # 10200032
SITE ID # 3

| DIRECTION | W>=X | W<X |
|---|---|---|
| N COUNT: | 0 | 2 |
| AVE TSP: | 0. | 193. |
| NNE COUNT: | 1 | 5 |
| AVE TSP: | 210. | 191. |
| NE COUNT: | 2 | 2 |
| AVE TSP: | 191. | 158. |
| ENE COUNT: | 1 | 2 |
| AVE TSP: | 173. | 223. |
| E COUNT: | 0 | 1 |
| AVE TSP: | 0. | 157. |
| ESE COUNT: | 1 | 2 |
| AVE TSP: | 176. | 168. |
| SE COUNT: | 0 | 0 |
| AVE TSP: | 0. | 0. |
| SSE COUNT: | 0 | 3 |
| AVE TSP: | 0. | 212. |
| S COUNT: | 3 | 5 |
| AVE TSP: | 171. | 179. |
| SSW COUNT: | 6 | 1 |
| AVE TSP: | 174. | 266. |
| SW COUNT: | 8 | 3 |
| AVE TSP: | 188. | 171. |
| WSW COUNT: | 5 | 8 |
| AVE TSP: | 203. | 209. |
| W COUNT: | 2 | 4 |
| AVE TSP: | 230. | 190. |
| WNW COUNT: | 5 | 4 |
| AVE TSP: | 233. | 261. |
| NW COUNT: | 1 | 1 |
| AVE TSP: | 213. | 176. |
| NNW COUNT: | 3 | 3 |
| AVE TSP: | 174. | 188. |
| ALL COUNT: | 38 | 46 |
| AVE TSP: | 194. | 198. |


BAP MONTHLY ARITHMETIC MEANS (NG/M**3) FOR NATIONAL STEEL - DETROIT, MI
READY
BAP NG M**3
60
50
40
30
20
10
0
J A J O
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
LEGEND
SAROAD ID SITE ID
10200016 5




BaP roses for National Steel - Detroit, Michigan, for the period 1978-1982 for cases of $\omega > 0.80$. Each circle represents 5 ng/m$^3$.

## AIR QUALITY EVALUATION - NATIONAL STEEL, DETROIT, MICHIGAN

Air quality trends:

All stations except #7 indicated an upward trend beginning in mid-1978 through mid-1979. This was followed by a downtrend from late 1979 through 1982.

Long-term trends were the strongest at station #4, with a Spearman correlation coefficient of -0.92. Strong downward trends were also evident at stations #2, #3, and #6 (coefficients of -0.78, -0.78, and -0.82, respectively).

Stations #1 and #2 demonstrated percentages of observations exceeding 150 $\mu g/m^3$ that declined to a minimum in 1978, which was followed by a sharp rise until mid-1979. This was followed by a steady decline in the percentage through 1982. The percentage for stations #4, #5, and #6 fell from the 50-60 percent level in 1974 to generally under 20 percent for the period 1976 through 1979. The percentage further declined to between 5 and 10 percent in 1982.

Standard exceedance status:

All stations except #7, the station farthest from the mill, exceeded the primary TSP standards through 1980. Stations #3, #5, and #6 no longer showed violations in 1981; stations #1 and #4 no longer showed violations in 1982. Station #2 remained in violation of the primary annual standard in 1982.

Pollution roses:

Station #1 indicates impact from both the Zug Island and Ecorse plants. Canadian stations #3 and #4 continue to show strong mill impact, particularly from the Zug Island coke batteries.

Standard exceedance roses:

Approximately two-thirds of the primary standard exceedances at stations #1 and #2 were associated with wind directions coming from sectors in which mill sources are located. The majority of exceedances at the three closest Canadian stations (#3, #4, #5) also occurred with winds directed from the mill.

BaP:

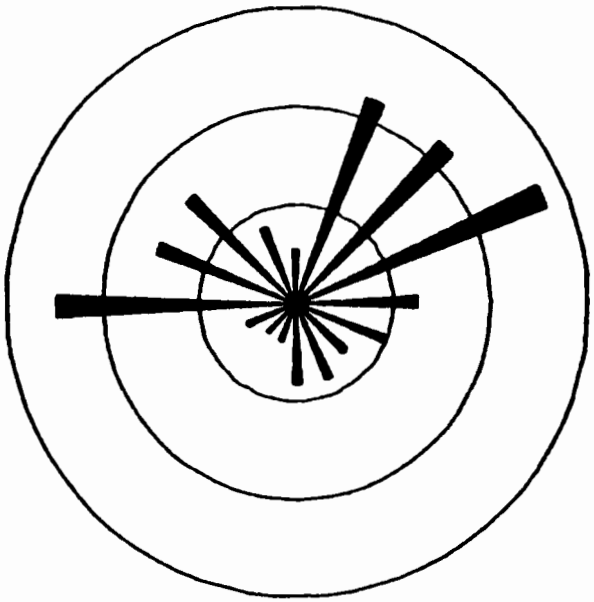
BaP was sampled at station #5. Monthly average values were generally less than 10 ng/m$^3$. The BaP pollution rose for station #5 indicates that the greatest observed ambient BaP originates from National Steel coking operations on Zug Island.

Inhalable particulate matter:

Station #2 sampled IP as part of the EPA IP Network. Data for this site are summarized below:

| Year | Instrument | # of Obs. | Arithmetic Mean | Highest | Second Highest | Standard Deviation |
|---|---|---|---|---|---|---|
| 1980 | SSI | 10 | 70.4 | 123.8 | 117.7 | 32.5 |
| 1981 | SSI | 20 | 82.0 | 173.5 | 138.9 | 40.3 |

WIND ROSE
PERSISTENCE CLASS 0.95
WIND STATION 10200001

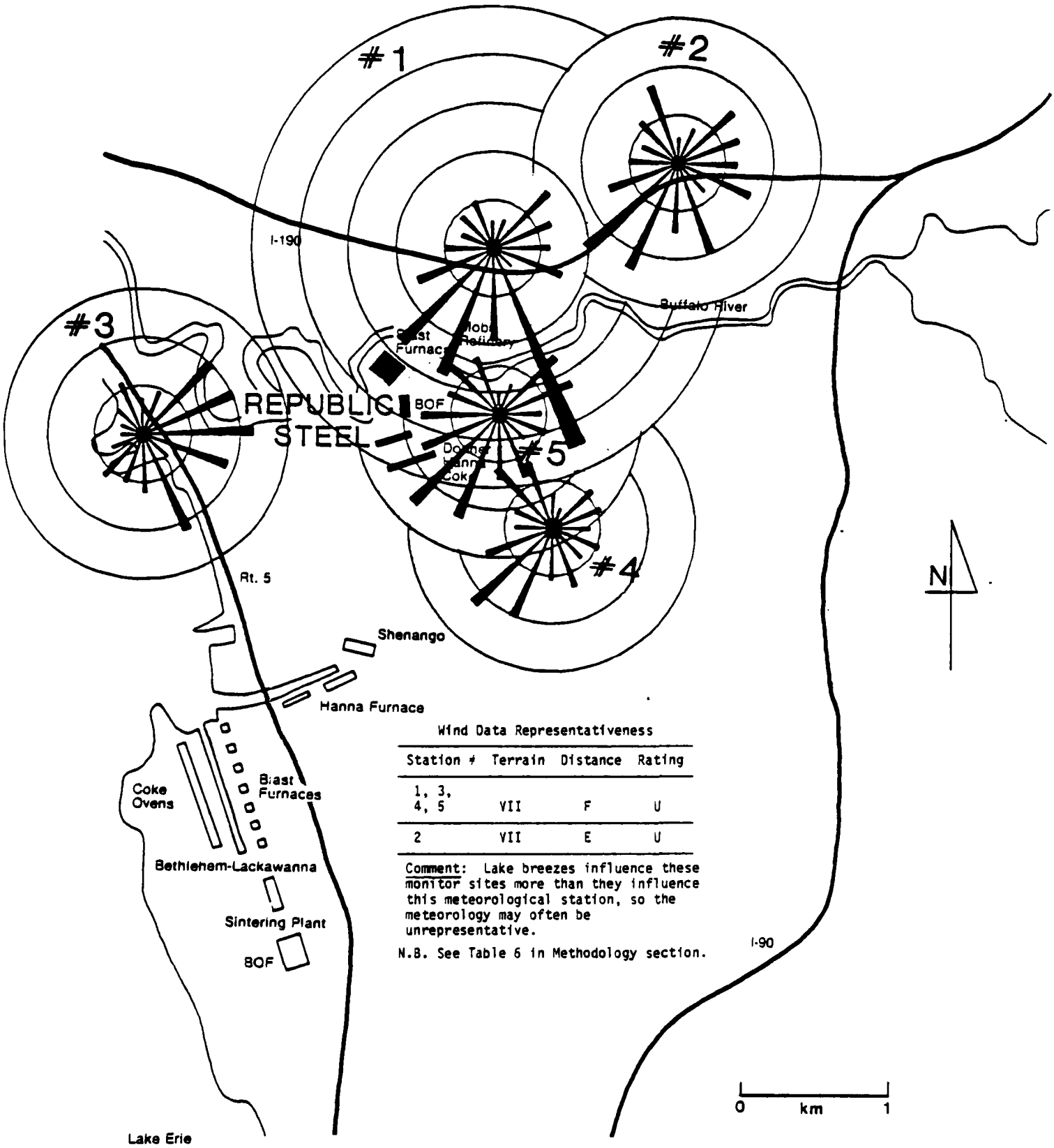


REPUBLIC STEEL
Buffalo
Erie County
New York
EPA Region II

Hi-Vol Monitoring Sites--Republic Steel, Buffalo, New York

| Site ID Number | SAROAD Number | Site Name and Address | Plant Location from Site: Facility/ Bearing (°) | Plant Location from Site: Distance (km) | Elevation (m): Above Ground | Elevation (m): Above MSL | Elevation (m): Above Plant | Site Description | Nearest Roadway: Name | Nearest Roadway: Direction | Nearest Roadway: Distance (m) | Nearest Roadway: Type & Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 33-0660-003-G01 | Public School #26<br>84 Harrison St.<br>Buffalo, NY | Blast furnaces 225<br>BOF 213<br>Donner Hanna Coke 205 | 1.3<br>1.6<br>2.0 | 9 | 180 | 2 | Roof<br>Center city-industrial | Harrison St. | ESE | 23 | L |
| 2 | 33-0660-005-F01 | 185 Dingens St.<br>Buffalo, NY | Blast furnaces 236<br>BOF 229<br>Donner Hanna Coke 224 | 3.2<br>3.3<br>3.6 | 3 | 183 | 5 | Top of trailer | Access rd. to state bridge maintenance yard<br>Dingens St. | E<br>N | 3<br>60 | L<br>2-lane, M |
| 3 | 33-0660-014-F01 | Buffalo Port Terminal<br>901 Fuhrman Blvd.<br>Buffalo, NY | Blast furnaces 73<br>BOF 82<br>Donner Hanna Coke 92 | 2.4<br>2.4<br>2.4 | 9 | 178 | 0 | Roof<br>Center city-residential | Rt. 5 | NE | 90 | 4-lane, M to H |
| 4 | 33-0660-006-F01 | Holy Family School<br>920 Tifft St.<br>Buffalo, NY | Blast furnaces 318<br>BOF 312<br>Donner Hanna Coke 300 | 2.0<br>1.7<br>1.4 | 15 | 180 | 2 | Roof<br>Center city-industrial | Tifft St. | S | 15 | 2-lane, M |
| 5 | 36-0660-010-F01 | Public School #28<br>1515 S. Park Ave.<br>Buffalo, NY | Blast furnaces 296<br>BOF 276<br>Donner Hanna Coke 242 | 1.1<br>0.9<br>0.9 | 9 | 178 | 0 | Roof<br>Center city-industrial | Bailey<br>S. Park Ave. | ENE<br>NNE | 45<br>45 | 2-lane, M<br>2-lane, M |

Key: U = Unavailable M = Moderate
L = Light H = Heavy




Wind Data Representativeness

| Station # | Terrain | Distance | Rating |
|---|---|---|---|
| 1, 3, 4, 5 | VII | F | U |
| 2 | VII | E | U |

Comment: Lake breezes influence these monitor sites more than they influence this meteorological station, so the meteorology may often be unrepresentative.

N.B. See Table 6 in Methodology section.

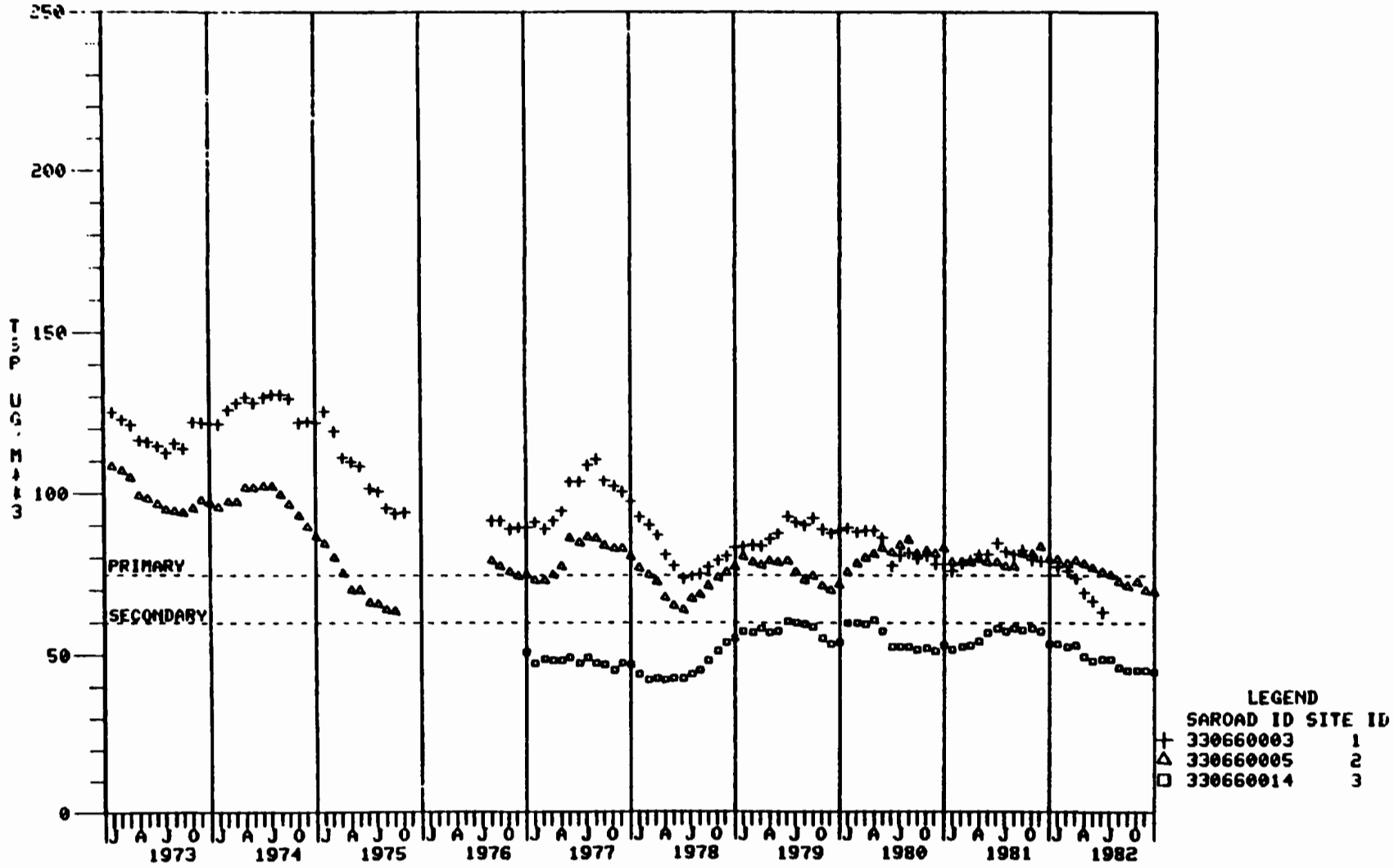
TSP roses for Republic Steel - Buffalo, New York, for the period 1978-1982 for cases of $\omega$>0.90. Each circle represents 50 $\mu g/m^3$.

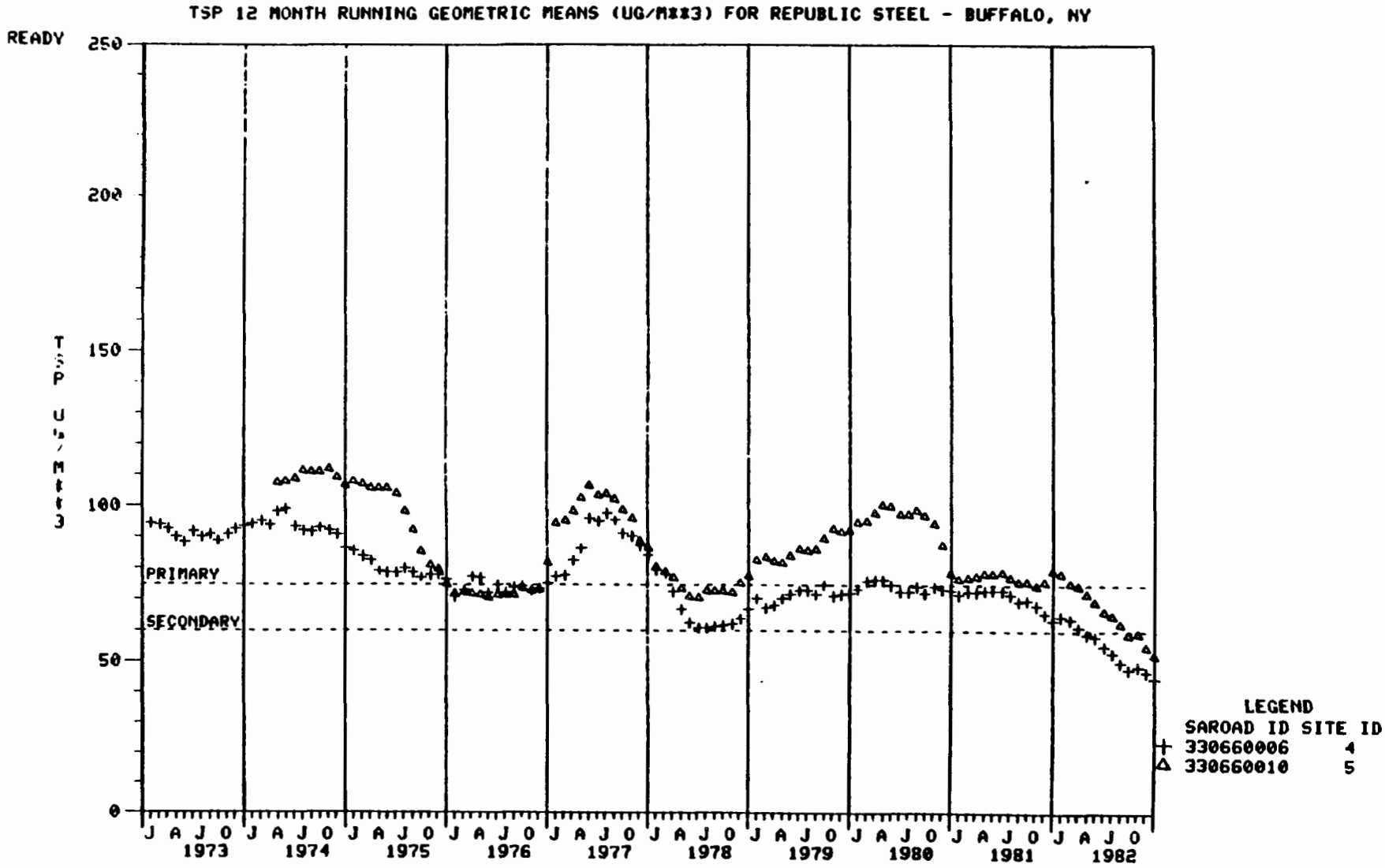
NUMBER OF TSP OBSERVATIONS USED IN POLLUTION ROSES

Republic Steel--Buffalo, NY

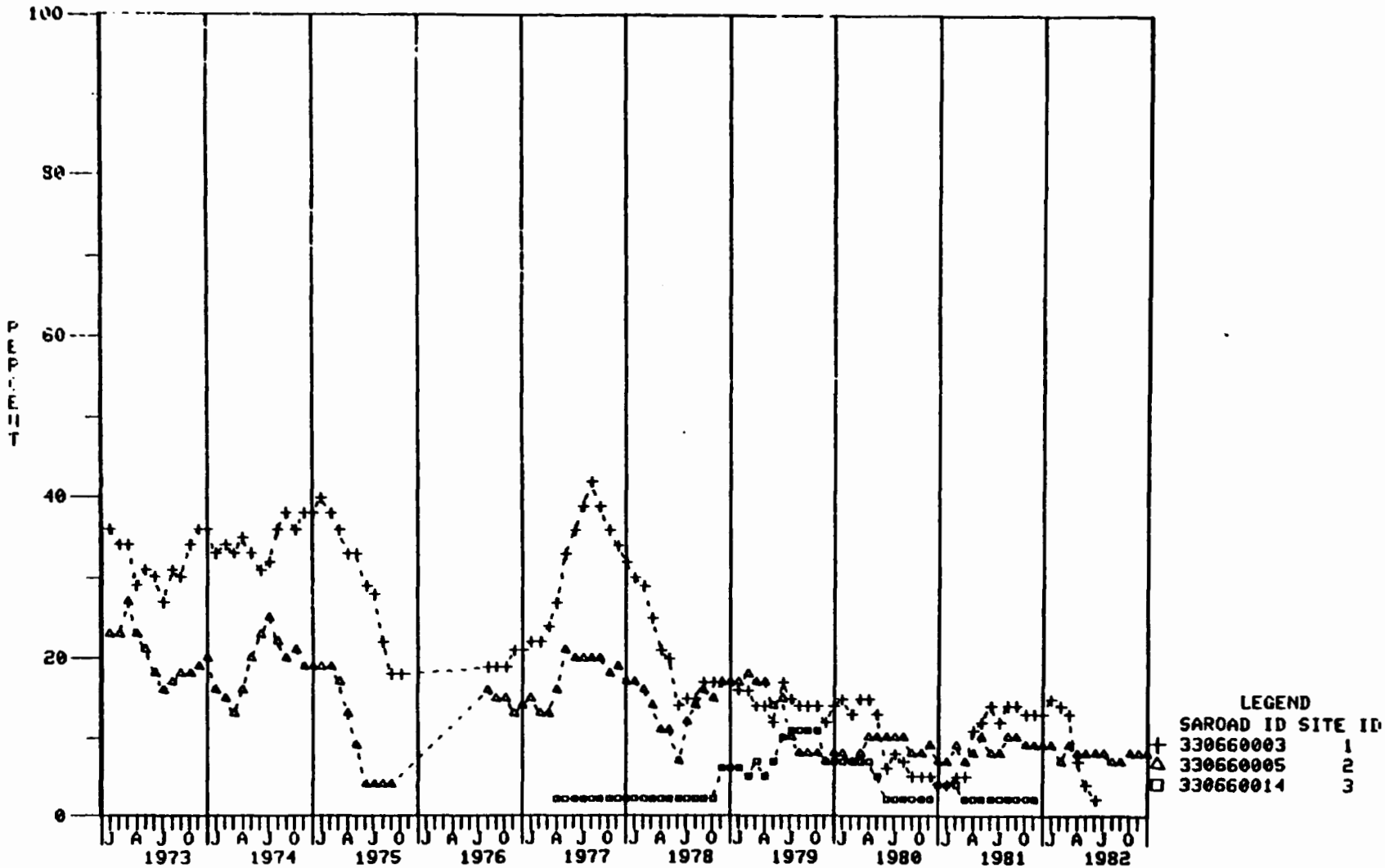
| Wind Direction | Monitoring Site Numbers #1 | #2 | #3 | #4 | #5 |
|---|---|---|---|---|---|
| N | 2 | 2 | 2 | 2 | 1 |
| NNE | 1 | 2 | 2 | 2 | 3 |
| NE | 4 | 6 | 5 | 6 | 7 |
| ENE | 4 | 6 | 5 | 5 | 5 |
| E | 3 | 4 | 4 | 3 | 4 |
| ESE | 1 | 1 | 1 | 1 | 1 |
| SE | 1 | 2 | 2 | 2 | 2 |
| SSE | 3 | 5 | 5 | 4 | 6 |
| S | 6 | 7 | 7 | 7 | 8 |
| SSW | 14 | 15 | 12 | 13 | 16 |
| SW | 19 | 20 | 18 | 22 | 21 |
| WSW | 18 | 22 | 20 | 21 | 20 |
| W | 8 | 12 | 10 | 10 | 15 |
| WNW | 6 | 7 | 6 | 8 | 10 |
| NW | 3 | 2 | 3 | 3 | 4 |
| NNW | 1 | 2 | 2 | 1 | 2 |
| Total | 94 | 115 | 104 | 110 | 125 |

