Printing Industry of Illinois/Indiana Association

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June 30, 2005

Pollution Control Board
Dorothy Gunn, Clerk
JRTC
100 W. Randolph Street, Suite 11-500
Chicago, Illinois 60601

Dockets: R04-12/R04-20

Dear Ms. Gunn:

These comments are in response to the proposed Clean-up Part III Amendments to 35 Ill. Adm. Code Parts 211, 218, and 219 that were published in the May 27, 2005 issue of the *Illinois Register*. After having the opportunity to review the proposed amendments and in light of a recent interpretation by the Illinois EPA regarding the regulatory status of varnish and other coatings used as part of the commercial printing process, the Printing Industry of Illinois/Indiana Association (PII) is submitting the following comments.

As background, the PII represents the commercial printing industry in the states of Illinois and Indiana. Printing is one of the largest manufacturing industries in Illinois, comprising at least 2,775 printers with over 80,000 employees. Approximately 80% of the establishments have 20 or fewer full time employees, making the printing industry a prime example of small business manufacturing.

Of the 2,775 establishments, about 60% utilize the offset lithographic printing process. The three main forms of offset lithography are sheetfed, heatset web, and nonheatset web. Although all three use a planographic plate to deliver an inked image to the substrate (which differentiates lithography from the other printing processes), they differ in the feed, delivery, and ink drying mechanisms.

The PII is very concerned about the regulatory requirements for coatings applied in the lithographic printing process as proposed in the changes to 35 Ill. Adm. Code Parts 218 and 219. In addition, a recent situation arose where the Illinois EPA has interpreted the existing requirements regarding how such coatings should be classified and regulated. The attached letter, describing the situation in detail, was submitted to Illinois EPA on May 27, 2005.

This May 27, 2005 letter highlights the issue associated with varnish and coatings in general and offers several suggestions for alternative interpretations. While a formal response has not been issued by Illinois EPA, the opportunity to revise the paper coating regulations found at 35 IAC 218.204 and 219.204 should provide the essential and necessary clarification on this critical issue.

As indicated in the attached letter, there are currently inconsistencies between the attainment and nonattainment rules as they apply to coatings. The Illinois EPA has offered no rationale for these significant differences. The proposed changes to the coating rules will broaden the inconsistencies and further add to the confusion. These inconsistencies have led to differences in the development of terms and conditions that have been included in construction and operating permits issued to printers, indicating that the Agency itself has inconsistently interpreted and applied the nonattainment area paper coating regulations.

The attainment area coating regulations contain a Board note in Section 215.204(c) that the paper coating VOM limitations do not apply to equipment that is used for both printing and paper coating. Therefore, a lithographic (or flexographic or gravure) printing press that prints and applies varnish or other coatings is not subject to the paper coating rule. In contrast, the nonattainment regulations in Sections 218.204(c) and 219.204(c) each contain a note similar to that included in Section 215.204(c), except, for some reason, it excludes only paper coating lines on which printing is performed if the paper coating lines comply with the limitations of Sections 218.401 or 219.401, Flexographic and Rotogravure Printing. As noted in the attached May 27, 2005 letter, this exclusion in Sections 218.204(c) and 219.204(c) has on numerous occasions been interpreted by Illinois EPA permit writers to cover all printing processes, not just flexography and rotogravure.

This slight difference in the applicability criteria (and the Illinois EPA's recent interpretation of this note) results in lithographic operations where coatings are also applied potentially being subject to two sets of regulatory requirements for a single piece of equipment – the lithographic printing requirements of Subpart H and the coating requirements of Subpart F of Sections 218 or 219. This dual regulation of a single process cannot be justified based on the materials that are employed as coatings in lithographic printing nor is it consistent with the Illinois EPA's position as expressed by Charles Matoesian during the hearings on this proposed rulemaking that, "The amendments generally clarify existing regulatory provisions with the goal of *reducing the burdens and of affording additional flexibility* in demonstrating compliance". (Transcript of May 6, 2004 Pollution Control Board hearing, page 6, emphasis added.) In fact, the proposed revision to the note in Sections 218.204(c) and 219.204(c) will *increase the burden and reduce the flexibility* of lithographers in demonstrating compliance by imposing a second set of requirements on their operations beyond those specifically called for in Subpart H.

