BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

IN THE MATTER OF:	)	
	)	
Petition of Royal Fiberglass Pools, Inc.	)	AS 2009-04
for an Adjusted Standard from	)	(Adjusted Standard)
35 IAC § 215.301	)	

FIRST AMENDED PETITION FOR AN ADJUSTED STANDARD

Royal Fiberglass Pools, Inc. ("Royal"), through its attorneys, Bryan Cave LLP, and pursuant to 35 Ill. Adm. Code § 104.400 et seq., submits this First Amended Petition For An Adjusted Standard ("First Amended Petition") to the Illinois Pollution Control Board ("IPCB"), seeking an adjusted standard from 35 Ill. Adm. Code §215.301 (commonly known as the "8 lb/hr Rule") as it applies to the emissions of volatile organic material ("VOM") at Royal's Dix, Illinois swimming pool manufacturing facility. This First Amended Petition For An Adjusted Standard shall replace in its entirety Royal's original Petition For An Adjusted Standard filed on March 31, 2009. In addition, Royal is replacing in its entirety the Technical Document which supported the Royal's original Petition with the Technical Document Supporting This First Amended Petition which is attached hereto, incorporated herein, and filed contemporaneously. This First Amended Petition does not seek a substantive change to the relief sought by Royal in its original Petition, therefore, pursuant to 35 Ill. Adm. Code § 104.418, Royal does not plan to re-notice this First Amended Petition.

I. BACKGROUND

Royal operates a fiberglass pool manufacturing facility located at 312 Duncan Road, Dix, Illinois (the "Dix Plant"). The facility has one large production building in which composite pool manufacturing occurs inside three self-contained rooms, which are called "bays," that are located inside the plant building. Most of the pool production occurs in the two main bays (Bay 1 and Bay 2), but pool finishing, part repair, and some occasional small pool production occurs in the third bay. All three bays are connected to a common exhaust ventilation system. The production bays utilize an approximate 35,000-cfm cross-flow ventilation system that exhausts air from the work areas to the outside atmosphere through a 36 inch diameter, 36 foot tall vertical discharge stack in order to control worker exposure to styrene.

Royal has always strived to comply with environmental and other regulations that apply to operations at the Dix Plant and, until recently, has been able to demonstrate compliance with such rules. In keeping with its desire to comply with applicable rules, in November of 2004, Royal submitted an application for a Clean Air Act Permits Program ("CAAPP") operating permit from the Illinois Environmental Protection Agency ("Illinois EPA").[1/] To date, a permit has not been issued. Royal is aware that Illinois EPA has rejected the use of averaging to demonstrate compliance with the 8 lb/hr Rule. The Illinois EPA has stated that the 8 lb/hr Rule

[1/] On July 14, 2009, Royal submitted to Illinois EPA a modification to its CAAPP permit application.

specifies a maximum hourly emission rate and, therefore, compliance with the rule would need to be demonstrated on a strict hourly basis, not on an average from any longer time period.

On January 10, 2006, the Illinois EPA issued Violation Notice A-2005-00281 to Royal. After receipt of this Notice, representatives of Royal met with Illinois EPA in person and also corresponded with Illinois EPA regarding the notice. As part of these communications, Royal provided a significant amount of information to Illinois EPA regarding the Dix Plant and the relevant industry. With assistance from its environmental consultant, Engineering Environmental Consulting Services ("EECS"), Royal computed the VOM emitted during the manufacture of the various pools Royal constructs. Royal discovered that, based on Illinois EPA's strict hourly interpretation of demonstrating compliance, the hourly VOM emissions from certain of its operations (gelcoat and resin application) did not appear to comply with IEPA's interpretation of the 8 lb/hr Rule.

After carefully examining its options for add-on controls and/or for changing manufacturing methods/equipment to reduce Royal's levels of hourly VOM emissions, Royal realized that the cost for compliance via either of these options will neither allow it to remain competitive nor profitable, and will force closure of the Dix Plant. Royal met with Illinois EPA and presented evidence demonstrating why requiring Royal's compliance with the 8 lb/hr Rule on a strict hourly basis is unreasonable. After considering the information presented by Royal, Illinois EPA agreed that applying the 8 lb/hour Rule to Royal's operations on a strict hourly basis would indeed impose an unreasonable burden. Royal and Illinois EPA agreed that Royal would apply for an adjustment from the 8 lb/hr Rule.[2]

Accordingly, Royal offers the following summary of reasons as to why it should receive an adjusted standard with respect to the 8 lb/hr Rule:

- Royal is already subject to National Emission Standard for Hazardous Air Pollutants for reinforced plastic composite manufacturing facilities, found at 40 CFR Part 63 Subpart WWWW (the "Composites MACT"). EPA estimates that the annual cost for a facility to comply with the MACT is $2,800/ton of hazardous air pollutants removed and will reduce styrene emissions by an average of 43%. Royal has been in continuous compliance since the start of operations and is currently in compliance with the MACT emission limits and work practices.

- Technical and regulatory constraints (such as the high air flow needed to ventilate building air in order to comply with OSHA worker health & safety standards) make the cost for Royal to comply with the 8 lb/hr Rule on a strict hourly basis using emission controls unreasonably high.

- The capital costs associated with tail-stack (end-of-pipe) controls for Royal to comply with the 8 lb/hr Rule on a strict hourly basis would amount to approximately $709,500 to

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[2]/ To the extent the IPCB does not grant Royal an adjusted standard pursuant to this Petition, Royal reserves all rights and defenses it may have concerning the application of the 8 lb/hr Rule to Royal's operations, and this Petition shall not act as a waiver of such rights or defenses, nor as an admission of positions taken by Illinois EPA.

install and over $470,000 per year to operate. This equates to approximately $18,400 per ton of pollutant removed.

- Although some alternate methods for manufacturing fiberglass reinforced plastic ("FRP") products exist, none of them can be technically or economically applied to a swimming pool manufacturing operation such as Royal's and none of them will actually allow Royal to fully comply with the 8 lb/hr Rule on a strict hourly basis.

- The high cost of using either end-of-stack emission controls or very expensive alternative production methods (those requiring complete re-tooling and re-design of production methods and procedures), will put Royal at a significant competitive disadvantage. This will result in one of the following scenarios:

  - To remain competitive, Royal will be forced to move to another state which does not have an 8 lb/hr Rule (or any similar limitation); or
  - Royal will eventually be forced out of business because it will not be able to compete for customers due to the high cost of its swimming pools and/or due to the diminished quality/durability of its swimming pools.

- The 8 lb/hr Rule puts Royal at a competitive disadvantage to other swimming pool manufacturers located in states without a similar 8 lb/hr Rule. Royal and its consultant, EECS, are familiar with swimming pool manufacturing facilities in at least seven other states (Tennessee, West Virginia, Florida, Arizona, South Carolina, New York and Louisiana, where Royal's only other manufacturing facility is located), and none of those states have an 8 lb/hr Rule. Royal and its consultant are not familiar with any other swimming pool manufacturing operations within Illinois.

II. 35 ILL. ADM. CODE § 104.406 REQUIREMENTS

A. Standard From Which Relief is Sought -- § 104.406(a)

Royal requests an adjusted standard from 35 Ill. Adm. Code § 215.301 (Use of Organic Material, otherwise known as the "8 lb/hr Rule"). Illinois' organic material emission limitations were originally promulgated as Rule 205 in 1971. Section 215.301 now provides:

> "No person shall cause or allow the discharge of more than 3.6 kg/hr (8 lbs/hr) of organic material into the atmosphere from any emission source, except as provided in Sections 215.302, 215.303, 215.304 and the following exception: If no odor nuisance exists the limitation of this Subpart shall apply only to photochemically reactive material."

35 Ill. Adm. Code § 215.101 states that "the definitions of 35 Ill. Admin. Code 201 and 211 apply to this part." Pursuant to 35 Ill. Adm. Code § 201.102, "emission source" means "any equipment or facility of a type capable of emitting specified air contaminants to the atmosphere." Additionally, § 211.4250(b) defines "organic material" as:

"Any chemical compound of carbon including diluents and thinners which are liquids at standard conditions and which are used as dissolvers, viscosity reducers, or cleaning agents, but excluding methane, acetone, carbon monoxide, carbon dioxide, carbonic acid, metallic carbonic acid, metallic carbide, metallic carbonates, and ammonium carbonate."

B. Nature of the Regulation of General Applicability – Section 104.406(b)

This regulation was promulgated to implement the federal requirements under the Clean Air Act, 42 USC § 7401 et seq.

C. Level of Justification – Section 104.406(c)

The regulation of general applicability from which Royal seeks an adjusted standard does not specify a level of justification for an adjusted standard.

D. Facility and Process Description – Section 104.406(d)

Royal operates a fiberglass swimming pool manufacturing facility in Dix, Illinois. Royal manufactures twenty different models of fiberglass pools, ranging from 12' wide × 16' long × 3' 10" deep to 17' wide × 40' 6" long × 8' deep. The Dix Plant began operations in the early 1990s and during peak season employs approximately twenty individuals plus another five to ten contract haulers. Additional information regarding Royal's history and operations (including photographs and maps showing its location) are set forth Section 1 of the attached Technical Document.

The CAAPP permit application submitted to Illinois EPA in November 2004 requested a maximum facility-wide annual production cap of 400 pools per year, which corresponds to full production (two pools per day) in spring, summer and fall. This same facility-wide annual production cap of 400 pools per year is also included in Royal's modification to its permit application filed on July 14, 2009.

Composite Pool Manufacturing Procedure. The composite pool manufacturing at the Dix Plant consists of three basic process steps, all of which emit VOMs and would be subject to the requested adjusted standard:

1. **Gelcoat application.** Either a thin layer of white gelcoat or two layers (one of which is translucent gelcoat and the other is regular production gelcoat) is applied to each bare waxed pool mold with a Magnum Venus Products ("MVP") high-volume low-pressure ("HVLP") fluid impingement technology ("FIT") applicator gun. The gelcoat applicator is operated as an atomizing gelcoat spray gun. The white gelcoat used at Dix contains 27% styrene monomer by weight and 3% methyl methacrylate (MMA) by weight. The two layer gelcoats range from 27% - 38% styrene and 3% - 10% MMA.

This gelcoat is the state-of-the-art in low-HAP formulations for swimming pool production.

2. **Barrier coat resin application.** A 100 to 120 mil (0.100 to 0.120") laminate layer of three ounce glass mat and vinyl ester ("VE") corrosion-resistant resin is applied to the cured gelcoat layer with the same MVP applicator that is used to apply gelcoat. However, the gelcoat tip is replaced with a 5020 VE tip and the pump pressure is adjusted to allow for the non-atomized application of the VE resin. The VE resin contains up to 48% styrene content by weight.

3. **Isophthalic structural resin application.** A series of consecutive laminate layers consisting of 1½ oz. chopped glass strand mat ("CSM"), woven glass roving ("WR"), and isophthalic ("ISO") corrosion-resistant resin is applied to the cured VE layer with the same MVP applicator that is used to apply the gelcoat and VE resin. However, the VE tip is replaced with a 7025 ISO resin tip and the pump pressure is adjusted to allow for the non-atomized application of the ISO resin.

The other manufacturing steps include: (1) parts finishing, including trimming, grinding and sanding of finished pools parts; (2) gelcoat and resin cleanup, in which acetone, non-HAP and non-VOC cleaning solvent is used to clean gelcoat and resin residues from the application equipment and roller tools; and (3) mold repair and mold prep, in which very small amounts of tooling gelcoat and tooling resin are used to repair the molds and a small quantity of mold cleaner, mold sealer, and mold release (called mold wax), is used to prepare the bare mold for gelcoat application. These other steps do not have significant amounts of VOM emissions.

VOM Emissions Estimates. The VOM emissions from the Dix Plant vary depending on the type and size of each swimming pool part. The facility emissions consist predominately of styrene, but also include small amounts of other VOM and volatile organic HAP species such as methyl methacrylate ("MMA"). The average VOM emissions per pool for the gelcoating process is 53.8 lbs of VOM. The resin process averages 94.4 lbs of VOM emitted per pool. The total average VOM emitted per pool is 148.8 lbs. The maximum facility-wide hourly VOM emission rate is 156.70 lbs per hour. Annual VOM emissions at the Dix Plant for 2007 and 2008 were 14.8 tpy and 11.6 tpy, respectively. The current CAAPP application estimates the Dix Plant's maximum VOM emissions at about 29.76 tpy, approximately 27.54 tons of which relate to potential styrene emissions. For more detailed information regarding Royal's VOM emissions, see Section 2 of the attached Technical Document which contains three exhibits (Exhibits A, B, and C) from Royal's modification to its CAAPP permit application filed July 14, 2009, as well as a memorandum regarding the Dix Plant's maximum hourly VOM emission rate.

Compliance with the Composites MACT. The Composites MACT, 40 C.F.R. 63 Subpart WWWW, requires that subject facilities similar to Royal's be in compliance with the work practice standards contained therein by April 21, 2006. Royal was in compliance with the Composites MACT by February 2006. To comply with the work practice standards in the Composites MACT, Royal adopted standards requiring that all resin containers are closed when not in use, and implementing the use of acetone, which has no HAP or VOM emissions. By complying with the Composites MACT, United States EPA estimates that industry-wide, reinforced plastic composite manufacturers will reduce HAP emissions by an average of 43%. Royal meets the MACT emission standards by using the HAP emissions factor averaging option (see 40 CFR 63.5810(b)) and Royal has continually been in compliance with the emission limits set forth in the Composites MACT.

E. Investigation of Compliance Alternatives: Methods for Reducing VOM Emissions From Royal's Swimming Pool Manufacturing Operations – Section 104.406(e)

Royal investigated compliance alternatives that would help enable it to comply with the 8 lb/hr Rule on a strict hourly basis. As discussed below, Royal investigated: (1) reducing VOM content in production materials; (2) using alternative operating procedures and methods; and (3) installing add-on emission control technologies. It is important to note, however, that other than add-on emission controls, many of the alternatives investigated would not allow Royal to comply with the 8 lb/hr Rule on a strict hourly basis. In addition, Royal could not identify any feasible compliance alternatives to further reduce VOM emissions from Royal's operations.

1. Lower VOM Content Materials

Royal has already reduced the VOM concentration in its production materials (gelcoat and resin materials) in compliance with the MACT. Complying with the MACT alone will not reduce Royal's emissions to a level satisfactory to meet the 8 lb/hr Rule on a strict hourly basis. While Royal has inquired of its suppliers regarding lower VOM content production materials, further reduction of styrene in the resins (below that needed to comply with MACT) is not currently technically feasible while still maintaining product integrity.

2. Alternate Operating Procedure and Methods

Royal carefully studied the gelcoating process at the Dix Plant, and considered every recognized alternative procedure and method that might reduce the hourly VOM emissions rate. However, this study revealed inherent process limitations that precluded the use of any effective alternative:

- Composite swimming pools are produced with open molding processes on very large male molds.
- Composite pools are too large to use any closed molding process. Even if closed molding was feasible for the smallest pool model, the gelcoat layer must still be applied to the "open" closed mold with a gelcoat applicator.
- A high-quality gelcoat finish is an essential component of a commercially acceptable composite pool. The pool models are much too large to use a vacuum-formed thermoplastic shell finish, which is the only acceptable alternative finish that is used for smaller spa pools.

- Gelcoat must be applied to the pool mold in a single uniform layer. Gelcoat cannot be applied in separate strips or sections, because the lapped gelcoat seams would be structurally unsound and unsightly.
- Gelcoat must be applied to the mold with an atomizing mechanical applicator. Non-atomizing gelcoat equipment is available that might reduce the gelcoat emission rate. However, the available non-atomizing equipment will not provide an acceptable surface finish and has failed to reduce gelcoat emissions as promised by the manufacturer.
- The gelcoat process takes about one hour for the largest pool model and the largest pool model requires at least 360 pounds of gelcoat.
- The white gelcoat used by Royal is state-of-the–art and contains the lowest feasible monomer contents of 27% styrene and 3% MMA. This gelcoat provides a flexible, durable, glossy finish that must resist impact, weathering, temperature extremes, UV radiation, and blistering.
- The emissions from the current gelcoat process cannot be appreciably reduced with any additional workpractice improvements, pollution prevention techniques, or gelcoat material substitutions.
- The application of gelcoat takes place in large work bay areas that require significant amounts of ventilation airflow to protect the workers against styrene exposure. This ventilation is required by OSHA regulations. The relatively large airflow rate and low styrene exposure limits established by OSHA result in a large dilute exhaust stream that cannot be economically controlled with add-on air pollution control equipment. The cost of the lowest-cost control equipment is detailed in the next section.

3. Add-On Air Pollution Controls

The cost and feasibility of add-on air pollution controls at reinforced plastic composite manufacturing facilities has been thoroughly studied and documented as part of the Composites MACT (40 C.F.R. 63 Subpart WWWW). The Dix Plant is fully compliant with the HAP emission limits listed in the Composites MACT standard, averaging 72% of the MACT emissions limit.

According to the Composites MACT, a composites facility such as the Dix Plant is not required to install add-on air pollution controls. During the promulgation and development of the Composites MACT, the United States EPA discovered that add-on air pollution controls are not cost effective at most existing composite facilities. The United States EPA also determined that add-on controls with 95% control efficiency would only be cost effective for new composite facilities that emit more than 100 tpy of HAP or new facility that produces large parts such as swimming pools and emits more than 250 tpy of HAP. The Dix Plant emitted less than 12 tons of HAPs in 2008, so add-on controls would not be cost effective by a very wide margin.

A comprehensive study entitled "*Feasibility and Cost of the Capture and Control of Hazardous Air Pollutant Emissions from the Open Molding of Reinforced Plastic Composites*" prepared by EECS was submitted to United States EPA in April 2000 as part of the promulgation of the Composites MACT rule. This report has 377 pages of information concerning the cost and feasibility of add-on controls at composites facilities. Very little has changed since the 2000 publication date, except that the cost of electricity and natural gas needed to operate add-on controls has risen dramatically.[3/]

An abbreviated summary of the air pollution control systems, which are detailed in the aforementioned study and are available for use, is contained in the following table:

Commercially Available Air Pollution Controls

Technology		Applicability Concerns	Status at the Dix Plant
Absorption		Styrene is nearly insoluble in water	infeasible
Adsorption		Styrene polymerizes on sorbent media Desorbed styrene is not reusable Desorbed styrene must be disposed as hazardous waste	infeasible
Biodigestion		Microbes are unreliable and must stay warm and moist Digestion beds must be huge to handle exhaust airflow	infeasible
Condensation		Styrene concentration in air too low to be economic Condensate is mostly water with trace styrene Condensate must be disposed as hazardous waste	infeasible
Flare		Styrene concentration in air is too low to be economic	infeasible
Oxidation	TO	Conventional recuperative oxidation is always more costly than RTO	RTO is better
	RTO	Regenerative thermal oxidation is currently employed at one truck cap plant and several large bathware plants that produce small parts on automated production lines, operate continuously (24 hr/day, 360 days/yr) and have uncontrolled styrene emissions >250 tpy. A RTO system large enough to handle the 35,000 cfm exhaust airflow at the Dix Plant would cost over $600,000 to install and over $300,000 per year to operate.	technically feasible economically infeasible
	CO	Catalytic media has a relatively short lifetime and is unreliable	infeasible
Preconcentration w/RTO		Preconcentration is currently employed at four large bathware plants. The long-term performance of the adsorber in questionable due to an unexpected failure of the activated charcoal sorbent media at one of the sites. A preconcentrator system large enough to handle the 35,000 cfm exhaust airflow at the Dix Plant would cost almost one million dollars to install and operate.	technically questionable economically infeasible

[3/] Due to the size of this study, Royal is not including a copy with this Petition. It is part of EPA's docket regarding the Composites MACT rule promulgation and adoption. Should the Board desire a copy of the study, Royal would be pleased to provide it to the Board.

Royal commissioned EECS to prepare a detailed control cost analysis for a skid-mounted RTO system for the Dix Plant. EECS's report of its analysis was submitted to Illinois EPA on June 19, 2009 and is attached in the accompanying Technical Document at Section 3. As detailed in this analysis, the skid-mounted RTO control option would have an installed capital cost approximately $709,500 and would have annual operating costs of over $470,000 per year. The cost effectiveness for this add-on control would be about $18,400 per ton of styrene and MMA removed per year. As such, the cost effectiveness of the RTO control option is much greater than what is widely regarded as affordable. The annual operating cost of the RTO control options is several times greater than the annual profit for the Dix Plant. Hence, add-on controls are prohibitively expensive and not economically feasible for the Dix Plant.

F. <u>Royal's Proposed Adjusted Standard – Section 104.406(f)</u>

As set forth above, the rule of general applicability from which Royal seeks this adjusted Standard prohibits Royal from emitting "more than 8 lbs/hr of organic material into the atmosphere from any emission source." 35 I.A.C. §215.301. Because IEPA will not allow averaging of emissions to meet this standard, Royal can not comply with the 8 lb/hr Rule as interpreted by IEPA. Accordingly, Royal proposes that, in lieu of being subject to 35 I.A.C. §215.301, Royal shall comply with the MACT Standard finalized at 40 C.F.R. Part 63, Subpart WWWW (the "Composites MACT"). As discussed in Section II.D of this First Amended Petition, Royal has come into compliance with the work practice standards of the Composites MACT Standard. According to the Composites MACT, EPA estimates that compliance with the MACT will cost $2,800/ton annually and will reduce emissions by an average of 43%.

Royal proposes the following language for a Board order to impose the adjusted standard:

1. Pursuant to Section 28.1 of the Environmental Protection Act ("Act") (415 ILCS 5/28/1), the Board grants Royal Fiberglass Pools ("Royal") an adjusted standard from 35 Ill. Adm. Code. 215.201 ("8 lb/hr Rule"), effective ______, 20__. The adjusted standard applies to the emissions of volatile organic material ("VOM") into the atmosphere from Royal's swimming pool manufacturing facility located in Dix, Illinois.

