

# **A Multiple Pollutant Emission Reduction Reporting System**

**That Includes Emission Reductions from  
Energy Efficiency and Other Measures**

**Prepared by  
Leonardo Academy**

**For**

**The Wisconsin Department of Natural Resources  
and  
The United States Environmental Protection Agency**

**Version 1.3**

**September 15, 1998**

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## Foreward

This report describes consensus standards for a multiple pollutant approach to emission reduction reporting and crediting for energy efficiency improvements, production process changes, combustion process changes and other emission reduction actions. Implementing a multi pollutant approach has significant potential benefits. These benefits arise from the fact that many individual actions like increased energy efficiency reduce multiple pollutants.

So how can these potential benefits be captured? Luckily, in the near future opportunities for implementation of a multi pollutant approach to emission reduction reporting and crediting for the full range of emission reduction actions including energy efficiency improvements are within reach. These opportunities are provided by the stream of tighter restrictions on environmental emissions being enacted within the U.S. and the rest of the world. While the timing and order of pollutants being more tightly regulated in the future varies from country to country, the story is the same: As the negative impacts of each pollutant become recognized, the regulation of these emissions are tightened up.

In the U.S., the stream of pollutants facing tighter regulation start with tighter NO<sub>x</sub> emission limits in the 22 eastern states in the OTAG region starting in 2003. Each of these 22 states needs to announce how they will meet these requirements by late 1999. Each of these states has the opportunity to use a multi pollutant approach, include the full range of emission reduction actions, and use competitive markets to drive down the cost of achieving their emission reduction goals. In 2006, plans will start to be developed to reduce smaller particulate emissions (PM<sub>2.5</sub>) which have not been regulated in the past. Around 2010, carbon emission reductions may be implemented. Also, mercury emission reductions may be required in the early 2000's. Whenever a multi pollutant approach is implemented it will reduce the cost of achieving both the immediate emission reduction goal and reduce the cost of achieving all the subsequent emissions reduction targets for other pollutants.

So what can be done to make this happen? Owners and implementers of emission reduction actions should start right now to doing as much reporting using the multi pollutant approach as possible to make recognition of the reporting a self fulfilling prophesy. Implementing a multi-pollutant approach to emission reduction reporting and crediting will make it easier for organizations to identify the full range of benefits of their emission reduction actions and be recognized for their contribution to environmental improvement. It will also allow them to capture the full economic value of these actions where markets for emission reduction are created that allow all types of emission reduction actions to compete in the competitive marketplace. This approach will reduce the cost of achieving emission reduction objectives by expanding the recognized pool of available emission reduction actions. Finally it should reduce the administrative burden on state and federal regulatory agencies by moving from the currently common one pollutant at a time reporting that requires multiple reports for multiple pollutants.

Several steps can be taken that provide a direct path to implement multi pollutant emission reduction reporting and crediting.

First, organizations that have projects in place and are implementing projects need to start reporting their voluntary emission reductions using this approach, which is allowable under 1605(b). This will create the experience needed to support regulatory recognition and crediting of these reductions. It will also create a constituency for regulatory recognition and crediting of these reductions both among organizations owning and implementing these reduction actions and among state and federal regulators.

Second, the organizations using this reporting on a voluntary basis can encourage state and federal regulators to encompass this multi pollutant approach with the full range of emission reduction actions including energy efficiency into all future emission reduction actions.

Third, state and federal regulators could include this multi pollutant approach in all future emission reduction actions. When state and federal regulators do include this approach in emission reduction actions, the voluntary reporting standards described in this report will need to be upgraded to regulatory reporting and crediting standards by these state and federal regulators with input from the reporting organizations. In particular, specific standards will need to be set for the calculations, measurement, and verification of emission reduction impacts of actions.

Leonardo Academy's Cleaner and Greener<sup>sm</sup> Program appreciates the financial support of the Air Bureau of the Wisconsin Department of Natural Resources and the Office of Air Quality Planning Standards (OAQPS) of the US Environmental Protection Agency. We also thank all of the participating organizations that are listed in Appendix A for their input. While the contribution of all of these organization to this project cannot be overstated, it is also important to recognize that they each have their own particular process for making formal decisions that were not used to develop this report. For this reason, while fully recognizing the contribution of all the participants, this report is in the end a report of Leonardo Academy's Cleaner and Greener<sup>sm</sup> Program. We hope that each participating organization as well as their peers in the U.S. and around the world will consider including this multi pollutant approach in all their future emission reduction actions. To facilitate such consideration, a list of some of the implementation issues that will need to be decide by the US Environmental Protection Agency and state environmental protections agencies are included in Appendix E.

We invite your comments, questions and suggestions on:

- \* The multiple pollutant emission reduction reporting and crediting system that has been developed and
- \* On how it can best be implemented on a voluntary and a formal basis.

We encourage potential reporters of emission reductions to start the voluntary reporting of these reductions and to include in this reporting the multi pollutant emission reduction reporting extensions provided in the appendices of this report. If you have any questions about how to do this please contact us, we would be happy to help you. Voluntary reporting will give your organization information about the magnitude of the emission reductions you are causing and put your organization in a good position to capture the economic value of these emission reductions when they are included in future cap and trade systems for emission reduction.

Using a multi pollutant approach to emission reduction reporting and crediting should have legs because it is hard to argue with achieving pollution reduction goals at a lower cost.

Michael Arny,  
Director of Leonardo Academy

Madison, Wisconsin, September 1998



## Executive Summary

There are many benefits gained from developing and implementing a multiple pollutant emission reduction reporting system that would support a robust trading market. To create truly competitive emission reduction markets, environmental regulations should allow all sources of emission reductions to participate. These sources include emission reductions by emitters and other measures like energy efficiency. Multiple pollutant emission reduction reporting would:

- Simplify reporting for organizations that have projects to report that affect multiple emissions
- Simplify review of reported information by state and federal regulatory agencies
- Increase the number of organizations that find reporting beneficial and thus increase the reporting of emission reductions
- Lower the cost of reaching environmental objectives for society and individual organizations by increasing the size of the available pool of reported emission reductions
- Provide the accounting needed as the foundation for organizations that own and implement energy efficiency and other projects that reduce emissions. This would allow them to capture the economic value of their emission reductions.

A three-step process was used to develop a multiple pollutant reporting of emission reductions. First, the general criteria for a multiple pollutant reporting system that would support a robust emission reduction trading market were identified. From these criteria, the US DOE EIA 1605(b) Reporting System [1] was deemed robust enough to serve as a good starting block for developing a multiple pollutant emission reduction reporting system. Next, the project evaluated the extent to which 1605(b) addressed each of the general criteria and made extensions to 1605(b) where it did not adequately address the general criteria. Lastly, the multiple pollutant emission reduction reporting system that the project developed was analyzed. This was accomplished by pilot testing the reporting standards developed in this project with real projects. Sixteen individual projects were evaluated using the identified extensions to 1605(b) reporting forms developed for this project. A facility-level report was also prepared based on nine of these individual projects from one company.

Implementing a multiple pollutant reporting system can be done gradually. The purpose of this project was to create a credible reporting system that could to serve as a building block for this process. Once a multiple pollutant emission reduction reporting system is in place, new environmental regulations could include the use of the selected multiple reporting system. Also, when existing environmental regulations are updated, they could then incorporate the use of the selected reporting system into their operation.

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## **Section 1: Potential Benefits of a Multiple Pollutant Reporting System**

Developing and implementing a multiple pollutant emission reduction reporting system that will support a robust trading market would provide several benefits. These benefits will be captured where environmental regulations are implemented in ways that create competitive emission reduction markets that allow all sources of emission reductions to participate. These sources include emission reductions by emitters and other measures like energy efficiency. Multiple pollutant emission reduction reporting would:

1. Simplify reporting for organizations that have projects to report that affect multiple emissions
2. Simplify review of reported information by state and federal regulatory agencies
3. Increase the number of organizations that find reporting beneficial and thus increase the reporting of emission reductions
4. Lower the cost of reaching environmental objectives for society and individual organizations by increasing the size of the available pool of reported emission reductions
5. Provide the accounting needed as the foundation for organizations that own and implement energy efficiency and other projects that reduce emissions. This would allow organizations to capture the economic value of their emission reductions.