TSP 12 MONTH RUNNING GEOMETRIC MEANS (UG/M**3) FOR REPUBLIC STEEL - BUFFALO, NY

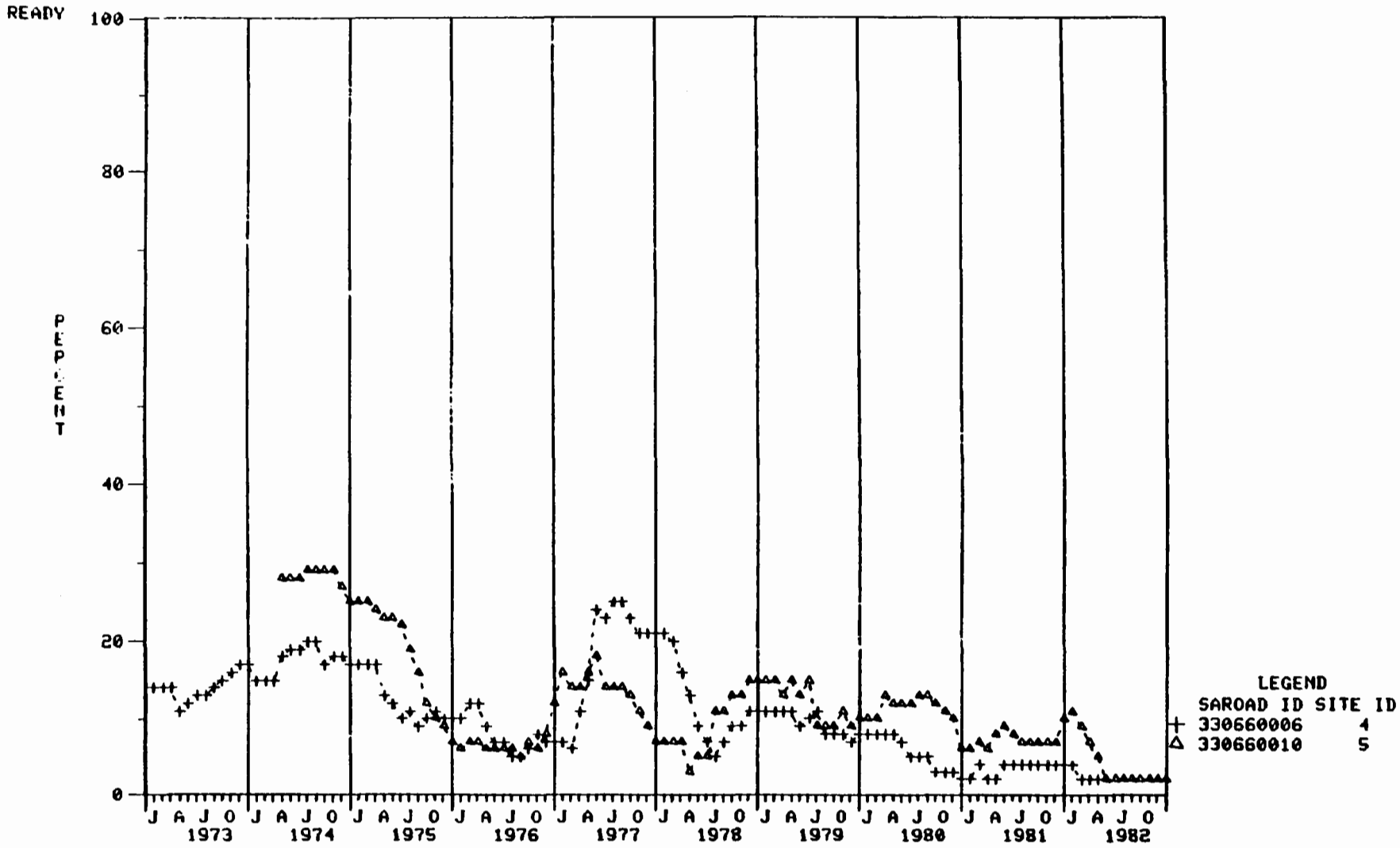



TSP 12 MONTH RUNNING GEOMETRIC MEANS (UG/M**3) FOR REPUBLIC STEEL - BUFFALO, NY
READY
250
200
150
100
50
0
TSP UG/M**3
PRIMARY
SECONDARY
J A J O J A J O J A J O J A J O J A J O J A J O J A J O J A J O J A J O J A J O
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
LEGEND
SAROAD ID SITE ID
330660006 4
330660010 5

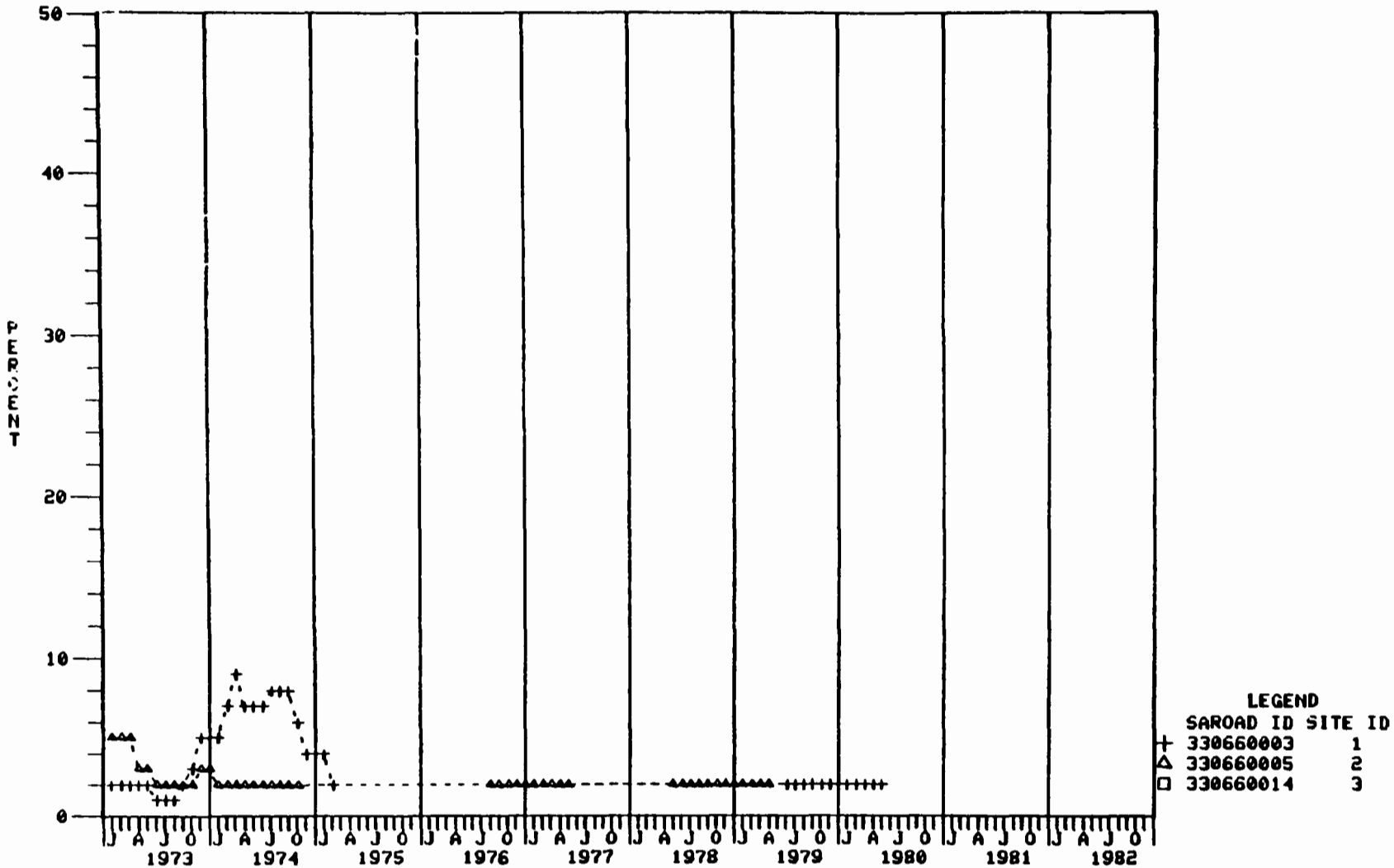
TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 150 (UG/M**3) FOR REPUBLIC STEEL - BUFFALO, NY



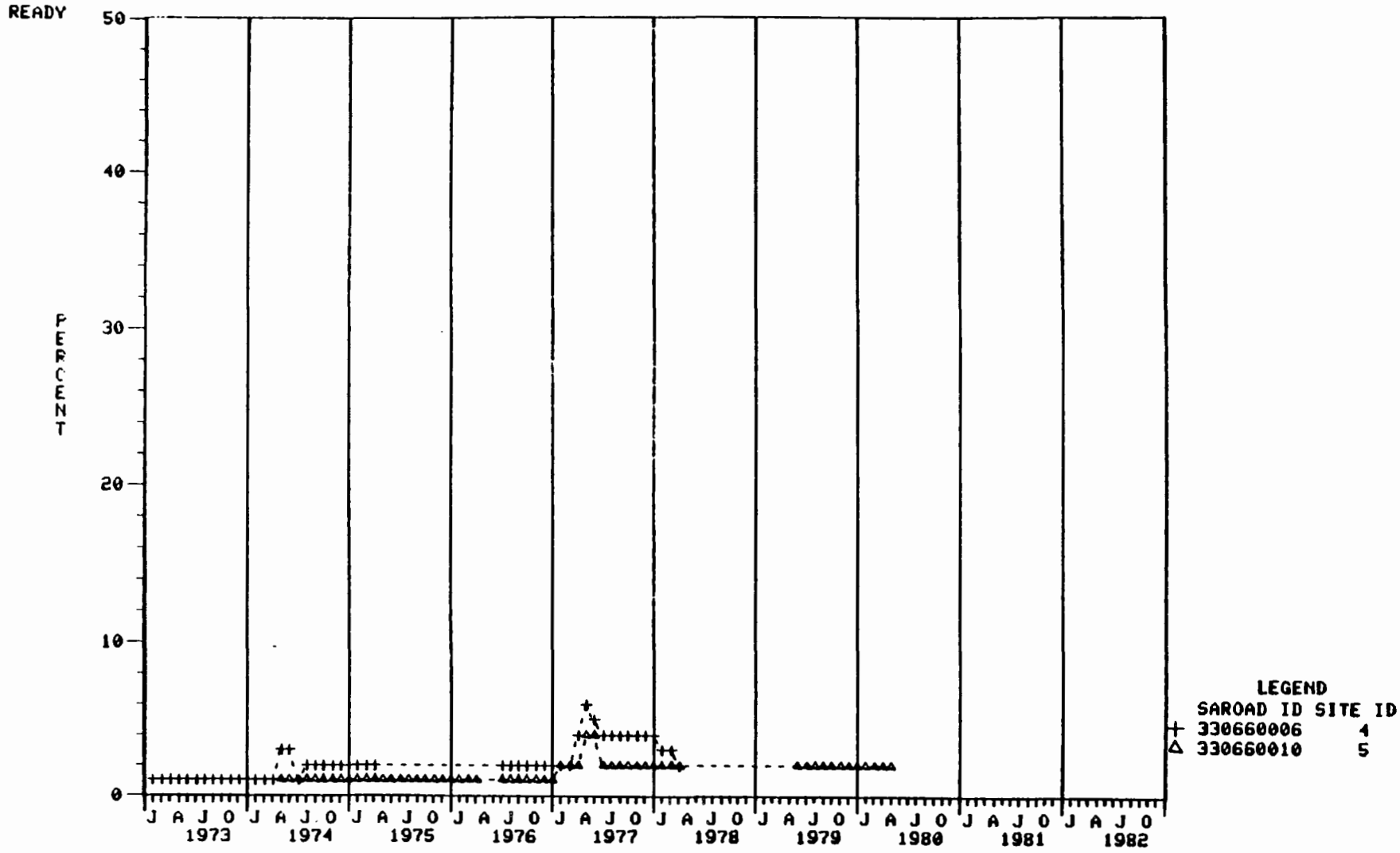
TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 150 (UG/M**3) FOR REPUBLIC STEEL - BUFFALO, NY



TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 260 (UG/M**3) FOR REPUBLIC STEEL - BUFFALO, NY



TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 260 (UG/M**3) FOR REPUBLIC STEEL - BUFFALO, NY



TSP DATA SUMMARY FOR REPUBLIC STEEL - BUFFALO, NY
SAROAD STATION # 330660003 SITE ID # 01
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 137 | 58 | 53 | 39 | 56 | 44 | 54 | 49 | 56 | 60 | 15 |
| GEOMETRIC MEAN: | 125.7 | 121.6 | 122.2 | ****** | 89.7 | 98.0 | 83.3 | 88.6 | 78.4 | 74.7 | ****** |
| GEOMETRIC S.D.: | 1.5 | 1.6 | 1.6 | ****** | 1.7 | 1.7 | 1.8 | 1.7 | 1.5 | 1.7 | ****** |
| ARITHMETIC MEAN | 136.7 | 136.1 | 135.7 | ****** | 103.7 | 112.4 | 96.9 | 102.7 | 84.9 | 84.3 | ****** |
| HIGHEST BY LARSEN EXTRP: | 430.8 | 500.2 | 478.6 | ****** | 447.4 | 478.1 | 440.3 | 421.5 | 267.3 | 328.3 | ****** |
| 1ST HIGHEST: | 363.0 | 309.0 | 312.0 | 243.0 | 253.0 | 231.0 | 254.0 | 438.0 | 166.0 | 178.0 | 127.0 |
| DATE : | 720612 | 731112 | 740306 | 750418 | 760611 | 770419 | 780526 | 790620 | 800304 | 810522 | 820505 |
| 2ND HIGHEST: | 290.0 | 303.0 | 289.0 | 183.0 | 248.0 | 224.0 | 230.0 | 251.0 | 159.0 | 174.0 | 110.0 |
| DATE : | 720427 | 730416 | 740228 | 750124 | 761214 | 770513 | 780911 | 790509 | 800720 | 810615 | 820429 |
| # OF READINGS EXCEEDING 260 : | 4 | 3 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 49 | 21 | 19 | 7 | 12 | 14 | 8 | 7 | 2 | 8 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 8 | 6 | 7 | 8 | 19 | 13 | 17 | 10 | 15 | 21 | 10 |
| 66-130: | 58 | 25 | 25 | 21 | 17 | 16 | 24 | 30 | 37 | 29 | 5 |
| 131-195: | 55 | 18 | 11 | 9 | 15 | 10 | 10 | 7 | 4 | 10 | 0 |
| 196-260: | 12 | 6 | 8 | 1 | 5 | 5 | 3 | 1 | 0 | 0 | 0 |
| 261-325: | 3 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR REPUBLIC STEEL - BUFFALO, NY
SAROAC STATION # 330660005 SITE ID # 02
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 60 | 61 | 54 | 38 | 56 | 53 | 60 | 60 | 56 | 55 | 61 |
| GEOMETRIC MEAN: | 105.0 | 97.1 | 86.7 | ****** | 74.7 | 80.6 | 77.6 | 71.7 | 82.9 | 79.4 | 69.5 |
| GEOMETRIC S.D.: | 1.6 | 1.7 | 1.7 | ****** | 1.8 | 1.8 | 1.9 | 1.7 | 1.6 | 1.6 | 1.6 |
| ARITHMETIC MEAN | 116.5 | 112.2 | 98.8 | ****** | 88.0 | 94.7 | 93.8 | 81.1 | 92.2 | 88.5 | 78.3 |
| HIGHEST BY LARSEN EXTRP: | 408.8 | 486.0 | 402.1 | ****** | 388.1 | 449.5 | 518.5 | 316.1 | 360.8 | 322.1 | 299.7 |
| 1ST HIGHEST: | 292.0 | 279.0 | 259.0 | 201.0 | 281.0 | 222.0 | 290.0 | 227.0 | 186.0 | 249.0 | 181.0 |
| DATE : | 720409 | 731124 | 740411 | 751120 | 760611 | 770419 | 780526 | 790509 | 800304 | 810522 | 820429 |
| 2ND HIGHEST: | 290.0 | 270.0 | 208.0 | 189.0 | 242.0 | 206.0 | 209.0 | 180.0 | 171.0 | 167.0 | 172.0 |
| DATE : | 720608 | 730116 | 740417 | 750524 | 760629 | 770413 | 780911 | 790220 | 800421 | 810504 | 820511 |
| # OF READINGS EXCEEDING 260 : | 2 | 2 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 12 | 12 | 10 | 3 | 7 | 9 | 10 | 5 | 4 | 5 | 5 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 8 | 14 | 15 | 19 | 26 | 19 | 21 | 23 | 16 | 16 | 29 |
| 66-130: | 33 | 28 | 23 | 14 | 20 | 20 | 26 | 31 | 31 | 31 | 23 |
| 131-195: | 13 | 13 | 14 | 4 | 6 | 11 | 9 | 5 | 9 | 7 | 9 |
| 196-260: | 4 | 4 | 2 | 1 | 3 | 3 | 3 | 1 | 0 | 1 | 0 |
| 261-325: | 2 | 2 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR REPUBLIC STEEL - BUFFALO, NY
SAROAD STATION # 330660014 SITE ID # 03
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 0 | 0 | 42 | 51 | 52 | 55 | 56 | 57 | 53 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | ****** | 49.4 | 46.9 | 55.2 | 54.0 | 53.2 | 53.6 | 44.6 |
| GEOMETRIC S.D.: | ****** | ****** | ****** | ****** | 1.8 | 1.8 | 2.4 | 2.0 | 1.8 | 1.8 | 1.7 |
| ARITHMETIC MEAN | ****** | ****** | ****** | ****** | 58.7 | 55.8 | 72.6 | 67.0 | 62.8 | 61.8 | 50.3 |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | ****** | 293.3 | 273.2 | 757.8 | 436.3 | 292.0 | 278.2 | 198.8 |
| 1ST HIGHEST: | ****** | ****** | ****** | ****** | 149.0 | 203.0 | 232.0 | 180.0 | 205.0 | 135.0 | 113.0 |
| DATE : | ****** | ****** | ****** | ****** | 760605 | 770419 | 781116 | 790620 | 800328 | 810323 | 820716 |
| 2ND HIGHEST: | ****** | ****** | ****** | ****** | 120.0 | 128.0 | 222.0 | 175.0 | 154.0 | 131.0 | 100.0 |
| DATE : | ****** | ****** | ****** | ****** | 760418 | 770922 | 780426 | 790322 | 801205 | 810422 | 820330 |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 4 | 2 | 0 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 0 | 0 | 26 | 34 | 28 | 31 | 35 | 29 | 40 |
| 66-130: | 0 | 0 | 0 | 0 | 15 | 16 | 20 | 17 | 17 | 25 | 13 |
| 131-195: | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 7 | 3 | 3 | 0 |
| 196-260: | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 0 | 1 | 0 | 0 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR REPUBLIC STEEL - BUFFALO, NY
SAROAD STATION # 330660006 SITE ID # 04
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 139 | 82 | 52 | 40 | 58 | 57 | 56 | 59 | 57 | 57 | 43 |
| GEOMETRIC MEAN: | 94.7 | 93.4 | 86.3 | 76.4 | 75.2 | 84.5 | 66.9 | 72.2 | 73.0 | 63.4 | 44.7 |
| GEOMETRIC S.D.: | 1.5 | 1.6 | 1.6 | 1.6 | 1.6 | 1.8 | 1.8 | 1.7 | 1.4 | 1.6 | 1.6 |
| ARITHMETIC MEAN | 102.4 | 104.1 | 97.2 | 86.3 | 86.5 | 102.0 | 79.0 | 82.0 | 77.8 | 70.6 | 49.6 |
| HIGHEST BY LARSEN EXTRP: | 309.8 | 362.4 | 364.2 | 325.1 | 324.4 | 510.1 | 370.5 | 333.6 | 208.4 | 249.9 | 188.3 |
| 1ST HIGHEST: | 279.0 | 351.0 | 292.0 | 215.0 | 414.0 | 314.0 | 235.0 | 220.0 | 154.0 | 161.0 | 114.0 |
| DATE : | 720608 | 730609 | 740417 | 750418 | 760611 | 770413 | 780526 | 790509 | 800304 | 810522 | 820511 |
| 2ND HIGHEST: | 195.0 | 213.0 | 196.0 | 214.0 | 182.0 | 308.0 | 200.0 | 175.0 | 140.0 | 157.0 | 103.0 |
| DATE : | 720917 | 730608 | 740411 | 750623 | 761015 | 770302 | 780911 | 790602 | 800421 | 810227 | 820429 |
| # OF READINGS EXCEEDING 260 : | 1 | 1 | 1 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 17 | 13 | 9 | 4 | 4 | 12 | 5 | 5 | 1 | 2 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 29 | 20 | 14 | 14 | 25 | 19 | 28 | 24 | 22 | 33 | 37 |
| 66-130: | 78 | 41 | 26 | 20 | 25 | 23 | 21 | 28 | 31 | 20 | 6 |
| 131-195: | 31 | 16 | 10 | 4 | 7 | 9 | 5 | 6 | 4 | 4 | 0 |
| 196-260: | 0 | 4 | 1 | 2 | 0 | 4 | 2 | 1 | 0 | 0 | 0 |
| 261-325: | 1 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR REPUBLIC STEEL - BUFFALO, NY
SAROAD STATION # 330660010 SITE ID # 05
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 102 | 284 | 176 | 78 | 55 | 53 | 59 | 88 | 60 | 56 |
| GEOMETRIC MEAN: | ****** | ****** | 106.6 | 74.7 | 81.6 | 86.7 | 77.6 | 92.2 | 78.1 | 79.3 | 52.1 |
| GEOMETRIC S.D.: | ****** | ****** | 1.5 | 1.6 | 1.6 | 1.5 | 1.7 | 1.6 | 1.5 | 1.6 | 1.9 |
| ARITHMETIC MEAN | ****** | ****** | 116.8 | 82.8 | 91.9 | 94.9 | 89.3 | 100.8 | 84.8 | 88.7 | 61.4 |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | 386.4 | 281.7 | 324.9 | 302.7 | 384.8 | 334.8 | 267.3 | 325.4 | 357.3 |
| 1ST HIGHEST: | ****** | 291.0 | 352.0 | 262.0 | 286.0 | 277.0 | 257.0 | 264.0 | 175.0 | 204.0 | 171.0 |
| DATE : | ****** | 731108 | 741022 | 750418 | 760611 | 770419 | 780526 | 790509 | 800328 | 810522 | 820429 |
| 2ND HIGHEST: | ****** | 246.0 | 270.0 | 236.0 | 254.0 | 223.0 | 187.0 | 185.0 | 172.0 | 190.0 | 137.0 |
| DATE : | ****** | 730830 | 740514 | 750112 | 761114 | 770413 | 780707 | 791018 | 800626 | 810504 | 820505 |
| # OF READINGS EXCEEDING 260 : | 0 | 1 | 2 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 27 | 72 | 13 | 9 | 4 | 8 | 5 | 5 | 6 | 1 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 14 | 43 | 64 | 26 | 12 | 18 | 11 | 31 | 22 | 37 |
| 66-130: | 0 | 54 | 143 | 92 | 38 | 36 | 26 | 35 | 48 | 28 | 16 |
| 131-195: | 0 | 22 | 77 | 17 | 10 | 5 | 8 | 12 | 9 | 9 | 3 |
| 196-260: | 0 | 11 | 19 | 2 | 3 | 1 | 1 | 0 | 0 | 1 | 0 |
| 261-325: | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

24-HR STANDARD EXCEEDANCE ROSE FOR
REPUBLIC STEEL - BUFFALO, NY
(ALL CASES > 260 UG/M**3)
X=0.900
COUNT/AVERAGE TSP OF PRIMARY EXCEEDANCES

| SAROAD # | 330660003 | | 330660005 | | 330660014 | | 330660006 | | 330660010 | |
|---|---|---|---|---|---|---|---|---|---|---|
| SITE ID # | 1 | | 2 | | 3 | | 4 | | 5 | |
| DIRECTION | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X |
| N COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| NNE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| NE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 277. |
| ENE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| E COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| ESE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| SE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| SSE COUNT: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 438. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S COUNT: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| AVE TSP: | 0. | 0. | 0. | 279. | 0. | 0. | 0. | 0. | 0. | 262. |
| SSW COUNT: | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 309. | 0. | 290. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| SW COUNT: | 3 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 |
| AVE TSP: | 300. | 303. | 0. | 0. | 0. | 0. | 308. | 314. | 352. | 270. |
| WSW COUNT: | 0 | 0 | 2 | 0 | 0 | 0 | 3 | 0 | 1 | 1 |
| AVE TSP: | 0. | 0. | 276. | 0. | 0. | 0. | 352. | 0. | 286. | 291. |
| W COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| WNW COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| NW COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| NNW COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| ALL COUNT: | 5 | 1 | 3 | 1 | 0 | 0 | 4 | 1 | 2 | 4 |
| AVE TSP: | 330. | 303. | 280. | 279. | 0. | 0. | 341. | 314. | 319. | 275. |

24-HR STANDARD EXCEEDANCE ROSE FOR
REPUBLIC STEEL - BUFFALO, NY
(ALL CASES > 150 UG/M**3)
X=0.900
COUNT/AVERAGE TSP OF SECONDARY EXCEEDANCES

| SAROAD # | 330660003 | | 330660005 | | 330660014 | | 330660006 | | 330660010 | |
|---|---|---|---|---|---|---|---|---|---|---|
| SITE ID # | 1 | | 2 | | 3 | | 4 | | 5 | |
| DIRECTION | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X |
| N COUNT: | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 |
| AVE TSP: | 0. | 0. | 0. | 181. | 0. | 0. | 0. | 0. | 0. | 168. |
| NNE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| NE COUNT: | 0 | 2 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 1 |
| AVE TSP: | 0. | 193. | 0. | 222. | 222. | 203. | 0. | 212. | 185. | 277. |
| ENE COUNT: | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 2 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 180. | 0. | 0. | 0. | 179. |
| E COUNT: | 0 | 0 | 1 | 2 | 1 | 1 | 0 | 1 | 0 | 1 |
| AVE TSP: | 0. | 0. | 227. | 163. | 232. | 175. | 0. | 155. | 0. | 190. |
| ESE COUNT: | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 197. | 0. | 0. | 0. | 159. |
| SE COUNT: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| AVE TSP: | 0. | 160. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 172. |
| SSE COUNT: | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 1 |
| AVE TSP: | 438. | 178. | 161. | 0. | 180. | 0. | 0. | 168. | 0. | 166. |
| S COUNT: | 3 | 1 | 1 | 4 | 0 | 0 | 1 | 1 | 1 | 6 |
| AVE TSP: | 186. | 243. | 158. | 209. | 0. | 0. | 153. | 215. | 157. | 196. |
| SSW COUNT: | 16 | 12 | 6 | 6 | 0 | 1 | 3 | 4 | 13 | 17 |
| AVE TSP: | 191. | 180. | 209. | 181. | 0. | 156. | 183. | 163. | 188. | 168. |
| SW COUNT: | 27 | 11 | 16 | 11 | 0 | 0 | 17 | 6 | 42 | 11 |
| AVE TSP: | 193. | 192. | 175. | 188. | 0. | 0. | 188. | 194. | 185. | 194. |
| WSW COUNT: | 9 | 8 | 7 | 6 | 0 | 0 | 11 | 5 | 11 | 13 |
| AVE TSP: | 188. | 197. | 224. | 181. | 0. | 0. | 229. | 172. | 195. | 187. |
| W COUNT: | 0 | 3 | 0 | 4 | 0 | 0 | 0 | 2 | 7 | 7 |
| AVE TSP: | 0. | 221. | 0. | 167. | 0. | 0. | 0. | 193. | 192. | 184. |
| WNW COUNT: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 |
| AVE TSP: | 0. | 162. | 0. | 0. | 0. | 0. | 0. | 0. | 210. | 193. |
| NW COUNT: | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 1 |
| AVE TSP: | 0. | 168. | 0. | 176. | 0. | 0. | 0. | 204. | 0. | 163. |
| NNW COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 154. | 0. |
| ALL COUNT: | 56 | 41 | 32 | 37 | 3 | 6 | 32 | 22 | 80 | 69 |
| AVE TSP: | 196. | 190. | 193. | 184. | 211. | 182. | 201. | 183. | 188. | 184. |

## AIR QUALITY EVALUATION - REPUBLIC STEEL, BUFFALO, NEW YORK

Air quality trends:

A rather pronounced downturn in 12-month running geometric means of TSP occurred from mid-1977 through mid-1978 at all stations except the background site #3. All stations, including #3, indicated rising TSP levels from mid-1978 through mid-1980. Substantial decreases occurred during 1982.

