

ILLINOIS POLLUTION CONTROL BOARD  
July 20, 1995

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Division of Legal Counsel  
Bureau of Air

JUL 25 1995

Environmental Protection  
Agency

IN THE MATTER OF: )  
 )  
JOINT PETITION OF SOLAR )  
CORPORATION AND THE ILLINOIS )  
ENVIRONMENTAL PROTECTION )  
AGENCY FOR ADJUSTED )  
STANDARDS FROM 35 ILL. ADM. CODE. )  
218, SUBPART PP. )

AS 94-2  
(Adjusted Standard - Air)

MARK LATHAM OF GARDNER, CARTON & DOUGLAS APPEARED ON BEHALF OF  
PETITIONER, SOLAR CORPORATION;

SHEILA G. KOLBE APPEARED ON BEHALF OF PETITIONER, ILLINOIS  
ENVIRONMENTAL PROTECTION AGENCY.

OPINION AND ORDER OF THE BOARD (by M. McFawn):

This matter is before the Board on a petition for adjusted standard filed by Solar Corporation (Solar) on February 14, 1994, as amended on January 3, 1995, and joined by the Illinois Environmental Protection Agency (Agency) on February 28, 1995. The petitioners request that Solar be given an adjusted standard from the air emission control requirements of 35 Ill. Adm. Code Part 218 Subpart PP for its manufacturing facility located in Libertyville, Lake County, Illinois.

The Board's responsibility in this matter arises from the Environmental Protection Act (Act) (415 ILCS 5/1 et seq.). The Board is charged therein to "determine, define and implement the environmental control standards applicable in the State of Illinois" (Section 5(b) of the Act) and to "grant...an adjusted standard for persons who can justify such an adjustment" (Section 28.1(a) of the Act). Thus, the Board is charged with the authority to grant individual adjusted standards which are different from the Board's generally applicable regulations. Although usually granted as permanent relief, the adjusted standard is not adopted as a rule under the Administrative Code. Rather, the opinion and order granting, and oftentimes conditioning, the relief requested serves both a regulatory and an enforcement function.

Based upon the record before us and upon review of the factors involved in the consideration of adjusted standards, the Board finds that petitioners, most particularly Solar, have demonstrated that the adjusted standard sought is warranted. The adjusted standard accordingly is granted, subject to the conditions outlined in the order.

## ADJUSTED STANDARD PROCEDURE

Section 28.1 of the Act provides that a petitioner may request, and the Board may adopt, an environmental standard that is: (a) applicable solely to the petitioner, and (b) different from the standard that would otherwise apply to petitioner pursuant to a rule of general applicability. Such a standard is called an adjusted standard. The general procedures that govern an adjusted standard proceeding are found at Section 28.1 of the Act and within the Board's procedural rules at 35 Ill. Adm. Code Part 106.

Where, as here, the regulation of general applicability does not specify a level of justification required from a petitioner to qualify for an adjusted standard, the Act at Section 28.1 (c) specifies four demonstrations that must be made by a successful petitioner. They are:

- (1) Factors relating to that petitioner are substantially and significantly different from the factors relied upon by the Board in adopting the general regulations applicable to that petitioner;
- (2) The existence of those factors justifies an adjusted standard;
- (3) The requested standard will not result in environmental or health effects substantially and significantly more adverse than the effects considered by the Board in adopting the rule of general applicability; and
- (4) The adjusted standard is consistent with any applicable federal law.

(415 ILCS 5/28.1(c))

## PROCEDURAL HISTORY

Solar originally filed a petition for adjusted standard on February 14, 1994. On March 3, 1994, the Board issued an order finding this petition deficient, and directing Solar to submit an amended petition by April 15, 1994. On April 1, 1994, Solar and the Agency moved for an extension of time to file an amended petition, i.e., until May 27, 1994. That motion was granted by Board order of April 24, 1994. After several more joint motions requesting additional time to file, all of which were granted, Solar filed its amended petition on January 3, 1995, which was accepted by the Board on January 11, 1995.