## **Section 2: How a Multiple Pollutant Reporting System Can Be Implemented**

The development and implementation of environmental regulations is an ongoing process. As a result, some regulations are already in place, some regulations are in the process of being developed, and other additional regulations will be developed in the future. Since environmental regulation is an ongoing process, the only practical approach to implementing a multiple pollutant reporting system is to implement it gradually. A gradual implementation process would have three components:

- 1) Select an emission reduction reporting system that will support multiple pollutant reporting
- 2) When new environmental regulations are developed:
  - a. Include the use of the selected multiple pollutant reporting system
  - b. Enhance the multiple pollutant reporting system as necessary to address any issues raised by the use of this system in the new environmental regulations
- 3) When existing environmental regulations are updated:
  - a. Incorporate the use of the selected multiple pollutant reporting system
  - b. Enhance the multiple pollutant reporting system as necessary to address any issues raised by the use of this system in the updated environmental regulations

### **Section 3: Criteria for a Multiple Pollutant Reporting System That Will Support a Robust Emission Reduction Trading Market**

#### List of Criteria

- 1) A system that provides one stop reporting for the range of emission types.
  - a. Covers the full range of emission types that are regulated and those that may be regulated in the future
  - b. Can be expanded to cover other emissions that become regulated in the future
  - c. Establish an exchange rate mechanism between different types of emissions  
(Whether or not c. was necessary as a general criterion was discussed at the July 22, 1998 project meeting and consensus was not reached on inclusion to the list)
- 2) A system that provides one stop reporting for the range of types of emission reduction actions.
  - a. Covers the range of identified actions that reduce emissions
  - b. Can be expanded to cover other future identified actions that reduce emissions
- 3) A system that specifies adequate approaches to estimating and measuring emission reductions, including appropriate base lines to use for emission reduction calculations.
  - a. Covers currently adequate approaches
  - b. Defines 'what is adequate'
  - c. Can be expanded to cover additional approaches in the future
  - d. Defines appropriate approaches for developing baselines
- 4) A system that provides a credible level of verification of emission reduction actions.
- 5) A system that clearly specifies ownership of emission reductions so that potential double counting of emission reductions is avoided.
  - a. Specifies how original ownership of emission reductions is determined
  - b. Specifies how ownership of emission reductions can be transferred
- 6) A system that provides the necessary levels of information and credibility needed to support recognition of the emission reductions by:
  - a. The owners and implementers of emission reduction actions and potential purchasers of emission reductions
  - b. The State Environmental Protection Agencies
  - c. The US Environmental Protection Agency
  - d. Governments of Other Countries
- 7) A system that is practical and workable for its current and future users through its simplicity, ease of administration, and low administration costs for example:
  - a. The owners and implementers of emissions reduction actions including energy efficiency. If the system is not workable for implementers, it will not bring additional emission reduction actions into the marketplace.

- b. The State Environmental Protection Agencies. If the system is not workable for State EPAs, the reductions reported would not be considered valid by the State EPAs and the reported reduction will have no value.
  - c. The US Environmental Protection Agency. If the system is not workable for the US EPA, the reductions reported would not be considered valid by the US EPA and the reported reductions will have no value.
  - d. The Governments of Other Countries. If the system is not workable for the governments of other countries, the reporting system will not be considered valid by these governments and will therefore not support international trading. The reported reductions will then have diminished value.
- 8) The system should avoid duplication of effort by allowing any reported reduction that is required under an existing mandatory program to be supported by simply including reference to and location of the information reported under the other program. Where the transfer of data between other reporting systems and this reporting system occurs with sufficient frequency, the implementation of an interface that automatically transfers the information into this reporting system should be considered.
- 9) The system should provide a method of documentation, not a restriction on the information that can be provided.
- 10) The system should require sufficiently comprehensive reporting of the environmental impacts of actions so that all the significant increases and decreases in each type of emissions are captured and tracked by the reporting system. For example, where an action results in the reduction of one pollutant while at the same time increases another; this should be captured and tracked by the reporting system.

## Section 4: Multi Pollutant Reporting System Development Process Suggestions

Early on in the development process for this project it was decided through the stakeholder group that the project should not needlessly duplicate ongoing or past efforts of other systems and projects. From this decision came two development process suggestions. First, incorporate NOx SIP Group [7][8] findings into the project as they are disseminated, particularly information regarding estimating, measuring, and verifying emission reductions. Secondly, study alternative emission inventory reporting systems to see if they would be more suitable than the 1605(b) Voluntary Reporting of Greenhouse Gases Reporting System [1] as a base for modification into a multiple pollutant emission reduction reporting system.

**Suggestion 1:** Incorporate NOx SIP Group findings into the project as they are disseminated, particularly information regarding estimating, measuring, and verifying emission reductions.

The NOx SIP Energy Efficiency Working Group is developing standards for the calculation of NOx emissions reductions from energy efficiency. These standards include acceptable emissions rates, calculation methods, measurement and verification, and baselines needed to support these calculations and also standards for how emission reduction crediting will vary depending on the measurement and verification approach used. These standards will be completed by the end of 1998 so that states can consider using them as part of the model rule for using a cap and trade approach in the State Implementation Plans (SIP) for achieving the NOx emission caps set by the USEPA.

Using these standards in this multi pollutant emission reduction reporting system will fully address the calculation, measurement and verification for NOx emission reductions. Using these standards will also provide measurement and verification standards that are applicable to the calculation of emission reductions for all energy efficiency projects.

Using these calculation, measurement and verification standards developed for NOx in this multi pollutant reporting and crediting system:

- Makes the multi pollutant emission reduction reporting and crediting system fully compatible with the NOx model cap and trade rule
- Gives the multi pollutant emission reduction reporting and crediting system measurement and verification standards that have been adopted by the USEPA and by the states that adopt the model cap and trade rule
- Makes it easy to use the multi pollutant emission reduction reporting and crediting system for cap and trade systems set up for other pollutants in the future such as greenhouse gas emissions, particulates, and mercury

As mentioned in the forward, each time a cap and trade system is created for a new pollutant, the affected regulatory organizations will need to formalize the standards for reporting and crediting that pollutant with input from the reporting organizations. Then the reporting organizations will need to update their reporting to meet these standards if they want to receive full credit for their reductions. Each time this is done using the multi pollutant emission reduction reporting and crediting system, it will get easier for the regulators because more of the issues will have already been addressed in formalizing the standards for previous pollutants. It will also get easier for

reporting organizations because fewer and fewer changes will be needed to update reporting to get full credit for the pollutants addressed by each new cap and trade system

**Suggestion 2:** Try to evaluate some current emission inventory reporting systems to see if they would be flexible enough to be modified into a multiple pollutant emission reduction reporting system as an alternative to modification of the 1605(b) Voluntary Reporting of Greenhouse Gases Reporting System [1].

A general review of the current emissions inventory reporting systems in use by the Wisconsin Department of Natural Resources was carried out. These reporting systems are focused on reporting emissions from various sources. They do not address emission reduction impacts from end-use measures like energy efficiency. For this reason they are not a useful starting point for developing an emission reduction reporting system that includes end-use measures like energy efficiency. In order to avoid duplication of effort in the multi pollutant reporting system being developed, source emission reductions that are reported under another emission reporting system can be reported by reference to the other reporting system.

## **Section 5: Issues That Will Need to be Addressed in the Implementation of a Trading System**

The Multi Pollutant Emission Reduction Reporting System project was intended to develop a measurable and verifiable reporting system for emission reduction actions including energy efficiency and renewable-based reductions. It was also intended to serve as a creditable base for supporting an emission reduction trading system under a cap-and-trade approach. The reporting system was developed to support all possible types of emission reduction actions.

