

Illinois Department of
**Public
Health**

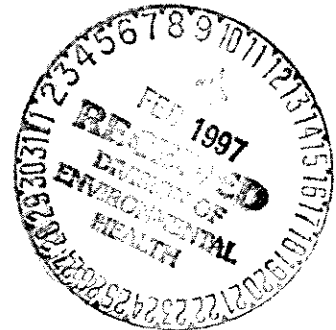
John R. Lumpkin, M.D., M.P.H., Director

4302 North Main Street • Rockford, Illinois 61103-1209

February 7, 1997

Case# ⁹~~10197001~~
103139701

Mr. Art Commare
Belvidere School Administrative Office
1201 5th Ave
Belvidere, IL 61008



Dear Mr. Commare:

The analysis of the indoor air monitoring data collected from Lincoln School (January 14-23, 1997) has been completed. Three Ventilation Efficiency Measurement Systems (VEMS) were used to monitor temperature, humidity, and carbon dioxide (CO₂). The instruments monitored indoor air quality for ten days and were located in the library, [REDACTED] room, and the kindergarten room. The results have been plotted on the attached graphs and are explained below.

The American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) Standard - Thermal Environmental Conditions for Human Occupancy (ASHRAE 55-1992) recommends an optimal indoor temperature between 68 and 79 degrees (depending on relative humidity and other climatic conditions). During periods of building occupancy, it appears that the thermal environment of the school building was adequate during this monitoring period.

ASHRAE Standard, ASHRAE 55-1992 recommends a relative humidity of 30 - 60%. The relative humidity in the school ranged between 10 and 27% during this monitoring period. These levels are slightly below the recommended range. Health complaints including nose, throat and respiratory irritation, dry skin, dry eyes, lethargy and headaches have been found at higher rates in environments with low relative humidity. Although the relative humidity is slightly low, we do not recommend the use of personal humidifiers. Improperly designed humidification systems, including personal humidifiers, may cause microbial problems in the building which are more harmful than the effects of low humidity.

CO₂ is a common inert gas that is used as a general indicator of indoor air quality. At low concentrations, it is not a significant health risk. As an indicator, it can identify areas of inadequate ventilation where potential indoor pollutants, if present, can build up. Normal outdoor concentrations can range from 350 - 450 parts per million (ppm). In a properly ventilated building or classroom the indoor levels of CO₂ will remain below 1,000 ppm. As the level increases, the number of indoor air quality complaints generally increase. Indoor air quality complaints are usually minimal when CO₂ levels are maintained below 800 ppm and a comfortable temperature and humidity are maintained.

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As you can see from the attached graphs, the CO₂ levels increase rapidly when the rooms are occupied in the morning. The levels generally increase to about 1,000 ppm or slightly more and then drop back to about outdoor levels when the building is not occupied. Based on the CO₂ data, it appears that the school building is somewhat under ventilated. Current ASHRAE guidelines (ASHRAE 62-1989) recommend that classrooms be supplied a minimum of 15 cubic feet of outdoor air per minute per person.

Please be aware that this sampling period was conducted during some very cold weather. This fact and the fact that the building (and ventilation system) is very old may make it difficult to properly ventilate and maintain a comfortable indoor temperature during cold weather.

Although the school building is not properly ventilated, it is probably not serious enough to account for some of the health complaints. As discussed by telephone, additional bioaerosol sampling will be conducted. In addition, we may collect more CO₂ data during milder weather to better help assess the indoor air quality of the building. A complete report discussing the indoor air quality of the building will be provided after all our samples are collected and analyzed.

We will be contacting you as soon as the sampling equipment becomes available for the bioaerosols. In the meantime, if you have any questions, please feel free to contact our Rockford Regional Office located at 4302 North Main Street, Rockford Illinois, 61103, telephone 815/987-7511.

