State Innovation Grant Technical Project Report
Printer Environmental Management System (EMS) Permit Project

The purpose of the Environmental Management System (EMS) Performance-Based Permit Project was to create a flexible multi-media permit that could be issued under Wisconsin's Green Tier Program. This reduces the administrative burden of permits in general, and acts as an incentive for facilities with a demonstrated history of superior environmental performance and a capacity for continual environmental improvement which are two important requirements of the Green Tier program.

The main goals of the EMS Performance-Based Permit were to use innovative regulatory strategies to relieve administrative burdens of a "cluster initiative" business. The printing industry in Wisconsin was chosen for this project. As stated in the preproposal, the goals were to:

- Increase the number of facilities that understand and comply with environmental regulations.
- Lower the administrative costs to the state and those we regulate.
- Reduce the administrative burden for industry.
- Reduce hazardous air pollutant and ozone forming air emissions.
- Create a multimedia regulatory model for industry in Wisconsin.
- Develop this model so that it is transferable to other business sectors.
- Make information about the project accessible to other states.

Background

In 2004, the Wisconsin Department of Natural Resources (WDNR) Air Management Program undertook an extensive evaluation of its air permitting program. This evaluation was a priority of WDNR Secretary Scott Hassett who directed the Air Program *to develop and implement ways to improve our efficiency in environmental regulation and program implementation while meeting the environmental protection needs of our citizens*. The principal goals of this initiative were to streamline the permit process and investigate innovative air permitting alternatives. This initiative was driven by concerns over the effort and time involved in traditional approaches to air permitting as well as reservations about the value of permits in achieving environmental improvement. There was also strong industry interest in having WDNR adopt a more comprehensive approach to environmental regulation. These factors provided strong incentives for the development of innovative and efficient tools.

Under these circumstances, WDNR applied for a State Innovation Grant to pilot alternative approaches to air pollution control permitting. The Printer EMS Permit Project was proposed to work with several large printing facilities in the state to pilot a flexible, multimedia, performance –based permit that incorporated EMS principles.

Wisconsin's Green Tier Program was the perfect state platform to test flexible permitting meshed with EMS. An EMS (Environmental Management System) is created using a strict methodology that starts by listing out every single environmental impact caused by the actions at a facility. Using a mathematical weighing system, the environmental impacts are then rated based on how likely the impact is to occur and how bad it would be for the environment if it did. The facility ends up with a list of significant environmental aspects. The EMS approach then dictates that a facility set targets and objectives that will eventually address each significant aspect through an environmental management plan also known as an EMP. The EMS process calls for rigorous documentation of actions taken, audit results, training plans, work practices and compliance demonstration methods, and contains many reporting requirements. A certified system must be audited at least annually to ensure that it remains up to date and functioning. Wisconsin's Green Tier statute contains a definition of EMS and requires that participating facilities create an EMS that is certified by the International Standards Organization, ISO 14001 or that is equivalent to that certification.

Tier 2 of the Green Tier program offers regulatory incentives under a binding contract to facilities that have an EMS and a demonstrated record of superior environmental performance. The performance-based printer EMS permit was envisioned as the regulatory incentive that would be offered to printing facilities meeting the Tier 2 requirements.

A performance-based permit under the Printer EMS Permit Project is not yet issued. The project began with four pilot facilities. Two facilities engaged in developing EMS's and applied for Tier 1 of Green Tier. One facility, Serigraph, Inc., ultimately went on to obtain ISO 14001 certification of its EMS and applied for Tier 2 of Wisconsin's Green Tier program. At this writing, Serigraph is in the process of negotiating a Green Tier 2 contract and draft performance-based EMS Permit. The goal is to get both the permit and the contract out for public comment before the end of this year and finalize the contract and the permit by the end of 2009 or early 2010. Baseline data on this facility has been gathered and the tracking of performance measures will continue for the next several years to observe the effects of performance-based permitting on the facility. It is hoped that one or more of the other original pilot facilities will also move toward Tier 2 once Serigraph's permit is issued.

Summary
In some ways Environmental Management Systems and traditional environmental permits are a study in opposites. EMS's are used to set environmental goals, and a facility then strives to reduce its environmental impacts to meet those goals. In contrast, the role of a traditional environmental permit is to lay out the highest environmental impact allowed under the law and then require the facility to prove that its impacts stay below that highest allowed level. Both approaches have their pros and cons. This project shows that EMS approaches to regulation can be combined with traditional environmental permits, namely, Title V Air Pollution Control Permits, without adding lots of time and cost to the permit process.

The format and structure of Wisconsin's air permits lends itself to using a facility's EMS required reporting and work practices and training requirements in lieu of more traditional compliance demonstration requirements. Actions driven by the EMS can also be used as conditions in a permit to justify alternate limits and requirements. For example, the draft permit proposed with this project contains a requirement to elevate VOC emissions from printing operations to the level of significant aspect and to conduct at least one environmental management program (based on the setting of objectives and targets in the EMS) that involves VOC emission reductions from printing operations in a given time period. These conditions and the subsequent, on-going performance monitoring, along with the facility-wide VOC emission cap, justify granting variance to specific emissions limits applicable to each printing press.

The efforts to provide regulatory flexibility under this project ran into many barriers which took more time and incurred more costs than the traditional permit. One of the biggest hurdles to overcome was the need for facilities to implement an EMS *before* providing them with a flexible permit. Implementing an EMS can incur considerable costs for a facility. None of the facilities in our pilot project was willing to invest tens of thousands of dollars to hire a consultant to help them create an EMS. All chose, instead, to use their own internal staff and create the system in-house. DNR staff and representatives of the Specialty Graphic Imaging Association (SGIA) and the Graphic Arts Trade Federation (GATF) presented a series of short courses and printed materials to help step facilities through the EMS process, but it still took much more time and effort than either the facilities or DNR anticipated.

Also, in order for the facilities to commit to the pilot project and to creating an EMS, we prepared several draft concepts of what an EMS, performance-based permit could look like. This did not seem to reassure facilities however. They seemed stuck in the command and control concept of regulation where DNR would issue the permit first that would make them implement the EMS. Their reticence to totally commit to the pilot project ended up in two facilities dropping out and only one successfully completing and obtaining ISO certification of an EMS.

The other main barrier rests with structural issues at EPA itself. Under Wisconsin's Green Tier Program, regulatory flexibility can be implemented through a variance process when facilities attain Tier 2 status. However, EPA's Air Permit branch has no similar platform on which to evaluate a request to vary an applicable requirement. Significant time was spent with EPA air staff reviewing the draft permit language and finding that the innovative regulatory flexibilities proposed did not meet the current interpretation of Federal requirements. Without a law similar to Green Tier, EPA air staff's hands were tied when it came to approving proposed permit flexibility. This resulted in long delays, rewriting major sections of the permit, renegotiating conditions with the facilities and re-reviewing conditions with the state.

Additional time and costs were incurred when EPA determined that each variance granted in a flexible EMS permit would not be federally enforceable until each was approved as a separate source specific State Implementation Plan (SIP) revision. At the outset of this project, WDNR attempted to submit a "menu of flexibilities" to EPA for review and approval under the SIP revision process. This would have streamlined the process because once such a menu was approved, any combination of the individual flexibilities could be included in EMS Permits and issued to Tier 2 facilities and would immediately be federally enforceable. It also would have given facilities considering Tier 2 some definite list of flexibilities available to them. This more efficient strategy was abandoned because EPA's Air Branch does not have the ability to approve permit conditions without seeing them in the context of individual permits. They simply do not have the procedural tools that might allow them to consider such a strategy. This means that DNR will be required to submit to EPA each individual facility's EMS Permit variances for separate approvals as individual source specific SIP revisions. This constitutes a tremendous work load for both DNR and EPA and significantly increases the time and cost attributed to issuing any permit containing a variance.

On the other hand, past experience shows that if EPA does approve an alternative permit condition or rule interpretation, it usually does so in the context of allowing the new conditions for all future air permits. However, the permit flexibilities being proposed for the facilities in the pilot project meeting the Tier 2 requirements of Green Tier should not be available to all facilities. The flexible permit is a reward for superior environmental performance. Facilities that make it through to Tier 2 would be expected to have the understanding, expertise, and management support, to meet and demonstrate compliance with non-standard, innovative permit conditions. Such conditions would not be appropriate for all facilities such as a facility that has an enforcement record or difficulty in tracking material use for example. It is critical that flexible performance-based EMS permits remain an incentive that differentiates those who make commitments to superior environmental performance from those who do not.

The general idea behind using a flexible, multimedia, performance-based permit as an incentive to facilities with a demonstrated history of superior performance under a Tier 2 Contract with Green Tier is a sound one. The baseline measurements of the time and money spent by both the regulator and the regulated community on air permitting indicates a significant burden (see Attachment E). The potential for streamlining and greater efficiency is high. The streamlining will increase the ability of a facility to respond to customer and market demands and could lead to a competitive advantage for the facility. The regulators will have simplified compliance data and fewer overall permits to review. If the draft permit can be issued and a Tier 2 contract signed with Serigraph, DNR will have an opportunity to collect data on emissions reductions and the time and energy spent on compliance assurance and permit writing for this facility versus similar facilities. With this data, DNR can decide whether or not to pursue with EPA the recommendations (listed below) for issuing performance-based permits with a reasonable amount of effort.

Recommendations

1. EMS approaches and philosophies can and should be used in Title V permits for some facilities

2. EPA needs a regulatory flexibility approval structure to allow facilities in state leadership programs (such as Wisconsin's Green Tier,) to use alternatives to meeting certain emission limits and requirements in Title V Air Permits

3. EPA should explore with DNR the review and one-time SIP approval of a "Menu of Flexibilities" that would then be available to Tier 2 Green Tier facilities as federally enforceable air permit conditions.

4. Flexible performance-based permits issued in conjunction with Tier 2 of Green Tier should continue to be explored by DNR and EPA.

Future Outcomes

The EMS Permit project is not yet complete. To date, a draft permit is being reviewed by one pilot facility, Serigraph, Inc. Serigraph has submitted a Tier 2 letter of intent to the Green Tier Program and is also in the middle of negotiating a Green Tier contract with the Department. Both the draft permit and the contract are due to go to public comment very shortly. A final permit should be issued and a Tier 2 contract signed before the end of this year. Future expected outcomes of this project are:

- Measured reductions in VOC and HAP emissions
- Measurable reductions in administrative effort spent by both the regulator and the regulated
- Evidence that a flexible performance-based, multi-media permit issued in conjunction with Wisconsin's Green Tier Program drives "beyond compliance" behavior
- An increase in facilities in the printing industry as well as other business sectors pursuing Tier 2 of Green Tier due to the availability of a flexible performance-based permit tool that can be used only in conjunction with Green Tier.

Project Narrative

Issuing the flexible, multimedia EMS performance-based permits to large printing facilities in Wisconsin involved many steps. In order to get DNR authority to issue a permit with alternative emission limits, a pilot facility must comply with Wisconsin's Green Tier law. To qualify for Green Tier, a facility establishes an environmental management system that: 1) meets or is equivalent to ISO 14001 standards; 2) qualifies under first Tier 1 and then Tier 2 of Green Tier; and 3) negotiates a participation contract. Simultaneously, the facility determines what alternatives to traditional environmental rules and regulations would best realize its business plan and further its environmental policy, objectives, and targets. Next, the facility applies for and negotiates a performance-based permit document that satisfies the requirements of Title V permitting under the Clean Air Act and any applicable state and federal permitting requirements. Finally, a Tier 2 contract establishing superior environmental performance is signed and a flexible performance based permit can be issued establishing the incentive portion of Green Tier program

This project began in 2004 by identifying a broad range of stakeholders in the printing industry. Once interest in the project was established, a group mainly from printing trade associations met regularly by conference call to brainstorm ideas for the function, structure, and procedures of a performance-based, multimedia permit.

