

ILLINOIS POLLUTION CONTROL BOARD  
December 13, 1979

IN THE MATTER OF: )  
 )  
PROPOSED AMENDMENT OF AIR ) R78-9  
POLLUTION CONTROL RULES )  
203(e) and 206(b) )

PROPOSED OPINION AND ORDER OF THE BOARD (by Dr. Satchell):

This matter comes before the Board upon a petition for amendment to air pollution control rules filed September 1, 1978 by Olin Corporation (Olin), a Virginia corporation authorized to do business in Illinois. The regulatory proposal seeks to amend Rule 203(e) and 206(b) of Chapter 2: Air Pollution Control Regulations (Air Rules). These provisions set emission limitations for particulates and carbon monoxide from incinerators. The proposal would set site specific limitations for two small explosive waste incinerators operated by Olin near Marion, Williamson County. The proposal was published in Environmental Register, No. 179, September 15, 1978. A public hearing was held in Marion on November 9, 1978. An economic impact study (EcIS) was prepared by the Illinois Institute of Natural Resources. An economic impact hearing was held in Marion on October 23, 1979 pursuant to notice given in Environmental Register, No. 200, September 17, 1979. Members of the public attended the hearings but did not comment.

Olin manufactures various propellant and pyrotechnic devices on a site leased from the U. S. Government within the Crab Orchard National Wildlife Refuge between Marion and Carbondale. The manufacturing process generates explosive waste and explosive contaminated waste. This waste includes reject product, floor sweepings and other material which becomes contaminated with explosive, propellant or pyrotechnic material. This waste requires special handling because it is likely to catch fire or explode. The traditional method of disposal is open burning which can take place only pursuant to variance as provided by Air Rules 502 and 505. In the past Olin has been granted such variances, as well as variances to operate the incinerators. The latest of these was PCB 78-242, 32 PCB 169, November 30, 1978. In 1975 Olin proposed a state-wide regulation governing explosive waste incinerators. This proceeding was later dismissed by order of the Board (R75-13; 19 PCB 189, October 30, 1975; 20 PCB 189, February 26, 1976). There is presently pending before the Board a further petition for a variance to allow operation of these incinerators during the notice and comment period involved in this proceeding (PCB 79-234).

The proposal contains no definition of "explosive" or "explosive contaminated waste." At the hearings Olin and the Agency agreed to adoption of the definition of "explosive" proposed by Olin in its previous proposal for a state-wide regulation, R75-13 (R. 16). The definition is as follows:

Explosives: The term explosives includes any chemical compound or mixture which, when subjected to heat, friction, detonation or other suitable initiation, undergoes a very rapid chemical change with the evolution of large volumes of highly heated gases which exert pressures in the surrounding medium.

In using the term "explosive" in these proposed amendments the Board intends the term to be as defined above. However, the Board will not at this time amend the definitions of Air Rule 201 to include this term since the definition does not depart from the general meaning of the word and since the proposal is site specific.

The traditional disposal method, open burning, is undesirable because of inefficient combustion, inadequate monitoring and uncontrolled emissions (EcIS 17; R. 10). Disposal in a landfill is undesirable because the materials remain hazardous for an indefinite period of time after burial and because it is doubtful if the practice could in any event be permitted at the present time in Illinois (EcIS 32; R. 54, 65, 77). Several incinerator systems are discussed in the study (EcIS 19). These include a vertical draft incinerator, a rotary kiln incinerator, SITPA I and II (Simplified Incineration Technique for Pollution Abatement) and a fluidized bed incinerator. Also discussed is wet air oxidation in which an aqueous slurry of waste is fed into an autoclave along with steam and compressed air. There is doubt whether any one of these methods could handle the wide range of wastes Olin generates. They also appear to have higher capital and operating costs than the incinerators in question. The author of the EcIS was unable to find specific information on emissions to determine whether better control could be achieved with the alternative systems (EcIS 30).