Over the long term (1973-1982), stations #1 and #4 demonstrate the most pronounced downtrends (Spearman rank correlation coefficients of -0.87 and -0.80, respectively).

The percentage of observations exceeding 150 $\mu g/m^3$ has declined the most at station #1, from over 40 percent in 1977 to less than 5 percent in 1982.

Standard exceedance status:

Station #1 last exceeded the primary annual standard in 1980; stations #2 and #5 last exceeded the annual standard in 1981. No primary standard exceedances occurred in 1982.

Pollution roses:

All five stations demonstrate impacts of the Republic plant and Donner Hanna Coke. Stations #4 and #5 demonstrate greater impact of the Bethlehem Steel plant in Lackawanna, despite the greater distance. The large impact from the south-southeast at station #1 cannot be explained in terms of the major known sources in the area.

Standard exceedance roses:

Four out of the six cases of primary 24-hour standard exceedances at station #1 occur with persistent winds and indicate impact of Republic and Donner Hanna. All of the station #4 exceedances occur under southwest and west-southwest winds, possibly implicating Donner Hanna Coke rather than Republic. Two-thirds of the exceedances at station #5 were from the directions of Bethlehem Steel in Lackawanna.

Inhalable particulate matter:

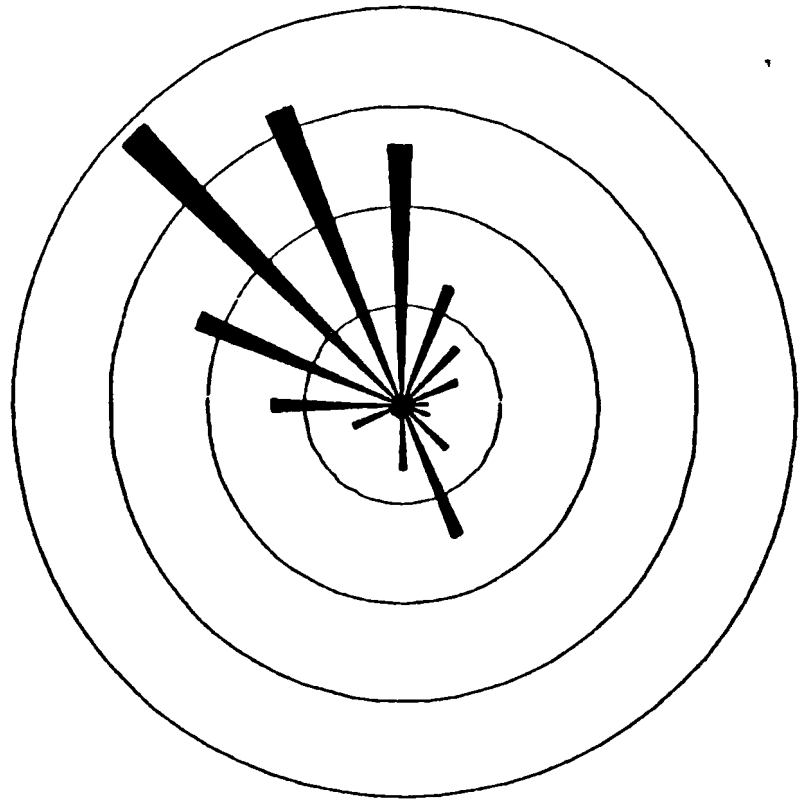
Stations #1 and #5 observed IP as part of a special study conducted from July 1978 through March 1979 by the New York State Department of Environmental Conservation.

| Station | Instrument | # of Obs. | Arithmetic Mean | Highest | Second Highest | Standard Deviation |
|---|---|---|---|---|---|---|
| #1 | DICHOT | 41 | 48.8 | 125 | 120 | 26.5 |
| #5 | DICHOT | 31 | 48.2 | 99 | 87 | 22.0 |

Stations #1 and #5 are part of EPA's IP Network. Data for 1980-1982 are summarized below:

| Year | Instrument | # of Obs. | Arithmetic Mean | Highest | Second Highest | Standard Deviation |
|---|---|---|---|---|---|---|
| Station #1 | | | | | | |
| 1980 | DICHOT | 56 | 63.5 | 127.6 | 121.1 | 25.8 |
| 1981 | SSI | 24 | 70.4 | 136.3 | 123.6 | 27.1 |
| 1981 | DICHOT | 43 | 71.9 | 148.9 | 142.0 | 36.0 |
| Station #5 | | | | | | |
| 1980 | DICHOT | 58 | 47.7 | 106.7 | 92.2 | 22.3 |
| 1981 | SSI | 21 | 62.8 | 104.8 | 102.5 | 22.8 |
| 1981 | DICHOT | 46 | 38.7 | 82.2 | 80.7 | 18.9 |
| 1982 | DICHOT | 27 | 39.8 | 80.1 | 72.5 | 17.8 |
| 1982 | DICHOT (10 μm) | 34 | 47.7 | 85.2 | 82.4 | 19.4 |

WIND ROSE
PERSISTENCE CLASS 0.90
WIND STATION 14733

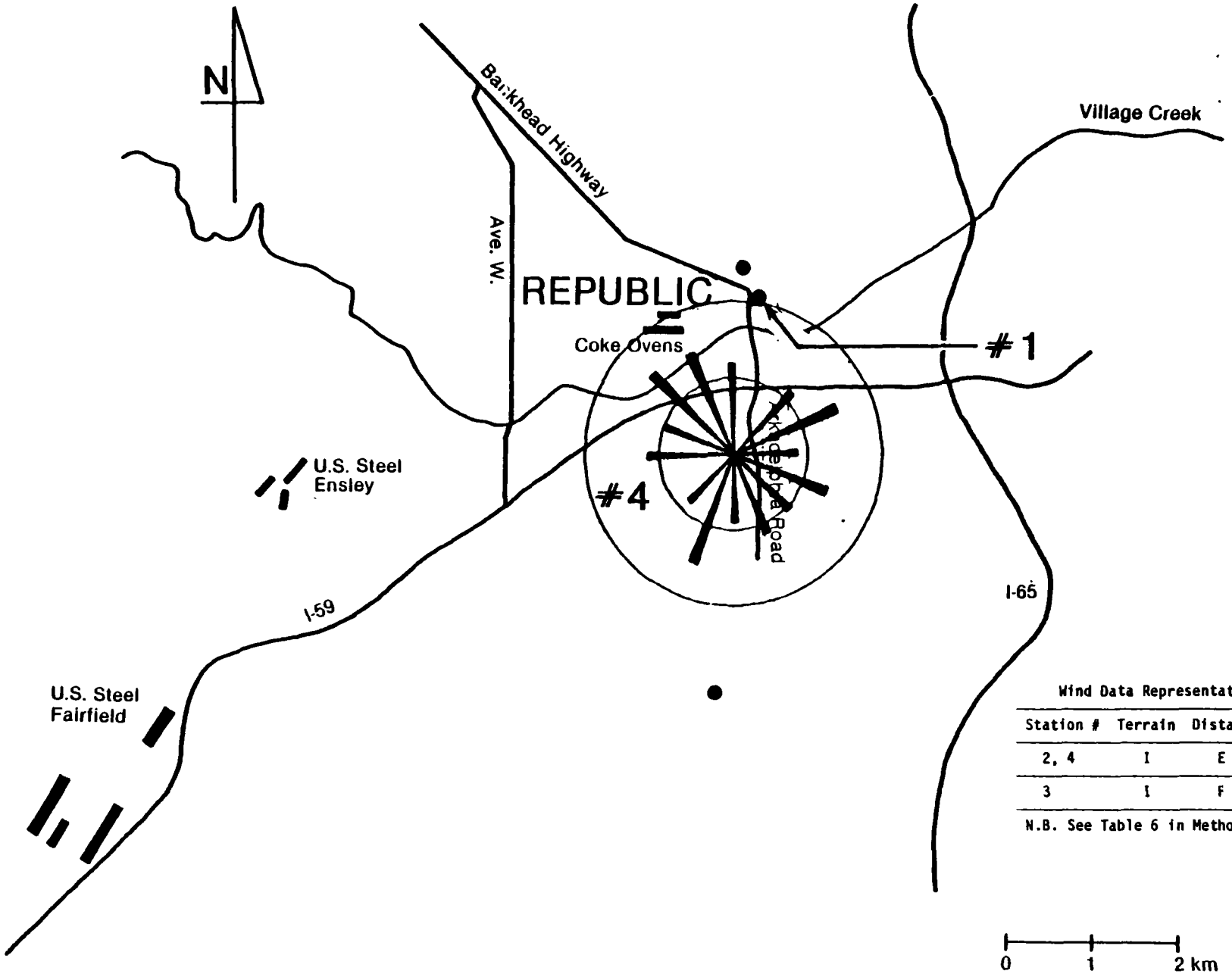


REPUBLIC STEEL
Birmingham
Jefferson County
Alabama
EPA Region IV

Hi-Vol Monitoring Sites--Republic Steel, Birmingham, Alabama

| Site ID Number | SAROAD Number | Site Name and Address | Plant Location from Site | | Elevation (m) | | | Site Description | Nearest Roadway | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Bearing (°) | Distance (km) | Above Ground | Above MSL | Above Plant | | Name | Direction | Distance (m) | Volume |
| 1 | 01-0380-019 | East Thomas Site<br>Finley Ave. Bypass<br>Birmingham, AL | 250 | 1.0 | 3 | 165 | 0 | Platform between highway and service rd. | Finley Ave.<br>Service rd. | NW<br>SE | 8<br>4 | M<br>L |
| 2 | 01-0380-022 | East Thomas Site<br>WERC Radio<br>2400 Arkadelphia Rd.<br>Birmingham, AL | 228 | 1.2 | 1 | 171 | 6 | Ground level near radio transmitter bldg. | Dead end st. | E | 23 | L |
| 3 | 01-0380-011 | West End Site<br>1334 Steiner Ave.<br>Birmingham, AL | 350 | 4.0 | 3 | 174 | 9 | Platform between traffic lanes | Steiner Ave. | NW & SE | 2 | M |
| 4 | 01-0380-029-G01 | Phillips Hall<br>800 8th Ave. W.<br>College Hill<br>Birmingham Southern College<br>Birmingham, AL | 327 | 1.7 | 11 | 207 | 24 | Roof<br>Suburban-residential | Arkadelphia Rd.<br>8th Ave. W.<br>9th Ave. W. | E<br>S<br>N | 198<br>198<br>213 | 15,000 ADT<br>5,000 ADT<br>3,000 ADT |

Key: U = Unavailable M = Moderate ADT = Average daily traffic
L = Light H = Heavy

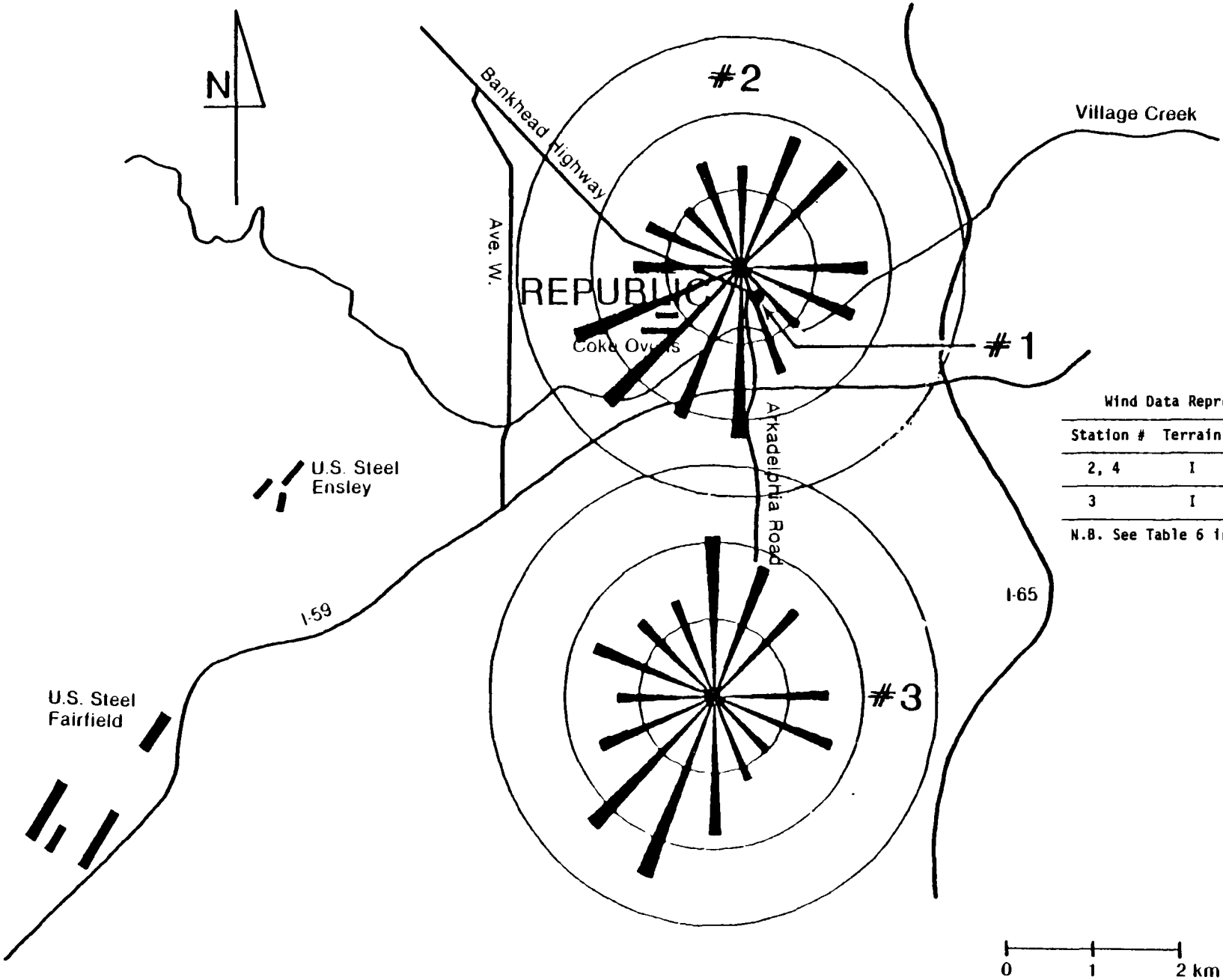



Wind Data Representativeness

| Station # | Terrain | Distance | Rating |
|---|---|---|---|
| 2, 4 | I | E | E-VG |
| 3 | I | F | VG |

N.B. See Table 6 in Methodology section.

TSP roses for Republic Steel - Birmingham, Alabama, for the period 1978-1982 for cases of $\omega>0.85$. Each circle represents 50 $\mu g/m^3$.




Wind Data Representativeness

| Station # | Terrain | Distance | Rating |
|---|---|---|---|
| 2, 4 | I | E | E-VG |
| 3 | I | F | VG |

N.B. See Table 6 in Methodology section.

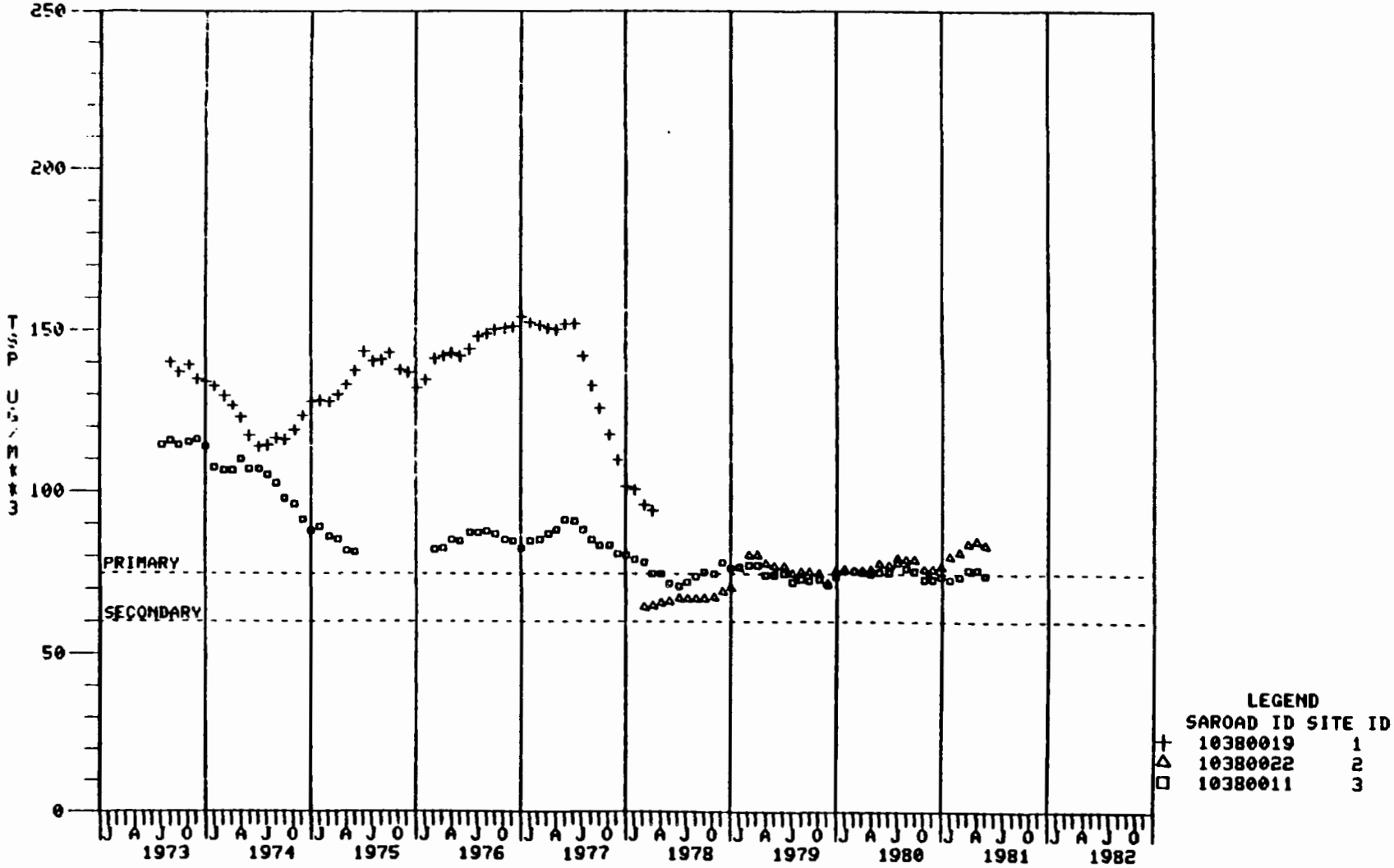
TSP roses for Republic Steel - Birmingham, Alabama, for the period 1978-1982 for cases of $\omega > 0.85$. Each circle represents 50 $\mu g/m^3$.

NUMBER OF TSP OBSERVATIONS USED IN POLLUTION ROSES

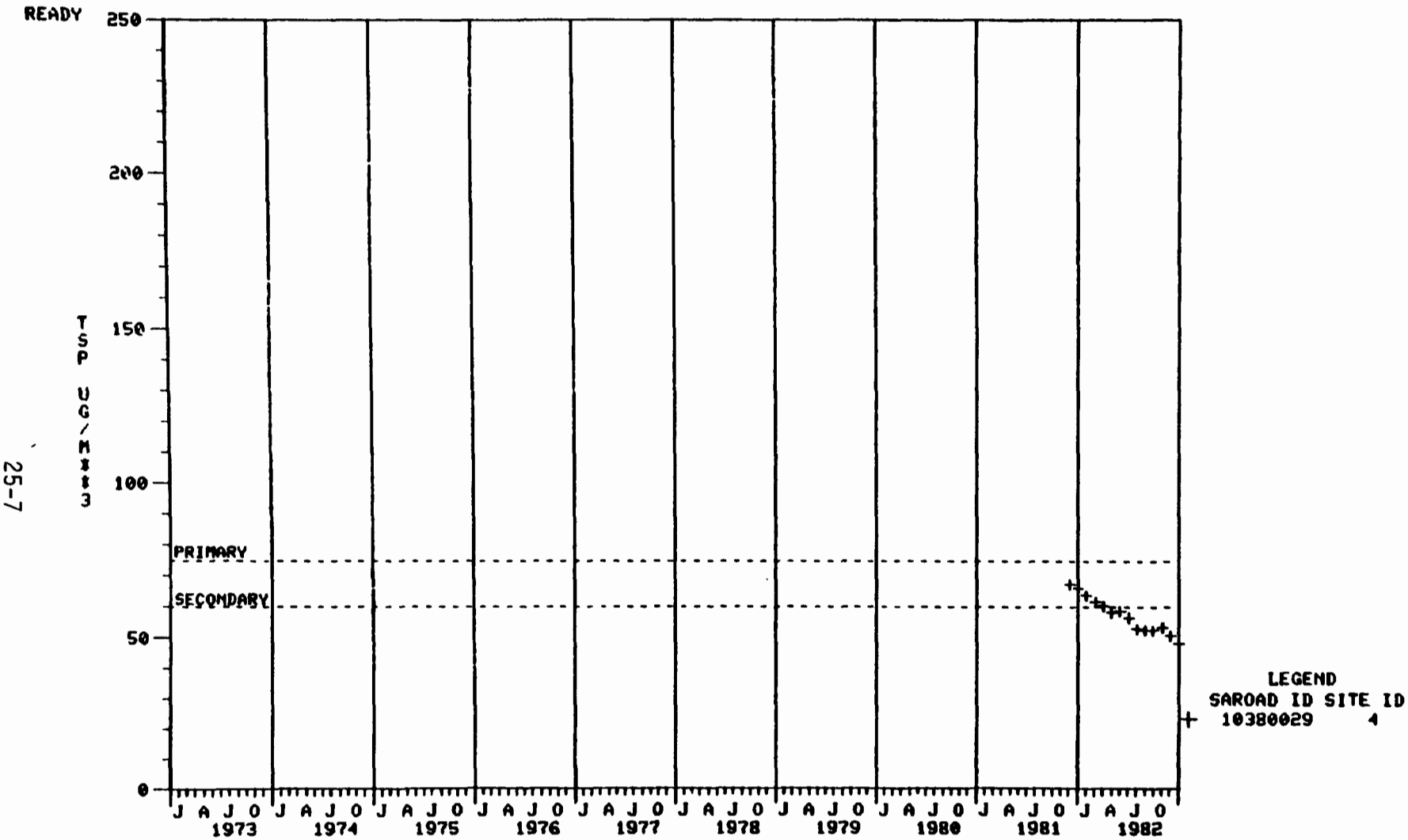
Republic Steel--Birmingham, AL

| Wind Direction | Monitoring Site Numbers #2 | #3 | #4 |
|---|---|---|---|
| N | 21 | 11 | 7 |
| NNE | 7 | 5 | 0 |
| NE | 2 | 2 | 2 |
| ENE | 0 | 0 | 2 |
| E | 9 | 8 | 7 |
| ESE | 5 | 4 | 1 |
| SE | 4 | 4 | 5 |
| SSE | 6 | 6 | 2 |
| S | 7 | 4 | 1 |
| SSW | 2 | 3 | 2 |
| SW | 1 | 1 | 3 |
| WSW | 2 | 1 | 0 |
| W | 10 | 10 | 2 |
| WNW | 8 | 4 | 1 |
| NW | 6 | 7 | 5 |
| NNW | 9 | 11 | 4 |
| Total | 99 | 81 | 44 |