In order to take the next step of implementing a trading system, there are a number of important issues that will need to be decided by the National Environmental Protection Agencies and state environmental protection agencies. It is in the implementation of trading systems for specific pollutants that these agencies will need to address these issues with specific rules and requirements.

Many of these issues result from not having the regulatory systems in place such as a defined cap and trade system that the reporting system is intended to support. In this section, these issues are identified and discussed in the context of a possible cap and trade implementation scenario.

### **Policy Issues that will Need to Be Decided**

The policy choices made on the following issues will be important to emission reduction reporters. They are explained here in order to familiarize potential reporters with these issues. However, since these issues are likely to be decided in other forums, no attempt has been made to come to a consensus on these issues.

- 1) When will actions start to receive credit for early reporting for each pollutant:

- a. CO<sub>2</sub>: Will all reported emissions reductions from 1990 on count as promised by 1605(b) or will the rules be changed so that emission reductions start to receive credit at a later date?
  - b. NO<sub>x</sub>: What early reporting of NO<sub>x</sub> emission reductions will receive credit? Starting when and for what sources?
- 2) Will emission reductions from energy efficiency be given allowances from the pool of emission allowances under the emissions cap?
  - 3) What approach will be used for giving emissions credits to energy efficiency and other actions not directly affected by the emissions cap?

Will energy efficiency actions receive less than full credit for the emission reductions they deliver because of concerns about exceeding the number of allowances set aside for energy efficiency base emission reductions. Or will energy efficiency actions receive less than full credit for the emission reductions they deliver, with plans in place to increase the set aside for energy efficiency as necessary to accommodate the amount of reductions delivered by energy efficiency?

This issue arises from the possibility that the amount of emission reductions from energy efficiency could exceed the amount of emission reduction allowances set aside for energy efficiency. Concern about this possibility is sometimes raised as a reason to have energy efficiency actions receive less than full credit for the emission reductions they deliver by limiting the types of emission reductions that receive credit and by adding criteria to the motivations that the project owner must meet. This amounts to designing the whole system so that it does not work as well as it could and so that it does not deliver its full potential for emission reductions.

An alternative approach is to design the system based on the point of view that all positive actions should be rewarded. This approach is focused on making the reporting and crediting system work well so all emission reductions from energy efficiency receive full credit and so that the system can deliver its full potential for emission reductions. This approach addresses the possibility of over-subscription by having a plan in place to address it if it occurs. An example of such a strategy would be to plan to:

- a. Give all emission reductions from energy efficiency full credit.
- b. If the amount of allowances set aside for energy efficiency based emission reductions is over subscribed in one year, increase the allocation of allowances set aside for energy efficiency based emissions reductions to match the demand the next year.
- c. If the point is eventually reached where all of the allowances are allocated to energy efficiency based emission reductions and over subscription still occurs, either:
  - i. Reduce the crediting rate for emission reductions from energy efficiency projects from a 1 to 1 rate to a lower rate like 0.9 to 1 rate that allows all verified actions to be rewarded, or
  - ii. Raise the standards for what level of efficiency improvements are rewarded so the smaller pool of qualifying actions can be given full credit for emission reductions delivered.

- 4) How will the emission reduction trading system be designed to accommodate both secondary emission reduction actions and direct emission reductions?
- 5) Will credit for reported emission reductions depend on the motivation of the owner of the emission reduction actions or will credit for reported emission reductions depend on the nature of the action?

The motivation-based approach sees why the owner implemented the project and asks if they would have done it anyway? The nature of the action sees the direct consequence of the action as what is important rather than why the action was taken. In administering a crediting program, accurately determining the owner's motivation can be difficult. In the past, credit for emission reductions from electric generation and other fuel combustion have usually not depended on the motivation of the owner. This issue applies to each of the various potential sources of emission reductions:

- a. For emission reductions from energy efficiency
  - b. For emission reductions from electric generators
  - c. For emission reductions from other fossil fuel combustion
- 6) Will an exchange rate between different types of emissions be established?  
This will need to be determined by the environmental regulators. Where individual pollutants affect the same environmental problem and do not have characteristics that require emission specific control requirements, the environmental regulators may want to establish an exchange rate such as reducing one pound of pollutant #1 is equivalent to reducing pollutant #2 by 0.75 pounds. Where individual pollutants have characteristics that require emission specific control requirements, exchange rates will not be appropriate. An example of specific control requirements for a pollutant that would make exchange rates inappropriate is a toxic pollutant where the local area emission rate or concentration is limited to prevent negative health effects.
  - 7) Will the system include a "rolling grandfather clause" mechanism that would guarantee the credits for a project for a given period of time?  
This would provide stability to the additional money stream that could be used to justify projects that reduce emissions.

## **A Likely Scenario for Implementation of an Emissions Trading System and A Discussion of Issues Regulators will need to Address at the Time of Implementation**

### **Cap and Trade**

A cap and trade approach to emissions reductions sets an emissions cap to limit emissions and establishes rules that allow trading to reduce the cost of achieving this emissions cap.

### **Setting the Emissions Cap and Requiring Compliance with this Emissions Cap Delivers Achievement of the Environmental Objective**

In setting up a cap and trade system it is important to remember the different purposes of the cap and the trading. Setting the cap ensures the achievement of the environmental objective. Imposing penalties on emitters that fail to have enough emission allowances to cover their emissions enforces the emissions cap. For the cap to be effective, regulators need to set these penalties high enough to motivate compliance with the cap by emitters.

The emissions cap determines the total number of emissions allowances that are available. All of these emission allowances come from “under the cap”. As long as the regulators do not create additional allowances, the cap will be met.

### **Establishing the trading system helps reduce the cost to society of achieving the cap.**

Trading allows those who can deliver emission reductions at a low cost to sell allowances to emitters that choose to purchase emission allowances rather than reduce their own emissions.

### **Handing Out Emissions Allowances is a Wealth Transfer: Regulators Will Need to Decide What Actions to Reward.**

Regulators shape emission reduction trading systems by setting the rules for the trading system, by deciding what will be included in the trading system, and by deciding to whom to give the emissions allowances that are permissible under the trading system. Those that receive emission reduction allowances are the direct participants in the trading system. The trading system is driven by the choices of the direct participants.

Deciding to whom to give the emissions allowances is a policy choice. Regulators making this policy choice have many options. A few examples are:

- (1) They can sell all the emission allowances to the highest bidders,
- (2) They can give all the allowances to the emitters,
- (3) They can give allowances to implementers of all energy efficiency projects based on the amount of efficiency delivered,
- (4) They can give each individual living in the region affected by the emissions cap a per capita share of the emission allowances, or
- (5) One of many other possible choices.

Each of these ways of distributing the emission allowances will achieve the emission reduction goal set by the emissions cap. Each approach has a variety of pluses and minuses but they would all achieve the direct environmental objective. Both the allocation approach chosen and the specific rules chosen for distribution of these emission allowances are irrelevant to the achievement of the direct environmental objective.

Some pros and cons of each approach for allocating emissions allowances:

- (1) Sell all the emissions allowances to the highest bidders,  
This lets the market make the decisions and includes the full market cost of emissions in the costs of production of the goods and services the emitter produces. These could be pros or



- cons depending upon your perspective. One benefit of this approach is that a valuable commodity, the allowances, is not just simply given away by the environmental regulators.
- (2) Give all the allowances to the emitters,  
Emitters like this approach. This approach has frequently been used in the past when the emitters usually have been the only business organizations participating in the emission allowance allocation discussions. Some cons of this approach are that allocations are based on past emissions so that the sources that emitted the most pollution are rewarded with the most allowances and many organizations that are taking actions that produce positive emission reductions are left out of the allowance allocation.
- (3) Give allowances to implementers of all energy efficiency projects base on the amount of efficiency delivered,  
This has several benefits. This rewards low cost behaviors that reduce emissions. It creates an additional incentive to do more energy efficiency projects that reduce all types of emissions caused by power plants. Increasing the incentives for energy efficiency reduces long-term emission reduction costs because more emission reductions are delivered by energy efficiency and fewer need to be delivered by high cost options at power plants. This approach makes many business organizations happy because it awards valuable emissions allowances to all types of organizations that: implement energy efficiency in their own facilities, supply energy efficiency equipment, or install energy efficiency equipment for others. This approach does add a level of complexity to the allowance allocation system.
- (4) Give each individual living in the region affected by the emissions cap their per capita share of the emission allowances.  
This would make lots of people happy but this is likely to have higher administrative costs than any of the other approaches because of the large number on people that would receive emissions allowances.

