

**THIRD PARTY AUDIT PILOT PROJECT  
IN THE STATE OF DELAWARE  
FINAL REPORT  
JUNE 6, 2000**

## EXECUTIVE SUMMARY

The government resources available to ensure compliance with the EPA Risk Management Program rule<sup>1</sup> are severely limited. To explore potential solutions, the Wharton School of the University of Pennsylvania conducted a series of roundtable meetings to discuss market-based approaches. The recommendation from the roundtable meetings was to conduct a pilot experiment to determine if non-governmental third party auditors could help ensure compliance with the rule. This concept has been successful in the past, especially for regulatory compliance inspections of steam boilers and pressure vessels.

Because of the roundtable recommendation the State of Delaware (DNREC) became part of a task force, along with EPA HQ (CEPPO), EPA Region III, and Wharton to investigate the possibility of using third parties to audit compliance with the rule. Delaware's role was to act as the technical resource and to provide host facilities for the first phase of the pilot. Phase 1 of the pilot would examine the viability of third party audits at facilities in a state that already had a robust state-level chemical accident prevention regulation similar to the EPA RMP program. Phase 2 of the pilot will be implemented in Pennsylvania, and will test the third party audit concept in a state without previously existing RMP-like accident prevention regulations in place.

The approach to the pilot project underwent two major changes prior to its implementation. These changes included abandoning an initial idea to use ISO 14000 audits as surrogates for RMP compliance audits, and removing propane facilities as prospective participants in the audit due to Congressional legislation. With these changes, the scope of the pilot was limited to two business segments, water chlorination and ammonia refrigeration. These two business segments currently represent over fifty percent of the RMP-regulated community.

The first phase of the pilot project took place in Delaware, and DNREC acted as the implementing agency for the first phase. In this capacity, DNREC developed an inspection protocol and a training program, selected eight auditors from an extensive list of candidates, trained the auditors, and conducted follow-up inspections at facilities participating in the pilot.

Eight facilities in Delaware agreed to participate in the pilot. The trained third-party auditors inspected the facilities using the standard protocol developed by DNREC. Experienced Delaware inspectors conducted follow up inspections to evaluate the performance of the auditors.

The first phase of the pilot demonstrated that non-governmental third party auditors with the appropriate background knowledge and experience can successfully perform a Risk Management Program compliance audit. In order to be successful, auditors must have sufficient

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<sup>1</sup> 40 CFR Part 68 "Chemical Accident Prevention Provisions".

chemical industry experience, background knowledge and auditing skills, and may require some additional training on the particular type of industrial process at the target facility or on the EPA Risk Management Program. The amount of training needed varies with the background of each individual auditor. The overall performance of the group was not unlike what a new implementing agency will encounter to train its staff to do onsite audits.

Issues that were not addressed in the Delaware pilot were:

1. Certification of third party auditors,
2. The effect of the EPA Audit Policy's self-disclosure provisions,
3. The viability of the third-party audit concept at facilities new to accident prevention regulations, and
4. Market-based incentives for facilities and non-governmental auditors to continue to participate in third party audits.

## **BACKGROUND**

Regulated facilities are subject to the general Clean Air Act (CAA) provisions for unannounced inspections to verify compliance with the Risk Management Program requirements. Under the CAA, EPA officials and authorized representatives may enter a facility's premises to inspect equipment or records.<sup>2</sup> In addition, EPA's Risk Management Program rule requires the implementing agency to conduct periodic audits of the facilities' Risk Management Plans. Auditing Risk Management Plans involves verifying the RMP data reported by the facility against an independent source of information, such as other government databases or conducting on-site verification.<sup>3</sup> When the implementing agency inspects a facility, the agency may examine whether a facility complies with either the Risk Management Program or the Risk Management Plan or both. The pilot project covered both types of audits.

Due to the large number of facilities that were subject to the EPA Risk Management Program regulation and the relatively small amount of resources available to oversee implementation of regulation, EPA was interested in determining the viability of using third party audits for verifying compliance with the rule as an alternative to traditional methods of regulatory oversight. For the purpose of this project, third party audits were defined as voluntary audits performed by a party other than EPA and the regulated facility itself.