Sincerely,

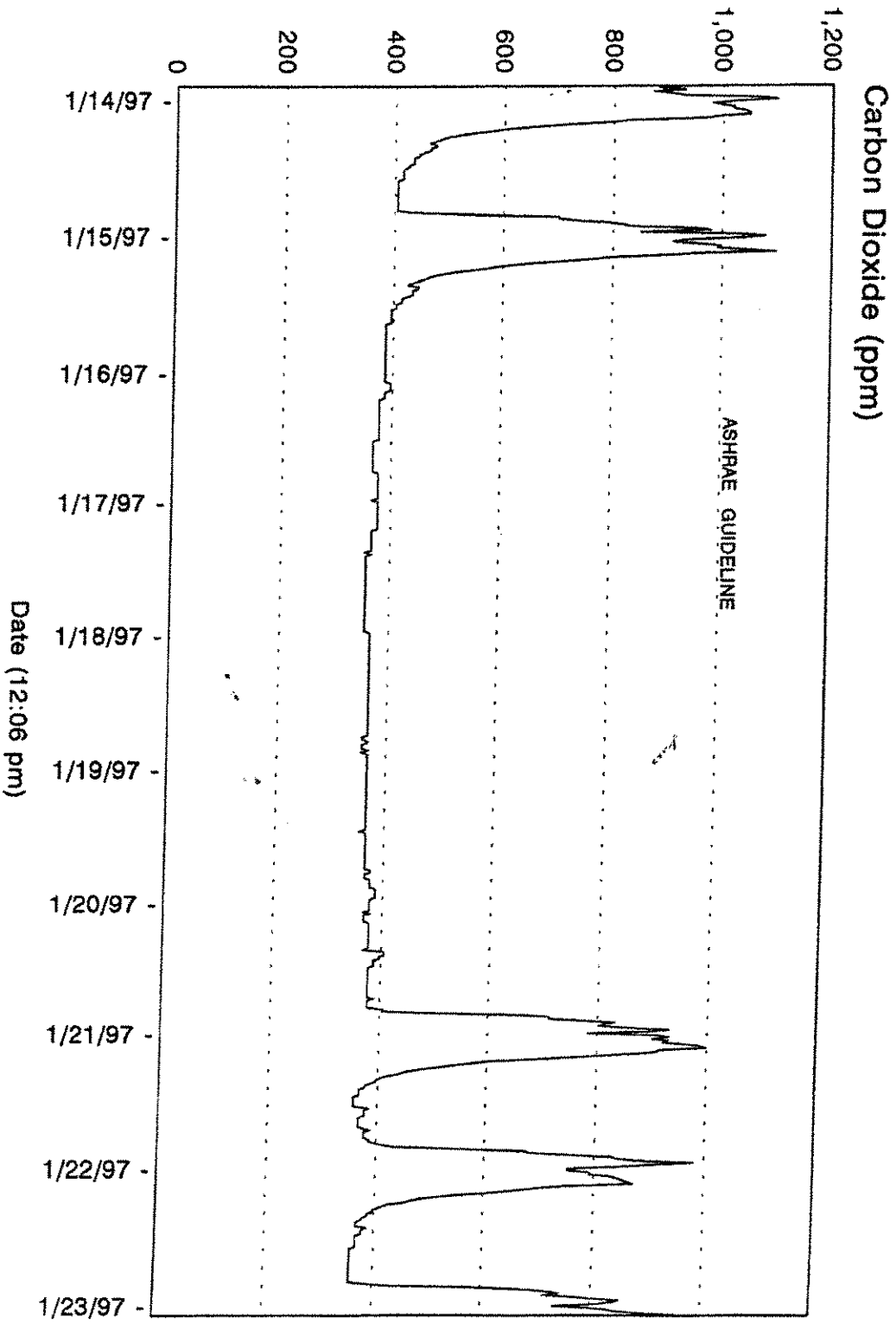


Roger J. Ruden, P.E.
Regional Engineer

SJ:sj
cc - Central Office
- Rockford Regional Office

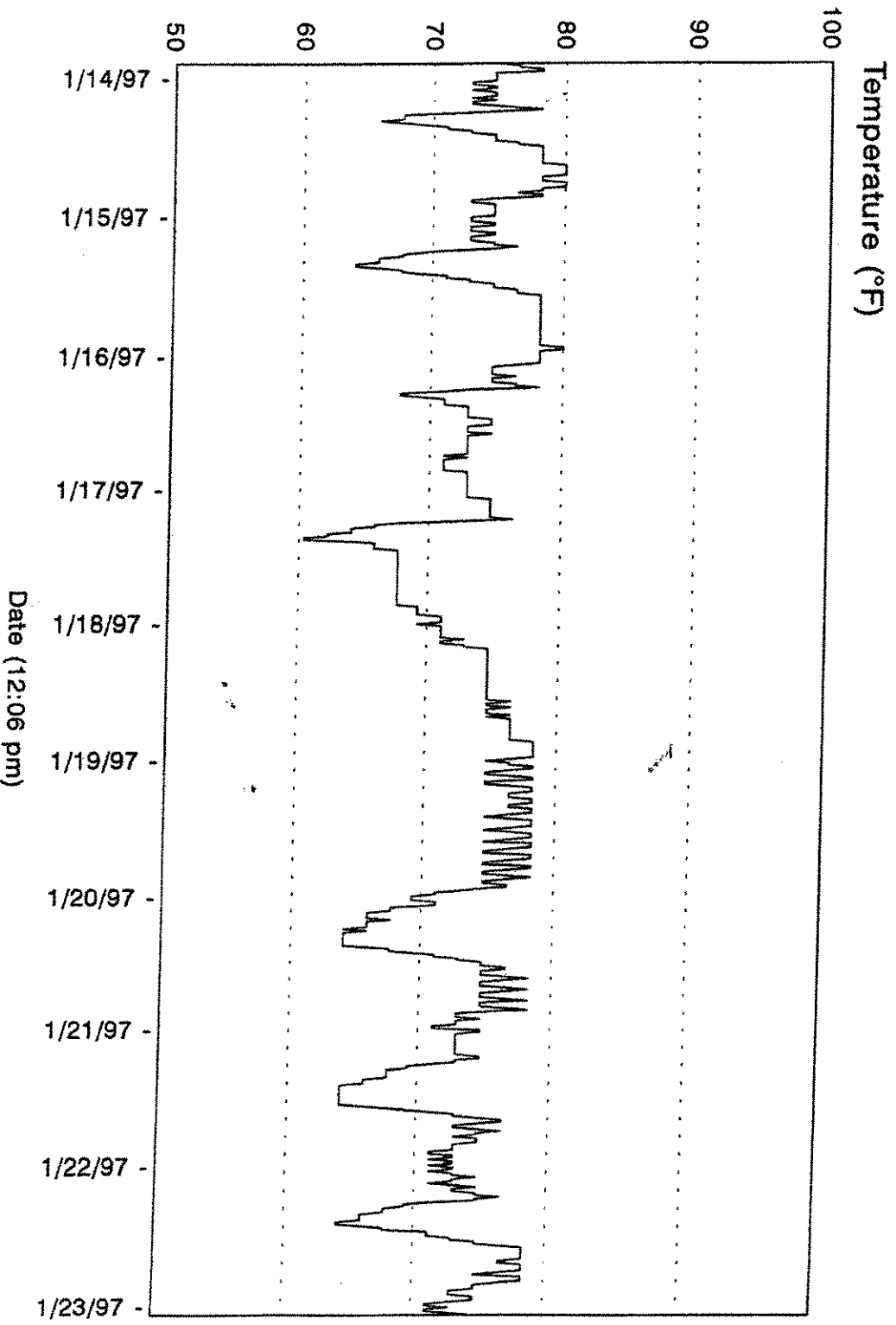
enc.