During the time intervening the initial filing and the amended petition, Solar and the Agency negotiated regarding the

relief requested by Solar. Prior to the amended petition being filed, the Agency reviewed the draft of the same and asked that Solar prepare a Technical Support Document (TSD) which would provide additional support for the adjusted standard sought by Solar. The fifth joint extension of time filed October 26, 1994 and granted by the Board on November 3, 1994 was to afford Solar time to prepare such TSD. The TSD was filed along with the January 3, 1995 amended petition. Solar requested trade secret protection for two exhibits attached to the TSD, pursuant to 35 Ill. Adm. Code 120.201, which has been afforded by the Board since that time.

At the time the amended petition was filed, Solar and the Agency still had some unresolved underlying issues. They successfully resolved those issues, and on February 28, 1995, they filed a joint motion for co-petitioner status, attached to which was proposed language for the adjusted standard amending the language proposed in the January 3 amended petition. The Board granted that motion and accepted the amended proposed language by order dated March 9, 1995. On April 7, 1995 a hearing was held in this matter in Libertyville, Illinois before hearing officer June Edvenson. Kenneth Formanski and Greg Miller testified on behalf of Solar, and John Blazis testified on behalf of the Agency. Board Member McFawn, her assistant, Kevin Desharnais and technical assistant Anand Rao were present. No members of the public were present. On May 3, 1995, Solar filed a motion to correct the transcripts, which is hereby granted. On May 5, 1995, Solar and the Agency filed a joint motion to modify the proposed adjusted standard language adding, in pertinent part, a specific commitment by Solar to continue its research and development efforts to find alternatives to solvent-based adhesives. That motion is also hereby granted.

#### RULE OF GENERAL APPLICABILITY

Solar seeks an adjusted standard from the air emission control requirements of 35 Ill. Adm. Code Part 218 Subpart PP, which is entitled Miscellaneous Fabricated Product Manufacturing Processes. The Board notes that Solar filed the initial adjusted standard petition on February 14, 1994, i.e., within 20 days of the effective date of those RACT requirements. Therefore, Solar is exempt from these requirements until the Board's final decision on this petition. Absent a grant of the requested adjusted standard, the following requirements would become applicable to Solar:

1. Emissions capture and control techniques which achieve an overall reduction in uncontrolled VOM emissions of at least 81 percent; or
2. Use of adhesives that do not exceed 3.5 pounds of VOM per gallon; or

3. An equivalent alternative control plan which has been approved by the Agency and the U.S. EPA in a federally enforceable permit or as a State Implementation Plan (SIP) revision.

(35 Ill. Adm. Code 218.926.)

Of most concern to Solar is the daily weighted average content of coating limitation of 3.5 pounds of volatile organic materials (VOM) per gallon when miscellaneous fabricated products are manufactured. This limitation was originally adopted as RACT in R91-7, RACT Deficiencies in the Chicago Area: Amendments to 35 Ill. Adm. Code Part 215 and the Addition of Part 218 (July 25, 1991), and was initially applicable only to major sources with actual VOM emissions in excess of 100 tons per year (tpy). In response to the Federal Implementation Plan adopted by the U.S. EPA, the Board later amended the applicability threshold to a maximum theoretical emissions (MTE) of VOM of 100 tpy or more for Chicago-area sources in R93-9, Omnibus Cleanup of the VOM RACT Rules Applicable to Ozone Nonattainment Areas (September 9, 1993). In R93-14, RACT for Major Sources Emitting VOM in Chicago Nonattainment Area: 25 Tons (January 6, 1994), the applicability threshold for Chicago area sources was again amended to include miscellaneous fabricated product manufacturing processes with potential to emit (PTE) of 25 tpy or more of VOM, but which have MTE of VOM less than 100 tpy. These 25 tpy sources, which include the Solar facility located in Libertyville, are now regulated as major sources, and the date of compliance with Subpart PP is March 15, 1995. Prior to the adoption of the rules R93-14, Solar had not been regulated by the 100 tpy rules at Subpart PP.

