

ILLINOIS POLLUTION CONTROL BOARD

November 28, 1972

In the Matter of)
) R 72-11
Open Burning Regulations)

Opinion of the Board (by Mr. Henss)

The Environmental Protection Agency filed its proposal to amend the Open Burning Regulations in order to allow the open burning of landscape waste in small municipalities outside of metropolitan areas. On October 24, 1972 this Board ordered that the final draft of the proposal be published in order to allow the widest public comment. We now detail the history of this Regulation and our reasons for amending it.

In 1970 the Congress enacted Clean Air Amendments ordering the United States Environmental Protection Agency to establish National Ambient Air Quality Standards. The Primary Air Quality Standard was defined by the Congress as that necessary to protect the public health, and Congress ordered the States to attain this Primary Standard by May 30, 1975. The Secondary Ambient Air Quality Standard was defined as that Standard which is necessary to protect the public welfare and is to be achieved in a reasonable time. (Clean Air Amendments, Sec. 109 and 110)

On April 28, 1971 the U. S. Environmental Protection Agency, as directed, did adopt the National Primary and Secondary Ambient Air Quality Standards.

National Ambient Air Quality Standards were established for six of the principle air pollutants: Particulate matter, sulfur oxide, hydrocarbons, carbon monoxide, photochemical oxidants and nitrogen oxides.

In adopting the Standards the Administrator of the Agency, Mr. William D. Buckelshaus stated "current scientific knowledge of the health and welfare hazards of these air pollutants is imperfect. To increase and improve this knowledge the Environmental Protection Agency will continue to conduct and support relevant research. At the same time the need for increased knowledge of the health and welfare effects of air pollution cannot justify failure to take action based on knowledge presently available. The Clean Air Act, as amended, requires promulgation at this time of National Standards for six air pollutants on the basis of available data set forth in air quality criteria documents. Thus, the Administrator is required to make judgments as to the proper interpretation of the presently available data and to establish National Primary Standards which

include an adequate margin of safety to protect human health. Where the validity of available research data has been questioned, but not wholly refuted, the Administrator has in each case promulgated a National Primary Standard which includes a margin of safety adequate to protect the public health from adverse effects suggested by the available data". Federal Register, Volume 36, No. 84, p. 1816.

In establishing the Primary Air Quality Standard Mr. Ruckelshaus did not take into account any factors other than public health. The Clean Air Act as amended did not permit him to do so. A number of comments were made questioning the feasibility of implementing the proposed Standards but no revisions were made on this basis.

The Federal EPA determined that the health related Standard for particulate matter in the air should be: 75 micrograms per cubic meter of particulate matter as an average (annual geometric mean) and 260 micrograms per cubic meter, maximum 24 hour concentration (not to be exceeded more than once per year). This is a Standard which, in the opinion of the Administrator of the Environmental Protection Agency, was necessary to protect the public health.

Federal law requires the various States to submit plans for the attainment and maintenance of the Federal Air Quality Standards. Illinois has done so and is taking steps to achieve the Primary Standards in 1975 and to achieve the Secondary Standards within a reasonable period of time.

In 1970 the Illinois Legislature enacted the Environmental Protection Act. EPA Section 9(c) states: "No person shall cause or allow the open burning of refuse". Refuse is defined by the Legislature as "any garbage or other discarded solid materials". Section 3(k)

In addition the Legislature delegated certain authority to the Illinois Pollution Control Board. The statute specifically gives the Board authority to prescribe the Ambient Air Quality Emission Standards, and in adopting the regulations to make different provisions as required by circumstances for different contaminant sources and for different geographical areas. EPA Section 9, 10 and 27.

The Statewide ban on open burning which was ordered by this Board on September 2, 1971 was a valid exercise of this authority which had been delegated by the Legislature to the Board. The Board is required to, and did, take into account the existing geographical conditions, the character of the area involved, zoning classifications, nature of

existing air quality, and technical feasibility and economic reasonableness of measuring or reducing the particular type of pollution.

In its September 1971 Opinion the Board referred to the evidence of danger from leaf burning: "Dr. George Arnold on behalf of the Madison County Sanitation and Pollution Committee argued that leaf burning creates a hazard of fire and of traffic accidents, contributes to the violation of particulate air quality standards, reduces visibility, endangers health, and destroys valuable organic matter. (R. 64-67) Several witnesses discussed from personal experience the adverse health effects of leaf burning, especially on persons with respiratory problems. (R. 214.32) An allergy specialist testified as to the serious health effects of burning leaves, especially those contaminated with pesticides, upon people with allergies or respiratory diseases. (R. 184-91)."