LINCOLN SCHOOL
BELVIDERE, ILLINOIS
ROOM



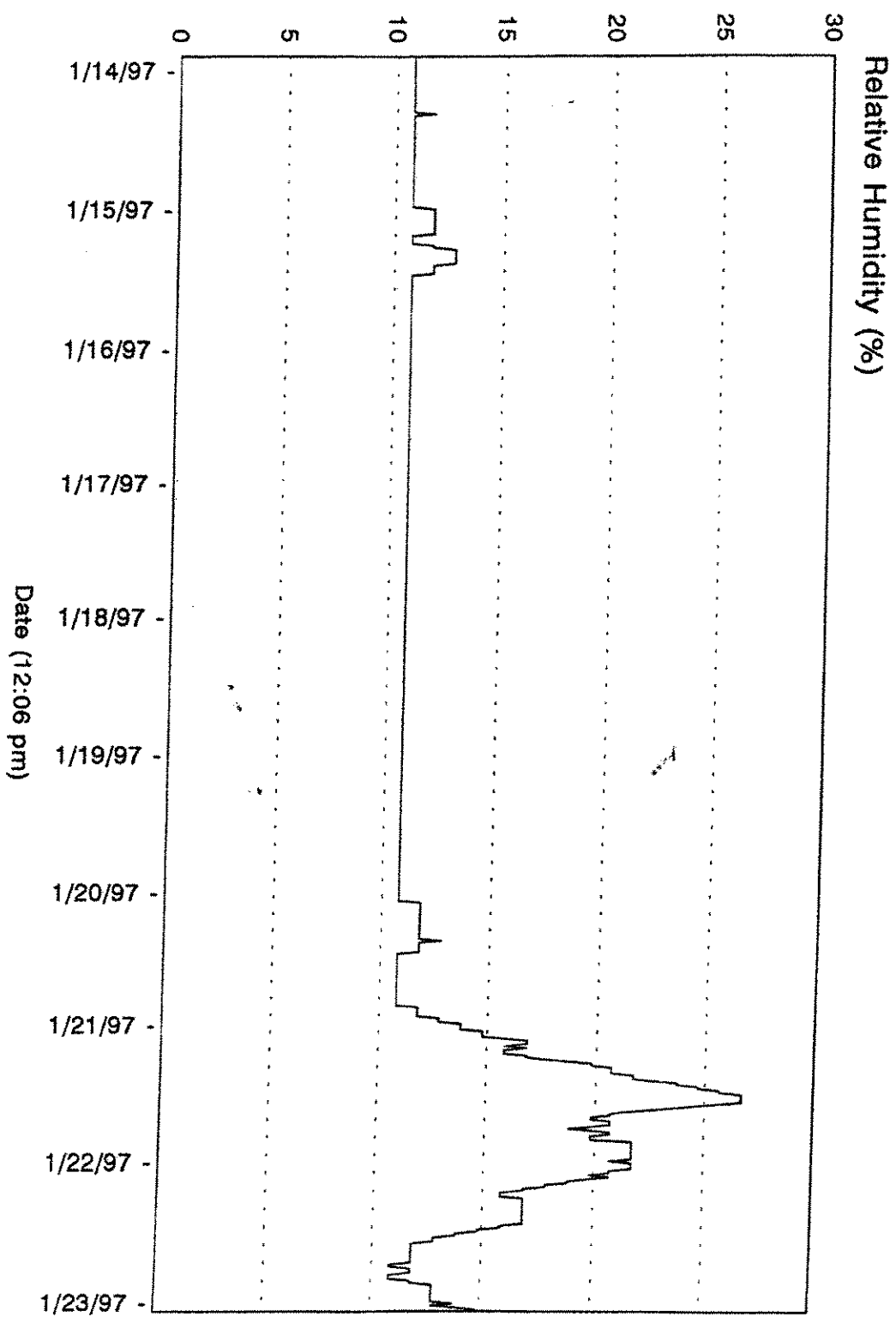
Sample Rate = 20 minutes
Minimum Value = 356 ppm
Maximum Value = 1099 ppm