At the same time, four pilot facilities were selected and this smaller group began meeting regularly. The objectives for this group were to lead them through the steps necessary to get to Tier 2 of Green Tier, the stage where an alternative permit could be issued.

The first step toward Tier 2 is to establish and implement an EMS that is either certified under ISO 140001 or found by DNR to be equivalent to a certified system. Only one of the pilot facilities had EMS experience. Serigraph, Inc., had been directed by its owner to become ISO certified because of its role as a supplier to the automotive industry. Serigraph had a good start on identifying aspects and impacts of its operations and were beginning to move toward rating the significance of its environmental aspects. The other three facilities were starting from scratch. Two national printer trade associations, SGIA and GATF, along with DNR CEA staff, stepped the pilot facilities through a "101" style course on EMS. The facilities were encouraged to share documents with each other and with facilities that had already been through the process. The experienced facilities also gave presentations on different parts of the process and benefits to their own EMS's.

Two of the pilot facilities entered the program because upper management was interested in Green Tier. The other two facilities wanted to work with WDNR because their environmental managers were interested in Green Tier and EMS. Meetings included presentations by managers of other Green Tier facilities that had already been through the initial EMS process. These presentations touched on the benefits of their programs. As the facilities began to understand the work load involved in creating a functioning EMS, two facilities dropped out. The remaining two facilities benefitted from the interest and support of their upper management and ultimately made it through to Tier 1 of Green Tier and moved forward with adequate resources to create an EMS.

Besides EMS, Green Tier also requires facilities to demonstrate a record of superior environmental performance. The pilot facilities began to look at the Tier 1 requirements and move in the direction of "beyond compliance" activities. These activities could be documented by incorporating them into the EMS as environmental management programs if the facilities were far enough along in their systems development.

In the meantime, WDNR approached EPA with the idea of looking at ways to streamline the process of getting federal approval for alternative permit conditions. Usually, when the state varies an applicable requirement, even if that requirement is in a facility's federally approved Title V permit, the condition is not federally enforceable until the state submits and receives approval of a source specific revision to the State Implementation Plan (SIP). This is a time consuming and administratively expensive process for both the state and the federal government that takes a year or more to complete. As a result, a facility can follow its performance-based permit but, until it is federally approved, the facility is at risk of federal enforcement and law suits by citizens.

To alleviate some of the workload, speed up the process for approval, and give facilities applying for performance-based permits certainty and peace of mind, DNR proposed a Menu of Flexibilities that could be reviewed and approved by EPA in the SIP outside the individual permit. The idea was that facilities that qualified for Green Tier 2 could then pick from the Menu of preapproved alternative permit conditions and the performance-based permit would be federally enforceable as soon as it was issued.

EPA was not able to approve conditions as a group in the Menu of Flexibilities. As more and more detail was added, it became apparent that the next best way to proceed was to put the requested flexibilities into the permit. Once the first performance-based permit is SIP approved, DNR can again pursue with EPA the general preapproval of such conditions in a Menu of Flexibilities for Tier 2 facilities.

Another part to this project was to set up an evaluation and measurement plan for the project and gather baseline data. With EPA's support, Ross & Associates worked with WDNR to lay out a plan for evaluating whether the issuance of a performance-based permit leads to meeting the goals of the project. This was accomplished through a series of conference calls where the project goals and projected outcomes were discussed. Ross then helped set up the measures needed to determine whether the outcomes are met. Ultimately the proposed measures were discussed with the pilot facilities and modified and tailored to each facility's specific operations. Finally, base-line data was requested from the pilot facilities that had moved ahead into Tier 1 of Green Tier. Ross & Associates' final report is attached as Appendix D. Base-line data from Serigraph is contained in Appendix E.

The assistance of Ross & Associates was essential in meeting this important evaluation piece of the Innovation Grant. Evaluation and measurement is a science of its own and requires a specialized skill set. DNR staff involved in this project did not have the knowledge or skills necessary to craft a robust evaluation and measurement plan for this project. We highly recommend that EPA continue providing this assistance to all its facilities engaged in piloting innovative projects.

Once facilities enter Tier 1 of Green Tier, they have a year to complete an EMS. This pushed the facilities into higher gear. Soon Serigraph, Inc., was conducting internal audits in preparation for its ISO audit and certification. They submitted a Tier 2 letter of intent to negotiate a contract in March of 2008. Arandell Corporation has been accepted into Tier 1 but has yet to move on to Tier 2.

During nearly all this time, different forms of the draft performance-based permit had been shared with Serigraph and EPA for review. Once Serigraph submitted its Tier 2 letter of intent, the draft permit was tailored specifically to their facility and operations. This permit has undergone several transformations. EPA disputed the WDNR's stated attainment status for Washington County where Serigraph is located. The initial permit was for a minor source. However, EPA's position that the major source threshold for Washington County is 25 tons VOC per year forced WDNR to completely rework the permit as a major source permit.

Facilities that are not considered major under the air pollution rules are issued state permits. EPA gives the states some leeway on conditions in state permits. Once EPA concluded that the permit would have to be a Title V major source nonattainment area permit, it became much more difficult to obtain any flexibility on applicable limitations. The main request of all the facilities that entered the program was to cap VOC emissions on a facility-wide basis, allowing the facilities to move in presses and other VOC-emitting equipment without a construction permit. The originally proposed conditions were not accepted by EPA and WDNR instead had to use the federal plant-wide applicability limitation (PAL) regulations recently adopted by DNR for major sources. The PAL was disputed by the

printing industry at the time of its promulgation. Currently, the Serigraph has major issues with some of the provisions of the PAL. This dispute alone has added a year to the permit negotiations.

The final result is a draft permit that has requirements that could be included in almost any air permit issued to any facility in Wisconsin. It proposes a limited number of permit flexibilities previously proposed by EPA (but never finalized) such as preapproval for new construction and approved replicable methods for compliance demonstration. Beyond that, the current draft permit contains very little that could be construed as performance-based nor is there much in the permit that can be considered an incentive available exclusively to a Green Tier 2 facility.

The final steps of the project are to agree on a draft permit and contract language, get public comment and issue a final permit and contract by the end of 2009 or early 2010. WDNR will gather data for the next two years to establish whether or not a performance based permit actually reduces administrative burden while driving beyond compliance behavior such as reductions in VOC and HAP emissions.

Key Project Findings

1. Considerable background and preparation are needed for a facility to draft and implement an ISO 14001 certifiable EMS. This preparation alone can take from a year to 18 months with final certification taking on average three or more years.

2. Building management understanding and support of EMS implementation is critical.

3. An EMS approach to regulation fits nicely into a Title V Permit, but the permit and EMS documents work better if they remain separate because they serve different purposes. In other words, an EMS Permit does not necessarily have to contain or be contained by the EMS itself.

4. Issued and federally enforceable flexible, performance-based EMS Permits are desirable by the regulated community and would act as an incentive for facilities entering Tier 2 of Wisconsin's Green Tier Law.

5. Wisconsin's Green Tier Law is an excellent platform on which to pilot innovative permit strategies for facilities demonstrating superior environmental performance because it has a clear mechanism for approving innovations in permits and varying applicable requirements. EPA lacks a similar mechanism to approve any regulatory flexibility in Title V Permits which makes it nearly impossible to pilot flexible EMS permit conditions in Federally enforceable air permits.

6. Due to EPA's lack of a regulatory flexibility approval structure, the draft permit that WDNR proposed to pilot facilities under this project contains few regulatory flexibilities not already available to any facility in Wisconsin seeking an air permit. Because few of the permit's benefits are exclusive to Tier 2 facilities, the draft permit has no additional economic or environmental benefits and ceases to be an incentive under Green Tier.

7. The time and costs of issuing a performance-based EMS permit could be similar to that of issuing a traditional Title V operation permit. The impasse created by EPA's lack of a regulatory flexibility approval structure is what ballooned the time and costs incurred in writing a performance-based EMS permit.

8. The time and costs of issuing a performance-based EMS permit are also increased when each permit must be submitted and its conditions approved as a source specific SIP revision before the permit can be considered federally enforceable. This could be remedied by SIP approval of the menu of individual permit flexibilities being proposed and then allowing these "pre-approved" flexibilities to be used and considered federally enforceable in permits issued to qualified Green Tier 2 facilities.

9. A Permit should not serve the dual purpose of acting as the mechanism for assuring beyond compliance behavior and acting as a flexible innovative regulatory incentive. A Tier 2 facility does not consider it an incentive to be issued a permit with conditions that are more stringent and burdensome than those that would be issued to a neighboring facility not meeting the Green Tier 2 requirements. Green Tier structure allows contracts under Tier 2 of

Green Tier to act as the binding voluntary agreement that assures continued beyond compliance superior environmental performance and be granted in parallel with the flexible performance Based EMS Permit.

Conclusions and Project Evaluation

Although a permit was not issued within the first two years of this project as planned, the entire process of bringing facilities into Wisconsin's Green Tier Program, shepherding them through the EMS development, and negotiating new and innovative permit and contract language has been an invaluable learning experience. WDNR is fully committed to completing this process by issuing this permit and then collecting data to ascertain whether the goals and outcomes predicted actually come to pass. The real value in the first years of this project are in the lessons learned, the barriers discovered, and the connections made that make it possible to remove the barriers.

Lessons Learned

1. It takes more than one year to develop and fully implement a EMS that satisfies the requirements of Green Tier. If a facility is starting from scratch, it takes approximately 3 years to fully implement an EMS and reach ISO 14001 certification or the equivalent. The one pilot facility that implemented a certified EMS and applied for Green Tier 2 began developing its EMS well before volunteering to participate as a pilot facility in the project. The other three had no EMS experience prior to the project.

2. A top down management driven desire to have an EMS is essential to the success of its development and implementation. Of the four pilot facilities that began this project, the two that were able to get into the EMS process both were directed to do so by their management.

3. An approval mechanism for alternative emission limitations and variances from certain requirements must be available at the federal level as well as the state level for performance-based permits to be issued. The current version of the performance-based permit associated with this project has very little of the original permit flexibilities envisioned still in it. Most notably, the facility-wide cap on VOC emissions originally proposed in the permit to replace old limits issued to avoid major source permitting were not accepted by the EPA. Instead WDNR was required to put a Federal Plant-Wide Applicability Limitation (PAL) in the permit. The PAL does not meet the goals of a performance-based permit for several reasons:

- First, any major stationary source is eligible for a PAL; its inclusion in a permit is not special to Green Tier facilities. In order to be an effective incentive, a performance-based permit must be available only to facilities meeting the rigorous requirements of Tier 2 of Green Tier.
- Second, the PAL rule is very prescriptive in how it must be worded, the compliance requirements that go along with it, what an application for it must look like and where the PAL emission level must be set. In other words, the PAL is a traditional command and control approach to regulation, inconsistent with the performance-based permitting concept.
- Third, the requirements in the PAL governing renewal and redistribution of emissions if a facility chooses not to renew the PAL are unacceptable to the facility and the printing industry. This greatly limits WDNR's ability to negotiate with the facility as promised under the Green Tier Program.

4. Industry has as much trouble imagining an alternative regulatory approach as the regulators do. One of the biggest struggles in the initial stages of this project was getting the facilities to come up with regulatory flexibilities for their operations. Industry can imagine a world with no permitting, but it has trouble imagining a different form of permitting. In the end, a few requested flexibilities were common to all the facilities:

- Find a way to allow construction and modification of equipment without having to wait for a construction permit
- Remove conflicts or overlap from multiple permit limitations and requirements that apply to a single pollutant emitted from a piece of equipment
- Reduce recordkeeping requirements, especially daily recordkeeping

Concluding Note

The recommendations for this project are listed at the beginning of this report but there is one that bears repeating.