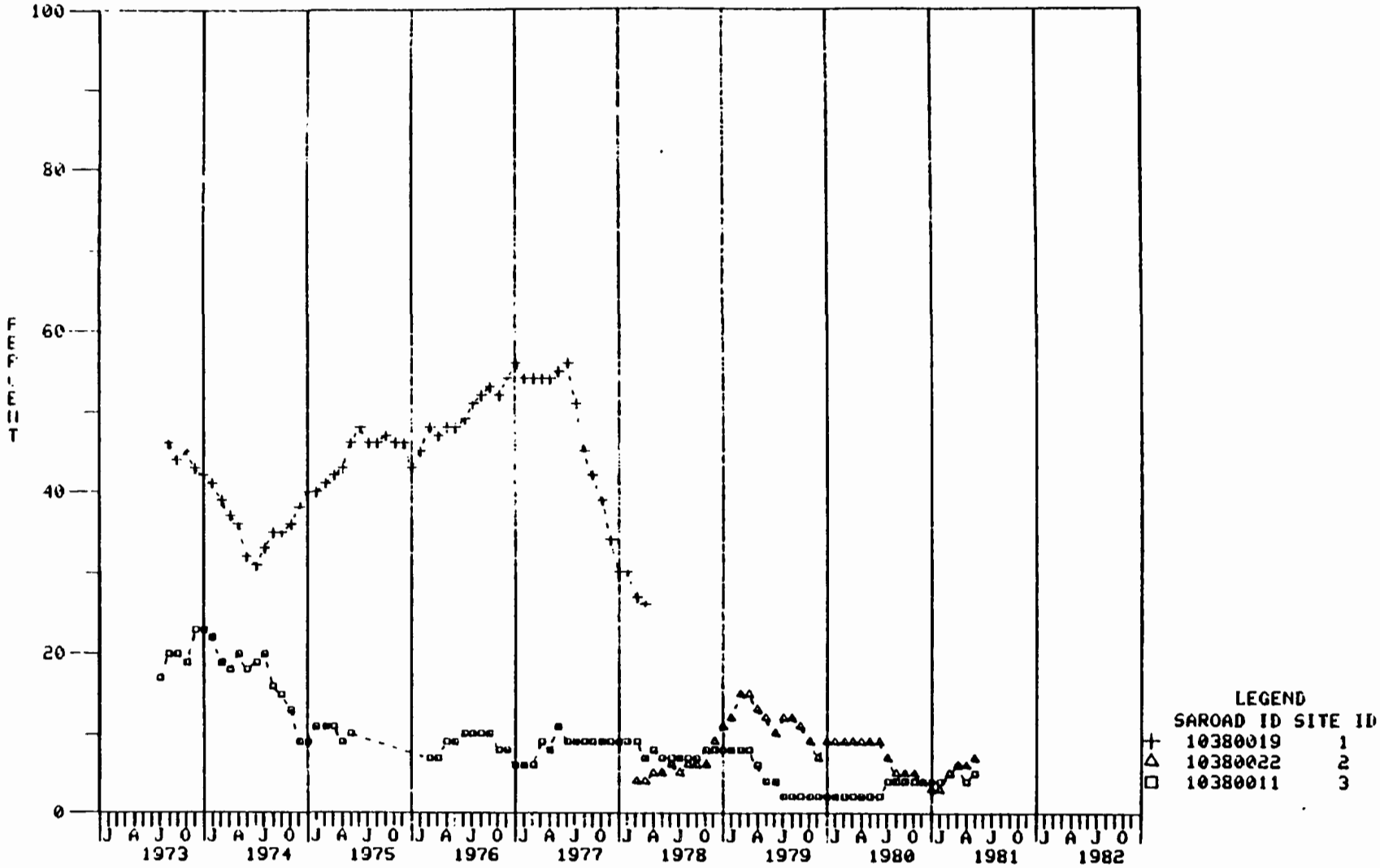
TSP 12 MONTH RUNNING GEOMETRIC MEANS (UG/M**3) FOR REPUBLIC STEEL - BIRMINGHAM, AL



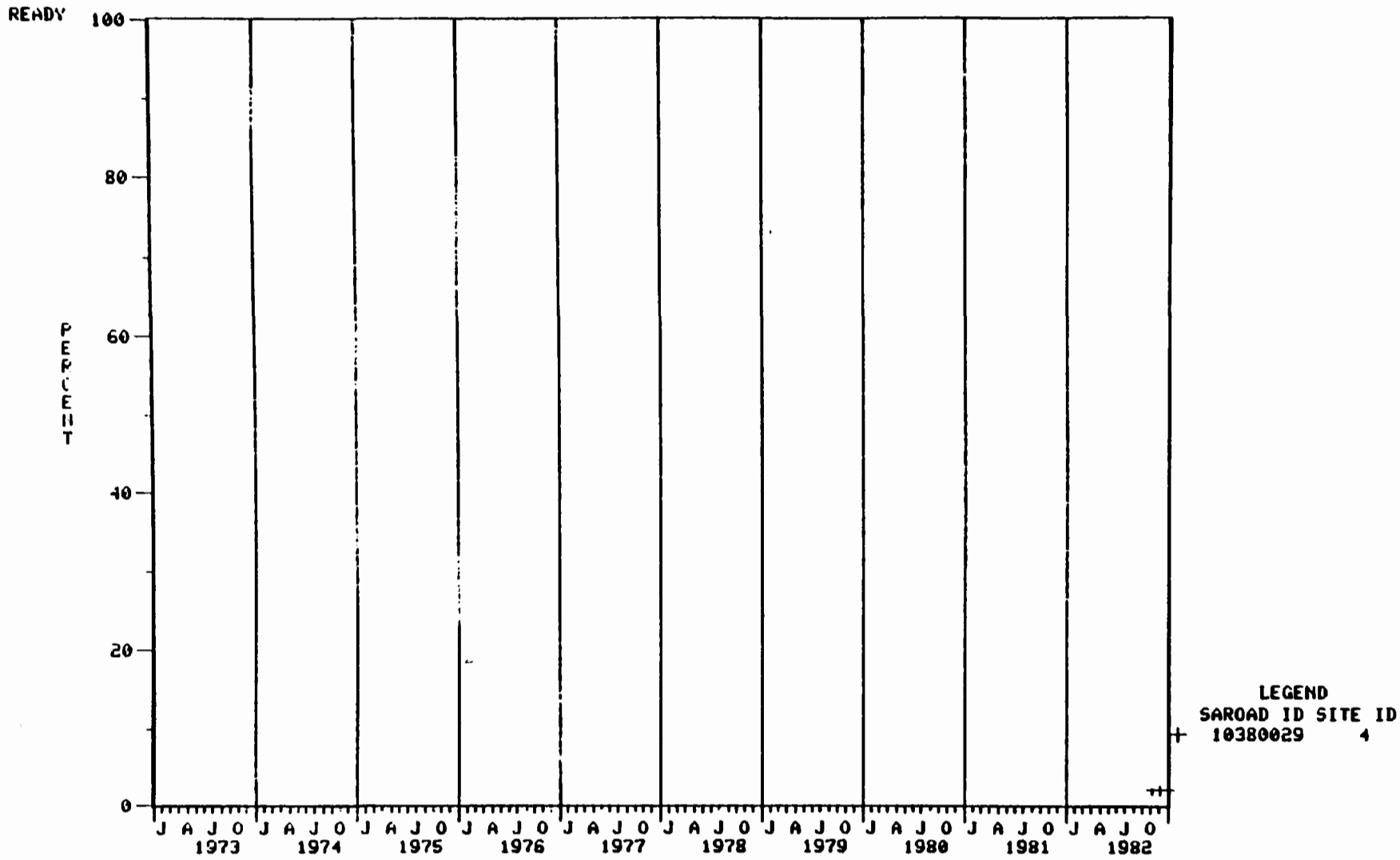
TSP 12 MONTH RUNNING GEOMETRIC MEANS (UG/M**3) FOR REPUBLIC STEEL - BIRMINGHAM, AL



TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 150 (UG/M**3) FOR REPUBLIC STEEL - BIRMINGHAM, AL



TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 150 (UG/M**3) FOR REPUBLIC STEEL - BIRMINGHAM, AL



TSP DATA SUMMARY FOR REPUBLIC STEEL - BIRMINGHAM, AL
SAROAD STATION # 010380019 SITE ID # 01
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 15 | 257 | 284 | 229 | 272 | 240 | 0 | 0 | 0 | 0 | 0 |
| GEOMETRIC MEAN: | ****** | 133.9 | 128.0 | 132.1 | 154.4 | 101.8 | ****** | ****** | ****** | ****** | ****** |
| GEOMETRIC S.D.: | ****** | 1.7 | 1.7 | 1.8 | 1.6 | 1.9 | ****** | ****** | ****** | ****** | ****** |
| ARITHMETIC MEAN | ****** | 152.6 | 146.9 | 153.7 | 172.7 | 124.1 | ****** | ****** | ****** | ****** | ****** |
| HIGHEST BY LARSEN EXTRP: | ****** | 632.3 | 623.9 | 717.3 | 643.4 | 648.8 | ****** | ****** | ****** | ****** | ****** |
| 1ST HIGHEST: | 321.0 | 447.0 | 441.0 | 486.0 | 621.0 | 514.0 | ****** | ****** | ****** | ****** | ****** |
| DATE : | 721229 | 730205 | 741026 | 751118 | 760123 | 770210 | ****** | ****** | ****** | ****** | ****** |
| 2ND HIGHEST: | 276.0 | 384.0 | 425.0 | 454.0 | 399.0 | 464.0 | ****** | ****** | ****** | ****** | ****** |
| DATE : | 721228 | 730413 | 741025 | 751119 | 760722 | 770211 | ****** | ****** | ****** | ****** | ****** |
| # OF READINGS EXCEEDING 260 : | 3 | 33 | 25 | 25 | 38 | 20 | 0 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 4 | 107 | 114 | 98 | 147 | 71 | 0 | 0 | 0 | 0 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 4 | 22 | 32 | 26 | 15 | 60 | 0 | 0 | 0 | 0 | 0 |
| 66-130: | 4 | 99 | 109 | 82 | 79 | 92 | 0 | 0 | 0 | 0 | 0 |
| 131-195: | 4 | 77 | 83 | 64 | 93 | 51 | 0 | 0 | 0 | 0 | 0 |
| 196-260: | 0 | 26 | 35 | 32 | 47 | 17 | 0 | 0 | 0 | 0 | 0 |
| 261-325: | 3 | 24 | 15 | 17 | 22 | 14 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 8 | 5 | 4 | 13 | 3 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 1 | 5 | 3 | 2 | 1 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 1 | 1 | 2 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR REPUBLIC STEEL - BIRMINGHAM, AL
SAROAD STATION # 010380022 SITE ID # 02
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 0 | 0 | 0 | 119 | 84 | 55 | 59 | 9 | 0 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | ****** | ****** | ****** | 70.4 | 75.7 | 76.8 | ****** | ****** |
| GEOMETRIC S.D.: | ****** | ****** | ****** | ****** | ****** | ****** | 1.8 | 1.7 | 1.5 | ****** | ****** |
| ARITHMETIC MEAN | ****** | ****** | ****** | ****** | ****** | ****** | 83.1 | 85.9 | 83.9 | ****** | ****** |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | ****** | ****** | ****** | 391.2 | 340.7 | 276.5 | ****** | ****** |
| 1ST HIGHEST: | ****** | ****** | ****** | ****** | ****** | 193.0 | 244.0 | 208.0 | 188.0 | 189.0 | ****** |
| DATE : | ****** | ****** | ****** | ****** | ****** | 770708 | 780104 | 791205 | 801205 | 810227 | ****** |
| 2ND HIGHEST: | ****** | ****** | ****** | ****** | ****** | 189.0 | 225.0 | 186.0 | 156.0 | 164.0 | ****** |
| DATE : | ****** | ****** | ****** | ****** | ****** | 771021 | 780331 | 791117 | 800215 | 810221 | ****** |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 0 | 0 | 0 | 6 | 9 | 4 | 2 | 2 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 0 | 0 | 0 | 51 | 36 | 21 | 21 | 3 | 0 |
| 66-130: | 0 | 0 | 0 | 0 | 0 | 54 | 35 | 25 | 32 | 4 | 0 |
| 131-195: | 0 | 0 | 0 | 0 | 0 | 14 | 9 | 8 | 6 | 2 | 0 |
| 196-260: | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 1 | 0 | 0 | 0 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR REPUBLIC STEEL - BIRMINGHAM, AL
SAROAD STATION # 010380011 SITE ID # 03
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 121 | 56 | 55 | 43 | 49 | 58 | 50 | 56 | 53 | 9 | 0 |
| GEOMETRIC MEAN: | ****** | 114.0 | 87.7 | ****** | 82.5 | 80.6 | 76.5 | 73.7 | 74.0 | ****** | ****** |
| GEOMETRIC S.D.: | ****** | 1.6 | 1.5 | ****** | 1.7 | 1.6 | 1.6 | 1.5 | 1.5 | ****** | ****** |
| ARITHMETIC MEAN | ****** | 132.6 | 95.8 | ****** | 94.6 | 89.8 | 85.1 | 79.9 | 79.5 | ****** | ****** |
| HIGHEST BY LARSEN EXTRP: | ****** | 490.5 | 311.3 | ****** | 377.8 | 304.5 | 297.1 | 244.8 | 230.7 | ****** | ****** |
| 1ST HIGHEST: | 275.0 | 776.0 | 230.0 | 215.0 | 341.0 | 262.0 | 246.0 | 151.0 | 176.0 | 154.0 | ****** |
| DATE : | 720201 | 730116 | 740628 | 750112 | 760611 | 770413 | 780408 | 790421 | 800421 | 810221 | ****** |
| 2ND HIGHEST: | 224.0 | 293.0 | 199.0 | 181.0 | 270.0 | 245.0 | 181.0 | 149.0 | 154.0 | 125.0 | ****** |
| DATE : | 720209 | 731019 | 741026 | 751202 | 760406 | 770513 | 780402 | 790202 | 800714 | 810227 | ****** |
| # OF READINGS EXCEEDING 260 : | 1 | 2 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 31 | 13 | 5 | 4 | 3 | 5 | 4 | 1 | 2 | 1 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 12 | 6 | 12 | 10 | 15 | 21 | 20 | 21 | 17 | 3 | 0 |
| 66-130: | 65 | 33 | 35 | 26 | 26 | 30 | 24 | 31 | 32 | 5 | 0 |
| 131-195: | 38 | 10 | 6 | 6 | 6 | 4 | 5 | 4 | 4 | 1 | 0 |
| 196-260: | 5 | 5 | 2 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 0 |
| 261-325: | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR REPUBLIC STEEL - BIRMINGHAM, AL
SAROAD STATION # 010380029 SITE ID # 04
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 50 | 58 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 65.5 | 48.1 |
| GEOMETRIC S.D.: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 1.4 | 1.6 |
| ARITHMETIC MEAN | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 68.8 | 53.8 |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 170.9 | 183.7 |
| 1ST HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 111.0 | 170.0 |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 810721 | 821026 |
| 2ND HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 108.0 | 133.0 |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | ****** | 810826 | 820511 |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21 | 46 |
| 66-130: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 29 | 10 |
| 131-195: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 196-260: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

24-HR STANDARD EXCEEDANCE ROSE FOR
REPUBLIC STEEL - BIRMINGHAM, AL
(ALL CASES > 260 UG/M**3)
X=0.850
COUNT/AVERAGE TSP OF PRIMARY EXCEEDANCES

| SAROAD # | 10380019 | | 10380022 | | 10380011 | | 10380029 | |
|---|---|---|---|---|---|---|---|---|
| SITE ID # | 1 | | 2 | | 3 | | 4 | |
| DIRECTION | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X |
| N COUNT: | 3 | 6 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 282. | 353. | 0. | 0. | 0. | 0. | 0. | 0. |
| NNE COUNT: | 4 | 6 | 0 | 0 | 2 | 1 | 0 | 0 |
| AVE TSP: | 339. | 323. | 0. | 0. | 306. | 293. | 0. | 0. |
| NE COUNT: | 5 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 310. | 298. | 0. | 0. | 0. | 0. | 0. | 0. |
| ENE COUNT: | 2 | 7 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 355. | 288. | 0. | 0. | 0. | 0. | 0. | 0. |
| E COUNT: | 1 | 6 | 0 | 0 | 0 | 1 | 0 | 0 |
| AVE TSP: | 306. | 326. | 0. | 0. | 0. | 776. | 0. | 0. |
| ESE COUNT: | 2 | 8 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 351. | 323. | 0. | 0. | 0. | 0. | 0. | 0. |
| SE COUNT: | 8 | 16 | 0 | 0 | 1 | 0 | 0 | 0 |
| AVE TSP: | 338. | 304. | 0. | 0. | 262. | 0. | 0. | 0. |
| SSE COUNT: | 1 | 8 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 426. | 315. | 0. | 0. | 0. | 0. | 0. | 0. |
| S COUNT: | 3 | 4 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 312. | 313. | 0. | 0. | 0. | 0. | 0. | 0. |
| SSW COUNT: | 2 | 13 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 515. | 326. | 0. | 0. | 0. | 0. | 0. | 0. |
| SW COUNT: | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 447. | 314. | 0. | 0. | 0. | 0. | 0. | 0. |
| WSW COUNT: | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 287. | 0. | 0. | 0. | 0. | 0. | 0. |
| W COUNT: | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 318. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| WNW COUNT: | 2 | 8 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 295. | 316. | 0. | 0. | 0. | 0. | 0. | 0. |
| NW COUNT: | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 341. | 282. | 0. | 0. | 0. | 0. | 0. | 0. |
| NNW COUNT: | 4 | 6 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 283. | 341. | 0. | 0. | 0. | 0. | 0. | 0. |
| ALL COUNT: | 41 | 100 | 0 | 0 | 3 | 2 | 0 | 0 |
| AVE TSP: | 334. | 316. | 0. | 0. | 291. | 535. | 0. | 0. |

24-HR STANDARD EXCEEDANCE ROSE FOR
REPUBLIC STEEL - BIRMINGHAM, AL
(ALL CASES > 150 UG/M**3)
X=0.850
COUNT/AVERAGE TSP OF SECONDARY EXCEEDANCES

| SAROAD # | 10380019 | | 10380022 | | 10380011 | | 10380029 | |
|---|---|---|---|---|---|---|---|---|
| SITE ID # | 1 | | 2 | | 3 | | 4 | |
| DIRECTION | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X |
| N COUNT: | 24 | 23 | 2 | 0 | 6 | 3 | 0 | 0 |
| AVE TSP: | 199. | 242. | 173. | 0. | 197. | 157. | 0. | 0. |
| NNE COUNT: | 10 | 31 | 1 | 0 | 4 | 4 | 0 | 0 |
| AVE TSP: | 251. | 234. | 183. | 0. | 235. | 225. | 0. | 0. |
| NE COUNT: | 14 | 12 | 1 | 1 | 0 | 0 | 0 | 0 |
| AVE TSP: | 234. | 197. | 162. | 167. | 0. | 0. | 0. | 0. |
| ENE COUNT: | 13 | 24 | 0 | 1 | 0 | 0 | 0 | 0 |
| AVE TSP: | 218. | 221. | 0. | 189. | 0. | 0. | 0. | 0. |
| E COUNT: | 11 | 21 | 0 | 3 | 0 | 2 | 0 | 0 |
| AVE TSP: | 204. | 232. | 0. | 183. | 0. | 471. | 0. | 0. |
| ESE COUNT: | 5 | 34 | 0 | 3 | 0 | 1 | 0 | 0 |
| AVE TSP: | 256. | 220. | 0. | 176. | 0. | 153. | 0. | 0. |
| SE COUNT: | 16 | 31 | 0 | 3 | 1 | 0 | 0 | 0 |
| AVE TSP: | 259. | 254. | 0. | 209. | 262. | 0. | 0. | 0. |
| SSE COUNT: | 8 | 20 | 1 | 1 | 0 | 2 | 0 | 0 |
| AVE TSP: | 214. | 243. | 175. | 164. | 0. | 159. | 0. | 0. |
| S COUNT: | 6 | 19 | 2 | 1 | 0 | 1 | 0 | 0 |
| AVE TSP: | 248. | 219. | 182. | 188. | 0. | 156. | 0. | 0. |
| SSW COUNT: | 17 | 27 | 0 | 0 | 2 | 1 | 0 | 0 |
| AVE TSP: | 223. | 264. | 0. | 0. | 166. | 253. | 0. | 0. |
| SW COUNT: | 7 | 14 | 0 | 1 | 1 | 0 | 0 | 0 |
| AVE TSP: | 225. | 204. | 0. | 163. | 189. | 0. | 0. | 0. |
| WSW COUNT: | 5 | 22 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 179. | 220. | 0. | 0. | 0. | 0. | 0. | 0. |
| W COUNT: | 5 | 15 | 0 | 1 | 0 | 1 | 0 | 0 |
| AVE TSP: | 249. | 193. | 0. | 225. | 0. | 229. | 0. | 0. |
| WNW COUNT: | 11 | 29 | 0 | 1 | 2 | 1 | 0 | 0 |
| AVE TSP: | 216. | 221. | 0. | 166. | 173. | 256. | 0. | 0. |
| NW COUNT: | 8 | 20 | 0 | 0 | 2 | 0 | 0 | 0 |
| AVE TSP: | 201. | 203. | 0. | 0. | 213. | 0. | 0. | 0. |
| NNW COUNT: | 9 | 26 | 0 | 0 | 1 | 3 | 0 | 1 |
| AVE TSP: | 236. | 223. | 0. | 0. | 152. | 200. | 0. | 170. |
| ALL COUNT: | 169 | 368 | 7 | 16 | 19 | 19 | 0 | 1 |
| AVE TSP: | 224. | 228. | 176. | 185. | 201. | 225. | 0. | 170. |

## AIR QUALITY EVALUATION - REPUBLIC STEEL, BIRMINGHAM, ALABAMA

Air quality trends:

An upward trend (Spearman correlation coefficient of +0.78) was detected at station #2, which is the station most clearly impacted by emissions from the Republic coking operations.

Over the long-term, station #1 shows very little overall trend despite a large decline in 1977 and early 1978. The most well-defined long-term downward trend is at station #3 with a Spearman rank correlation coefficient of -0.86; however, this station is only marginally affected by the coke plant emissions. Station #4, which came on line in 1981, showed a consistent downtrend (coefficient of -0.97). With the exception of station #1, the percentage of observations exceeding 150 $\mu g/m^3$ has remained under 20 percent.

Standard exceedance status:

Site #4 was the only station fully operational in 1981 and 1982; it showed no exceedances of the primary standards.

Pollution roses:

The Republic contribution to the TSP values for the peak directions (southwest and west-southwest) on the station #2 rose cannot be determined since these directions also encompass the U.S. Steel Ensley and Fairfield Works.

Standard exceedance roses:

No measured 24-hour primary standard exceedance occurred at stations #2 and #4. During the years of operation of station #1, exceedances occurred from all 16 directions; this phenomenon probably occurred due to the poor siting of the sampler near a roadway. None of the five primary standard exceedances at station #3 can be attributed to Republic.

REPUBLIC STEEL
Gadsden
Etowah County
Alabama
EPA Region IV

Hi-Vol Monitoring Sites--Republic Steel, Gadsden, Alabama

| Site ID Number | SAROAD Number | Site Name and Address | Plant Location from Site: Facility/ Bearing (°) | | Distance (km) | Elevation (m): Above Ground | Above MSL | Above Plant | Site Description | Nearest Roadway: Name | Direction | Distance (m) | Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1* | 01-1480-001 | Etowah Co. Health Center Gadsden, AL | BOF, electric arc furnace | 264 | 3.5 | 8 | 177 | 15 | Roof | 8th St. | E | 15 | M |
| | | | | | | | | | | Forrest Ave. | NE | 45 | H |
| | | | Power house | 267 | 3.5 | | | | | | | | |
| | | | Sinter plant | 269 | 3.4 | | | | | | | | |
| | | | Blast furnace | 269 | 3.5 | | | | | | | | |
| | | | Coke plant | 273 | 3.4 | | | | | | | | |
| 2 | 01-1480-003-F02 | Walnut Park Fire Station Gadsden, AL | BOF | 56 | 0.6 | 5 | 171 | 9 | Roof Center city-industrial | Delaware | ESE | 15 | L to M |
| | | | Electric arc furnace | 49 | 0.5 | | | | | S. 11th St. | WSW | 20 | L to M |
| | | | | | | | | | | Hickory | SSW | 15 | L to M |
| | | | Power house | 46 | 0.8 | | | | | | | | |
| | | | Sinter plant | 43 | 0.9 | | | | | | | | |
| | | | Blast furnace | 40 | 0.9 | | | | | | | | |
| | | | Coke plant | 36 | 1.1 | | | | | | | | |
| 3 | 01-1480-005-F02 | Jesse Dean Smith School S. 11th & Hall Sts. S. Gadsden, AL | BOF | 321 | 2.4 | 5 | 168 | 6 | Roof Suburban-residential | S. 11th St. | N | 30 | M |
| | | | Electric arc furnace | 317 | 2.4 | | | | | Hall St. | E | 30 | L |
| | | | Power house | 325 | 2.4 | | | | | | | | |
| | | | Sinter plant | 327 | 2.5 | | | | | | | | |
| | | | Blast furnace | 325 | 2.5 | | | | | | | | |
| | | | Coke plant | 331 | 2.6 | | | | | | | | |
| 4 | 01-1480-006 | Walnut Park School Gadsden, AL | Coke plant | 55 | 0.9 | U | 167 | 5 | Roof | Sudie Ave. | N | U | U |
| | | | BOF | 83 | 0.5 | | | | | | | | |
| | | | Electric arc furnace | 80 | 0.4 | | | | | | | | |
| | | | Sinter plant | 55 | 1.0 | | | | | | | | |
| | | | Blast furnace | 59 | 0.7 | | | | | | | | |

Key: U = Unavailable M = Moderate
L = Light H = Heavy

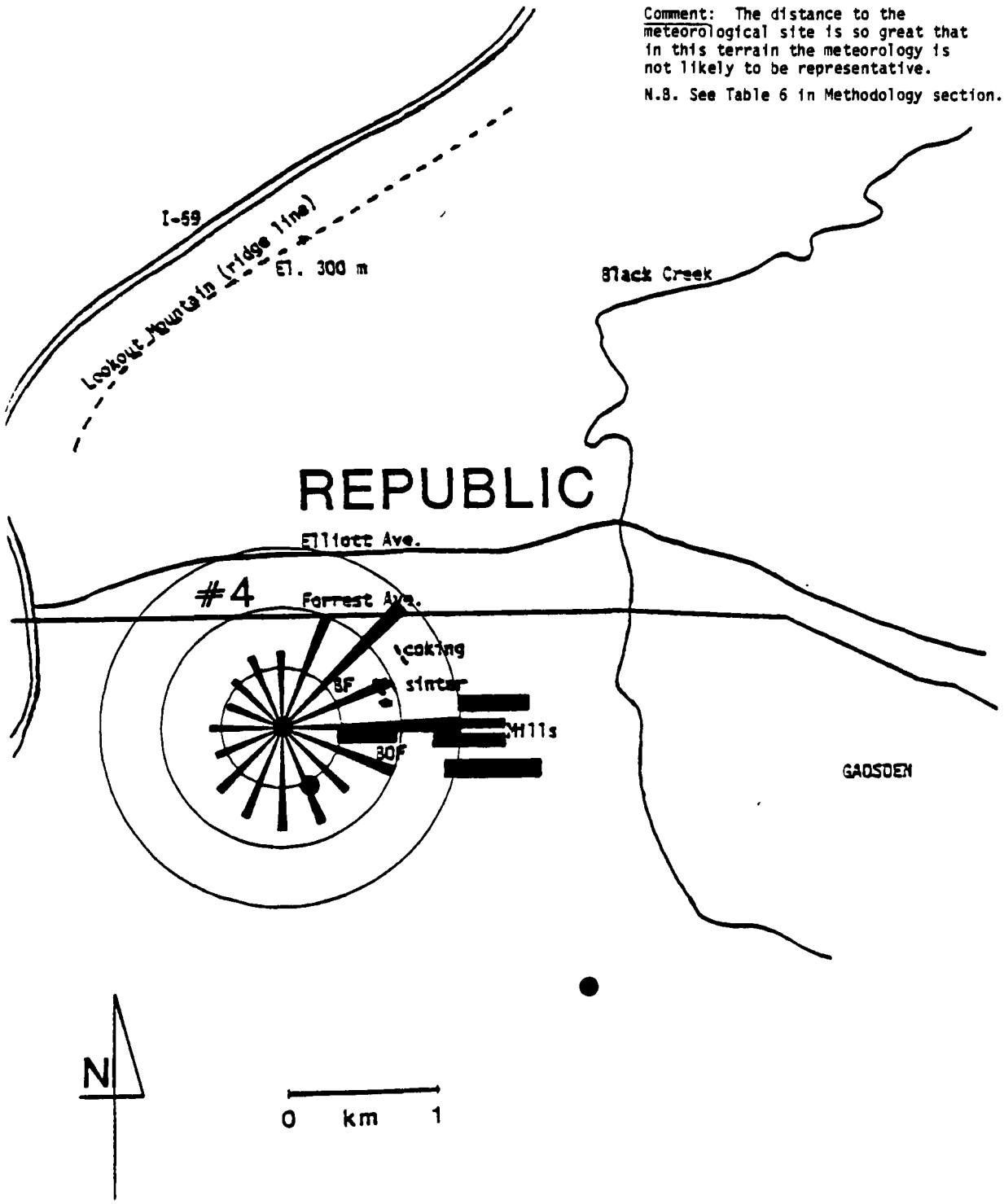
* Data from this station were included in the original 1973-1977 analysis; however, no strong mill impact on TSP was noted at this site. Based on the likelihood that this situation has not changed, data from this site were not employed in the 1978-1980 or the 1981-1982 updates.