LINCOLN SCHOOL
BELVIDERE, ILLINOIS
ROOM



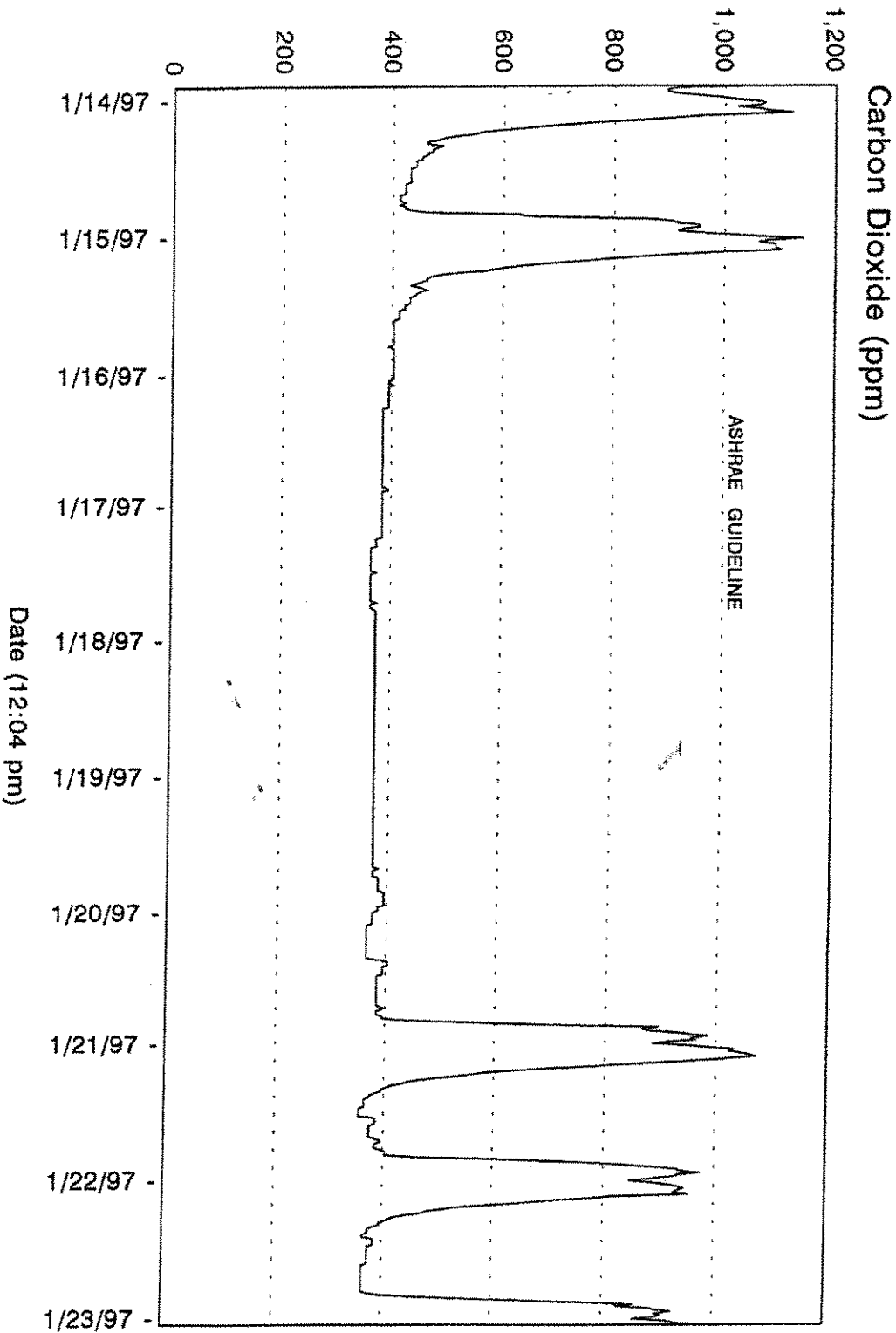
Sample Rate = 20 minutes
Minimum Value = 60.4 °F
Maximum Value = 80.1 °F