The third party audit project is a cooperative effort between EPA's Chemical Emergency Preparedness and Prevention Office (CEPPO), EPA Region III, Delaware's Department of Natural Resources and Environmental Control (DNREC) and the Risk Management and Decision

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<sup>2</sup>CAA Section 114(a)(2).

<sup>3</sup>40 CFR 68.220(a).

Making Center (RMADC) of the Wharton School of the University of Pennsylvania. The pilot program took place in two phases. Phase 1 of the pilot, the subject of this report, took place in Delaware, and examined the viability of third party audits at facilities which have already implemented a robust state-level chemical accident prevention regulation similar to the EPA RMP program. Phase 2 of the pilot will be implemented in Pennsylvania, and will test the third party audit concept at facilities without previously existing RMP-like accident prevention regulations in place.

If the pilot program proves successful, a third party option would have several advantages. First, it would allow the government to more efficiently direct its relatively scarce in-house auditing resources to those areas where traditional oversight was deemed most critical, while simultaneously meeting its audit responsibilities under the Risk Management Program via the use of non-governmental auditors. Second, it would allow the participating regulated facilities to operate with a minimum of formal implementing agency oversight and involvement. Finally, it may result in better relations between the facility and the local community, since the community would be assured that the facility's risk management program had been reviewed by an independent third party.

## **ISO 14000 ALTERNATIVE**

The initial alternative that was considered for this project was to determine whether ISO 14000 audits could serve as surrogates for Risk Management Program compliance audits. It was believed that this option could enhance implementation of the Risk Management Program and would be acceptable to industry, the public, and implementing agencies. It was expected that the ISO 14000 option would be attractive to larger facilities and some moderate sized companies, as these companies would be most likely to seek ISO certification for reasons other than Risk Management Program compliance.

If this option had proven successful, a regulated facility could have demonstrated compliance through actions taken to achieve its ISO 14000 certification without extensive formal oversight by the implementing agency. A successful ISO 14000 option would potentially require even less formal government oversight than other third party audit alternatives, since maintaining ISO certification requires periodic satisfactory re-inspection by an ISO registrar. Such an option could potentially allow the implementing agency to use a less resource intensive review of the ISO 14000 registrars, rather than the actual facilities, in order to ensure compliance at these "better" facilities.

While the advantages of pursuing the ISO 14000 alternative were compelling, several factors prevented this option from being selected for the pilot. First, very few facilities had pursued or achieved ISO 14000 certification. Representatives from the Delaware Department of Natural Resources and Environmental Control (DNREC) discussed the project with representatives of the Delaware Chemical Industry Council (CIC). The CIC pointed out that only a very few companies

in Delaware (the location chosen for the first phase of the pilot) had pursued or obtained ISO 14000 certification, and of these, only one facility was required to comply with the EPA Risk Management Program rule. A review of facilities in other States showed a similar pattern nationwide.

Another shortcoming of the ISO 14000 alternative was that the ISO 14000 certification process would not provide for an independent audit of every specific compliance element of the EPA Risk Management Program. For a facility undergoing ISO 14000 certification, the independent auditor does determine whether a management system is in place to achieve environmental compliance. However, since the compliance elements of the Risk Management Program are not identical to ISO certification elements, the certification audit would not, as a matter of course, audit each compliance element of the Risk Management Program.

Nevertheless, we still believed that the ISO 14000 option could be evaluated in Delaware. A facility that manufactures polyvinyl chloride (PVC) had received ISO 14000 certification. They were contacted and agreed to participate in the study. Another Delaware facility that also manufactures PVC was going to be used as the comparison facility.

This proposal was discussed with representatives of EPA Region III. It was then decided not to further pursue this alternative as the candidate ISO-certified facility had poor past environmental record. The facility in fact had become certified in ISO 14000 and ISO 9000 in an effort to show good faith efforts in improvement of environmental performance, and recent environmental performance (last 3-5 years) had improved. Nevertheless, environmental violations dating back to 1985 were not easily forgotten.

Because of the limited number of facilities, lack of an independent audit of the risk management program, and finally the poor past environmental record of the single available candidate facility, it was decided to pursue other third party options.