It is not apparent either in the original rule or in the proposed rule and summary of testimony and public comments from the first proposal, why coatings applied inline on lithographic printing presses should be regulated differently from those applied via the other printing processes. In fact, it is not clear from the examples in the definition in 35 IAC 211.4470 that it was ever intended that the application of a varnish in printing operations was ever to be considered as "paper coating" for purposes of these regulations. In addition, the coatings applied on lithographic presses are not so unique as to require special treatment under the regulations. As noted in the attached May 27, 2005 letter, the varnishes used in lithographic printing are essentially unpigmented inks. Other coatings used by lithographers include UV-cured, which contain virtually no VOM, and low -VOM content aqueous coatings, which contain minimal VOM and would fall below the applicable VOM content limits for paper coatings in Sections 218.204(c) and 219.204(c).

The differences between the attainment and nonattainment rules and the proposed changes to the notes in Sections 218.204(c) and 219.204(c) do not clarify the applicability of the regulations and pose a significant challenge in terms of compliance for the lithographic printer. Even though

lithographic printing lines are not currently included in the notes for Sections 218.204(c) and 219.204(c), we believe the classification of printing lines that apply inks and coatings as being subject to the printing rules only, and not the coating rules, would be more consistent with the intent of the regulation.

The PII requests that the Board reconsider the proposed applicability of paper coating to lithographic printing lines and revise the notes in Sections 218.204(c) and 219.204(c) to provide consistency between the RACT regulations for the nonattainment areas and the corresponding regulations for the attainment areas of Illinois.

Specifically, the note in Section 218.204(c) (and the corresponding note in Section 219.204(c)) needs to be revised as follows:

> *The paper coating limitation shall not apply to any owner or operator of any equipment on which both printing and coating are performed if the equipment complies with the applicable emission limits in Subpart H, Sections 218.401 through 218.411. In addition, screen printing on paper is not regulated as paper coating, but is regulated under Subpart TT of this Part.*

Summary and Conclusion

In examining the definitions and regulations that cover printing and paper coating activities, there are several aspects that are overlapping, conflicting and confusing and have led the Illinois EPA to inconsistently interpret these requirements and have resulted in the issuance of multiple permits with inconsistent applicability of the paper coating requirements to printing lines.

The composition of materials, method of application and definition of a printing line all indicate that printing lines applying both inks and coatings are appropriately regulated only as printing lines and should not be subject to the paper coating requirements. The Board and Illinois EPA now have the opportunity to revise the regulations to clarify the applicability of the coating regulations so that small business can readily understand and meet its compliance obligations.

If you have any questions or concerns regarding the recommendations, please feel free to contact me at (312) 580-3032.

Sincerely,

Joanne Rock
Executive Vice President
Printing Industry of Illinois/Indiana Association

Att.

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May 27, 2005

Mr. David Bloomberg
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Dear Mr. Bloomberg:

My thanks to you and Robert Bernoteit for taking the time on April 27, 2005, to discuss the Illinois EPA's position on the regulatory requirements under 35 IAC 218 and 219 Subparts F and H for varnish and other coatings when applied to printed materials. This letter is a follow up to our conversation and provides additional information regarding the use and application of coatings and varnishes in the printing industry and our recommendations for regulatory applicability. The principal goal of this letter is to develop a consistent approach to the regulation of varnish and other coatings used in all printing processes.

Based on our conversation, additional information on the terminology associated with varnishes and their drying mechanism needs to be provided so that the Illinois EPA can make an informed decision on this critical issue. Therefore, it is necessary to review the definitions and concepts regarding offset lithographic varnishes and offset lithographic inks.