LINCOLN SCHOOL
BELVIDERE, ILLINOIS
[REDACTED] ROOM



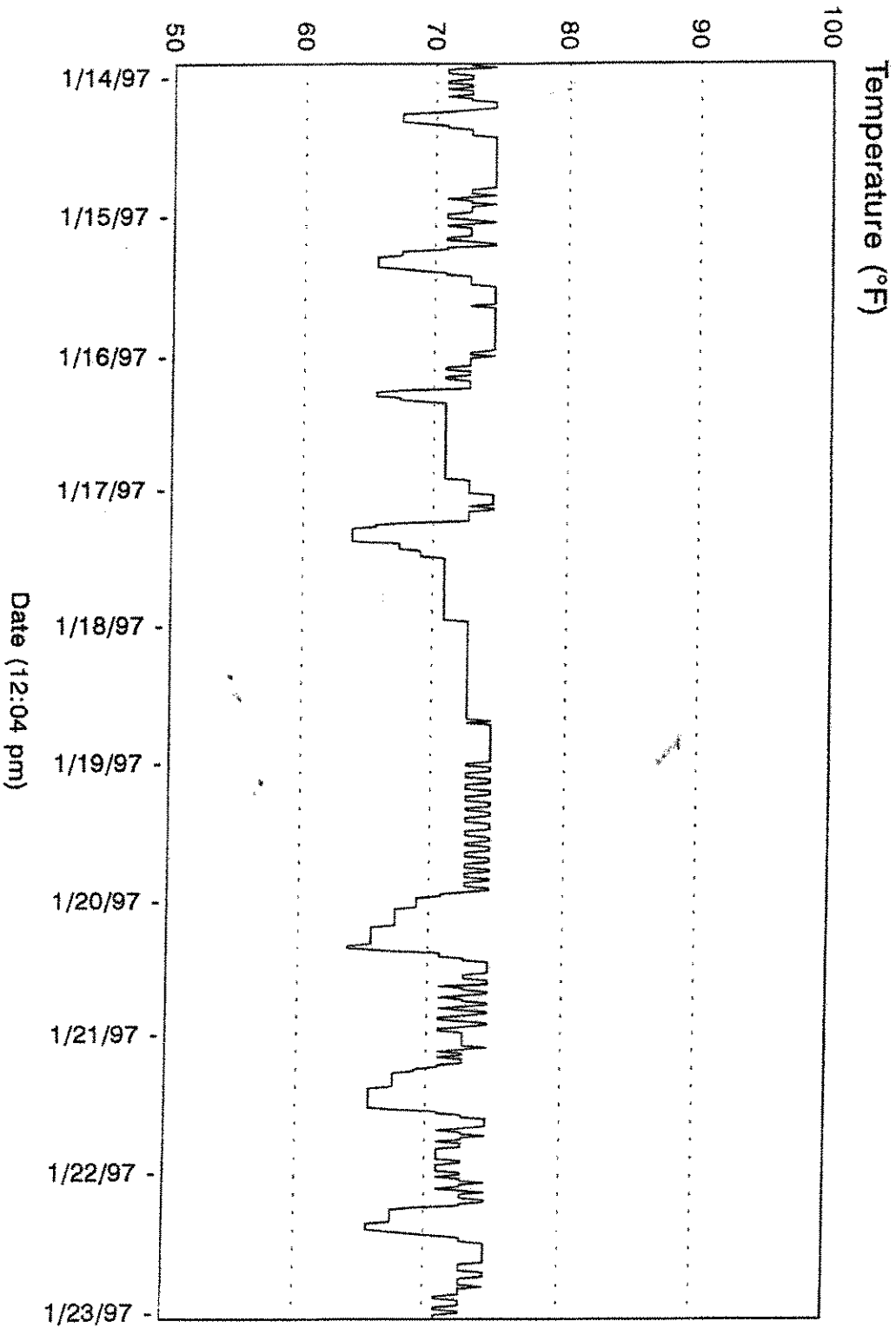
Sample Rate = 20 minutes
Minimum Value = 10.8 %rH
Maximum Value = 26.7 %rH