2. 35 Ill. Adm. Code 215.301 does not apply. Royal remains subject to the following:

   a. Royal must continue to investigate: (a) swimming pool production methods that generate fewer VOM emissions, and (b) materials that have a reduced VOM content and/or are compliant with the Composites MACT HAP content. Where practicable, Royal must substitute current materials with lower VOM content materials as long as such substitution does not result in a net increase in VOM emissions.

   b. Royal must perform any reasonable test of new technologically or economically reasonable production methods or materials applicable to the open-mold swimming pool manufacturing industry, which may reduce VOM emissions at

Royal's facility which the Illinois Environmental Protection Agency (Agency) specifically requests in writing they do. After performance of such tests, Royal must prepare and submit a report summarizing the activities and results of these investigatory efforts. The report must be submitted to the Agency, Bureau of Air, Compliance and Enforcement Section.

c. Royal must operate in full compliance with the Clean Air Act, its Clean Air Act Permit Program permit (once issued), the National Emissions Standard for Hazardous Air Pollutants for Reinforced Plastic Composite Manufacturing Facilities, set forth in 40 C.F.R. 63, Subpart WWWW, as required by Section 9.1(a) of the Act, and any other applicable regulation.

G. Quantitative and Qualitative Description of Royal's Impact on the Environment Before and After the Proposed Adjusted Standard – Section 104.406(g)

Air Quality Impact Analysis of Royal's Operations. As indicated, the Dix Plant is already in compliance with the Composites MACT, and the proposed adjusted standard will not impact future compliance with the MACT. Additionally, attached at Section 4 of the Technical Document is an Air Quality Impact Analysis of the Dix Plant. This analysis presents the worst-case scenario for ozone emissions using the proposed adjusted standard. Based on the results of the analysis, the worst-case one-hour average ozone impact is still only 74% of the one-hour ozone standard. Royal understands that in 2005, EPA replaced the one-hour average ozone standard with an eight-hour average standard, but believes the hourly calculation presented in the attached Air Quality Impact Analysis is useful given the obvious concerns about hourly emissions that are reflected in the 8 lb/hr Rule.

Should Royal's First Amended Petition be granted, there will not be any increase on a per unit basis over the current emissions from the Dix Plant. This First Amended Petition merely seeks to allow Royal to continue manufacturing in the same manner, and granting the First Amended Petition will not amount to an increase of per unit emissions.

Cross-Media Environmental Impacts Resulting from an Adjusted Standard. None. The Dix Plant's waste and wastewater generation is independent of VOM emissions, thus no change in the nature or volume of waste and wastewater generation is anticipated.

H. Justification – Section 104.406(h)

Under Section 28.1 of the Environmental Protection Act (the "Act"), the Board may grant an adjusted standard for persons who can justify such an adjustment consistent with subsection (a) of Section 27 of the Act. 415 I.L.C.S. 5/28.1. Moreover, if a regulation of general applicability does not specify a level of justification required of a petitioner to qualify for an adjusted standard, the Board may grant individual adjusted standards upon adequate proof that: (1) factors relating to that petitioner are substantially and significantly different from the factors relied upon by the Board in adopting the general regulation 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.

Significantly, the proposed adjusted standard is consistent with prior adjusted standards from the 8 lb/hr Rule issued by the IPCB for similar manufacturing processes. Specifically, on July 22, 2002, the IPCB granted Crownline Boats, Inc.'s ("Crownline") Petition for Adjusted Standard. Crownline operates a fiberglass boat manufacturing facility in West Frankfort, Illinois, using a gelcoat and resin application process very similar to that employed by Royal. Crownline was granted an exemption from compliance with the 8 lb/hr Rule because compliance with a MACT standard similar to the Composites MACT could be demonstrated. See Section 5 of the attached Technical Document for a copy of the IPCB's opinion and order regarding the Crownline petition. The adjusted standard proposed herein is based on the adjusted standard approved by the IPCB in response to Crownline's petition.

1. Factors Relating to Royal are Substantially and Significantly Different

The primary intent of the 8 lb/hr Rule was to prevent ozone formation and odor nuisance. However, the Board did not contemplate the methods Royal Fiberglass Pools would use to manufacture swimming pools at the Dix Plant when it promulgated the 8 lb/hr Rule in 1971. The manufacture of large composite parts such as swimming pool shells involves a batch-type process rather than a continuous application process typically used in manufacturing processes for other products. This fact, together with the ventilation system needed to comply with OSHA's worker protection regulation at 29 C.F.R. Part 1910, makes the use of add-on emission controls economically infeasible. Under OSHA health and safety standards for styrene, the Dix Plant must maintain large airflow to ventilate the work areas properly. The small emission rate and large airflow makes the cost of using add-on emissions controls unaffordable. In short, Royal Fiberglass Pools believes that the Board did not anticipate the requisite production methods for manufacturing large composite parts and the OSHA standard when adopting the 8 lb/hr Rule in 1971.

The factors relating to Royal's operations are substantially and significantly different than the general factors relied upon by the Board in promulgating the 8 lb/hr Rule. The 8 lb/hr Rule was first promulgated in 1971 as Chapter 2: Air Pollution, Rule 205. 4 PCB 191, R71-23. Because it was adopted over 30 years ago, it is difficult, if not impossible, to know exactly what factors the Board relied upon in adopting this rule. However, based upon Illinois Pollution Control Board case law and a common sense reading of the rule, Royal believes that the factors primarily relied upon by the Board involved concerns about preventing ozone formation. In fact, it appears that the main intent of the rule was to ensure that operations emitting organic material utilized control equipment already in place to ensure that their facilities do not cause a violation of the one-hour ozone standard nor create an odor nuisance. For example, in Illinois v. Processing and Books, Inc., the IPCB explained that:

"Rule 205: Organic Material Emission Standards serves both to achieve and maintain

> compliance with the federal air quality standard for photochemical oxidants (0.08 ppm for one hour not to exceed more than once per year, 36 Fed. Reg. 22385 Nov. 25, 1971) and to prevent local nuisances. . . . the major purpose of these regulations is for control of photochemical oxidants. In addition, odor causing organic emissions were included if a local odor nuisance exits . . . these provisions are designed to require the use of equipment that is already in use at numerous facilities . . ."

1977 WL 9986, *4 (Ill. Pol. Control. Bd.). From this explanation it is evident that the Board was most concerned with: (1) protecting ambient air quality by preventing any violation of the 1-hour ozone NAAQS; and (2) controlling any odor nuisances from manufacturing operations. A review of Royal's operations shows that the main purposes of this rule are not furthered through its application to Royal: first, as discussed in Section II.G of this First Amended Petition, the daily amounts of VOM emitted by Royal's operations have a negligible impact on ambient ozone levels and would not cause a violation of the ozone NAAQS; and second, Royal has a tall stack in place to minimize odor nuisance from its operations.

The above quote from the Illinois Pollution Control Board also shows that, when adopting the rule in 1971, the Board most likely relied upon the fact that facilities would have no problem complying with the rule by utilizing equipment already available and in use by most facilities subject to the rule. It is clear that this rule was promulgated as a catch-all provision, intending to cast a wide net over all operations which emit organic materials. However, the Board could not possibly have contemplated all the circumstances in which organic material is emitted, and, in fact, there is no indication that the Board considered the factors peculiar to pool fabrication when adopting this rule.

There are other substantial and significant factors which are inherent or otherwise necessary to Royal's operations that the Board did not consider (nor could it have) when it adopted the 8 lb/hr Rule in 1971. The building of a fiberglass swimming pool involves a batch-type process (of applying layers or skins), rather than a continuous application process. This is an important distinction because compliance with the rule can be reasonably accomplished and demonstrated when manufacturing operations (that involve the use of materials that emit VOMs) are of a continuous nature or, are at least are distributed more evenly over a 24 hour period. For continuous or near-continuous operations, the use of emission controls, as provided by 35 I.A.C. 215.302, is economically feasible. Due to the large size of the swimming pool molds and necessary batch-type sequence of the gelcoat and resin application processes at the Dix Plant, they are neither continuous nor evenly distributed over a longer period of time.

Additionally, the advent of OSHA's worker protection regulation at 29 CFR 1910, requires manufacturers who use materials that contain and emit styrene to maintain an in-plant work area atmosphere (worker breathing air) of less than 100 ppm. To do so, Royal had to install a large ventilation system that exhausts approximately 35,000 cubic feet of plant air every minute. This makes the use of add-on emission controls for Royal's operations fiscally impractical. See Section 3 of the Technical Document. The Board could not have possibly anticipated this OSHA requirement and its affect when it made its decision to adopt the 8 lb/hr Rule for all manufacturing facilities in the State.

Finally, on June 15, 2005, EPA revoked the one-hour average ozone standard, which was replaced by an eight-hour average standard. See 69 Fed. Reg. 23951 (Apr. 30, 2005). As referenced by the Board in Illinois v. Processing and Books, Inc., the 8 lb/hr Rule was designed in primary part to assist in achieving compliance with EPA's one-hour average standard. Although Royal is not requesting that the Board revoke the 8 lb/hr Rule, Royal asserts that the elimination of one of the fundamental purposes of the 8 lb/h Rule supports this request for an adjusted standard.

Because the IPCB could not (and did not) consider these factors relating to Royal's operations, Royal contends that it is unreasonable to expect it to demonstrate compliance with the 8 lb/hr Rule on a strict hourly basis.

2. The Existence of Those Factors Justifies an Adjusted Standard

As discussed fully in Section II.E. of this First Amended Petition, Royal has investigated numerous compliance alternatives that have proven to be neither economically nor technically feasible due to the substantially different factors relating to Royal's operations. The existence of these factors, coupled with IEPA's endorsement of Royal's efforts to obtain an adjusted standard justifies the granting of an adjusted standard.

3. The Requested Standard Will Not Result in Adverse Environmental or Health Effects.

As discussed previously in Section II.G of this First Amended Petition, the requested adjusted standard will have little, if any, adverse impact on the environment or health. By complying with the Composites MACT, Royal has limited its VOM emissions and also decreased the amount of solid and hazardous waste Royal generates. Even without these changes, Royal's operations do not cause or contribute to any ozone exceedances. With respect to health effects, Royal notes that Illinois does not have a health standard for styrene emissions, and this manufacturing process is the same process used by swimming pool manufacturers in many other states.

4. The Proposed Adjusted Standard is Consistent with Federal Law

The granting of this proposed adjusted standard is consistent with federal law and will not violate any provision of the federal Clean Air Act. Specifically, there is no Clean Air Act equivalent rule or regulation prohibiting swimming pool manufacturers' emissions of organic material in excess of 8 lbs/hr, on a strict hourly basis. Because Royal is proposing to comply with the Composites MACT, the proposed adjusted standard is consistent with federal law.

I. Consistency with Federal Law – Section 104.406(i)

There is no Clean Air Act equivalent rule or regulation prohibiting VOM emissions from reinforced plastic composite manufacturing in excess of 8 lbs/hr on a strictly hourly basis.

Regardless, the facility must comply with the new federal NESHAP for reinforced plastic composite manufacturing. For these reasons, the proposed adjusted standard is consistent with federal law.

J. Hearing – Section 104.406(j)

Royal requests a hearing in this matter.

K. Supporting Document – Section 104.406(k)

The Technical Document is filed contemporaneously with this First Amended Petition.

III. CONCLUSION

The requested adjusted standard should be granted as an alternative to Royal's compliance with 35 IAC §215.301. Notwithstanding the technical impracticality of complying with the requirements of the 8 lb/hr Rule on a strict hourly basis, to require Royal to comply with the 8 lb/hr Rule would result in substantial economic hardship to Royal, and perhaps even closure of the Dix Plant.

WHEREFORE, Royal Fiberglass Pools, Inc. respectfully requests an adjusted standard from 35 IAC § 215.301 as set forth herein.

Respectfully Submitted,

BRYAN CAVE LLP

By: ______________________

Dale A. Guariglia, MO Bar #32988
Brandon W. Neuschafer, MO Bar #53232
One Metropolitan Square
211 North Broadway, Suite 3600
St. Louis, Missouri 63102
Tel. (314) 259-2000
Fax. (314) 259-2020

Attorneys for Royal Fiberglass Pools, Inc.

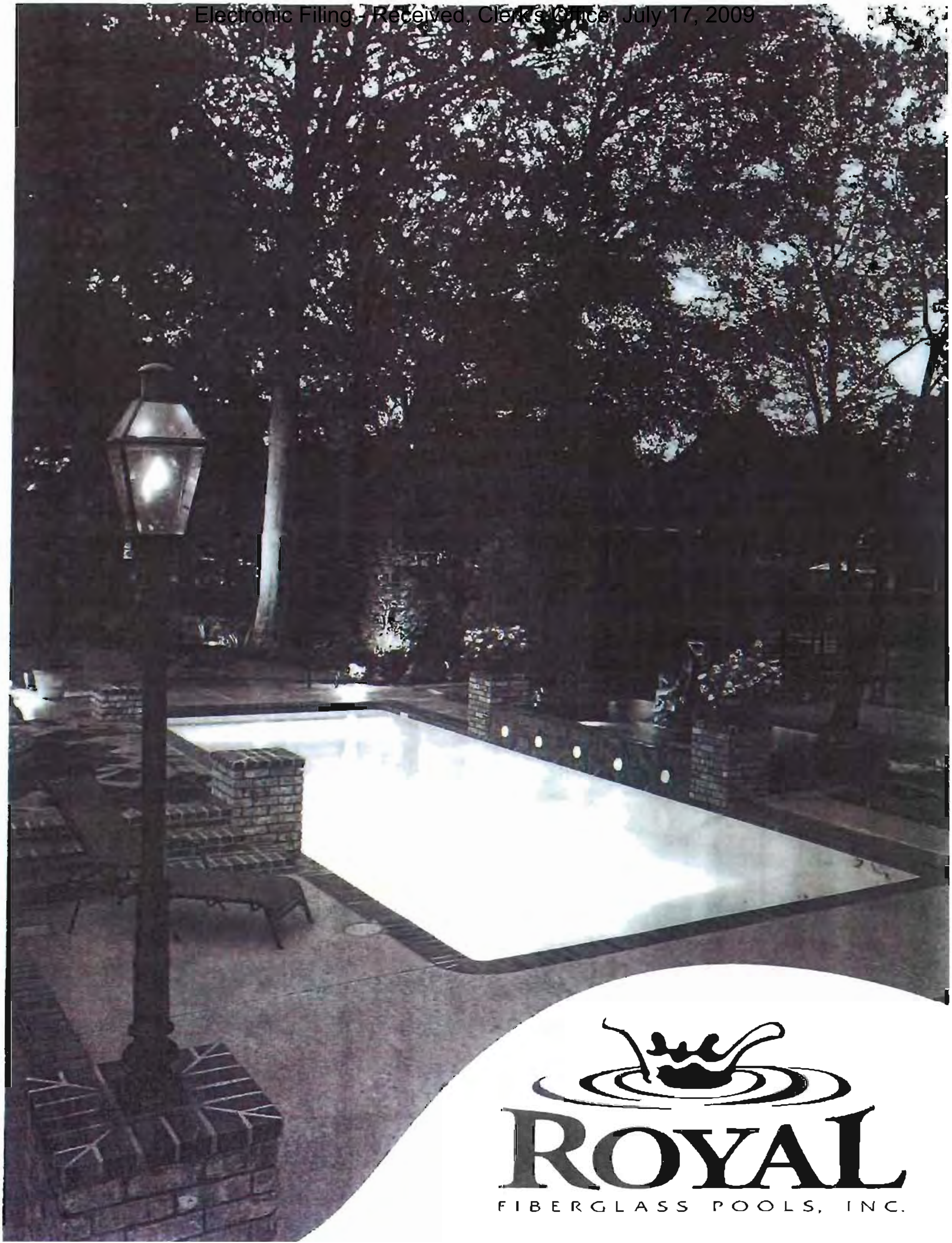
CERTIFICATE OF SERVICE

The undersigned certifies that a copy of the foregoing First Amended Petition was served upon the following parties on the 17th day of July, 2009:

Illinois Pollution Control Board, Attn: Clerk
100 West Randolph Street
James R. Thompson Center, Suite 11-500
Chicago, IL 60601-3218

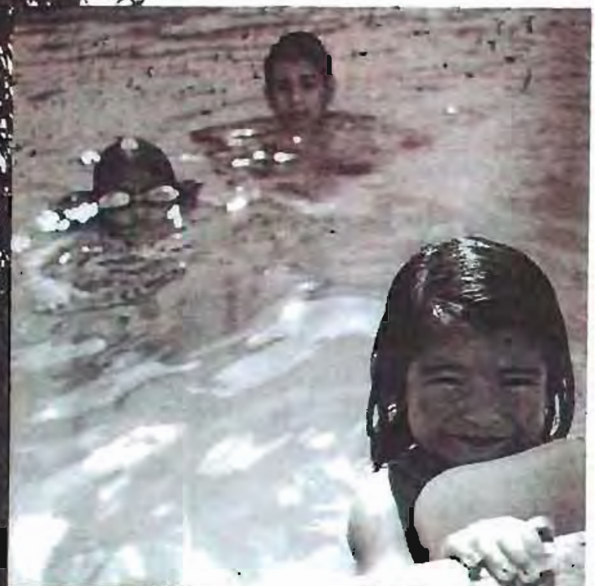
Division of Legal Counsel
Illinois Environmental Protection Agency
1021 North Grand Avenue East
P.O. Box 19276
Springfield, IL 62794-9276
Attn: Charles Matoesian

EXHIBIT 1



ROYAL

FIBERGLASS POOLS, INC.

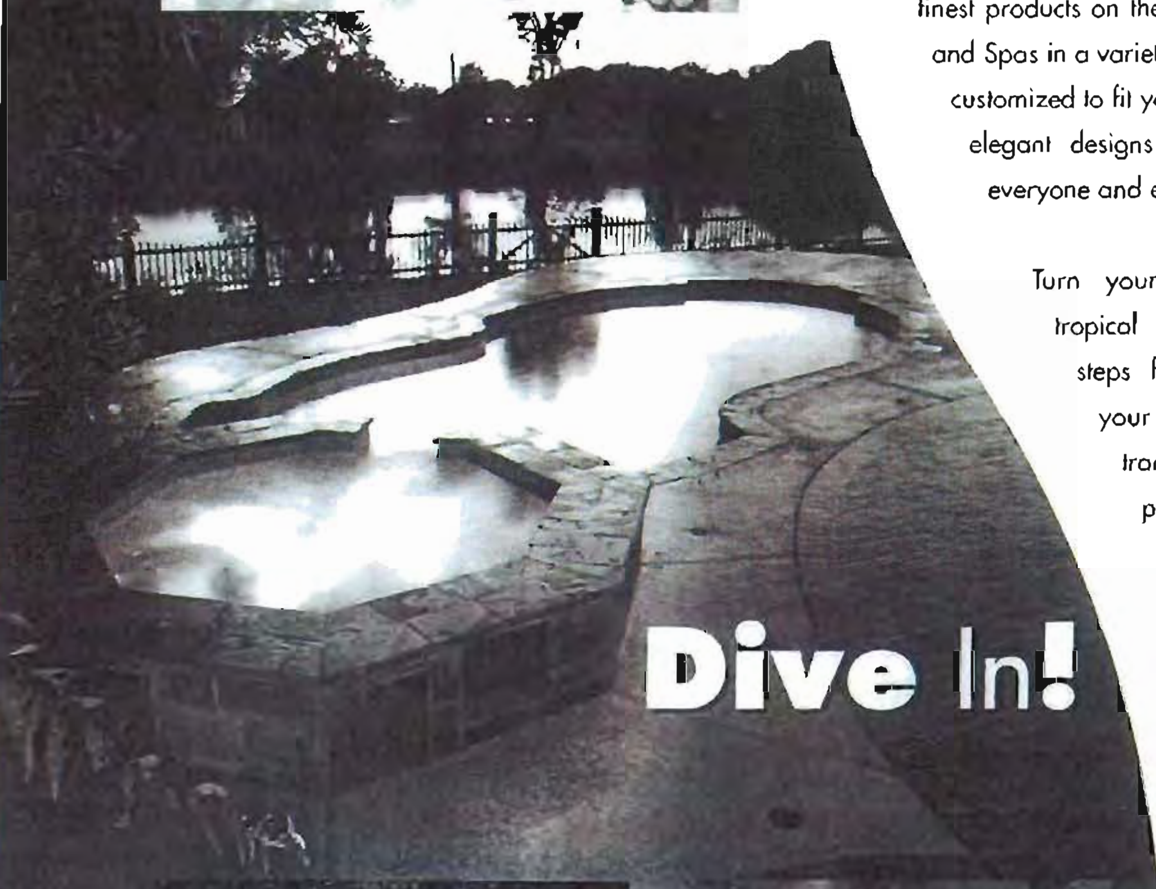


DIVE IN!

Ah...there's nothing quite like it...the feel of cool, invigorating water rushing over you as you take that first dive into your new Royal Fiberglass Pool. In an instant, the world is quiet, tranquil. All your tensions just flow away.

Welcome to the Royal Fiberglass Pools experience. Royal Fiberglass Pools offers the finest products on the market today. Pools and Spas in a variety of shapes and sizes, customized to fit your lifestyle. Simple to elegant designs offer something for everyone and every budget.