In lieu of compliance with the 3.5 pound per gallon limitation, Solar requests an emission limitation of 5.75 pounds per gallon (0.69 kg/l) for sources at its Libertyville facility, subject to certain recordkeeping restrictions.

#### BACKGROUND

Solar owns and operates a plant of approximately 250,000 square feet in Libertyville, Lake County, Illinois. At this facility, which is approximately 35 miles north of Chicago, and within the Chicago area source non-attainment area for ozone, Solar employs approximately 750 persons. There, Solar produces custom-made, fabric-covered plastic decorative components for customers manufacturing electronic home and office products, and a wide variety of fabric-covered interior automotive products for automotive manufacturers. The decorative components produced by Solar include speaker grills for stereos and televisions, pressure-formed thermoplastic back enclosures for television sets, and other decorative molded parts and fabric wrapped sub-

assemblies. The automotive interior products include speaker grills, vinyl and fabric clad door trim components, injection molded decorative subassemblies, seat trim components, and electric subassemblies.

Production of these products occurs on a three-shift basis, five days a week. Solar is known as a "job shop" because it does not maintain an inventory of fabric-covered plastic parts readily available to ship on demand to its customers. Instead, Solar produces particular component parts upon demand. When Solar receives an order from one of its customers, Solar quickly re-tools as necessary to produce the part, produces it, and promptly ships the product out. This may require Solar to make as many as 30 to 35 line changes per day. (TSD at 4.) At hearing, Miller, a senior manufacturing engineer at Solar, testified that 40 to 100 line changes can occur, depending on the product load that day. (Tr. at 29.) He later explained in a different context that line changes involve changing the "nests" for each different product parts, and sometimes also the location of the auto-spray machines. (Tr. at 62.)

The production of fabric-covered plastic parts by Solar requires the application of adhesives, which contain and emit VOM, to the plastic part prior to fabric application. Solar's customers' requirements dictate the type of fabric to be applied to various plastic parts and specifies the adhesion requirements that must be demonstrated and provided by the adhesives used by Solar. Both the plastic parts and the adhesives must withstand a wide range of temperatures and humidities. The adhesives must ensure that the fabric applied will adequately bond and maintain its adhesion through the life of the plastic part.

#### ADHESIVES and VOM EMISSIONS

Most adhesives used by Solar contain VOM in amounts greater than 3.5 pounds per gallon. The annual VOM emissions from all adhesives for the years 1990 through 1994 were 27.35 Tons (T), 40.15 T, 29.14 T, 44.68 T and 39.80 T per year, respectively. (Ex.3) The most used adhesive is Imperial 3317, which contains 5.49 pounds per gallon of VOM. Miller estimated that Imperial 3317 is used in approximately 70 to 75 percent of Solar's production. (Tr. at 30.) In the years 1990 through 1994, its use accounted for 27.35 T, 38.22 T, 29.41 T, 43.65 T, and 32.00 T per year, respectively. (Ex. 2) As discussed in more detail at page 6 of this opinion, its VOM content has been reduced by approximately one half to three quarters of a pound of VOM per gallon. (Tr. at 31.) The total VOM emissions from all sources, including adhesives, paints and solvents in the years 1990 through 1994 are 68.24 T, 88.90 T, 73.07 T, 89.90 T, and 95.50 T per year, respectively. (Ex.1)

## APPLICATION OF SOLVENT-BASED ADHESIVES

To apply the adhesives to plastic parts, Solar uses either manual spray guns or "auto-spray" machines. The manual application by spray guns takes place in eleven spray booths currently permitted by the Agency. The auto-spray machines, of which there are nine permitted at the time of hearing, and two others to come on line shortly, are custom-made and deliver a pre-measured amount of adhesives, eliminating the over spray incurred with manual spray guns. However, the auto-spray machines cannot be used in all applications because, with one exception, they can only apply adhesives on an X/Y axis. Manual spray guns must be used to apply adhesives to irregularly shaped or curved plastic parts. (Am.Pet. at 8; TSD at 10; Tr. at 34-36.)