## **PROPANE ALTERNATIVE**

The next alternative considered for the pilot was to perform third party audits that were tailored specifically to check for Risk Management Program compliance, and to focus the audits on propane distributors. Among the many different types of facilities subject to the RMP rule, propane distributors, ammonia refrigeration facilities, and publicly owned water and wastewater treatment plants were considered to be the best candidates for the pilot because they represented a large percentage of RMP-regulated facilities. These three business segments employ a relatively narrow, well-developed, and simple technology, but often have limited in-house resources to conduct audits. The distribution of the 5,440 RMP-regulated facilities within Region III at that time was as follows:

- 53% were facilities with propane (primarily propane distributors),
- 10% were ammonia refrigeration facilities
- 14% were publicly owned water and wastewater treatment facilities,

- 23% were other types of facilities.

Thus, a large percentage of RMP-facilities could serve as potential candidates for the pilot and be aided by a successful third party option.

The propane industry was considered the best industry sector for the pilot since at that time propane distributors constituted the largest percentage of facilities subject to the Risk Management Program and, as previously indicated propane facilities have conditions suitable for employing this alternative implementation approach. Also, if this pilot is successful, the concept could potentially be extended almost immediately to more than half of the facilities subject to the Risk Management Program nationwide without expending substantial amounts of limited government resources.

The propane alternative was abandoned when, on August 5, 1999, the “Chemical Safety Information, Site Security and Fuels Regulatory Relief Act” (Public Law 106-40) became law. This law prohibits EPA from regulating flammable substances under the Risk Management Program when they are used as fuel or held for sale at a retail facility. This essentially exempted most propane distributors from the Rule.

## **CHLORINE AND AMMONIA ALTERNATIVE**

With propane distributors now exempt from the RMP rule, we again found it necessary to adjust the scope of the pilot project. Focus now turned to chlorination and ammonia refrigeration facilities, as these were the two largest remaining industrial sectors covered by the RMP rule, representing about 50% of the remaining regulated facilities. The pilot project was eventually implemented at facilities representing these two industrial sectors.

## **IMPLEMENTATION**

DNREC was the principal lead agency for the first phase of the project. Delaware was selected due to DNREC’s impressive Accidental Release Prevention Program record and its proximity to EPA Headquarters, EPA Region III and Wharton. DNREC prepared an Implementation Plan during this development phase. Once all parties agreed on the Plan, the Implementation phase began. This phase involved five primary functions:

1. Finding acceptable facilities;
2. Developing protocols and training materials;
3. Selecting and training auditors that wanted to participate;
4. Conducting Follow-up Third Party Compliance Audits; and
5. Completing the compliance audit reports.

To accomplish these functions, consideration was given to creating an outreach brochure that explained the program to the regulated community. In addition, depending on the availability of existing compliance data, DNREC or the auditors might need to perform pre-assessments to establish a compliance baseline that could be used to gauge the success of the program. The

instrument used by the auditors to determine compliance (e.g., checklist or inspection manual) was provided in hard copy and in html format that was published on DNREC's web site.<sup>4</sup>

## AUDITOR SELECTION AND TRAINING

One of the challenges that the task force faced was determining what criteria it might use to select third party auditors and what legal responsibility EPA might have if an accidental release occurred after a satisfactory third party audit has been conducted. Because of the legal and reputational consequences that such a release could have, EPA was reluctant to establish formal certification criteria for third party auditors in the pilot experiment. However, the project team did enumerate a non-binding set of desired auditor qualifications that were used to screen potential auditors. In any case, since the first phase of the pilot took place in Delaware under the auspices of DNREC, potential legal issues related to auditor certification and qualification were moot, since under the Delaware Code, DNREC can use trained and tested representatives to conduct audits.<sup>5</sup>

The selection of auditors for the pilot was legally and administratively the responsibility of DNREC. The project team received recommendations from a number of trade and professional organizations, suggesting individuals that they thought would be good auditors. DNREC selected candidates based upon their industrial audit experience and professional credentials. Eight individuals were selected from three different sources: insurance companies, professional consulting firms, and non-profit business assistance agencies. The auditors agreed to participate in the pilot on a *pro bono* basis.

