ILLINOIS POLLUTION CONTROL BOARD
August 30, 1982

IN THE MATTER OF:	)	
	)	
SULFUR DIOXIDE EMISSION LIMITATIONS: RULE 204 OF CHAPTER 2	)	R80-22

Proposed Opinion. First Notice.

OPINION OF THE BOARD (by I. G. Goodman):

This Opinion supports the Board Order of August 18, 1982 in this matter. On December 1, 1980 the Board received the Illinois Environmental Protection Agency's (Agency) proposal to adopt emission limitations for sulfur dioxide from fuel combustion emission sources located within the three Major Metropolitan Areas (MMA) of St. Louis, Peoria, and Chicago. Also proposed was a reduction in the emission limitations for process emission sources located in the St. Louis and Chicago MMAs. The Agency filed its proposal in R77-15 and R78-14, two ongoing regulatory proceedings which had been consolidated for hearings. R77-15 was a site-specific rulemaking proposed by Ashland Chemical Company (now Sherex Chemical Company, Inc.) to amend Rule 204(c)(1)(A) of the Board's Chapter 2: Air Pollution and finalized by Board Order on December 17, 1981. R78-14 was an inquiry concerning Rule 204(c)(1)(A) instituted by the Board and dismissed on January 8, 1981. The Agency's proposal was primarily a response to the legislative mandate that it review the sulfur dioxide emission limits for existing fuel combustion emission sources located within these three MMAs and thereafter propose amendments consistent with the Clean Air Act's National Ambient Air Quality Standards program, which would enhance the use of Illinois coal. (Ill. Rev. Stat. 1981, ch. 111½, par. 1009.2). On December 19, 1980 the Board docketed the Agency's proposal to amend Rules 204(c)(1)(A), 204(d), 204(f), 204(h) and 204(i) of Chapter 2 as R80-22.

The Agency submitted revisions to the R80-22 proposal on February 26, 1981, January 25, 1982 and June 1, 1982. Public merit hearings were held in East St. Louis, Peoria, and Chicago on February 26, March 10 and 12, 1981, respectively, and again on June 1, 1982 in Chicago. The Department of Energy and Natural Resources (ENR) submitted the Economic Impact Study of the proposed sulfur dioxide amendments, ENR Document No. 82/11, on April 26, 1982. Economic impact hearings were held in Chicago and Peoria on June 1 and 22, 1982, respectively.

The record was kept open for public comments until July 14, 1982. The Village of Winnetka (Winnetka) requested an extension on July 12, 1982. That motion is granted and the comments filed

by Winnetka on July 30, 1982 are accepted. Another public comment period for forty-five days will begin when the rules proposed by the Board are published in the Illinois Register for First Notice.

Emission limitations for sulfur emitting sources were among the first air regulations promulgated by the Board in 1972. Since then the rules for fuel combustion emission sources have been contested and are even now remanded to the Board. Yet in these ten years the original national ambient air quality standards for sulfur dioxide have remained substantially unchanged; the primary annual standard has been attained statewide in Illinois; the control technologies originally considered have proven feasible; and compliance with the original Board emission limits widely achieved. Two new concerns impacting control of sulfur dioxide have developed over the ten year span. The need to utilize more domestic fuel has become apparent for a healthy economy. This realization is especially important considering Illinois' reserves of high sulfur coal. However, it is also probable that further reductions in sulfur dioxide emissions are necessary for a healthy environment. Cognizant of these conflicting developments, it is the Board's intent to reconcile them as much as possible in establishing sulfur dioxide emission limits to replace those voided by the Courts. These limits should also provide for the attainment and maintenance of the air quality in Illinois for sulfur dioxide. As noted, the history of the Board's regulations for sulfur dioxide is lengthy. Therefore, a brief summary precedes the analysis of the rules.

HISTORY

As stated before, the emission limitations for sulfur dioxide produced by solid fuel combustion and process emission sources were among the first air pollution regulations promulgated by the Board, including those for the St. Louis, Peoria and Chicago MMA. In the Matter of Emission Standards, 4 PCB 298 April 13, 1972. Rule 204, as adopted, provided future compliance dates for both types of emission source: May, 1975 for solid fuel combustion sources and December, 1973 for the process emission sources. In so doing, the Board acknowledged that the control technologies envisioned by these limits were only then rapidly developing. For this reason and because compliance alternatives included switching from high sulfur coal to limited reserves of low sulfur coal, oil, or gas, these emission limits were not uniform statewide, but instead geographic and source determinative. It should be noted that Rule 202: Visual Emissions and Rule 203: Particulate Emissions were adopted concurrently with Rule 204: Sulfur Limitations.