The point here is that the allocation of emissions allowances is a policy decision that environmental regulators will need to make and that this allocation decision is separate from requiring achievement of the emissions reduction objective set by the emissions cap. Regulators will need to make this policy decision on the basis of what types of actions the regulators want to reward and which types of actions have the greatest long-term environmental benefits.

### **Interaction of the Multi-Pollutant Emission Reduction Reporting System with Capped Pollution Sources**

The objective of the Multiple Pollutant Emission Reduction Reporting System project is to develop a measurable and verifiable emission reduction reporting system for emission reduction actions including energy efficiency and renewable-based reduction. The second objective was that the reporting system be adequate to serve as a creditable base for supporting an emission reduction trading system under a cap-and-trade approach. The reporting system was developed to support all possible types of emission reduction actions.

What role different types of emission reduction actions can play in a cap and trade system will depend on whether the action is directly included in the cap set by the regulations or whether it is an action outside of the cap. The rules for the actions directly affected by the emission cap will be

defined by the specific rules of the regulated cap. Mandatory emission reductions from an effected smokestack are a good example. These emission reductions could be reported under the multi-pollutant emission reduction reporting standards but the emissions reductions would need to meet the specific standards and requirements specified by the regulators that set the emissions cap. For actions not directly required by the emissions cap, the multi pollutant emission reduction reporting standards can be used for both defining and reporting the reductions.

From this discussion it should be clear that the multi pollutant emission reduction reporting standards cover a wide range of emission reduction actions could be accurately reported. The emission reduction actions directly required by the cap will be subject to the rules of the cap and the other reportable emission reductions can also be included in a trading system. The reporting system was developed to support whatever policy decisions are made on both the cap and the issue of what emission reductions to include in the trading system.

### **Discussion of Emission Reduction Calculation, Measurement and Verification Issues**

Standards will need to be set for the calculation, measurement and verification for reported actions including:

- a. Emissions rates for reduction calculations,
- b. Standards for measurement and verification
- c. Standards for setting baselines for actions
- d. Sliding scale for crediting actions depending on a level of the precision used in the calculations, measurement and verification, and in the establishment of a baseline.

For the USA, many of these issues will be decided in the process of developing the State Implementation Plans acceptable to the US EPA for achieving NO<sub>x</sub> reductions if a cap and trade approach is used and where energy efficiency and renewable energy are included. The USEPA plans to release a guidance document on how energy efficiency can be included in SIPs and on appropriate standards for measurement and verification including the setting of baselines for energy efficiency projects. Since these issues will need to be resolved in the NO<sub>x</sub> SIP process for NO<sub>x</sub>, it will be most practical to apply the same standards to multi pollutant emission reduction reporting.

#### **1) Emission Factors for Reduction Calculations**

Decisions will need to be made on what emission factors to use in calculating the emission reduction impacts of energy efficiency projects that reduce electricity use. These factors could be on a state, regional, or national level. Different emissions rates are appropriate for different purposes. In the end, specifying the allowable set of emissions factors to use is a policy decision that will be made by the environmental regulators.

For calculating total emissions caused by a consumer's electricity use, average all generation emission rates seem most appropriate. Average all generation emissions rates are calculated by dividing the emissions from all generation by the total amount of electricity generated in the state.

For calculating the emission reduction caused by an energy efficiency or renewable energy project, a variety of emissions rates could potentially be used. The potential emissions rates include system average emission rates, marginal emission rates, and fossil fueled generation emission rates. Fossil fueled generation emission rates are calculated by dividing the emissions from the fossil fuel generation by the amount of electricity generated by fossil fuel generation in the state. Leonardo Academy believes that fossil fuel generation emission factors provide more accurate estimates of emission reductions from energy efficiency. This is because low operating cost generation like hydroelectric generation and nuclear generation will run whenever they are available because of their low position in the generation loading order regardless of decreases in overall energy consumption. As a result, a decrease in energy consumption from increased energy efficiency will have little or no impact on the total output of nuclear and renewable-based generation. Appendix C, Attachment 1 in this report provides a more detailed discussion of this issue and includes the factors for electricity emissions that we believe are the most accurate for each purpose.

The 1605(b) program emission factors are average all generation emission factors. As such, Leonardo Academy believes the current 1605(b) emission factors are best suited for calculating the total emissions from a consumer's electricity use and that these emissions factors underestimate the emission reductions delivered by energy efficiency projects for the reasons described above.

Environmental regulators will need to decide which type of emission rates should be used when emission reduction trading systems are set up for each new pollutant.

### **How location specific should electric generation emission factors be?**

Another issue in selecting emission factors is how location specific to make them. Because of the interconnected nature of the electric transmission and generation system, it is uncertain where the electricity used by a specific customer is actually generated. For this reason using some kind of regional average is appropriate. Since it is likely that much of the electricity used by a consumer is produced reasonably nearby, it is reasonable to use emission factors that reflect the generation mix in various regions of the country. Using emission factors for each state or for regions that include several states are probably a reasonable compromise.

In the pilot reports prepared for this project, the owner of one of the projects included in the pilot reporting choose to use U.S. average emission factors for calculating the multi-pollutant reductions. For a company with multiple locations in many states this provides a reasonably accurate emission reduction estimate. The other pilot projects used state average emission factors. Using emission factors calculated using areas smaller than a state, probably do not improve the accuracy emissions reduction estimates because of the uncertainty about where the electricity being used was actually generated. In unusual circumstances such as off grid, isolated generation and customer group, site specific emission factors could be appropriate.

In deciding what emission factors to use, it is important to remember the function that these emission factors are serving. Just as was discussed above for measurement verification, where

the emission factors are used to calculate emissions from emission sources directly affected by the cap, the emission factors will be important to the achievement of the environmental emission reduction objective and therefore their precision is important. Where they are being used to decide how many emission allowances to give to emission reductions that result from actions that are not directly affected by the emissions cap, they are simply being used to allocate some of the emission allowances to encourage these other emission reduction actions. Since in this case the emission factors are simply being used for allocation purposes and will not affect the achievement of the environmental objective set by the cap, the emission factors for this purpose do not need great precision. Setting reasonably accurate factors will be helpful in increasing our understanding of the contribution of these other measures to emission reductions. It is also helpful to remember that all the emission allowances that are not used to reward these other emission reduction actions will, if tradition is followed, be allocated to the emitters using an allocation system that rewards the highest emitters of environmental pollution with the largest number of allowances. Until regulators stop rewarding emitters of environmental pollution with emission allowances altogether in the allocation process, attempts to add great precision to the calculations used to allocate some of the emission allowances for positive actions not mandated by the emissions cap are unjustified.

Environmental regulators will need to decide the geographic areas that are appropriate to use for calculating emission rates. These decisions will need to be made when emission reduction reporting moves from a voluntary to a regulator specified system as each pollutant is included in a regulator mandated trading program.

## **2) Measurement and Verification**

Measurement and verification of emissions from sources for which emissions are directly limited by the emissions cap is critical to the achievement of the environmental emission reduction objective specified by the emissions cap. For this reason, a high level of accuracy in the measurement and verification for the emissions and emission reductions from these sources is necessary for achieving the environmental emission reduction objective specified by the emissions cap.