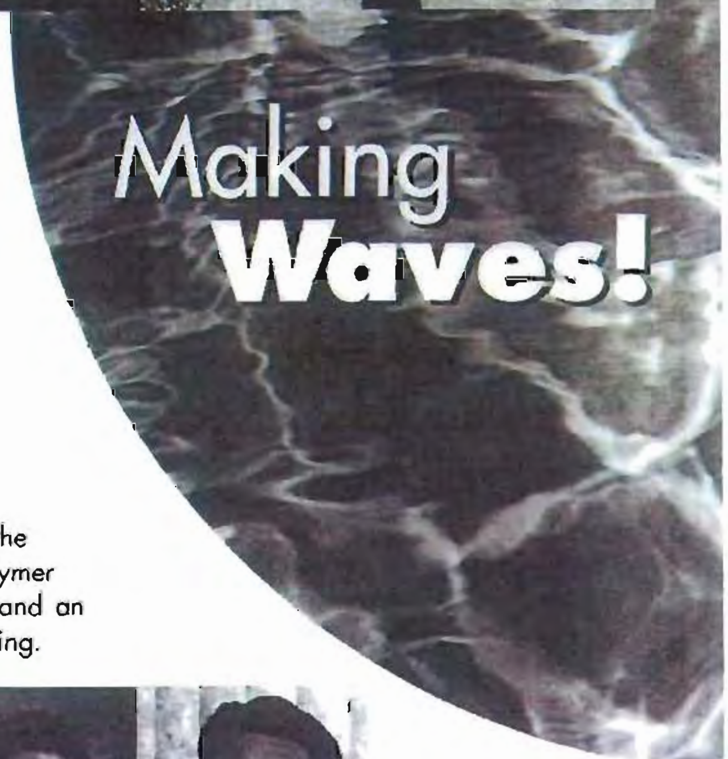
Turn your backyard into a tropical retreat. Just a few steps from your backdoor, your world can be transformed into a calm, peaceful oasis or exciting water adventure for the entire family.



MAKING **WAVES!**

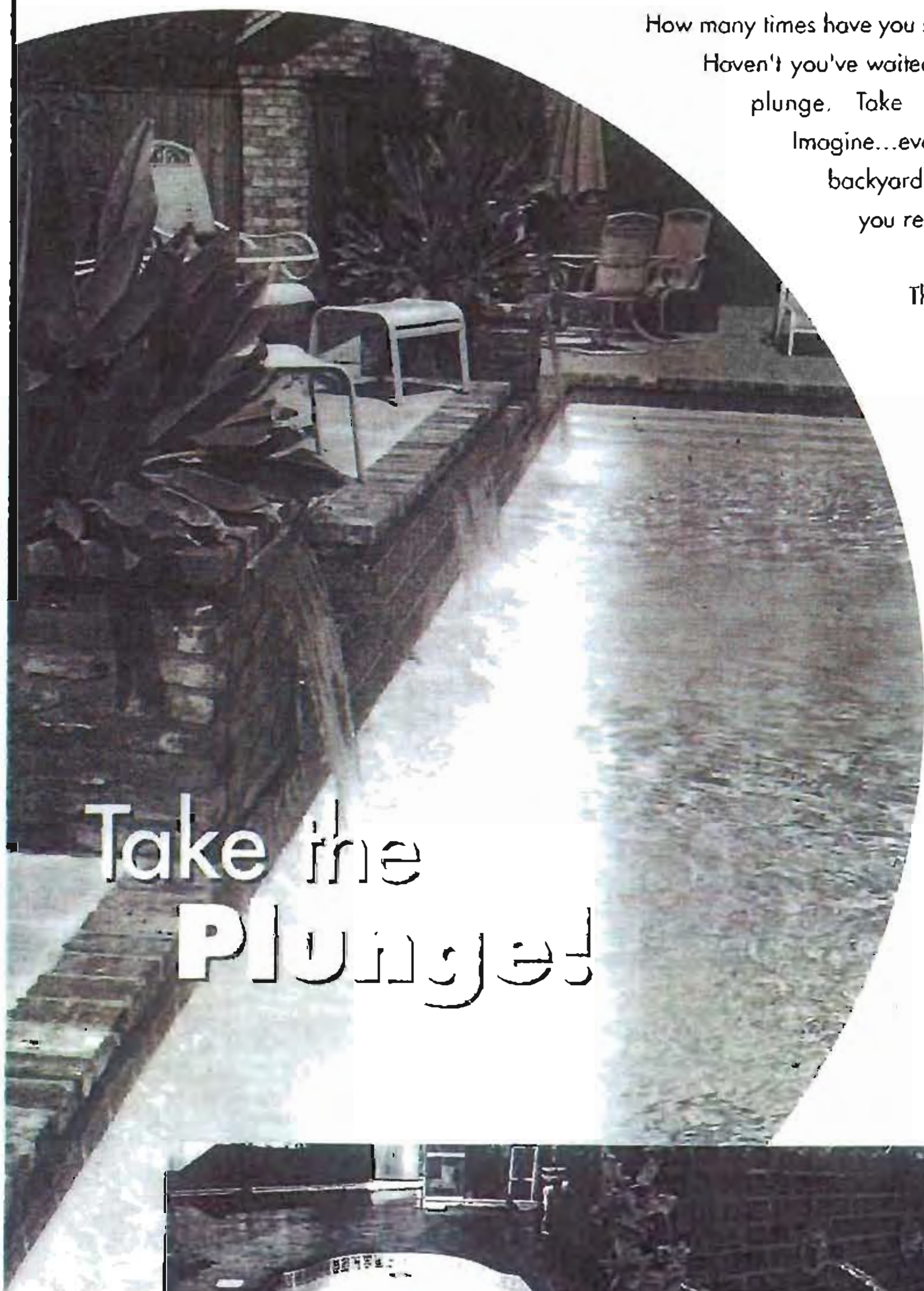
Royal Fiberglass Pools is a family owned and operated business. For nearly four decades, the Hebert family has remained true to their promise...to offer the highest quality pools and spas that money can buy. The Hebert's commitment to quality has revolutionized the pool and spa industry. Cliff Hebert (affectionately known as "Mr. Cliff"), founder and industry leader and innovator, is the person credited for first utilizing Vinyl Ester Resin in the manufacturing of composite pools. These high quality one-piece fiberglass pools and spas are adaptive to any climate and are the best structurally designed pools ever manufactured.

With an outstanding reputation for quality craftsmanship, Royal Fiberglass Pools remains dedicated to providing the best pools and spas in the country. Every Royal pool and spa is constructed with eight layers of high quality fiberglass to assure the utmost durability. The top coat, or gel coat layer, offers a beautiful surface that is both durable and easy to maintain. Layers of Vinyl Ester resin and chopped strand mat provide impact and blister resistance. For added corrosion resistance and superior strength, Royal utilizes Isotholic resin to encapsulate more glass than any other fiberglass pool manufacturer.



The Hebert family applies strict quality control measures to the manufacturing of its products. The thickness of the polymer coatings is controlled within a few thousandths of an inch and an inspector checks each and every Royal process prior to shipping.

TAKE THE **PLUNGE!**



How many times have you said it? "One day, we'll have a pool." Haven't you've waited long enough? Go ahead... take the plunge. Take that dream and make it real. Imagine...everyday you could escape to your own backyard paradise. You'll feel like royalty as you relax in your very own sparkling pool.

The addition of a Royal Pool or Spa adds a new dimension to your home. It's the perfect setting for entertaining. The ultimate spot for quality family time. A luxurious way to spend some quiet time to focus and rejuvenate. A mini vacation in your own backyard year after year.

When you invest in a Royal Pool or Spa, you can count on quality craftsmanship that only comes with the Royal name. The process used in the manufacture of these fine quality pools and spas is, by far, the best in the industry

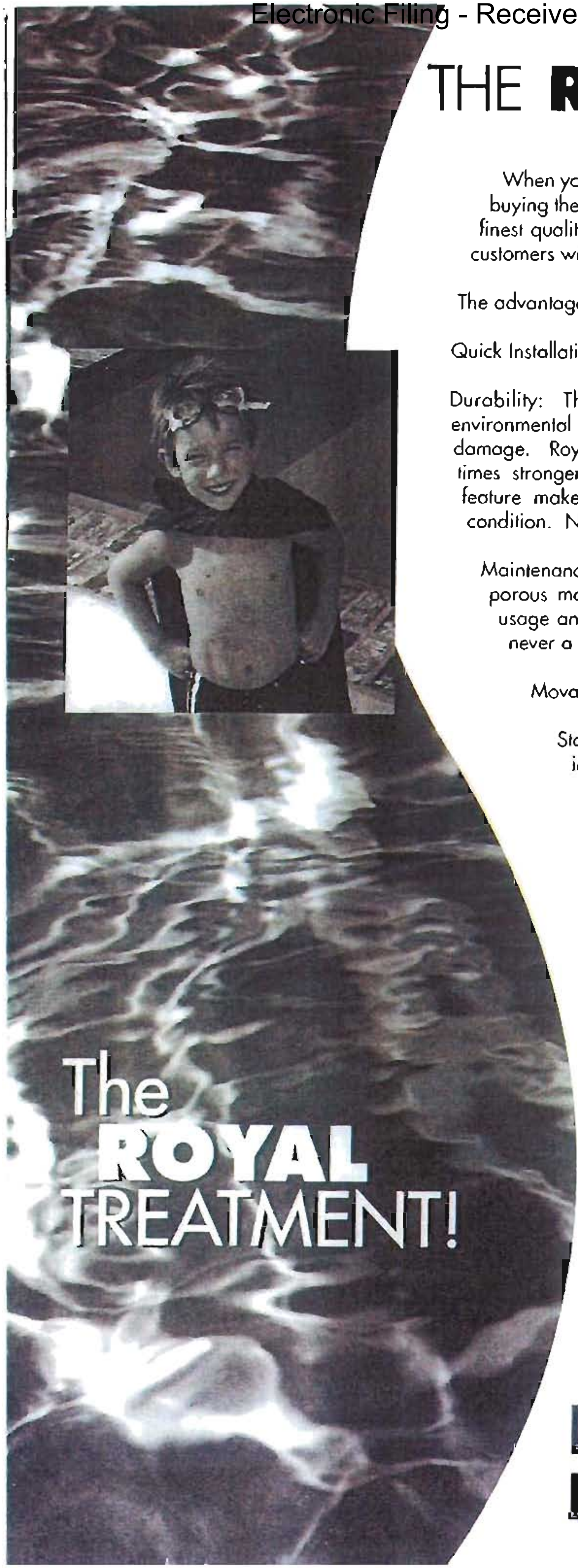
MAKE A **SPLASH!**

With your backyard transformed into a tropical paradise, entertaining will take on a whole new dimension. Holidays. Birthdays. Family reunions. Weekend bar-b-ques. A Royal Pool is cause for celebration any day of the year. Even the most average day can turn into something spectacular.

Royal Fiberglass Pools offers breathtakingly beautifully and exquisitely designed pools and spas to satisfy a variety of tastes. Pools and spas may be combined to create an exciting spillover effect. If you prefer, Royal can create custom designs built to your specifications. Custom pools are available in many sizes and shapes from small swim lanes to Olympic competition pools.

Royal Fiberglass Pools, in association with its distributors, offers many amenities such as vanishing edge pools, built-in coping, contoured non-slip steps and seats. Make up a wish list for your perfect pool setting and your Royal Fiberglass Pools representative will coordinate everything for you.

Your Royal pool is unconditionally warranted by Royal Fiberglass Pools, Inc. against defects in material or workmanship for a period of 25 years after installation. Your non-prorated pool warranty is transferable to a new homebuyer.



THE **ROYAL** TREATMENT!

When you invest in a pool by Royal Fiberglass Pools, you know you're buying the very best pool that money can buy. In addition to selling the finest quality pools and spas in the country, the Hebert family provides customers with the utmost respect and attention.

The advantages of a Royal Fiberglass Pool are many.

Quick Installation: Usually 3 to 5 days.

Durability: The pool's seamless construction withstands extreme environmental changes and can flex up to twelve full inches without damage. Royal Fiberglass Pools are engineered to be up to seventeen times stronger per inch than concrete pools. This remarkable flexing feature makes the fiberglass pool the most resilient to any weather condition. No other pool comes close.

Maintenance Free: The gelcoat finish is smooth, hard and non-porous making it resistant to algae. This feature reduces chemical usage and maintenance costs. Unlike other types of pools, there is never a need to drain a one-piece fiberglass pool.

Movable: When you move, your pool can go with you.

Standard Features: Your Royal Fiberglass Pool includes a built-in coping, molded, non-slip surface steps and benches.

Standard Accessories: Skimmer, main drain and return inlets.

Optional Accessories: Automatic pool cleaner, water heater, additional decking, slide, diving board, extra jets, winter cover, solar blanket and reel auto cover, ozone purification, ceramic tile, landscape lighting, fiber optic lighting, handrails, and ladders.

Royal Fiberglass Pools has manufacturing facilities in Breaux Bridge LA and Dix IL, centrally located to serve our nationwide dealer network.

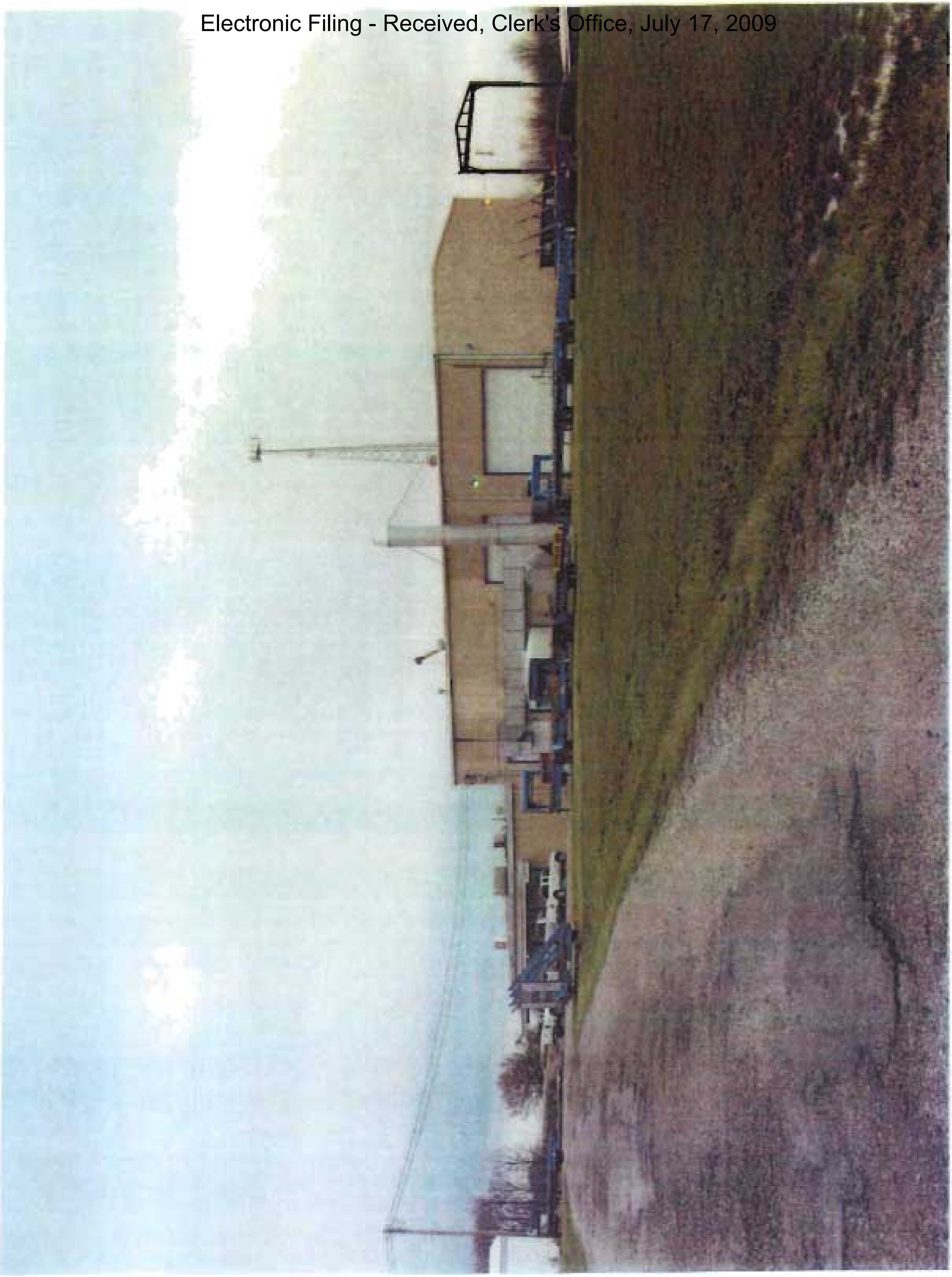
Made In America And Proud Of It!

Member of:

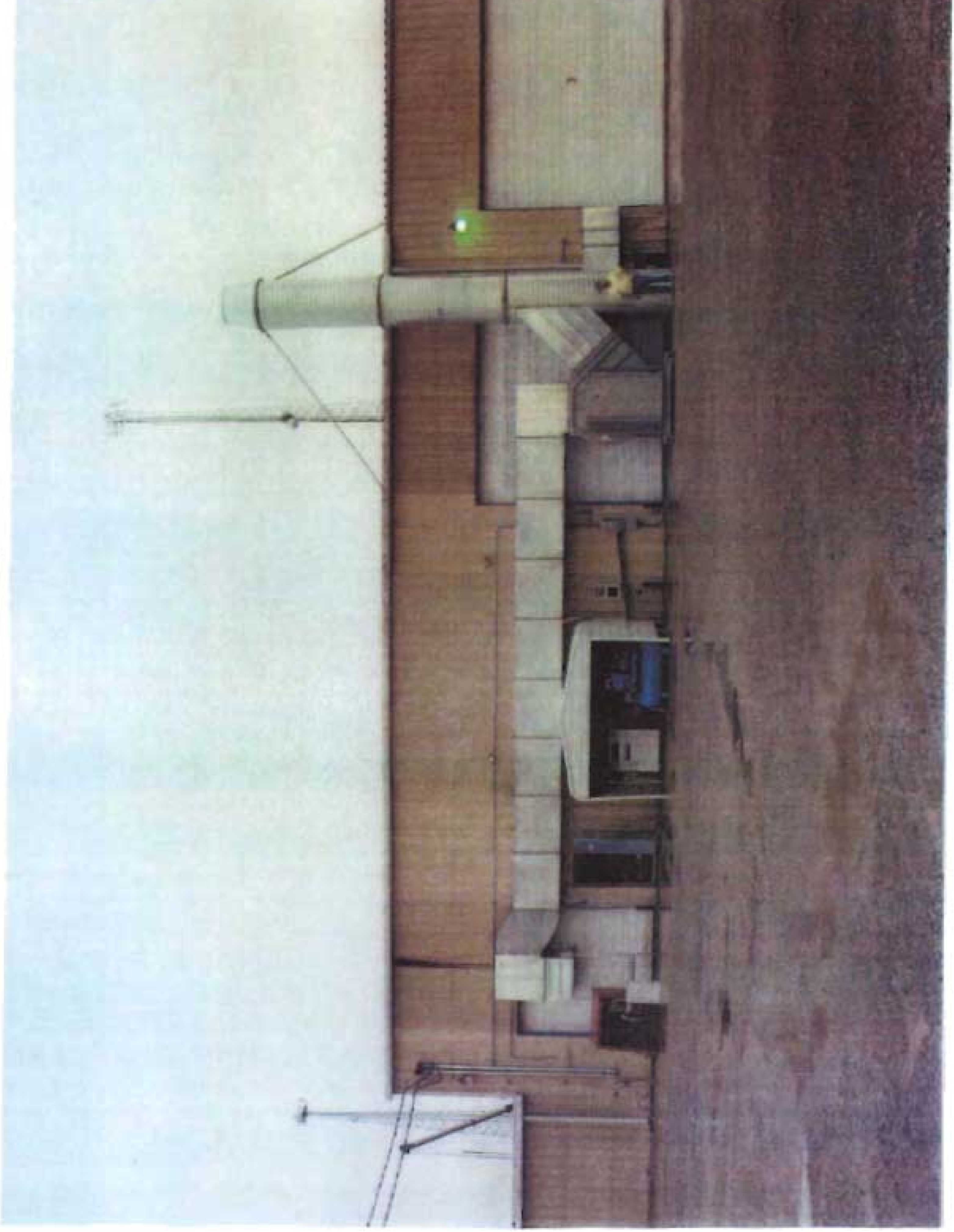
NATIONAL SPA & POOL INSTITUTE

MEMBER 2003

NFIB



Electronic Filing - Received, Clerk's Office, July 17, 2009



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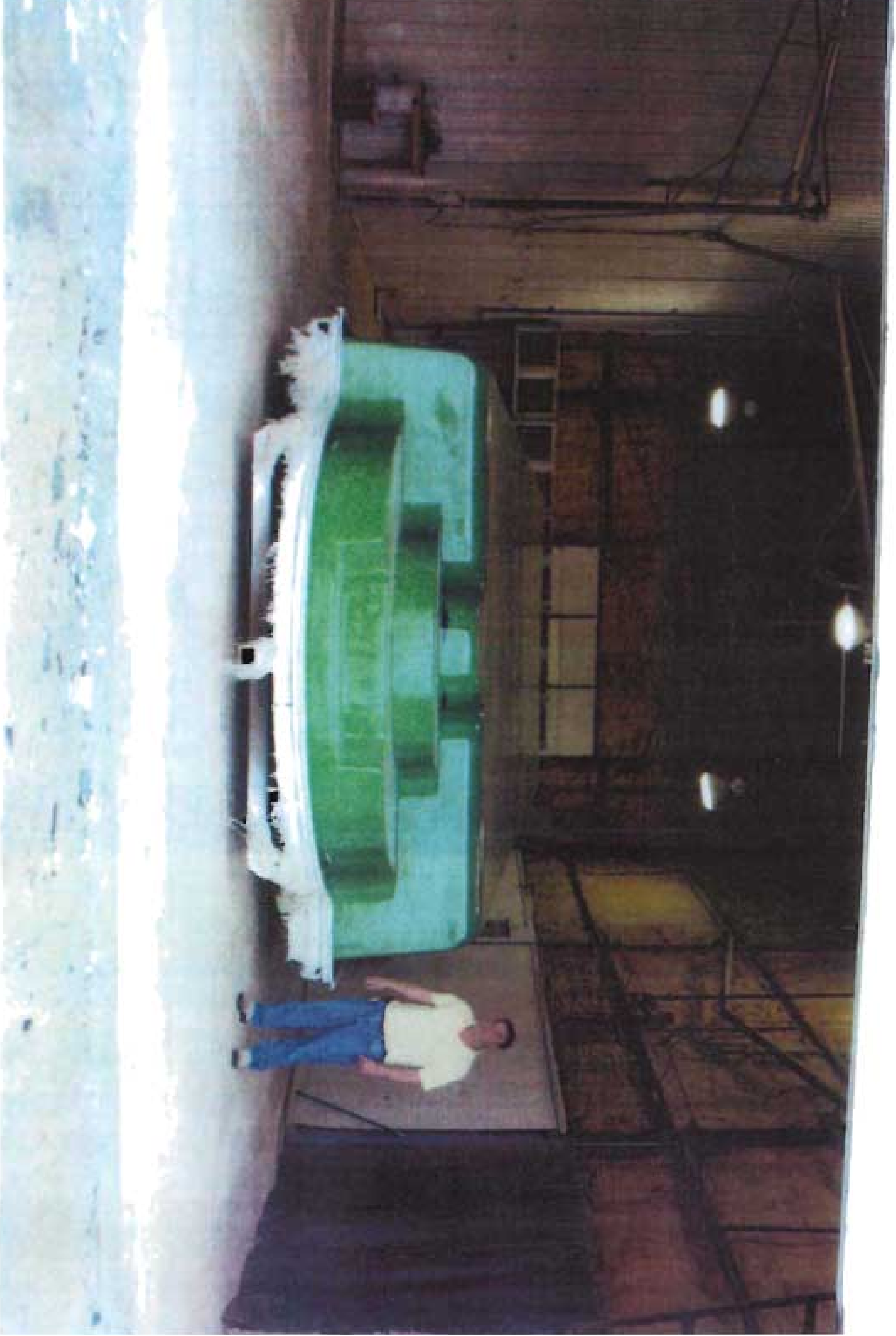