In 1970 Olin began a program to find an alternative to open burning. This program was directed by Mr. Richard Altekruze of Olin and Dr. Howard Hesketh of Southern Illinois University as a consultant. After a literature search of various options and some unsuccessful experimentation with an air curtain destructor, incinerator A was built in 1972. This is a single chamber type incinerator with an induced draft. Waste is fed into a combustion chamber in small packages by means of a conveyor through a blast

resistant reinforced concrete wall. The waste is ignited when it comes into contact with a bed of incandescent coke. The combustion and decomposition products are exhausted by means of the induced draft through a high velocity venturi throat where they are scrubbed with water. The contaminants are separated in a cyclone separator and the scrubbed gases exhausted to the atmosphere (R. 24, 34, 59, 65).

In 1974 incinerator B, a destructor retort, was constructed. This has walls of heavy steel construction to contain shrapnel from detonation of intermediate calibre ammunition components. Ignition is provided by a fuel oil flame rather than a coke bed. The combustion products are exhausted to the same scrubber used for incinerator A. The two can therefore not be operated at the same time (R. 26, 34, 65).

Although there are other explosive waste incinerators in operation, these are unique in design. The Illinois Environmental Protection Agency (Agency) has been involved in their development and testing. The Agency believes the incinerators represent best available technology (R. 6). Nevertheless they violate the emission limits for incinerators for particulates and carbon monoxide.

Rule 203(e)(3) provides that: "No person shall cause or allow the emission of particulate matter . . . to exceed 0.2 grains per standard cubic foot of effluent gases corrected to 12 percent carbon dioxide." For example, any emission in excess of 0.1 gr/cu ft would be in violation if the effluent contained 6% carbon dioxide. Rule 206(b) similarly provides that: "No person shall cause or allow the emission of carbon monoxide . . . to exceed 500 ppm, corrected to 50 percent excess air." An emission in excess of 333 ppm would thus be in violation if there were 75% excess air.

The reason for correcting to 12% carbon dioxide or 50% excess air is to prevent circumvention of the rules by dilution of effluent gases with excess air. These rules were based on typical emissions achievable by a well-operated municipal incinerator, which, when burning waste containing a typical amount of carbon, would operate with 50% excess air and generate about 12% carbon dioxide. Olin contends, and the Agency agrees, that this model municipal incinerator is fundamentally different from Olin's explosive waste incinerators (R. 6). Two reasons are given. First, the explosive materials typically have a lower proportion of carbon than municipal waste and hence produce less carbon dioxide when burned and are unfairly penalized by the correction to 12% carbon dioxide (R. 26, 53). Second, the incinerators must operate with much more than 50% excess air because a large induced draft is necessary to damp pressure spikes following explosions to prevent puffing of waste gases through openings in the incinerator and to

cool the gases prior to scrubbing. Whereas more than 50% excess air in a municipal incinerator indicates inefficient operation, this is not the case with regard to the explosive waste incinerator (R. 7, 27, 41, 53).

The air quality impact of the incinerators at Olin's property line was studied in a report prepared for Olin by ETA Engineering, Inc. of Westmont (Ex. E). The study was based on the following charging and emission rates which are comparable to those given in testimony at the hearing (Ex. E, p. 4; R. 28).

	<u>Incinerator A</u>	<u>Incinerator B</u>
Max. Waste Throughput		
Short-term	300 lb/hr	454 lb/hr
Annual	150,000 lb/yr	20,500 lb/yr
*Max. Daily Operation	6 hrs	6 hrs
Max. Short-term		
Emission Rates		
Particulates	0.12 g/sec	0.36 g/sec
Carbon Monoxide	2.5 g/sec	0.45 g/sec

\*Incinerators cannot be operated simultaneously.

The ambient air quality impact of the emissions was predicted based on the Climatology Dispersion Model (CDM), PTMAX and PTDIS. Meteorological data was taken from the National Weather Service Station records at Terre Haute, Indiana. Worst case air quality impacts at Olin's property line are presented in the table below. For comparison purposes the significant increments applicable to major new emission sources are presented, although these are not applicable to Olin's facility (Ex. E, p. 5, 11; EcIS 14). This conclusion is not affected by the recent decision in Alabama Power v. Costle, No. 78-1006, U. S. Court of Appeals for the District of Columbia, June 18, 1979 (R. 74).

