

ILLINOIS POLLUTION CONTROL BOARD
December 5, 1986

IN THE MATTER OF:)
)
PETITION FOR SITE-SPECIFIC)
REGULATIONS APPLICABLE TO)
PARTICULATE EMISSIONS FROM) R84-48
LTV STEEL COMPANY'S)
CHICAGO WORKS HOT SCARFING)
MACHINES (35 Ill. Adm. Code)
212.451))

ADOPTED RULE. FINAL ORDER.

ORDER OF THE BOARD (by J. Theodore Meyer):

This matter comes before the Board on the petition of LTV Steel Company for site-specific relief from 35 Ill. Adm. Code 212.451 which provides that emissions from hot scarfing machines shall not exceed 69 milligrams per dry standard cubic meter (mg/dscm) (0.03 grains per dry standard cubic foot (gr/dscf)) during hot scarfing operations. LTV seeks to increase this limitation to 138 mg/dscm (0.06 gr/dscf) for its hot scarfing machine located at its "Chicago Works" plant. Hearing was held on June 7, 1985. The Department of Energy and Natural Resources (DENR) issued a negative declaration for this rulemaking on October 15, 1985 and the Economic Technical Advisory Committee concurred with this finding at its October 17, 1985 meeting. On March 27, 1986 the Board proposed regulatory language for first notice comment which was published at 10 Illinois Register 5695 on April 11, 1986. During the first notice comment period the Board received one comment from the Illinois Environmental Protection Agency (Agency) suggesting a modification in the regulation so that it would apply not only to the hot scarfing machine but to the related pollution control equipment as well. The Agency also commented that a change in the respirable particle ambient air quality standard might necessitate additional control on the hot scarfing machine. The Board declined to change the proposed language at second notice.

The Board proposed this rule for second notice review by the Joint Committee on Administrative Rules (JCAR) on September 11, 1986. The statutory second notice period expired on November 6, 1986. However, the regulation was not considered by JCAR until its November 19, 1986 meeting. JCAR determined that no objection would be issued to this proposed rule provided certain language modifications were made to enhance clarity. The Board has agreed to make these modifications which will be discussed below.

LTV owns an integrated steel mill known as the Chicago Works plant located roughly between 112th Street and 130th Street between the Calumet River and Burley Avenue on the south side of Chicago. This area is designated as primary and secondary non-attainment for particulates. The plant occupies approximately 790 acres. It presently employs about 3,800 people with a payroll of \$98 million. The plant manufactures semi-finished steel bars which are used for axles, springs, and other load-bearing applications. As an integrated steel mill, it has a coke plant, blast furnace, an electric furnace, an oxygen furnace, melting shop and various rolling and finishing facilities.

Production of the steel bars begins with the reduction of iron ore in the blast furnace with coke to liquid iron. The iron is then refined in the oxygen furnace to produce steel. The steel is poured into molds where it solidifies to form ingots. Each ingot weights approximately 94 tons. The ingots proceed through a series of rolling systems, the first being known as the 44-inch rolling mill. However, before proceeding to the rolling mill the ingots go through a reheating step called the soaking pits. During this process the ingots form a layer of oxides referred to as "scale". For certain types of steel the scale is detrimental to the finished product and therefore, it must be removed. Removal takes place after the ingots go through the rolling mill in a machine known as the 44-inch mill hot scarfing machine. At this point the ingots are roughly 2,000 °F. Gaseous oxygen is blown against them to burn off the oxide deposits. This process results in the formation of iron oxide which is emitted as particulate matter. Approximately 70 percent of the steel produced at the Chicago Works plant is treated in the scarfing machine. Petitioners state that scarfing is necessary in order to meet the quality specifications of their customers. It takes approximately 20 seconds to scarf one ingot. At present production, approximately 13 ingots per hour are scarfed.

The hot scarfer emissions are presently controlled by an exhaust hood, duct work, venturi scrubber, mist eliminator and an induced draft fan which releases the cleaned emissions to the atmosphere. However, despite these controls, Petitioner is unable to meet the 0.03 gr/dscf standard.

The scarfing operation has twice been tested for emission concentrations. The first test was conducted by Interlake, Inc., Technical Center in October of 1975 by a method called WP-50. Three runs were conducted on October 14, 16, and 20. Emissions in gr/dscf during these runs were: 0.0413, 0.0339, and 0.0194 for an average of 0.0315. (Pet. Exh. 6). The second set of tests was run by Mostardi-Platt Associates on April 23 and 24, 1981 utilizing USEPA's method No. 5. The results of three test runs in gr/dscf were: 0.0411, 0.1063 and 0.0442 for an average of 0.0639. (Pet. Exh. 5). Tom J. Harlan, Jr., Environmental Management Engineer at LTV, calculated standard deviations for

each test which indicated that the second set of tests were not as precise. (R. at 73). When expressed in terms of standard error, the first test run had a standard error of approximately 30 percent and the second test run had a standard error of approximately 50 to 55 percent. (R. at 83). He accounts for the considerably higher result on the second run of the Mostardi-Platt test as an artifact of the sampling. Thus, it is his estimate that the average of emissions is probably closer to 0.04 gr/dscf based on an average of all six runs which comes to 0.0477 gr/dscf, with a standard deviation of 0.0336. (R. at 74).