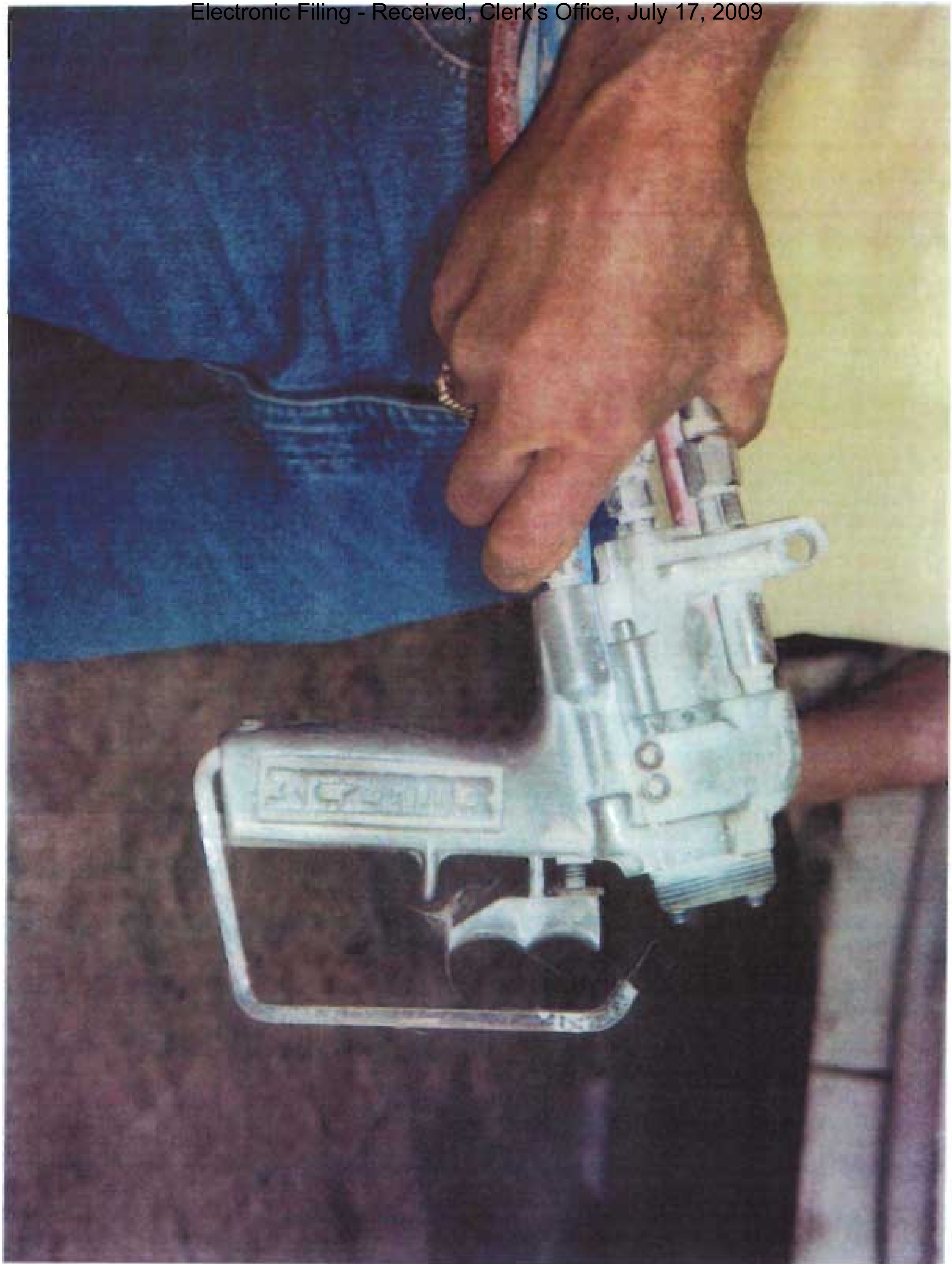

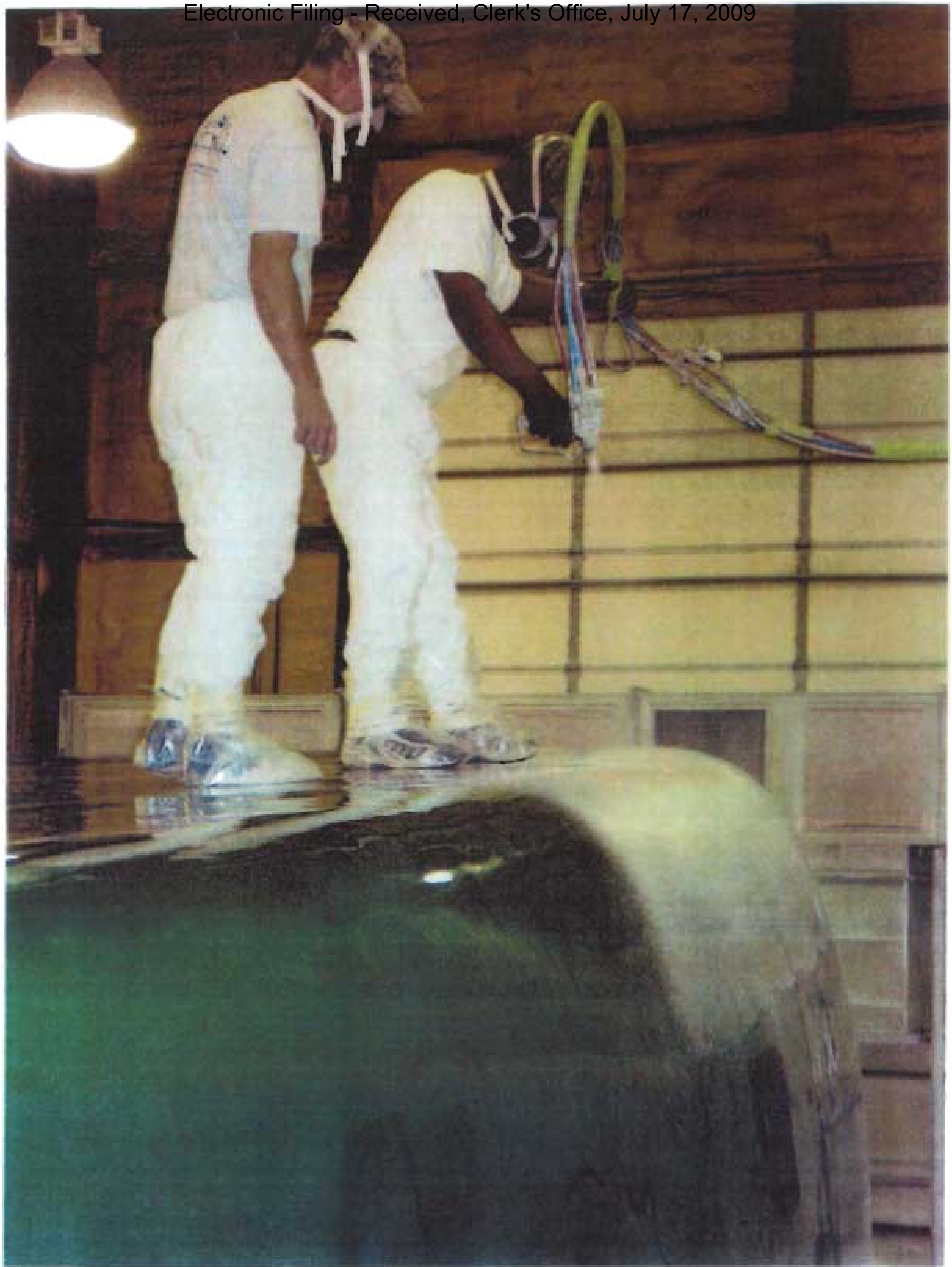

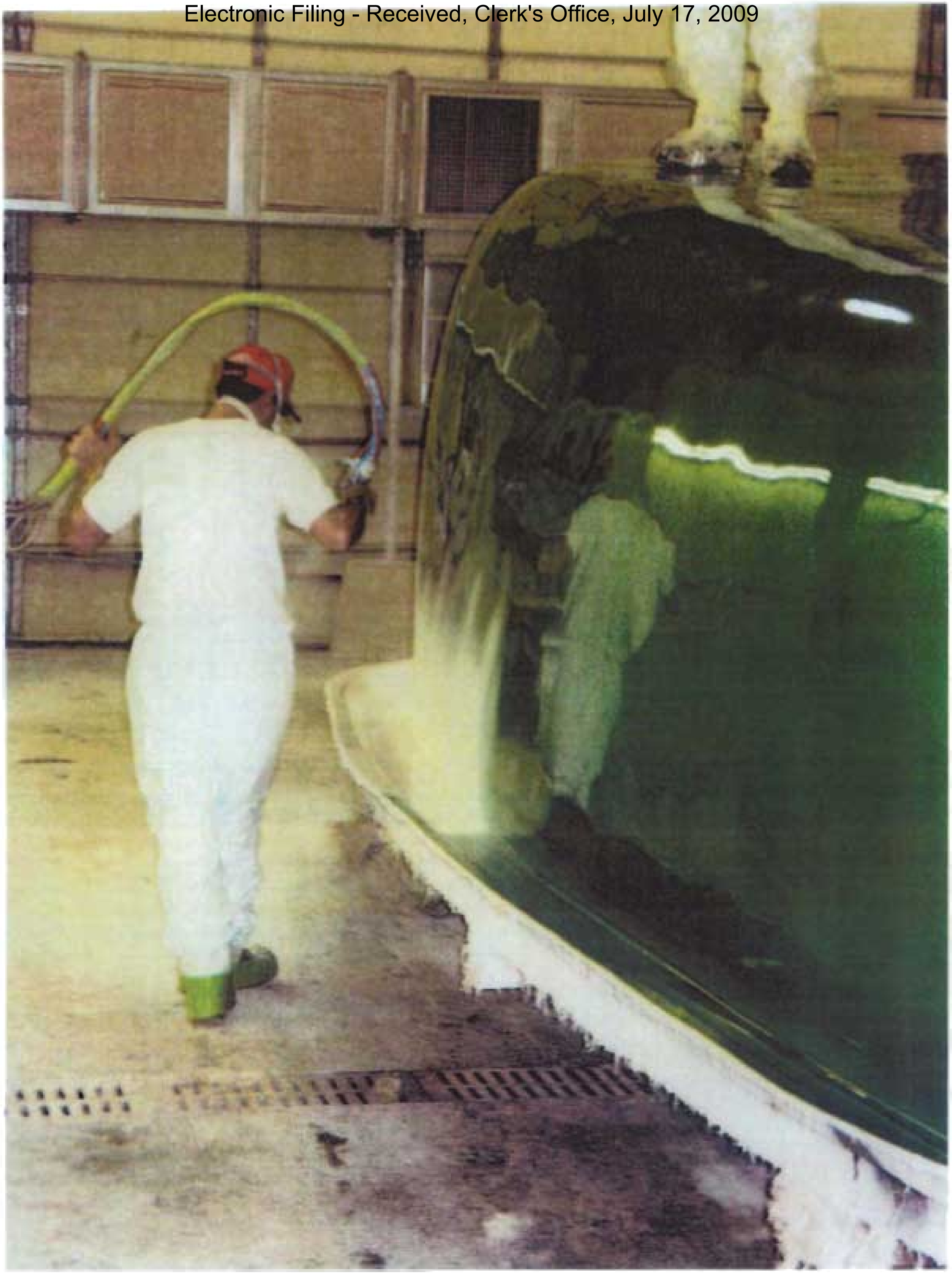

Google maps Address **312 N Duncan Ln**
DIX, IL 62830

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EXHIBIT 2

EXHIBIT A

Royal Fiberglass Pools - Dix Plant
Material Usages and Emissions - 2005 through 2008

Year		2005	2006	2007	2008
Pools built per year		**158**	**188**	**200**	**161**
Hours worked	manhours	**27,657**	**28,714**	**30,002**	**21,340**
Manhours per pool		**175**	**153**	**150**	**133**
Hours per pool (9 workers)		**19**	**17**	**17**	**15**

Actual Annual Material Usages

		2005	2006	2007	2008
Resins	lb/yr	161,800	267,140	324,500	233,820
Gelcoats	lb/yr	35,704	51,475	71,727	55,607
Catalysts	lb/yr	3,136	4,068	5,317	4,608
Putties	lb/yr	0	0	0	0
Reported VOM	lb/yr	**14,773**	**23,222**	**29,616**	**21,443**
emissions	tpy	**7.39**	**11.61**	**14.81**	**11.65**
		Actual "Per-Pool" Usages			
Resins	lb/pool	1,024	1,421	1,623	1,452
Gelcoats	lb/pool	226	274	359	345
Catalysts	lb/pool	19.8	21.6	26.6	28.6
Catalyst Ratio	% wt	1.59%	1.28%	1.34%	1.59%

Maximum "Per-Pool" Usages

	per original Sep 06 NOV plan lb/pool	per actual usage data 2005 through 2009 lb/pool
Resins	**990**	**1,625**
Gelcoats	**220**	**360**
Catalysts	**19.2**	**32**
Putties	**0**	**0**

Maximum "Per-Pool" Emission Rate

	Max actual Usage lb/pool	CY 2008 average VOM Content % wt	VOM Factor % VOM	VOM Emission lb/pool
Resins	1,625	**47.5%** styrene	12.23%	94.4
Gelcoats	360	**27.0%** styrene	44.51%	43.3
		3.9% MMA	75%	10.5
Catalysts	32	**2%** VOM	100%	0.6
Putties	0	N/A		0
	Total VOM emissions per pool (lb/hr) =			**148.8**

y

EXHIBIT B

Royal Fiberglass Pools – Annual Potential-to-Emit VOM Calculation

Average Per-Pool VOM Emissions (based on worst-case from 2005 to 2008 data)

Gelcoat –	360 lb × 27.0% styrene × 44.51% styrene wt =	43.3 lb styrene/pool
	360 lb × 3.9% MMA × 75% MMA wt =	10.5 lb MMA/ pool
Resin –	1,625 lb × 47.5% styrene × 12.23% styrene wt =	94.4 lb styrene/ pool
Catalyst –	32 lb × 2% MEK × 100% MEK wt =	0.6 lb MEK/pool
		148.8 lb VOM/pool

Annual VOM Emissions for 400-Pools-per-Year

148.8 lb VOM/hr per pool × 400 pools per year / 2000 lb/ton = **29.76 tpy VOM**

EXHIBIT C - Maximum Hourly VOM Emissions from Gelcoating at the Royal Fiberglass Pools Dix Plant

Pool Model	Royal Color	Gelcoat Usage	Backcoat Color	Backcoat Usage	Gelcoat Contents		Gelcoat Factors		Gelcoat Emissions			Backcoat Contents		Backcoat Factors		Backcoat Emissions		
	SAFAS				Styrene	MMA	Styrene	MMA	Styrene	MMA	VOM	Styrene	MMA	Styrene	MMA	Styrene	MMA	VOM
		lb/pool		lb/pool	(%wt)	(%wt)	(%sty)	(%MMA)	(lb/pool)	(lb/pool)	(lb/pool)	(%wt)	(%wt)	(%sty)	(%MMA)	(lb/pool)	(lb/pool)	(lb/pool)
BARON	Cream	334.69	White	202.13	24%	4%	44.51%	75%	35.75	10.04	45.79	27%	3%	44.51%	75%	24.29	4.55	28.84
BARON	Midnight	334.69	Clear	174.25	24%	4%	44.51%	75%	35.75	10.04	45.79	38%	10%	52.28%	75%	34.62	13.07	47.69
BARON	Periwinkle	357.00	Light Blue	174.25	24%	4%	44.51%	75%	38.14	10.71	48.85	28%	4%	44.51%	75%	21.72	5.23	26.94
BARON	Royal Sapphire	428.40	Clear	223.04	24%	4%	44.51%	75%	45.76	12.85	58.61	38%	10%	52.28%	75%	44.31	16.73	61.04
BARON	WHITE	223.69		0.00	27%	3%	44.51%	75%	26.88	5.03	31.91			44.51%	75%	0.00	0.00	0.00
CLASSIC	Teal	223.13	Gray	174.25	24%	4%	44.51%	75%	23.84	6.69	30.53	28%	4%	44.51%	75%	21.72	5.23	26.94
CLASSIC	WHITE	142.35		0.00	27%	3%	44.51%	75%	17.11	3.20	20.31			44.51%	75%	0.00	0.00	0.00
DUCHESS	Royal Sapphire	499.80	Clear	287.00	24%	4%	44.51%	75%	53.39	14.99	68.38	38%	10%	52.28%	75%	57.02	21.53	78.55
DUCHESS	Sky Blue	481.95	Light Blue	136.00	24%	4%	44.51%	75%	51.48	14.46	65.94	28%	4%	44.51%	75%	16.95	4.08	21.03
DUCHESS	Teal	446.25	Gray	174.25	24%	4%	44.51%	75%	47.67	13.39	61.06	28%	4%	44.51%	75%	21.72	5.23	26.94
DUCHESS	WHITE	266.79		0.00	27%	3%	44.51%	75%	32.06	6.00	38.06			44.51%	75%	0.00	0.00	0.00
DUKE SHALLOW	Midnight	334.69	Clear	174.25	24%	4%	44.51%	75%	35.75	10.04	45.79	38%	10%	52.28%	75%	34.62	13.07	47.69
DUKE SHALLOW	MOSS GRAY	211.40	Gray	90.00	24%	4%	44.51%	75%	22.58	6.34	28.92	28%	4%	44.51%	75%	11.22	2.70	13.92
DUKE SHALLOW	WHITE	226.64		0.00	27%	3%	44.51%	75%	27.24	5.10	32.34			44.51%	75%	0.00	0.00	0.00
JEWEL	Periwinkle	334.69	Light Blue	174.25	24%	4%	44.51%	75%	35.75	10.04	45.79	28%	4%	44.51%	75%	21.72	5.23	26.94
JEWEL	Teal	260.31	Gray	155.66	24%	4%	44.51%	75%	27.81	7.81	35.62	28%	4%	44.51%	75%	19.40	4.67	24.07
JEWEL	WHITE	188.99		0.00	27%	3%	44.51%	75%	22.71	4.25	26.96			44.51%	75%	0.00	0.00	0.00
KING DEEP	Midnight	557.81	Clear	261.38	24%	4%	44.51%	75%	59.59	16.73	76.32	38%	10%	52.28%	75%	51.93	19.60	71.53
KING DEEP	WHITE	291.72		0.00	27%	3%	44.51%	75%	35.06	6.56	41.62			44.51%	75%	0.00	0.00	0.00
KING SHALLOW	Cream	557.81	White	174.25	24%	4%	44.51%	75%	59.59	16.73	76.32	27%	3%	44.51%	75%	20.94	3.92	24.86
KING SHALLOW	Midnight	483.44	Clear	261.38	24%	4%	44.51%	75%	51.64	14.50	66.15	38%	10%	52.28%	75%	51.93	19.60	71.53
KING SHALLOW	Periwinkle	557.81	Light Blue	261.38	24%	4%	44.51%	75%	59.59	16.73	76.32	28%	4%	44.51%	75%	32.57	7.84	40.42
KING SHALLOW	Royal Sapphire	553.53	Clear	238.72	24%	4%	44.51%	75%	59.13	16.61	75.73	38%	10%	52.28%	75%	47.43	17.90	65.33
KING SHALLOW	Sand	571.20	White	223.04	24%	4%	44.51%	75%	61.02	17.14	78.15	27%	3%	44.51%	75%	26.80	5.02	31.82
KING SHALLOW	Sky Blue	481.95	Light Blue	287.60	24%	4%	44.51%	75%	51.48	14.46	65.94	28%	4%	44.51%	75%	35.84	8.63	44.47
KING SHALLOW	WHITE	339.15		0.00	27%	3%	44.51%	75%	40.76	7.63	48.39			44.51%	75%	0.00	0.00	0.00
MONARCH	WHITE	171.55		0.00	27%	3%	44.51%	75%	20.62	3.86	24.48			44.51%	75%	0.00	0.00	0.00
NOBLE	WHITE	173.67		0.00	27%	3%	44.51%	75%	20.87	3.91	24.78			44.51%	75%	0.00	0.00	0.00
PRINCESS DEEP	Teal	223.13	Gray	87.13	24%	4%	44.51%	75%	23.84	6.69	30.53	28%	4%	44.51%	75%	10.86	2.61	13.47
PRINCESS DEEP	WHITE	139.54		0.00	27%	3%	44.51%	75%	16.77	3.14	19.91			44.51%	75%	0.00	0.00	0.00
QUEEN	Moss Gray	361.46	Gray	133.41	24%	4%	44.51%	75%	38.61	10.84	49.46	28%	4%	44.51%	75%	16.63	4.00	20.63
QUEEN	Periwinkle	464.84	Light Blue	178.90	24%	4%	44.51%	75%	49.66	13.95	63.60	28%	4%	44.51%	75%	22.30	5.37	27.66
QUEEN	Sand	481.95	White	188.19	24%	4%	44.51%	75%	51.48	14.46	65.94	27%	3%	44.51%	75%	22.62	4.23	26.85
QUEEN	WHITE	322.66		0.00	27%	3%	44.51%	75%	38.78	7.26	46.04			44.51%	75%	0.00	0.00	0.00
ROMAN	WHITE	144.67		0.00	27%	3%	44.51%	75%	17.39	3.26	20.64			44.51%	75%	0.00	0.00	0.00

FROM: Robert Haberlein, Ph.D., QEP, Engineering Environmental Consulting Services
DATE: July 16, 2009
RE: Maximum Hourly VOM Emissions, Royal Fiberglass Pools, Dix, Illinois

The maximum hourly VOM emission rate is based on the following assumptions:

1. Maximum process emissions occur during the gelcoating process (gelcoat application emits at about twice the resin application rate).