All candidates had auditing experience, primarily in environmental or industrial hygiene-related roles. Only one had conducted audits specifically related to the EPA Risk Management Program or the OSHA Process Safety Management (PSM) Standard. The most experienced auditor had 29 years of auditing experience. Professional credentials of the eight auditors included:

1. A Professional Engineer (PE),
2. Certified Industrial Hygienists,
3. Certified Safety Professionals (CSP),
4. One Doctor of Jurisprudence with experience in environmental compliance auditing,
5. A Chief Boiler Inspector certified by the National Board of Boiler and Pressure Vessel Inspectors.

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<sup>4</sup> This information can be found at: [http://www.dnrec.state.de.us/air/aqm\\_page/arp.htm](http://www.dnrec.state.de.us/air/aqm_page/arp.htm).

<sup>5</sup> Title 7, Delaware Code, Chapter 77, Section 7710

(d) *Inspection protocol* – All inspections shall be conducted by trained and tested personnel or representatives. All inspections shall be conducted within the limits of a through Risk Management Program Inspection Protocol issued by the Department and adopted after a public hearing. The protocol shall consist of specific questions, facilities characteristics, required risk management components, physical observations and interviews.

(e) *Inspection training program* – The Department shall have a training program to periodically educate and test state employees or representatives responsible for inspecting regulated facilities.

The auditors had a wide range of academic backgrounds, including: BA Liberal Arts, BS Environmental Science, BS Biomedical Engineering, BA Biology with a JD in Law, BS Chemistry, BS Chemical Engineering with an MBA, and MS Engineering. The experience level and professional credentials represented in this pilot may well be representative of the available pool of auditors nationwide.

## AUDITOR TRAINING AND QUALIFICATIONS

Stationary sources subject to the Rule range from the simple (small chlorination processes) to the most complex (large refineries). Training auditors to conduct compliance inspections for all covered facilities was beyond the scope of this pilot project. For the purposes of the pilot, training was limited to the two business segments (chlorination and ammonia refrigeration) that were the subject of the pilot third party audits.

DNREC's Accidental Release Prevention Group conducted a two-day training session with the assistance of EPA's Region III Office of Solid Waste and Emergency Response (OSWER). DNREC, which has been conducting process safety compliance inspections for ten years, developed the syllabus and training materials. The training consisted of the following:

1. An overview of the Risk Management Program elements including definitions of some of the terminology,
2. A process description of a program level 2 chlorination process using materials provided by the Chlorine Institute,<sup>6</sup>
3. A process description of a program level 3 refrigeration process using parts of a five part video series purchased from IAR,<sup>7</sup>
4. An overview of the Draft Audit Checklist for program level 2 chlorination system,
5. An overview of the Draft Audit Checklist for program level 3 ammonia refrigeration system using a video developed by IARW,<sup>8</sup> and
6. A test of the components of a simple ammonia refrigeration system.

Delaware Code requires that a compliance inspection for accidental release prevention *"shall be conducted by trained and tested state personnel or representatives."*

Following the training session, Wharton developed a questionnaire to allow the auditors to comment on the training. The responses were tabulated by the Risk Management and Decision Processes Center and most were favorable.

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<sup>6</sup> "Chlorine Safety for Water and Wastewater Operators", video – running time 29:50 and "Water and Wastewater Operators Chlorine Handbook," Edition 1, March 1999, Pamphlet 155, 1999 The Chlorine Institute, Inc., 2001 L Street, N.W., Washington, D.C.20036-4919

<sup>7</sup> Series 1: Module 2 "Ammonia Refrigeration Systems," International Institute of Ammonia Refrigeration (IAR), 1110 North Glebe Road, Suite 250, Arlington, VA 22201

<sup>8</sup> "PSM Program" video, International Association of Refrigerated Warehouses (IARW), 7315 Wisconsin Avenue, Suite 1200N, Bethesda, MD 20814-3202.

The amount of training that an auditor needs to perform a quality Risk Management Program audit is dependent upon the auditor's experience level, educational background and previous audit training. We believe that experienced auditors can be ready to do an adequate 112r audit with two days of training. Certification by an outside professional group, in and of itself was not sufficient to qualify someone to perform an audit. The following criteria represent desirable qualities for prospective auditors (along with the 2-day training):

1. Auditing experience,
2. Engineering background,
3. Chemical industry experience,
4. PSM / 112r knowledge, and
5. Interpersonal auditing skills.