The focus of this letter is on the varnish used on sheetfed and heatset web offset lithographic printing presses. Varnishes used by heatset web offset lithographic printers are applied to the substrate prior to the dryer and the ink oil is subsequently evaporated and typically ducted to an add-on control device. Per our conversation, this scenario is considered an acceptable compliance approach under 35 IAC 218.207(b). Due to the composition of varnish, in that it is essentially ink without pigment; EPA's policy on capture testing for heatset web offset lithographic presses would apply. According to EPA's policy, only negative air pressure flow to the dryer is required to demonstrate 100% capture of the ink oil.

Varnish Composition and VOM Emissions

The first concept that needs to be addressed is how the term "varnish" is used in the printing industry. Varnish is a generic term for a material that is used either as a component of ink or as a stand-alone material that is applied to a surface of the substrate. The varnish is usually used to

impart two important characteristics to the finished product. It may be used to protect the surface of the printed film and/or provide a finish (e.g., gloss, matte, or semi-gloss) on either printed or unprinted parts of the substrate. It can also be used to convey text and images to provide a unique graphic communication piece.

Varnish is either applied over the entire printed area or only a portion of it. When varnish is applied over the entire printed portion of the substrate, it is referred to as a "flood coat". However, even when a "flood coat" is applied, it is important to understand that the coating is not applied over the entire length or width of the substrate. When the varnish is applied to only a portion of the printed area, it is referred to as a "spot coat."

A further distinction for varnishes is made in the method of application. Varnishes are applied through an existing printing unit. Typically, the last unit of the lithographic press is used to apply the varnish. The method of application usually involves using a lithographic plate, which is identical to the method in which printing ink is applied.

In examining the formulation of a varnish and a sheetfed offset lithographic ink, it can be seen that they are virtually identical, except that varnish contains no pigments or is without a distinctive color. The table below depicts would-be examples of a typical overprint varnish and sheetfed offset lithographic ink formulation:

Sheetfed Overprint Varnish		**Sheetfed Offset Ink**	
%	Component	%	Component
0	Pigment	10-15	Pigment
35-40	Resin – Acid Modified Rosin Ester	31-34	Resin – Acid Modified Rosin Ester
8-10	Resin - C-9 Neutral Hydrocarbon	7-8.5	Resin - C-9 Neutral Hydrocarbon
6-8	Resin - Linseed Oil Based Alkyd	5-7	Resin - Linseed Oil Based Alkyd
8-10	Drying Oil - Tung Oil	7-8.5	Drying Oil - Tung Oil
10-15	Drying Oil - Linseed Oil	9-13	Drying Oil - Linseed Oil
20-25	Ink Oil - Petroleum Distillate	20-25	Ink Oil - Petroleum Distillate
2-3	Wax-Polyethylene wax	2-3	Wax-Polyethylene wax
0.7-1.3	Mist Control-Oxy Aluminum Octoate	0.7-1.3	Mist Control-Oxy Aluminum Octoate
1.5	Drier – Cobalt Naphthate	1.5	Drier – Cobalt Naphthate
1.5	Drier – Manganese Naphthate	1.5	Drier – Manganese Naphthate

In terms of VOM content and VOM emissions, ink oils account for virtually all of the VOM that is found in offset lithographic printing inks. The ink oil is composed principally of high boiling paraffinic and naphthenic fractions of a petroleum distillate. These oils possess a vapor pressure of less than 0.1 mm Hg at 70^{o}F. Petroleum-based sheetfed ink oils usually have initial boiling points greater than 500^{o}F and boiling ranges extending up to 800^{o}F. Vegetable-based ink oils can be composed of a number of oils, of which soya is the most common. Other oils are tung, linseed, corn, safflower, canola, castor, coconut, cottonseed, sunflower, and veronia. They do not have a measurable vapor pressure at room temperature and their boiling points cannot be measured at atmospheric pressure. The vegetable oils will decompose (discoloration, charring, and ultimately the evolution of smoke) before they can actually boil. The VOM content of varnishes can range from a low of 10% to as high as 45% by weight.

