PROPOSED AMENDMENTS TO PHR CHAPT. 43,
AIR POLLUTION REGULATIONS, AND
STATE IMPLEMENTATION PLAN

Statement for Department of Health Public Hearing
26 September 1975

By
Anders Daniels, Dept. of Meteorology
Jerry M. Johnson, School of Public Health
Doak C. Cox, Environmental Center

This statement concerns certain parts of the proposed amendments to the
State Air Pollution Regulations, Public Health Regulation Chapt. 43, and to the
State Air Pollution Control Implementation Plan--those parts that are related
to air pollution by sulfur oxides. The statement does not represent an institu­
tional position of the University of Hawaii.

The present regulation of sulfur oxide pollution in PHR Chapter 43 is in
terms of two limits on the sulfur content of fuels: 2 percent in general, and
0.5 percent for power plants of greater than 25 megawatts or 250 million BTU/hr.
heat input. For these limitations, the proposed amendment would substitute
limitations on the sulfur dioxide emissions relative to heat input of the power
plants. The proposed limitations would be 0.44 lbs. SO₂ per million BTU for
power plants, except those that burn bagasse that have a capacity of 25 megawatt
or more, or that have a total heat input of 250 million BTU/hr. or more; and
2.03 lbs. SO₂ per million BTU input generally. However, provision is made for
variances from the more stringent limitation.

A variance may be granted by the Department of Health (DOH), subject to the
approval of the Environmental Protection Agency (EPA), provided the DOH considers
that a less stringent emission limitation will result in compliance with National
Ambient Air Quality Standards and the applicant will conduct a program combining
monitoring and modelling of the SO₂ plume from the power plant. The results must
be provided to the DOH, and the emission limitation specified in the variance may
be modified if they indicate that the national standards are not met.
The same limitations and variance provision are reflected in the proposed amendment to the State Implementation Plan Control Strategy for Sulfur Oxides except that, through a seeming typographical error, 0.44 lbs. SO\textsubscript{2} per million BTU/hr. is shown as 0.44 BTU/hr (p. VII-10(e), para. 3, 1.6).

The proposed Control Strategy states: "This emission limitation is adopted instead of a sulfur content of fuel regulation in order to allow the source the options of complying through the use of low-sulfur fuel or through the utilization of control equipment." The change in the base of the standards from the sulfur content of fuel to SO\textsubscript{2} concentration in the emission does not appear intended to affect ambient air quality.

A statement "Revision of the State of Hawaii Implementation Plan Control Strategy for Sulfur Oxides," accompanying the proposed amendment to the Control Strategy, indicates that although no violations of the National Ambient Air Quality Standards for SO\textsubscript{2} were indicated by the air quality data collected by EPA and DOH up to 1971, 94 violations of the primary ambient air quality standards between June 1974 and February 1975 have been identified in subsequent monitoring at Kahe, and 7 between March and May 1975 at Kahului. The Control Strategy itself indicates that, unless controls on SO\textsubscript{2} emissions are installed, the sulfur content of fuel may have to be reduced to 0.4% at Kahului to 0.7% at Kahe to meet the national annual mean standard.

The fact that so many violations of the ambient air quality standards for SO\textsubscript{2} have been found, although none were originally expected, indicates that the original air quality data and analysis were quite inadequate. Unfortunately, the data and analysis now available still seem inadequate. The Control Strategy proposed is based on the results of monitoring at a single station each at Kahe and Kahului. Diffusion modelling was done "in an attempt to determine if maximum concentrations are being recorded at these monitoring stations and to determine the pattern of sulfur dioxide concentration downwind of the plants . . . " (p. VII-10). However, "In comparing modelling results with concentration at the monitoring stations it appears that atmospheric conditions exist at each of these plants which cannot be examined by the model used," and hence "the control strategy is based entirely on the actual data collected at the monitoring stations . . . ." (p. VII 10(a)).

We cannot conclude, as does the DOH that "the peculiar conditions . . . existing at these two plants . . . , make mathematical modelling of plume dispersion impractical." Indeed the requirement for programs including not only additional monitoring, but associated diffusion modelling, proposed as conditions to the grant of variances, seems to us appropriate, although inconsistent with the DOH conclusion. We wish that more extensive and intensive monitoring and modelling had begun earlier.

The experience to date indicates that choices of models, of input data, of location of monitoring stations, and of periods of monitoring are extremely critical. It is appropriate that the users of power pay for the monitoring and modelling efforts, as is implied by making the applicants for variances responsible for the monitoring-modelling programs. But considering the difficulties to be
anticipated in obtaining unbiased results, and the changes in plan that are likely to be necessary as the programs proceed, we question whether the public interest will be met adequately by merely the requirement of DOH and EPA approval, implying approval in advance. Closer governmental control over the programs seems desirable.