Wind Data Representativeness

| Station # | Terrain | Distance | Rating |
|---|---|---|---|
| 2, 3, 4 | IV | H | U |

Comment: The distance to the meteorological site is so great that in this terrain the meteorology is not likely to be representative.

N.B. See Table 6 in Methodology section.



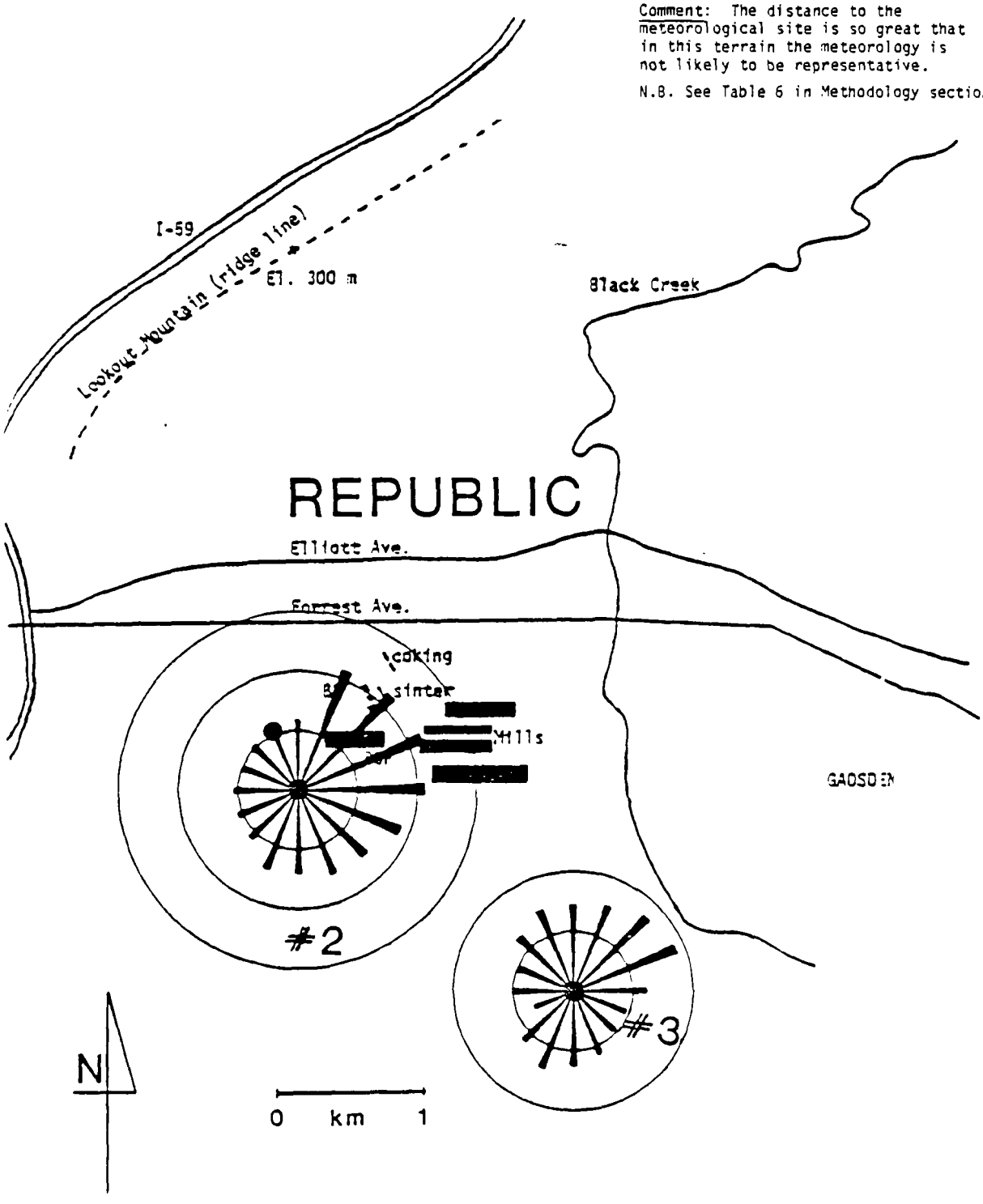

TSP roses for Republic Steel - Gadsden, Alabama, for the period 1978-1982 for cases of $\omega>0.90$. Each circle represents 50 $\mu g/m^3$.

Wind Data Representativeness

| Station # | Terrain | Distance | Rating |
|---|---|---|---|
| 2, 3, 4 | IV | H | U |

Comment: The distance to the meteorological site is so great that in this terrain the meteorology is not likely to be representative.

N.B. See Table 6 in Methodology section.



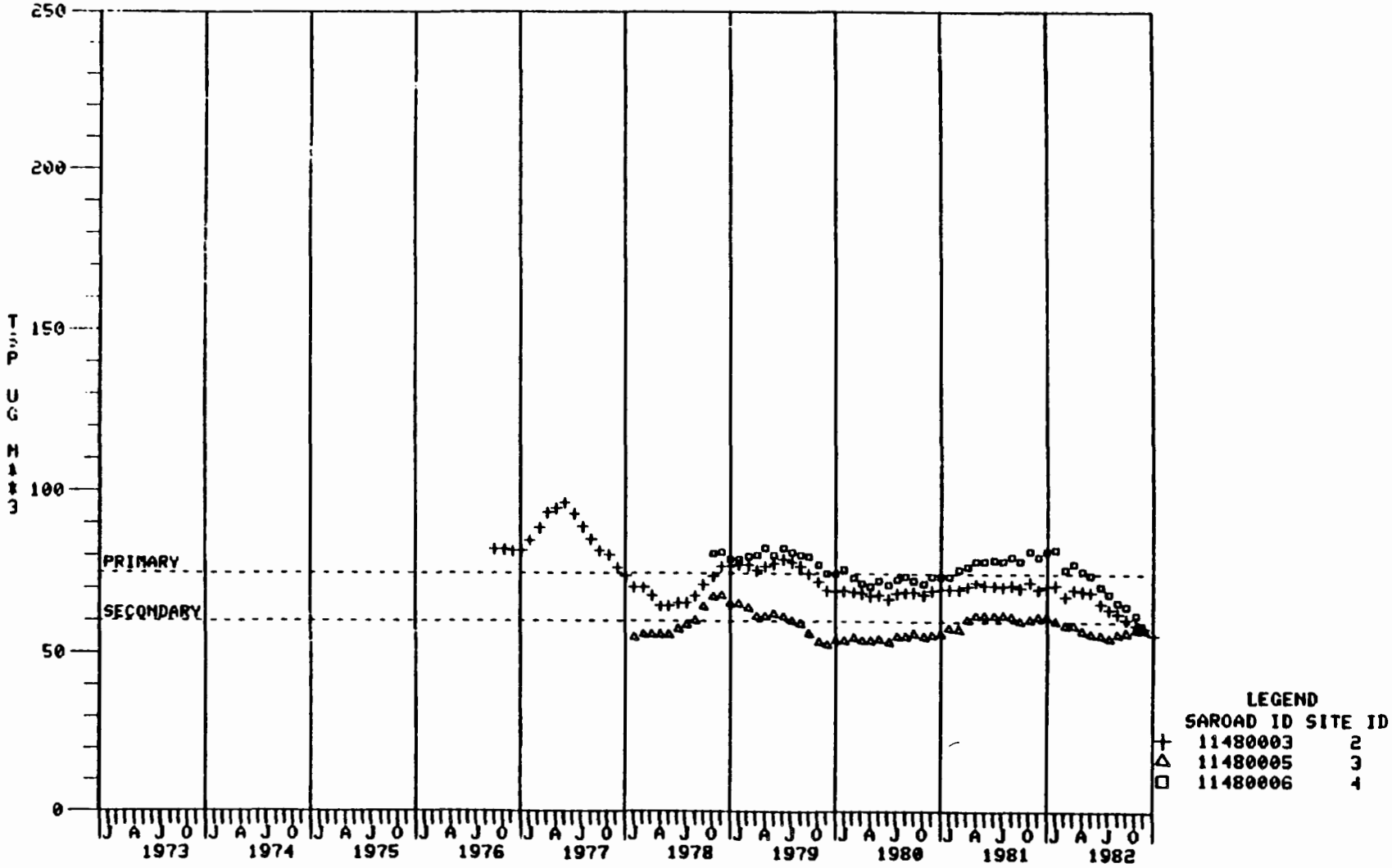

TSP roses for Republic Steel - Gadsden, Alabama, for the period 1978-1982 for cases of $\omega$>0.90. Each circle represents 50 $\mu g/m^3$.

NUMBER OF TSP OBSERVATIONS USED IN POLLUTION ROSES

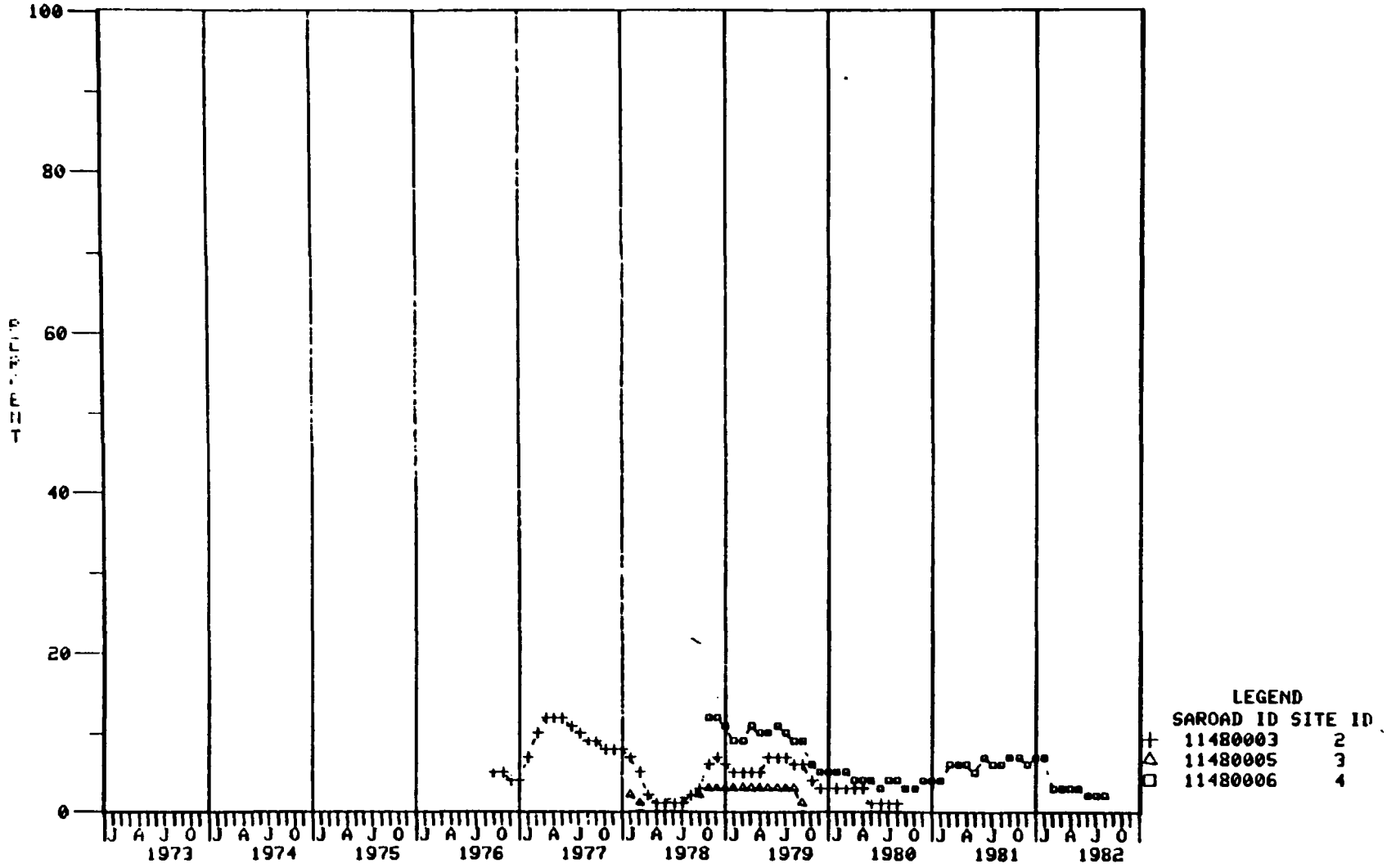
Republic Steel--Gadsden, AL

| Wind Direction | Monitoring Site Numbers #2 | #3 | #4 |
|---|---|---|---|
| N | 18 | 18 | 19 |
| NNE | 4 | 5 | 4 |
| NE | 3 | 3 | 3 |
| ENE | 3 | 3 | 4 |
| E | 18 | 21 | 17 |
| ESE | 2 | 3 | 2 |
| SE | 7 | 7 | 7 |
| SSE | 15 | 13 | 10 |
| S | 7 | 7 | 5 |
| SSW | 6 | 6 | 5 |
| SW | 4 | 7 | 5 |
| WSW | 1 | 1 | 2 |
| W | 8 | 8 | 8 |
| WNW | 8 | 7 | 8 |
| NW | 11 | 10 | 9 |
| NNW | 17 | 17 | 17 |
| Total | 132 | 136 | 125 |

TSP 12 MONTH RUNNING GEOMETRIC MEANS (UG/M**3) FOR REPUBLIC STEEL - GADSDEN, AL



TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 150 (UG/M**3) FOR REPUBLIC STEEL - GADSDEN, AL



TSP DATA SUMMARY FOR REPUBLIC STEEL - GADSDEN, AL
SAROAD STATION # 011480003 SITE ID # 02
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 0 | 0 | 47 | 66 | 96 | 98 | 112 | 60 | 61 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | ****** | 81.8 | 73.7 | 77.1 | 69.2 | 70.1 | 70.7 | 56.1 |
| GEOMETRIC S.D.: | ****** | ****** | ****** | ****** | 1.5 | 1.7 | 1.6 | 1.6 | 1.4 | 1.5 | 1.5 |
| ARITHMETIC MEAN | ****** | ****** | ****** | ****** | 87.7 | 85.6 | 85.5 | 77.4 | 74.4 | 76.3 | 60.6 |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | ****** | 250.1 | 353.4 | 304.3 | 297.5 | 197.9 | 227.0 | 178.6 |
| 1ST HIGHEST: | ****** | ****** | ****** | ****** | 171.0 | 320.0 | 199.0 | 175.0 | 139.0 | 149.0 | 132.0 |
| DATE : | ****** | ****** | ****** | ****** | 760301 | 770212 | 780822 | 790517 | 800509 | 810627 | 820129 |
| 2ND HIGHEST: | ****** | ****** | ****** | ****** | 157.0 | 275.0 | 192.0 | 164.0 | 135.0 | 140.0 | 117.0 |
| DATE : | ****** | ****** | ****** | ****** | 760406 | 770320 | 781105 | 790501 | 801114 | 810227 | 820505 |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 0 | 0 | 2 | 5 | 6 | 3 | 0 | 0 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 0 | 0 | 15 | 25 | 36 | 45 | 45 | 27 | 35 |
| 66-130: | 0 | 0 | 0 | 0 | 25 | 34 | 49 | 46 | 63 | 29 | 25 |
| 131-195: | 0 | 0 | 0 | 0 | 7 | 4 | 10 | 7 | 4 | 4 | 1 |
| 196-260: | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR REPUBLIC STEEL - GADSDEN, AL
SAROAD STATION # 011480005 SITE ID # 03
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 0 | 0 | 0 | 55 | 95 | 99 | 117 | 58 | 35 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | ****** | ****** | ****** | 65.1 | 54.1 | 56.1 | 61.4 | ****** |
| GEOMETRIC S.D.: | ****** | ****** | ****** | ****** | ****** | ****** | 1.6 | 1.5 | 1.5 | 1.5 | ****** |
| ARITHMETIC MEAN | ****** | ****** | ****** | ****** | ****** | ****** | 72.4 | 58.5 | 60.5 | 65.8 | ****** |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | ****** | ****** | ****** | 261.7 | 181.2 | 179.0 | 190.3 | ****** |
| 1ST HIGHEST: | ****** | ****** | ****** | ****** | ****** | 176.0 | 176.0 | 119.0 | 134.0 | 134.0 | 133.0 |
| DATE : | ****** | ****** | ****** | ****** | ****** | 770320 | 780907 | 790517 | 800509 | 810504 | 820318 |
| 2ND HIGHEST: | ****** | ****** | ****** | ****** | ****** | 166.0 | 165.0 | 111.0 | 123.0 | 110.0 | 122.0 |
| DATE : | ****** | ****** | ****** | ****** | ****** | 770212 | 781023 | 790819 | 800421 | 810404 | 820827 |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 0 | 0 | 0 | 31 | 44 | 62 | 73 | 30 | 21 |
| 66-130: | 0 | 0 | 0 | 0 | 0 | 22 | 45 | 37 | 43 | 27 | 13 |
| 131-195: | 0 | 0 | 0 | 0 | 0 | 2 | 6 | 0 | 1 | 1 | 1 |
| 196-260: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR REPUBLIC STEEL - GADSDEN, AL
SAROAD STATION # 011480006 SITE ID # 04
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 0 | 0 | 0 | 0 | 84 | 84 | 109 | 59 | 35 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | ****** | ****** | ****** | 78.9 | 75.0 | 74.0 | 81.7 | ****** |
| GEOMETRIC S.D.: | ****** | ****** | ****** | ****** | ****** | ****** | 1.7 | 1.7 | 1.5 | 1.6 | ****** |
| ARITHMETIC MEAN | ****** | ****** | ****** | ****** | ****** | ****** | 89.3 | 85.9 | 80.3 | 90.0 | ****** |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | ****** | ****** | ****** | 349.6 | 360.3 | 245.6 | 309.2 | ****** |
| 1ST HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | 239.0 | 350.0 | 172.0 | 209.0 | 131.0 |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | 781105 | 790912 | 800714 | 810227 | 820423 |
| 2ND HIGHEST: | ****** | ****** | ****** | ****** | ****** | ****** | 210.0 | 184.0 | 168.0 | 172.0 | 126.0 |
| DATE : | ****** | ****** | ****** | ****** | ****** | ****** | 780907 | 790501 | 801114 | 810215 | 820129 |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 3 | 4 | 4 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 0 | 0 | 0 | 0 | 32 | 33 | 47 | 20 | 20 |
| 66-130: | 0 | 0 | 0 | 0 | 0 | 0 | 38 | 40 | 51 | 31 | 14 |
| 131-195: | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 10 | 11 | 7 | 1 |
| 196-260: | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 0 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

24-HR STANDARD EXCEEDANCE ROSE FOR
REPUBLIC STEEL - GADSDEN, AL
(ALL CASES > 260 UG/M**3)
X=0.900
COUNT/AVERAGE TSP OF PRIMARY EXCEEDANCES

| SARGAD # | 11480003 | | 11480005 | | 11480006 | |
|---|---|---|---|---|---|---|
| SITE ID # | 2 | | 3 | | 4 | |
| DIRECTION | W>=X | W<X | W>=X | W<X | W>=X | W<X |
| N COUNT: | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. |
| NNE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. |
| NE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. |
| ENE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. |
| E COUNT: | 0 | 0 | 0 | 0 | 1 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 350. | 0. |
| ESE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. |
| SE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. |
| SSE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. |
| S COUNT: | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. |
| SSW COUNT: | 0 | 1 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 320. | 0. | 0. | 0. | 0. |
| SW COUNT: | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. |
| WSW COUNT: | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. |
| W COUNT: | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. |
| WNW COUNT: | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. |
| NW COUNT: | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. |
| NNW COUNT: | 0 | 1 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 275. | 0. | 0. | 0. | 0. |
| ALL COUNT: | 0 | 2 | 0 | 0 | 1 | 0 |
| AVE TSP: | 0. | 298. | 0. | 0. | 350. | 0. |

24-HR STANDARD EXCEEDANCE ROSE FOR
REPUBLIC STEEL - GADSDEN, AL
(ALL CASES > 150 UG/M**3)
X=0.900
COUNT/AVERAGE TSP OF SECONDARY EXCEEDANCES

| SAROAD # | 11480003 | | 11480005 | | 11480006 | |
|---|---|---|---|---|---|---|
| SITE ID # | 2 | | 3 | | 4 | |
| DIRECTION | W>=X | W<X | W>=X | W<X | W>=X | W<X |
| N COUNT: | 0 | 1 | 0 | 1 | 0 | 0 |
| AVE TSP: | 0. | 170. | 0. | 165. | 0. | 0. |
| NNE COUNT: | 0 | 1 | 0 | 0 | 1 | 2 |
| AVE TSP: | 0. | 157. | 0. | 0. | 160. | 164. |
| NE COUNT: | 0 | 2 | 0 | 1 | 1 | 3 |
| AVE TSP: | 0. | 163. | 0. | 176. | 177. | 182. |
| ENE COUNT: | 2 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 159. | 0. | 0. | 0. | 0. | 0. |
| E COUNT: | 1 | 1 | 0 | 0 | 6 | 2 |
| AVE TSP: | 199. | 175. | 0. | 0. | 196. | 160. |
| ESE COUNT: | 0 | 0 | 0 | 0 | 0 | 3 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 186. |
| SE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. |
| SSE COUNT: | 1 | 1 | 0 | 0 | 1 | 0 |
| AVE TSP: | 160. | 180. | 0. | 0. | 162. | 0. |
| S COUNT: | 0 | 1 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 171. | 0. | 0. | 0. | 0. |
| SSW COUNT: | 0 | 2 | 0 | 1 | 0 | 1 |
| AVE TSP: | 0. | 256. | 0. | 166. | 0. | 239. |
| SW COUNT: | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. |
| WSW COUNT: | 0 | 1 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 160. | 0. | 0. | 0. | 0. |
| W COUNT: | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. |
| WNW COUNT: | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. |
| NW COUNT: | 1 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 233. | 0. | 0. | 0. | 0. | 0. |
| NNW COUNT: | 0 | 1 | 0 | 1 | 0 | 0 |
| AVE TSP: | 0. | 275. | 0. | 176. | 0. | 0. |
| ALL COUNT: | 5 | 11 | 0 | 4 | 9 | 11 |
| AVE TSP: | 182. | 193. | 0. | 171. | 186. | 181. |

## AIR QUALITY EVALUATION - REPUBLIC STEEL, GADSDEN, ALABAMA

Air quality trends:

Graphs of 12-month running geometric means are essentially in phase, with values at station #4 slightly above those at station #2. Geometric means at station #3 are consistently lowest of the three. Geometric means declined from mid-1977 through mid-1978. Values recovered to higher levels in 1979. Overall trends of decreasing values are indicated at stations #2 and #4 (Spearman rank correlation coefficients of -0.65 and -0.41, respectively). No trend was found for station #3 (Spearman correlation coefficient of -0.04).

During 1981 and 1982, only station #4 demonstrated a nonzero percentage of observations exceeding 150 $\mu g/m^3$.

Standard exceedance status:

Station #2 was not in violation of secondary TSP standards in 1982. Station #4 violated the annual primary standard in 1981; although there were insufficient data to compute the annual average for 1982, the TSP concentrations were likely considerably lower in 1982 than in 1981.