The adoption of Rules 203(g)(1), 204(a)(1) and 204(c)(1)(A) was successfully appealed at the appellate and supreme court level. Commonwealth Edison Company v. Pollution Control Board, 25 Ill. App. 3d 241, 323 N.E.2d 84 (1st Dist. 1974), 62 Ill. 2d 494,

343 N.E.2d 959 (1976). These specific rules pertained to the particulate and sulfur dioxide emissions for sources located within the three largest MMA. In its remand, the appellate court instructed the Board "either to validate [these rules] in accordance with Section 27 of the Act or to prepare proper rules as substitutes." Id. at 96. In affirming the Appellate Court, the Supreme Court introduced the notion that the Board's record was insufficient as to whether simultaneous compliance with Rules 203 and 204 was technically feasible and economically reasonable. The higher Court's decision also cited the fact that "a weight of new evidence" had become available, presumably a reference to the Board's inquiry hearings into sulfur dioxide rules (R74-2) and the Agency's proposal for sulfur dioxide rules (R75-5), and like the appellate decision, directed that the contested rules be validated or appropriate new rules adopted.

Thereafter the Board consolidated the records in R71-23, R74-2 and R75-5 and held two additional public hearings. It should be noted that just prior to the Supreme Court's decision the Environmental Protection Act was amended to require 1) economic impact studies (EcIS) and hearings in future rulemakings and 2) adoption of regulations by the Board prescribing conditions for sulfur emission sources to use intermittent control systems (ICS). The Supreme Court's decision acknowledged the ICS amendment, but was silent on the EcIS amendment. Consideration of ICS was deferred until final rulemaking in R74-2 and R75-5 to avoid introducing a new rulemaking in the validation process. No economic impact statement was prepared or hearings held. An abstract of the consolidated record with its "wealth of information" was prepared by Marder & Associates. On July 7, 1977 the Board validated the remanded rules, after reviewing the pertinent information in the record and considering the issues identified by the Courts. 27 PCB 57. Therein the Board decided that an economic impact study was not necessary for validation, and relied instead on the economic evidence already in the record. Furthermore, the opinion stated that the "Marder report" served only as an aid, and not an analysis of the merits of the information. Nevertheless, the validation of the rules was vacated. Ashland Chemical Company v. Pollution Control Board, 64 Ill. App. 3d 169, 381 N.E. 2d 56 (3d Dist. 1978) and Illinois State Chamber v. Pollution Control Board, 67 Ill. App. 3d 839, 384 N.E.2d 922 (1st Dist. 1978). Both courts declined ruling on the substantive validity of the R71-23 regulations and instead voided the Board's validation on procedural grounds. Among other things, both Courts found that the Board's use of the Marder report without public hearings on the same violated due process rights and that Section 6 of the Act, requiring an economic impact study and accompanying public hearings had not been complied with.

Validation having failed, the Board instituted inquiry proceedings into the remanded sulfur dioxide rules (R78-14) and the particulate rule (R78-16). On December 14, 1978, these regulatory

proceedings were consolidated with R77-15 (the Ashland site-specific proposal) and R78-15 (Rochelle site-specific proposal) for hearing purposes. Final action on R77-15 was taken on December 17, 1982 and is still pending on R78-15. On February 15, 1979, the issues outstanding from the combined hearing record in R71-23, R74-2, and R75-5 were resolved. Sulfur dioxide emission limits for rural fuel combustion sources including an adjudicatory procedure and formula for site-specific limits were adopted in the consolidated order for R74-2 and R75-5. ICS rules were not adopted having been subsequently barred by amendment to the Clean Air Act as a dispersion enhancement technique. As stated above, the Agency's proposal for emission limits in the MMAs was separately docketed as R80-22. R78-14 (sulfur dioxide inquiry) was shortly thereafter dismissed. R78-16 (particulate rule inquiry) was also dismissed with leave to reopen should simultaneous compliance with the particulate and sulfur dioxide emission limitations become an issue in R80-22. It should be noted that R82-1, another Board proceeding concerning Rule 203(g)(1), has been instituted, with further action dependent on submittal of the economic impact study. Therefore, resolution of the issues involved in this rulemaking (R80-22) will hopefully conclude the entangled regulatory history of sulfur dioxide since the Commonwealth Edison appeal.

ANALYSIS OF THE REGULATIONS

Fuel Combustion Emission Sources

The limit for sulfur dioxide emissions for existing sources in the three MMAs was originally adopted at 1.8 pounds per million British thermal units (lb/mBtu). 4 PCB 298. Compliance with this and the other limitations concurrently adopted anticipated that air quality statewide would be better than that established by levels the national sulfur dioxide standards in 1971. The National Ambient Air Quality Standard (NAAQS) for sulfur dioxide includes two primary standards: an annual standard of 0.03 ppm (80 ug/m^3) and a 24 hour standard of 0.14 ppm (365 ug/m^3); and a secondary standard based on 3 hours of 0.5 ppm (1300 ug/m^3). Since 1975 no violations of the annual primary standard have been recorded in any of the three MMAs. The short-term primary standard has been violated in all three MMAs, but not since 1977 in Chicago and Peoria. Violations of the secondary standard have occurred in East St. Louis and Peoria.