Provide a mechanism at the Federal level to approve alternative Title V permit conditions for facilities in State Leadership Programs Title V of the Clean Air Act requires permits for industries that are major sources of air pollution. Permits are covered in 40 CFR Part 70 which details at length what must be contained in those permits. Title I of the Clean Air Act also governs air permits for new construction or modifications of existing equipment. The programs overlap and even conflict in some areas. Both programs are very complex and air permit implementation involves case law review and extensive reference to guidance documents. The culture of the air program is one of probing deeply into precedents and guidance to determine the correct applicable limit and compliance requirements for the situation. Flexibility is not built into the program nor does the culture of air regulation look for flexibility. If performance based Title V Permits are to be issued then a mechanism for approving alternative emission limits and conditions must be available at both state and federal levels.

LIST OF ATTACHMENTS

Appendix A: Program Goals and Desired Outcomes and Logic Model
Appendix B: Project Sequence
Appendix C: Project Milestones Draft Permit?
Appendix D: Report from Ross & Associates on Approaches for Evaluating the EMS Permit Pilot Project
Appendix E: Performance Measures Memo from Ross & Associates with Baseline Data collected from a pilot facility

ATTACHMENT A
PROGRAM GOALS AND DESIRED OUTCOMES

The goals of the project as laid out in Wisconsin's grant preproposal were:

- Increase the number of facilities that understand and comply with environmental regulations.
- Lower the administrative costs to the state and those we regulate.
- Reduce the administrative burden for industry.
- Reduce hazardous air pollutant and ozone forming air emissions.
- Create a multimedia regulatory model for industry in Wisconsin.
- Develop this model so that it is transferable to other business sectors.
- Make information about the project accessible to other states.

The initially projected outputs and outcomes of the project are taken from the logic model submitted with the grant application.

Logic Model – Performance-Based Title V Permit for the Printing Sector

INPUTS	OUTPUTS		OUTCOMES		
	Activities	Customers Reached	Short-term (Learning)	Medium-term (Actions)	Long-term (Conditions)

Logic Model – Performance-Based Title V Permit for the Printing Sector

INPUTS		OUTPUTS			OUTCOMES	
DNR air staff and grant$ Partners staff, volunteers, and $ ▪ Other DNR staff – CEA, waste water, storm water, haz waste; Jeff Smoller ▪ Department of Commerce ▪ Printing Cluster Initiative ▪ UWEX Agents & Specialists? ▪ Printing Permit Streamlining Group – PIW, GATF, SGIA ▪ PNEAC ▪ EPA ▪ Environmental Orgs ▪ Multi-State Working Group (MSWG) on Environmental Performance Time ▪ Planning ▪ Implementation ▪ Evaluation Previous work with Printers: Great Printers, Printer GOP work, memo establishing compliance demonstration methods for printers, cooperative environmental agreements		1. Obtain baseline information on: a. DNR collects VOC emissions baseline data from participating facilities using Air Emissions Inventory Data b. DNR collects data on construction permit application submittals and permit revision requests at participating facilities for the previous 5 years using Air Permit databases. c. DNR collects data on time lag between when a participating facility made the decision to make an operational change and the date the change actually occurred using facility records and DNR permit databases d. DNR collects information on the administrative time DNR has spent processing construction permits and revisions at participating facilities over the previous five years using Air Permit databases and employee time sheets. e. DNR collects information on the administrative time DNR has spent on compliance and enforcement activities at participating facilities during the last 5-year period using DNR compliance databases and employee time sheets. f. Participating facilities provide DNR with information on the administrative time needed for them to meet regulatory commitments over the previous five years. g. DNR surveys the public to ascertain their awareness of public involvement requirements, their past participation, and their satisfaction with past participation over the previous 5 years.	Portion of printing sector needing Title V permits Interested public Stakeholders EPA DNR personnel		S1. Data to show that a performance-based Title V permit incorporating EMS elements can meet all the requirements of Part 70.[start gathering data upon permit issuance Oct 05 and continue through life of grant] S2. Ability to quickly and efficiently establish a performance-based permit which incorporates EMS. S3. Understanding by the public of their role in the Performance-based Title V permits process. S4. Ability of DNR Staff to audit environmental management systems and to be able to evaluate compliance with a performance-based permit that incorporates EMS. S5. Ability of DNR staff to understand and create a Performance-based Title V permit that incorporates EMS elements.	M1. Collect data to show that a performance-based Title V permit incorporating EMS elements can be as effective or more effective in reducing emissions and driving innovation as a traditional Title V permit. M2. Gain acceptance by EPA of a permit that uses the structure of an EMS to hold the requirements of a performance-based Title V permit. M3. Measure a reduction in VOC emissions. M4. Measure a reduction in Hazardous Air Pollution Emissions. M5. Measure reductions in pollutants in other media besides air that were established as priorities during the cross media planning step. M6. Measure a reduction in the amount of time DNR needs to review construction permit applications and revisions requests from participating facilities M7. Establish increased compliance rates.	L1. Attain and maintain 8-hr Ozone Standard L2. Attain and maintain environmental standards from other media established as priorities during the cross media planning step. L3. Reduced administrative time for DNR staff in air management and in other affected programs. L4. Reduced administrative time for facilities to meet regulatory obligations. L5. Establishment of lasting and meaningful partnerships between interested public and participating facility.

Logic Model – Performance-Based Title V Permit for the Printing Sector

		Activities	Customers Reached		Short-term (Learning)	Medium-term (Actions)	Long-term (Conditions)
Educational/Instructional Materials: Printwi$er Printer's expertise in EMS EPA's Environmental Management Guidance document		2. Start programs with 2 or 3 facilities a. Select facilities in Aug 04, b. Begin meeting with partners in September 04, c. Establishment of a relationship between EMS capabilities and major source permitting requirements. c. Establish env. Goals by March 05, d. Start permit drafting by Oct. 04, 3. e. Finalize permit by Oct. 05 4. Cross Media Planning Step: Air staff meets with DNR staff in other areas and participating facilities to establish a. Other media regulatory concerns, priorities, and goals b. Cross media impacts. c. Baseline data that needs to be collected. d. Possible permit conditions including facility wide limits, variance needs, etc, 5. Use outside consultants to provide training for facilities, DNR staff, and public partners a. Provide training to DNR staff and facilities and any other interested parties on EMS b. Provide training to interested parties group and participating facilities on expectations, roles, responsibilities, etc. for participation in such a group c. Provide training to select DNR compliance staff with the goal that they would become certified auditors of EMS. 6. Gather data on baseline info in 1[start after permit is finalized and continue].				M8. Survey public to establish whether there is increased public satisfaction. M9. Cultivated interest from other business sectors in pursuing Performance-based Title V permits process.	L6. Use of the Performance-based Title V permits by sectors other than the Printing industry.

Logic Model – Performance-Based Title V Permit for the Printing Sector

INPUTS		OUTPUTS			OUTCOMES		
		Activities	Customers Reached		Short-term (Learning)	Medium-term (Actions)	Long-term (Conditions)
		7. In conjunction with DNR's CEA program, establish criteria for approval of EMS. 8. After evaluation of the program, create model documents and strategies for: a. Performance-based Title V model permit using EMS structure. b. EMS elements needed to satisfy our requirements specifically for printers. c. Compliance procedures to be used with performance-based approach. d. Procedures for establishing emission-caps. e. Procedures for establishing variance from selected non-performance-based requirements. f. Strategy for obtaining meaningful and continuing public involvement in the EMS and permit process. 8. DNR and pilot facilities and their interested parties groups provide training for other DNR staff and facilities and potential interested parties on the procedures laid out in 7.				

APPENDIX B
PROJECT SEQUENCE

I. Stake Holder Process
   a. Held Kick off meeting with printers, printer trade associations, environmental groups, and DNR
   b. Laid out goals from the project
   c. established how involved each stakeholder group wanted to be in the project
      i. Trade associations remain very involved with initial EMS and permit conceptual development
      ii. Environmental groups are unable to remain actively involved but agree to review final products.

II. Select and Mentor pilot facilities through EMS process
   a. Held series of workshops taking facilities through fundamentals of EMS with help from trade associations and DNR staff. Workshops included the following topics:
      i. Environmental Policy
      ii. Analysis of Aspects and Impacts
      iii. Plans and Procedures to achieve and maintain compliance
      iv. Identification of environmental requirements
      v. Identification of Environmental objectives and plans for meeting objectives
      vi. Establishment of a structure for operational control and responsibility for environmental performance.
      vii. Employee training plan
      viii. Plan for prevention and correction of environmental problems
      ix. Communication plan
      x. Procedures for document control and recordkeeping
      xi. Plan for System Audits
      xii. Plan for ensuring continual environmental improvement
   b. Guided facilities through EMS Process
      i. Set environmental Policy
      ii. Analyzed Aspects and Impacts
      iii. Set Objectives and Targets
      iv. Created all required Plans and Procedures
      v. Performed a system Audit
      vi. Obtained certification or the equivalent

III. Pilot Facilities Enter Green Tier – Tier 1
   a. Requirements
      i. Facility must be working on its EMS with the goal of completing it in 1 year.
      ii. Facility must have a clean enforcement record
      iii. Facility must demonstrate a record of superior environmental performance
   b. Process for Tier 1
      i. Submit a Tier 1 Green Tier Application
      ii. Public Notice application
      iii. Informational Meeting
      iv. Accept/deny application in 60 days

IV. Establish Measures and Evaluation Methods with assistance from Ross Assoc.
   a. Outlined project and goals to Ross through a series of conference calls
   b. Collaborated with Colorado EMS Permit Effort to pool resources
      i. looked at goal similarity
      ii. looked at measure similarity

iii. Prepared CO/WI crosswalk

c. Collected baseline measures for each pilot facility in Tier 1
   i. Worked with pilot facilities to draft appropriate measures for their operations
   ii. Worked with pilot facilities to collect baseline data
   iii. Finalized baseline data with facilities
d. Ross prepared and submitted final report on Evaluation and Measures for Wisconsin EMS Permit Project.

V. Pilot Facilities Enter Green Tier – Tier 2, must continue working on their EMS
a. Requirements
   i. EMS must be ISO 14001 certified or determined by DNR staff to be functionally equivalent to an ISO certified system
   ii. Facility must have a clean enforcement record
   iii. Demonstrate a record of superior environmental performance
b. Process for Tier 2
   i. Submit Tier 2 Letter of Intent that details superior environmental performance
   ii. Public notice receipt of LOI
   iii. Informational Meeting
   iv. Begin to negotiate Participation Contract – 1 year available for negotiating contract, time can be extended.