LINCOLN SCHOOL
BELVIDERE, ILLINOIS
KINDERGARTEN ROOM



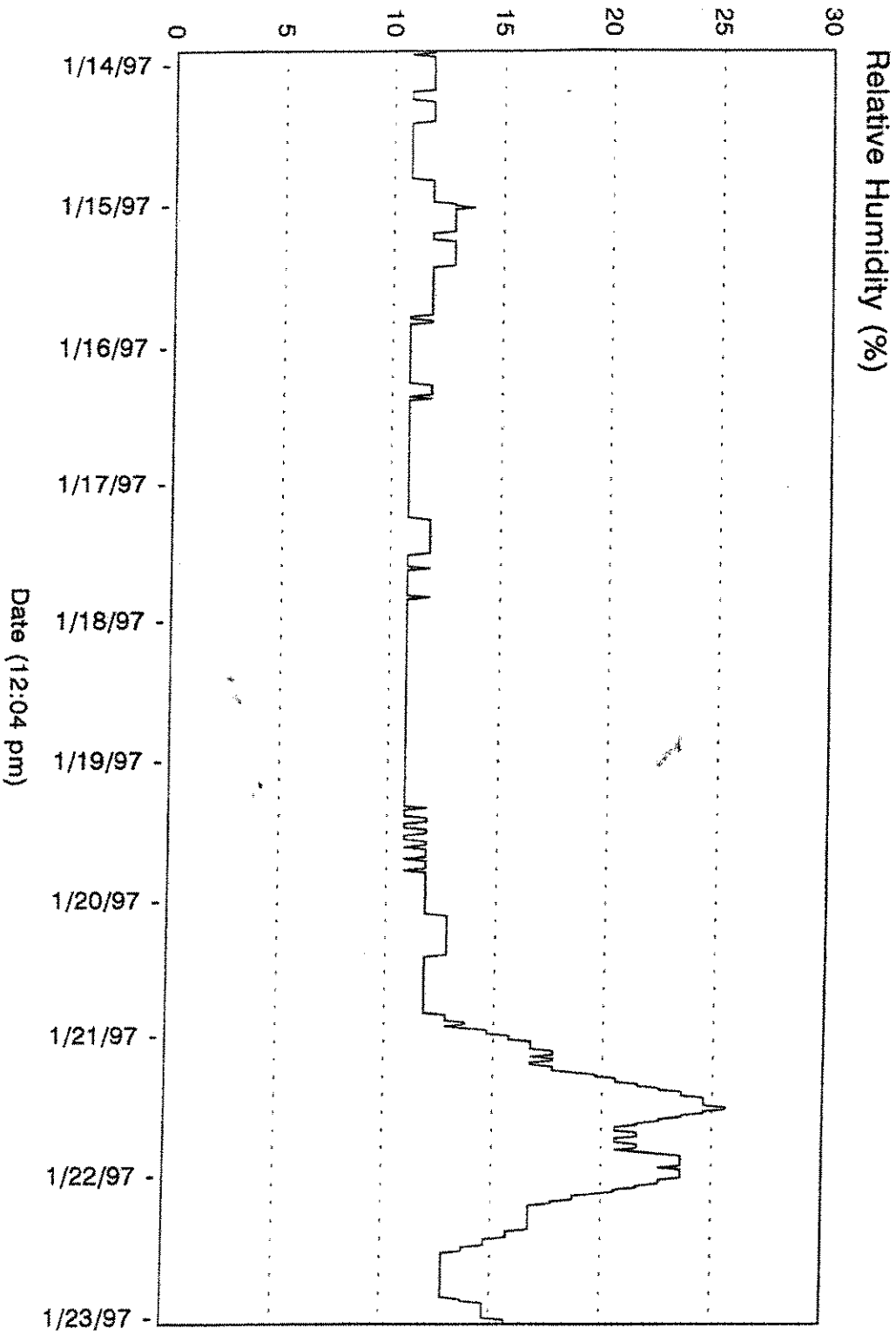
Sample Rate = 20 minutes
Minimum Value = 354 ppm
Maximum Value = 1142 ppm

LINCOLN SCHOOL
BELVIDERE, ILLINOIS
KINDERGARTEN ROOM



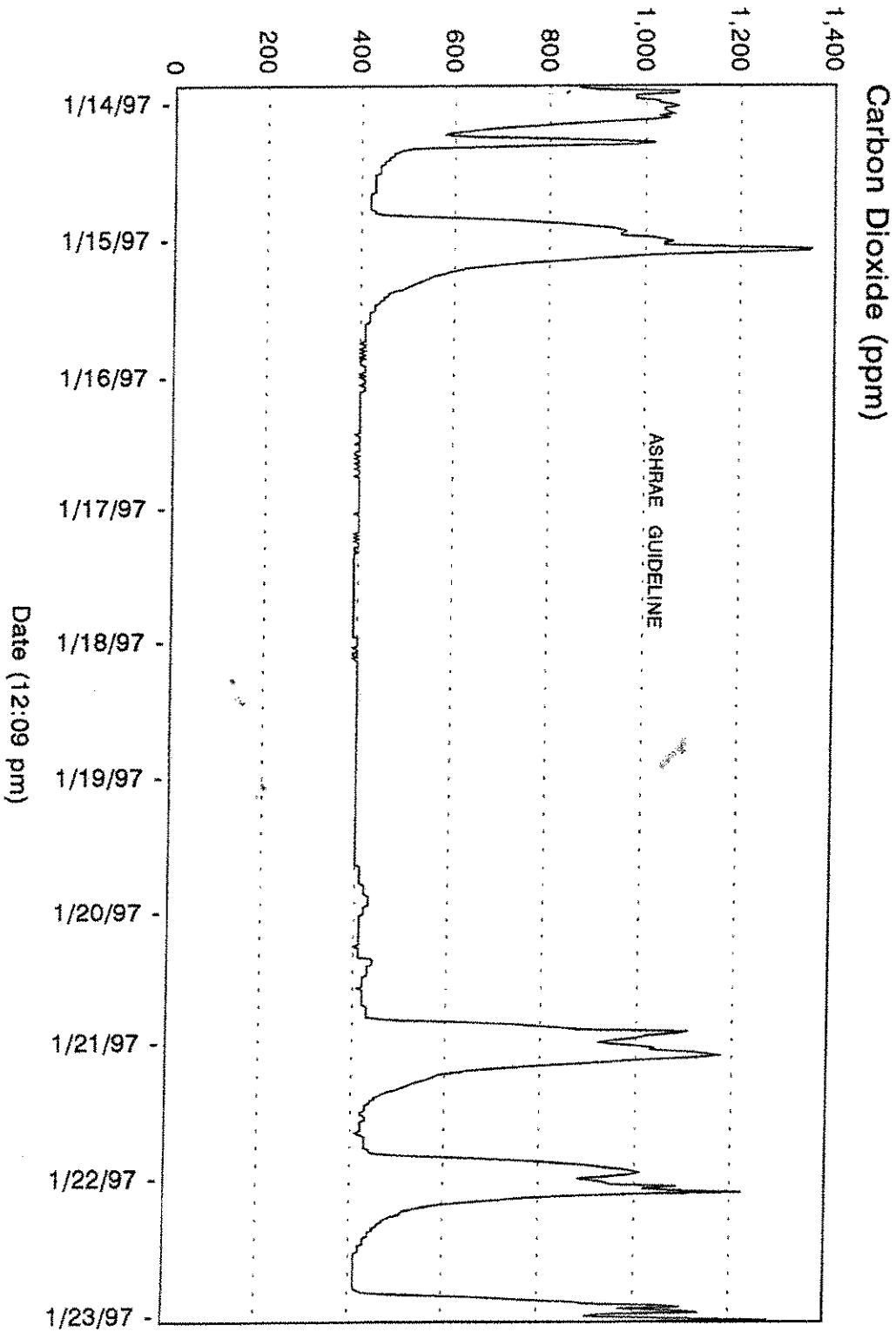
Sample Rate = 20 minutes
Minimum Value = 63.9 °F
Maximum Value = 74.5 °F