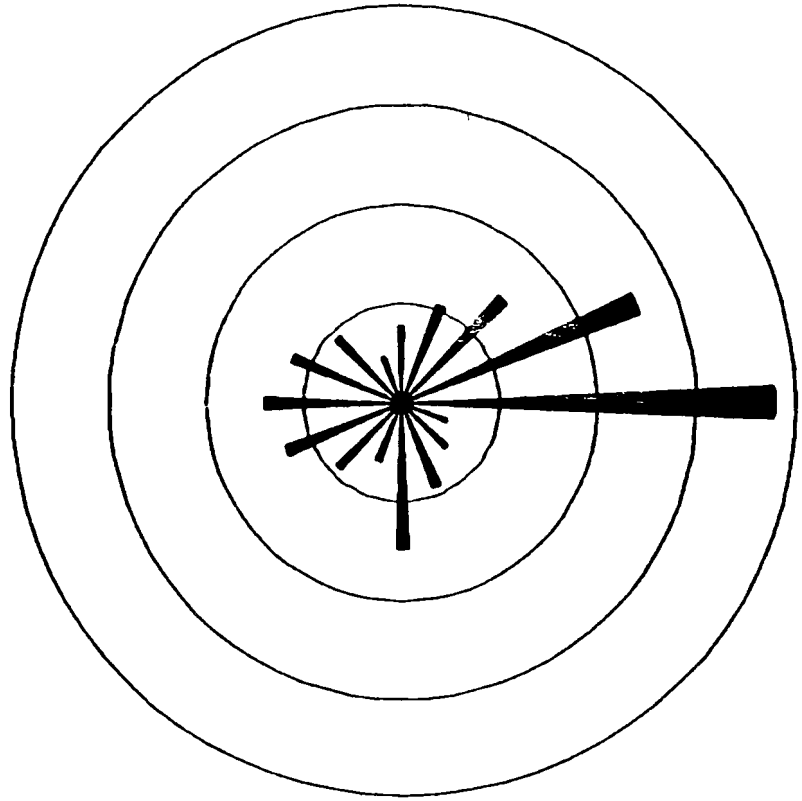
Pollution roses:

Stations #2 and #4 showed substantial increased TSP loadings under steady winds from directions containing the Republic facility. Station #3 was affected to a lesser amount.

Standard exceedance roses:

There were no excursions beyond 24-hour primary TSP standards at stations #2 or #3 under persistent winds. Only one such primary 24-hour excursion occurred at station #4, under easterly winds, indicating receipt of plant emissions.

WIND ROSE
PERSISTENCE CLASS 0.95
WIND STATION 13876



REPUBLIC STEEL
Canton
Stark County
Ohio
EPA Region V

Hi-Vol Monitoring Sites--Republic Steel, Canton, Ohio

| Site ID Number | SAROAD Number | Site Name and Address | Plant Location from Site: Facility/ Bearing (°) | Plant Location from Site: Distance (km) | Elevation (m): Above Ground | Elevation (m): Above MSL | Elevation (m): Above Plant | Site Description | Nearest Roadway: Name | Nearest Roadway: Direction | Nearest Roadway: Distance (m) | Nearest Roadway: Type and Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 36-1000-001-H02<br>H09 | Canton City Hall<br>218 Cleveland Ave., S.<br>Canton, OH | Republic<br>Ford | 75<br>85 | 3.1<br>4.2 | 8 | 331 | 11 | Roof<br>Center city-commercial | Rts. 172 & 30 E. | S | 6 | 2-lane, M |
| 2 | 36-1000-003-H02 | Fairmont School<br>2710 Coventry, NE.<br>Canton, OH | Republic<br>Ford | 209<br>183 | 2.7<br>2.8 | 9 | 348 | 28 | Roof<br>Center city-residential-industrial | Baldwin Ave.<br>Canton RR. yards | W<br>SE | 9<br>1,000 | 2-lane, L<br>Multiple tracks |
| 3* | 36-1000-005-H02 | Allen School<br>1114 Gonden Ave., SE.<br>Canton, OH | Republic<br>Ford | 46<br>64 | 2.8<br>3.5 | 12 | 328 | 8 | Roof<br>Commercial-industrial | Proposed Rt. 30 (under construction)<br>Norfolk & Western RR. | W<br>NE | 305<br>500 | Heavy construction traffic, 1978-1979<br>Tracks and small yard |
| 4 | 36-1000-006-H02 | Belden School<br>2115 Georgetown Rd., NE.<br>Canton, OH | Republic<br>Ford | 33<br>73 | 1.1<br>1.9 | 14 | 343 | 23 | Roof<br>Center city-residential industrial | Belden Ave. | W | 30 | 2-lane, L to M |
| 5 | 36-1000-009-H01 | Madge Youtz School<br>1901 Midway, NE.<br>Canton, OH | Republic<br>Ford | 199<br>161 | 1.7<br>2.0 | 8 | 342 | 21 | Roof<br>Center city-residential commercial | 19th St.<br>Mahoning Road Plaza | S&E<br>S | 75<br>185 | 2-lane, M |

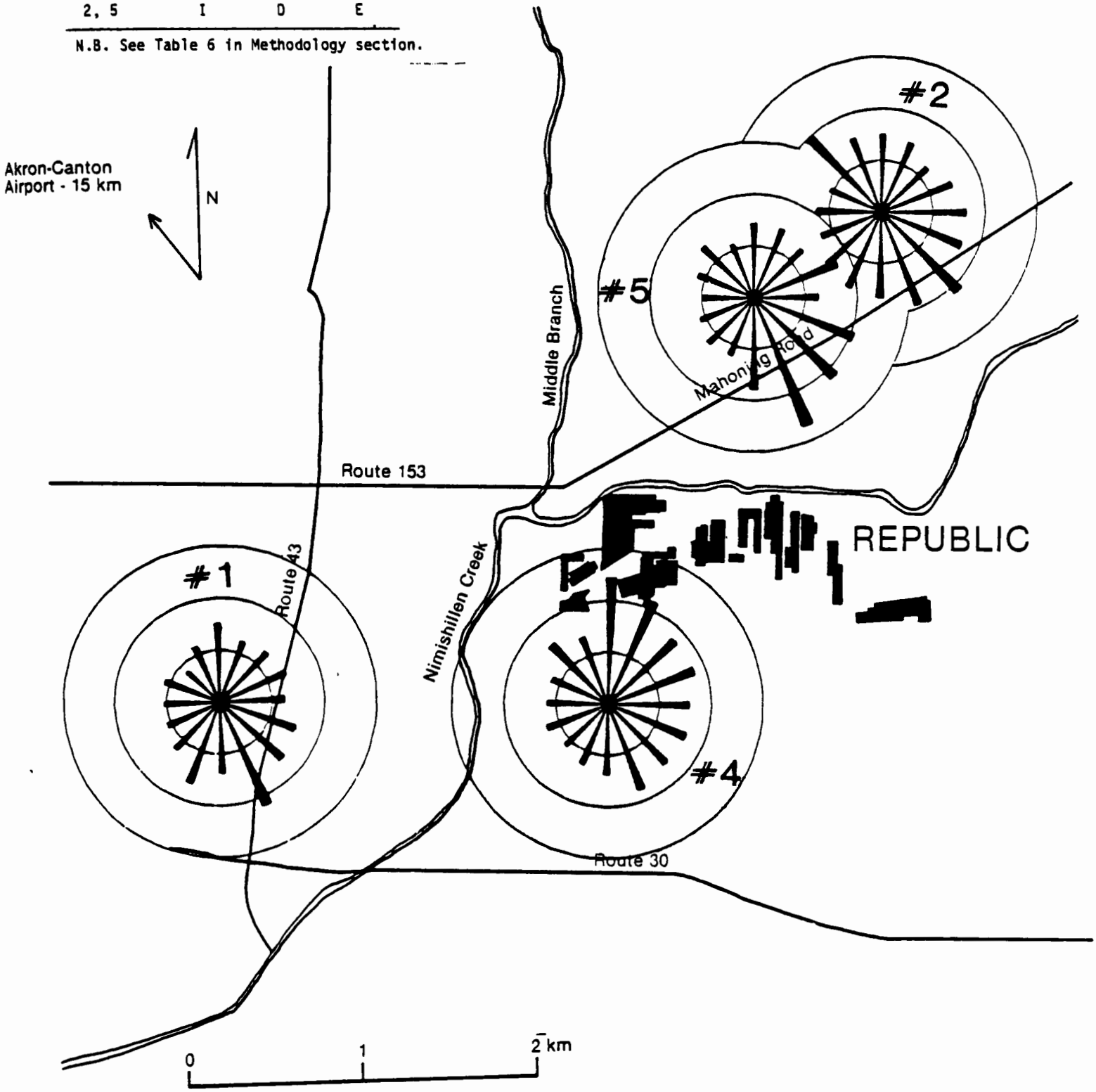
Key: U = Unavailable M = Moderate
L = Light H = Heavy

* Data from this station were included in the original 1973-1977 analysis; however, no strong mill impact on TSP was noted at this site. Based on the likelihood that this situation has not changed, data from this site were not employed in the 1978-1980 or the 1981-1982 updates.

Wind Data Representativeness

| Station # | Terrain | Distance | Rating |
|---|---|---|---|
| 1, 4 | I | C | E |
| 2, 5 | I | D | E |

N.B. See Table 6 in Methodology section.



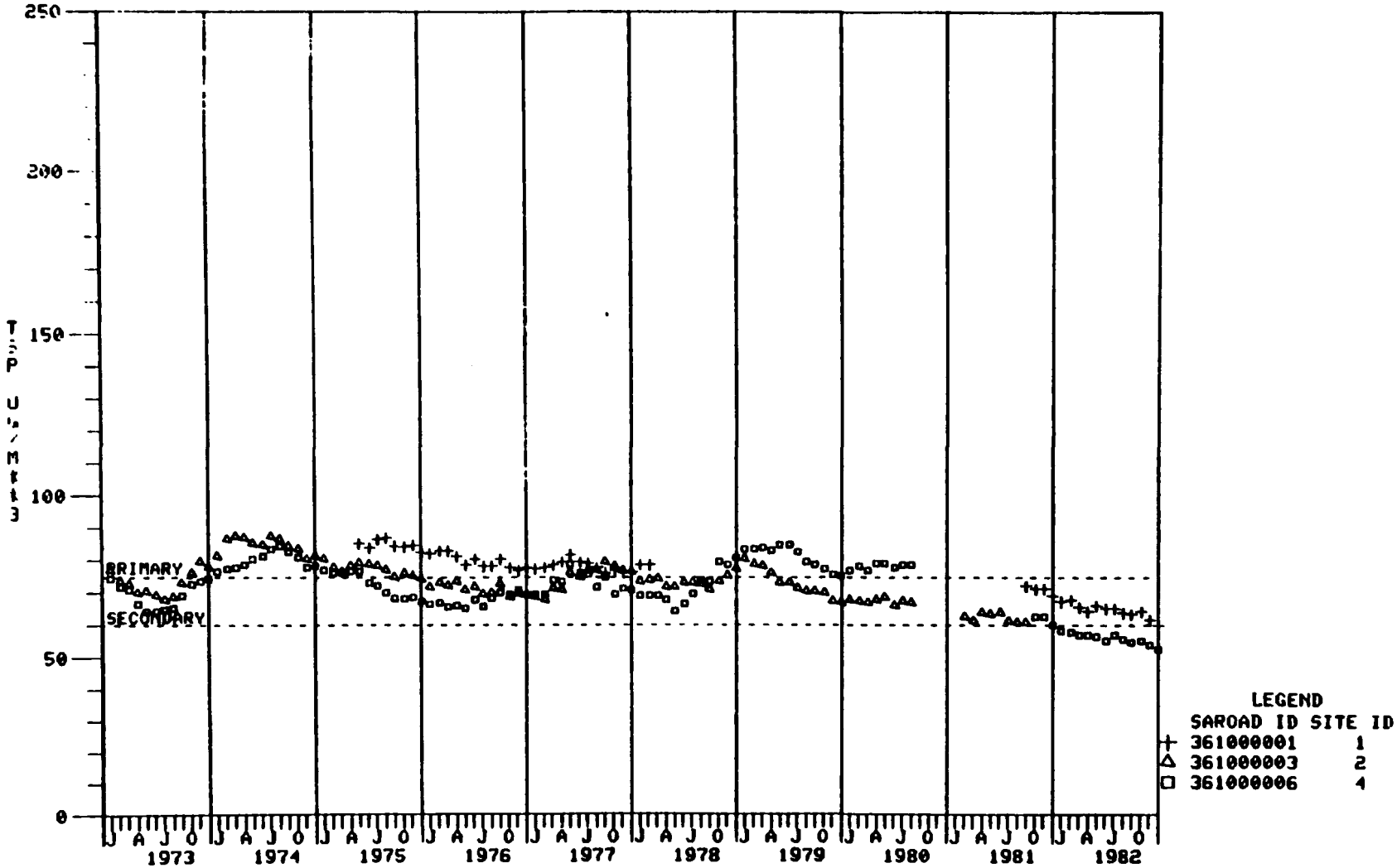

TSP roses for Republic Steel - Canton, Ohio, for the period 1978-1982 for cases of $\omega$>0.90. Each circle represents 50 $\mu g/m^3$.

NUMBER OF TSP OBSERVATIONS USED IN POLLUTION ROSES

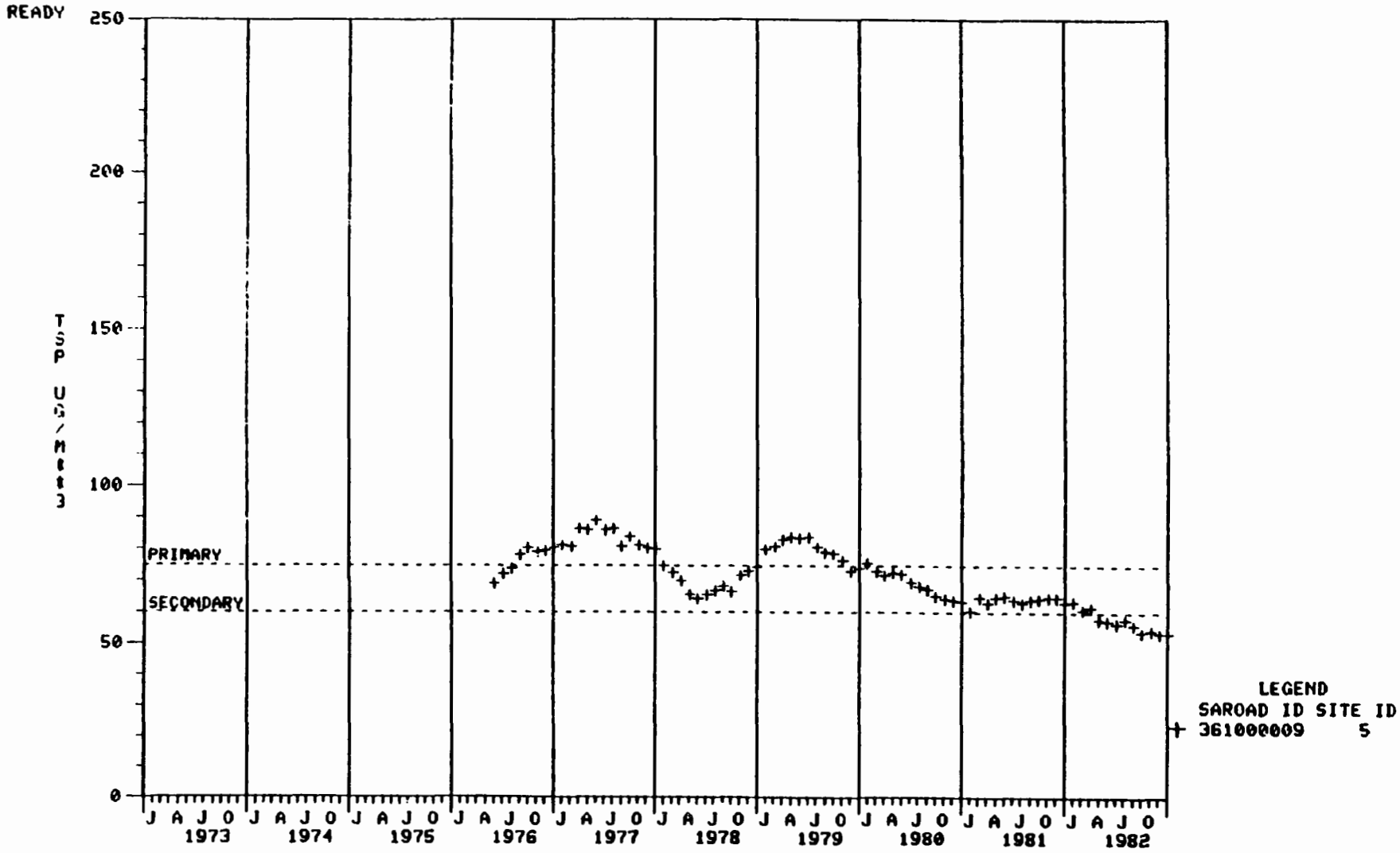
Republic Steel--Canton, OH

| Wind Direction | Monitoring Site Numbers #1 | #2 | #4 | #5 |
|---|---|---|---|---|
| N | 8 | 4 | 4 | 4 |
| NNE | 8 | 5 | 4 | 3 |
| NE | 14 | 5 | 8 | 9 |
| ENE | 3 | 1 | 1 | 1 |
| E | 8 | 1 | 3 | 5 |
| ESE | 2 | 3 | 4 | 4 |
| SE | 4 | 4 | 5 | 6 |
| SSE | 8 | 4 | 4 | 5 |
| S | 33 | 11 | 9 | 13 |
| SSW | 20 | 5 | 8 | 9 |
| SW | 17 | 8 | 10 | 11 |
| WSW | 18 | 9 | 15 | 15 |
| W | 26 | 7 | 10 | 11 |
| WNW | 16 | 9 | 11 | 11 |
| NW | 11 | 6 | 4 | 5 |
| NNW | 5 | 4 | 5 | 5 |
| Total | 201 | 86 | 105 | 117 |

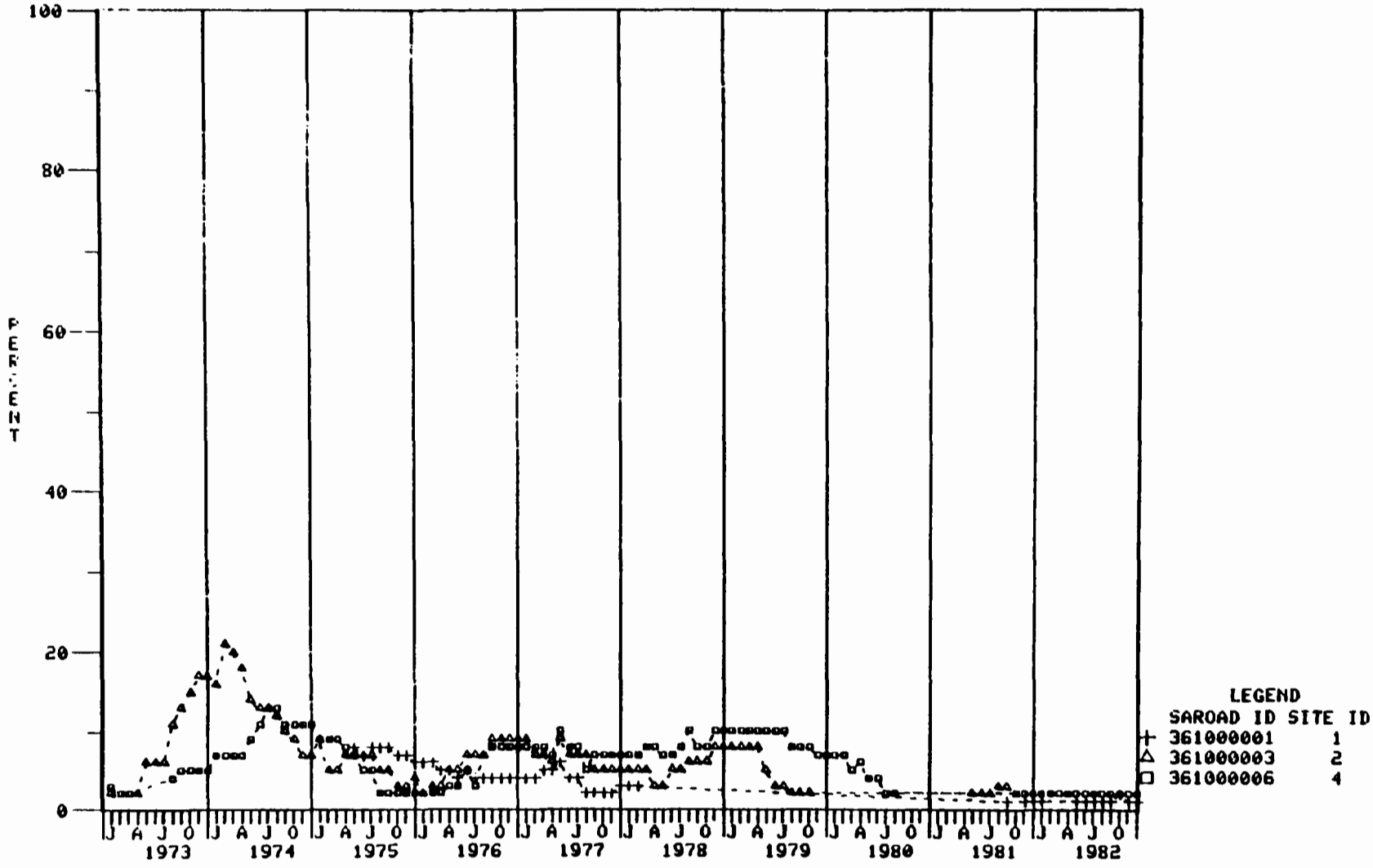
TSP 12 MONTH RUNNING GEOMETRIC MEANS (UG/M**3) FOR REPUBLIC STEEL - CANTON, OH

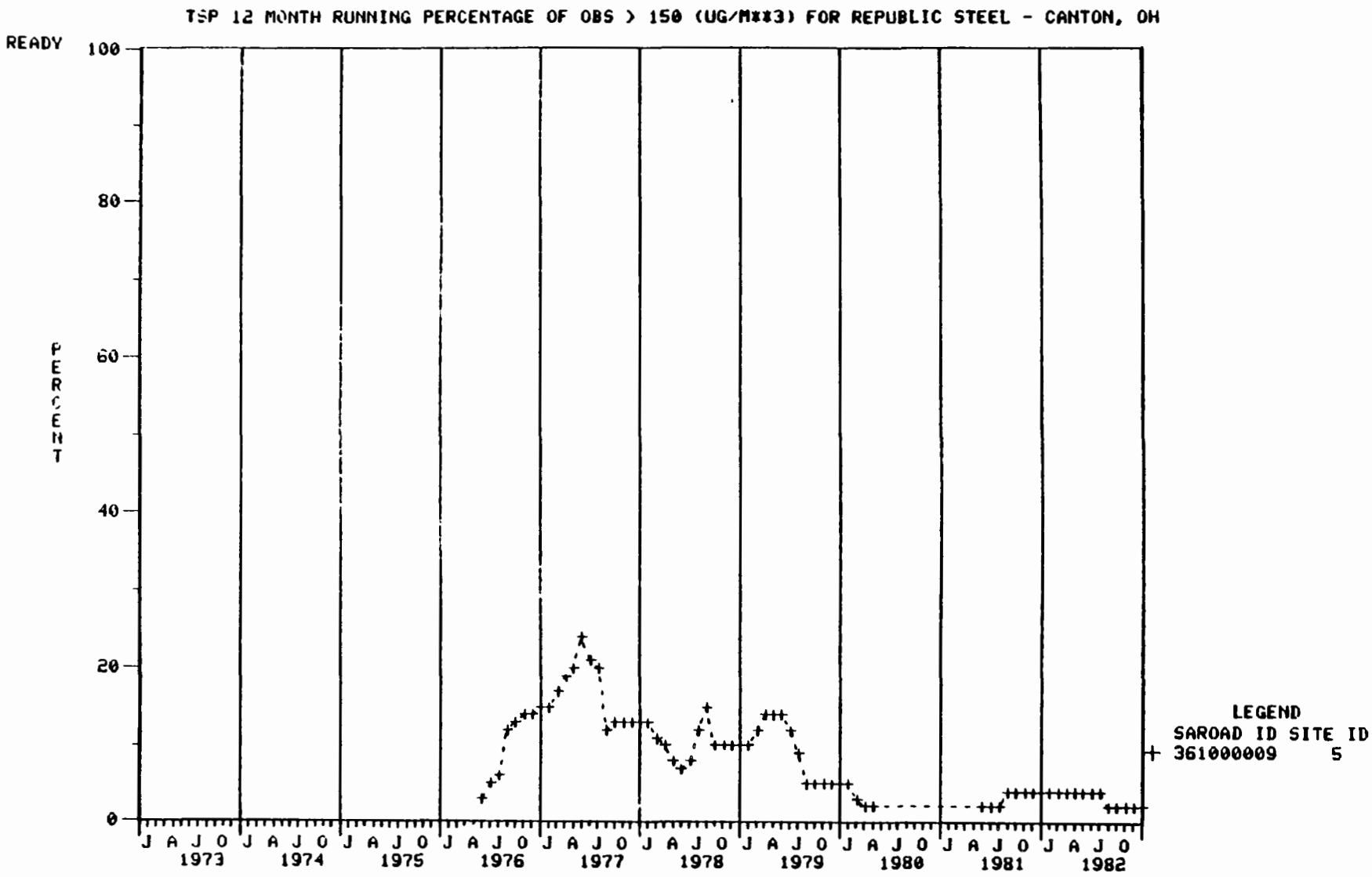


TSP 12 MONTH RUNNING GEOMETRIC MEANS (UG/M**3) FOR REPUBLIC STEEL - CANTON, OH



TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 150 (UG/M**3) FOR REPUBLIC STEEL - CANTON, OH




TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 150 (UG/M**3) FOR REPUBLIC STEEL - CANTON, OH
READY
PERCENT
100
80
60
40
20
0
J A J O
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
LEGEND
SAROAD ID SITE ID
361000009 5

TSP DATA SUMMARY FOR REPUBLIC STEEL - CANTON, OH
SAROAD STATION # 361000001 SITE ID # 01
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 22 | 266 | 208 | 194 | 0 | 0 | 0 | 249 | 260 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | 82.7 | 77.8 | 76.7 | ****** | ****** | ****** | 69.0 | 60.2 |
| GEOMETRIC S.D.: | ****** | ****** | ****** | 1.5 | 1.5 | 1.5 | ****** | ****** | ****** | 1.5 | 1.6 |
| ARITHMETIC MEAN | ****** | ****** | ****** | 89.8 | 85.2 | 82.8 | ****** | ****** | ****** | 74.5 | 66.2 |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | 278.9 | 281.4 | 240.8 | ****** | ****** | ****** | 221.2 | 222.0 |
| 1ST HIGHEST: | ****** | ****** | 160.0 | 242.0 | 221.0 | 221.0 | ****** | ****** | ****** | 195.0 | 168.0 |
| DATE : | ****** | ****** | 740827 | 750802 | 760610 | 770310 | ****** | ****** | ****** | 810217 | 821006 |
| 2ND HIGHEST: | ****** | ****** | 140.0 | 227.0 | 196.0 | 216.0 | ****** | ****** | ****** | 166.0 | 154.0 |
| DATE : | ****** | ****** | 740429 | 750730 | 760608 | 770329 | ****** | ****** | ****** | 811105 | 820716 |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 1 | 16 | 8 | 5 | 0 | 0 | 0 | 2 | 3 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 4 | 68 | 67 | 65 | 0 | 0 | 0 | 110 | 146 |
| 66-130: | 0 | 0 | 12 | 165 | 121 | 112 | 0 | 0 | 0 | 128 | 103 |
| 131-195: | 0 | 0 | 6 | 28 | 18 | 15 | 0 | 0 | 0 | 11 | 11 |
| 196-260: | 0 | 0 | 0 | 5 | 2 | 2 | 0 | 0 | 0 | 0 | 0 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR REPUBLIC STEEL - CANTON, OH
SAROAD STATION # 361000003 SITE ID # 02
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 54 | 48 | 55 | 57 | 58 | 57 | 66 | 59 | 41 | 25 | 0 |
| GEOMETRIC MEAN: | 79.7 | 77.7 | 81.4 | 74.2 | 69.0 | 76.4 | 77.6 | 67.1 | ****** | ****** | ****** |
| GEOMETRIC S.D.: | 1.6 | 1.7 | 1.6 | 1.5 | 1.7 | 1.7 | 1.7 | 1.6 | ****** | ****** | ****** |
| ARITHMETIC MEAN | 87.0 | 89.3 | 89.9 | 80.3 | 79.2 | 85.9 | 87.3 | 73.9 | ****** | ****** | ****** |
| HIGHEST BY LARSEN EXTRP: | 290.2 | 374.2 | 313.6 | 242.1 | 340.9 | 376.5 | 340.6 | 257.3 | ****** | ****** | ****** |
| 1ST HIGHEST: | 160.0 | 199.0 | 180.0 | 178.0 | 176.0 | 174.0 | 181.0 | 140.0 | 115.0 | 161.0 | ****** |
| DATE : | 720227 | 730808 | 740210 | 750418 | 760611 | 770419 | 780526 | 790912 | 800503 | 810522 | ****** |
| 2ND HIGHEST: | 143.0 | 183.0 | 178.0 | 165.0 | 167.0 | 168.0 | 180.0 | 133.0 | 113.0 | 121.0 | ****** |
| DATE : | 720801 | 730919 | 740228 | 750124 | 760430 | 770531 | 781104 | 790316 | 800527 | 810329 | ****** |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 1 | 8 | 4 | 2 | 5 | 3 | 5 | 0 | 0 | 1 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 19 | 19 | 19 | 20 | 25 | 18 | 23 | 26 | 22 | 14 | 0 |
| 66-130: | 28 | 18 | 26 | 33 | 25 | 33 | 31 | 30 | 19 | 10 | 0 |
| 131-195: | 7 | 10 | 10 | 4 | 8 | 6 | 12 | 3 | 0 | 1 | 0 |
| 196-260: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR REPUBLIC STEEL - CANTON, OH
SAROAD STATION # 361000006 SITE ID # 04
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 58 | 58 | 56 | 59 | 59 | 60 | 61 | 60 | 31 | 46 | 54 |
| GEOMETRIC MEAN: | 76.2 | 74.5 | 78.1 | 67.6 | 69.4 | 70.8 | 80.7 | 75.3 | ****** | 59.9 | 52.5 |
| GEOMETRIC S.D.: | 1.6 | 1.6 | 1.6 | 1.5 | 1.7 | 1.9 | 1.7 | 1.6 | ****** | 1.5 | 1.6 |
| ARITHMETIC MEAN | 83.4 | 83.0 | 87.9 | 73.0 | 78.5 | 82.1 | 91.7 | 83.2 | ****** | 64.9 | 58.3 |
| HIGHEST BY LARSEN EXTRP: | 282.8 | 299.6 | 336.9 | 216.3 | 309.0 | 470.5 | 374.4 | 274.1 | ****** | 200.6 | 205.2 |
| 1ST HIGHEST: | 189.0 | 206.0 | 218.0 | 201.0 | 186.0 | 223.0 | 255.0 | 217.0 | 123.0 | 155.0 | 150.0 |
| DATE : | 720209 | 730913 | 740815 | 750729 | 760822 | 770922 | 780526 | 790322 | 800503 | 810522 | 820505 |
| 2ND HIGHEST: | 159.0 | 164.0 | 188.0 | 132.0 | 168.0 | 186.0 | 183.0 | 195.0 | 117.0 | 120.0 | 140.0 |
| DATE : | 720427 | 730808 | 740628 | 751208 | 760418 | 770904 | 780824 | 790720 | 800702 | 810323 | 820716 |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 2 | 3 | 6 | 1 | 5 | 4 | 6 | 4 | 0 | 1 | 0 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 18 | 21 | 22 | 27 | 24 | 26 | 19 | 23 | 9 | 27 | 38 |
| 66-130: | 36 | 29 | 25 | 30 | 29 | 27 | 33 | 29 | 22 | 18 | 14 |
| 131-195: | 4 | 7 | 8 | 1 | 6 | 6 | 8 | 7 | 0 | 1 | 2 |
| 196-260: | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 0 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR REPUBLIC STEEL - CANTON, OH
SAROAD STATION # 361000009 SITE ID # 05
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 0 | 0 | 0 | 30 | 81 | 61 | 58 | 61 | 46 | 56 | 56 |
| GEOMETRIC MEAN: | ****** | ****** | ****** | ****** | 80.4 | 80.0 | 74.5 | 73.7 | 63.5 | 62.9 | 53.4 |
| GEOMETRIC S.D.: | ****** | ****** | ****** | ****** | 1.9 | 1.9 | 1.8 | 1.6 | 1.5 | 1.6 | 1.6 |
| ARITHMETIC MEAN | ****** | ****** | ****** | ****** | 95.8 | 92.0 | 86.4 | 82.2 | 69.3 | 70.2 | 59.8 |
| HIGHEST BY LARSEN EXTRP: | ****** | ****** | ****** | ****** | 500.5 | 496.4 | 414.8 | 320.9 | 229.4 | 259.6 | 227.2 |
| 1ST HIGHEST: | ****** | ****** | ****** | 157.0 | 337.0 | 198.0 | 189.0 | 184.0 | 123.0 | 165.0 | 153.0 |
| DATE : | ****** | ****** | ****** | 750930 | 760804 | 770419 | 780601 | 790220 | 800503 | 810826 | 820505 |
| 2ND HIGHEST: | ****** | ****** | ****** | 129.0 | 223.0 | 191.0 | 176.0 | 171.0 | 114.0 | 163.0 | 130.0 |
| DATE : | ****** | ****** | ****** | 751027 | 760825 | 770218 | 780719 | 790322 | 800328 | 810522 | 820716 |
| # OF READINGS EXCEEDING 260 : | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 0 | 0 | 0 | 1 | 12 | 8 | 6 | 3 | 0 | 2 | 1 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 0 | 0 | 0 | 16 | 28 | 19 | 21 | 22 | 23 | 28 | 36 |
| 66-130: | 0 | 0 | 0 | 13 | 37 | 32 | 27 | 34 | 23 | 23 | 19 |
| 131-195: | 0 | 0 | 0 | 1 | 12 | 9 | 10 | 5 | 0 | 5 | 1 |
| 196-260: | 0 | 0 | 0 | 0 | 3 | 1 | 0 | 0 | 0 | 0 | 0 |
| 261-325: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 326-390: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

24-HR STANDARD EXCEEDANCE ROSE FOR
REPUBLIC STEEL - CANTON, OH
(ALL CASES > 260 UG/M**3)
X=0.900
COUNT/AVERAGE TSP OF PRIMARY EXCEEDANCES

| SAROAD # | 361000001 | | 361000003 | | 361000006 | | 361000009 | |
|---|---|---|---|---|---|---|---|---|
| SITE ID # | 1 | | 2 | | 4 | | 5 | |
| DIRECTION | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X |
| N COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| NNE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| NE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| ENE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| E COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| ESE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| SE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| SSE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| S COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 337. |
| SSW COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| SW COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| WSW COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| W COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| WNW COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| NW COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| NNW COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| ALL COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 337. |

24-HR STANDARD EXCEEDANCE ROSE FOR
REPUBLIC STEEL - CANTON, OH
(ALL CASES > 150 UG/M**3)
X=0.900
COUNT/AVERAGE TSP OF SECONDARY EXCEEDANCES

| SARCAD # | 361000001 | | 361000003 | | 361000006 | | 361000009 | |
|---|---|---|---|---|---|---|---|---|
| SITE ID # | 1 | | 2 | | 4 | | 5 | |
| DIRECTION | W>=X | W<X | W>=X | W<X | W>=X | W<X | W>=X | W<X |
| N COUNT: | 1 | 1 | 1 | 0 | 1 | 2 | 1 | 0 |
| AVE TSP: | 158. | 151. | 181. | 0. | 255. | 178. | 173. | 0. |
| NNE COUNT: | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 |
| AVE TSP: | 185. | 158. | 0. | 0. | 154. | 181. | 0. | 0. |
| NE COUNT: | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 218. | 0. | 0. | 0. |
| ENE COUNT: | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 1 |
| AVE TSP: | 0. | 186. | 0. | 0. | 0. | 0. | 0. | 196. |
| E COUNT: | 0 | 2 | 0 | 0 | 0 | 3 | 0 | 1 |
| AVE TSP: | 0. | 179. | 0. | 0. | 0. | 204. | 0. | 171. |
| ESE COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| SE COUNT: | 0 | 2 | 0 | 0 | 0 | 0 | 1 | 2 |
| AVE TSP: | 0. | 189. | 0. | 0. | 0. | 0. | 176. | 188. |
| SSE COUNT: | 1 | 1 | 0 | 2 | 0 | 2 | 2 | 3 |
| AVE TSP: | 168. | 206. | 0. | 162. | 0. | 176. | 175. | 169. |
| S COUNT: | 1 | 2 | 4 | 2 | 1 | 4 | 2 | 6 |
| AVE TSP: | 168. | 204. | 167. | 160. | 167. | 181. | 175. | 197. |
| SSW COUNT: | 3 | 3 | 4 | 5 | 2 | 1 | 0 | 5 |
| AVE TSP: | 193. | 207. | 180. | 168. | 161. | 160. | 0. | 167. |
| SW COUNT: | 1 | 4 | 2 | 5 | 1 | 3 | 1 | 3 |
| AVE TSP: | 160. | 187. | 165. | 168. | 167. | 175. | 171. | 171. |
| WSW COUNT: | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 158. | 0. | 0. | 0. | 0. | 0. | 0. |
| W COUNT: | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| AVE TSP: | 0. | 152. | 0. | 0. | 0. | 155. | 0. | 0. |
| WNW COUNT: | 1 | 2 | 0 | 2 | 0 | 2 | 0 | 2 |
| AVE TSP: | 152. | 169. | 0. | 162. | 0. | 169. | 0. | 169. |
| NW COUNT: | 1 | 2 | 1 | 0 | 0 | 4 | 0 | 2 |
| AVE TSP: | 191. | 175. | 172. | 0. | 0. | 179. | 0. | 176. |
| NNW COUNT: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| AVE TSP: | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 176. |
| ALL COUNT: | 10 | 25 | 12 | 16 | 7 | 23 | 7 | 26 |
| AVE TSP: | 176. | 183. | 172. | 166. | 183. | 179. | 174. | 179. |

## AIR QUALITY EVALUATION - REPUBLIC STEEL, CANTON, OHIO

Air quality trends:

Stations #2, #4, and #5 displayed highest 12-month running geometric means in 1979, with steadily declining values since then. Station #4 showed a slightly negative overall trend (Spearman correlation coefficient of -0.16). Stations #1 and #5 displayed the strongest downward trends (Spearman correlation coefficients of -0.93 and -0.80, respectively).

Station #5 demonstrated the highest percentage of observations exceeding 150 $\mu g/m^3$ (over 20 percent); this parameter fell to under 5 percent by the end of 1982.

Standard exceedance status:

All stations showed no violations of the primary standards in 1981 or 1982. Only station #1 exceeded the annual secondary standard in 1982.

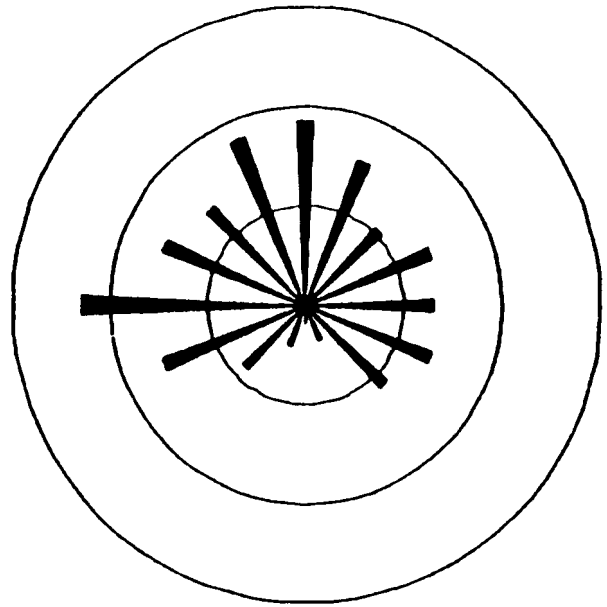
Pollution roses:

The pollution rose for station #4 indicates an impact of plant emission under persistent winds from the north through east-northeast. Under these conditions, stations #2 and #5 are upwind and show substantially lower values. All four stations show relatively large values from southeasterly or south-southeasterly winds.

Standard exceedance roses:

There were no recorded excursions beyond the 24-hour primary standard under persistent winds. Station #5 registered the lone recorded event under nonpersistent winds from a general southerly direction that may have transported mill emissions to the station. Approximately half of the excursions above the 24-hour secondary standard of 150 $\mu g/m^3$ occurred with winds transporting plant emissions toward the station.

WIND ROSE
PERSISTENCE CLASS 0.90
WIND STATION 361000001



REPUBLIC STEEL
Chicago
Cook County
Illinois
EPA Region V

Hi-Vol Monitoring Sites--Republic Steel, Chicago, Illinois

| Site ID Number | SAROAD Number | Site Name and Address | Plant Location from Site | | Elevation (m) | | | Site Description | Nearest Roadway | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Bearing (°) | Distance (km) | Above Ground | Above MSL | Above Plant | | Name | Direc-tion | Distance (m) | Volume |
| 2 | 14-1220-018 | Carver High School<br>801 E. 133d St.<br>Chicago, IL | 52 | 4.5 | 15 | 179 | 1 | Roof<br>Center city-industrial | Paved rd. | W | 60 | L |
| 3 | 14-1220-022 | Washington High School<br>3500 E. 114th St.<br>Chicago, IL | 220-270 | 1.0-1.4 | 9 | 178 | 0 | Roof<br>Center city-industrial | 114th St.<br>South Ave. O | N<br>W | 60<br>60 | M<br>H |
| 4 | 14-1220-031 | Addams Elem. School<br>10810 South Ave.<br>Chicago, IL | 208-225 | 1.8-2.5 | 10 | 178 | 0 | Roof<br>Center city-industrial | 108th St.<br>South Ave. H | N<br>W | 45<br>60 | H<br>M |
| 5* | 15-1780-005 | Police & Fire Station<br>2211 Calumet Ave.<br>Hammond, IN | 270-290 | 3.5 | 5 | 178 | 0 | Roof | Calumet Ave. | W | 15 | H |
| 8* | 15-1780-007 | GSA Bldg.<br>Hammond, IN | 325 | 4.0 | 3 | 178 | 0 | Roof | Paved rd. | S | 12 | L |
| 9* | 15-1780-008 | 1300 141st St.<br>Hammond, IN | 320 | 6.5 | 5 | 178 | 0 | Roof | 141st St. | N | 15 | M |

Key: U = Unavailable M = Moderate
L = Light H = Heavy

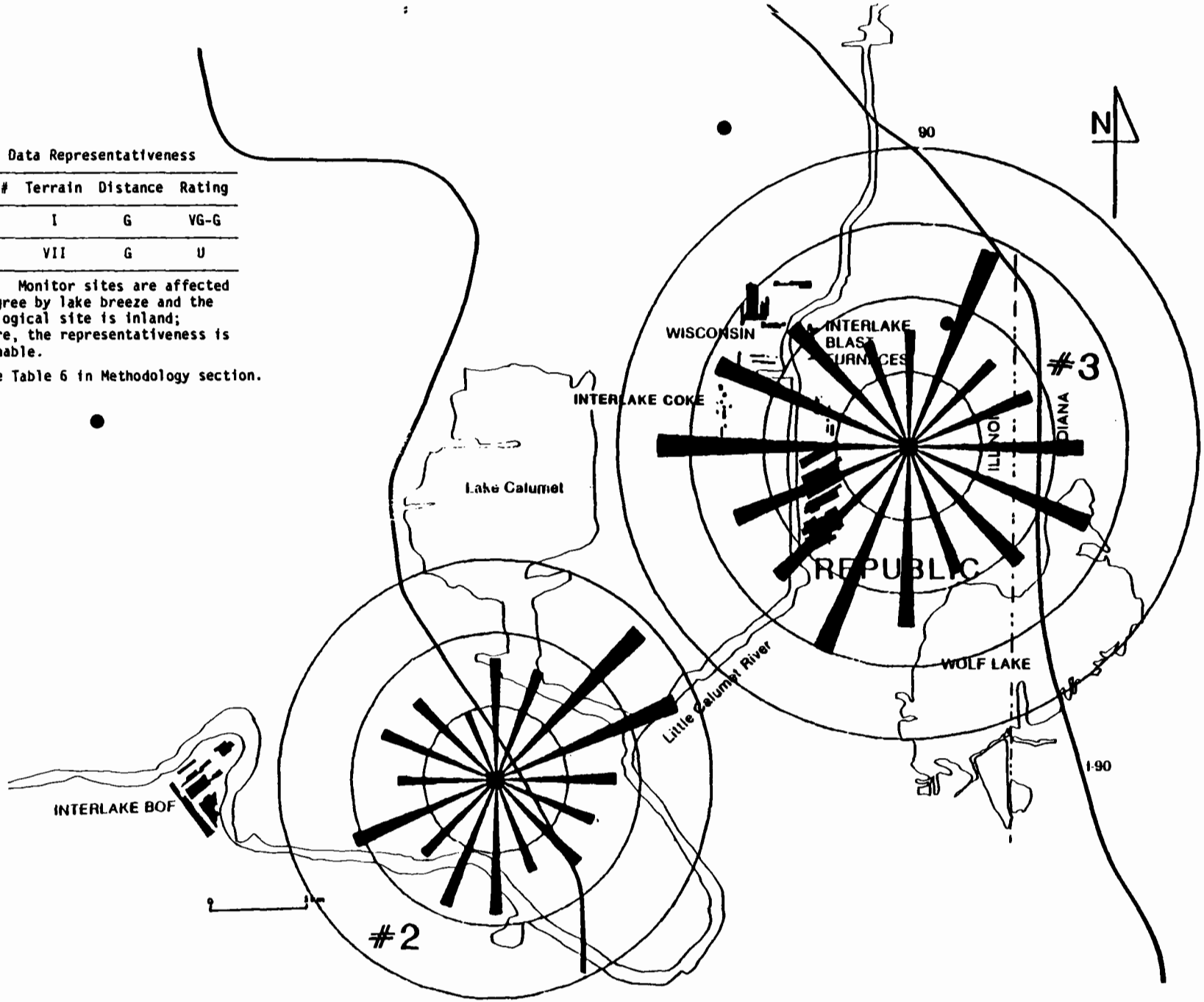
* Data from this station were included in the original 1973-1977 analysis; however, no strong mill impact on TSP was noted at this site. Based on the likelihood that this situation has not changed, data from this site were not employed in the 1978-1980 or the 1981-1982 updates.

Wind Data Representativeness

| Station # | Terrain | Distance | Rating |
|---|---|---|---|
| 2 | I | G | VG-G |
| 3 | VII | G | U |

Comment: Monitor sites are affected to a degree by lake breeze and the meteorological site is inland; therefore, the representativeness is questionable.

N.B. See Table 6 in Methodology section.



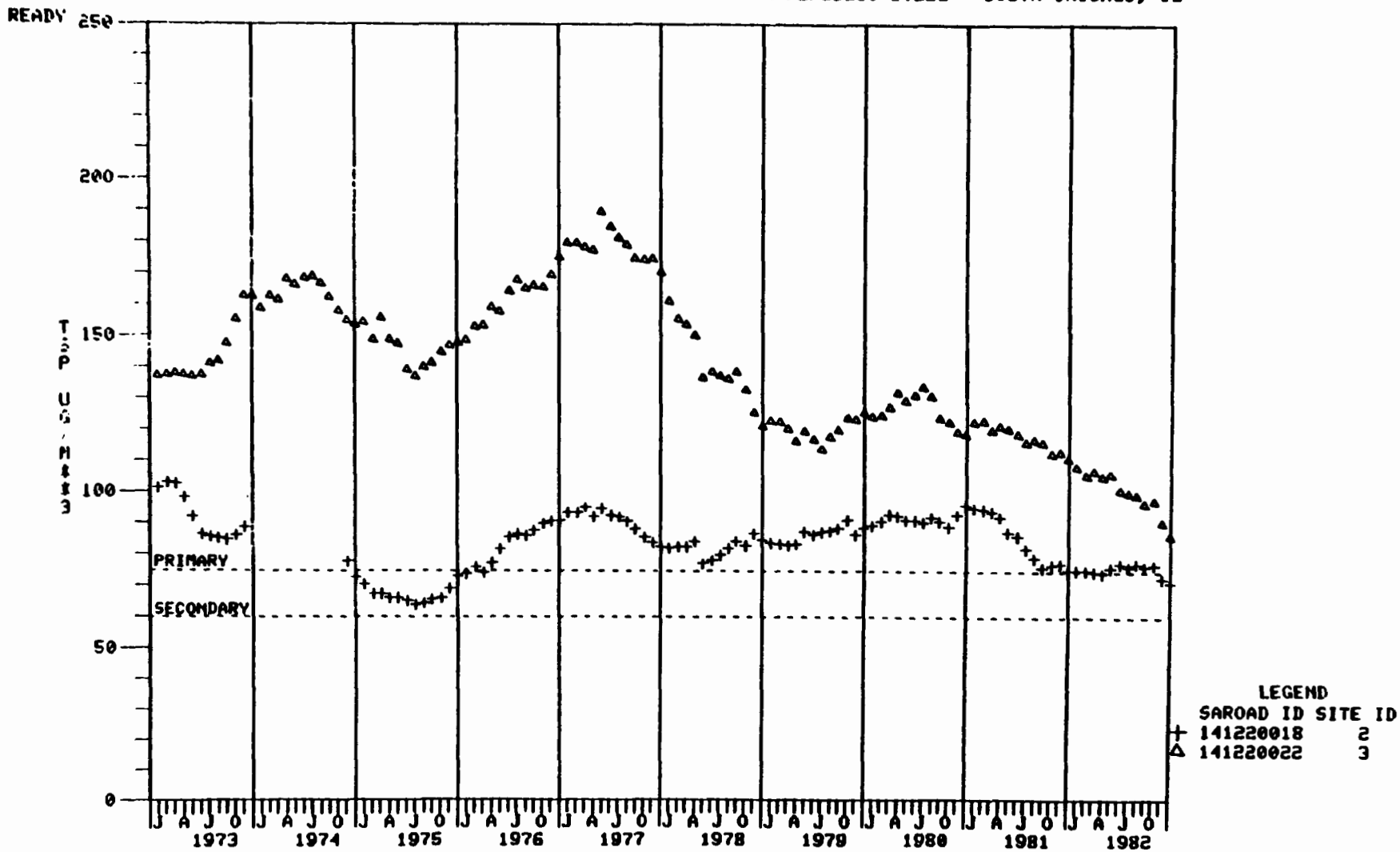

TSP roses for Republic Steel - Chicago, Illinois, for the period 1978-1982 for cases of $\omega>0.90$. Each circle represents 50 $\mu g/m^3$.