Solar has calculated that each auto-spray machine emits only 2.45 pounds of VOM per eight hour shift, in comparison to a manual spray gun which emits an estimated 14.03 pounds of VOM per eight hour shift. (Am.Pet. at 7; TSD at 8-9; Tr. at 34-35.) These calculations for VOM emissions were based on material usage observations comparing adhesive usage by auto-spray machines and manual spray guns over a one week period.

## COMPLIANCE ALTERNATIVES

To achieve compliance with the 25 ton RACT rules, Solar investigated: (1) reformulation of adhesives; (2) water-based adhesives; (3) alternatives to adhesives; and (4) catalytic oxidation. Each alternative compliance method is discussed below.

Reformulation of Adhesives. Early on, Solar began investigating reformulating the adhesives. Initially, reformulation allowed Solar to reduce the VOM content in the adhesive most widely used from 6.02 to 5.49 pounds per gallon, raising the percent of solids from 20 percent to 30 percent. Further reduction could not be achieved without increasing the solids content to 50 per cent, which would result in an adhesive so viscous that it could not be applied with either the manual gun or auto-spray. Solar also investigated substituting acetone for either toluene or methylene ketone; neither was technically feasible because satisfactory bonding of the fabric to the plastic substrate could not occur without either volatile component. (TSD at 1-11; Tr. 30-32; Am.Pet. at 9.)

Water-Based Adhesives. Solar currently uses two water-based adhesives. Investigations began in 1987 into water-based adhesives, resulted in Solar being able to replace a two-component solvent-based adhesive with a water-based adhesive, thereby reducing emissions associated with adhesives by at least

10 percent. This water-based adhesive is applied using a laminating process, which only works well with flat, two dimensional surfaces. (Tr. at 50-15.)

The second type of water-based adhesive is used to apply vinyl to a plastic substrate in Solar's vacuum-forming process. Solar anticipates that two to three percent of its production in 1996 will involve this process. (Tr. at 49.) This glue has a reportable VOM content of 1.88 pounds per gallon, compared to the glue formerly used which had approximately 84 percent methylene ketone, which represents approximately six pounds per gallon of VOM.

Adhesiveless Processes. Solar also investigated alternatives to adhesives, conducting test trials with sonic welding and a heat plate. Sonic welding proved unsatisfactory for technical and economic reasons. Technically, sonic welding only works if the plastic edges are joined at 90 degree angles. Many of the plastic parts are not flat, and therefore cannot be welded in that manner. (Tr. at 58-61.) The capital cost for 10 sonic welding machines was estimated at \$750,000, with operating (retooling) costs of \$500,000 for a total of \$1,250,000. Retooling would have to occur on an annual basis since the products produced by Solar's customers change year to year. (TSD p.13, Am.Pet. p.11.) At hearing, Miller lowered that estimate to \$1 Million based upon an estimate of \$3,600 per new nest, i.e., retooling, for a total of \$360,000 in annual retooling costs plus the \$750,000 in capital costs. (Tr. at 63.)

Solar also investigated and now uses a heat plate to bond cloth to plastic, which is an adhesiveless process. For this process to be feasible, the plastic part must have sufficient cross section to withstand the heat generated in bonding. Currently, Solar uses this process for approximately 20 per cent of the fabric covered plastic parts. Since this process uses no adhesives, the VOM formerly emitted in applying the fabric to these plastic parts is reduced to zero. (Tr. at 52-54.)

Catalytic Oxidation. Solar also investigated catalytic oxidation as add-on controls as a means of achieving 81 per cent capture and control of VOM emissions from the manual spray booths and auto-spray machines. The estimated costs were \$25,000 and \$10,000 per ton for the manual spray guns and auto-spray machines, respectively. Solar believes these costs to be economically unreasonable.