Ideally, a certifying agency would determine an auditor's level of expertise through examination, provide specific training in areas where the auditor was weak, and attest to the competency of the auditor. We found that some auditors needed more training, than was provided during the 2-day training, on the specifics of the Program level 2 Hazard Review and the Program level 3 Process Hazard Analysis.

## **SELECTION OF FACILITIES**

In Delaware, six wastewater chlorination process owners or operators and twelve ammonia refrigeration system owners or operators submitted Federal Risk Management Plans. Some of these facilities were not eligible to participate in the pilot project because of past compliance history. DNREC offered four facilities from each group an opportunity to participate in the pilot.

All of the eight facilities that the Accidental Release Prevention group asked agreed to participate in the audit based on the reputation of Accidental Release Prevention group and a long relationship with most of the facilities. Each of the eight facilities was paired with one of the eight, trained third party auditors.

Whether the benefits to a facility are large enough for a facility to choose this option without being asked has not been answered. The benefits for the facility to select a third party mechanism must be improved and there must be a threat of an implementing agency inspection or there is little reason for a facility to volunteer for a third party audit.

## **AUDITOR'S INSPECTIONS**

The Desk Audit Checklist was used to examine the facilities RMP prior to going on site. Downloaded versions of the facilities RMPs were provided to third party auditors once the facility assignments had been made. The Offsite Consequence Analysis (OCA) information was not provided to the third party auditors because of the restrictions mandated by Congress in Public Law 106-40. Therefore, the auditors were not able to evaluate all of the OCA information unless

the facility had included all of the OCA information in their executive summary. Some auditors realized part of the information was missing. Others did not. Because of time limited nature of the training, only brief training was given on how to evaluate the OCA. No training was given on how to use the EPA OCA guidance, RMP\*Comp, EPA's process specific OCA guidance for chlorination processes or for ammonia refrigeration systems or on catastrophic modeling in general. All of these are important and must be understood by an auditor that is charged with evaluating the OCA information for compliance.

An audit checklist was developed to help the third party auditor perform the on site portion of the inspection. This checklist was developed using EPA draft auditing guidance and the OSHA Directive CPL 2-2.45A Appendix A for the Process Safety Management (PSM) Standard. This checklist is divided into two sections; one for Program level 2 processes (municipal chlorination systems) and one for Program level 3 processes (OSHA regulated chlorination processes and ammonia refrigeration systems). There is also an Appendix, which contains various interview questions. The checklists and final report can be downloaded from our web page at [http://www.dnrec.state.de.us/air/aqm\\_page/arp.htm](http://www.dnrec.state.de.us/air/aqm_page/arp.htm).

The final report is a summary of the findings from the two checklists. In the Delaware pilot, the final report was discussed with the owner or operator at the completion of the on site portion of the inspection by the third party auditor. The auditor then sent the report to the Accidental Release Prevention group. Thus, in Delaware, the auditors were representatives of the state and the third party auditors provided feedback to the implementing agency concerning the compliance status of the facility. One suggestion for a market driven mechanism that may prove to be viable is for insurance auditors to provide the Risk Management Program third party audit. The insurance audit could potentially be provided at low or no cost to the insured facility. However, insurance auditors may not want to be placed in the position of being required to report their client's deficiencies to the implementing agency. For this pilot to work nationally, a mechanism must be devised for, at a minimum, keeping the implementing agency informed of any egregious violations.

## **DNREC FOLLOW-UP INSPECTIONS**

The Accidental Release Prevention group performed an independent review of the third party audit at each of the eight facilities. This review was more involved than just a record review, but was not as thorough as our normal inspection. The review required two engineers 4-6 hours for a refrigeration system and one engineer 6 hours for a simple chlorination process.

## **AUDITOR DEBRIEFING**

A debriefing session was held for the auditors on March 28, 2000. The following are a summary of their comments:

**Collaboration** — Most felt that this was a good idea especially for the first inspection. It would have been good to have an experienced auditor for the first inspection. Two could have been more assertive. One auditor was not allowed into the process on the first day and on the next visit, it was

felt that the facility was hiding something. The DNREC follow up inspection confirmed that this was the case.