	<u>Ambient Primary Standard</u>	<u>Significant Increment</u>	<u>Olin "Worst Case" Modeling Results</u>
Carbon Monoxide			
1 hour	40 mg/m <sup>3</sup>	2 mg/m <sup>3</sup>	0.92 mg/m <sup>3</sup>
8 hour	10 mg/m <sup>3</sup>	0.5 mg/m <sup>3</sup>	0.64 mg/m <sup>3</sup>
<u>Particulates</u>			
24 hour	260 ug/m <sup>3</sup>	5 ug/m <sup>3</sup>	32.3 ug/m <sup>3</sup>
Annual	75 ug/m <sup>3</sup>	1 ug/m <sup>3</sup>	0.04 ug/m <sup>3</sup>

Under the proposed rule, Olin's allowable annual emissions at its projected operating rate would amount to 108 kg of particulates and 1800 kg of carbon monoxide. These are small compared with Williamson County sources emitting 766,000 kg of particulates and mobile sources emitting 24,000,000 kg of carbon monoxide annually (EcIS 4; R. 56).

Olin's incinerators are located on privately owned land about one mile north of the National Forest boundary (R. 77, Ex. C). This is an abandoned strip mine near Energy. The nearest residence is 0.4 miles distant and there are a few others about a mile away. Neighboring land uses include Olin's test facility for solid propellants and intermediate calibre ammunition, farming and coal recovery from strip mine spoil banks (R. 38). Background particulate levels of 30 to 45 ug/m<sup>3</sup> have been modeled for rural central Illinois. However, there has been no specific work on fugitive particulate levels from spoil banks per se (R. 64). The incinerators are located in West Marion Township, a designated non-attainment area for particulates. The nearest monitoring station is 2.8 miles southeast of the incinerators, in Marion. The secondary twenty-four hour National Ambient Air Quality Standard for particulates was exceeded in 1977 but not in previous years. Williamson County is unclassified for carbon monoxide (Ex. E, p. 1). Based on the evidence in the record, the Board finds that the incinerators will not prevent attainment of national air quality standards. Since the air quality impact study is strongly influenced by the short operating hours (six hours), the proposal will be amended to limit total daily operating time.

The air quality effects were predicted for Olin's property line. At all points outside the facility the actual effect on ambient air quality would be less. The EcIS did not attempt to quantify the health effects of the expected emissions. It would probably not be possible to measure the increase in ambient concentrations at a distance from the site where there is a high population density. Estimation of the health effects was deemed impossible (EcIS 15).

The EcIS did not identify any cost associated with the proposed regulation. The incinerators were determined to be far cheaper than the other systems examined in detail (EcIS 35). Olin contended that the alternative to the proposed regulation was to close the facility resulting in loss of employment and tax base in Williamson County (R. 32). The Agency challenged this conclusion, pointing out that the more expensive technology would amount to only eight and one-half percent of the facility's output (R. 67).

Olin's proposal has been modified somewhat in the proposed Order. The proposal specified the location as "within four miles of Marion." This has been narrowed to include only Section 3, T. 9 S., R. 2 E., 3 PM (Ex. C). The proposal has been rearranged and the language made more general so that, in the event other, similar facilities are constructed, they can be covered by the same rule by addition of alternative conditions to the definition of existing small explosive waste incinerator found in Rule 203(e) (6) (A).