Measurement and verification of emission impacts of energy efficiency and other actions that are not the emission sources for which emissions are directly limited by the emissions cap is not critical to the achievement of the environmental emission reduction objective specified by the emissions cap. The measurement and verification of emission impacts of these energy efficiency and other actions are only being used as part of the mechanism for allocation of the emission allowances and does not affect the achievement of the emissions cap. For this reason, a high level of accuracy in the measurement and verification for the emissions and emission reductions from these sources is not necessary for achieving the environmental emissions reduction objective specified by the emissions cap. The environmental emission reduction objective will be met with or without a high level of accuracy in the measurement and verification for the emissions and emission reductions from these sources. For this reason, requiring a reasonable but not excessive level of accuracy in the measurement and verification

for emission reductions from these sources will minimize the burden of reporting and encourage broader participation by these other sources of emission reductions.

Keeping in mind these differences in the impacts on the achievement of the emission reduction goals set by the emissions cap, environmental regulators will need to decide what measurement and verification standards to apply to both the sources directly affected by the cap and other emission reduction actions. These decisions will need to be made when emission reduction reporting moves from a voluntary to a regulator specified system as each pollutant is included in a regulator mandated trading program.

### **3) Base Lines**

Another key to implementing multiple pollutant reporting systems is specifying what are acceptable methods for establishing baselines. There are more than one way to set baselines. For the Multiple Pollutant Emission Reduction Reporting System and the US DOE 1605(b) Reporting System, there are two general approaches to setting baselines, the basic reference case and the modified reference case.

The basic reference case uses the emissions in a specific year as the baseline and post action emissions are compared with this baseline. This approach works well for emission sources directly affected by an emissions cap and for static situations. The other main approach to setting baselines is the modified reference case. In the modified reference case, the forecast of what would have occurred without the action is used as the baseline. Emission reductions are defined by the difference between actual emissions and what emissions would have been in the absence of the action.

The modified reference case approach to setting baselines works well in dynamic situations because it can accommodate changing circumstances. Since organizations and their operations frequently change their size and how they do things, the modified reference case provides greater ability to identify the savings relative to what would have otherwise occurred. For example, if a reporting company uses one-year of historical data as the building block for its forecasted modified reference case baseline, they can incorporate the purchase of additional subsidiary companies that increase their total energy use and still identify the savings that result from increased energy efficiency in the rest of their operations. This approach allows the emission reduction benefits of their energy efficiency improvements to be recognized and rewarded despite the increase in their companies overall energy use do to their acquisition.

Environmental regulators will need to decide the what approaches to setting baselines are acceptable. These decisions will need to be made when emission reduction reporting moves from a voluntary to a regulator specified system as each pollutant is included in a regulator mandated trading program.

### **4) Crediting Emission Reductions**

How emission reductions are translated into emission reduction credits will affect how easy it is to participate in the voluntary part of emission reductions trading systems. To provide participants with the greatest flexibility while maintaining assurance of emission reduction

impacts, the crediting process could specify a sliding scale of crediting for emission reductions that issues credits based on the degree-value of rigor used in the calculating, verifying, and measuring of reductions and setting of baselines.

In the end, the final decision on what are the appropriate methods for establishing baselines for reporting emissions reductions will be made by the environmental regulators, with input from the other affected parties. These decisions will need to be made when emission reduction reporting moves from a voluntary to a regulator specified system, as each pollutant is included in a regulator mandated trading program.

## **Section 6: Review of the Extent to Which 1605(b) Addresses Each of the General Criteria in Section 3 and How 1605(b) can be Extended to Address Each of the General Criteria**

- 1) The system will provide one stop reporting for emission types.
  - a. Covers the full range of types of emissions currently regulated and those that may be regulated in the future.

Existing 1605(b) covers all greenhouse gases including carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), and halogenated substances. Indirect greenhouse gases include nitrogen oxides (NO<sub>x</sub>) and volatile organic compounds (VOCs) which contribute to ozone, which is a greenhouse gas.

**Action Needed:** The extended version of 1605(b) covers all other emissions from fossil fuel combustion that are currently or may be regulated in the future including SO<sub>2</sub>, NO<sub>x</sub>, PM<sub>10</sub>, and Hg.
- 2) A system that provides one stop reporting for emission reduction actions.
  - a. Covers the full range of identified actions that reduce emissions.

**Plus:** 1605(b) already covers a wide range of actions that reduce emissions.

**Addition Needed:** There are no methods for calculating the emission impact of additional actions that reduce emissions including actions that reduce mercury emissions from sources other than combustion of fossil fuels or provisions for end of pipe technologies such as low NO<sub>x</sub> burners. Also need to define whether the full range of actions is creditable (has value) for trading.
  - b. Can be expanded to cover other actions that reduce emissions that are identified in the future.

**Plus:** 1605(b) can be expanded to cover additional actions.
- 3) A system that specifies what are adequate approaches to estimating and measuring emission reductions.
  - a. Covers currently adequate approaches.

**Plus:** 1605(b) already covers a number of approaches.

**Addition Needed** 1605(b) does not specify what approaches are adequate for each type of action and does not define 'what is adequate'. Address this by incorporating the calculation methods and measurement and verification protocols that are being developed by the US EPA for including energy efficiency in the NO<sub>x</sub> State Implementation Plans (SIPs). These

will define what are adequate calculation and measurement methods for emissions reductions. When the development of these calculation methods and measurement and verification protocols by the US EPA are completed, they can be incorporated into the multi pollutant reporting system to provide the necessary standards. This approach avoids developing an interim system of standards that will be superseded as soon as EPA completes its standards and it ensures compatibility of the multi pollutant reporting system with the standards used for the next major emission reduction initiative that is currently being implemented: nitrogen oxide emissions reductions in 22 eastern states and the District of Columbia.

**Addition that would facilitate reporting:** Add capability for calculating emission reductions for all types of emissions to the 1605(b) software.

**Plus:** 1605(b) can be expanded to cover additional actions.

- 4) A system that provides a credible level of verification of emission reduction actions.

**Plus:** 1605(b) already requires that reporters sign a declaration that the emission reductions reported are correct.

**Addition Needed:** 1605(b) does not specify what approaches to verification are adequate for each type of action and does not define 'what is adequate'. Address this by incorporating the calculation methods and measurement and verification protocols that are being developed by the US EPA for including energy efficiency in the NO<sub>x</sub> State Implementation Plans (SIPs) as discussed in Point 3 above. This will define credible levels for verification of emission reduction actions. When the development of these calculation methods and measurement and verification protocols by the US EPA are completed, they can be incorporated into the multi pollutant reporting system to provide the necessary standards

**Addition that would facilitate reporting:** Add capability for calculating emission reductions for all types of emissions to the 1605(b) software.

- 5) A system that clearly specifies ownership of emission reductions so that potential double counting of emission reductions is avoided.

- a. Specifies how original ownership of emissions reductions is determined.

**Addition Needed:** Specification of how original ownership of emission reductions is determined.

- b. Specifies how ownership of emission reductions can be transferred.

**Addition Needed:** Specification of how ownership of emission reductions can be transferred.

- 6) A system that provides the necessary levels of information and credibility needed to support recognition of the emission reductions by:

- a. The owners and implementers of emission reduction actions and potential purchasers of emission reductions

- b. The State Environmental Protection Agencies

- c. The US Environmental Protection Agency

- d. Governments of Other Countries

**Plus:** 1605(b) is a nationally recognized and accepted voluntary reporting system. If all of the other criteria are met then the multi pollutant reporting system will provide the necessary levels

of information and credibility needed to support recognition of the emission reductions by the various affected parties.