Due to the physical characteristics of the petroleum ink oils and the drying mechanism of the sheetfed ink and varnish, a high percentage of the ink oil does not evaporate and remains with

the print throughout its life. EPA has granted a 95% retention or 5% emission factor for sheetfed offset lithographic inks. The 95% retention factor has been incorporated into the Illinois RACT rules at 35 IAC 218.411(a)(1)(B)(iii) and has also been incorporated into many of the air permits issued to printers by the Illinois EPA.

The same 95% retention factor should apply to a varnish since its drying mechanism is identical to sheetfed offset lithographic inks. These inks dry by a combination of penetration and oxidation. The oxidation process is aided via cobalt and manganese catalysts. When a sheetfed offset lithographic ink or varnish is applied to the paper, the nondrying ink oils quickly absorb into the paper, allowing the remaining portions of the ink to remain on the surface and begin the drying process. The absorption of the ink oil into the substrate increases the viscosity of the remaining portion of the ink and leads to fairly rapid setting of the ink. Drying of the ink film does not occur until several hours to several days later through an oxidative polymerization reaction where oxygen from the air reacts with sites on the drying oils and resins to form a hard film protecting the pigment.

Based on the nearly identical composition and properties of varnishes and inks, we see no reason that they should be treated separately when applied to the same substrate on the same piece of equipment. We suggest that the Illinois EPA reconsider its proposal to narrow the exemption of printing operations from the paper coating requirements of 35 IAC 218.204(c) to only the flexographic and gravure printing operations of 35 IAC 218.401 and, rather, extend it to all printing and publishing processes included in Subpart H. Based on numerous Illinois EPA-issued air permits (see below), it is obvious that this is how many agency permit writers have interpreted this exemption since the RACT rules were adopted.

Air Permits For Printing Operations

A preliminary review of permits for the Chicago non-attainment area in SIC 27 has revealed an inconsistent application of the paper coating regulations to printing operations. The EPA Region V permit database for Illinois contains 146 entries for permits issued to facilities in SIC 27 in the Chicago non-attainment area. Excluding those entries for draft permits, where no permit was included in the database, or operations where there are no actual printing processes, leaves 133 permits issued to gravure, flexographic and lithographic printing operations. Of these 133 permits, there are total of 78 unique Title V, FESOP and Construction permits (excluding renewals and administrative amendments) for printers. Of this total, 35 include heatset lithographic printing, 44 address nonheatset lithography, seven have been issued for gravure printers and 12 permits have been issued for flexographic printing. As we discussed, the applicability of 35 IAC 218.204(c) to these permitted facilities has varied widely, as follows:

- For the 35 heatset lithographic printing permits, 12 permits (34%) explicitly state that the paper coating regulations of 35 IAC 218.204(c) do ***not*** apply, seven permits contain some reference to coating materials with no statement as to the applicability of the paper coating regulations, 12 permits contain no reference to either coatings or the paper coating requirements and only four permits (11%) contain a statement that 35 IAC 218.204(c) is an applicable requirement.

- For the 44 nonheatset lithographic printing permits, three permits explicitly state that the paper coating regulations of 35 IAC 218.204(c) do not apply, ten permits contain some reference to coating materials with no statement as to the applicability of the paper coating regulations, 18 permits contain no reference to either coatings or the paper

coating requirements and only 13 permits (30%) contain a statement that 35 IAC 218.204(c) is an applicable requirement.

- For the seven gravure printing permits, three permits explicitly state that the paper coating regulations of 35 IAC 218.204(c) do not apply, two permits contain some reference to coating materials with no statement as to the applicability of the paper coating regulations, and two permits contain no reference to either coating materials or the paper coating requirements. No permits contain a statement that 35 IAC 218.204(c) is an applicable requirement.

- For the 12 flexographic printing permits, two permits explicitly state that the paper coating regulations of 35 IAC 218.204(c) do not apply, five permits contain some reference to coating materials with no statement as to the applicability of the paper coating regulations, and four permits contain no reference to either coatings or the paper coating requirements. Surprisingly, one permit contains a statement that 35 IAC 218.204(c) is an applicable requirement.