The Board allowed a grace period until July 1, 1972 for people without access to a refuse collection service to make arrangements to comply with the regulation.

There have been varying degrees of compliance with the ban on open burning. Monticello, a town of 4,100 population, has purchased a leaf vacuum machine, a chipping machine and has made arrangements to mulch leaves onto farm property in order to reduce the quantity of material going into its landfill. Monticello considered purchase of an air curtain destructor which would enable the burning of landscape waste but postponed the purchase because of the \$8,000-\$10,000 cost. (Urbana R. 103-108)

Palestine, population 1,686, baled its leaves from windrows in the streets. The bales were then used by gardeners and by farmers. The cost of this operation, however, was about \$15,000. (Springfield R. 67)

The ban on open burning of landscape waste was in effect during the Fall of 1971 for those communities which had a refuse collection service but authorities apparently did not take action to enforce the leaf burning ban during that leaf collecting or burning season and in July 1972 the Environmental Protection Agency filed a proposal requesting a relaxation of the leaf burning ban for the smaller communities. The proposal was to allow open burning of landscape waste in municipalities having a population less than 1,000 and outside of major metropolitan areas. The Agency included 15 counties within its definition of major metropolitan area.

Our newsletter published August 25, 1972 gave notice that hearings on this proposal would be held at Joliet, Rock Island, Urbana, Springfield, Carbondale and Macomb. Additional notices were given in other newsletters and in the newspapers published in the communities involved.

Testimony was received from State Legislators, elected municipal officials, municipal employees, pollution experts of governmental agencies, private citizens and representatives of contracting associations and ecology groups. Those who could not or desired not to appear at the hearings did submit written statements detailing their views.

Evidence in the hearings centered around the quantity of particulate matter given off by the burning of leaves, and the problems involved in the disposal of leaves which are not burned. The expert witnesses of the EPA testified that if simultaneously each family in a town of 2,500 persons burned one pile of leaves the peak one hour concentration of particulates at the downwind edge of the town would be 264 micrograms per cubic meter of air and if this level of burning continued for eight hours the resulting 24 hour average particulate level would be 93 micrograms per cubic meter of air. The health related allowable 24 hour standard is 260 micrograms per cubic meter of air and the welfare related 24 hour standard is 150 micrograms per cubic meter of air. The Agency assumed that there were 500 families in a town of 2.5 square miles, that a typical leaf pile was 4' x 4' x 3', the duration of burn was 1 hour, the estimated emission rate equalled .8 lbs. of particulate per hour per pile (.1 grams per second) and that wind speed was 8 miles per hour. It was estimated that the particulate background was 40 micrograms per cubic meter of air in these smaller communities.

The EPA witnesses Dr. John Roberts, Division Manager, and Gary Melvin, Meteorologist, testified that the open burning of landscape waste in municipalities up to 2,500 in population would not cause a violation of Federal Air Quality Standards. They relied upon the observations and calculations published by Dr. Bruce Turner, Chief of Air Resources, Field Research Office, United States Environmental Protection Agency in his "Workbook of Atmospheric Dispersion Estimates". The particulate background of 40 micrograms per cubic meter of air is applicable only in rural areas and in the cleaner smaller communities in the State of Illinois. Dr. Roberts testified that particulate levels in the major metropolitan areas of the State including Chicago, Rockford, Quad Cities, Peoria and E. St. Louis exceeded the Federal Air Quality Standards.

The EPA testimony was not based upon studies of air quality in any Illinois municipality at a time when leaves were being collected and burned in that community. Mr. Melvin stated "to my knowledge there have not been any studies performed within this State to determine precisely the contribution of open burning or burning of landscape waste to the air quality--that is not hard data". (Macomb R. 23)

An EPA statement said: "For each ton of landscape waste burned without the aid of air pollution control equipment approximately

17 lbs. of particulate, 60 lbs. of carbon monoxide, 20 lbs. of hydrocarbons (as methane), and 2 lbs. of nitrogen oxides are emitted to the atmosphere. See: Compilation of Air Pollutant Emission Factors (Rev. 1972) U. S. Environmental Protection Agency, Office of Air Programs, Pub. No. AP-42, pages 2-7. Of these air contaminants particulate matter is the most serious in terms of its effect on air quality, even though emissions of carbon monoxide are three times as great. This paradox can be understood if one recognizes that safe levels of carbon monoxide in the ambient air are over twenty times greater than the levels which are considered acceptable for particulate matter. See: 36 C.F.R. 22384, November 25, 1971.