- 7) A system that is practical and workable for its current and future users through its simplicity, ease of administration, and low administration costs for example:  
**Plus:** 1605(b) is a nationally recognized reporting system that would remain easy and provide low costs for reporters, governments and government agencies if updated and accepted as a creditable multi pollutant reporting system.
  - a. The owners and implementers of emission reduction actions including energy efficiency. If the system is not workable for implementers, it will not bring additional emission reduction actions into the emission reduction marketplace.  
**Plus:** 1605(b) in its current form is workable for owners and implementers.  
**Question:** Will 1605(b) after the addition of extensions selected to address the issues be workable for the owners and implementers of emission reduction actions?
  - b. The State Environmental Protection Agencies. If the system is not workable for State EPAs, the reductions reported would not be considered valid by the State EPAs and reported reduction will have no value.  
**Question:** Will 1605(b), after the addition of extensions selected to address the issues be workable for the State Environmental Protection Agencies?
  - c. The US Environmental Protection Agency. If the system is not workable for US EPA, the reductions reported would not be considered valid by the US EPA, and the reported reductions will have no value.  
**Question:** Will 1605(b) after the addition of extensions selected to address the issues be workable for the US Environmental Protection Agency?
  - d. The Governments of Other Countries. If the system is not workable for the governments of other countries, the reporting system will not be considered valid by these governments and will therefore not support international trading. The reported reductions will then have diminished value.  
**Question:** Will 1605(b) after the addition of extensions selected to address the issues be workable for the governments of other countries.
- 8) The system should avoid duplication of effort by allowing any reported reduction that is required under an existing mandatory program to be supported by simply including reference to and location of the information reported under the other program. Where the transfer of data between other reporting systems and this reporting system occurs with sufficient frequency, the implementation of an interface that automatically transfers the information into this reporting system should be considered.  
**Plus:** 1605(b) already includes a section which requests information on reports made to other agencies and another section which requests information on project participation in other voluntary programs.  
**Addition Needed:** The 1605(b) reporting system still requires you to submit all of the required information regardless of whether you reported some of the reductions elsewhere. There should be a means for avoiding this duplication spelled out in the multi pollutant reporting system.
- 9) The system should provide a method of documentation, not a restriction on the information that can be provided.



**Plus:** 1605(b) already includes space for any and all additional information or comments that the reporter may wish to include.

10) The system should require sufficiently comprehensive reporting of the environmental impacts of actions so that all the significant increases and decreases in each type of emissions are captured and tracked by the reporting system.

**Plus:** 1605(b) already includes comprehensive reporting and tracking of the environmental impacts of actions and emission types currently allowed under the program.

**Addition Needed:** Require that any additional emission reduction types or actions follow the same procedures as the current 1605(b) requirements.

## **Section 7: Identified Extensions to 1605(b) Reporting Forms That Implement Each of the Needed Extensions to 1605(b) Reporting**

Extensions to the existing 1605(b) reporting forms and directions have been developed to address each of the shortcomings relative to the criteria. These extensions are described in Appendix C. Appendix C is designed to use as a supplement to the existing 1605(b) reporting form. Filling out the existing 1605(b) reporting form plus following the directions and filling out the forms found in Appendix C is designed to provide a multi pollutant emission reduction report that will support an emission reduction trading market.

## **Section 8: Results of Pilot Testing of Multiple Pollutant Emission Reduction Reporting Standards Developed in this Project**

The multiple pollutant emission reduction reporting standards developed in this project were pilot tested by having a number of projects reported using these standards. Then the reporting organizations and the other organizations participating in this project had the opportunity to provide comments on how well these reports met the standards developed in this project in terms of being workable and effective for the affected organizations.

These pilot reports were developed using the extensions to the existing 1605(b) reporting forms as described above and found in Appendix C.

The pilot reports were developed for the following companies and projects:

- (1) Vulcan Chemicals Inc., A Potential Energy Efficiency and Mercury Emission Reduction Project
- (2) Johnson and Johnson Inc., Company Wide Energy Efficiency Projects
- (3) Johnson Controls Inc., Six Energy Efficiency Projects

The pilot reports for these projects were prepared using the multiple pollutant emission reduction reporting standards. These pilot reports were distributed to project participants for their review. No inadequacies in the reporting process defined by the multiple pollutant emission reduction reporting standards were identified.

**Table 8.1. Emission Reductions through 1990 - 1997 from Projects Included in Pilot Testing of the Multiple Pollutant Emission Reduction Reporting System**

<b>Project</b>	<b>NOx (short tons)</b>	<b>CO2 (short tons)</b>	<b>SO2 (short tons)</b>	<b>PM10 (short tons)</b>	<b>Mercury (lbs.)</b>
Johnson Controls					
Project 1 – Batelle	10	5,944	26	0.7	0.5
Project 2 – Calhoun	15	4,597	34	0.6	0.2
Project 3 – CMAC	11	3,346	21	0.4	0.1
Project 4 – Los Alamos	37	9,671	1	0.0	0.0
Project 5 – Methodist	68	12,950	49	1.0	0.4
Project 6 – UMC	165	42,138	10	0.2	0.1
Johnson & Johnson Entity- Level Reductions	927	229,541	1,456	25.2	14.1
Vulcan Chemicals Project*	151	68,009	447	8.0	1,255.5
<b>Total</b>	<b>1,384</b>	<b>376,196</b>	<b>2,044</b>	<b>36</b>	<b>1,271</b>

\*Note – The Vulcan Chemicals Project is a potential project and the numbers represent one year only.

If multiple pollutant emission reduction reporting is implemented as part of emission reduction trading systems for pollution reductions it will provide additional incentives for increased energy efficiency. The completed and potential projects included in the pilot reporting provide an indication of the potential emission reductions from energy efficiency as shown in Table 8.1. These projects would receive additional incentives if a multiple pollutant emission reduction reporting system were implemented as part of emission reduction trading systems for pollution reduction. For some future energy efficiency projects, the financial rewards from multi pollutant emission reduction reporting and trading could provide the final hurdle needed to guarantee the rate of return required for project implementation.

**Table 8.2. Emission Reductions through 1990 - 1997 from the Energy Service Company Industry that could be Reported Under the Multiple Pollutant Emission Reduction Reporting System**

<b>Emission Types</b>	<b>NOx (short tons)</b>	<b>CO2 (short tons)</b>	<b>SO2 (short tons)</b>	<b>PM10 (short tons)</b>	<b>Mercury (lbs.)</b>
Total Reductions	307,425	75,231,144	421,573	7,288	4,062

Table 8.2 shows the emission reductions from the energy service company industry that could be reported under the multi pollutant emission reduction reporting system [5]. The energy service company industry is just one industry among many that deliver increased energy efficiency and it shows the very large amounts of emission reductions that could be reported. If all the other industries that deliver increased energy efficiency were added, these numbers would be substantially larger.

If the multiple pollutant emission reduction reporting is implemented as part of emission reduction trading systems for pollution reductions it will provide additional incentives for increased energy efficiency by all industries that deliver increased energy efficiency, fuel switching and other means of reducing emissions.

## **Section 9 Conclusions**

This project developed and pilot tested a multiple pollutant emission reduction reporting system that would support a robust trading market. This reporting system was developed based on the input and review from the participating organizations.

There are many benefits gained from developing and implementing a multiple pollutant emission reduction reporting system that would support a robust trading market. To create truly competitive emission reduction markets, environmental regulations should allow all sources of emission reductions to participate. These sources include emission reductions by emitters and other measures like energy efficiency. Multiple pollutant emission reduction reporting would:

- Simplify reporting for organizations that have projects to report that affect multiple emissions
- Simplify review of reported information by state and federal regulatory agencies
- Increase the number of organizations that find reporting beneficial and thus increase the reporting of emission reductions
- Lower the cost of reaching environmental objectives for society and individual organizations by increasing the size of the available pool of reported emission reductions
- Provide the accounting needed as the foundation for organizations that own and implement energy efficiency and other projects that reduce emissions. This would allow them to capture the economic value of their emission reductions.

A three-step process was used to develop a multiple pollutant reporting of emission reductions. First, the general criteria for a multiple pollutant reporting system that would support a robust emission reduction trading market were identified. From these criteria, the US DOE EIA 1605(b) Reporting System [1] was deemed robust enough to serve as a good starting block for developing a multiple pollutant emission reduction reporting system. Next, the project evaluated the extent to which 1605(b) addressed each of the general criteria and extensions were made to 1605(b) where it did not adequately address the general criteria. Lastly, the multiple pollutant emission reduction reporting system that the project developed was analyzed. This was accomplished by pilot testing the reporting standards developed in this project with real projects. Sixteen individual projects were evaluated using the identified extensions to 1605(b) reporting forms developed for this project. A facility-level report was also prepared based on nine of these individual projects from one company.