VI. Negotiate Participation Contract
a. Requirements
   i. EMS requirements
   ii. System Audits
   iii. Compliance Audits
   iv. Remedies for failure to comply
   v. Length and Renewal
b. Process
   i. Analyze incentives to ensure commensurate with performance
   ii. Public Notice of Participation Contract
   iii. Make decision in 30 days
   iv. Sign Contract and issue final permit simultaneously

VII. Performance Based Permit meeting Title V requirements an other program requirements if applicable
a. Permit goals
   i. Create an administratively simpler permit – requiring fewer revisions, reducing construction permitting
   ii. Make innovation possible within the permit without needing permit revision or modification
   iii. Reduce recordkeeping burden without sacrificing accuracy
   iv. Use EMS elements and regulatory style within the permit whenever possible
   v. Put all permit requirements from all regulatory programs under one permit
   vi. Include a Plan-Do-Check-Act function in the permit
   vii. Use reporting required under EMS to meet reporting requirements of Title V
b. Process
   i. Prepare analysis including calculations and rule applicability.
   ii. Discuss and justify variances requested by the facility
   iii. Prepare draft permit
   iv. Internal review with DNR, EPA, and pilot facility
   v. Come to agreement on final draft permit
   vi. Public notice draft permit and preliminary determination on whether the permit may be issued

vii. Allow 30 days for public comment
viii. Hold Public hearing (required for variances)
ix. Prepare Proposed Permit
x. EPA gets 45 day review of proposed permit
xi. Issue final permit simultaneously with Participation Contract signing

VIII. Obtain federal approval of Performance Based EMS Permit
a. DNR and Facility work with EPA to obtain a assurance of enforcement discretion during SIP Revision approval Process
b. Process for obtaining SIP Revision approval
i. Submit variances on emission limits to EPA as Source Specific Revisions to Wisconsin's State Implementation Plan
ii. Submit analysis and justification for federal approval of SIP Revision
iii. EPA reviews submittal
iv. EPA publishes draft SIP Revision approval in federal register
c. Final SIP revision approval obtained from EPA

Note that the sequence of events was not as linear as it appears from the steps listed above. Steps II and III occurred simultaneously as did steps V, VI and VII. Step IV happened during the middle of the project Currently one pilot facility has successfully obtained ISO 14001 certification for its EMS, submitted a Tier 2 letter of intent and is in the midst of contract negotiations and discussions of the draft permit. The final permit issuance and participation contract signing is expected to occur before December 2009.

APPENDIX C
PROJECT MILESTONES

Table 1 lists the project milestones submitted with quarterly reports for this project and the dates completed or anticipated to be completed.

Table 1

Date of anticipated completion	Performance-based EMS permit Milestones
September 2005 Completed	Select participating facilities Gather baseline data Establish interested parties group Establish multi-media team
December 2005	Provide training on EMS to WDNR staff Provide training for interested parties group and facilities on roles and responsibilities
March 2006	For participating facilities establish environmental goals and measures
June 2006	Evaluate and revise QAPP and work plan ***(Spring 2009)*** Establish compliance methodology
September 2006	**Obtain data on satisfaction with new public participation process** *No progress, must wait for final permit* **Initiate development of draft permits Identify multimedia impacts**
December 2006	**Complete draft performance Based Permit** **Issue performance-based permits** *(Dec. 2009)*
January 2007	**Evaluate the permit review process** *(2010 and on)*
April 2007	**Collect first round of data for pilot and control facilities and complete an initial evaluation of the EMS permit approach** *(May 2009)*

APPENDIX D
Report from Ross Assoc on Approaches for Evaluating the EMS Permit Pilot Project

M E M O R A N D U M

TO: Mark McDermid, Kristin Hart, Jon Heinrich (WI DNR)

CC: Beth Termini, Suganthi Simon, Marilou Martin (US EPA)

FROM: Rob Greenwood and Tom Beierle, Ross & Associates

DATE: August 31, 2005

RE: Evaluation support for Wisconsin Title V EMS Permit Pilot Project

This memorandum is intended to assist the Wisconsin Department of Natural Resources (WI DNR) as it further develops an approach for evaluating the Tile V EMS Permit Pilot Project. The approach taken for developing the memorandum was to:

- Develop a summary of the WI DNR evaluation approach for the Title V EMS Permit Pilot Project based on background documents;
- Cross-walk the WI DNR approach with EPA's EMS evaluation modules;
- Cross-walk the WI DNR approach with Colorado's approach for evaluating its EMS Permit Pilot Project; and
- Suggest next steps related to data collection.

Key information and high-level findings are included in this memorandum, and more detailed issues are contained in the accompanying tables.

Summary of WI DNR's Evaluation Approach for Title V EMS Permit Pilot Project

The Title V EMS Permit Pilots for the printing sector are occurring in the context of a number of recent and ongoing efforts to streamline the regulatory process in Wisconsin. As such, the evaluation being developed for the Title V EMS Permit Pilot Project is informed by state activities in a number of areas related to permitting generally and air permitting specifically. Recognizing these linkages, a number of background documents were used to summarize the evaluation approach being developed for the Title V EMS Permit effort. These background materials include:

- The Alternative Regulatory Tools Workgroup Measures;
- The Air Pollution Innovation Initiative (APII) Targets and Measures and related documents on APII;
- The Innovation Grant Logic Model;
- The Innovation Grant Project Narrative; and
- The Green Tier Base Metrics and related documents.

Based on the background documents and discussions with WI DNR, the evaluation approach appears to be comprised of the goals and (bulleted) objectives listed below. Note that these are not arranged in any order of priority.

Goal: Improve efficiency for regulated entities and for agency

- Reduce agency time spent on permitting

- Reduce agency time spent on compliance
- Reduce regulated entity time spent on permitting
- Reduce regulated entity time spent on compliance
- Increase operating efficiency of regulated entity

Goal: Improve environmental performance
- Reduce air emissions beyond what is required in regulation
- Reduce other pollution
- Enable facility innovation related to environmental performance

Goal: Transferability
- Consistency with Title V requirements
- Transfer approach to other firms/sectors

Goal: Demonstrate continued compliance
- Maintain or increase compliance rates

Goal: Improve public involvement in permit development
- Increase public involvement
- Increase satisfaction with public involvement
- Increase knowledge of public involvement

Table 1 describes the evaluation approach in more detail, including measures for each of the objectives suggested by background documents. For each measure, the table also includes targets, indicators, data sources, and baseline periods. As much of the detailed information for each measure as possible was taken from background documents; our suggestions for filling gaps in information are included in blue. Where relevant, the table includes additional comments to consider for each measure.

One consideration in thinking through the programmatic goals described here is how these goals align with the facility-specific goals that will be described in each pilot facility's EMS permit. Facilities are likely to be much more focused on meeting their own goals than on meeting the programmatic goals; the more the two sets of goals are similar, the more likely that they will both be satisfied. At this early stage of developing the programmatic evaluation framework and developing the EMS permits, there is an opportunity to discuss and align programmatic and facility goals.

Cross-walk of WI DNR Evaluation Approach with EPA Modules

Table 2 describes a cross-walk of the WI DNR evaluation approach with EPA's EMS evaluation modules.[1] The EPA EMS modules are as follows:
- Module 1: Mapping the EMS Project (corresponds to the development of the WI DNR Logic Model)
- Module 2: Assessing the Environmental Results of the EMS Project (corresponds to WI DNR goal "Improve environmental performance")
- Module 3: Assessing the Cost and Cost Savings of the EMS Project (corresponds to WI DNR goal "Improve efficiency for regulated entities and for agency")
- Module 4: Enforcement and Compliance Assurance (corresponds to WI DNR goal "Demonstrate continued compliance")
- Module 5: Public Involvement and Stakeholder Feedback (corresponds to WI DNR goal "Improve public involvement in permit development")

[1] The EPA EMS modules and related documentation can be found at: http://www.epa.gov/permits/ems/tools.htm

- Module 6: Assessing the Potential Transferability of the EMS Project (corresponds to WI DNR goal "Transferability")

In general, the five goals described by WI DNR match well with EPA EMS Modules 2 through 6; the pilot project's Logic Model is a key element of EMS Module 1. There are no additional high-level goals suggested by the modules that are not already incorporated into WI DNR's approach. The objectives and measures outlined by Wisconsin are largely consistent with the EPA EMS modules as well. However, the modules do suggest some additional ways of characterizing objectives and measures. These are noted in the table.

It is important to remember that the EPA EMS modules are only meant to inform an evaluation approach, not to prescribe one. Therefore, the "suggestions from EMS Modules" contained in Table 2 are merely further issues to consider that may suggest additions or refinements to the evaluation approach. In any reasonable scenario for developing an evaluation with limited resources, informed choices must be made about what to include and what to leave out.

Cross-walk of WI DNR Approach with Colorado EMS Permit Pilot Project Approach

Table 3 presents a cross-walk of WI DNR's proposed evaluation approach with that of the Colorado EMS Permit Pilot Project. For each of the WI DNR goals, the table lists the related goals outlined by Colorado (called "intended outcomes" in the Colorado memo) and the indicator categories proposed by Colorado (these are comparable to the "measures" described in this memorandum).

In terms of goals, the Wisconsin and Colorado approaches are quite similar. The exceptions are Colorado's more explicit focus on pollution prevention, cross-media impacts, and improved information (these are highlighted in green in the table). Aspects of some of these goals are subsumed under WI DNR's other goals (e.g., pollution prevention as an aspect of the "innovation" objective under the environmental performance goal).

The more specific measures proposed by Wisconsin are also similar to the indicator categories proposed by Colorado. Through work on the Logic Model, APII, and other activities, Wisconsin appears to have a somewhat more refined picture of its measures and data than does Colorado. Further information on how Colorado is addressing its measurement efforts is contained in the table.

Suggestions on Path Forward for Data Collection

Suggested next steps for WI DNR as it proceeds with the evaluation approach are the following:

1. Finalize a version of this memo's Table 1, which specifies the goals, objectives, measures, targets, indicators, data sources, and baseline periods (where relevant) that will make up the evaluation approach. Lessons from the EMS modules, the Colorado experience, and this assessment may suggest new ideas or refinements. Measures of environmental performance beyond air may have to be developed individually for each facility.

2. Collect baseline data. Background materials already specify data sources for some information, but other information will have to come from facilities themselves. An approach taken by Colorado was to conduct individual baseline assessments of each of the pilot facilities. These involved site visits, conversations with facility personnel, and related activities. If conducted with a concrete idea of the evaluation approach, such baseline assessments can be the repository for much of the information that will be needed later for the evaluation. Report-related activities can also be used to further the dialogue with facilities about future procedures for collecting and sharing information on the measures of interest.

3. Develop the procedures that will be used for collecting data related to the implementation of the EMS permits. This involves activities like tracking employee administrative time related to developing and implementing the

permits, making arrangements with facilities to share data about implementation of the permits, and conducting surveys of the public and, possibly, other firms interested in adopting the innovation.

Table 1. Summary of Wisconsin Title V EMS Permit Pilot Project Evaluation Approach

Goals	Objectives	Measures (Sources in parentheses)	Potential Targets/Data/Sources/Baselines	Comments
Improve efficiency for regulated entities and for agency	Reduce agency administrative time spent on permitting.	DNR administrative time needed to implement EMS permit vs. traditional permitting (ARTWM, APII, LM, PN)	Target: Reduce the hours spent per permit review, renewal, and revision by 20-40% (APII). Indicator: Number of person-hours spent annually per individual permit action (review, renewal, revision) (APII). Source: Air permit databases, employee timesheets. (LM) Baseline: Data from previous five years. (LM)	May want to track permit-related administrative time in three categories: • Up-front research, development, and capacity building for EMS permit program • Individual permit development • Ongoing permit administration As experience with the program builds, time spent on each of these activities would be expected to decline over time, although probably at different rates; research and development time would be expected to decline faster (although not disappear) compared to permit development and permit administration time. Permitting authorities involved in EPA alternative permitting pilots said that initial costs were offset by savings elsewhere in the first three years of permit implementation. Separating out the time measures will allow analysts to capture this dynamic.[2] Note that the logic model mentions a related "short term outcome" of ensuring sufficient agency capacity to understand and create an EMS permit.
		Amount of air permit activity, including applications received, and air permit revisions requested with EMS permit vs. traditional permitting (ARTWM, APII, LM, PN)	Target: Reduce by 40-50% the need to revise or modify permits (APII). Indicator: Number of operation permit revision requests and the numbers of construction/ modification permit applications submitted at each permitted facility (APII, LM). Source: Air permit databases (LM) Baseline: Data from previous five years. (LM)	Note that, for the pilot phase, it will only be possible to provide these measures for the participating facilities, not the broader program as envisioned by the APII measures and targets.
	Reduce agency time spent on compliance-related activities	Administrative time spent on compliance activities related to EMS permit vs. traditional approach (ARTWM, LM)	Target: Reduce agency compliance-related administrative time for pilot facilities by X% to Y% Indicator: Number of person-hours spent annually on compliance activities per facility. Source: Compliance databases, employee timesheets. (LM)	Note that the logic model mentions a related "short term outcome" of ensuring sufficient agency capacity to audit environmental management systems and evaluate compliance with a performance-based permit that incorporates an EMS.