Monitoring alone can neither provide a plan to achieve air quality in the St. Louis MMA, nor can it determine the extent the limit may be relaxed and the NAAQS in the other two MMAs still maintained. Forecasting of this type must be developed through air quality analysis. Therefore, regional air quality analyses, including base and strategy analyses, were prepared for each of the three MMAs. The modeling format used for each

of the three MMAs was basically the same, as were the data requirements. The data information, on the other hand, were geographically specific. Each base analysis involved the Rural Area Model (RAM), which was modified to provide modeling for both urban and rural sources. The RAM was further modified to conform with a second model, the CRSTER, which was used to account for isolated emission sources.

It should be noted that modeling is intended to demonstrate that even under the worst meteorological and maximum emission situation, violations of the NAAQS do not occur. Exept for the St. Louis MMA, modeling was done only to evaluate the short-term standards, i.e., the 24 hour and 3 hour standards. This was considered sufficient since attainment of the annual had already been demonstrated, and the short-term standards are considered more stringent than the primary annual standard.

The emission inventories contained the location, magnitude, frequency, duration and relative constributions of the fuel combustion emission sources in each area. Generally, only point sources emitting more than 100 tons of sulfur dioxide per year (T/yr) were included, and area sources were accounted for in the background levels. The point sources were identified in the Agency's total air system (TAS), which was compiled initially in 1974 and has since been continuously updated. In calculating the sources' impacts on the model's receptors, all sources were assumed to operate at their maximum allowable rate, based on the remanded emission limits.

The air quality data consists of the monitored values. Sulfur dioxide monitors operate continuously and the data gathered is averaged to obtain hourly values. Each study had a different number of monitors involved and a different base year. The monitoring date was used to develop the background levels for each area studied, by matching it with the meteorological data for the same base year. Exclusion angles were uniformly calculated to eliminate "downwind" sources from the background totals.

Emission Limits

St. Louis MMA

An annual analysis was performed for the East St. Louis area using the Climatological Dispersion Model (CDM). The meteorological data consisted of data collected between 1975 and 1978 at Lambert Field and the National Climatic Center, and upper air observations were obtained from the National Weather Service at Salem, Illinois. Even after growth was considered, no violations of the annual sulfur dioxide standard were predicted. However, violations of the secondary standard were predicted.

Like the other two MMAs, an analysis of the short-term standards was programmed. The meteorological data for 1973-1977 was gathered from the same sources used for the annual analysis. The RAM was used in those areas which are basically urban in nature, and a modified version used for the rural areas. The CRSTER model, which does not have the capability to model several sources at separate locations, was used for the isolated power plant, Illinois Power Baldwin. The maximum allowable emission rates of all major sources in Madison, St. Clair, and Monroe Counties was used in the model. The sulfur dioxide sources for Missouri were not used because the maximum allowable emission rates and stack parameters were not available for these sources. These emissions were, however, reflected in the background determination. Emissions due to growth were not explicitly modeled in this analysis. It was instead assumed that any additional emissions would be minor, and readily absorbed since the model was already conservative in that all existing sources operate at maximum allowable rates. Furthermore, any new major sources would be required to show no significant impact on air quality pursuant to the Prevention of Significant Deterioration (PSD) or New Source Review (NSR) programs.

The short-term modeling predicted widespread violations of the primary 24 hour standard and the secondary 3 hour standard primarily in the industrial areas of East St. Louis (Ex. 3, pp. 85-86). Consequently, a culpability assessment was made, using the "worst case" days of the five year period modeled. The results, which included background concentrations, and Illinois urban and rural sources of sulfur dioxide, found the sources in the Alton Wood River Area to be varied; whereas in East St. Louis and Granite City, the elevated sulfur dioxide levels were more localized and source-oriented. The two sources identified, however, were process sources as opposed to fuel combustion sources.

Due to the number of violations predicted, no relaxation of the emission limitation for fuel combustion sources in the St. Louis MMA is proposed. Sulfur dioxide emission limits are predicted to increase from fuel combustion sources in the next decade -- but from residential and commercial sources -- and remain constant from industrial sources. In an effort to achieve attainment in this MMA, more stringent limitations for process sources were proposed by the Agency. These will be discussed later in this Opinion.