In sum, Solar has designed and purchased new processes, products and equipment to reduce its VOM emissions, even before Subpart PP became applicable to the Libertyville facility. Solar has investigated reformulated adhesives. In 1989, Solar replaced one of the adhesives frequently used, that had a VOM content of

6.02 pounds per gallon, with a higher solids adhesive that has only 5.49 pounds per gallon of VOM. (TSD p. at 11; Am.Pet. at p.12.) Also, where feasible, Solar has replaced high VOM content adhesives with water-based adhesives, which contain virtually no VOM. It has automated its spraying operations to the maximum extent possible to date, and switched to a heat plate process for bonding fabric to 20 percent of the fabric covered plastic parts it produces, eliminating VOM emissions entirely from that portion of its production.

In a comparison of adhesive used in 1993 and 1994, two years in which the amount of Solar's business was relatively the same, Solar used approximately 2,000 gallons less of adhesives in the latter year. Solar attributes that reduction for the most part to the heat plate process and, in lesser part, to an increased use in the auto-spray machines over the manual spray guns. (Tr. at 74-89.) Solar believes that the measures taken by it over the years to research, develop and implement alternative technologies and adhesives represent all that is technically feasible and economically reasonable at this time. They also represent a commitment by Solar to aggressively investigate and implement processes which reduce the amount of VOM emitted by their operations.

#### HEALTH AND ENVIRONMENTAL EFFECTS

The petitioners assert that the impact to general air quality will be insignificant based upon the emission data of VOM from the adhesives used by Solar and that the requested adjusted standard will have no adverse impact on health or the environment.

With respect to air quality, Solar estimates the maximum VOM emissions per day will be significantly less than one ton per day should it receive the requested adjusted standard<sup>1</sup>. Based upon the Agency's total daily emission of VOM from all sources in Lake County at 113.62 tons, Solar's contribution given the requested relief will be significantly less than one percent of the total daily VOM emissions in Lake County. (TSD at 14.) Based upon its

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<sup>1</sup>Solar made this representation at a time that it was requesting an adjusted standard which would have allowed it to use a "specialty adhesive" with an emission limit of 8.2 pounds per gallon. That request was subsequently withdrawn because Solar learned that the solvent in this adhesive, methylene chloride was not defined as a VOM. Solar never quantified how much of its daily VOM emissions were attributable to this specialty adhesive, but attributed .84 tpy to the specialty adhesive. Since the daily effect is something less than that represented in the Amended Petition, the Board will rely upon Solar's annual representations primarily when assessing the environmental impact of the requested adjusted standard.

1993 adhesive usage, Solar estimates that the total VOM emissions will be 45.72 tpy. If Solar were to comply with Subpart PP using adhesives with a maximum VOM content of 3.5 pounds per gallon, the result would be VOM emissions of 28 tpy, as compared to the 1993 47.5 tpy. The difference is approximately 20 tpy or 0.054 tons per day, which Solar contends would have no quantifiable effect on ambient ozone levels in the Chicago area ozone non-attainment area. (Am.Pet. at 16.)

With respect to other impacts on the environment, Solar explained that its solid waste generation will remain the same whether it complies with Subpart PP or the proposed adjusted standard. However, Solar explained that the proposed adjusted standard will result in lower energy usage and costs. Since no compliant adhesives are available, Solar would have to attempt compliance using the 81 percent capture and control compliance alternative. While the result would be a very dilute VOM concentration in the exhaust stream, this compliance alternative would require using large amounts of natural gas to provide sufficient heat for adequate VOM destruction, assuming that this air stream could in fact be captured. (TSD at 13; Am.Pet. at 16.)

At hearing, the Agency stated its conclusion that the hardship resulting from the denial of the adjusted standard would outweigh any environmental impact from the grant of the relief requested. (Tr. at 101.)

#### CONSISTENCY WITH FEDERAL LAW

The petitioners assert that the proposed adjusted standard would be consistent with federal law. They assert that the proposed alternative standard constitutes RACT for the Libertyville facility, and is therefore consistent with the federal Clean Air Act. (Am. Pet. at 17.) Solar notes that should the adjusted standard be granted by the Board, it will be submitted as a SIP revision as the RACT rule specific to Solar, thus comporting with federal procedural requirements.