Therefore, the principle concern with any relaxation of the ban on burning of leaves and other landscape wastes is the potential for violation of the National Ambient Air Quality Standards for Particulate Matter. These levels are established at 75 micrograms per cubic meter for the health related standard and 60 micrograms per cubic meter for the welfare related standard (annual geometric mean). Twenty-four hour standards of 260 micrograms per cubic meter (primary, health related) and 150 micrograms per cubic meter (secondary, welfare related) are to be exceeded no more than one day per year."

Particulate matter exists commonly in two basic forms--solid particulates consisting of dust, smoke and fumes; and liquid particulates consisting of mist and spray.

Solid particulates, with which we are now concerned, have a diverse chemical composition. They may exert a toxic effect in three ways: 1) the particulate may be intrinsically toxic due to its inherent chemical or physical characteristics (although few common atmospheric particulates have been shown to be intrinsically toxic). 2) The particulate may interfere with one or more of the clearance mechanisms in the respiratory tract. 3) The particulate may act as a carrier of an absorbed toxic substance. Particulates sometimes combine with other pollutants, to form harmful products. Synergism occurs when two or more pollutants combine to produce a pollutant more damaging than the sum of the effects of the individual pollutants acting independently. The presence of carbon or soot as a common particulate pollutant is noteworthy, as carbon is well known as an efficient adsorber of a wide range of organic and inorganic compounds. Carcinogenic materials have been identified in the atmosphere of virtually all large cities in which studies have been conducted and it may be seen that large quantities of particulates may help carry these pollutants into the human body. (Air Quality Criteria for Particulate Matter, U.S. Dept. of Health, Education and Welfare, Jan. 1969, AP-49, Page 137)

Lung cancer mortality, bronchitis, and pulmonary mortality in males and bronchitis in females have been strongly correlated with particulate density. A positive association between the degree of air pollution and the incidence of both bronchitis and lung cancer

have been made. (Air Quality Criteria for Particulate Matter, U.S. Dept. of Health, Education and Welfare, Jan. 1969, AP-49, Page 172) Two recent British studies showed increases in respiratory illnesses in children to be associated with annual mean smoke levels of about 120 micrograms per cubic meter. A study of the Buffalo, New York area found that increases in the mortality rate were significantly linked to higher levels of suspended particulate pollution. A study in the Nashville, Tennessee area found significant increases in all respiratory deaths at soiling levels over 1.1 COH annual average.

The number of deaths in New York City was reviewed for excess mortality in relation to the air pollution episode of November 1953. Excess deaths were related to increased concentrations of sulfur dioxide and suspended particulates. The lowest particulate levels at which health effects appear to have occurred in this country are reported in studies of Buffalo and Nashville. The Buffalo study clearly shows increased death rates from selected causes in males and females 50 to 69 years old at annual geometric means of 100 micrograms per cubic meter and over. The study suggests that mortality may rise in areas with two year geometric means of 80 micrograms per cubic meter to 100 micrograms per cubic meter. The Nashville study suggests increased death rates for selected causes at levels above 1.1 COHs. Sulfur oxides were also present during the periods studied. (Air Quality Criteria for Particulate Matter, U.S. Dept. of Health, Education and Welfare, Jan. 1969, AP-49, Page 183)

During the recent hearings it was variously stated that the open burning of landscape waste causes a fire hazard, a visibility problem on highways, damage to pavement and endangers the health of citizens. Other persons described the problems which accompanied the ban on burning: the fact that leaves plug storm sewers when they are not disposed of; that compost piles in back yards often harbor rodents, sometimes give off odors and are unsightly; that the useful life of a landfill is reduced by putting landscape waste in the landfill; that plastic bags sometimes used for the disposal of leaves are not readily degradable; that machinery and manpower to haul leaves and collect them costs money; that an air curtain destructor for the burning of landscape waste also costs money and may not be very efficient for the burning of loose leaves.

There was a considerable amount of testimony regarding the special problems of the smaller communities. The smaller municipalities often have a small tax base which is insufficient to provide the financing for refuse and waste collection. A higher percentage of the citizens in the smaller communities are senior citizens living on a more meager income and unable to handle the additional cost of collection of landscape waste.