Peoria Major Metropolitan Area

Neither the modeling done in 1978 nor recent monitoring indicates violations of the annual standards in the Peoria MMA. Thus, only short-term analyses were considered, on the assumption that short-term standards are more restrictive than the annual

standards and, therefore, any subsequent relaxation could not jeopardize the annual attainment status. A five year base analysis, using the RAM and CRSTER model, was developed to determine if the 1.8 lb/mBtu limitation could be relaxed. Five years (1973-1977) of meteorological data from the Peoria National Weather Service Station was used in the analysis. Again, maximum allowable emissions based on the 1.8 lb/mBtu standard were used along with appropriate background concentrations. The results of the base analysis predicted violations of the primary 24 hour standard, which were isolated to two small areas, and none for the secondary 3 hour standard (Ex. 3, pp. 25-26).

A culpability analysis was also developed, using the two receptors which had indicated violations in the short-term base analysis. The culpability analysis associated these violations with sources located at the Caterpillar Mossville Plant and Caterpillar East Peoria Plant. Both of these Caterpillar plants are already equipped with flue gas desulfurization equipment (FGD). Therefore, if the actual emissions were used in the base analysis, it can be assumed that violations of the primary standard would not be predicted. For this reason, Rule 204(c)(5)(C) is proposed. The specific emission limitations set out therein reflect the actual emissions for three sources at these two Caterpillar facilities. With these limitations in place and enforceable, the base analysis would no longer indicate violations of any standards, so relaxation of the 1.8 lb/mBtu limit can be considered for some of the area's remaining existing sources.

Two strategy analyses were conducted by the Agency to determine the extent relaxation possible without creating violations of the NAAQS. The first strategy analysis focused on the violations predicted for the two Caterpillar plants as discussed above. It considered the effects of the FGDs. The second strategy analysis utilized an MPTER model. The MPTER is a dispersion model which can simulate the dispersion of several sources' pollutants in a moderate terrain. Applying a data base consisting of the relaxed emission inventory, a modified receptor network, and five years of meterological data, the modeled impacts for all urban and rural sources, and background concentrations to the MPTER, air quality based on a 5.5 lb/mBtu emission limit was determined. Violations of the short-term standards were predicted. Therefore, a second culpability analysis was performed. Caterpillar's Mapleton Plant, despite an emission limit of 1.8 lb/mBtu, and the Sherex Chemical Company were identified as the sources of violation.

Based on this analysis, the following conclusions were made:

(1) The cause of Caterpillar Mapleton and Sherex's predicted violations were the Mapleton bluffs;

(2) the emission limits of 1.0 lb/mBtu for the Caterpillar East Peoria Plant and 1.6 lb/mBtu for the Caterpillar Mossville plant would be sufficient to maintain NAAQS;

(3) Sherex's emission limit could be relaxed from 1.8 lb/mBtu to 3.3 lb/mBtu without jeopardizing the NAAQS; and

(4) with the exceptions of the Caterpillar and Sherex facilities, the emission limit could be relaxed from 1.8 lb/mBtu to 5.5 lb/mBtu for industrial boilers with a generating capacity of less than 250 mBtu.

It should be noted that only one industrial facility with a generating capacity of greater than 250 mBtu remained subject to the 1.8 lb/mBtu limitation -- CPC International (now Pekin Energy, Inc.).

During the merit segment of the June 1, 1982 hearing, a third strategy analysis was presented. The emissions inventory for the modeling was revised to include the Caterpillar plants emitting at their actual limit of 1.8 lb/mBtu, small industrial boilers (less than 250 mBtu) emitting at 5.5 lb/mBtu, and CPC International boiler (rated at 330 mBtu) assessed at 5.5 lb/mBtu. The Sherex boiler was modeled at an assumed stack height of 200 feet, which would allow Sherex to emit up to 5.5 lb/mBtu without causing NAAQS violations due to the Mapleton bluffs. This analysis indicated that emission limits for the Caterpillar Mapleton and East Peoria facilities must be further reduced to assure compliance with the NAAQS. An emission limit of 0.8 lb/mBtu at the Mapleton facility and 1.1 lb/mBtu at the East Peoria facility would eliminate any possibility of violation.

Chicago Major Metropolitan Area

The air quality analyses for the Chicago MMA were prepared in 1981 and presented at the June 1st merit hearing (Ex. 11). The base analysis utilized the RAM model for those areas identified as urban, the MPTER model for those areas identified as rural, and the CRSTER model was later used to demonstrate the air quality near two isolated areas. The meteorological data for the models was provided by the Chicago Midway National Weather Service and the Peoria National Weather Service provided the upper air soundings. The meteorological effects due to Lake Michigan were not considered since (1) no meteorological sites continuously operate near the Lake, and (2) no readily available dispersion modeling is available to take the Lake effects into account. The emission inventory included point sources considered to have significant impacts, that is greater than 100 T/year, located in Cook, Lake, Will, McHenry, Kane and DuPage Counties. The maximum allowable emission rate was used throughout; this way the possible

violations of the NAAQS could be identified, with the additional benefit that growth need not be specifically considered.