Mr. Harlan then calculated the excess pounds of particulate emissions emitted per scarf. (Pet. Exh. 7). Using the 0.03 gr/dscf standard of 35 Ill. Adm. Code 212.451, he calculated the estimated allowable emissions per scarf to be 0.1 pounds. Then using the Mostardi-Platt results, Mr. Harlan calculated that 0.2 pounds of particulates were actually being emitted per scarf. Thus, at the historical average of 10 scarfs per hour, particulates would be emitted at the rate of two pounds per hour which is one pound per hour over the allowable limit. Although the scarfer is capable of more than 10 scarfs per hour, and is indeed presently operating at 13 scarfs per hour, as the number of scarfs per hour increases both the actual and allowable emissions in pounds per hour increase proportionately. Mr. Harlan testified that the maximum number of ingots through the scarfing machine in the historical peak hour was 33. However, he guessed that the 70 percent scarfing rate would probably apply to this figure meaning that only 23 ingots were actually scarfed. Although the scarfing operation is not limiting on production, the facility could probably not operate at the historical maximum rate over any lengthy period of time since other steps in the production process limit the amount of steel that can go through the scarfer. (R. at 78).

Technical Feasibility and Economic Reasonableness

Petitioner argues that to upgrade the existing control equipment to meet the 0.03 gr/dscf standard would impose an arbitrary or unreasonable financial burden without resulting in any significant improvement in air quality. Petitioner obtained an estimate of the cost in 1981 to obtain compliance of \$1 million. Based on standard escalation factors, Petitioner now estimates the actual cost to be closer to \$1.2 million. (R. at 23). This plan would require upgrading the present equipment to provide approximately 20 inches more differential pressure across the venturi scrubber. Kenneth R. Basciani, Works Engineer at LTV, testified that the actual cost of the necessary equipment was approximately \$165,000. The balance of the \$1.2 million cost represents labor and material to be supplied by LTV. While the modifications to the scrubbing equipment are relatively minor, extensive modification of the ductwork is necessary because of the present low operating pressures. Mr. Basciani testified that

the existing fan would have to be replaced with a 2500 horsepower induced draft fan and that the largest part of the overall job cost was attributable to the installation of this fan and the associated electrical work. He stated that the great expense was due to the placement of the present equipment within a very confined area. Specifically, the tight confines limit the ability to use heavy construction equipment causing the construction period to be much longer. (R. at 45-6). In fact, installation of the new equipment would necessitate a shutdown of the scarfing operation for several months.

LTV did consider other alternatives such as the use of electrostatic precipitators and baghouses but determined that because of space constraints the equipment would have to be located remotely from the scarfing machine. Consequently, although no formal estimates were made, it was determined that these alternatives would be more costly than revamping the existing equipment. (R. at 26-7).

Environmental Impact

In support of its contention that upgrading the scrubbers will cause no significant improvement in air quality, petitioner supplied modeling studies performed by Richard Hans Schulze, an environmental engineer and president of Trinity Consultants. Trinity Consultants specializes in the field of dispersion modeling.

Mr. Schulze testified that he ran two models. Each was based on surface meteorological data collected in Chicago and on mixing height data collected in Peoria for the years 1970 through 1974 as recommended by the Agency. It was determined to use the Industrial Source Complex (ISC) short term model because there are wake effects attributable to a roof ridge. Mr. Schulze testified that the roof ridge will cause the emissions under most conditions to be caught in its wake. (R. at 102). Because Mr. Schulze was uncertain as to whether, under USEPA guidelines, the area would be designated urban or rural he decided to run both the rural and urban options of the ISC model.

The model calculated concentrations of particulates on a "grid" with receptor points 100 meters apart. In addition, concentrations at three "discrete" receptors located at the sites of three schools in the vicinity of LTV were calculated. (R. at 113-14). Although LTV has estimated that it emits approximately one pound of particulates per hour over the allowable amount, Mr. Schulze assumed an emission rate of 100 pounds per hour or 100 times the excess emission rate. Mr. Schulze stated that he selected this emission rate simply because he wanted some larger numbers to show up in the printouts as it is easier to multiply by a factor of 100 than keep track of small numbers with many decimal places. (See Exhs. 8, 9, 10, 11, 12).

The results of Mr. Schulze's calculations are as follows:

Maximum Off Property Concentrations
Maximum Annual and Highest - 2nd high 24-hour average (1970-1974)
(micrograms per cubic meter)

	Rural		Urban		
	<u>Annual</u>	<u>24 hour</u>	<u>Annual</u>	<u>24 hour</u>	
Maximum off property		0.14	1.9	0.12	1.7
Washington School		0.05	0.5	0.05	0.4
Adams School		0.02	0.2	0.02	0.2
Bright School		0.01	0.2	0.01	0.2

(See Petition for Rule Change, Exh. 2).