Not only do the smaller communities have a greater financial problem in disposing of leaves but generally they have a better air quality. They have less pollution from the burning of leaves.

EPA witness, David Gray, testified that Illinois had 540 landfills. A majority of sanitary landfills are located close to metropolitan areas. Smaller communities, quite often, are not near a landfill. Relaxation of the ban for the smaller communities, he said, would have a favorable effect on the life of those landfills and reduce the problem of hauling waste a longer distance which is quite often the case for the smaller communities.

At most of the hearings the witnesses concentrated on showing the smaller municipalities should be permitted to burn landscape waste if they did not adjoin a larger metropolitan area. Stanley A. Nelson, Director of the Quad-City area Regional Air Pollution Control Agency submitted a statement: "Rock Island County (as well as some of the others listed) has a rural area several times that of the metropolitan area. Several of the small communities are situated only a few miles from an adjacent county where a community of similar size would be permitted the exemption. These communities feel that this discriminates against those located in a county containing a metropolitan area. They agree that any municipality, regardless of size, which is contained in or is contiguous with a metropolitan area should be included in the ban on open burning applying to the metropolitan area. It would seem the primary consideration should be the proximity of a community to a major metropolitan area rather than just the county in which it is located".

Donald A. Haselhoff representing the Bi-State Metropolitan Planning Commission stated that it was unrealistic to designate all of Rock Island County as a buffer zone. He said, however, that open burning should be prohibited in the metropolitan area. (Rock Island, Haselhoff, p. 5)

At the last hearing (Macomb October 12, 1972) representatives of park districts and larger municipalities appeared and requested authority to burn landscape waste for a period of several weeks in the autumn and another period of several weeks in the spring of each year. This proposal was substantially different from the proposal which had been submitted to the Board and had been published in our newsletter. Such a substantially different proposal would require 20 days notice to the public and a new schedule of hearings pursuant to our statute, EPA Section 28. The proposal came too late to accomplish its purpose for the 1972 leaf disposal season. We suggest that any person or municipality desiring to make further changes in the Regulation may make such a proposal pursuant to Rules 203 and 204 of our Procedural Rules. Those Rules provide that ten copies of each Proposal for Amendment or Repeal of a Regulation shall be filed with the Clerk. The proposal shall include the text of the proposed regulation or amendment and a statement of reasons supporting the proposal.

In an effort to broaden the hearings and show that air quality in some of the larger cities meets the Federal Standards, the Rock Island Park Director submitted 1971 data from a tape sampler which is used to determine Coefficient of Haze (COH) in downtown Rock Island. This method of sampling does not conform to the Federal requirements as a method of determining the weight of particulate matter in the air. Federal law requires that a Hi Vol sampler be used for this purpose. One is located in Rock Island and shows that in 1971 the geometric mean was 90 micrograms per cubic meter-- a figure in excess of both the Primary and Secondary Air Quality Standards. It appears, however, that the COH readings during the 6 week leaf burning period of 1971 (October 15 - November 30) were only slightly higher than the annual average and Rock Island did not at any time approach COH readings which would have required an Episode alert.

For the larger municipalities there are alternatives to the burning of landscape waste: Municipalities have used vacuum tank trucks for the collection of loose leaves and have used garbage compacting trucks for the collection of bagged leaves. The loose twigs, leaves, and brush may be disposed of through incineration, composting or sanitary landfill. The bagged leaves are disposed of at sanitary landfills. Use of plastic bags and sanitary landfill is probably the most practiced and least desirable method for disposal of leaves. The leaves as a result of the high cellulose content are not considered good landfill material. The plastic bags full of leaves use up a landfill more rapidly than necessary and create a hazard because of the pressure of gasses built up beneath the unstable ground. Public Works Journal Corporation, E. Stroudsburg, Pennsylvania, Vol. 103, No. 1, January 1972, p. 51. This Board previously stated that "we have some reservations about the spreading practice of placing leaves in plastic bags for collection. Plastic bags are relatively non-degradable and may interfere with normal decomposition of the leaves in a sanitary landfill. Moreover, the gaseous products of incineration of plastic bags may not be desirable additions to the air". September 2, 1971 Opinion

Municipalities or persons who have access to an air curtain destructor or similar device may apply to the Environmental Protection Agency for a permit to burn landscape wastes. Rules 404(a)(4). We have some doubt whether such devices are entirely effective for the burning of loose leaves. One possible solution would be to have the leaves compressed and baled before introduction into the destruction pit.