Unlike the analyses for the other two MMAs, the background areas to be included in the Chicago study had to be limited because of the size and complexity of the geographic locale. Four areas were identified as needing background value determination: Will County, Lake County, southern Cook County and northern Cook County. In estimating these background levels, actual data gathered at nine continuous sulfur dioxide monitors, as recorded in 1976 and 1977, was coupled with the hourly meteorological data for 1976 and 1977. Downwind sources were discounted through the use of "exclusion angles."

The base analysis identified violations of both short-term standards. For the 24 hour standard, four were predicted in Cook County, and one in Will County. For the 3 hour standard, three violations were predicted in Will County.

The Chicago MMA culpability analysis predicted throughout the Chicago area exceed the 24 hour and the 3 hour standards. In Cook County ten sources were identified as significantly contributing for five days studied in 1975. One source was identified in Will County, which has been mothballed; therefore, its actual emissions have been eliminated. Similarly, the ten sources identified may not actually be contributing emissions near the maximum allowable emission limits used in the model. Therefore, rather than making a blanket determination that relaxation is not permissible in these areas, it should be realized that individually these sources may be able to prove that increased emission rates may not jeopardize the NAAQS in the surrounding vicinity.

In addition to the base and culpability analyses, four strategy analyses were conducted to determine which sources could be granted relaxed emission limits. Two of the four analyses were site-specific, and two looked initially to the geographic areas to determine if any sources located therein could profit from relaxed limitations.

The first strategy evaluated the emission sources in Kankakee and McHenry Counties to determine if the limitation could be relaxed from 1.8 lb/mBtu to 6.8 lb/mBtu without jeopardizing the attainment status. Each county has one coal burning facility and one oil and/or gas burning facility which is unaffected by any relaxation. Nevertheless, these facilities had to be included in the modeling since they each contribute more than two-thirds of the total sulfur dioxide emissions per year in their respective county. The CRSTER model indicated that the coal burning sources could emit up to 6.8 lbs/mBtu without jeopardizing the air quality in these attainment areas.

The Shapiro facility in Kankakee County was individually

modeled. It had not been included in the Kankakee study since its boilers are equipped to operate on natural gas. It does have a single coal-fired boiler which, if utilized with the relaxed emission limit of 6.8 lb/mBtu, would not adversely impact air quality in Kankakee. Furthermore, should Shapiro decide to switch to Illinois coal, results of the CRSTER model indicate that the other coal-fired facility in Kankakee would not be affected, and the attainment status would not be jeopardized.

The second geographic area considered was the areas of the Chicago MMA which were outside the non-attainment areas. Only five sources, which are currently burning non-Illinois coal, were modeled as potential condidates for a relaxed emission limit of 5.5 lbs/mBtu. These emission sources, meteorological data from 1973 (the "worst case" year), and previously identified receptor locations were input into the RAM (urban) and MPTER model. Background data for Lake, Will and Cook Counties were also processed. Only two sources were identified as not causing violations of the short-term standards if allowed to emit up to 5.5 lbs/mBtu. However, as was the case for two sources in the Peoria MMA, modeling to determine possible terrain and downwash problems is necessary before a relaxation could be granted to these sources. They therefore are potential candidates for the site-specific adjudicatory procedure also proposed in this rulemaking.

Lastly, the Caterpillar facility in Kendall County was modeled to determine if the emission limitation could be relaxed to 6.8 lbs/mBtu. Kendall County is currently an attainment area for sulfur dioxide. Should the emission limit be relaxed, however, the CRSTER model predicts significant violations of the short-term standards, but no violation of the annual primary standard. Relaxation is denied at this time because the CRSTER model did not take into account background levels, terrain, or building downwash effects.

The overall effect of the relaxations proposed is that an additional 220,000 tons of Illinois coal can be burned annually in addition to the 120,000 tons burned annually by Sherex, Bemis and Celotex pursuant to R77-15. Conversions by sources in the Peoria MMA and Kankakee and McHenry Counties from oil or natural gas will also increase Illinois coal usage. At this time, however, the amount is not certain (R.648). The increased usage of high-sulfur coal has been adequately demonstrated, primarily on a source-by-source basis, not to jeopardize current air quality.

In addition to the specific limitations adopted for fuel combustion emission sources in the three MMAs, an exemption procedure is proposed much like that available to rural sources pursuant to Rule 204(g) (former Rule 204(e)). Adopting the adjudicatory format, petitioning sources are required to demonstrate that the relaxed emission limit sought will not jeopardize air quality. This procedure should be readily available to

sources since they can merely premise air quality modeling on that already completed by the Agency for each of the MMAs.