#### CONCLUSION

The Board finds that the joint petitioners have demonstrated that an adjusted standard is appropriate for the Solar facility in Libertyville, Illinois. They have demonstrated that no other technologies or alternative adhesives, other than those currently in use, are available at this time which are technologically feasible and economically reasonable for Solar's manufacturing process. Furthermore, they have presented proof adequate to support the following findings by the Board on the criteria set out Section 28.1(c) of the Act.

Solar did not participate in the R93-14 rulemaking which contains the technical support justifying RACT for adhesives. However, as Solar pointed out, that record did not contain specific technical support about the application of fabric to plastic parts. Solar explained that it did not participate in that rulemaking because it believed that its research and development efforts would allow it to achieve compliance with Subpart PP. Instead, through diligent research and development efforts Solar has achieved reductions in its VOM emissions and is using technology and adhesives which represent RACT for its manufacturing operation. We find that this evidence demonstrates that factors relating to Solar's operations are substantially and significantly different from those relied upon by the Board in adopting the rule of general applicability, and that these factors warrant the granting of an adjusted standard.

We further find that the evidence presented by Solar concerning its VOM emissions and the impact on air quality and other aspects of the environment demonstrates that the proposed alternative standard will not impact human health or the environment substantially or significantly more adversely than the effects considered by the Board in adopting Subpart PP in the R93-14 rulemaking. Finally, petitioners have demonstrated that the proposed alternative standard will be consistent with federal law. Accordingly, the proposed adjusted standard is granted, subject to conditions suggested by the joint petitioners.

This opinion constitutes the Board's findings of fact and conclusions of law in this matter.

#### ORDER

Solar is hereby granted an adjusted standard from the control requirements found at 35 Ill. Adm. Code 218.Subpart PP for its facility located at 100 Solar Drive in Libertyville Township, Lake County, Illinois, subject to the following provisions and conditions:

- 1) The emission limitation of VOM for the adhesive applied for joining fabric to plastic parts at sources subject to this adjusted standard is:

	<u>kg/l</u>	<u>lb/gal</u>
Adhesive	0.69	(5.75)

- 2) The above emission limitation is expressed in units of VOM per volume of adhesive (minus water and any compounds which are specifically exempted from the definition of VOM) as applied by each adhesive applicator. Compounds which are specifically exempted

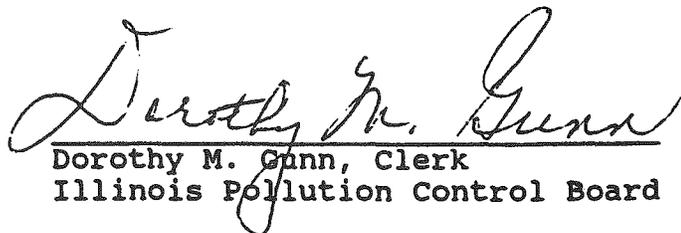
from the definition of VOM shall be treated as water for the purpose of calculating the "less water" part of the coating composition.

- 3) Compliance with this adjusted standard must be demonstrated through the applicable coating analysis test methods and procedures specified at 35 Ill. Adm. Code 218.105(a) and the recordkeeping and reporting requirements specified at 35 Ill. Adm. Code 218.211(c).
- 4) Solar shall continue its research and development efforts regarding alternatives to solvents-based adhesives and will utilize such alternatives as they become available, if and when they are technically feasible and economically reasonable.

IT IS SO ORDERED.

Section 41 of the Environmental Protection Act (415 ILCS 5/41 (1994) provides for the appeal of final Board orders within 35 days of the date of service of this order. The Rules of the Supreme Court of Illinois establish filing requirements. (See also 35 Ill. Adm. Code 101.246 "Motions for Reconsideration".)

I, Dorothy Gunn, Clerk of the Illinois Pollution Control Board, hereby certify that the above opinion and order was adopted on the 20<sup>th</sup> day of July, 1995, by a vote of 6-0.

  
Dorothy M. Gunn, Clerk  
Illinois Pollution Control Board