Composting is probably the least practiced method of municipal disposal of landscape waste. However, some communities are now turning to the recycling of leaves with composting programs. These programmed methods can take 30 cubic yards of street collected leaves and reduce them into one cubic yard of rich black leaf mold which,

when returned to the soil, can promote growth and restore a vital link in nature's chain. Public Works Journal Corporation, E. Stroudsburg, Pennsylvania, Vol. 103, No. 1, January 1972, p. 48.

Brookhaven, New York, population 250,000, has developed a program which includes publishing and distributing free booklets on composting and the development of composting demonstration centers. Plastic bags have been ruled out in favor of a new biodegradable Kraft paper bag. Maplewood, New Jersey which has had a composting program since 1931 has been able to realize a modest profit from the sale of composted leaves. Compost Science, Rodale Press, Emmaus, Pa., Volume 12, Number 6, Nov.-Dec., 1971, p. 3. Tenaflly, New Jersey because of a municipal composting program cleans catch basins and drainage systems only one-third as often as before. Wellesley, Mass., with a population of 28,000 has had a leaf composting program for 12 years and reports a production of 5,000 cubic yards of leaf mold. Public Works Journal, Jan. 1972, pgs. 45-50. Although not all of the communities utilizing composting programs can report profit, most have reported reduced cost in the handling of leaves in addition to environmental quality gains.

Individuals also will ordinarily have other methods for leaf disposal available to them. Where a relatively small quantity of landscape waste is involved it may be convenient simply to place it in bags for municipal collection. When it becomes available, the paper bag is to be preferred. If the municipality has a vacuum tank collector the individual citizen might find it easier to rake leaves to the designated area for collection by the vacuum machine. Individuals who have a suitable area might find the individual compost pile a good solution to their problem. Composting machines may be rented or purchased to quicken the process of shredding the leaves for a compost pile. These shredders are also available to reduce the volume of leaves and small limbs for insertion into bags. Others will simply mulch the leaves onto the ground.

We find from the evidence that smaller communities do not have the financing and the manpower to provide good alternatives to leaf burning and in many cases there is no landfill near the smaller municipalities. We further find it unlikely that the Federal Air Quality Standards will be violated by open burning of landscape waste in municipalities of 2,500 persons or less which do not adjoin larger municipalities and are located outside our major metropolitan areas of Chicago and E. St. Louis. We believe that the burning permitted by the Regulation can be conducted without harm to the public. Care must still be taken in setting individual fires since the Regulation is not intended to condone open burning which constitutes a nuisance or causes a violation of Air Quality Standards. Park districts or forest preserves which are not located in a prohibited area may conduct open burning

of landscape waste, but, because of the quantities of waste which may be involved need to take special care not to create a nuisance. Such open burning of landscape waste is authorized only on the premises where it is generated, when atmospheric conditions will readily dissipate the contaminants and if the burning does not create a visibility hazard.

It has been calculated that this relaxation of the ban will affect about 5% of the population of Illinois. It is the unanimous opinion of the Board that the relaxation should be made at least to that extent. The Board is divided as to the necessity for providing still more relief from the Regulation previously adopted in September 1971. Mr. Henss would amend the Regulation to allow open burning of leaves by those people who can show that they have no practical and ecologically sound alternative. He states that the public should have a speedy and inexpensive method of obtaining such permission from the EPA if they have a unique disposal problem. A majority of the Board have rejected this recommendation. In prohibited areas, the variance procedure remains as the only method available to the public to obtain permission to burn landscape waste without an air curtain destructor.

The prohibition remains in effect in municipalities over 2,500 in population and in their adjoining municipalities; and within rural areas (unincorporated areas) 1,000 feet or less from municipalities where open burning of landscape waste is banned. Open burning of landscape waste is prohibited in all municipalities regardless of size which are located in the Chicago Metropolitan area, i.e. wholly within 40 statute miles, by air, of Meigs Field. A similar ban applies to all municipalities regardless of size in the E. St. Louis metropolitan area, i.e. wholly within 20 miles of McKinley Bridge connecting St. Louis, Missouri and Venice, Illinois.

I, Christan L. Moffett, Clerk of the Pollution Control Board, certify that the Board adopted the above Opinion this 28th day of November, 1972, by a vote of 5-0.

Christan L. Moffett