At the June 1, 1982 hearing, Winnetka sought a relaxed emission limit for its utility company. It submitted modeling studies based on the Agency's studies, to demonstrate that air quality would not be jeopardized if it was allowed to emit up to 6.8 lbs/mBtu. Winnetka's evidence is impressive, but untimely. The public was not sufficiently noticed that R80-22 would consider the Winnetka power plant. Therefore, Winnetka is not included in this rulemaking. However, based on the documentation completed to demonstrate possible relaxation, it is considered a candidate for the new exemption procedure.

Aside from amending the rules for fuel combustion sources burning solid fuel exclusively, the formula for those burning combination of fuels is amended and a new formula for steel mills is proposed. The numerical limitation for distillate oil sulfur dioxide emissions is eliminated as a specific component in the present formula. The new formula regulating combustion of combination fuels at steel mills is self-explanatory.

Process Emission Sources

Sulfur compounds are emitted into the atmosphere from fuel burned at process sources or from the process itself. As noted in the St. Louis MMA discussion, the process sources' emissions in that area contribute significantly to the non-attainment demonstration. Consequently, revised and new emission limits are proposed which reflect these sources' current actual emissions and control capabilities. These regulations, which impose no immediate obligations on the regulated facilities, will not necessarily improve air quality. Instead these revisions will enhance the air quality demonstration, which will in turn reflect a larger margin for health and growth purposes. The amendment will also insure that localized atmospheric sulfuric loading is not inadvertently increased by area sources. It should be noted at the outset that the rules for process sources are reorganized and amended into two subparts: process emission sources and fuel burning process sources.

The present general emission limit for process emission sources is 2000 parts per million (ppm). This limit represents a concentration standard as opposed to a mass limitation standard. Although the concentration standard is appropriate for a general limit, it has its drawbacks. For instance, correction factors necessary to compensate for excess air introduced into the exhaust flow are difficult to develop. Therefore, wherever possible a mass limitation standard is proposed.

Three processes are already exempted from the 2000 ppm limit:

processes designed to remove sulfur compounds from fuel combustion emission sources' flue gas, i.e., FGDs; existing processes designed to remove sulfur compounds from petroleum and petrochemical processes' flue gas; and qualified existing hydrogen sulfide flares at chemical manufacturing plants. Five additional sources are proposed for exemption from the general concentration limit: (1) sodium aluminum sulfate manufacturing process; (2) sodium sulfite manufacturing process; (3) secondary lead smelting process; (4) glass melting furnaces; and (5) glass heat treating with sulfur dioxide process. Of these five categories only two, secondary lead smelting and glass melting furnaces, are found to significantly contribute to the Chicago MMA non-attainment status for sulfur dioxide (R.635). This is reflected in that the rules proposed are geographically specific.

The differences between the emissions allowed, based on the 2000 ppm standard, and the actual emissions contributed are significant. Review of the processes themselves makes it evident that these differences are inappropriate and unneeded by the process facilities. For example, under the general rule, the glass heat treating with sulfur dioxide process could emit up to 21 pounds of sulfur dioxide per ton of product. Yet, the raw materials as a whole used in this process can only generate one pound of sulfur dioxide per ton of product produced.

Instead of the process-specific emission limits, these five categories are exempted from the general concentration standard. Exemption, as opposed to specific limits, will allow the individual sources emission limits for sulfur dioxide that are appropriate and readily achievable at the individual facility. It should be noted that none of these sources use control equipment for sulfur dioxide. The Agency has requested this regulatory format in an amended proposal.

A specific emission limit is proposed for <u>new</u> process emission sources in the St. Louis MMA which are designed to remove sulfur compounds from the flue gases of petroleum and petrochemical process, commonly known as the Claus process. This process is a recovery unit intended to recapture sulfur from the acid or sour gases at petroleum refineries. The sulfur dioxide emissions from this recovery process are usually more than 9000 ppm, much greater than the 2000 ppm limit. Therefore, secondary recovery is required to control the tail gas emissions of sulfur dioxide. In-plant studies indicate that secondary recovery units can reduce sulfur dioxide emissions to 11-13.9 pounds of sulfur dioxide produced. This corresponds to 646 ppm to 834 ppm, which is far below the 2000 ppm allowed by the general rule.

Shell Oil Company objected to this reduced emission limitation for two reasons. It had just recently installed a SCOT (Shell Claus Off Gas Treating) process at its sulfur recovery

plant in St. Louis. It stated that the 1979 stack test results obtained there and relied on by the Agency in developing the revised limit could not be generalized since design and installation at other facilities might produce different results. Secondly, due to increased recovery efficiency of the SCOT unit, the primary recovery unit is subjected to increased sulfur loadings which result in increased emissions (R.108).