LINCOLN SCHOOL
BELVIDERE, ILLINOIS
KINDERGARTEN ROOM



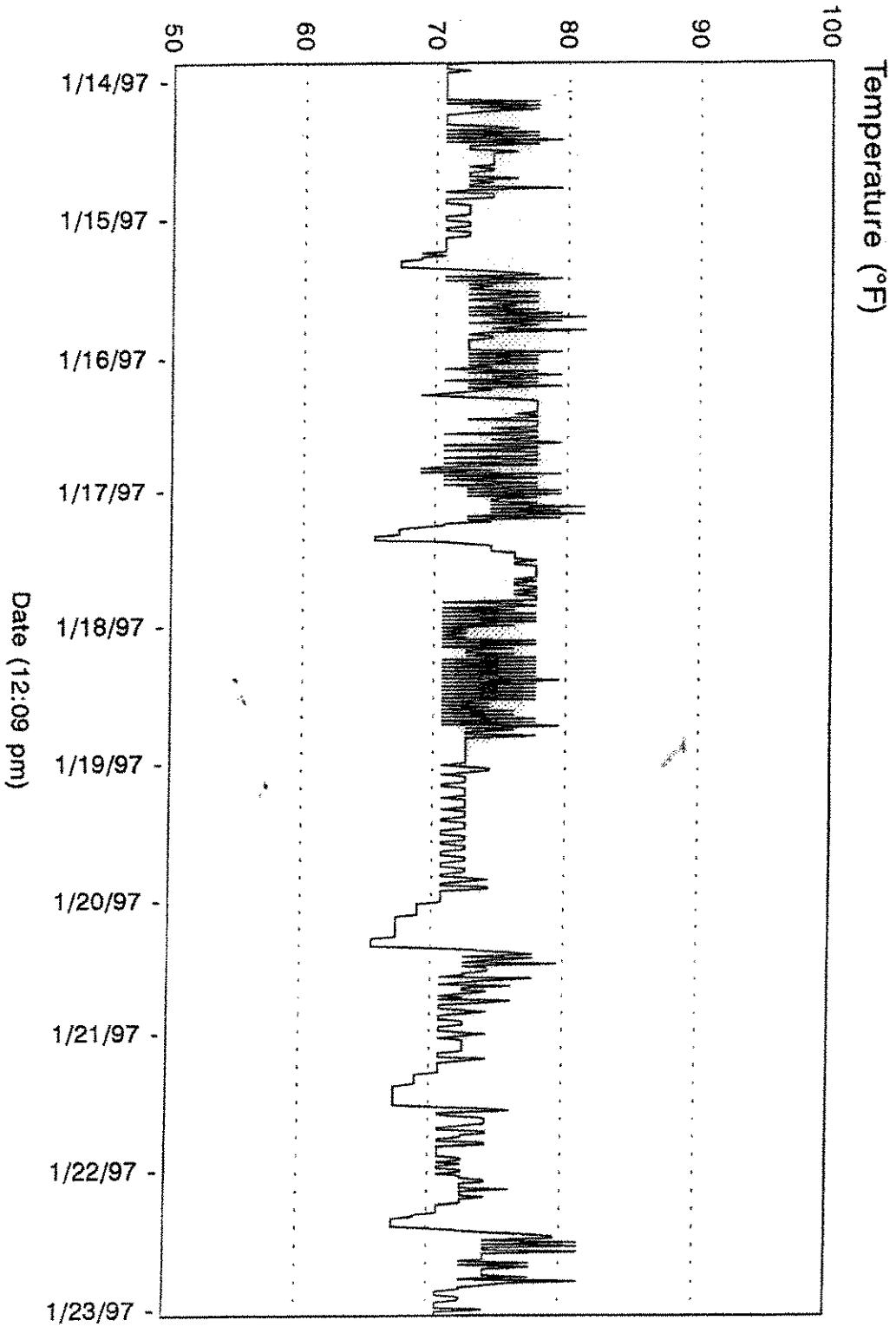
Sample Rate = 20 minutes
Minimum Value = 10.8 %rH
Maximum Value = 25.8 %rH