A substantial change has also been made. Under the proposal, the incinerators would be exempt from the applicable incinerator standard of Rule 203(e) (3) on condition that, inter alia, the emissions of particulate matter "not exceed 50.0 grains for each pound of combined waste and auxiliary fuel burned." Under the proposal, if the facility emitted 50.1 gr/lb, Rule 203(e) (3) would apply and the particulate emissions would be corrected to 12% carbon dioxide. Considering the evidence in the record, a de minimus emission over 50.0 grains per pound could result in a gross violation of 0.2 gr/cu ft standard of Rule 203(e) (3). There would be difficulty in judging the amount of penalty to assess in such a case. Furthermore, there would be difficulty in enforcing any penalty against Olin based on Rule 203(e) (3) since the Board has found, in adopting this rule, that the standard applicable to incinerators in general is not rationally related to these explosive waste incinerators. To avoid these problems the 50.0 grains per pound limitation has been dropped as a condition for exemption. It will, however, be a violation of Rule 203(e) (6) (B) if the particulate emissions exceed 50.0 gr/lb or 7140 mg/kg of combined waste and fuel.

The 50.0 gr/lb limit has also been dropped as a condition for exemption from the carbon monoxide limitation of Rule 206(b). Under the proposal particulates of 50.0 gr/lb would imply no carbon monoxide exemption which would result in correction to 50% air resulting in a gross violation of carbon monoxide Rule 206(b). The rational basis for such a rule is even more tenuous and not supported by the record.

An incidental result of this modification is that there is no carbon monoxide limitation at all for the incinerators so long as they comply with the conditions of Rule 203(e) (6) (A). However, this is probably the same as the practical effect of the proposal which in effect judged compliance with the carbon monoxide limitation on the basis of the particulate emissions. An excursion over the 50.0 gr/lb particulate standard could not be made more serious because it resulted in violation of two rules rather than one.

The proposal included no definition of "explosive contaminated waste." As used in the proposed Order, explosive contaminated waste is waste which contains explosives and other wastes which have become admixed during the ordinary and necessary activities of manufacture, storage or transportation and from which other wastes cannot be economically separated with sufficient reliability to permit conventional disposal (R. 22). It is not the Board's intention to authorize the burning of wastes which are not contaminated with explosives except as otherwise provided in the Air Rules. The Board further expects Olin to exercise due care to prevent unnecessary commingling with other waste and to separate waste where practicable.

The proposal provided as a condition that: "The incinerators were designed and built for the sole purpose of burning explosives or explosive contaminated waste." Nothing in the language would remove the exception from the general incinerator rules upon their subsequent dedication to burning municipal waste. This was obviously not the intention of the proposal. Accordingly, this condition has been changed to: "The incinerator burns explosives or explosive contaminated waste exclusively." If other waste is burned the emissions will be judged on the basis of the rules applicable to the waste burned. A second purpose of the language in the proposal may have been to differentiate the explosive waste incinerators on the site from other incinerators. However, the explosive waste incinerators have been adequately described in this Opinion. The general rules will apply to any other incinerators on the site even if they burn explosive waste exclusively.

The proposal in Olin's earlier petition, R75-13, contained extensive definitions of "ammunition" and "ammunition components." The exceptions also named these items specifically. This is not included in this proposal and no mention was made of it at the hearing. It is clear, however, that incinerator B was designed primarily to handle ammunition. The Board therefore notes that the terms "explosive" and "explosive contaminated waste" may extend to ammunition and ammunition components as defined in the proposal in R75-13, provided they meet the general definition of explosive or explosive contaminated waste.

The incinerators will, of course, continue to be subject to the general provisions of the Air Rules, including the permit requirements of Rule 103 and the monitoring and reporting requirements of Rules 106 and 107. At the hearing Olin agreed to submit quarterly reports on the amount of explosive waste burned in its incinerators and the times when such incinerators are operated

(R. 32, 39). No rule requiring this is necessary since it is within the power of the Agency to require such reporting and monitoring by permit condition under the existing rules. Likewise, Olin will continue to be subject to the episode action plan requirements of Rule 404 (Ex. D).

There is presently in effect an emergency Rule 203(e)(6). This was adopted by Order of the Board on March 28, 1977; 25 PCB 251. It is a temporary rule on afterburners which by its own terms expired March 7, 1977. This rule will be repealed and the number used for Olin's site specific regulation.