[2] For more information on the alternative permitting pilot projects, see the U.S. EPA report "Evaluation of Implementation Experiences with Innovative Air Permits: Summary Report" which is available at: http://www.epa.gov/ttn/oarpg/t5/memoranda/iap_eier.pdf.

Table 1. Summary of Wisconsin Title V EMS Permit Pilot Project Evaluation Approach

Goals	Objectives	Measures (Sources in parentheses)	Potential Targets/Data/Sources/Baselines	Comments
			Baseline: Data from previous five years. (LM)	
	Reduce regulated entity time spent on permitting	Facility's administrative time needed to implement EMS permit vs. traditional permitting vs. traditional approach (ARTWM, PN)	Target: Reduce facility's permit-related administrative time by X% to Y%. Indicator: Number of person-hours spent annually per individual permit action. Source: Data provided by facility. Baseline: Data from previous five years.	See note above about splitting out permit-related administrative time into three categories. Note that in EPA alternative permitting pilot projects (see footnote 2) facilities' up-front costs were greater with the alternative permits, but costs were more than compensated by time savings later on (and far overshadowed by cost-savings related to avoiding production delays once the alternative permits were in effect).
	Reduce regulated entity time spent on compliance	Facility's time spent on compliance activities affected by use of EMS permit (ARTWM, LM, PN)	Target: Reduce facility's time spent on compliance-related activities by X% to Y%. Indicator: Number of person hours spent annually on compliance-related activities related to permit by facility. Source: Data provided by facility. Baseline: Data from previous five years.	
	Increase operating efficiency of regulated entity	Time lag between industry's decision to make an operational change and the date the change is implemented, under the EMS permit vs. the traditional approach. (ARTWM, LM, PN)	Target: Reduce average lag time by X% to Y%. Indicator: Average lag time Source: Facility records and DNR permit databases (LM, PN) Baseline: Data from previous five years.	A key aspect of this objective is getting at firms' ability to react more quickly to changing market conditions and to improve operational planning. Facilities cited these as important results of flexible permits in EPA's evaluation of flexible permit pilots (see footnote 2). In that assessment, analysts posed a number of questions to facilities about the nature of flexible permits after these facilities' had some experience operating under the new permits. The three questions most focused on increased operating efficiency were as follows: • Under conventional permitting, which source changes potentially subject to air permitting incur an opportunity cost of being "late to market" due to permitting "delays"? What is the potential extent of the cost? • In cases where flexible provisions were used, what approach would the facility have taken absent the flexible provision (e.g., not made the change, taken steps to avoid triggering requirements, complied with the conventional provision)? How much time and resources were saved by utilizing the flexible provision vs. the alternative cited? • Did the flexible permit allow the facility to better plan operations (e.g., longer planning horizon)? If so, how? (Facilities were asked to provide examples.)

Table 1. Summary of Wisconsin Title V EMS Permit Pilot Project Evaluation Approach

Goals	Objectives	Measures (Sources in parentheses)	Potential Targets/Data/Sources/Baselines	Comments
Improve environmental performance	Reduce air emissions beyond what is required in regulation	Emissions of VOCs and HAPS with EMS permit vs. traditional approach (ARTWM, APII, LM, PN, GT)	Target: Reduce emissions by X% to Y% for VOCs and A% to B% for HAPs. Indicator: Annual VOC and HAP emissions (APII, LM, PN) Source: Air Emissions Inventory data (annual consolidated report) Baseline: Data from previous five years.	• As discussed in APII materials, WI DNR plans to "conduct an analysis of the cause of emissions reductions, specifically whether the reduction was due to the use of the alternative regulatory tool and would not otherwise have occurred." The project narrative describes a control group comparison, which would help with this assessment. Another approach for analyzing what caused changes in emissions is through discussions with facility personnel or surveys. Relevant questions used in, or suggested by, EPA's evaluation of flexible permit pilots (see footnote 2) are as follows: • What factors other than permit provisions affected your emissions over the period of interest? • How would you compare a conventional permitting approach vs. flexible permits in terms of your emissions trends, emissions gaps between actual and allowable emissions, and other notable results? • Describe the type and amount of emissions reductions made to comply specifically with EMS permit provisions (e.g., emission caps, plant-wide applicability limits, etc.). o Did your emissions per unit of production (e.g., lbs/widget) go down, stay the same or go up during the term of the flexible permit? o In the absence of the EMS permit provision (e.g., emission caps, plant wide applicability limits, etc.), how would the facility have accommodated any expansions or increases in use? (For example, changing emissions, avoiding making a change, etc.) Note that the Logic Model includes the "long-term outcome" of attaining and maintaining 8-hr Ozone Standard. This is a place to make "continuous improvement" explicit with a more open-ended target. In a parallel effort to the Title V EMS Permit Pilots, environmental business practice indicators are being developed for the Environmental Results Program (ERP) for smaller printers. An example of these indicators might be "VOC emissions per ton paper printed." Consistency of indicators used in the two pilot projects would help with evaluation and assessment activities related to the APII effort as a whole.

Table 1. Summary of Wisconsin Title V EMS Permit Pilot Project Evaluation Approach

Goals	Objectives	Measures (Sources in parentheses)	Potential Targets/Data/Sources/Baselines	Comments
	Reduce other pollution	Reduce pollution (other than air) with EMS permit vs. traditional approach (LM, PN, GT)	Target: Reduce emissions/discharges/transfers of [pollutant] by X% to Y%. To reflect continuous improvement, could be to reduce emissions X% per year. Indicator: Annual measure of pollution Source: Will vary Baseline: Data from previous five years.	The Logic Model says that other pollution issues will be identified on a case-by-case basis during a cross-media planning step. The Project Narrative specifically mentions water, solid waste, and hazardous waste. Green Tier mentions a large list of indicators for water, waste, energy, etc. Note that logic model includes the "long-term outcome" of attaining and maintaining environmental standards for media other than air. This is a place to make "continuous improvement" explicit with a more open-ended target.
	Enable facility innovation related to environmental performance	Innovation under EMS permit vs. traditional approach (LM)	Target: Able to identify permit-related innovations Indicator: List of innovations per facility Source: Facility discussions/survey Baseline: Perception of traditional levels of innovation and barriers to innovation	This objective is not treated in depth in background materials although it is mentioned in the Logic Model, was discussed in phone conversations with WI DNR, and is consistent with the spirit of Green Tier and the APII. Pollution prevention activities (which are more explicitly addressed by Colorado) would be one example of innovations. Note that there is a "transferability" aspect here, in that innovations could be judged on the extent to which they transfer to other facilities.
Transferability	Consistency with Title V requirements	Consistency with Title V air permit requirements (LM)	Target: Consistency with Title V. Indicator: Acceptance/approval by EPA Source: Not applicable Baseline: Not applicable	Demonstrating consistency with Title V requirements is a necessary step for transferring the EMS permit program to other facilities and industries. Some aspects of the pilot program evaluation (e.g., those related to environmental performance and compliance) may help make the case that the EMS permit meets Title V requirements.
	Transfer approach to other firms/sectors	Interest of other facilities (in and out of printing industry) to participate (LM, PN)	Target: X facilities or Y% of facilities interested in innovation Indicator: Facilities expressing an interest in undertaking the innovation Source: Discussions/survey Baseline: Not applicable	Need to think about what the thresholds of interest are for pursuing program expansion, either more pilots or mainstreaming of program. Note that there is another aspect of "transferability" not addressed here—transferability to other media.
Demonstrate continued compliance	Maintain or increase compliance rates	Compliance rates (ARTWM, APII, LM, PN)	Target: Maintain compliance or increase compliance to X% compliance.	Focus on compliance rates could be supplemented by severity and duration of non-compliance as suggested by EPA EMS modules.

Table 1. Summary of Wisconsin Title V EMS Permit Pilot Project Evaluation Approach

Goals	Objectives	Measures (Sources in parentheses)	Potential Targets/Data/Sources/Baselines	Comments
			Indicator: Compliance rates Source: WACD and Compliance Certification Reports (APII) Baseline: Data from previous five years.	If resources are limited, it may be appropriate to focus on particularly relevant areas of compliance (e.g., those related to air) rather than all aspects of compliance.
Improve public involvement in permit development	Increase public involvement	Public involvement in EMS permit vs. traditional approach (LM, PN, GT)	Target: Increase number of participating person-events by X% to Y%. Indicator: Attendance at meetings and other events; visits to website; etc. Source: DNR survey of the public (LM, PN); number of people touring facility (GT); number of hits to website (APII) Baseline: Data from previous five years or perceptions about pre-innovation participation.	Although we have suggested targets, indicators, etc., for this measure, we don't recommend this approach for evaluating public involvement. Measuring public involvement in terms of the number of people participating may be a misleading measure of "success" because increases in involvement may indicate increasing community concerns about the facility. Two of the alternative measures described below (e.g., public satisfaction, and public knowledge) are better measures of involvement. An additional way to evaluate public involvement is to judge the "results" of involvement. This can be done by looking at public satisfaction (as noted below) or by asking more focused questions, such as, "Have new public involvement opportunities, • Reduced conflict related to the facility, • Increased confidence in the operation and regulation of the facility, • Added useful information or ideas about facility operations, • Increased neighbors knowledge about the facility and its operations, and/or • Resulted in operational changes based on community concerns?"
		Opportunities for public involvement in EMS permit vs. traditional approach (GT)	Target: Provide public involvement opportunities that appropriately meet public demand for participation. Indicator: Public satisfaction with public involvement opportunities. Source: Survey. Baseline: Data from previous five years or perceptions about pre-innovation participation.	Rather than targeting an increase in public involvement opportunities, the important question is whether public involvement opportunities are adequate given the "demand" for involvement—not too many opportunities nor too few opportunities. This is, however, more difficult to measure quantitatively than simply counting up meetings, etc. To a large extent, the suggested approach for measuring the adequacy of public participation opportunities begins to converge with the measure of "satisfaction with public involvement process" listed below. The measure could be addressed in a survey with a question such as: "Do you feel that public involvement opportunities are sufficient for you to feel that you can be effectively involved in the permitting process?"

Table 1. Summary of Wisconsin Title V EMS Permit Pilot Project Evaluation Approach

Goals	Objectives	Measures (Sources in parentheses)	Potential Targets/Data/Sources/Baselines	Comments
	Satisfaction with public involvement	Satisfaction with public involvement process with EMS permit vs. traditional approach (ARTWM, APII, LM, PN)	Target: Increase % of public satisfied by X% to Y%. Indicator: Public satisfaction with meaningful participation (APII) Source: Survey (LM, APII, PN) Baseline: Data from previous five years or perceptions about pre-innovation participation.	Background materials focus on satisfaction with the participation process. An additional important question is how satisfied the public is with the new permit approach. This could be measured by fewer complaints, lower resistance to operational change, and perhaps even a decrease in public involvement activities if those with concerns are more likely to participate.
	Knowledge of public involvement	Knowledge of public involvement opportunities in EMS permit vs. traditional approach (LM, PN)	Target: % increase in knowledge about public involvement activities. Indicator: Public awareness of public involvement requirements (LM, PN) and/or role of public (LM) Source: DNR survey of the public Baseline: Data from previous five years or perceptions about pre-innovation participation.	Similar to the comment above regarding public satisfaction, this measure could also examine knowledge about facility operations. If members of the public are informed about the facilities' operations and are not concerned enough to participate, then that is a good measure of success. Note that the EMS Modules and the Colorado approach put a heavier emphasis on the availability of facility information than does WI DNR.