LINCOLN SCHOOL
BELVIDERE, ILLINOIS
LIBRARY ROOM



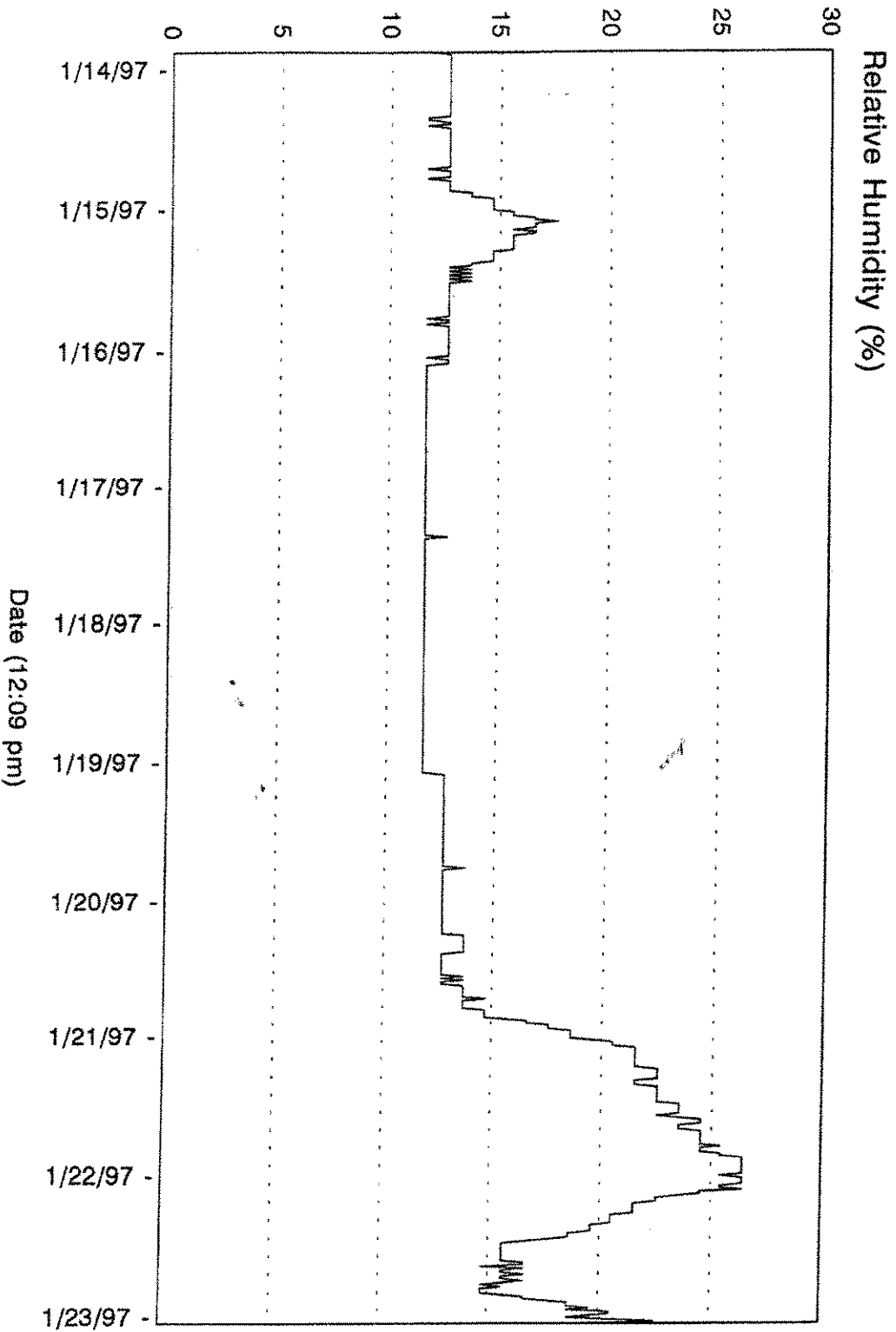
Sample Rate = 20 minutes
Minimum Value = 392 ppm
Maximum Value = 1352 ppm

LINCOLN SCHOOL
BELVIDERE, ILLINOIS
LIBRARY ROOM



Sample Rate = 20 minutes
Minimum Value = 65.5 °F
Maximum Value = 81.3 °F

LINCOLN SCHOOL
BELVIDERE, ILLINOIS
LIBRARY ROOM



Sample Rate = 20 minutes
Minimum Value = 11.7 %rH
Maximum Value = 26.4 %rH