

HRP Associates, Inc. assists RMAX, Inc. with the Transition to a Hydrocarbon Blowing Agent

In the spring of 1998, RMax, Inc. (RMax), a polyisocyanurate foam insulation manufacturer located in Greer, South Carolina, began the difficult task of finding an alternative chemical for one of its major process components, its blowing agent. Its current blowing agent, a mixture of HCFC 141b and R22, has a phase out date for use in the United States of 2003 (Both HCFC 141b and HCFC 22 are ozone depleting substances).

RMax's main goal in the search for a replacement was to find an alternative chemical(s) with similar properties such that the insulating values of its foam would not be adversely affected. In its manufacturing process, it is the blowing agent which is contained, as a gas, in the foam and which gives the foam its insulating properties. RMax's search eventually led it to a similar hydrocarbon blowing agent that is being successfully used in operations in Europe. With the decision to use a hydrocarbon blowing agent (a blend of volatile organic

AIR PERMITTING

During the standard controlled foam manufacturing process used by RMax, a small amount of blowing agent is released from the facility. Since both HCFC 141b and HCFC 22 were determined to have a negligible photochemical reactivity (for regulatory purposes these compounds were not considered VOC's) RMax was not required to maintain an air emissions permit for these minor releases. With the use of the hydrocarbon blowing agent, however, maximum potential emissions from the process would exceed major source thresholds for VOC's, requiring not only a state operating permit, but also a Title V (major source) permit. In addition, at these emission levels, regulations requiring costly permitting efforts and/or emissions controls, such as Prevention of Significant Deterioration (PSD) and Lowest Achievable Emission Rate (LAER) were potentially applicable. Mr. Ed Godlewski, Plant Manager for RMax, commented,

"Obtaining an air emissions permit that would allow RMax the operational flexibility it needed was paramount in the project moving forward."

Our goal, based on the results of the regulatory review, was to develop a permitting strategy that would maximize the flexibility of the process while minimizing the cost of permitting and controls.

HRP prepared a construction permit, a dispersion modeling analysis demonstrating compliance with all applicable applications of the process, which included emission calculations for all sources at the ambient air quality standards, and a proposed plant wide emission limitation (that would allow RMax to operate using the hydrocarbon blowing agent without triggering emission levels requiring PSD permitting or the installation of LAER control technology.) This application was approved by the South Carolina Department of Health and Environmental Control (SCDHEC) which issued construction (and subsequently operating) permits. These permits not only allowed RMax to install the injection system and operate using the hydrocarbon blowing agent, but to also have the ability to increase production capacity by approximately 30% over CY 1998 production, while at the same time, avoiding the installation of any type of emissions controls.

PLANT UPGRADES (MECHANICAL/ELECTRICAL)

Following issuance of the SCDHEC construction permits, HRP coordinated the design of plant mechanical and electrical system upgrades by Spectrum Engineering Services, Inc. These upgrades included the design of spot ventilation and exhaust systems to prevent the accumulation of hydrocarbon vapor

buildup inside of the plant as well as the relocation or modification of existing electrical equipment to maintain compliance with the requirements of the National Electrical Code (NEC). The injection system (components of which were provided by Piedmont Energy Services, Inc. and Bayer

– Hennecke Machinery), consists of a 12,000 gallon above ground storage tank, associated fill and discharge pumps and piping, high pressure injection pumps, and a chemical mixing system.

HRP also assisted RMax with issues related to the installation of the injection system such as the selection of the tank location, its compliance with applicable NFPA code requirements, and coordination of its approval with local fire department officials.

RISK MANAGEMENT/PROCESS SAFETY MANAGEMENT PLANNING

Simultaneous to the design of plant upgrades, HRP developed a combination Risk/Process Safety Management Plan (RMP/PSM Plan) for RMax's new process. This RMP/PSM Plan outlined procedures for complying with the requirements of both EPA's Risk Management Program Rule and OSHA's Process Safety Management Program. Included in this task were the evaluation of worst case scenarios, and alternative release scenarios, development of a prevention program, and development of an emergency action plan. The worst case release and alternative release scenario evaluations were based on EPA guidance, as well as evaluation of site activities to determine more plausible release events.

RMax's prevention program includes elements such as an employee participation program, a contractor safety program, an incident investigation program, a mechanical integrity program, scheduled compliance audits, a management of change program, and an employee training program. Under HRP's direction, a process hazard analysis (PHA) was also conducted. *"This PHA proved extremely helpful in that it identified potential hazard situations and allowed for the design and implementation of corrective actions to prevent the occurrence of releases of and minimize the chance for employee exposure to the hydrocarbon blowing agent,"* Mr. Godlewski reported.

The emergency action plan developed by HRP for RMax included procedures for the response to emergencies such as fires, explosion, spills, releases, power failures, and natural disasters. It also outlined procedures for notification of local emergency response agencies and procedures for response to medical emergencies.



RMax's ventilated enclosure surrounding its high pressure injection pumps

OPERATION

In January 2000, RMax's bulk storage tank was filled with hydrocarbon blowing agent, and its injection system started without any significant problems. RMax now has the ability to produce (at its maximum production capacity) polyisocyanurate foam insulation using either an HCFC 141b /22 blowing agent or a hydrocarbon blowing agent. In summary, the culmination of approximately 18 months of work was a definite success for RMax, HRP, and all of those involved. Mr. Godlewski, further commented:

"The end result was a very smooth project, which involved seven (7) different contractors and equipment suppliers whose components were required to work together in order for our process to work effectively. This project ended up starting up on time, on budget, with everything working as designed the first time we pushed the button."

Following successful completion of this project at RMax, Inc., Greer, South Carolina, HRP has assisted another RMax, Inc. facility, located in Fernley, Nevada, in its process modifications to allow the use of a hydrocarbon blowing agent.

With the ability to produce a CFC-free (non-ozone depleting) foam insulating product for use in residential and commercial applications, RMax continues to be a leader in its industry in the United States.



RMax's hydrocarbon injection system main control panel



RMax's 12,000 gallon Hydrocarbon Blowing Agent storage tank

compounds (VOC's) that is extremely flammable), RMax was faced with an entirely different set of environmental, health and safety compliance issues and challenges.

HRP Associates, Inc., a multi-disciplined environmental, health and safety engineering consulting firm located in Greenville, South Carolina, was retained by RMax to assist with all aspects of its plant modernization. Areas of assistance provided by HRP included a code and regulatory review, permitting, design of plant upgrades, and assistance with risk management/process safety management planning.

REGULATORY REVIEW

HRP first completed a code and regulatory review that evaluated potentially applicable Federal, State, and local environmental and health and safety regulations with regards to the installation of a hydrocarbon injection system and use of the hydrocarbon blowing agent by RMax. As a result of this review, it was determined that in addition to the upgrade of its facility and existing equipment for the use of a flammable liquid, RMax would have to comply with stringent air emissions permitting requirements and discharge limitations, as well as developing and implementing a Risk Management Plan and a Process Safety Management Plan.

To learn more about HRP Associates, Inc. and our full range of environmental, health & safety, and engineering consulting services, please contact us at (864) 289-0311 or (800) 752-3922. Please visit us at our website at www.hrpassociates.com