2. According to actual usage data for CY 2008, the maximum gelcoat emissions occur when the greatest-emitting and second greatest-emitting colored pool models are gelcoated simultaneously in the same one-hour period.

3. The greatest gelcoat-emitting pool model is a Duchess Pool with a Royal Sapphire finish, which emits 78.55 lbs VOM per hour (see Exhibit C to the CAAPP revision).

4. The second greatest gelcoat-emitting pool model is a King Shallow Pool with a Sand finish, which emits 78.15 lbs VOM per hour (again see Exhibit C to the CAAPP revision).

The corresponding maximum facility-wide hourly VOM emission rate is:

78.55 + 78.15 = **156.70 lbs VOM per hour.**

The maximum resin application VOM emission rate for one pool is based on the following assumptions:

1. Maximum resin usage rate of 1.5 gallons per hour which is equivalent to 812 lbs per hour or about 50% of the total resin used per pool.

2. Resin styrene content of 47.5% by weight.

3. UEF emission factor for non-atomized resin application equal to 12.23 % styrene content weight

The maximum single-pool rein application hourly VOM emission rate is:

812 × 47.5% × 12.23% = **47.17 lbs VOM per hour**

The corresponding maximum facility-wide hourly VOM emission rate for simultaneous resin application to two pool molds is twice the single-pool rate:

47.17 + 47.17 = **94.34 lbs VOM per hour.**

EXHIBIT 3

ANALYSIS

Control Cost for a Regenerative Thermal Oxidation System at the Royal Pools Facility in Dix, Illinois

prepared under the supervision of

Mr. Dale A. Guariglia
Bryan Cave LLP
One Metropolitan Square
211 N. Broadway
Suite 3600
St. Louis, Missouri 63102-2750

on the behalf of

Royal Pool, Inc.
Breaux Bridge, Louisiana

by

Robert A. Haberlein, Ph.D., QEP
Engineering Environmental
Two Fisk Circle
Annapolis, Maryland 21401-3212

June 19, 2009

Executive Summary

If Royal Pools' Dix, Illinois facility were to install add-on emission controls, thermal oxidation is the only commercially available technology that is generally free of technical problems for controlling styrene vapor emissions from composite facilities.

A small skid-mounted regenerative thermal oxidizer unit is the most practical thermal oxidation option for the facility. As detailed in this report, a skid-mounted RTO control system would have the following characteristics and costs:

- The installed capital cost would be **$709,500**.
- The operating cost would be **$473,000 per year**.
- The amount of reduced annual styrene emissions would be about **25.71 tpy** (assuming 29.76 tpy at 86% overall capture & control efficiency – 90% capture and 96% control).
- The cost effectiveness would be about **$18,400 per ton** reduced styrene emissions per year.

Therefore, the RTO system is too expensive and would not be economically feasible at the Royal Pools' Dix, Illinois facility.

Section I – Introduction

Purpose

This report provides an updated and detailed Best Available Control Technology (BACT) cost analysis of the economic feasibility of a skid-mounted regenerative thermal oxidation system for a small, reinforced plastic composite pool manufacturing facility located in Dix, Illinois, which is henceforth called the "Dix Plant." This facility is owned and operated by Royal Pools, Inc. This updated and detailed control cost analysis was requested by the Illinois Environmental Protection Agency (IEPA) to support a petition request by Royal Pools for an adjusted standard that would allow the Dix Plant to emit more than eight pounds of VOC per hour when fabricating a large composite pool part.

Background

As detailed in **Table 1** of the compliance plan submitted to IEPA in 2005 (please see the next page), thermal oxidation is the only proven, commercially available control technology for controlling exhaust streams from a small, reinforced plastic composite facilities such as the Dix Plant. As shown in this table and discussed in Section III of this report, a pre-packaged skid-mounted RTO system is the least expensive oxidation technology for exhaust streams less than 50,000 cfm. Adwest is a leading manufacturer of skid-mounted RTO systems with competitive RTO equipment prices. For these reasons, this control cost analysis is based on a skid-mounted RTO unit manufactured by Adwest.

The cost analysis procedure in this analysis follows the guidelines for small RTO systems that are set forth in the *OAQPS Control Cost Manual - Sixth Edition.*

References

This report utilizes information on air pollution control systems from the following reference sources:

- EPA's *"Top-Down" Best Available Control Technology Guidance Document*
- EPA's *Handbook of Control Technologies for Hazardous Air Pollutants*
- EPA's *Assessment of Styrene Emission Controls for FRP/C and Boat Building Industries*
- Air pollution control cost guidelines in the EPA *OAQPS Control Cost Manual - Sixth Edition*
- ACMA's *Feasibility and Cost of the Capture and Control of Hazardous Air Pollutant Emissions from the Open Molding of Reinforced Plastic Composites*
- Recent control system quotes and communications from Adwest

Table 1 Commercially Available Air Pollution Controls
(Reprinted from the Feb 28, 2005 compliance plan submitted to IEPA)

Technology		**Applicability Concerns**	**Status at the Dix Plant**
Absorption		Styrene in nearly insoluble in water	infeasible
Adsorption		Styrene polymerizes on sorbent media Desorbed styrene is not reusable Desorbed styrene must be disposed as hazardous waste.	infeasible
Biodigestion		Microbes are unreliable and must stay warm and moist Digestion beds must be huge to handle exhaust airflow	infeasible
Condensation		Styrene concentration in air too low to be economic Condensate is mostly water with trace styrene Condensate must be disposed as hazardous waste.	infeasible
Flare		Styrene concentration in air is too low to be economic	infeasible
Oxidation	TO	Conventional recuperative oxidation is always more costly than RTO – SEE below	RTO is better
	RTO	Regenerative thermal oxidation is currently employed at one truck cap plant and several large bathware plants that produce small parts on automated production lines, operate continuously (24 hr/day, 360 days/yr) and have uncontrolled styrene emissions >250 tpy. A RTO system large enough to handle the 50,000 cfm exhaust airflow at the Dix Plant would cost over $600,000 to install and over $300,000 per year to operate.	technically feasible economically infeasible
	CO	Catalytic media has a relatively short lifetime and is unreliable	infeasible
Preconcentrator w/RTO		Preconcentrators are currently employed at four large bathware plants. The long-term performance of the adsorber is questionable due to an unexpected failure of the activated charcoal sorbent media at one of the sites. A preconcentrator system large enough to handle the proposed 50,000 cfm exhaust airflow at the Dix Plant would cost almost one million dollars to install and operate.	technically questionable economically infeasible

Since 2005, some of the referenced preconcentrator systems have been decommissioned and demolished and the original preconcentrator system has failed twice, leading to enforcement actions against the facility. The preconcentrator process is a still a technically questionable control technology for reinforced plastic composite facilities.

Section II – Description of Facility and Operations

Facility Operations

The Dix Plant produces large reinforced plastic composites pools using the mechanical atomized gelcoat application and the mechanical non-atomized resin application processes. The raw production materials include fiberglass reinforcements, metal and wood reinforcements, high-performance gelcoats, and high-performance vinyl ester and isophthalic resins. The gelcoats and resins are mixed with a small amount of organic peroxide initiator to start the curing reaction. Normally, about 50-75% of the gelcoat process emissions occur during the application phase, and the 25-50% occurs during the curing phase. About 33-50% of the resin emissions occur during application, and 50-67% occurs during rollout and curing.

All gelcoat and resin application at the plant takes place inside three self-contained rooms, which are called "Bays," that are located inside the plant building. Most of the pool production occurs in the two main bays (Bay 1 and Bay 2), but pool finishing, part repair, and some occasional small pool production occurs in the third bay. All three bays are connected to a common exhaust ventilation system.

Existing Ventilation

The exhaust ventilation for the three bays is currently provided by a single centrifugal fan connected to a single tall exhaust stack. The fan is rated at 40,000 cfm maximum airflow. The proposed control system would be directly connected to the existing ventilation outlet using a new section of 48-inch diameter duct and fittings, and the existing stack would be demolished.

According to the ventilation designer, Mr. Jimmie Talbot of Reed Industrial Systems, Inc., Shreveport, Louisiana, the Dix system is a typical push-pull ventilation system. The push-pull design directs fresh supply air around a reduced work zone area around the pool molds inside the bays. Most of the supply air is delivered by a mechanical air supply unit. An important portion of the supply air enters through gaps under the partially opened exterior bay doors.
According to Talbot, the doors should be opened about three to four feet above the floor for proper airflow and air motion in the work zones. The airflow induced by the supply air envelopes the pool mold and conducts most of the process vapors to the exhaust inlets located at the back of the bays (opposite the doors), where a significant portion of the process emissions are collected and discharged through the exhaust stack. However, a portion of the process emissions is recirculated back to the bay spaces, because the volumes of induced airflow moving towards the inlets are normally greater than the exhaust airflow. In this circumstance, it is physically impossible for all of the air flowing towards the exhaust inlets to be captured at the inlets and some of this air must be recirculated back.

The original control cost estimate in 2005 assumed the exhaust airflow was 50,000 acfm. At the request of IEPA, the actual exhaust airflow was measured by a third-party testing company, and Royal Pools has updated the original analysis using the actual measured airflow rate. The exhaust airflow rate in the exhaust stack was measured by CEC on May 19, 2009. The rate was measured three times for two conditions, the bay doors opened 1.5 feet and the doors wide open. The average exhaust airflows were 34,240 acfm and 34,810 acfm, respectively.

The difference between the two conditions was negligible (less than 2%). This is explained by the fact that most of the supply air is furnished by a mechanical supply air system inside the bays, so the flow restriction caused by partially closed doors has no appreciable effect on the exhaust airflow rate.

Accordingly, an exhaust airflow rate of 35,000 cfm, the nearest whole value derived from the recent third-party stack measurements by CEC, is assumed for this cost analysis.

Capture Efficiency

As discussed above, the ventilation system was designed to operate properly with the outside doors opened a minimum of three feet from the floor. The ventilation airflow was recently measured with the doors opened about 1.5 feet (18 inches), which was about one-half of the design gap distance specified by the system designer. The door gaps remain open during routine operation, so these gaps at the floor are natural draft openings (NDO) as defined in EPA Reference Method 204. In order to meet the presumption of 100% capture as detailed in Method 204, the inward air velocity through these openings must average 200 fpm or greater.

The three outside doors are the same size, measuring 20 feet wide and 16 feet high each. The design open gap is 3 feet, so the open area is $3 \times 20 = 60\ ft^2$ per door or $180\ ft^2$ in total for the three doors.

According to Mr. Talbot, approximately 80% of the supply air is delivered to the three bays from the mechanical supply air heater/handler unit. Hence, 20% of the supply air flows into the bays through the three open door gaps.

The average inward air velocity through the door gaps can be estimated using a simple volumetric calculation. Assuming a 1.5-foot gap under each door (only 50% of the design value of 3 feet) and 20% of the total 35,000 acfm controlled airflow rate derived from the CEC measurements, the average air velocity through the NDOs is $20\% \times 35{,}000\ cfm / (3 \times 1.5 \times 20) = 78\ fpm$. Hence, the actual average air velocity is only 39% of the minimum 200-fpm air velocity criterion required under EPA Reference Method 204 for 100% capture efficiency. The bays do not meet this criterion by a wide margin, so 100% capture of the process emissions inside the bays <u>cannot</u> be assumed.

The capture efficiency of the bays is also impacted by another physical phenomenon. Some of the bay walls and the bay ceilings are exterior building enclosure surfaces that are influenced by wind pressure. The negative pressures caused by the flow of wind, even light winds, will overwhelm the mechanically induced suction pressure created by the exhaust fan. This phenomenon is widely recognized and well documented, and is part of the Docket for the Composite MACT rule (see the report entitled *Feasibility and Cost of the Capture and Control of Hazardous Air Pollutant Emissions from the Open Molding of Reinforced Plastic Composites*). Negative wind pressures could draw process emissions out of the building through numerous cracks and cervices for all wind directions, and through the open door gaps for about three-fourths of the possible wind directions. The degree of loss depends on the wind direction and speed.

The actual average capture efficiency is unknown and may be truly unknowable. Method 204 offers several field-test methods to measure the actual capture efficiency for short periods, but these complex methods are difficult, time-consuming, and prohibitively expensive to perform. Regardless, the outcome of such testing would be so dependent on the wind speed and direction during the test runs that the results would not be accurate or representative.

As explained above, the value cannot be either 0% or 100%, so some intermediate value must be assumed in order to perform this cost analysis. Therefore, an interim value of 90% capture efficiency is assumed to reflect the very low average air velocity through the NDO door-gap openings and the influence of wind pressure on the exterior enclosure walls and ceiling.

Maximum Emission Rates

Prior to 2004, Royal Pools submitted an application to IEPA to permit the composite operations at the Dix Plant at a production level of 250 pools per year. In 2004, Royal Pools requested two revisions to this pending application. The company raised the maximum pool production level to 400 pools per year and increased the corresponding annual emission estimate to 16.3 tpy. The revised emissions estimate was based on conditions, materials, and processes used at the Louisiana Plant in 2004, not the conditions or materials used at the Dix Plant.

The original control cost estimate submitted to IEPA in 2005 included a detailed annual emission estimate for production of all-white pools at the Dix Plant. Based on this original estimate, the maximum annual emission rate was about 11.3 tpy for a production level of 250 pools per year.

There have been several important changes in material types and usages per pool since 2005. The Dix Plant now produces colored pools (using two layers of different gelcoats) in addition to the all-white pools that were made in 2005. Further, the company now has four years of material usage data at the Dix Plant instead of just one year. A summary of this new data is listed in **Table 2** on the next page.

Table 2 – Material Usages at the Dix Plant for 2005 through 2008

Year		2005	2006	2007	2008
Pools built per year		**158**	**188**	**200**	**161**
Hours worked	manhours	**27,657**	**28,714**	**30,002**	**21,340**
Manhours per pool		**175**	**153**	**150**	**133**
Hours per pool (9 workers)		**19**	**17**	**17**	**15**
Actual Annual Material Usages					
Resins	lb/yr	161,800	267,140	324,500	233,820
Gelcoats	lb/yr	35,704	51,475	71,727	55,607
Catalysts	lb/yr	3,136	4,068	5,317	4,608
Putties	lb/yr	0	0	0	0
Reported VOM	lb/yr	**14,773**	**23,222**	**29,616**	**21,443**
emissions	tpy	7.39	11.61	14.81	**11.65**
Actual "Per-Pool" Usages					
Resins	lb/pool	1,024	1,421	1,623	1,452
Gelcoats	lb/pool	226	274	359	345
Catalysts	lb/pool	19.8	21.6	26.6	28.6
Catalyst Ratio	% wt	1.59%	1.28%	1.34%	1.59%

Maximum "Per-Pool" Usages

	per original Sep 06 NOV plan lb/pool	per actual usage data 2005 through 2009 lb/pool
Resins	**990**	1,625
Gelcoats	**220**	360
Catalysts	**19.2**	32
Putties	**0**	0

A detailed estimate of the maximum emission rate per pool at the Dix Plant, which is based on the worst-case material usage data for four years of actual operations at Dix, is listed below:

Gelcoat –	360 lb gelcoats × 27.0% styrene × 44.51% styrene wt =	43.26 lb
	360 lb gelcoats × 3.9% MMA content × 75% MMA wt =	10.53 lb
Resin –	1,625 lb resins × 47.5% styrene × 12.23% styrene wt =	94.37 lb
Catalyst –	32 lb × 2% MEK × 100% MEK wt =	0.64 lb
	Total emissions per pool =	**148.80 lb**

Royal Pools has reviewed the above estimate and believes that it more accurately reflects the current conditions at the Dix Plant. The corresponding maximum annual emission rate at a production level of 400 pools per year is now:

400 pools/yr × 148.80 lb/hr / 2,000 lb/ton = **29.76 tpy**

For this reason, a maximum annual emission rate of 29.76 tpy is used in this cost analysis.

Maximum Production Hours-of-Operation and Annual Control Period

IEPA suggested that Royal Pools use the conditions specified in the 2004 permit application revision request for this control cost analysis. However, the 2004 request did not include any hours-of-operation limitation. Without such limitation, the facility could hypothetically operate continuously for 8,760 hours per year (non-leap years), so strictly speaking, this analysis should be made at 8,760 hours per year. However, a presumption of continuous operation is not reasonable for a production level of 400 pools per year at the Dix Plant. Obviously, a more reasonable assumption should be made for this analysis.

Historically, the Dix Plant has produced pools during three seasons and then shutdown production during the coldest part of the winter season. However, Royal Pools plans to build pools during the winter seasons in the future, after the pool market improves and stockpiling an inventory of pools becomes feasible. Thus, full four-season operation must be assumed for this analysis.

The Dix Plant needs a full 8-hour workshift to build 250 large pools per year. However, the plant has never produced 250 pools per year, so the additional labor requirements for 400-pools-per-year are not well documented. According to best estimates by Royal Pools, the production of 400 pools per year would require a full second-shift at the Dix Plant. Less than two shifts would result in significant overtime costs and scheduling problems. Hence, a full four-season two-shift production period is assumed for this cost analysis, which is equivalent to:

$$250 \text{ days/yr} \times 16 \text{ hrs/day} = 4{,}000 \text{ work hours per year}$$

In reality, the control system must be operated longer than the 4,000-hour work period assumed above for two important reasons. First, the oxidizer unit must be pre-heated to the prescribed 1,600 F oxidation temperature before the start of production. The unit preheating will require about one hour of firing with supplemental natural gas fuel on Monday mornings due to the prolonged two-day weekend unit shutdown and about 30 minutes of preheating on the other weekday mornings due to the shorter overnight unit shutdown period. Second, the oxidizer unit must be operated for about 15 minutes after the end of operations each workday to collect and destroy the process emissions that have accumulated inside the bay spaces. The total maximum control period, which includes the maximum production period and the additional preheat and after-work control periods, is computed as follows:

Two-shift production period		4,000 hrs/yr
Monday mornings	50 per year × 1 hrs/day =	50 hrs/yr
Other weekday mornings	200 per year × 0.5 hrs/day =	104 hrs/yr
After-work periods	250 per year × 0.25 hrs/day =	63 hrs/yr
Total annual control period		**4,213 hrs/yr**

Accordingly, a control period of 4,213 hours per year is assumed for this cost analysis.

Exhaust Styrene Concentration

The Ideal Gas Law and molecular weight of styrene can be used to convert the maximum annual emission rate into the corresponding average styrene concentration in the exhaust airflow. MMA and styrene have nearly the same molecular weight (104 for styrene and 100 for MMA) so styrene values can be used for both pollutants. The average hourly emission rate for an annual emission rate of 29.76 tpy with a capture efficiency of 90% over a control period of 4,123 hr/yr result is 12.99 lb/hr. The styrene exhaust concentration calculation is shown in **Table 3** below.