Of these 98 processes covered in the 78 unique permits, only 38 (39%) actually address the applicability of the paper coating operations to lithographic, flexographic or gravure printing operations. Another 24 permits include a reference to coating materials without addressing the applicability of the coating regulations and the remaining 36 permits (37%) contain no mention of coating operations whatsoever. Based on our knowledge of printing operations, the fact that 37% of the permits do not include any references to coatings does not necessarily mean that coatings are not being applied on these presses.

This preliminary analysis clearly indicates an inconsistent application of the regulations and that clarification is necessary. This is especially a concern in that 36 of these 78 permits (46%) are FESOPs and 28 (36%) are Title V permits with the remainder being construction permits that will eventually be consolidated into operating permits. Since one of the primary means by which a printer determines compliance status is by documenting compliance with the terms and conditions of a FESOP or Title V permit, the inconsistent applicability of the coating requirements to printers creates a significant opportunity for permit ***compliance*** that may result in regulatory ***noncompliance***.

As noted above, it is obvious from this analysis that many agency permit writers have interpreted the paper coating regulations to provide lithographers an exemption from the coating requirements since the RACT rules were adopted. Not only is the proposed narrowing of the exemption language unnecessary, it may result in large numbers of printers in the Chicago area being forced to modify their processes and/or materials to comply with what will be, for them, a new applicable requiem.

<u>Analysis of Definitions and Regulations</u>

In examining the applicable regulations for coatings and printing operations, it can be seen that there are confusing, conflicting and overlapping requirements regarding the regulation of varnishes. The two important questions that need to be answered are (1) whether or not varnish applied on a printing line makes that line subject to the paper coating requirements and (2) what regulations apply to this process.

Regarding the first question, it is critical to understand that, as noted above, varnish is essentially ink without pigment. It is applied by the same equipment to the same substrate and dries in the

same manner as ink. It is not always used as a varnish nor is it applied to all printed sheets. It is typically only applied to a portion of a sheet and does not cover the entire surface of the substrate. Based on how varnish is used, it appears that it would meet the definition of both *ink* and *coating*.

Furthermore, the regulatory definitions of *ink* and *printing line* make no distinction between inks and coatings and that one or more coatings can be applied on a printing line. Since a varnish is an unpigmented ink and is applied using the lithographic printing process, its use on a lithographic printing line should not transform the printing line into a coating line subject to an entirely new set of requirements any more than the application of a coating on a flexographic or gravure press requires that these printing lines meet the paper coating regulations. Therefore, even though varnish can be used as a protective film over certain portions of a printed film, it should be considered an ink and not a paper coating.

In looking at the regulations for the attainment areas of Illinois, it is clear that the intent of the regulations is to have any printing line that applies coating be regulated as a printing line and not a paper coating line. Section 215.204(c) contains a note that the paper coating VOM limitations do not apply to equipment that is used for both printing and paper coating. Therefore, a lithographic (or flexographic or gravure) printing press that prints and applies a varnish is not subject to this rule.

Section 218.204(c) also contains a note similar to that included in Section 215.204(c), except that, for some reason, it only addresses those printing lines subject to Section 218.401, Flexographic and Rotogravure Printing. Even though lithographic printing lines are not included in the note, the classification of printing lines that apply inks and coatings as being subject to the printing rules and not the coating rules would be more consistent with the intent of the regulation.

We request that the Illinois EPA reconsider the applicability of paper coating to lithographic printing lines to bring the RACT regulations into line with the regulations for the attainment areas of Illinois.