ARTWM: Alternative Regulatory Tools Workgroup Measures
APII: Air Pollution Innovation Initiative Targets and Measures
LM: Logic Model (baseline data needed and outcomes)
PN: Grant Project Narrative
GT: Green Tier Base Metrics
Note: Our suggestions are in blue.

Table 2. Cross-walk of Wisconsin Evaluation Approach with EPA EMS Modules

WI Goals	Relevant EPA EMS Module	Suggestions from EMS Module
Improve efficiency for regulated entities and for agency	Module 3: Assessing the Cost and Cost Savings of the EMS Project	The WI DNR approach focuses mainly on saving time, using a quantitative approach to measurement. This is consistent with the EPA modules and the APII and Green Tier efforts to which the pilots are related. The EPA EMS modules do, however, take a somewhat broader view of efficiency by focusing on "cost" and "cost-savings" rather than just measures of time savings. The modules also describe a more expansive set of costs and cost-savings than is reflected in the evaluation approach. These include: • Cost of new firm-level investments related to EMS permit and permit compliance; • Cost savings from environmental performance changes linked to the EMS permit (e.g., materials use, energy use); and • Efficiencies for regulators of reorienting attention from low risk to high risk activities. Note that APII Measure IN2.5 calls for a benefits assessment covering all activities related to APII, including the Title V EMS Permit Pilot project. The benefits assessment would appear to take a more expansive cost-benefit approach than is reflected in the evaluation measures; in doing so, it may cover some of the broader set of costs and cost-savings outlined in the EPA EMS Module.
Improve environmental performance	Module 2: Assessing the Environmental Results of the EMS Project	The EPA EMS module suggests documenting each indicator according to its related objective, baseline data, source, and procedure for measurement (see EMS Module 2's Table 2). For Wisconsin, such documentation is relatively clear for air and will have to be worked out for the other media on a case-by-case basis. The EMS modules and the Colorado approach to evaluating environmental performance address improved ability to assess (and act on) cross-media impacts. Improving assessment of cross-media impacts was not described as a goal or objective in the WI DNR background documents reviewed for this memorandum, and it may not be a large component of this pilot project because the environmental concerns of printers are heavily focused on air. However, a process for incorporating media other than air in the permit process, including the use of multimedia teams, has been developed (or is being developed). If the issue of measuring cross-media impacts becomes important to WI DNR, our suggestions to Colorado may be helpful. In Colorado's case, we suggested the following approaches for measuring improved ability to assess cross-media impacts: • Improved analysis and information related to cross-media impacts; • Improved allocation of resources resulting from cross-media analysis of relative environmental benefits; and/or • Improved overall (i.e., cross-media) environmental performance.

WI Goals	Relevant EPA EMS Module	Suggestions from EMS Module
		The EMS modules also suggest using some project-wide indicators, which Wisconsin may want to consider. These include: • Increased pollution prevention; • Increased management review and attention to environmental outcomes; and • More attention paid to unregulated indicators (e.g., water use).
Transferability	Module 6: Assessing the Potential Transferability of the EMS Project	The EMS module on transferability focuses on Everett Rogers' innovation-diffusion model[3], which is based on the following five components: 1. Relative advantage—what are the costs and benefits of the project and how are they distributed? 2. Compatibility of the project with organizational goals of stakeholders and potential adopters. 3. Ease of adoption. 4. Trialability—what are the "barriers to entry?" 5. Observability—are project results apparent to others? In general, the higher a project scores on these components, the more transferable it will be. The Rogers model may provide an appropriate model for what kind of information to collect in order to inform decisions about transferability. Some of the information relevant to scoring the pilots according to the innovation-diffusion model will be collected through evaluation measures. For example, measures related to the goal of increased efficiency will be relevant to examining relative advantage. Information useful for other aspects of the model—or for gaining an understanding of transferability regardless of whether the model is used—can be derived from discussions with pilot participants or surveys. The EMS modules suggest that the following questions be asked of those participating in the pilots: • To what extent do users consider the EMS project to be an improvement over the traditional way of doing business? • What are the advantages and disadvantages of the EMS permit approach? • What are the primary lessons from the pilot? • What is the potential for broader application? • What are the primary barriers for broader application?
Demonstrate continued compliance	Module 4: Enforcement and Compliance Assurance	The main focus of the EPA module on compliance is on documenting new requirements contained in the innovation and measuring whether they have been met. In the WI DNR case, the requirements will be documented in the actual EMS permit and the evaluation will look at compliance with these requirements.

[3] This model is described further in the EPA EMS Module 6 and Companion User's Guide. The original source for the model is E. Rogers., *Diffusion of Innovations*, 4th Edition, The Free Press: New York, NY, 1995.

WI Goals	Relevant EPA EMS Module	Suggestions from EMS Module
		The EMS module suggests that the meaning of "improved regulatory compliance" could be refined by specifying which areas of compliance will be included and by introducing the concepts of severity and duration of non-compliance. The EPA EMS module also addresses "practical enforceability," which, in the Wisconsin case, is measured under compliance-related aspects of efficiency.
Improve public involvement in permit development	Module 5: Public Involvement and Stakeholder Feedback	The module and related documents suggest the following evaluation questions regarding public participation, which are largely covered by the WI DNR approach: • What is the pre-EMS permit "baseline" for public involvement and accountability against which progress is measured? • How does the EMS permit address regulatory requirements for public participation? • What changes to the transparency in decision-making and the degree of stakeholder/public leverage result from the EMS permit? The WI DNR focus is more on participation than information and transparency. Some information-related objectives suggested by the EMS module include: • Increase the amount, scope, & depth of information available to the public; • Increase access to information; • Improve quality (relevance, accuracy) and timeliness of information available to public; and/or • Increase the transparency of decision making. The EMS module suggests addressing some additional aspects of participation, such as: • Measuring the impact of public participation (e.g., improved information); • Participation by groups that are traditionally not involved (e.g., low income and minority communities); and • Organizational learning about the best means of involving stakeholders.

Table 3. Cross-walk of Wisconsin and Colorado Evaluation Approaches

WI Goals	CO Goals	CO Indicator Categories	Implementing Colorado's Approach
Improve efficiency for regulated entities and for agency	Increased efficiency of the regulatory system	• EMS costs and benefits • Resource savings by the facility • Resource savings by CDPHE	• Will be assessed quantitatively. • Colorado is still developing its approach for assessing costs and benefits of the program; little baseline data has been collected.
Improve environmental performance	Superior public health and environmental protection Pollution prevention Better assessment of cross-media impacts	• Environmental performance (reduction of solid waste, water use, energy use, air pollution, water pollution, hazardous waste, risk to employees, and risk to the community) • Environmental condition indicators • Pollution prevention indicators (including performance indicators and priority actions) • Continual improvement	• Environmental performance measures will be assessed quantitatively; CO is working on how to measure environmental performance of CAFOs; likely to address implied, rather than actual, risk reduction; conducted baseline reports to gather data. • CO will probably not measure environmental conditions. • Pollution prevention measures will be measured quantitatively to the extent possible, although not through an eco-efficiency index; pollution prevention was redefined as a component of "superior public health and environmental protection;" we suggested a qualitative approach (e.g., counting pollution prevention activities, product line changes, etc.). • Unclear how CO will assess measurement of cross-media impacts; it was a goal, but not an indicator category. We suggested that it could be measured in terms of better ability to conduct cross-media assessment, improved allocation of resources, or overall environmental performance. • Unclear how addressing continual improvement.
Transferability			• Transferability was not identified initially as important to Colorado, but discussion of EMS modules highlighted that it was an important consideration.
Demonstrate continued compliance	Improved regulatory compliance	• Environmental compliance indicators	• Will be assessed quantitatively. CO still needs to decide whether to focus on specific types of compliance and refine approach for measuring it.
Improve public involvement in permit development	Enhanced stakeholder involvement	• Community involvement measures related to community involvement in identifying facility goals. • Involvement of interested parties	• Will be addressed qualitatively. • Has not decided on specific focus of assessment. • Community involvement plans are required for each facility.
	Improved information for stakeholders, the public, and agencies	• Community involvement measures related to distribution of public reports. • Quality and quantity of environmental information produced	• Will be addressed qualitatively.
		Other indicators: • EMS design • Employee involvement	• These indicator categories were not identified with any particular goal. • EMS design was evaluated for each of the pilots through EMS audit reports. • Data on employee involvement was gathered in baseline report and EMS audit reports.

*In the Colorado memo, these are referred to as "intended outcomes."

Appendix E
Performance Measures Memo from Ross & Associates with Baseline Data collected from a pilot facility

MEMO

To: Beth Termini, EPA; Kristin Hart, WI DNR; Jeffrey Voltz; WI DNR
From: Tom Beierle, Ross & Associates Environmental Consulting
Date: 5/12/08
Re: EMS and Permitting Pilot Project Performance Measures

Introduction

The purpose of this memo is to present performance measures data for Wisconsin Department of Natural Resources' EMS and permitting pilot project and to describe issues encountered by the project team in the data collection process. Performance measures and associated data are included in tables attached at the end of this memo.

The performance measures were developed between May and July 2007 with personnel from the U.S. Environmental Protection Agency, Wisconsin Department of Natural Resources, and Colorado Department of Public Health and Environment. The subsequent effort to collect performance data focused on the Serigraph facility in Wisconsin, one of two pilot facilities in the State seeking to obtain an innovative performance-based permit. A key feature of the performance-based permit is its linkage to the facility's Environmental Management System (EMS). Serigraph is a member of Wisconsin's Green Tier program, a tiered permitting program that provides regulatory and non-regulatory incentives for high-performing firms.

Serigraph is a manufacturer of printed decorative components for a wide range of manufacturers as well as the point-of-purchase advertising industry. Examples of products include the graphics for the instrument cluster in a car, the control panel on a dishwasher or office copier, and advertising in a fast food store. Serigraph's basic technologies involve a variety of printing processes, but include many other methods of adding decorative effects for products and stores.

Performance Measurement Issues

As the project team proceeded from identifying performance measures to collecting baseline data for the Serigraph facility, it encountered a number of issues, which are detailed below.

Clarity on what production facilities are being measured.

Serigraph has multiple facilities, but only the plant 2 facility (also known as the "Automotive/OEM plant") is covered by Serigraph's membership in Green Tier. It is this facility that would be influenced by Green Tier membership and would operate under the performance-based permit. Care needed to be taken only to collect and report environmental data for Plant 2, which required disaggregating some data that was collected and reported for multiple plants. In 2007, Plant 4 was consolidated with Plant 2 as reflected in the attached tables.

The challenge of attributing environmental performance to pilot programs and setting a baseline year.

Linking environmental performance to any specific policy intervention is challenging because performance can be affected by so many different forces. This issue can be addressed, at least in part, by picking a "pre-intervention" baseline year and then comparing it to subsequent performance under Wisconsin's EMS and permitting program. As part of the data collection effort, the project team obtained information on important steps in Serigraph's membership in Green Tier, as follows:

- Application for Green Tier 1 (Nov 28, 2005)
- Completion of ISO 14001 Lead Auditor training (Aug 25, 2006)
- Development of EMS system (Dec 19, 2006)
- Submission of Functionally Equivalent Determination to DNR (June 2007)
- Submission of Green Tier 2 letter of intent (Nov 11, 2007)
- Receipt of external audit to ISO 14001 (Dec 19-21, 2007)
- Completion of corrective actions from audit (Feb 28, 2008)

Given this progression and dates, the project team decided to set the baseline year as 2004, before Serigraph applied for Green Tier Level 1 status. Changes in performance after that date could, then, be at least partially attributed to the program. A lingering unresolved issue was how to separate the influence of Green Tier membership from the influence of obtaining a performance-based permit to determine the additional "value added" from the permit. In the future, it would be appropriate to also set a permit-specific baseline year, which would be the year before Serigraph begins operating under its performance-based permit.