Implementing a multiple pollutant reporting system can be done gradually. The purpose of this project was to create a credible reporting system that could to serve as a building block for this process. Once a multiple pollutant emission reduction reporting system is in place, new environmental regulations could include the use of the selected multiple reporting system. Also,

when existing environmental regulations are updated, they could then incorporate the use of the selected reporting system into their operation.

If implemented the multiple pollutant reporting system developed in this project would provide additional incentives for a broad range of emission reduction activity. Organizations can contribute to implementation by beginning to report their emission reductions using these standards on a voluntary basis. State, regional and national environmental regulators can contribute to implementation of these standards by incorporating the multiple pollutant reporting standards into trading systems for each pollution reduction action they implement in the future.

## Bibliography

- [1] EIA-1605 Electronic Form and Public Use Database (1998). for Voluntary Reporting of Greenhouse Gases, United States Department of Energy, Energy Information Administration, 1998.
- [2] EIA State Energy Data Report 1995. Consumption Estimates, United States Department of Energy, Energy Information Administration, 1997.
- [3] EPA National Emission Trends Viewer CD 1985 – 1995. Version 1, United States Environmental Protection Agency, Sept. 1996.
- [4] Kyoto Protocol on Climate Change, December 1997.
- [5] Leonardo Academy Report (1998). *The Energy Savings and Environmental Reduction Benefits Delivered by the Energy Service Company Industry*, Prepared for the US DOE Energy Fitness Program, May, 1998.
- [6] Leonardo Academy's Cleaner and Greener Program Report (1998). *Average Emission Factors for All the Fossil Fueled Electric Generation in Each of the States and Territories*, 1998.
- [7] NOx SIP Energy Efficiency Working Group, 1998.
- [8] NOx SIP Final Rule (1998). *Final Rule for Reducing Regional Transport of Ground-Level Ozone (Smog) and Two Related Proposals*, Sept. 1998 (Available for download from the USEPA web site at <http://www.epa.gov/airlinks>).



## **Appendix A**

### **Participant List for the Multi Pollutant Emission Reduction Reporting Project**





**Participant List for the  
Multi Pollutant Emission Reduction Reporting Project**

<u>Name</u>	<u>Organization</u>
Tammy Croote	OAQPS-USEPA
Anna Garcia	APPD/OAR-USEPA
Pamela Herman Milmoie	USEPA-Climate Wise Program
John Mooney	Region 5-USEPA
Victoria Hayden	Region 5-USEPA
Arthur Rypinski	EIA-DOE
John Atcheson	EERE-DOE
Pat Meier	Wisconsin Energy Bureau
Jolene Anderson	Wisconsin Energy Bureau
Caroline Garber	WDNR-Air Management Bureau
Tom Karman	WDNR-Air Management Bureau
Dennis Koepke	WDNR-Air Management Bureau
Eric Mosher	WDNR-Air Management Bureau
Paul Von Paumgarten	Johnson Controls
George Gissel	Vulcan Chemicals
Chris Maras	Vulcan Chemicals
Cara Kurtenbach	Wausau Mosinee Paper Corporation
Tari Emerson	Quad Graphics Inc.
Tom Mucklin	Johnson Wax
Ed Wilusz	Wisconsin Paper Council
Patrick Stevens	Wisconsin Manufacturers & Commerce
Donna Danihel	Wisconsin Electric
Kris McKinney	Wisconsin Electric
Gary Van Helvoirt	Wisconsin Public Service
Steve Guyer	Alliant / Wisconsin Power and Light
Dave Donovan	Northern States Power Company
Harold Frank	Dairyland Power Cooperative
Edwin L. Mongan, III	Dupont Corporation
Terry Prichett	General Motors Corporation
Harry Kauffman	Johnson & Johnson
Christopher Hunter	Johnson & Johnson
Philip A. Jallouk	Lockheed-Martin
Rick Renner	3M
Steve Schultz	3M
Patricia M. Rockey	Boeing
Ardin Arnell	British Petroleum
Barbara Ennis	Lucent Technologies
Mike Army	Leonardo Academy
Shana Israelstam	Leonardo Academy
Steve Olson	Leonardo Academy



## **Appendix B**

### **Public Involvement Process used for the Multi Pollutant Emission Reduction Reporting Project**



## **Public Involvement Process Used for the Multi Pollutant Emission Reduction Reporting Project**

The approach used was to invite representatives of the primary stakeholders in emission reduction reporting to participate in the project.

These stakeholders invited included:

- (1) Organizations from across the United States that were likely to report emission reductions under a multi pollutant reporting system. These included organizations already demonstrating their interest in reporting emission reductions by reporting under the voluntary reporting system for greenhouse gas emission reductions and other organizations that were considering reporting emission reductions.
- (2) Organizations that were likely to be involved in the implementation of a multi pollutant emissions reduction reporting system at the state level, including state environmental protection agencies and state energy offices.
- (3) Organizations that were likely to be involved in the implementation of a multi pollutant emissions reduction reporting system at the national level, including the national environmental protection agency and the national department of energy.

The stakeholders that participated in the project are included in the list in Appendix A.

The project participants were charged with the four tasks listed below. At each step along the way, including the drafting of the final report, participants were asked to provide their input, review, and comments to:

- (1) Develop criteria that a multi pollutant emission reduction reporting system would need to meet in order to provide an adequate foundation for a multi pollutant trading system.
  - a. Provide input towards development of criteria
  - b. Review and provide input on developed criteria
- (2) Develop a list describing where the existing 1605(b) voluntary reporting system falls short of these criteria.
  - a. Provide input towards development of list
  - b. Review and provide input on developed list
- (3) Develop a multi pollutant emission reduction reporting system that provides an adequate foundation for a multi pollutant trading system. Develop this system by identifying how the 1605(b) voluntary reporting system could be extended so that any short comings are remedied with extensions that meet these criteria.
  - a. Provide input towards development of these extensions
  - b. Review and provide input on developed extensions
- (4) Participate in the pilot testing of the developed multi pollutant emission reduction reporting system by submitting projects for reporting and/or participating in the review of these pilot reports.

- a. Provide input towards development of these pilot reports and/or
- b. Review and provide input on the adequacy of these reports

Based on the input from the participating organizations the results of each of these steps were included in this project report.

While the contribution of all of the participating organizations to this project cannot be overstated, it is also important to recognize that they each have their own particular process for making formal decisions that were not used to develop this report. For this reason, while fully recognizing the contribution of all the participants, this report is in the end a report of Leonardo Academy's Cleaner and Greener<sup>SM</sup> Program. We hope that each participating organization, as well as their peers in the U.S. and around the world, will consider including this multi pollutant approach in all their future emission reduction actions.

## **Appendix C**

### **Forms for Multiple Pollutant Emission Reduction Reporting and Supplementary Directions Under 1605(b)**





## Multi Pollutant Emission Reduction Reporting Requirements:

### Existing U.S. DOE 1605(b) Reporting Requirements

The EIA Forms for reporting emission reductions under 1605(b) that are most likely to be used in reporting multi-pollutant emission reductions have been included here along with the necessary extensions for reporting multiple pollutants. If it is found that other EIA forms need to be used to report a given project, information should be added in the reports prepared that addresses the issues raised in the extensions for reporting multiple pollutants.