<u>Recommendations</u>

The following are several options that we ask the Illinois EPA consider as being applicable to printing operations where varnishes are applied as part of the printing lines:

- Exclude varnishes from regulation under Sections 218.204(c) and 219.204(c), as has been done under Section 215.204(c). Since a printing line is defined to include printing and coating, meeting the requirements in Sections 218.407 and 219.407 for fountain solution and cleaning solvents satisfies all applicable requirements under the lithographic RACT rules. As there are no VOM limits for inks under these requirements, there is no reason that the similar coatings used on these presses should be subject to significantly more stringent limitation. As noted above, inks and varnishes used in sheetfed offset lithographic presses are not a significant source of VOM emissions due to the high retention of the ink oils.

- Apply the 15 pounds per day emissions exemption limit contain in Sections 218.208 and 219.208 to the varnish that is applied. Since the inks are already addressed under Sections 218.407 and 219.407, the varnish is the only material that would be potentially subject to the coating regulation. Unfortunately, this exemption requires ***daily*** records per the

requirements of Section 218.211(b)(3), which imposes a significant burden on small sources with minimal emissions. Since it would require the application of 1,000 pounds of coating with a 30% VOM content to exceed the 15 pound per day threshold, very few, if any, printers are likely to exceed this threshold. A simplified method of documenting that actual emissions remain below 15 pounds per day, similar to the methodology for documenting that actual emissions from lithographic printing operations are less than 100 pounds per day in Section 218.411 (a)(1)(B), using monthly data to calculate an average dally emission rate could provide a less burdensome approach to demonstrating that the exemption applies.

- Apply the VOM limit in Sections 218.204(c), and 219.204(c) to the emissions from the varnishes. The applicability statements for these sections contain the phrase "…no owner or operator of a coating line shall apply at any time any coating in which the **VOM content** exceeds the following **emission limitations** for the specified coating." It would appear that the limits in the regulation are based on the assumption that all of the VOM in the coating evaporates. Although this may be true for paper coatings formulated with high volatility VOM solvents as noted above, due to the low volatility and high retention of the ink oils, this is not the case for varnishes used in lithography. Since only 5% of the VOM in the varnish actually evaporates, *any* lithographic varnish formulated with ink oils will have emissions less than 2.3 pounds per gallon applied.

- Perform daily weighted averaging under Sections 218.205(a) and Section 219.205(a) and aggregation under Section 217.207 which allows for a daily weighted average approach to demonstrate compliance with the VOM content limitation. For example, a facility using a varnish that exceeds the VOM content limit and also uses other varnishes below the limit, could comply with a daily weighted average. Since products used in the daily weighted average would have to be of the same type and since varnishes are pigments without inks, they should be averaged with inks. Unfortunately, this exemption requires ***daily*** records per the requirements of Section 218.211(d), which imposes a significant burden on small sources with minimal emissions. A simplified method of documenting that actual emissions remain below 15 pounds per day, similar to the methodology for documenting that actual emissions from lithographic printing operations are less than 100 pounds per day in Section 218.411 (a)(1)(B), using monthly data to calculate an average dally emission rate could provide a less burdensome approach to demonstrating that the exemption applies.

Summary and Conclusion

In examining the definitions and regulations that cover printing and paper coating activities, there are several aspects that are overlapping, conflicting and confusing and have led the Illinois EPA to issue multiple permits that exempt printing lines from the paper coating requirements. Based on the minimal emissions anticipated from lithographic printing operations that apply coatings, regulation of these processes as paper coating operations appears unwarranted.

The composition of materials, method of application and definition of a printing line all indicate that printing lines applying inks and varnishes are appropriately regulated as printing lines and should not be subject to the paper coating requirements. We strongly support this approach and suggest that the Illinois EPA take the necessary steps to revise the regulatory requirements or issue guidance that clarifies this applicability. Short of that, there are several provisions within the coating regulations themselves that, with minor modification or guidance, would allow for the use of varnishes with VOM contents that exceed the specified limits of Section 218.204(c) to

be addressed so that printers could use these materials with limited recordkeeping and other compliance requirements.

If you have any questions or concerns regarding the recommendations, please feel free to contact me at (312) 580-3032.

Sincerely,

Joanne Rock
Interim President and CEO
Printing Industry of Illinois and Indiana Association