Normalizing environmental performance for production

Environmental impacts are often linked to production volumes—as production goes up emissions go up, as production goes down, emissions go down. Unless we account for production trends, emissions trends don't tell us whether facilities are becoming more eco-efficient by improving their environmental performance per unit of production. EPA's Performance Track program has addressed this issue by reporting both overall environmental performance measures and measures that are normalized for production.

This issue was relevant to Serigraph because air emissions and other environmental performance measures were showing year-to-year increases for some years and information from the facility suggested that these changes were being driven by the volume and type of production.

Typically, facilities normalize emissions by identifying a particular production "unit." The challenge for Serigraph was identifying such a unit given the wide variety of printing and production processes in which they engage. After some discussion, the project team focused on "number of screens" as an appropriate—although not perfect—production unit. Screens are made for each production lot, one screen per lot. One drawback of using the number of screens for normalizing is that lot sizes have been getting smaller over time. Everything equal, this means the facility would use more screens for the same amount of output over time. An improvement would be to weight the count of screens by lot size. Serigraph does not, however, currently track lot sizes.

Impact of changing production methods on environmental performance

Serigraph has recently implemented production changes to respond to market demand for on time delivery, fast response times, shorter throughput times, and generally more flexibility. To accomplish these changes, Serigraph has undertaken a comprehensive Lean implementation initiative that seeks to reduce waste at all

levels of the organization. However, the production changes have put upward pressure on key air emissions performance measures. As part of the effort to "lean" production, Serigraph ran smaller lot sizes so that rapid changes in customer schedules could be met. Smaller lot sizes required a significant increase in the number of set-ups made in production. With each lot run, there is some waste of ink (left over after printing) and more solvent used to clean the screens. As a result, Serigraph has noted the issue of rising VOC emissions even as ink use goes down because of shorter run times and the increased need to clean screens.

To reduce VOC emissions, Serigraph has sought to use more UV ink. However, only conventional ink can be used for production units that will be formed into three-dimensional shapes. Serigraph reported that it is getting more requests from customers for three-dimensional products, and needs to use more conventional ink.

Actual baseline costs and projected future costs and costs avoided

Because Serigraph's performance-based permit was still in draft form at the time of this project, the facility was still operating under its traditional permit. As a result, comparing costs between the traditional permit and the performance-based permit required estimating future costs under a performance-based permit. This was largely a matter of estimating what traditional costs would be avoided under the new permit for activities such as permit revisions. To do the calculations, the project team selected a representative period (e.g., five years), described the actual or estimated permitting activities during that time (and associated hours) and divided by the number of years to get an annual value for hours and costs devoted to permit development and compliance.

Identifying the right counterfactual for cost comparisons

As the work with Serigraph was proceeding, Wisconsin DNR and EPA were determining whether the pilot facilities—absent a performance-based permit—would continue to operate under a Title V permit or a synthetic minor permit. This raised the question of which type of traditional permit should be the baseline for comparing projected costs under the performance-based permit. If the facilities would be expected to operate under a synthetic minor permit in the absence of a performance-based permit, then it would be the appropriate "counterfactual" against which to compare the performance-based permit. However, all of the facilities' actual costs to date had been accrued under the Title V permit. The counterfactual analysis for a synthetic minor permit was not a matter of comparing estimated performance-based permit costs against past actual Title V costs, but of comparing estimated performance-based permit costs to estimated synthetic minor permit costs.

Other issues related to the right "counterfactual" came up during the project. For example, since 2005, a Printers Initiative allowed facilities to avoid some traditional permitting activity. An accurate estimate of the costs avoided under a performance-based permit would also have to take into account factors such as this Printing Initiative as part of the counterfactual.

Categorizing permit activities as "permit development" versus "permit compliance"

The cost comparison between a performance-based permit and traditional permit were partitioned into development costs and ongoing compliance costs. The distinction was made because, while some additional costs could be anticipated for developing an innovative performance-based permit, those costs were anticipated to be recouped in savings related to ongoing compliance under the new permit.

The category of "permit development" came to include not just initial permit development, but also permit revisions, the development of construction permits, and operation renewals. "Permit compliance" measured ongoing inspection costs. For Serigraph, the estimates included only air program compliance inspections. The measure did not include incidental compliance time that did not require significant agency time, such as review of annual reports, compliance assistance or potential enforcement and complaint investigation.

How should "marketability" be measured?

Pilot facilities were interested in how their status as top environmental performers involved in an innovative pilot project could help them to market and sell their products. There are a number of studies and guides describing how improved environmental performance can enhance a company's revenue and share value.[4] Related *process* measures can assess how companies have communicated their environmental performance to shareholders and what program participation has contributed to products or services. *Outcome* measures are typical measures of "top line" value, such as revenues, sales, market share growth, share price, or enhanced brand.

Serigraph determined that the most feasible measure of marketability was the dollar value of sales that were contingent on the firm's environmental leadership. For example, the automotive industry requires suppliers to have ISO-certified EMS's, and it was possible to identify which Serigraph sales contracts fell under this requirement. (It should be noted that Serigraph could have met this auto industry requirement for an EMS without being a Green Tier member or participating in the performance-based permit pilot.) The facility felt that it could better track sales that were linked to its environmental leadership.

Performance Measures Data Tables

The attached tables present performance data for Serigraph available as of May 2008. The first table describes the facility and key milestones. The following tables describe discrete sets of performance measures. The right-hand column titled "Notes" in the performance measures tables describes measure-specific issues and/or relevant information for interpreting the data. Where available, data is included for 2002 to 2007. The baseline year is 2004.[5]

[4] See, for example, the Global Environmental Management Initiative documents: "Environment: Value to the Top Line" and "Environment: Value to the Investor" at http://www.gemi.org/docs/PubTools.htm.

[5] Serigraph provided data for 2002 and 2003 as well as baseline year data for 2004. For future projects, it would be sufficient to have data for just the baseline year and subsequent years.

Background Table: Serigraph Summary, Milestones, and Context for Performance Data

Facility Summary

Serigraph Inc. is a manufacturer of decorative components for a wide range of OEM customers as well as the Point-of-Purchase advertising industry. In short, Serigraph decorates all kinds of products and stores for a wide range of very demanding global customers.

The products range from the graphics for the instrument cluster in a car, the control panel on a dishwasher or office copier, an outboard marine engine or a golf club shaft, or for advertising french fries and soft drinks in a fast food store. Serigraph's basic technologies revolve around a variety of printing processes, but include many other methods of adding decorative effects for products and stores. Serigraph can be thought of as a "high tech" printer.

Serigraph has always kept pace with changing requirements by being proactive through its strategic planning process which looks at the strengths, weaknesses, opportunities and threats of markets, customers, regulations, and global economics. Serigraph made a pioneering effort in 1997 to bring in Biofiltration technology to reduce VOC emissions by 30 tons. This was followed up with a conversion to alcohol-free fountain solutions for UV offset printing. In 2003, Wisconsin received the Wisconsin Business Friends of the Environment Award for its efforts in reducing VOC air emissions. In 2004 Serigraph committed to replacing solvent-based inks with low-VOC coatings and is working with its customers to get approvals for the new ink constructions.

Serigraph's environmental ethics extend beyond meeting and exceeding regulated and unregulated edicts. Serigraph has voluntarily undertaken a number of projects that have improved the environment. The scope of the Green Tier 2 application is Serigraph's plant 2 facility, also known as the Automotive / OEM plant. Corporate headquarters is also located in this facility.

Key Milestones and Dates

Applied for Green Tier 1	Nov 28, 2005
Completed ISO 14001 Lead Auditor training	Aug 25, 2006
EMS system developed	Dec 19, 2006
Submitted Functionally Equivalent Determination to DNR	June 2007
Green Tier 2 letter of intent submitted	Nov 11, 2007
Received external audit to ISO 14001	Dec 19-21, 2007
Completion of corrective actions from audit	Feb 28, 2008

Context for Performance Data

Data collected is for the Automotive/OEM facility. Customer expectations for on time delivery, fast response to pull–ups, and shorter throughput times have required Serigraph to become more flexible. This has been accomplished primarily through a comprehensive Lean implementation initiative that seeks to reduce waste at all levels of the organization. One of the main initiatives was to run smaller lot sizes so that rapid changes in customer schedules can be met. This requires a significant increase in the number of set-ups made in production (over 11,000 screens in 2007 from 2006). This does result in more waste, however, projects designed to reduce wipe usage and solvents, have resulted improved performance when compared to the number of screens made.

Table 1: Improved Environmental Performance

TYPE OF PERFOR-MANCE MEASURE	METRIC (Units)	DATA COLLEC-TION SOURCE	2002	2003	2004 (Baseline)	2005	2006	2007	NOTES
Air emissions	VOCs (tons/year)	Reported to WIDNR by Serigraph through Consolidated Reporting System	21.87	18.70	18.74	21.48	20.97	26.24	VOCs and HAPs are for Plant 2 only. Emission increase is due largely to consolidation with Plant 4 and shorter production runs leading to more clean up solvent usage.
	HAPs (tons/year)		6.3	4.8	3.2	7.5	0	6.5	
Water use	Water use (gallons/year)	Serigraph P2	16,717,800	14,425,180	16,570,440	15,761,108	12,398,100	15,728,196 (11,980,716)	Plant 4 consolidated with Plant 2 in 2007 which will save 3,747,480 gals annualized
Energy use	Electricity (KwH/year)	Serigraph P2	14,509,056	12,392,741	14,635,574	14,577,872	17,692,567	19,131,527 (16,917,527)	Plant 4 was consolidated with Plant 2 in 2007. Plant 4 shut down saves 2,214,000 kWH/yr
	Natural gas (Therms/year)	Serigraph P2	401,819	360,249	385.583	382,598	392,546	411,956 (341,701)	Plant 4 was consolidated with Plant 2 in 2007. Plant 4 shut down saves 70,255 therms/yr
	Other (e.g., propane, diesel)	Serigraph			N/A	N/A	N/A	N/A	
Solid waste	Solid or universal waste Lamps(# of lamps per year) Batteries/devices(Lbs per year)	Serigraph	2,291 lamps 200 lbs	3,180 lamps N/A	1,608 lamps N/A	3,511 lamps 369 lbs	811 lamps 394 lbs	4,037 lamps 214 lbs	Changed lighting to DL lamps from cool white fluorescent per customer specs. 100% of batteries and lamps are recycled
Hazardous waste	Hazardous waste (lbs/year)	WI DNR (via Consolidated Reporting	91,334	81,377	83,213	73,495	78,896	82,763	Hazardous waste data with J. Voltz.