**Preparation Time** — This ranged from 2 to 40 hours. This varied depending on the auditor's experience and the type of process being inspected. Ammonia refrigeration required more preparation time.

**On-site Audit Time** — The range was 3 to 13 hours. Ammonia refrigeration took longer.

**Checklists** — All agreed that they were very helpful but some thought that they were too long. It was agreed that with experience, many of the questions could be skipped and several items could be covered with open-ended questions.

**Training** — Most thought that two days was not sufficient. This depends on the auditor's experience with PSM and 112r. More time could have been spent on the ammonia refrigeration. We only used one video of a five part series. The series is excellent but it would take one day to train on the entire series. Another area that needs more explanation is the Process Hazard Analysis (PHA). We only spent one hour explaining the process. A good training program for PHA usually takes 3 to 5 days. DNREC follow up inspections confirmed that more training is required for PHAs.

**Certification Criteria** — All felt that all auditors should complete a minimal course to review the basics of the program and the audit report format. A current proven model should be followed. There are examples today that can be modified to meet program requirements. A "certified auditor" would have to meet education, experience and training requirements before being allowed to take a written and hands on examination of competency. All certified auditors should have credentials and should be required to maintain those credentials in accordance with a written process. One auditor suggested that experience might prove more valuable than an auditor's certifications.

**Mechanism to Assure Implementing Agency that Facility is not Significantly out of Compliance or an Egregious Violator** — One suggested that the auditor should be bonded and audited on a random basis by the governing agency. This arrangement has been used for the boiler and pressure vessel industry for seventy-five years.

## CONCLUSIONS

The third party auditors were able to identify both areas of exceptional performance and areas that required improvement. The auditors felt that the audit took longer to accomplish than they expected. Some auditors felt that working together on their first audits had some advantages.

The auditors occasionally accepted performance that the implementing agency would not have accepted. A disagreement over the degree of a potential deficiency is common, as this is a performance-based regulation that has limited specifications. This type of rule is open to

interpretation and acceptable compliance can vary depending on the observer. We feel this level of performance is much the same as any new implementing agency might experience.

The clients commented that some auditors asked every question on the checklist. Most of the clients found the auditors knowledgeable and fair in their findings and handled themselves in a professional manner. Some of the auditors did not use terminology specific to the industry and thus appeared less knowledgeable.

Some clients had experience with 112r third party audits from California and asked to be brought into the development process. These clients suggested that they were more comfortable with the concept of an insurance inspector that they could select as opposed to consultant selected for them that could generate more work. These clients also complained that the facility bears the cost of the California audits and that cost varies widely from location to location.

## **FUTURE WORK AND ISSUES**

The pilot experiment is complete in Delaware. The second phase will be conducted in Pennsylvania with EPA Region III, Office of Solid Waste and Emergency Response (OSWER), acting as the implementing agency. Although our grant has expired, DNREC is committed to remain involved to the extent that time allows. EPA Region III asked DNREC to duplicate the 2-day auditor training conducted in Delaware. This training was conducted on May 17-18, 2000 in Philadelphia.

While the phase of the pilot conducted in Delaware demonstrated the viability of the basic concept of third party audits under ideal conditions, additional work is needed to determine whether the concept can be implemented nationwide. The primary question that remains unanswered is whether sufficient incentives exist for facilities to voluntarily participate in third-party audits. Potential incentives may be financial (i.e., reduced insurance rates), reputational (improved relations with community), or regulatory (reduced penalties for violations identified during audits). Furthermore, the extent of the regulatory incentive is still unclear. EPA's Audit Policy allows a reduction in the gravity-based portion of penalties if the facility notifies EPA within 10 days (self-disclosure) that the third party audit discovered violations. The facility must also mitigate any violations within 60 days of discovery. However, the RMP regulation permits a different process for resolution of audit findings, and it is not yet known whether the two policies may be combined to provide the greatest regulatory incentive. Notably, the self-disclosure provision was pre-empted in the Delaware phase of the pilot. The third party auditors were trained and tested by Delaware State employees. The auditors then conducted a "compliance" inspection and transmitted the results directly to the Delaware Accidental Release Prevention group as well as the providing the report to the facility.