Based on these results, Mr. Schulze concluded that the scarfing operation has an insignificant air quality impact based on the emission rate of one excess pound per hour. (R. at 130). Mr. Schulze testified that the basis for this conclusion was a USEPA determination that the minimum amount of ambient impact considered "significant" is 5 $\mu\text{g}/\text{m}^3$ as a 24-hour average and 1 $\mu\text{g}/\text{m}^3$ as an annual average. 43 Fed. Reg. 26398 (1978). The values generated by the models are one-seventh to one-eighth of these significance levels depending on whether the urban or rural model is used.

The Agency has pointed out that 35 Ill. Adm. Code 212.451 is a RACT-based emission limitation and that any rule change must be approved by USEPA for inclusion in the State Implementation Plan (SIP). The RACT guidance document for iron and steel making entitled "Steel Industry Particulate Emissions Limitations Generally Achievable on a Retrofit Basis" was submitted by the Agency as Public Comment #1. The RACT emission limits given by this document are 0.022 gr/dscf during scarfing operations or alternatively, 0.01 gr/dscf as an hourly average. Although the Illinois rule is based on emissions during scarfing operations, Petitioner did calculate the emissions as an hourly average based on 70 percent of the peak historical 33 scarfs per hour. This yielded a calculated maximum emission concentration of 0.008 gr/dscf as an hourly average, a value below the alternate RACT-based limit of 0.01 gr/dscf. (P.C. #2, R. at 155-156). Petitioner also calculated the maximum emissions at the peak rate to be 4.5 lbs/hr or 19.5 tons/yr assuming the scarfer were operating 24 hours/day over 365 days/yr. Based on these values the Board finds that the expenditure of \$1.2 million and ceasing operation of the scarfing machine for a few months to control these "de minimus" emissions is not "reasonably achievable." (See Exh. 15).

Based on all the foregoing, the Board finds that compliance with 35 Ill. Adm. Code 212.451 although technically feasible is not economically reasonable and would impose an unreasonable financial hardship on LTV Steel Company without measurable reductions in particulate concentrations around the plant.

JCAR has made several requests for language modifications in the proposed rule. These include a request that the Board be more specific as to the time of the hot scarfing machine's existence. Thus, language has been inserted to clarify that the rule applies to the hot scarfing machine existing on LTV's premises as of the approximate date of adoption by striking the reference to "the existing hot scarfing machine" and substituting "the hot scarfing machine existing on January 1, 1987." Concerning the RACT-based limitation of 23 mg/dscm of particulates as an hourly average, JCAR has suggested that language be inserted to provide that "so long as emissions do not exceed" as a substitute for "and not to exceed." JCAR has also requested the addition of language to indicate that the hourly average is to be calculated on an hour by hour basis. In other words, were LTV to exceed the hourly limitation during one 60-minute period that exceedance could not be offset by averaging in an hour in which the machine was idle or operating substantially under the limitation. Thus, language providing that the hourly average of 23 mg/dscm is not to be exceeded "as measured per hour" has been added.

In addition JCAR has requested that the Board update its statutory authority to the 1985 edition of the Illinois Revised statutes.

With these modifications, the Board hereby adopts the following amendment to 35 Ill. Adm. Code 212.451:

Title 35: ENVIRONMENTAL PROTECTION
SUBTITLE B: AIR POLLUTION
CHAPTER I: POLLUTION CONTROL BOARD
SUBCHAPTER c: EMISSION STANDARDS AND LIMITATIONS FOR
STATIONARY SOURCES

PART 212
VISUAL AND PARTICULATE MATER EMISSIONS

Section 212.451 Hot Scarfing Machines

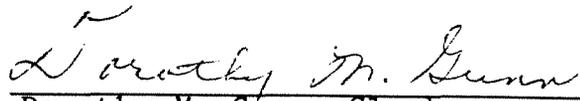
All hot scarfing machines shall be controlled by pollution control equipment. Emissions from said pollution control equipment shall not exceed 69 mg/dscm (0.03 gr/dscf) during hot scarfing operations. Provided, however, that the hot scarfing machine existing on January 1, 1987 and operated by the LTV Steel Company, Inc., at its Chicago Works, which employs

wet scrubbers, may emit particulate matter in amounts not exceeding 138 mg/dscm (0.06 gr/dscf) during hot scarfing operations so long as emissions do not exceed 23 mg/dscm (0.01 gr/dscf) as an hourly average, as measured per hour.

IT IS SO ORDERED.

Board Member R. Flema1 dissented.

I, Dorothy M. Gunn, Clerk of the Illinois Pollution Control Board, hereby certify that the above Order was adopted on the 5th day of December, 1986, by a vote of 5-1.



Dorothy M. Gunn, Clerk
Illinois Pollution Control Board