The variance provisions proposed relate directly to exceedances of the proposed emission limitations, and their allowance is proposed to be limited only in relation to the national ambient air quality standards. The proposed amendments drop completely the reference in the present versions of PHR Chapt. 43 and the Control Strategy to the SO₂ standards in the State ambient air quality standards, PHR Chapt. 42. These standards are about four times as stringent as the national standards.

The data supplied in the proposed Control Strategy indicate that ambient SO₂ concentrations have been observed that are 21 times as high as the state 24 hr. standard at Kahe and 26 times as high at Kahului (Table 1). Adjustments of the sulfur content of fuel or of SO₂ emission merely to meet the national standards will not result in compliance with the State standards. The effect of the proposed amendments, then, would be to make the State ambient air quality standards for SO₂ completely ineffective.

The national primary ambient air quality standards are intended to represent pollutant concentration clearly important from the standpoint of human health. The national secondary and state standards are intended to represent lesser pollutant concentration significant from standpoints of human well being such as effects on plants, animals, materials, and climate. Neither national nor state standards take into account differences in health hazard from place to place resulting from numbers of people affected or times during which they are exposed. The rate of respiratory disease in Hawaii is the highest among the states, but the role of SO₂ concentration, in the incidence of respiratory disease has not been conclusively established here. Clearly the exposure is different at Kahe, where, in tradewind conditions, the effluent plume, before going out to sea, passes over only a small recreational area used intensively but for only short periods of time by an individual, from the exposure at Kahului, where the effluent plume passes over commercial and residential districts. It is unfortunate that we seem to have no clearer picture of the health importance of SO₂ air pollution now than we had when the air quality standards were adopted.

The proposed amendment to subsec. a5a of PHR Chapt. 43, sec. 2 requires a showing of public interest before the DOH can grant a permit to construct a new air pollution source. The proposed new subsection a16 extends the requirement to renewals of permits to operate air pollution sources. The requirement should also extend to allowances of variances. The public interest certainly includes concerns with public health and broader aspects of public welfare. It certainly extends to factors that will influence the cost of power, such as the needs to use special fuel or to install special control equipment. Attachment P-11, specifying the contents of a public interest statement indicates appropriately the public interest in irretrievable commitments of sources, such as those of low-sulfur fuel. The establishment or amendment of regulations, standards, and implementation plans should represent the balancing of public interests, in this case between those respecting maximizing health and local environmental quality, on the one hand, and minimizing the cost of power and drains on fossil fuel resources, on the other.
Table 1.
Maximum violations of ambient air quality standards
for SO₂ at Kahe and Kahului power plants
from proposed amendment to DOH Control Strategy

<table>
<thead>
<tr>
<th></th>
<th>SO₂ concentrations, μg/m³, averaged over</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3 hrs</td>
</tr>
<tr>
<td></td>
<td>highest</td>
</tr>
<tr>
<td>Observed values</td>
<td></td>
</tr>
<tr>
<td>Kahului</td>
<td>4373</td>
</tr>
<tr>
<td>Kahe</td>
<td>1692</td>
</tr>
<tr>
<td>Standards</td>
<td></td>
</tr>
<tr>
<td>National primary</td>
<td></td>
</tr>
<tr>
<td>National secondary</td>
<td></td>
</tr>
<tr>
<td>State</td>
<td>400</td>
</tr>
<tr>
<td>Ratios</td>
<td></td>
</tr>
<tr>
<td>Kahului/Natnl.</td>
<td>2.7</td>
</tr>
<tr>
<td>Kahe/Natnl.</td>
<td>4.7</td>
</tr>
<tr>
<td>Kahului/State</td>
<td>10.9</td>
</tr>
<tr>
<td>Kahe/State</td>
<td>21.2</td>
</tr>
</tbody>
</table>
The balance represented by the proposed amendments to Chapter 43 and the Control Strategy is inconsistent with the balance represented by the State Ambient Air Quality Standards.

We suggest strongly that the present proposals for amendments to Chapter 43 and the Control Strategy for SO₂ either are not appropriate by themselves or are not appropriate at all.

If the proper balance is considered to be represented by limiting the maximum ambient concentration of SO₂ everywhere in Hawaii to the values in the State ambient air quality standards, the proposed amendments should be revised to provide that no variances from SO₂ emission limitations will be granted that will result in violation of the State ambient air quality standards.

If the proper balance is considered represented by limiting the ambient concentrations of SO₂ in most areas to the State ambient standards, but local exceptions may be warranted, provision should be made for variances from the State ambient standards as well as the emission limitations, and variances from the ambient standards should be required if those standards are exceeded even if the emission limitations are not.

If the proper balance is considered represented by the DOH proposals for amending Chapter 43 and the Control Strategy, the state ambient air quality standards for SO₂ should be changed.