#### ORDER

It is the Order of the Pollution Control Board that Rules 203(e) and 206(b) of Chapter 2: Air Pollution Control Regulations, be amended to read as follows:

#### Rule 203(e): Particulate Emission Standards and Limitations For Incinerators

- (1) No person shall cause or allow the emission of particulate matter into the atmosphere from any incinerator burning more than 60,000 pounds of refuse per hour to exceed 0.05 grains per standard cubic foot of effluent gases corrected to 12 per cent carbon dioxide.
- (2) No person shall cause or allow the emission of particulate matter into the atmosphere from any incinerator burning more than 2000 but less than 60,000 pounds of refuse per hour to exceed 0.08 grains per standard cubic foot of effluent gases corrected to 12 per cent carbon dioxide.
- (3) No person shall cause or allow the emission of particulate matter into the atmosphere from all other existing incinerators to exceed 0.2 grains per standard cubic foot of effluent gases corrected to 12 per cent carbon dioxide.
- (4) No person shall cause or allow the emission of particulate matter into the atmosphere from all other new incinerators to exceed 0.1 grains per standard cubic foot of effluent gases corrected to 12 per cent carbon dioxide.



- (A) Rule 203(e)(4) shall not apply to aqueous waste incinerators which, when corrected to 50 per cent excess air for combined fuel and charge incineration, produce stack gas containing carbon dioxide dry-basis volume concentrations of less than 1.2 per cent from the charge alone; if all the following conditions are met:
  - (i) The emission of particulate matter into the atmosphere from any such new or existing incinerator does not exceed 0.1 grains per standard cubic foot, dry basis, when corrected to 50 per cent excess air for combined fuel and charge incineration.
  - (ii) The waste charge to the incinerator does not exceed 2000 pounds per hour.
  
- (5) Exception: Subparagraphs (1), (2) and (4) of this Rule 203(e) shall not apply to incinerators which burn wood wastes exclusively, if all the following conditions are met:
  - (A) The emission of particulate matter from such incinerator does not exceed 0.2 grains per standard cubic foot of effluent gases corrected to 12 per cent carbon dioxide; and
  - (B) The location of such incinerator is not in a restricted area, and is more than 1000 feet from residential or other populated areas; and
  - (C) When it can be affirmatively demonstrated that no economically reasonable alternative method of disposal is available.
  
- (6) Exception: Certain small explosive waste incinerators.
  - (A) Subparagraphs (1), (2), (3) and (4) shall not apply to certain existing small explosive waste incinerators if all the following conditions are met:
    - (i) The incinerator burns explosives or explosive contaminated waste exclusively;
    - (ii) The incinerator burns 227 kilograms (500 pounds) of waste per hour or less;

- (iii) All incinerators on the same site operate a total of six hours or less in any day;
  - (iv) The incinerator was in existence prior to December 6, 1976 and is located in Williamson County in Section 3, Township 9 South, Range 2 East of the Third Principal Meridian.
- (B) No person shall cause or allow the emission of particulate matter into the atmosphere from any such existing small explosive waste incinerator to exceed 7140 milligrams per kilogram (50.0 grains per pound) of combined waste and auxiliary fuel burned.

Rule 206: Carbon Monoxide Emission Standards and Limitations.


\* \* \*

- (b) Incinerators. No person shall cause or allow the emission of carbon monoxide into the atmosphere from any incinerator to exceed 500 ppm, corrected to 50 percent excess air.
- (1) Exception: This Rule 206(b) shall not apply to existing incinerators burning less than 2000 pounds of refuse per hour which are in compliance with Rule 203(e)(3).
  - (2) Exception: This Rule 206(b) shall not apply to certain existing small explosive waste incinerators which meet the conditions of Rule 203(e)(6)(A).

\* \* \*

Mr. Werner dissented.

I, Christan L. Moffett, Clerk of the Illinois Pollution Control Board, hereby certify the above Opinion and Order were adopted on the 13<sup>th</sup> day of December, 1979 by a vote of 3-1.

  
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Christan L. Moffett, Clerk  
Illinois Pollution Control Board