NUMBER OF TSP OBSERVATIONS USED IN POLLUTION ROSES

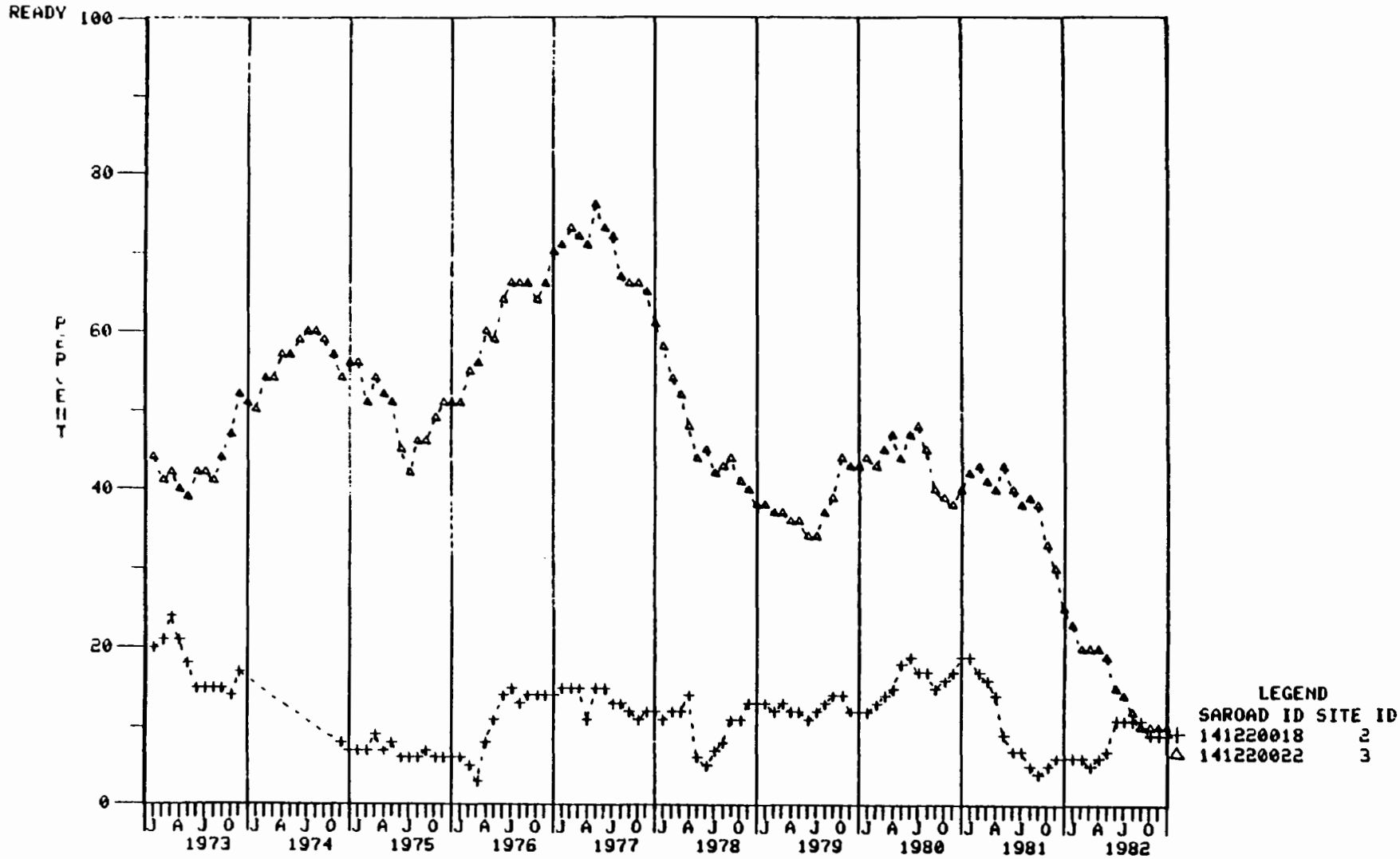
Republic Steel--Chicago, IL

| Wind Direction | Monitoring Site Numbers #2 | #3 |
|---|---|---|
| N | 8 | 10 |
| NNE | 8 | 7 |
| NE | 7 | 8 |
| ENE | 9 | 5 |
| E | 2 | 2 |
| ESE | 3 | 3 |
| SE | 4 | 3 |
| SSE | 7 | 8 |
| S | 43 | 36 |
| SSW | 20 | 18 |
| SW | 15 | 12 |
| WSW | 6 | 7 |
| W | 20 | 21 |
| WNW | 6 | 6 |
| NW | 9 | 8 |
| NNW | 4 | 4 |
| Total | 171 | 158 |

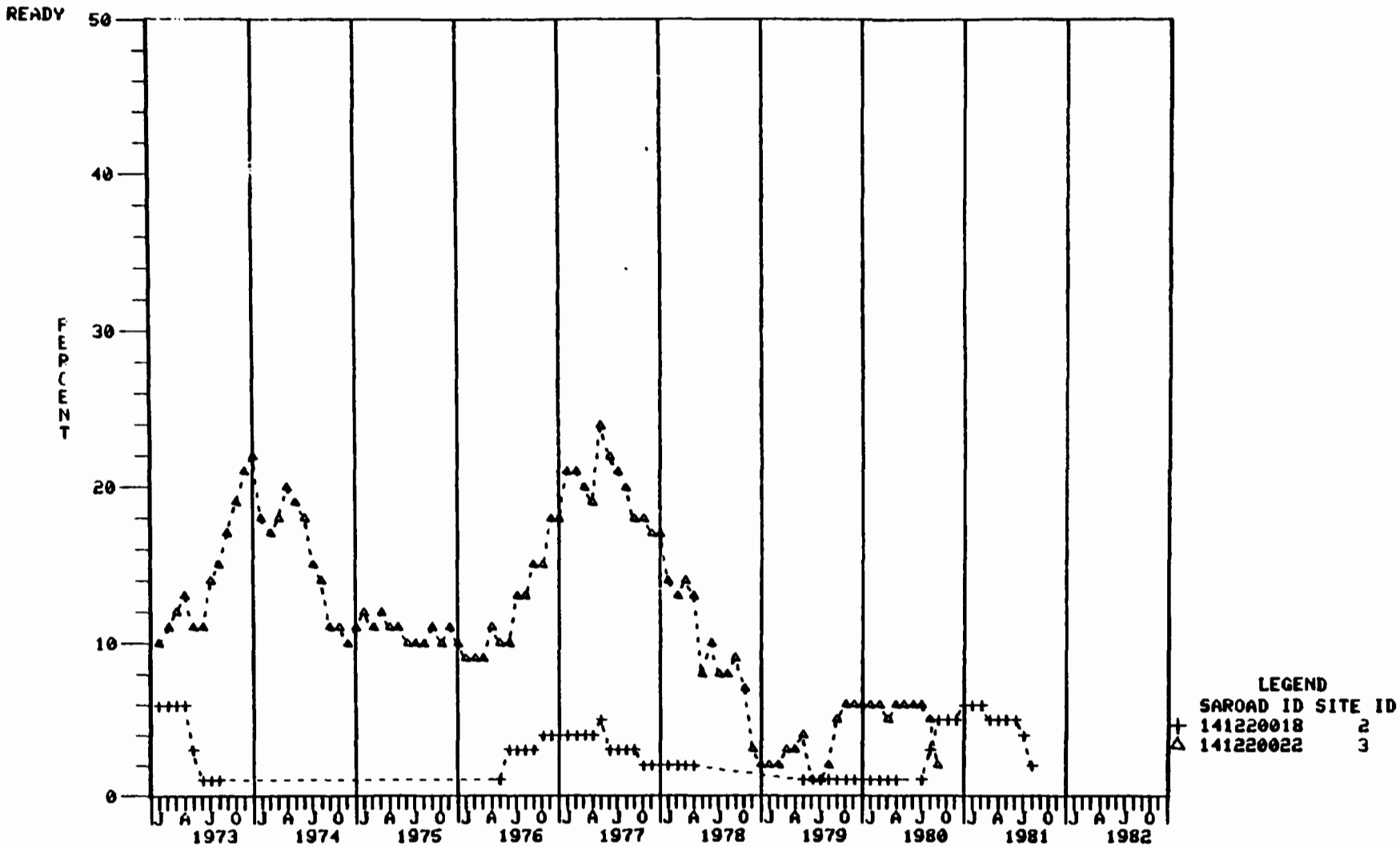
TSP 12 MONTH RUNNING GEOMETRIC MEANS (UG/M**3) FOR REPUBLIC STEEL - SOUTH CHICAGO, IL



TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 150 (UG/M**3) FOR REPUBLIC STEEL - SOUTH CHICAGO, IL



TSP 12 MONTH RUNNING PERCENTAGE OF OBS > 260 (UG/M**3) FOR REPUBLIC STEEL - SOUTH CHICAGO, IL



TSP DATA SUMMARY FOR REPUBLIC STEEL - SOUTH CHICAGO, IL
SAROAD STATION # 141220018 SITE ID # 02
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 136 | 54 | 82 | 86 | 103 | 108 | 104 | 110 | 53 | 54 | 58 |
| GEOMETRIC MEAN: | 100.9 | ****** | 72.5 | 73.0 | 90.7 | 82.8 | 84.7 | 88.7 | 95.9 | 75.3 | 71.2 |
| GEOMETRIC S.D.: | 1.7 | ****** | 1.7 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.8 | 1.5 | 1.7 |
| ARITHMETIC MEAN | 116.4 | ****** | 82.4 | 81.2 | 103.0 | 93.9 | 93.2 | 99.4 | 115.2 | 81.7 | 80.8 |
| HIGHEST BY LARSEN EXTRP: | 457.8 | ****** | 334.1 | 290.8 | 390.6 | 341.4 | 308.3 | 362.9 | 552.2 | 249.3 | 321.8 |
| 1ST HIGHEST: | 454.0 | 254.0 | 257.0 | 170.0 | 360.0 | 292.0 | 250.0 | 272.0 | 377.0 | 166.0 | 203.0 |
| DATE : | 720523 | 730206 | 740601 | 750518 | 761015 | 770522 | 780628 | 790530 | 800801 | 811031 | 820429 |
| 2ND HIGHEST: | 366.0 | 245.0 | 211.0 | 167.0 | 317.0 | 285.0 | 199.0 | 248.0 | 373.0 | 164.0 | 193.0 |
| DATE : | 720521 | 730227 | 740628 | 750319 | 760512 | 770519 | 780417 | 790322 | 800906 | 810404 | 820628 |
| # OF READINGS EXCEEDING 260 : | 8 | 0 | 0 | 0 | 4 | 2 | 0 | 1 | 3 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 25 | 10 | 6 | 5 | 14 | 13 | 12 | 13 | 10 | 3 | 4 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 26 | 15 | 34 | 37 | 26 | 40 | 29 | 31 | 14 | 21 | 23 |
| 66-130: | 73 | 27 | 38 | 38 | 57 | 51 | 57 | 56 | 24 | 27 | 29 |
| 131-195: | 20 | 9 | 8 | 11 | 12 | 9 | 15 | 15 | 9 | 6 | 5 |
| 196-260: | 9 | 3 | 2 | 0 | 4 | 6 | 3 | 7 | 3 | 0 | 1 |
| 261-325: | 5 | 0 | 0 | 0 | 3 | 2 | 0 | 1 | 1 | 0 | 0 |
| 326-390: | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 0 |
| 391-455: | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

TSP DATA SUMMARY FOR REPUBLIC STEEL - SOUTH CHICAGO, IL
SAROAD STATION # 141220022 SITE ID # 03
UNITS : MICROGRAMS/M**3

| YEAR | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # OF READINGS : | 136 | 87 | 84 | 98 | 115 | 113 | 88 | 84 | 52 | 60 | 59 |
| GEOMETRIC MEAN: | 134.0 | 162.8 | 153.4 | 148.0 | 175.1 | 170.4 | 121.2 | 125.6 | 118.5 | 110.7 | 86.3 |
| GEOMETRIC S.D.: | 1.6 | 1.6 | 1.7 | 1.6 | 1.6 | 1.7 | 1.7 | 1.6 | 1.5 | 1.5 | 1.6 |
| ARITHMETIC MEAN | 149.4 | 184.2 | 176.0 | 163.0 | 193.9 | 201.2 | 136.5 | 138.5 | 129.1 | 120.0 | 95.7 |
| HIGHEST BY LARSEN EXTRP: | 562.4 | 700.6 | 750.0 | 562.0 | 710.5 | 837.8 | 540.9 | 480.1 | 419.2 | 379.2 | 344.4 |
| 1ST HIGHEST: | 397.0 | 463.0 | 540.0 | 381.0 | 474.0 | 1106.0 | 517.0 | 325.0 | 231.0 | 254.0 | 209.0 |
| DATE : | 720601 | 730510 | 740613 | 751105 | 760714 | 771118 | 780613 | 790310 | 801006 | 810603 | 820511 |
| 2ND HIGHEST: | 320.0 | 422.0 | 506.0 | 367.0 | 452.0 | 688.0 | 278.0 | 294.0 | 226.0 | 229.0 | 198.0 |
| DATE : | 720817 | 730718 | 740228 | 750226 | 761223 | 771031 | 780601 | 790906 | 800310 | 810522 | 820111 |
| # OF READINGS EXCEEDING 260 : | 9 | 19 | 9 | 10 | 21 | 19 | 2 | 5 | 0 | 0 | 0 |
| # OF READINGS EXCEEDING 150 : | 59 | 44 | 47 | 50 | 79 | 68 | 33 | 36 | 20 | 15 | 6 |
| RANGE | | | | | | | | | | | |
| 0- 65: | 11 | 2 | 7 | 4 | 5 | 4 | 12 | 7 | 6 | 6 | 16 |
| 66-130: | 47 | 27 | 21 | 37 | 19 | 27 | 33 | 33 | 23 | 34 | 33 |
| 131-195: | 50 | 28 | 27 | 27 | 45 | 47 | 31 | 34 | 16 | 15 | 8 |
| 196-260: | 19 | 11 | 20 | 20 | 25 | 16 | 10 | 5 | 7 | 5 | 2 |
| 261-325: | 8 | 10 | 2 | 8 | 13 | 6 | 1 | 5 | 0 | 0 | 0 |
| 326-390: | 0 | 5 | 3 | 2 | 4 | 3 | 0 | 0 | 0 | 0 | 0 |
| 391-455: | 1 | 3 | 2 | 0 | 3 | 3 | 0 | 0 | 0 | 0 | 0 |
| >455: | 0 | 1 | 2 | 0 | 1 | 7 | 1 | 0 | 0 | 0 | 0 |

****** INDICATES MISSING OR INSUFFICIENT DATA

24-HR STANDARD EXCEEDANCE ROSE FOR
REPUBLIC STEEL - SOUTH CHICAGO, IL
(ALL CASES > 260 UG/M**3)
X=0.900
COUNT/AVERAGE TSP OF PRIMARY EXCEEDANCES

| SAROAD # | 141220018 | | 141220022 | |
|---|---|---|---|---|
| SITE ID # | 2 | | 3 | |
| DIRECTION | W>=X | W<X | W>=X | W<X |
| N COUNT: | 0 | 0 | 0 | 0 |
| AVE TSP: | 0. | 0. | 0. | 0. |
| NNE COUNT: | 0 | 0 | 2 | 0 |
| AVE TSP: | 0. | 0. | 482. | 0. |
| NE COUNT: | 1 | 1 | 1 | 3 |
| AVE TSP: | 304. | 373. | 342. | 387. |
| ENE COUNT: | 0 | 1 | 0 | 1 |
| AVE TSP: | 0. | 272. | 0. | 275. |
| E COUNT: | 0 | 1 | 0 | 0 |
| AVE TSP: | 0. | 317. | 0. | 0. |
| ESE COUNT: | 0 | 0 | 0 | 1 |
| AVE TSP: | 0. | 0. | 0. | 293. |
| SE COUNT: | 0 | 0 | 0 | 2 |
| AVE TSP: | 0. | 0. | 0. | 320. |
| SSE COUNT: | 0 | 0 | 1 | 2 |
| AVE TSP: | 0. | 0. | 688. | 329. |
| S COUNT: | 0 | 0 | 3 | 0 |
| AVE TSP: | 0. | 0. | 285. | 0. |
| SSW COUNT: | 1 | 1 | 8 | 6 |
| AVE TSP: | 292. | 285. | 324. | 362. |
| SW COUNT: | 0 | 0 | 9 | 2 |
| AVE TSP: | 0. | 0. | 320. | 357. |
| WSW COUNT: | 1 | 2 | 14 | 6 |
| AVE TSP: | 377. | 275. | 345. | 376. |
| W COUNT: | 1 | 0 | 9 | 5 |
| AVE TSP: | 360. | 0. | 377. | 363. |
| WNW COUNT: | 0 | 0 | 6 | 2 |
| AVE TSP: | 0. | 0. | 435. | 299. |
| NW COUNT: | 0 | 0 | 0 | 1 |
| AVE TSP: | 0. | 0. | 0. | 269. |
| NNW COUNT: | 0 | 0 | 1 | 0 |
| AVE TSP: | 0. | 0. | 601. | 0. |
| ALL COUNT: | 4 | 6 | 54 | 31 |
| AVE TSP: | 333. | 299. | 366. | 350. |

24-HR STANDARD EXCEEDANCE ROSE FOR
REPUBLIC STEEL - SOUTH CHICAGO, IL
(ALL CASES > 150 UG/M**3)
X=0.900
COUNT/AVERAGE TSP OF SECONDARY EXCEEDANCES

| SAROAD # | 141220018 | | 141220022 | |
|---|---|---|---|---|
| SITE ID # | 2 | | 3 | |
| DIRECTION | W>=X | W<X | W>=X | W<X |
| N COUNT: | 1 | 2 | 2 | 4 |
| AVE TSP: | 221. | 252. | 171. | 212. |
| NNE COUNT: | 1 | 2 | 4 | 4 |
| AVE TSP: | 162. | 184. | 324. | 193. |
| NE COUNT: | 4 | 8 | 2 | 9 |
| AVE TSP: | 208. | 206. | 287. | 257. |
| ENE COUNT: | 7 | 9 | 1 | 7 |
| AVE TSP: | 200. | 214. | 201. | 201. |
| E COUNT: | 0 | 9 | 0 | 13 |
| AVE TSP: | 0. | 211. | 0. | 196. |
| ESE COUNT: | 0 | 2 | 1 | 9 |
| AVE TSP: | 0. | 190. | 195. | 182. |
| SE COUNT: | 2 | 1 | 3 | 7 |
| AVE TSP: | 157. | 151. | 185. | 224. |
| SSE COUNT: | 1 | 2 | 4 | 6 |
| AVE TSP: | 164. | 177. | 311. | 230. |
| S COUNT: | 4 | 2 | 26 | 15 |
| AVE TSP: | 172. | 163. | 197. | 175. |
| SSW COUNT: | 6 | 2 | 41 | 30 |
| AVE TSP: | 203. | 246. | 212. | 217. |
| SW COUNT: | 3 | 2 | 22 | 25 |
| AVE TSP: | 162. | 162. | 252. | 216. |
| WSW COUNT: | 3 | 3 | 19 | 29 |
| AVE TSP: | 262. | 247. | 310. | 242. |
| W COUNT: | 2 | 5 | 29 | 20 |
| AVE TSP: | 288. | 177. | 254. | 243. |
| WNW COUNT: | 1 | 3 | 13 | 20 |
| AVE TSP: | 156. | 175. | 304. | 194. |
| NW COUNT: | 1 | 2 | 7 | 13 |
| AVE TSP: | 246. | 182. | 212. | 193. |
| NNW COUNT: | 0 | 0 | 5 | 8 |
| AVE TSP: | 0. | 0. | 267. | 183. |
| ALL COUNT: | 36 | 54 | 179 | 219 |
| AVE TSP: | 201. | 202. | 245. | 213. |

Air quality trends:

The graph of 12-month running geometric means for station #3 showed a dramatic decline that began in mid-1977, flattened out in 1979-1980, and continued a decline from mid-1980 through 1982. The geometric means for station #2 were cyclical and showed very little long-term trend (Spearman rank correlation coefficient of -0.01). Station #3 generated a Spearman correlation coefficient of -0.73, indicating a strongly negative overall trend.

Station #3 demonstrated percentages of observations exceeding 150 $\mu g/m^3$ that exceeded 70 percent in 1977; by 1982, the percentage had fallen to approximately 10 percent.

Standard exceedance status:

Station #2 did not exceed the primary annual standard in 1982, but station #3 continued to violate this standard in 1982, despite a decrease of 24 $\mu g/m^3$ in the geometric mean from 1981.

Pollution roses:

The pollution rose for station #3 indicates largest impact from directions containing plant activities. Contributions from other directions, however, are by no means minor. Similarly, station #2 receives its greatest TSP levels from directions containing the Republic facility.

Standard exceedance roses:

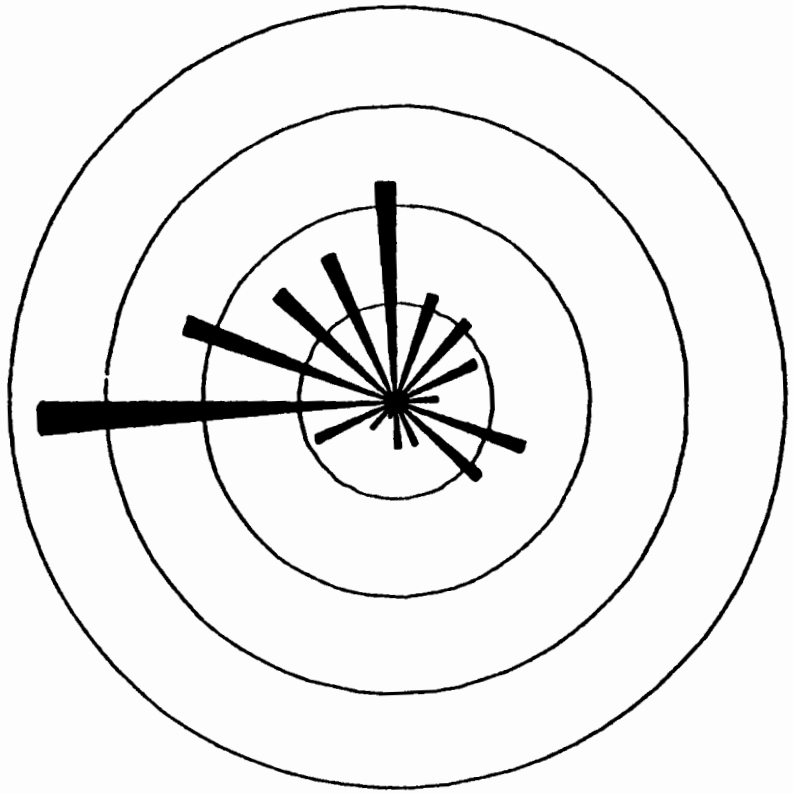
Station #2 recorded a total of four excursions beyond 24-hour primary standards under persistent winds. Of these, one involved winds that would have brought in Republic emissions. Station #3 recorded 54 such excursions. Of these, 38 involved winds that would have transported Republic emissions to the sampler.

Inhalable particulate matter:

Station #3 samples IP as part of the EPA IP Network. Data for this site are summarized below:

| Year | Instrument | # of Obs. | Arithmetic Mean | Highest | Second Highest | Standard Deviation |
|---|---|---|---|---|---|---|
| 1981 | SSI | 29 | 92.6 | 289.0 | 217.9 | 53.0 |
| 1981 | DICHOT | 40 | 58.5 | 120.1 | 109.5 | 23.8 |
| 1982 | DICHOT | 12 | 47.1 | 83.0 | 74.6 | 21.2 |

WIND ROSE
PERSISTENCE CLASS 0.90
WIND STATION 94846



# TECHNICAL REPORT DATA
*(Please read Instructions on the reverse before completing)*

| | | |
|---|---|---|
| 1. REPORT NO. EPA 340/1-85-016a | 2. | 3. RECIPIENT'S ACCESSION NO. |
| 4. TITLE AND SUBTITLE A STUDY OF PARTICULATE MATTER CONCENTRATIONS NEAR MAJOR STEEL FACILITIES (1973-1982) | | 5. REPORT DATE December 1983 |
| | | 6. PERFORMING ORGANIZATION CODE 80-01-148-27 |
| 7. AUTHOR(S) Kenneth E. Pickering, Alan L. Delman, Mary B. Charlton, and Douglas J. Pelton | | 8. PERFORMING ORGANIZATION REPORT NO. GEOMET Report Number ESF-1373 |
| 9. PERFORMING ORGANIZATION NAME AND ADDRESS GEOMET Technologies, Inc. 1801 Research Boulevard Rockville, Maryland 20850 | | 10. PROGRAM ELEMENT NO. |
| | | 11. CONTRACT/GRANT NO. 68-01-6311 |
| 12. SPONSORING AGENCY NAME AND ADDRESS Stationary Source Compliance Division U.S. Environmental Protection Agency 401 M Street, SW. Washington, D.C. 20460 | | 13. TYPE OF REPORT AND PERIOD COVERED Final Report, 1983 |
| | | 14. SPONSORING AGENCY CODE |

15. SUPPLEMENTARY NOTES

Volume 1 of 2

16. ABSTRACT


Ambient air quality statistics have been generated on 1973-1982 data collected near the Nation's 55 major integrated steel facilities. The data show levels of TSP, BaP, and IP near each facility. Conclusions concerning the impact of each mill are based on pollution roses and on analyses of conditions during days on which the National Ambient Air Quality Standards were exceeded. Trends in the 12-month running geometric means of TSP have been examined. Statistical summaries of the data are presented so that the attainment status of the vicinity of each mill can be easily determined. Data used in the analyses consist of those available from the National Aerometric Data Bank as well as special study data obtained from EPA and state and local agencies.

Over 80 percent of the stations used in the analyses demonstrate long-term downward trends in TSP levels. As of the end of 1982, the monitoring sites near 17 mills indicated no violations of primary TSP standards.

The methodology for the analysis is described and the results are presented in a separate section for each steel mill.


17. KEY WORDS AND DOCUMENT ANALYSIS

| a. DESCRIPTORS | b. IDENTIFIERS/OPEN ENDED TERMS | c. COSATI Field/Group |
|---|---|---|
| | | |

| | | |
|---|---|---|
| 18. DISTRIBUTION STATEMENT | 19. SECURITY CLASS (This Report) UNCLASSIFIED | 21. NO. OF PAGES 1,018 (total) |
| | 20. SECURITY CLASS (This page) UNCLASSIFIED | 22. PRICE |

EPA Form 2220-1 (9-73)