Table 3 – Styrene Exhaust Concentration Calculations

Molecular Wt (MW)	104.1	Styrene	
Standard Volume (SV)	24.45	@ 77°F & 1 atm	24.04 @ 68°F

Knowns		Unknown	
Average Flow Rate Q (dscfm)	Styrene Emission E (lb/hr)	Styrene Conc C (ppmv)	
35,000	150	268.7	peak hourly (gelcoating)
35,000	14.88	26.7	annual average production period
35,000	12.99	23.3	annual average control period 90% capture

$$C = \frac{35.53 \times 453{,}600 \times SV \times E}{60 \times MW \times Q}$$

Based on the foregoing, the plant-wide annual average hourly emission rate for all operations is greater than the 8-lb-per hour VOM emissions standard. The annual average control period concentration is surprising low. The low concentration is an unavoidable consequence of long periods of low emissions punctuated by short periods of very high emissions. The process ventilation system and companion control system must be sized large enough to protect the workers against chemical exposure at peak emissions, but then the system must continue to operate during the subsequent period of low emissions. This unique feature of composites manufacturing is the main reason that federal EPA did not require add-on controls for small sources in the Composite MACT rule.

Section III – Thermal Oxidation

Background

A thermal oxidation system uses thermal energy to oxidize the organic vapors in the plant exhaust. The oxidation process involves the high temperature destruction of the organic compounds into the combustion byproducts carbon dioxide (CO_2) and water vapor (H_2O). Theoretically, any hydrocarbon compound is completely oxidized according to the following equation:

$$C_aH_b + (a + 0.25b)\, O_2 \;\text{-->}\; (a)\, CO_2 + (0.5b)\, H_2O$$

For a natural gas-fired incinerator burning styrene vapor, the oxidation equations are:

$$CH_4 + (1 + 0.25 \times 4)\, O_2 \;\text{-->}\; CO_2 + 2\, H_2O$$

$$C_8H_8 + (8 + 0.25 \times 8)\, O_2 \;\text{-->}\; 8\, CO_2 + 4\, H_2O$$

The performance of an oxidizer is commonly characterized by three important parameters known as the "Three T's:"

1. ***Temperature*** - the oxidation reaction rate is accelerated at elevated temperatures. Higher temperatures cause faster oxidation rates and higher destruction efficiencies. In order to ensure a destruction efficiency of 99%, styrene vapor requires thermal oxidation temperature between 1,800 and 2,000°F with an associated retention time of 1 to 2 seconds. Acetone vapor requires an oxidation temperature of 1,800°F with a retention time of ½ to 1 second. Lower oxidation temperatures generally result in lower destruction efficiencies, as follows:

   - 1,525°F - the performance test of a RTO unit with an average oxidation temperature of 1,525°F revealed an excessive level of secondary carbon monoxide (CO) emissions in the exhaust that was unacceptable to the local EPA authorities.

   - 1,575°F - the average oxidation temperature for the aforementioned RTO unit was increased from of 1,525°F to 1,575°F, and the unit was retested. The concentration of secondary CO emissions in the exhaust dropped significantly to an acceptable level. Higher oxidation temperatures apparently resulted in lower secondary CO emissions.

   - 1,600°F - several existing RTO units at composite facilities have an oxidation temperature setting of about 1,600°F for styrene applications. This temperature corresponds to measured styrene destruction efficiencies of 98% or higher, and appears to result in the best balance of secondary CO and nitrogen oxide (NO_X) emissions.

2. ***Time*** - in order for the oxidation reaction to occur, the exhaust must remain at the reaction temperature for a minimum amount of time, called the "residence" or "retention" time. Greater destruction efficiencies result from longer residence times. Note that the temperature and time are inversely proportional (although nonlinear) to each other in determining destruction efficiency.

3. ***Turbulence*** - is required to ensure that the exhaust is well mixed throughout the incineration chamber. Otherwise, a portion of the exhaust could pass through the chamber without adequate oxidation. Note that turbulence is not directly related to either temperature or time, but is a necessary condition for high destruction efficiency.

Oxidation Technologies

An oxidation system may be characterized according to two different technology classification schemes:

- **Oxidation method** – "thermal" or "catalytic." Thermal oxidation is a mature control option that has been installed at several composites manufacturing facilities. No special technical problems are expected. Catalytic oxidization utilizes special catalytic cells, honeycombs, or coated beds that contain special catalyst materials. These catalyst materials consist of precious metals, such as platinum-coated or palladium-coated ceramic beads, or base metals, such as magnesium oxide particles. The catalyst hastens the oxidation of organic pollutant vapors at much lower temperatures than for straight thermal oxidation. The lower oxidation temperatures result in reduced supplemental fuel requirements and smaller amounts of secondary emissions from the oxidizer, such as carbon monoxides and nitrogen oxides.

- **Heat energy recovery method** - "recuperative" or "regenerative." Recuperative systems use heat exchangers and regenerative system use large thermal masses to recover oxidation heat.

The aforementioned oxidation technology classification schemes result in four possible system technology types:

1. **Recuperative Thermal Oxidation** – uses a heat exchanger to transfer the thermal energy from the oxidizer exhaust airstream to the inlet airstream. In this application, the heat exchanger normally consists of relatively thin metallic surfaces that serve to physically separate the two flow streams, yet still efficiently transfer the heat energy. These thin metallic surfaces are prone to mechanical and thermal damage at elevated temperatures, so a recuperative oxidizer is usually limited to chamber temperatures less than 1,600°F.

2. **Regenerative Thermal Oxidation (RTO)** – cycles the heat energy back and forth between the inlet and outlet airstreams using an arrangement of thermal masses. The

equipment is designed so that the hot exhaust gas heats a storage mass, usually a heat-resistant ceramic material, as the gas exits the very hot oxidation chamber. Once this storage mass has reached a preset temperature, the exhaust flow is redirected and the relatively cool styrene-laden plant exhaust flows through the heated mass. The energy stored in the thermal mass then heats the plant exhaust before it enters the oxidation chamber. As much as 95% of the thermal energy can be recovered and reused in this manner

3. **Recuperative Catalytic Oxidation** – combines the features of catalytic oxidation with recuperative heat recovery by incorporating a heat exchanger to transfer thermal energy from the oxidizer outlet stream to the inlet stream.

4. **Regenerative Catalytic Oxidation (RCO)** – combines the features of catalytic oxidation with the benefits of regenerative heat recovery. A RCO is very similar to a typical RTO unit, except that small layer or a fine coating of catalyst is added to the thermal regeneration masses.

Problems with Catalytic Oxidation Systems

Catalytic oxidation is more complicated than thermal oxidation and has four unique problems:

1. ***Catalyst Deactivation*** - refers to the steady deterioration in destruction efficiency caused by the deactivation of the catalyst. The transient nature of the catalytic effect requires careful system design and periodic replacement of the catalyst media. The catalyst in most systems is usually replaced every three to five years, but it may require annual replacement in some applications. Due to the unpredictable nature of the catalyst performance, continuous emissions monitoring may also be required by some regulatory agencies to verify the effectiveness of the catalyst. Such long-term monitoring is quite difficult for styrene vapor.

2. ***Catalyst Poisoning*** - is caused by various airborne contaminants, such as heavy metals, silicates, and sulfur, which poison the catalyst. This poisoning reduces the beneficial effect of the catalyst and requires the catalytic media to be replaced sooner than the expected service life. The problem of poisoning can be so sudden, severe, and unpredictable in some cases that catalytic oxidation is prohibited as a control option by the local reviewing agency. [Patkar, A. et. al.; "Hazardous Air Pollution Control Technologies: An Overview," New Hazardous Air Pollutant Laws and Regulations, SP-82; A&WMA, Pittsburgh, PA; 1992]. The problem of premature catalyst failure in a catalytic oxidizer was discussed with U.S.EPA during MACT promulgation, because the composites industry is likely to generate airborne catalytic poisons. Direct, firsthand evidence of this problem is available for the Polyad system at the American Standard fiberglass bathware facility in Ohio. The Polyad system used a catalytic oxidizer to destroy concentrated styrene vapor. However, catalyst poisoning caused the failure of the catalytic oxidizer. A core sample of the catalyst honeycomb was removed and analyzed for contamination. The analysis confirmed the

catalyst failure. An extremely large amount of silicon, and trace amounts of phosphorus, chlorine, and sulfur compounds were detected in the catalyst. Silicon is a common airborne contaminant at many composite plants (airborne glass dust and fiber) and was the suspected agent in this catalyst failure [Apr 29 '97 phone conversation with Magnus Danielson, Weatherly]. This experience offers a clear warning that catalytic oxidation is not suitable for composite facilities.

3. ***Catalyst Plugging*** - involves the small openings in the catalyst bed that can become plugged with foreign matter entrained into the exhaust stream. Significant quantities of dust and aerosol in the exhaust airstream are common to composites industry. Large resin aerosols can be easily removed by normal air filters, but fine dust and tiny aerosols are more difficult to remove. A thicker filter pad of the same filter media generally does not significantly increase the collection efficiency for tiny aerosols. A different media (much finer and more expensive) is needed instead. Indeed, any common filter media, no matter how thick cannot effectively collect the very tiny aerosol droplets. These tiny aerosols require a more sophisticated collection device. The filter pad installation at many plants is often "casual," resulting in gaps and holes, but this is a common problem and would be very difficult to avoid in practice. A completely different filter system and/or media would be needed to ensure a more "formal" installation.

4. ***Prefiltration Cost*** – is the most frequent solution proposed to prevent catalytic poisoning is a high-efficiency prefiltration system. If properly designed and maintained such a prefiltration system could greatly reduce, but not eliminate, the plugging problem. However, the cost of a high-efficiency filtration system can be great for large and dirty air streams, which are common at many open molding plants. For example, Aker Plastics composites manufacturing plant in West Virginia installed a high-efficiency prefiltration system to remove dust and aerosol from the exhaust airstream in the plant's exhaust streams.

Control System Design

The proposed RTO control system will include the following design features:

- ***Ductwork*** – will connect the existing exhaust outlets to the RTO unit inlet. This connection will consist of approximately 100 feet of 48-inch diameter galvanized steel spiral duct and four 48-inch galvanized steel elbow fittings. The cost of the ductwork material is given by the cost equations listed in Table 1.9 and Table 1.10 in Section 2 of the OAQPS Control Cost Manual. These OAQPS ductwork costs, which were developed in 1995, are adjusted to 2009 dollars using the Producer Price Index ratio of 1.394 for sheet metal manufacturing from the U.S. Bureau of Labor statistical database for the period from 1995 to 2009. The ductwork material costs are computed in **Table 4** on the next page. The ductwork installation cost is included in the overall control system cost estimate.

Table 4 – Ductwork Material Costs according to OAQPS

Duct diameter =	**48** in	
Inflation Factor $\$_{2009}/\ \$_{1995}$ = 187.5 / 134.5	**1.394**	
Galvanized spiral steel duct	**100** ft	OAQPS Cost Manual Section 2 - Table 1.9
Cost per ft $\$_{1995} = 1.55\ D^{.936}$	\$58 /ft	
Cost $\$_{1995}$	\$5,807	
Cost $\$_{2009}$	**\$8,096**	
Galvanized steel elbows	4 ea	OAQPS Cost Manual Section 2 - Table 1.10
Cost each $\$_{1995} = 30.4\ e^{0.0594(D)}$	\$258 ea	
Cost $\$_{1995}$	\$1,032	
Cost $\$_{2009}$	**\$1,438**	
Total ductwork material cost	**\$9,534**	

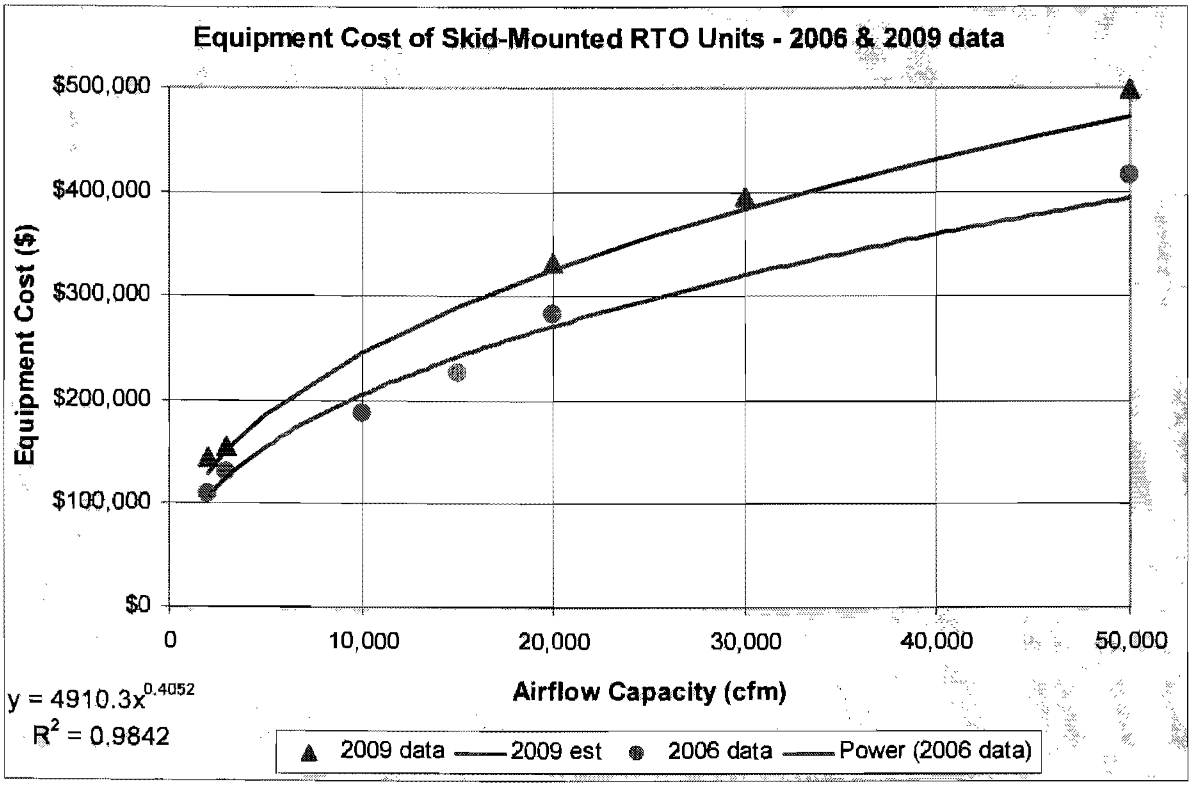
- ***Concrete Pad*** – the skid-mounted RTO unit will be mounted on a large steel-reinforced concrete pad that will be placed at an open area next the plant building. This pad must be designed to support the weight of the heavy RTO unit, and will require soil testing and special engineering approval. The cost of the design and installation of this pad is included as part of the overall OAQPS control cost estimate.

- ***Installation*** – a skid-mounted RTO system is a packaged unit that would require a minimal effort to install and start-up at the site. For this reason, the construction and startup line items in the OAQPS cost procedure are set to zero.

Control System Cost Assumptions and Parameters

- ***Annual control period*** – is 4,213 hours per years as previously discussed in Section II. This period covers a two-shift schedule and includes the startup, operating, and shutdown periods.
- ***RTO equipment cost*** – is **$408,833** FOB Anaheim using Adwest costs and cost multipliers as shown in **Figure 1** below:

Figure 1



The dark red line is the purchase cost equation (expressed as a power function) for skid-mounted RTO units made by Adwest. The data regression has a R^2 correlation of over 0.98, which indicates a very accurate regression fit This power function equation was used to estimate the RTO cost in the original cost analysis submitted to IEPA. However, according to Adwest, the purchase cost in 2009 will be at least 20% greater than the purchase cost in 2006 due chiefly to substantial increases in steel and ceramic media, which are energy sensitive raw materials. Thus, the original curve is modified by a factor of 120% to account for these cost increase (see the blue line). Five recent 2009 RTO unit quotes (shown as blue triangles) are plotted on the 2009 cost curve to verify the accuracy of the new 2009 cost curve. Ironically, the 2009 purchase cost for the smaller 35,000 cfm RTO unit is slightly greater than the original 2006 purchase cost for the larger 50,000 cfm RTO unit.

- ***State and local sales tax*** – is 7.75% of the purchased equipment cost (PEC) for Jefferson County, Illinois.
- ***Freight*** – 6% of PEC, which is greater than the OAQPS default value in 2000 due to the significant increases in freight costs since 2000.
- ***Ductwork material cost*** – is **$9,534** as computed earlier in **Table 4**.
- ***System pressure drop*** – is the sum of the pressure drops in the ductwork and RTO unit. According to Adwest, the combined pressure drop of the ductwork and unit will be 19 + 2 = 21 inches water gauge (w.g.).
- ***Fan efficiency*** – assumed 70%, which is the high bound of the OAQPS range of 40 to 70%.
- ***Motor efficiency*** – assumed 90%, which is the high bound of the OAQPS range for motors.
- ***Overall electrical efficiency*** – 70% × 90% = 63%.
- ***Electricity rate*** – $0.15 per kWhr is assumed for this cost analysis based on the comparable rates for the past few years and the likelihood of proportionally higher electricity rates for the next ten-year period,. This is an educated guess, because even the experts on electricity costs disagree on future rates for the next ten years, except that the rates will probably be much higher than today.
- ***Annual electricity cost*** – would be **$90,563 per year** as computed in **Table 5** below using the OAQPS equation. The total cost includes an additional 5% to operate the other equipment associated with control system.

Table 5 – Annual Electricity Utility Cost

Variable	Description	Value	Units	Source
Q_{exh}	Exhaust Airflow	35,000	cfm	
dP	Total pressure drop	21	in w.g.	Adwest 3/09
E_{motor}	Motor efficiency	90%		OAQPS
E_{fan}	Fan efficiency	70%		OAQPS 40-70%
E_{total}	Combined efficiency	63%	$E_{motor} \times E_{fan}$	OAQPS 60-70%

$$P_{fan} = 1.17 \times 10^{-4}\, Q_{con}\, dP \,/\, E_{total}$$

Electrical power rate 137 kW

H_{yr}	Annual operating hours	4,212.5	hr/yr	see hours sheet
E_{yr}	Annual electricity usage	575,006	kWhr	
R_{elect}	Electricity utility rate	$0.15	per kWhr	est 2010-2019

$$\$_{elect/yr} = P_{fan}\, H_{yr}\, R_{elect}$$

$86,251 / yr

Add 5% for unit controls and other powered control-related equipment

$90,563 / yr

- ***Interest rate*** – is assumed at 7% per year, which is the OAQPS default value. IEPA specifically directed this interest rate value in spite of the fact that IEPA also understands that a small facility such as the Dix Plant could not secure financing for a large air pollution control system at any interest rate under current economic conditions. If Royal Pools were forced to secure funding, the real interest rate might be 20 or 30%.
- ***Equipment lifetime*** – is assumed at 10 years, which is the OAQPS default value.
- ***Natural gas rate*** – is assumed at $15 per thousand cubic feet (MCF) which includes delivery charges and taxes.
- ***Thermal efficiency of RTO unit*** – would be at least 95% according to Adwest.
- ***Annual natural gas supplemental fuel cost*** – would be **$215,950 per year** according to the OAQPS supplemental fuel equation for thermal oxidation, which is shown in **Table 6** on the next page. The OAQPS equation requires an estimate of the specific heat value for air at 1,600 °F, which is provided in **Table** 7.
- ***Direct annual cost other than utilities*** – includes overhead, administrative charges, property taxes and insurance. The standard OAPQS values for these items are assumed
- ***Performance test*** – the OAQPS default value significantly underestimates the current cost of a Method 25A test. The typical cost for such a test, including the protocol, site prep, actual testing and test reporting, is $10,000. The analysis presumes that a performance test will be required by IL EPA every five years, which is equivalent to **$2,000 per year**.
- ***Filter replacement*** – would be **$7,000 per year** based on $0.20-per-cfm-per-year for similar high efficiency filters.
- ***Indirect annual costs*** – includes overhead, administrative charges, property taxes and insurance. The standard OAPQS values for these items are assumed.
- ***Capture efficiency*** – is assumed at 90%, as discussed in Section II.
- ***RTO oxidizer destruction efficiency*** – assumed to be 96% based on 1,600 °F oxidation temperature and actual performance test results for other units operated at this temperature.

The detailed control cost calculation for the RTO control system, which follows the procedures described in the OAQPS Control Cost Manual using the abovementioned assumptions and values, is shown in **Table 8** on the following two pages. This calculation includes the total capital investment and total annual operating cost and the control cost effectiveness.