The second fear would seem unjustified based on the 1979 stack tests. These were taken at the Claus plant, and therefore reflect these increased emissions. As for the first, the revised limit is intended to encourage the use of a secondary recovery process as efficient as the SCOT unit at new sulfur recovery facilities as opposed to low temperature Claus processes. In proposing this limit, it is understood that individual facilities might experience problems due to design, installation or other facility specifications. However, as is the case in adopting other regulations which are technology forcing, solutions to these possible quirks also are likely to become available as needed. An emission limit of 14 pounds of sulfur dioxide per ton of sulfur for new sulfur recovery processes is proposed.

A 500 ppm limit is proposed for sulfuric acid manufacturing plants in the City of Chicago. The one such plant affected is equipped with a Wellman-Lord sulfur dioxide recovery system with 96.3 percent efficiency. This control equipment was designed to meet the City of Chicago's 500 ppm limit for sulfur dioxide. (R.636). Based on this, the Board finds that the technology to achieve this reduction is feasible and economically reasonable. This limit is therefore proposed to achieve and maintain the NAAQS for sulfur dioxide in the Chicago MMA.

As stated earlier, emission limits based on the fuel combustion capabilities of process sources are proposed. Three categories of such sources are affected. One is source specific; the second involves a type of process source; and the third is an exemption.

The source specific limitation is applicable to a process source located in the St. Louis MMA which burns tea leaves as a solid fuel. The proposed emission limit of 0.70 lb/mBtu will not require any additional control equipment or investments by the affected source, and will allow it to utilize its waste product -- tea leaves -- in a manner more resourceful than landfilling.

Secondly, lime kilns as a fuel burning process source are exempted from both the 2000 ppm limit for process sources and the 1.8 lb/mBtu limit for solid fuel combustion sources. Lime kilns are only located in the Chicago MMA and rural areas and primarily burn high-sulfur coal. Subsequently, it should be subject to the 1.8 lb/mBtu applicable to other similarly located sources burning coal. However, the lime involved in the process itself reacts

with the sulfur to reduce the sulfur dioxide emissions to levels below the 1.8 lb/mBtu and therefore well below the 2000 ppm. In exempting it as a fuel combustion source and a process emission source, emission limits appropriate for the diverse individual kilns can be established.

An exemption is provided for those sources which can be classified as either fuel burning process sources or fuel combustion emission sources. The slab furnaces at the Granite City Steel Corporation are the only known such sources since the furnaces are directly fired. The oil burned there is too high in sulfur content to meet the limits applicable to fuel combustion sources. However, it does meet the 2000 ppm limitation. The exemption proposed in Rule 204(f)(1) allows these sources to meet either limitation without switching to fuel oil with lower sulfur content.

Economic Evaluation

At the March 12, 1981 hearing, an economist with the Agency discussed the possible compliance costs should the emission limits then proposed for fuel combustion sources be adopted. The Agency's permit files identified 113 coal burning facilities to which these limitations would apply. Only one of these, Sherex, was out of compliance with the limits proposed. Therefore, the cost of compliance would be only the amount Sherex would be required to expend to achieve the 3.3 lb/mBtu then proposed for its source.

Having concluded that adoption of the proposed regulations would result in little or no economic effects on the capital investment of the affected facilities, the Agency then considered the economic ramifications should the proposed regulations not be adopted. Fuel switching from low-sulfur coal to high-sulfur Illinois coal has obvious economic benefits, but only for a limited number of facilities. Forty-eight Peoria sources were already burning high-sulfur coal. The permitted coal consumption for the remaining sixty-five facilities is primarily attributable to electric utility companies. Since these facilities are committed to long-term western coal contracts, fuel switching is not a viable alternative. The economic benefits available by switching from liquid or combination fuel to Illinois coal are similarly attractive, but only if the conversion costs can be amortized over a long period.

The ENR economic impact study (Exhibit 17) reviewed separately the relaxed limits for fuel combustion emission sources and the reduced limits for process emission sources. Since cost of compliance was not at issue for either coal combustion sources or process sources, the study assessed the cost savings for the first and the economic consequences of the second. It also examined the probable economic impact on the Illinois fuel markets, which along

with cost savings, could be expressed in real dollars. The study considered the consequences to the health and welfare of the affected public and property. Assigning dollar values to this proved difficult.

Five industrial facilities equipped with coal combustion boilers were identified in the Peoria MMA which could benefit from the adoption of a 5.5 lb/mBtu limitation. It should be noted that three of the five, Celotex, Bemis, and Sherex, have already obtained this relief pursuant to R77-15. All five facilities, however, are briefly discussed here.

The Westinghouse Airbrake Company (WABCO) currently utilizes 4,500 tons of Kentucky low-sulfur coal per year at an approximate cost of $55.15 per ton (1981 dollars). Converting to Illinois coal, costing approximately $31.42 per ton, should save WABCO nearly $108,450 per year in fuel costs. Additionally, WABCO indicated that conversion costs would be negligible.