TYPE OF PERFOR-MANCE MEASURE	METRIC (Units)	DATA COLLEC-TION SOURCE	2002	2003	2004 (Baseline)	2005	2006	2007	NOTES
		System) or Serigraph							
Amount of recycling vs. total amount of materials used	Polycarbonate-recycled (lbs/year)	Serigraph P2	999,772	814,811	992,291	1,047,817	914,407	915,971	
	Polycarbonate-total used (lbs/year)	Serigraph P2	1,918,300	1,834,350	1,562,000	1,525,000	1,454,945	1,178,469	
	Styrene-recycled (lbs/year)	Serigraph P2	N/A	N/A	N/A	N/A	N/A	N/A	
	Styrene-total used (lbs/year)	Serigraph P2	None used	None used	None used	None used	None used	None used	
	Paper-recycled (lbs/year)	Serigraph	770,439	796,801	968,681	861,821	837,453	870,044	
	Paper-total used (lbs/year)	Serigraph	624,000	606,000	406,000	576,000	466,000	312,000	Paper usage could only be tracked for copy machine paper. An electronic storage system was implemented in 2007 to scan and store documents which reduced the amount of paper purchased and the need to make copies
	Metals-recycled (lbs/year)	Serigraph	105,682	91430	129,425	150,013	156,460	27,491	This includes all metal recycled including scrap pipe, stainless mesh, banding from crates, Misc tools, etc
	Metals-total used (lbs/year)	Serigraph	178,141	94,892	141,238	116,117	70,732	56,581	This only includes Aluminum purchased for a large program
	Other-recycled (lbs/year)	Serigraph	8,965	1,703	65,588	4,094	32,694	12,536	
	Other-total used (lbs/year)	Serigraph							

TYPE OF PERFOR-MANCE MEASURE	METRIC (Units)	DATA COLLEC-TION SOURCE	2002	2003	2004 (Baseline)	2005	2006	2007	NOTES
Pollution prevention performance	% use of UV (i.e., low-VOC) ink per unit of ink used (lbs UV ink / total ink used)	Serigraph P2		43.5%	78%	74.4%	84.5%	76.3%	Large customer program that was run with UV ink ended in 2007
Production levels	Number of screens made	Serigraph	29,856	28,123	32,221	31,911	35,545	46,748	To normalize emissions data Shorter runs and more set-ups are required to meet customer expectations which require the use of more solvents for clean -up

Table 2: "Beyond Compliance" Activities and Improved Management Practices

TYPE OF PERFOR-MANCE MEASURE	METRIC (Units)	DATA COLLECTION SOURCE	2002	2003	2004 (Baseline)	2005	2006	2007	NOTES
Commitments to "superior environmental performance" (from Green Tier acceptance letter)	VOC and air toxics emissions reductions	See VOC/HAP measures in Table 1	See Table 1	See Table 1	See Table 1	See Table 1	See Table 1	See Table 1	
	Waste minimization, including recycling	See recycling, solid waste, and hazardous waste measures in Table 1	See Table 1	See Table 1	See Table 1	See Table 1	See Table 1	See Table 1	
	Minimizing solvent usage parts cleaning (lbs per year)	Serigraph	8,053	5,286	4,336	2,987	2,757	3,204	
	Reduction in electrical consumption	See electricity consumption in Table 1	See Table 1	See Table 1	See Table 1	See Table 1	See Table 1	See Table 1	
	Prairie restoration and maintenance	Serigraph			75 acres	75 acres	75 acres	75 acres	
	Water use reductions	See water consumption in Table 1	See Table 1	See Table 1	See Table 1	See Table 1	See Table 1	See Table 1	
	Low VOC coatings to replace conventional ink	See VOC content per unit of ink in Table 1	See Table 1	See Table 1	See Table 1	See Table 1	See Table 1	See Table 1	
	Greenhouse gas emissions reductions (CO2 emitted per year)	Serigraph							
	Greenhouse gasses sequestered, e.g., through native plants (C02e absorbed per year)	Serigraph			30 tons	30 tons	30 tons	30 tons	
	Use of native vegetation around facility (units TBD)	Serigraph							
Measurable areas of "continuous improvement" (identified in annual report)	Number of spills (spills per year)	Serigraph	2	3	2	3	3	0	
	Ratio of # Screens Made / lbs of Used Rags	Serigraph	.67	.49	.47	.53	.60	.74	
	Ratio of # Screens Made / lbs of centrifuge solvent	Serigraph	.55	.58	.60	.66	.80	.84	
Environmental management	# of EMS non-conformances identified	Serigraph			N/A	N/A	N/A	12 – NC (non-conformances)	Serigraph received an external ISO 14001

TYPE OF PERFOR-MANCE MEASURE	METRIC (Units)	DATA COLLECTION SOURCE	2002	2003	2004 (Baseline)	2005	2006	2007	NOTES
improvement	in annual internal EMS audits							10 –OFI (opportunities for improvement)	audit. 12 non-conformances were found. All were minor and none caused or would cause a noncompliance. 10 out of 12 were corrected by February 2008.

Table 3: Pollution Prevention Activities Identified and Undertaken (to be filled out by Serigraph)

Pollution Prevention Activity*	Year Initiated	Relevant Outcome Measure (see Table 1)
Test alternative ink systems	2000	VOC content per unit of ink used
Test low VOC wash solutions	2003	VOC emissions
Use VOC-free fountain solution in the pressroom	2005	VOC emissions
Focusing on operational excellence (including identifying and developing low VOC ink systems)	1997	VOC content per unit of ink used
Recycling	1989	Recycling measures
Researching alternative low-VOC solvents	2003	VOC emissions
Entered into an interruptible power agreement with WE Energy	2005	Electricity use
Purchased a power monitoring and energy shed program for building management system	2006	Electricity use
Installed energy efficient frequency drive motors in the cooling towers	2005	Electricity use
Installed energy efficient lighting fixtures throughout the plant T 8 to T 12	2006	Electricity use
Reduced amount of water used during screen reclamation	2006	Water use
Reduce Scrap as a percent of cost	2004	Energy, water, VOC emissions

*Pollution prevention activities based on those described in Green Tier facility annual report

Table 4: Cost and Resource Savings—Permit Development

TYPE OF PERFOR-MANCE MEASURE	METRIC (Units)	DATA COLLEC-TION SOURCE	Calculated costs and resources for traditional Title V permit (Baseline)		Estimated costs and resources for synthetic minor permit		Estimated costs and resources for performance-based permit		NOTES
			Total Hours/$	Calculation Approach	Total Hours/$	Calculation Approach	Total Hours/$	Calculation Approach	
WI DNR cost and time for traditional permit development compared to performance-based permit	Time to develop traditional permit vs. performance-based permit (hours per permit)	WI DNR	189.5 hours per year	Calculated over 20 year period 1998-2007: ((3 permit revisions @ 10 hrs per) + (23 construction permits @ 120 hrs per) + (4 operation renewals @ 250 hrs per)) / 20 years	Same as Title V	Same as Title V	50 hours per year	Estimated over 5 year period: ((0 permit revisions) + (0 construction permits) + (1 operation renewals @ 250 hrs per)) / 5 years	Note that recent Printers Initiative has allowed facilities to avoid some traditional permitting activity since 2005
	Cost to develop traditional permit vs. performance-based permit (hours per permit)	WI DNR	$7580 per year	Average air engineer salary plus 33% of salary for benefits = $40/hr.	Same as Title V	Same as Title V	$2000/yr	Average air engineer salary plus 33% of salary for benefits = $40/hr.	Overhead not included
EPA cost and time for traditional permit development compared to performance-based permit	Time to develop traditional permit vs. performance-based permit (hours per permit)	WI DNR	0	Unlikely that EPA would review	0	EPA would not review synthetic minor (i.e., state) permit	Significant	EPA review time for first performance-based permit would likely be significant.	
	Cost to develop traditional permit vs. performance-based permit (hours per	WI DNR							

TYPE OF PERFOR-MANCE MEASURE	METRIC (Units)	DATA COLLEC-TION SOURCE	Calculated costs and resources for traditional Title V permit (Baseline)		Estimated costs and resources for synthetic minor permit		Estimated costs and resources for performance-based permit		NOTES
			Total Hours/$	Calculation Approach	Total Hours/$	Calculation Approach	Total Hours/$	Calculation Approach	
	permit)								
Facility cost and time for traditional permit development compared to performance-based permit	Time to develop traditional permit vs. performance-based permit (hours per permit)	Serigraph	160 hrs	Time required to collect data by press and then total facility			80 hrs	Time required to collect data by press and then total facility	
	Cost to develop traditional permit vs. performance-based permit (hours per permit)	Serigraph	$5,600	Total hrs x $35/hr = $			$2,800	Total hrs x $35/hr = $	
	Time to achieve Green Tier Tier II status, including EMS development (hours)	Serigraph	Not applicable	Not applicable					
	Cost to achieve Green Tier Tier II status, including EMS development ($)	Serigraph	Not applicable	Not applicable					

Table 5: Cost and Resource Savings—Permit Compliance

TYPE OF PERFOR-MANCE MEASURE	METRIC (Units)	DATA COLLEC-TION SOURCE	Calculated costs and resources under traditional Title V permit (Baseline)		Estimated costs and resources under synthetic minor permit		Estimated costs and resources under performance-based permit		NOTES
			Average Annual Hours/$	Calculation Approach	Average Annual Hours/$	Calculation Approach	Average Annual Hours/$	Calculation Approach	
Agency cost and time for compliance activity under traditional and performance-based permits	Time: Compliance activity under traditional vs performance-based permit (hours per year)	WI DNR	35 hours per year	One compliance inspection (70 hours) every two years	Same as Title V	Same as Title V	14 hours	One compliance inspection (70 hours) every five years Note: does not include time to review EMS audit results.	Only includes air program compliance inspections. Does not include incidental compliance time such as review of annual reports, compliance assistance or potential enforcement and complaint investigation, Does not include single point of contact under P-B permit vs. time individual inspectors would spend answering questions, etc. under traditional permit
	Cost: Compliance activity related to traditional permit ($ per year)	WI DNR	$8976/yr	Average air engineer salary plus 33% of salary for benefits = $40/hr	Same as Title V	Same as Title V	$2560/yr	Average air engineer salary plus 33% of salary for benefits = $40/hr	Overhead not included
Facility cost and time for compliance activity under traditional and performance-based permits	Time: Compliance activity under traditional vs. performance-based permit (hours per year)	Serigraph	8 hrs	Just have to notify DNR as long as Serigraph is under CAP					

TYPE OF PERFOR-MANCE MEASURE	METRIC (Units)	DATA COLLEC-TION SOURCE	Calculated costs and resources under traditional Title V permit (Baseline)		Estimated costs and resources under synthetic minor permit		Estimated costs and resources under performance-based permit		NOTES
			Average Annual Hours/$	Calculation Approach	Average Annual Hours/$	Calculation Approach	Average Annual Hours/$	Calculation Approach	
	Cost: Compliance activity related to traditional vs. performance-based permit ($ per year)	Serigraph	$280	Total hrs x $35/hr					
Facility record-keeping cost and time under traditional and performance-based permits	Time: Record-keeping under traditional vs performance-based permit (hours per year)	Serigraph	No change						
	Cost: Record-keeping under traditional vs performance-based permit ($ per year)	Serigraph							
Time from decision to implementation of operational change under performance-based permit vs. traditional permit	Elapsed time for operational change under traditional vs. performance-based permit (average days/year)	Serigraph	15 days or less						

Table 6: Marketability

TYPE OF PERFOR-MANCE MEASURE	METRIC (Units)	DATA COLLEC-TION SOURCE	2002	2003	2004 (Baseline)	2005	2006	2007	NOTES

Marketability	Amount of sales or customers attracted to company because it is "green." (units TBD by facility)	Serigraph			Not available	Not available	$250,000	$50,000	Sales managers were contacted and reported that some customers do ask about green initiatives, however, the primary factor in awarding business is still price. Marketing numbers are based on auto industry requirement that suppliers of an ISO-certified EMS; sales are not linked to membership in Green Tier or being a pilot facility for performance-based permit (WI DNR says Serigraph would likely have had an ISO-certified EMS even without Green Tier). This is an opportunity to track data better moving forward.

Table 7: Cross-Media Environmental Analysis and Opportunities

TYPE OF PERFOR-MANCE MEASURE	METRIC (Units)	DATA COLLECTION SOURCE	LIST OF IMPACTS and OPPORTUNITIES
Cross-media Environmental Analysis and Opportunities	Cross-media impacts of permitted activities identified in EMS or in developing performance-based permit	WI DNR and Serigraph	
	Opportunities for cross-media flexibility in permit requirements identified in EMS or in developing performance-based permit	WI DNR and Serigraph	