Table 6 – Annual Natural Gas Utility Cost

Calculation of RTO Auxiliary Fuel Usage and Fuel Cost

Reference - EPA-OAQPS Control Cost Manual EPA 450/3-90-006 (revised Appendix 3B)

ρ_{wi}	**0.0737**	lb/ft^3	waste gas inlet density	*ideal dry gas at 77 F*
Q_{wi}	**35,000**	ft^3/min	waste gas inlet volumetric flow rate	
Q_{fo}	35,057	ft^3/min	flue outlet volumetric flow rate	
T_{wi}	**77**	°F	waste gas inlet temperature	
T_{wo}	1,524	°F	waste gas regen outlet temeprature	
T_{fi}	**1,600**	°F	combustion temperature	
T_{fo}	153	°F	exhaust (flue) temperature	
$T_{ref,af}$	**77**	°F	reference temperature (auxillary fuel inlet)	*OAQPS Appendix 3B, 3-71*
C_{pm}	**0.258**	Btu/lb-°F	average specific heat of air	*OAQPS - SEE spec heat sheet*
$\Delta h_{styrene}$	**4,805**	Btu/ft3	heat value of pure styrene vapor	*Boundy & Boyer, 1952*
$m_{styrene}$	**23.3**	ppmv	organic volumetric content	
Δh_{cwi}	0.112	Btu/ft3	heat value of organic volumetric content	
ΔH_{cwi}	1.5	Btu/lb	heat value of organic mass content	
ΔH_{caf}	**22,750**	Btu/lb	heat value of natural gas auxiliary fuel	*1001 Btu/ft^3*
η_{loss}	1%		heat loss from equipment surfaces	*OAQPS Appendix 3B, 3-72*
η_{therm}	95%		overall thermal efficiency of RTO	

$$\rho_{af} Q_{af} = \rho_{wi} Q_{wi} \{[C_{pm} [\eta_{loss} (T_{fi}-T_{ref}) + (T_{fo}-T_{wi})] - \Delta h_{cwi}\} / \{\Delta h_{caf} - C_{pm} [\eta_{loss} (T_{fi}-T_{ref}) + (T_{fo}-T_{ref})]\}$$

	2.506	lb/min	auxiliary fuel usage mass rate	*OAQPS Appendix 3B, 3-71*
	3.42	MMBtu/hr		
ρ_{af}	**0.0440**	lb/ft^3	natural gas density	
Q_{af}	57.0	ft^3/min	natural gas volumetric flow rate	
Hr_{YR}	**4,213**	hr/yr	annual operating hours	
Q_{gasyr}	143,967	CCF/yr	annual auxiliary fuel consumption	
R_{gas}	**$15**	/ MCF	natural gas utility rate	

$$\$_{gasyr} = R_{gas} Q_{gasyr} / 10$$

$215,950 / yr

Table 7 – Specific Heat Value for Air at 1,600°F

Calculation of Specific Heat for Air

Reference - EPA-OAQPS Control Cost Manual EPA 450/3-90-006 Table 3.13

For OAQPS Method

T_2 =	**1,600 °F**	T_1 =	**77 °F**
	1144 °K		298 °K

1 lb-mole = 453.6 g-mol
24.45 l/gmol @ 77 °F
11090.533 l
1 lb-mole = 391.7532 ft3

$Cp = 6.713 + 0.04697\times10^{-2}\,T + 0.1147\times10^{-5}\,T^2 - 0.4696\times10^{-9}\,T^3$

Cp =	8.048513612	Btu/lb-mole-F
	0.020544857	Btu/ft3-F
	0.277899623	Btu/lb-F

air density 0.0739 lb/ft^3 @ 77 °F

$\int Cp\,dT = 6.713 \times T + 0.04697\times10^{-2}\,T^2/2 + 0.1147\times10^{-5}\,T^3/3 - 0.4696\times10^{-9}\,T^4/4$

	T_2		T_1		
Cair = $\int Cp\,dT$	8359.3	-	2030.5	=	7.480 Btu/lb-mole-°F
$T_2 - T_1$	1144.1	-	298		**0.0191** Btu/ft^3-°F
					0.2583 Btu/lb-°F

Table 8 – Control Cost Calculation for the RTO System

Calculation of Control Costs for Regenerative Thermal Oxidation

Reference - EPA-OAQPS Control Cost Manual EPA/452/B-02-001 (revised Sep 2000)
adjusted for small skid-mounted RTO unit per Adwest Costs

CAPITAL COSTS				**NOTES**
Direct Costs				
Purchased Equipment Costs				
Control Equipment Cost (EC)		EC		
Skid-mounted RTO unit	**35,000** cfm		**$408,833**	Adwest cost data
Auxiliary Equipment		AUX		
Ductwork Materials			**$9,534**	see ductwork cost
Pressure Controller			**$10,400**	Adwestquote
		A = EC + AUX	$428,767	
Instrumentation - controller upgrade			**$4,600**	Adwest quote
Sales Tax		**7.75% of A**	**$32,158**	Jefferson Co sales tax
Freight		**6% of A**	**$25,726**	Anaheim CA to Dix IL
Purchased Equipment Cost (PEC)		B = PEC	$491,251	
Direct Installation Costs				
Foundations and Supports		8% of B	$39,300	
Handling and Erection		**6% of B**	**$29,475**	reduced for skid-mount
Electrical		**2% of B**	**$9,825**	reduced for skid-mount
Piping		2% of B	$9,825	
Insulation for Ductwork		1% of B	$4,913	
Painting		1% of B	$4,913	
Direct Installation Costs (DIC)		DIC = 20% of PEC	$98,250	OAQPS minimum
Site Preparation		SP	**$5,000**	security fence
			$5,000	demo existing stack
Buildings		Bldg	**$0**	
Total Direct Cost (DC)		DC	$594,501	
Indirect Costs (Installation)				
Engineering		10% of B	$49,125	
Construction and Field Expense		**by Adwest**	**$0**	included by Adwest
Contractor Fees		10% of B	$49,125	
Start-up		**by Adwest**	**$0**	included by Adwest
Performance Test		**EPA Method source test**	**$2,000**	5-yr test estimate
Contingencies		3% of B	$14,738	
Total Indirect Costs (IC)		IC	$114,988	
Total Capital Investment (TCI)		**TCI = DC + IC**	**$709,488**	

Table 8, continued – Control Cost Calculation for the RTO System, Continued

ANNUAL COSTS				
Direct Annual Costs (DAC)				
Operating Labor		DOC		
Operator		0.5 hr/shift @ $12.95/hr	$6,480	OAQPS
Supervisor		15% of operator labor	$972	OAQPS
Operating Materials		OM	**$0**	
Maintenance		MAIN		
Labor		0.5 hr/shift @ $12.95/hr	$7,130	OAQPS
Materials		100% of Maint. Labor	$7,130	OAQPS
Replacement Costs		R		
High-efficiency air filters			**$7,000**	$0.2 per cfm per yr
Utilities				
Electricity		E	**$90,563**	see electricity cost
Supplemental Fuel		F	**$215,950**	see natural gas cost
Total Direct Annual Cost (DAC)	DAC =	DOC+OM+MAIN+R+E+F	$335,225	
Indirect Annual Costs (IAC)				
Overhead		OV = 60% (DOC + MAIN)	$13,027	OAQPS
Administrative Charges		2% of TCI	$11,890	
Property Taxes		1% of TCI	$5,945	
Insurance		1% of TCI	$5,945	
Capital Recovery (Amortized TCI)				
Return on Investment (%)	**7%**			at IEPA direction
Economic Life (yr)	**10**			
Capital Recovery Factor (CRF)	0.1424	CRF x TCI	$101,015	
Total Indirect Annual Cost (IAC)	IAC =	OV + (0.04 + CRF) TCI	$137,822	
Total Annual Cost (TAC)		**TAC = DAC + IAC**	**$473,047**	
EMISSIONS REDUCTION				
Uncontrolled Plant Emissions		PTE	29.76	
Fraction of PTE to be controlled		%P	100%	
Capture Efficiency C%	**90%**			
Oxidizer Efficiency O%	**96%**			
Capture & Control Efficiency		D% = %P x C% x O%	86%	
Annual Emissions Reduction (tpy)		tpy = PTE x D%	**25.71**	
Control Cost Effectiveness		TAC / tpy	$18,397	per ton

Section IV – Conclusions

If the Dix Plant were to install add-on emission controls, thermal oxidation is the only commercially available technology that is generally free of technical problems for controlling styrene vapor emissions from composite facilities.

A small skid-mounted regenerative thermal oxidizer unit is the most practical thermal oxidation option for the Dix Plant. As detailed in the previous section, a skid-mounted RTO control system would have the following characteristics and costs:

- The installed capital cost would be **$709,500**.
- The operating cost would be **$473,000 per year**.
- The amount of reduced annual styrene emissions would be about **25.71 tpy** (assuming 29.76 tpy at 86% overall capture & control efficiency – 90% capture and 96% control).
- The cost effectiveness would be about **$18,400 per ton** reduced styrene emissions per year.

Therefore, the RTO system is too expensive and would not be economically feasible at the Dix Plant.

EXHIBIT 4

ENGINEERING ENVIRONMENTAL
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July 10, 2009

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Mr. Guariglia:

As you requested, a revised worst-case air quality ozone impact analysis of the maximum VOM emission rate from the Royal Pools facility in Dix, Illinois is attached hereto. This revision incorporates the recent increase in the maximum annual VOM emission rate from 11.3 tpy for 250 pools per year to 29.7 tpy for 400 pools per year.

As before in the original analysis, this revised analysis employs the Scheffe ozone screening tables, the latest ambient one-hour average ozone data from the ozone monitoring station nearest to the Dix facility, and the one-hour average ozone standard established by U.S. EPA.

As shown in this revised analysis, the worst-case one-hour average ozone impact has not changed. The new increased emission rate of 29.7 tpy is still less than 50 tpy, which is the lowest VOC emission row the Scheffe table. The greatest ozone impact is still only 89 ppb, which is only 74% of the one-hour average 120 ppb ozone standard.

This analysis is conservative, because the actual VOM emissions from the Dix facility will be less than the smallest annual NMOC emission rate listed in the Scheffe screening tables.

Best regards

Robert A. Haberlein, Ph.D., QEP

Revised Air Quality Impact Analysis of the VOC Emissions from the Royal Pools Facility in Dix, Illinois using the Scheffe Screening Tables

The most recent available five years of one-hour average ambient ozone data from the nearest ozone monitoring station located in Hamilton County is listed in the following table:

Year	1st	2nd	3rd	4th (highest samples in ppb)
2007	89	85	84	83
2006	79	79	74	73
2005	87	86	86	**85**
2004	85	81	80	76
2003	102	89	**88**	**85**

The fourth greatest ozone measurement value is 85 ppb in calendar years 2003 and 2005. Therefore, the one-hour average ozone baseline concentration for the Dix facility is 85 ppb.

The maximum proposed annual styrene and MMA emission rates from the Dix facility that results from the production of 400 pools per year is now 29.7 tpy. Styrene and MMA are the only significant VOM emission species from the plant. The only other significant emission specie is acetone, which is non-photochemically reactive and does not contribute to the formation of ozone. The total VOM emissions from the facility will be less than 30 tpy.

The maximum natural gas usage at the Dix plant should be less than 10 million cubic feet per year. According to the AP-42 NO_X factors for gas-fired heaters, this maximum usage is equivalent to:

$$10 \text{ million cu. ft.} \times 100 \text{ lb/million cu. ft.} / 2000 \text{ lb/ton} = 0.50 \text{ tpy of } NO_X \text{ emissions.}$$

The annual VOC-to-NO_X ratio is 30 / 0.50 = 60.

According to Scheffe Table 1 "*Rural based ozone increment as a function of NMOC emissions and NMOC/NO_X ratios*" in the September 1988 report entitled VOC/NO_X Point Source Screening Tables by Richard D. Scheffe of the U.S. EPA OAQPS office, the worst-case ozone increment for the Dix facility will only be 4 ppb (0.4 pphm × 10 ppb/pphm). This table value appears in the row labeled 50 tpy NMOC under the column labeled >20.7 NMOC/NO_X ratio.

Adding the one-hour average ozone increment for the Dix facility to the one-hour average ozone baseline for the local area yields a worst-case ozone impact concentration of 85 + 4 = 89 ppb.

This worst-case impact is much less than the one-hour average ozone standard of 120 ppb established by U.S. EPA. Although EPA replaced the one-hour average ozone standard with an eight-hour average standard for most areas in the USA on June 15, 2005, the one-hour ozone standard is still the only standard that would apply to the IL EPA 8 pound-per-hour VOC limit, which is also an hourly emission limitation.

EXHIBIT 5

ILLINOIS POLLUTION CONTROL BOARD
July 22, 2002

IN THE MATTER OF:	)	
	)	
PETITION OF CROWNLINE BOATS, INC.	)	AS 04-01
FOR AN ADJUSTED STANDARD FROM	)	(Adjusted Standard)
35 ILL. ADM. CODE 215.301	)	

DALE A. GUARIGLIA, BRYAN CAVE, LLP, and ANDREW POLCYN, M.E., ADVANCE ENVIRONMENTAL ASSOCIATES, L.L.C., APPPEARED ON BEHALF OF PETITIONER; and

CHARLES E. MATOESIAN APPEARED ON BEHALF OF THE ILLINOIS ENVIRONMENTAL PROTECTION AGENCY.

OPINION AND ORDER OF THE BOARD (by N.J. Melas):

Crownline Boats, Inc. (Crownline) is a fiberglass boat manufacturer located in West Frankfort, Franklin County. In this opinion and order, the Board exempts Crownline from compliance with the volatile organic material (VOM) control requirements at 35 Ill. Adm. Code 215.301. Crownline remains subject, under state and federal laws, to VOM controls set forth in the National Emission Standard for Hazardous Air Pollutants (NESHAP) along with additional conditions contained in this order.

On December 5, 2003, Crownline Boats, Inc. (Crownline) filed a petition for an adjusted standard from 35 Ill. Adm. Code 215.301 of the Board's air pollution regulations, commonly known as the "8 lb/hr Rule," as that Board regulation pertains to the emissions of VOM. Crownline's facility is located at 11884 Country Club Road, West Frankfort, Franklin County. In the petition, Crownline requested a hearing, which was held April 23, 2004. The Illinois Environmental Protection Agency (Agency) filed a recommendation that the Board grant Crownline's petition on January 22, 2004.

Accompanying the petition, Crownline filed a motion for expedited review. Crownline asserts that the Agency recently issued Crownline a Title V Clean Air Act Permit Program (CAAPP) permit and Title I permit, requiring Crownline either to obtain an adjusted standard from 35 Ill. Adm. Code 215.301 or demonstrate compliance with that section by December 31, 2004. On the same day, Dale A. Guariglia filed a motion requesting permission to appear *pro hac vice* on behalf of petitioner in this proceeding in accordance with Section 101.400(a)(3). 35 Ill. Adm. Code 101.400(a)(3). The Board granted both Crownline's motion for expedited review and Mr. Guariglia's motion to appear *pro hac vice*.

Based on the record before it, the Board finds that Crownline has provided sufficient justification for each of the Section 28.1 factors. The Board grants Crownline an adjusted standard from the 8 lb/hr Rule subject to conditions outlined in this order.

ADJUSTED STANDARD PROCEDURE

The Environmental Protection Act (Act) (415 ILCS 5/1 *et seq.* (2002)) and Board rules provide that a petitioner may request, and the Board may grant, an environmental standard that is different from the generally applicable standard that would otherwise apply to the petitioner. This is called an adjusted standard. The general procedures that govern an adjusted standard proceeding are found at Section 28.1 of the Act and Part 104, Subpart D of the Board's procedural rules. 415 ILCS 5/28.1; 35 Ill. Adm. Code 104.400 *et al.*

The Board rules for the content requirements of the petition and Agency recommendation are found at Section 104.406 and Section 104.416, respectively. 35 Ill. Adm. Code 104.406, 104.416.

PROCEDURAL BACKGROUND

On December 5, 2003, Crownline filed this petition (Pet.), accompanied by a motion for expedited review, with the Board for an adjusted standard from the paper coating rule. From December 10, 2003 through December 24, 2003, Crownline published notice of the petition in the *West Frankfort Daily American*, and filed the certificate of publication with the Board on January 5, 2004. The Agency filed its recommendation (Rec.) that the Board grant Crownline's requested relief on January 22, 2004, subject to certain terms and conditions contained in the Agency's recommendation.

On April 23, 2003, Hearing Officer Carol Sudman conducted a hearing in this matter at the offices of the West Frankfort City Administration Office, 110 North Jefferson Street, West Frankfort. Three witnesses testified at hearing: Mr. James T. Claxton, president of Crownline Boats; Mr. Dale Guariglia, attorney for Crownline; and Mr. Andrew Polcyn, consultant for Crownline. Hearing officer Sudman found all three witnesses credible. Mr. David Bloomberg was also present on behalf of the Agency's Bureau of Air. At hearing, Crownline offered eight exhibits (Pet. Exh.). Crownline filed a post-hearing brief on May 14, 2004 (Pet. Br.), and the Agency filed a post-hearing brief on May 17, 2004 (Ag. Br.).

FACTUAL BACKGROUND

The Facility

Crownline owns and operates a fiberglass boat manufacturing facility where it manufactures approximately 30 different models of personal recreation fiberglass boats ranging from 17'6" open bow boat, to a 29' cabin cruiser. Pet. at 4. Since it began operations in 1991, Crownline has manufactured approximately 40,000 boats, currently producing between 15-20 boats each day. The Frankfort facility began operation in 1994 and employs approximately 500-600 individuals. *Id.*

Crownline's boat manufacturing process involves the following production areas: (1) mold fabrication; (2) gelcoat application; (3) lamination; (4) grind & trim; (5) woodworking; (6) upholstery; (7) final assembly; and (8) shipping. This petition focuses mainly on the gelcoat and lamination production areas, since they generate most of Crownline's VOM emissions and are, therefore, most impacted by the 8 lb/hr Rule. In addition, Crownline notes that the use of adhesives, lacquers, and caulks in other production areas also do not meet the 8 lb/hr Rule on a strict hourly bases. Pet. at 4. Crownline's VOM emissions that do not meet the 8 lb/hr Rule consist primarily of styrene. *Id.*

Gelcoat Application

The purpose of the gelcoat application is to provide color and a smooth surface to the fiberglass boats. Pet. at 5. Molds are prepared for the gelcoat application by cleaning with stripping solvent and a wax-releasing agent applied. Pet. at 4. In one of four gelcoat booths, gelcoat is applied to the hull or deck mold in a single application using air atomized spray guns. There are thirty-one atomized spray guns in the gelcoat area. *Id.*

Lamination

After the gelcoat has dried, the molds are moved to one of twenty-four laminating stations. Pet. at 5. During lamination, glass fibers, polyester resin and a resin catalyst are applied to the mold using non-atomized flow-coat chopper guns (flow-coat guns). The layer of fiberglass and resin is then rolled flat using hand rollers to remove any air bubbles that were created in the application. Laminate is applied in layers called "skins" and requires curing periods between each skin application. Pet. At 5. Three resin skins are typically applied to decks and two to three skins for hulls, followed by a separate application to build the boat floor. *Id.*

Pollution Control Equipment In Use

In the gelcoat application and lamination processes, Crownline uses the following: (1) a high-volume ventilation system to keep styrene levels below the worker exposure limit required by OSHA; (2) enclosed spray booths in the gelcoat application process to reduce VOM emissions into the plant air when using spray guns; (3) use of lower styrene-content gelcoat (33.4%) and resin with lower hazardous air pollutant (HAP) content (35% HAP); (4) flow-coat guns in place of air atomized spray guns in the lamination area, (5) panel filters inside the spray booths and lamination areas to control particulate emissions from the spray guns; and (6) submerged-fill resin tanks in the lamination process to reduce splashing and the creation of VOM emissions. Pet. at 5.

VOM Emissions

Crownline states that the VOM emissions from the facility vary depending on the type and size of each custom boat it manufactures. Pet. at 5. Crownline's emissions consist primarily of styrene, but also include other VOMs and volatile organic HAPs such as methyl methacrylate (MMA). Technical Doc. at 6, 7, App. 7.

For purposes of complying with the 8 lb/hr Rule, the Agency directed Crownline to consider each boat part (*e.g.*, hull, deck, etc.) as the "emission source." Pet. Exh. 1 at 4. From the individual emission sources, Crownline estimated hourly VOM emissions. Among the highest were 34.08 lb/hr for gray lacquer, 15.89 lb/hr for carpet adhesive, 21.8 lb/hr for gelcoat, and 19.8 lb/hr for resin. Technical Doc. App. 7, Pet. Exh. 1, Exh. 5 and 6. Crownline notes that some values were overestimated, but several boat models still have parts with emissions greater than 8 lb/hr when VOM emissions are determined on a strictly hourly basis. Pet. Exh. 1 at 5.

According to its 2002 Annual Emissions Report, Crownline estimated VOM emissions totaled 187 tons per year. To quantify and compare potential VOM reductions, Crownline calculated its annual VOM emissions based on 2003 production data under three scenarios: pre-MACT, MACT, and the 8 lb/hr Rule in place. The pre-MACT scenario resulted in 244.82 tpy VOM, while the MACT scenario resulted in 199.79 tpy VOM, and the 8 lb/hr scenario yielded 144.36 tpy VOM. Technical Doc. App. 6, Exh. 3, 4 and 5. In terms of HAP, Crownline's pre-MACT emissions were approximately 204 tpy HAP, while the MACT scenario would result in a 50 tpy reduction in HAP. Pet. Exh. 1 at 7.

CAAPP Permit

In discussions between the Agency and Crownline regarding Crownline's draft CAAPP operating permit, the Agency stated that Crownline could not average emissions to demonstrate compliance with the 8 lb/hr Rule. The Agency stated that the 8 lb/hr Rule specifies a maximum hourly emission rate and, therefore, compliance would need to be demonstrated on a strict hourly basis, not on an average from any longer period of time. Crownline determined that based on the Agency's interpretation, it could not comply with the 8 lb/hr Rule. Pet. at 1.

On November 13, 2003, the Agency issued Crownline a Title V CAAPP permit and Title I permit (No. 055070AAU). The Title V permit states that Crownline is to obtain an adjusted standard from 35 Ill. Adm. Code 215.301 or demonstrate compliance with Section 215.301 by December 31, 2004. Pet. at 2. Crownline's CAAPP permit limits annual emissions to 249 tons of VOM per year. Pet. Exh. 1 at 8.

STANDARD OF REVIEW

The Board agrees with Crownline and the Agency that the regulation of general applicability at 35 Ill. Adm. Code 215.301 does not specify a level of justification for an adjusted standard. Pet. at 11; Rec. at 7. Therefore, pursuant to Section 28.1(c) of the Act, the burden of proof is on the petitioner to demonstrate that:

1. Factors relating to that petitioner are substantially and significantly different from the factors relied upon by the Board in adopting the general regulation 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) (2002); 35 Ill. Adm. Code 104.426(a).