Pursuant to R77-15, Celotex currently burns approximately 45,000 tons of Illinois coal. Therefore, no cost savings is attributable to reaffirmation of the 5.5 lb/mBtu limit. However, if forced to use blended coal, costs would increase by $727,000 per year. Sherex, the original proponent in R77-15, is operating with the same relief. It currently burns only Illinois coal in its boilers which have two stacks. If forced to instead use blended coal, fuel costs could increase by $708,000 per year, or as much as $1,060,000 per year if low-sulfur Kentucky coal is required. These increased cost figures do not include any equipment costs associated with converting to blended coal because Sherex claims that would not be technologically feasible. In allowing a maximum emission limit of 5.5 lb/mBtu, aerodynamic downwash from its facility posed a problem. Sherex has corrected this by heightening its stack at an approximate cost of $235,000. The same situation holds true for Bemis Corporation which burns an estimated 31,000 tons of Illinois coal per year at a fuel cost savings of $499,000 per year. Bemis incurred no significant conversion costs.

In 1980 Pekin Energy Company, formerly CPC International, consumed 63,000 tons of Illinois coal and 123,000 tons of western coal for a blend costing an average of $45.40 per ton, or $8,380,000. Pekin Energy testified that, if permitted, it could instead consume 191,000 tons of Illinois coal at a total cost of $5,600,000 and thereby save $2,830,000. These savings, however, are offset by the estimated annualized cost of $125,000 for a fifty foot stack extension. Without such an extension, emissions ranging up to the 5.5 lb/mBtu limit could have caused aerodynamic downwash, which would result in air quality violations.

Based on the proposed relaxation in McHenry and Kankakee Counties in the Chicago MMA, cost savings were found to be avail-

able to one Kankakee facility. Other facilities were not studied since they indicated they would not utilize a relaxed emission limit of 6.8 lb/mBtu. The Kankakee facility, Roper Company, indicated that it could switch from using natural gas to Illinois coal, saving approximately $134,000 per year.

No relaxed limit is proposed for existing fuel combustion sources located in the St. Louis MMA, so no economic consequences were considered by the ENR study.

In adopting the two relaxed standards, total cost fuel savings for the facilities considered is estimated at $4,972,000. If the conversion costs, i.e., the stack extension costs, are considered, the net savings is estimated at $4,612,000. As noted above, relaxing the emission limits will only moderately increase usage of Illinois coal by approximately 0.35% of the current annual production. Consequently, secondary impacts on the Illinois coal industry were determined to be modest. An additional $6 to $7.4 million per annum will be generated, and seventy to ninety additional new jobs created. Using a regional economic theory previously developed by ENR, the authors extrapolated the effect of the estimated annual increase to determine the overall effect on the State's gross product. Assuming that an income multiplier of two was reasonable for small regions, the $6 to $7.4 million generated could possibly boost income in Illinois by $12 to $14.8 million.

The study considered whether increased use of Illinois coal could disrupt the residual fuel oil market. It concluded that such a possibility was unlikely. Not only is the number of sources switching from out-of-state coal to domestic coal few, but since the supply of Illinois coal is subject to the same uncertainty as out-of-state coal, it is likely that they will have to continue maintaining reserves of fuel oil. Even if such an impact was to occur, the economic ramification would be minimal since it would be a transfer of income rather than a direct loss.

In studying the effects of the proposal for the process emission sources, estimates for control costs or cost savings were not developed. The revisions of the present standard are intended only to more accurately reflect what is actually being emitted; no additional control is envisioned by the amendments. The study did note that in modifying the existing rules, the margin of operating error at the affected facilities is reduced, which has possible economic ramifications. The study also concluded that offsetting credits possibly envisioned by the affected facilities were eliminated.

The economic impact study also examined the costs to the health and welfare of persons and property. A cost of $1.032 to $2.434 million per year was estimated. In proposing these

amendments, the Board recognizes that a certain segment of the public is rendered less protection from sulfur dioxide, and that property is possibly subjected to increased deterioration from sulfur dioxide. However, the relaxations proposed are limited primarily to the Peoria MMA, and modeling for that locality has adequately demonstrated that downwash and atmospheric loading problems should not occur.

The remaining amendments should not cause any increase in sulfur dioxide emissions, but rather more accurately reflect the actual emissions from process sources. These should therefore not cause any impact on the health and welfare of the people of Illinois. Hopefully, the proposed amendments suffice to enhance the use of Illinois coal to the greatest extent possible, while attainment of the NAAQS for sulfur dioxide is furthered statewide.

IT IS SO ORDERED.

Board Chairman Dumelle and Board Member Werner concurred.

I, Christan L. Moffett, Clerk of the Illinois Pollution Control Board, hereby certify that the above Opinion was adopted on the 30th day of August, 1982 by a vote of 5-0.

Christa L. Moffett

Christan L. Moffett, Clerk
Illinois Pollution Control Board