CURRENT APPLICABLE STANDARDS

One standard applicable to Crownline's boat manufacturing operations is set forth in 35 Ill. Adm. Code 215.301. Section 215.301 provides:

> No person shall cause or allow the discharge of more than 3.6 kg/hr (8 lbs/hr) of organic material into the atmosphere from any emission source, except as provided in Sections 215.302, 215.303, 215.304 and the following exception: If no odor nuisance exists the limitation of this Subpart shall apply only to photochemically reactive material. 35 Ill. Adm. Code 215.301.

For purposes of complying with the 8 lb/hr Rule, the Agency has directed Crownline to consider each boat part (*e.g.*, hull, deck, etc.) an emission source. Pet. Exh. 1 at 4.

Under separate federal regulation effective August 23, 2004, Crownline must also meet newly promulgated NESHAPs for New and Existing Boat Manufacturing Facilities applicable to boat manufacturers that are major sources of HAP. Pet. at 6; citing 40 C.F.R. Part 63 Subpart VVVV, 40 C.F.R. 63.5683. Under Section 9.1(a) of the Act, NESHAP rules are applicable in Illinois and enforceable under the Act without additional rulemaking activity by the Board. 415 ILCS 5/9.1(a) (2002).

The rule requires that boat manufacturers use maximum available control technology (MACT) to meet the "MACT floor," which is the emission limitations achieved by the top performing 12% of boat manufacturers in the nation. Pet. at 6. To comply with a HAP limit calculated for a facility, manufacturers can use one of the following options: emissions averaging using a 12-month rolling average, compliant materials, and/or add-on controls. 40 C.F.R. 63.5701, 63.5710. Other requirements include: using lower HAP content gel-coat and resins; covering resin, gelcoat and solvent containers; and using cleaning solvents and adhesives containing no more than 5% HAP. The MACT standard does not require air pollution equipment. To comply with MACT, Crownline opines that most boat manufacturers with open molding operations will have to use flow-coat guns and low-HAP production materials in their resins, gelcoats, and adhesives. A flow coat gun generates fewer emissions because it operates at a lower pressure and has a non-atomized delivery system. The United States Environmental Protection Agency (USEPA) estimates that by complying with the new MACT standard, boat manufacturers will reduce HAP emissions by an average of 35%. Pet. at 2, 6; citing 66 F.R. 44222.

Crownline states it is currently in compliance with the new MACT standard. Crownline uses flow-coat guns in its lamination operating and resin and gelcoat with lower percentages of HAP content. Pet. at 6. Crownline has not yet made a demonstration of compliance to the USEPA, and will not be required to do so until August 2005. Pet. Exh. 1 at 3.

CROWNLINE'S PROPOSED ADJUSTED STANDARD

In the petition, Crownline proposed the following adjusted standard language for adoption by the Board:

> Pursuant to the authority under Section 28.1 of the Environmental Protection Act, the Board hereby adopts the following adjusted standard. This adjusted standard shall apply solely to Crownline Boats, Inc. ("Crownline"). As an alternative to compliance with 35 IAC § 215.301, this adjusted standard allows Crownline to limit its discharge of organic material into the atmosphere from its boat manufacturing operations by complying with the National Emission Standard for Hazardous Air Pollutants for New and Existing Boat Manufacturing Facilities, set forth at 40 CFR §63 Subpart VVVV, as may be amended in the future.

The Agency recommended that the Board grant Crownline the requested adjusted standard so long as Crownline complied with the following additional conditions:

a. Crownline shall operate in full compliance with the National Emission Standards for Hazardous Air Pollutants for New and Existing Board Manufacturing Facilities, set forth at 40 C.F.R. Section 63 Subpart VVVV, as may be amended in the future.

b. Operation in full compliance with the National Emission Standard for Hazardous Air Pollutants for New and Existing Boat Manufacturing Facilities, set forth at 40 CFR Section §63 Subpart VVVV, as may be amended in the future, shall be in lieu of compliance with the 8 lb/hr Rule found at 35 Ill. Adm. Code 215.301.

c. Crownline shall continue to investigate boat production methods with a reduced VOM content and, where practicable, shall substitute current coatings with lower VOM content coatings as long as such substitution does not result in a new increase in VOM emissions. Crownline shall be required to do any test which the Illinois EPA specifically recommends that they do. An annual report summarizing the activities and results of these investigatory efforts shall be prepared by Crownline and submitted to the Illinois EPA Bureau of Air, Compliance and Enforcement.

d. The relief granted in this proceeding shall be limited to the emission activities at the Crownline West Frankfort facility as of the date of this filing.

e. Crownline shall operate in full compliance with the Clean Air Act, its CAAPP, the Illinois Environmental Protection Act and other applicable regulations not otherwise discussed herein. Rec. at 5-6.

At hearing, Crownline submitted the following revised adjusted standard language, agreed to by the Agency (Tr. at 41, Pet. Br., Exh. B), for adoption:

> As an alternative to compliance with the 8 lb/hr Rule found at 35 Ill. Adm. Code 215.301, this adjusted standard allows Crownline to limit its discharge of organic material into the atmosphere from its boat manufacturing operations by operating in full compliance with the National Emission Standard for Hazardous Air Pollutants for New and Existing Boat Manufacturing Facilities, set forth at 40 C.F.R. §63, Subpart VVVV, as may be amended in the future, and with the following conditions:
>
> a. Crownline shall continue to investigate boat production methods with a reduced VOM content and, where practicable, shall substitute current coatings with lower VOM content coatings as long as such substitution does not result in a net increase in VOM emissions. Crownline shall be required to do any reasonable test of new technologically or economically reasonable production methods or materials applicable to the open-mold fiberglass boat manufacturing industry which may reduce VOM emissions at Crownline's facility which the Illinois EPA Bureau of Air specifically requests in writing that they do. An annual report summarizing the activities and results of these investigatory efforts shall be prepared by Crownline and submitted to the Illinois EPA Bureau of Air, Compliance and Enforcement Section.
>
> b. The relief granted in this proceeding shall be limited to the emission activities at the Crownline West Frankfort facility as of the date of this filing.
>
> c. Nothing in this adjusted standard shall relieve Crownline of its duty to operate in full compliance with the Clean Air Act, its CAAPP, the Illinois Environmental Protection Act and other applicable regulations not otherwise discussed herein.

CROWNLINE'S COMPLIANCE WITH THE MACT STANDARD

Under separate NESHAP requirements applicable to Crownline under Section 9.1(a) of the Act, Crownline states it took steps early to comply with the MACT and came into compliance with MACT emission limits more than a year prior to the deadline. Pet. at 2. However, Crownline has not yet demonstrated compliance, and will not have to until August 2005. Pet. Exh. 1 at 3. Crownline states that it will demonstrate compliance to USEPA with the new MACT standard by using the "model point value averaging option" based on a 12-month rolling average and by using compliant materials. *Id.* Crownline notes that its HAP emission limits will vary from month to month based on an equation set forth in 40 C.F.R. 63.5698. Pet. Exh. 1 at 6.

The USEPA estimates that compliance with the MACT standard by the boat manufacturing industry will result in an annual cost of compliance of $4,060 per ton of HAP reduced and will reduce HAP emissions by an average of 35%. 66 F.R. 44222. Crownline estimates its annual compliance costs at approximately $215,600 per year and that it will reduce annual HAP emissions (not total VOM) by approximately 50 tons, or 25%. Pet. Exh. 1 at 2. Crownline's annual compliance cost is approximately $4,312 per ton of HAP reduced, which is similar to USEPA's estimate of $4,060 per ton HAP reduced. Pet. Exh. 1 at 3, 8. In terms of VOM, Crownline estimated a reduction from 244.82 tpy VOM to 199.79 tpy VOM under the MACT scenario. Technical Doc., App. 6, Exh. 3 and 4.

EFFORTS TO ACHIEVE COMPLIANCE AND ALTERNATIVES

Crownline states it has investigated the following alternatives that would help Crownline comply with the 8lb/hr Rule: (1) reducing VOM content in production materials; (2) using alternative operating procedures and methods; and (3) installing end-of-the-pipe emission control. Crownline states that investigations proved that, other than end-of-the-pipe emission controls, many of the alternatives would not bring Crownline into compliance with the 8 lb/hr Rule on a strict hourly basis. Pet. at 6.

Reducing VOM in Production Materials

Crownline has reduced VOM in its resin and gelcoat production materials to meet the federal MACT standard. However, meeting the MACT standard alone will not bring Crownline into compliance with the State 8 lb/hr Rule. Crownline states that it is not possible to further reduce styrene in the resins and still maintain product integrity. Pet. at 6. Crownline and its consultant, Advanced Environmental Associates (AEA), could not identify any compliance alternatives to reduce VOM emissions from Crownline's use of adhesives, lacquer and caulks.

Using Alternative Operating Procedures and Methods

Crownline states that it investigated both open molding and closed molding alternative production methods. However, Crownline found that even though the alternatives investigated would reduce VOM emissions, they would not bring Crownline into compliance with the 8 lb/hr Rule on a strictly hourly basis. Crownline explained that the open and closed molding alternative production methods investigated are only available to the lamination process and there are no alternative technologies currently available for the gelcoat, lacquering, caulking, and adhesive operations. Pet. at 7. Crownline replaced its atomized spray chopper guns used for resin application with flow-coat guns in its lamination area. Technical Doc. at 4. The flow-coat guns have lower pressure and internal mixing as compared to the atomized guns. Pet. at 5. Crownline states it experimented with using flow-coat guns in the gelcoat process, but they had too much of a negative impact on product quality. Pet. Exh. 1 at 2.

End-of-Pipe Controls

In developing the MACT, the USEPA did not include any emission control technologies as the MACT floor for the following reasons: (1) only one boat manufacturer used tailstack emission control technologies to reduce HAP emissions; (2) the cost of emission control systems was very high because very high air flows needed by facilities to comply with OSHA's styrene regulations; and (3) the boat manufacturing industry can reduce HAP content of resins, gelcoat, and other materials to significantly reduce total HAP emissions without undue financial burden. Pet. at 7.

Crownline's consultant investigated the various end-of-pipe control technologies. As a result of the analysis, Crownline determined that emission controls are cost prohibitive and, therefore, not an economically reasonable option. For example, up-front capital costs to install tail-stack controls range from $7 million to $14 million with annual costs ranging from $4.5 million to nearly $6 million. Crownline estimates that such control would range from approximately $35,000 to $58,000 per ton of VOM removed. Pet. at 8; Technical Doc. at 16, 18.

Crownline explains that the reason end-of-pipe controls are so costly is because of the large volume of air that must be treated in order to reduce the relatively small amount of VOM. As discussed above, Crownline must move a large volume of air through the gelcoat and lamination areas to maintain compliance with OSHA's 8-hour worker exposure limit for styrene. Technical Doc. at 16, 18.

SUBSTANTIALLY DIFFERENT FACTORS

Crownline states that the primary intent of the 8 lb/hr Rule was to prevent ozone formation and odor nuisance. Crownline asserts that the Board did not contemplate the methods Crownline uses to manufacture boats at the Frankfort facility when it promulgated the 8 lb/hr Rule in 1971. Pet. at 11. Crownline states that manufacturing fiberglass boat decks or hulls involves a batch-type process rather than a continuous application process typically used in manufacturing processes for other products. Crownline argues this fact together with the ventilation system it uses to comply with OSHA's worker protection regulation at 29 C.F.R. 1910 makes the use of add-on emission controls economically unreasonable. Under OSHA worker health and safety standards for styrene, Crownline must maintain high air flow to ventilate building air. The high air flow makes the cost of using tail-end stack emissions controls unreasonably high. Crownline states that the Board did not anticipate the current fiberglass boat production methods and the OSHA standard when it adopted the 8 lb/hr Rule in 1971. Pet. at 12-13.

IMPACT ON THE ENVIRONMENT

Crownline contends that its requested adjusted standard will not adversely impact the environment or human health. Pet. at 13. Through AEA, Crownline performed an ambient air quality analysis to estimate Crownline's impact on ozone formation in south-central Illinois. Pet. at 9. AEA used an ozone screening method developed by the USEPA to determine the impacts of ozone formation. *Id.* Crownline contends that even without the changes it implemented to meet the MACT standard, the Crownline facility would not cause or contribute to any ozone exceedences in south-central Illinois. Based on its Ozone Impact Analysis, Crownline could more than triple its current annual VOM emissions without causing an exceedance of the 1-hour ozone NAAQS. Pet. Exh. 1 at 8, Pet. Exh. 2. Currently, the Crownline facility emits approximately 195 tons/yr of VOM per year, and is permitted to produce 249 tpy VOM. Tr. at 22; Pet. Exh. 1 at 8. Compliance with the 8 lb/hr Rule would yield approximately 144 tons of VOM per year. Rec. at 6. Before making any changes, the facility would emit approximately 245 tons/yr of VOM for similar production figures. *Id.* The Agency agrees with Crownline that if Crownline could capture the VOM emissions and release them uniformly, rather than in spurts, it could comply with the 8 lb/hr Rule while not reducing emissions at all. Rec. at 6.

Crownline asserts that the Agency estimates a decrease in the amount of solid waste generated and no adverse impacts on water quality and energy consumption from the adjusted standard. Pet. at 11.

CONSISTENCY WITH FEDERAL LAW

Crownline states there is no Clean Air Act equivalent rule or regulation prohibiting boat manufacturers' emissions of VOM in excess of 8 lbs/hr, on a strictly hourly basis. Crownline points out that regardless, the facility must comply with the new federal NESHAP for boat manufacturers. Moreover, Crownline contends that if the Board grants Crownline's requested relief, Crownline will submit the adjusted standard to the USEPA to be included in Illinois' State Implementation Plan (SIP). For these reasons, Crownline states the proposed adjusted standard is consistent with federal law. Pet. at 13.

DISCUSSION

Crownline seeks relief from the State's 8 lb/hr Rule in the form of an adjusted standard. Under separate federal regulation applicable to it under Section 9.1(a) of the Act, Crownline is already required to comply with the NESHAP for New and Existing Boat Manufacturing Facilities, which limits HAP emissions from facilities such as the Crownline West Frankfort plant. Crownline must comply with the MACT emissions limits under this standard by August 23, 2004. Accordingly, Crownline requests that Section 215.301 not apply to their operations. The Agency recommends that the Board grant Crownline the requested relief subject to certain conditions. If granted, the adjusted standard would apply only to the materials and methods Crownline uses to manufacture fiberglass boats at its West Frankfort facility.

The Board finds that Crownline's request for relief from the 8 lb/hr Rule meets the statutory "fundamentally different" factors of section 28.1(c) of the Act. Crownline has demonstrated that: (1) factors relating to it are substantially and significantly different from the factors relied upon by the Board in adopting the general regulation; (2) the existence of these factors justifies an adjusted standard; (3) the requested standard will not cause substantially or significantly more adverse environmental or health effects than the effects considered by the Board in adopting the rule of general applicability; and (4) the adjusted standard is consistent with applicable federal laws. 415 ILCS 5/28.1(c) (2002).

Crownline bases its justification for the requested relief on the lack of an economically reasonable or technically feasible alternative. The Board finds that the efforts beyond those Crownline has already implemented in the three categories of alternatives that Crownline investigated (reducing VOM content in production materials, employing alternative operating procedures and production methods, and applying end-of-pipe controls) are not currently technically feasible or economically reasonable. Additionally, the Ozone Impact Analysis shows that Crownline's emissions will not cause negative health or environmental effects.

The Board finds no inconsistency between granting Crownline's requested relief and federal law. Finally, the Board finds that the Board did not anticipate the batch-type processes of coating and laminating fiberglass boat parts that Crownline employs at the West Frankfort facility when it promulgated the 8 lb/hr Rule at Section 215.301. As a matter of law, Crownline must comply with the MACT emissions limits by August 23, 2004, which Crownline states it has achieved over a year early.

The Agency's recommended adjusted standard language contains some conditions that Crownline's proposed language does not include. Rec. at 5. Specifically, the Agency proposed language limiting Crownline's relief to apply specifically to the emission activities at the Crownline West Frankfort facility, the effective date being the Board's final decision in this matter. The Agency's adjusted standard language reiterated that Crownline must operate in full compliance with the federal standard. *Id.* The Agency proposed language requiring Crownline to continue to investigate boat production methods and, where practicable, substitute current coatings with lower VOM content coatings as long as the substitution does not result in increased VOM emissions. The Agency further proposed that Crownline must do testing as the Agency recommends and submit annual reports summarizing the activities and results of its investigations to the Agency, Bureau of Air. *Id.*

At hearing, Crownline submitted revised language, including three conditions, with no objection by the Agency. The revised wording incorporated the Agency's proposals to: (1) continue to investigate boat production methods with a reduced VOM content and, where practicable, substitute current coatings with lower VOM content coatings so long as the substitution does not result in higher VOM emissions; (2) perform any reasonable test of new production methods or materials that the Agency, Bureau of Air, request in writing that they do; and (3) submit an annual report summarizing the activities and results of their investigations. The revised wording also reiterates that Crownline must operate in compliance with the federal standard.

In granting this adjusted standard, the Board is adopting conditions similar, but not identical in wording, to those suggested by the parties. The Board used Crownline's revised language and, as the Agency recommended, the Board has tightened up the description of the facility and clarified reporting requirements. The balance of the changes are non-substantive, and are intended to bring this order into conformity with the Board's usual drafting style in adjusted standards.

CONCLUSION

The Board grants Crownline's requested relief and exempts it from the 8 lb/hr Rule at Section 215.301 of the Board's regulations at its facility in West Frankfort, Franklin County, Crownline remains subject to the NESHAP applicable to its facility and suggested conditions. The relief is effective as of the date of this order.

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

ORDER

1. Pursuant to Section 28.1 of the Environmental Protection Act (Act) (415 ILCS 5/28.1), the Board grants Crownline Boats, Inc. an adjusted standard from 35 Ill. Adm. Code 215.301 (8 lb/hr Rule), effective July 24, 2004. The adjusted standard applies to the emissions of volatile organic material (VOM) into the atmosphere from Crownline's boat manufacturing facility located at 11884 Country Club Road, West Frankfort, Franklin County.

2. 35 Ill. Adm. Code 215.301 does not apply. Crownline remains subject to the following:

   a. Crownline must continue to investigate boat production methods that generate fewer VOM emissions and materials that have a reduced VOM content. Where practicable, Crownline must substitute current materials with lower VOM content materials as long as such substitution does not result in a net increase in VOM emissions.

   b. Crownline must perform any reasonable test of new technologically or economically reasonable production methods or materials applicable to the open-mold fiberglass boat manufacturing industry, which may reduce VOM emissions at Crownline's facility which the Illinois Environmental Protection Agency (Agency) specifically requests in writing that they do.

   c. Crownline must prepare and submit each year an annual report summarizing the activities and results of these investigatory efforts. The annual report must be submitted to the Agency, Bureau of Air, Compliance and Enforcement Section;

   d. Crownline must operate in full compliance with the Clean Air Act, its Clean Air Act Permit Program permit, the National Emissions Standard for Hazardous Air Pollutants for New and Existing Boat Manufacturing Facilities, set forth at 40 C.F.R. 63, Subpart VVVV, as required by Section 9.1(a) of the Act, and any other applicable regulation.

IT IS SO ORDERED.

Section 41(a) of the Environmental Protection Act provides that final Board orders may be appealed directly to the Illinois Appellate Court within 35 days after the Board serves the order. 415 ILCS 5/41(a) (2000); *see also* 35 Ill. Adm. Code 101.300(d)(2), 101.906, 102.706. Illinois Supreme Court Rule 335 establishes filing requirements that apply when the Illinois Appellate Court, by statute, directly reviews administrative orders. 172 Ill. 2d R. 335. The Board's procedural rules provide that motions for the Board to reconsider or modify its final orders may be filed with the Board within 35 days after the order is received. 35 Ill. Adm. Code 101.520; *see also* 35 Ill. Adm. Code 101.902, 102.700, 102.702.

I, Dorothy M. Gunn, Clerk of the Illinois Pollution Control Board, certify that the Board adopted the above opinion and order on July 22, 2004, by a vote of 5-0.

Dorothy M. Gunn

Dorothy M. Gunn, Clerk
Illinois Pollution Control Board

BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

IN THE MATTER OF:	)	
	)	
Petition of Royal Fiberglass Pools, Inc.	)	AS 2009-04
for an Adjusted Standard from	)	(Adjusted Standard)
35 IAC § 215.301	)	

TECHNICAL DOCUMENT SUPPORTING ROYAL FIBERGLASS POOLS, INC.'S FIRST AMENDED PETITION FOR AN ADJUSTED STANDARD

Section	Description
1	General Information Regarding Royal Fiberglass Pools and Photographs of the Composite Fiberglass Swimming Pool Manufacturing Process.
2	Exhibits A, B, and C attached to Royal's modification to its CAAPP permit application filed July 14, 2009, detailing Royal's: material usages and emissions, annual potential to emit, and maximum hourly VOM emissions. July 16, 2009 memorandum regarding Royal Fiberglass Pools' Maximum Hourly VOM Emissions, prepared by Engineering Environmental Consulting Services.
3	June 19, 2009 Control Cost Analysis for a Regenerative Thermal Oxidation System prepared by Engineering Environmental Consulting Services.
4	July 10, 2009 Air Quality Impact Analysis of Royal Fiberglass Pools' Dix Plant Operations prepared by Engineering Environmental Consulting Services.
5	July 22, 2006 Illinois Pollution Control Board Decision Regarding Crownline Boats, Inc.'s Petition for an Adjusted Standard.

Respectfully submitted,

BRYAN CAVE LLP

By: [signature]

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CERTIFICATE OF SERVICE

The undersigned certifies that a copy of the foregoing Technical Document was served upon the following parties on the 17th day of July, 2009:

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[signature]