### Form EIA-1605 Schedule I. Entity Information

#### 1. Entity Information

Entity Name: \_\_\_\_\_  
Street: \_\_\_\_\_ P.O. Box: \_\_\_\_\_  
City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_  
Contact Name: \_\_\_\_\_  
Title: \_\_\_\_\_  
Tel.: (\_\_\_\_) \_\_\_\_\_ FAX: (\_\_\_\_) \_\_\_\_\_  
E-Mail Address: \_\_\_\_\_

#### 2. Entity Type

Select the category below that describes the entity:

- Individual or Family
- Partnership
- Corporation (*check all that apply*)
  - Publicly traded (*provide stock ticker symbol:*)
  - Privately held
  - Nonprofit
  - Subsidiary (*identify parent:*)
- Government (*indicate level*)
  - Federal
  - State
  - Regional
  - Local
- Joint venture (*list partners or attach sheet:*)
- Trade Association (*specify*)
  - Reporting on behalf of its members (*please attach list*)
  - Reporting on its own projects(s)
- Other (*specify:*)

#### 3. Geographic Scope of Activities

Please check one of the following:

- U.S. Only
- U.S. and Foreign
- Foreign Only

List all foreign countries in which activities are located: \_\_\_\_\_

4. **Primary Two Digit SIC Code for Industry:** \_\_ \_\_

5. **Confidentiality**

Does this report contain confidential information: circle yes or no

6. **Certification** I certify that the information reported on this form is accurate to the best of my knowledge and belief.

Certifying Official: Name: \_\_\_\_\_ Title: \_\_\_\_\_

Tel: \_\_\_\_\_ Date: \_\_\_\_\_

**Schedule II: Project-Level Emissions and Reductions Information required for Section 3: Energy End Use Projects**

**Part I. General Project Information**

1. **Name of Entity:** \_\_\_\_\_

2. **Name of Project:** \_\_\_\_\_

3. **Project Location:**

US Only:

Name: \_\_\_\_\_

Street: \_\_\_\_\_ P.O. Box: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Foreign Only:

List Countries: \_\_\_\_\_

4. **Date Project Became Operational:**

Month and Year: \_\_\_\_\_

5. **Reasons for Project** (*complete all that apply*):

Plant closing

Federal, state, or local requirement, specify: \_\_\_\_\_

Voluntary reduction

6. **Participation in Voluntary Programs:** If this project is associated with any voluntary programs (e.g., Green Lights, Energy Star Buildings Program), please list such programs below.

Program(s): \_\_\_\_\_

Other programs, specify: Program: Sponsor:

7. **Was this Project Reported Last Year?** Yes or No

**Part II: Specific Project Information**

1. **Project Type** (*check all that apply*):

Equipment and appliances

Lighting and lighting control

Load control

Heating, ventilating, and air conditioning

Building shell improvement

Motor and motor drive

Fuel switching

Urban forestry

Other, specify: \_\_\_\_\_

**2. Load Shape Effects** (*check all that apply*):

- Energy efficiency
- Load building
- Load shifting
- Peak clipping
- Valley filling

**3. Identify Sector(s) of Energy User(s) Affected by Project** (*check all that apply*):

- Residential
- Commercial
- Industrial
- Agricultural

**4. Project Scale:**

- Full-scale/Commercial
- Pilot/demonstration

**5. Actual Energy/Fuel Consumption**

Fuel or Energy Type	Unit of Measure	Quantity						
		1991	1992	1993	1994	1995	1996	1997

**Net Change in Energy/Fuel Consumption** (*report reductions in energy/fuel consumed as negative values*):

Fuel or Energy Type	Unit of Measure	Quantity						
		1991	1992	1993	1994	1995	1996	1997

**6. Project Description:** Provide a general description of the project on which you are reporting. You may wish to include economic information on the costs and benefits of this project as well as any special conditions that would be necessary to replicate its achievements.

### 1. Schedule II, Part III: Emissions and Reductions

Please use Emission Factors from Attachment 1 or the EIA 1605 reporting forms if you do not have regional or site specific emission factors (Direct = you own the generation facility. Indirect = Energy Efficiency projects).

Name of Entity: \_\_\_\_\_

Name of Project: \_\_\_\_\_

	Gas	Type of Emissions or Reductions	Unit of Measure	Physical Quantity						Accuracy High, Moderate, or Not determined	
				1991	1992	1993	1994	1995	1996		1997
<b>EMISSIONS</b>	CO2	Direct									
		Indirect									
	NOx	Direct									
		Indirect									
	SO2	Direct									
		Indirect									
	Particulates	Direct									
		Indirect									
	Hg	Direct									
		Indirect									
	VOC	Direct									
		Indirect									
	CO	Direct									
		Indirect									
Other Gas: Specify ___	Direct										
	Indirect										
<b>REDUCTIONS</b>	CO2	Direct									
		Indirect									
	NOx	Direct									
		Indirect									
	SO2	Direct									
		Indirect									
	Particulates	Direct									
		Indirect									
	Hg	Direct									
		Indirect									
	VOC	Direct									
		Indirect									
	CO	Direct									
		Indirect									
Other Gas: Specify ___	Direct										
	Indirect										

## Section II, Part IV: Project Evaluation

### 1. Reference Case:

- Basic
- Modified (*Describe Estimation Method*)

### 2. Reports to Other Agencies: Please list any other government bodies to which you report information on this project.

Government Body: \_\_\_\_\_  
Reference Number: \_\_\_\_\_

### 3. Multiple Reporting: Identify any other entity(ies) that could report on the effects of this project. (If you are a participant in a utility-sponsored, demand-side management program, please identify the sponsoring utility): \_\_\_\_\_

This report contains information on (*check one*):

- Entire project
- A portion of the project (%): \_\_\_\_\_

### 4. Estimation Method: Provide a detailed description of the estimation method used in assessing the emissions consequences of the project, including data sources, assumptions, and equations or emissions coefficients.

**Schedule II: Project-Level Emissions and Reductions Information specific for Section 1: Electricity Generation, Transmission, and Distribution Projects**

This section only includes those instances where the forms for electricity generation, transmission, and distribution differ with the previous forms included for energy end use.

**Part II: Specific Project Information**

**1. Project Type:**

- Heat rate or other efficiency improvement
- Availability improvement
- Fuel switching
- Increase in low-emitting capacity
- Decrease in high-emitting capacity
- Dispatching changes only
- High efficiency transformers
- Reconductoring
- Distribution voltage upgrade

Other transmission and distribution improvement, specify: \_\_\_\_\_

Other, specify: \_\_\_\_\_

**5. List the Generating Units Included in this Project:**

Operator of Unit	Power Plant	Generating Unit	Capacity (MW)

**Schedule II: Project-Level Emissions and Reductions Information specific for Section 2: Cogeneration and Waste Heat Recovery Projects**

This section only includes those instances where the forms for cogeneration and waste heat recovery differ with the previous forms included for energy end use.

**Part II: Specific Project Information**

**1. Fuel Consumption:**

Fuel or Energy Type	Unit of Measure	Quantity						
		1991	1992	1993	1994	1995	1996	1997
Reference:								
Actual:								

**2. Project Size** (complete all that apply):

Size Measure	Unit of Measure	Quantity						
		1991	1992	1993	1994	1995	1996	1997
Generation Nameplate Capacity	MW							
Total Energy Savings	MMBtu							
Quantity of Waste Heat Recovered	MMBtu							

**3. Electricity Metering Configuration** (check all that apply):

- Gross energy
- Surplus energy
- Net energy
- Time-of-day

**4. End-Use of Thermal Energy** (check all that apply):

- Process heating
- Machine drive
- Electrochemical process
- Process cooling and refrigeration
- Heating, ventilation, and air conditioning
- Industrial process heat
- Pre-heat fuel or combustion air
- Electricity generation
- Other, specify: \_\_\_\_\_

**5. Source of Waste Heat Energy Recovered** (check all that apply):

- Waste process heat
- Hot flue gases
- Hot process fluids
- Other, specify: \_\_\_\_\_

**Other Project Level Categories:**

Appendix C only includes examples of Schedule II. project-level emissions and reductions forms for Section 1. Electricity Generation, Transmission, and Distribution, Section 2. Cogeneration and Waste Heat Recovery, and Section 3. Energy End Use. 1605(b) also includes the following specific project-level emissions and reductions category forms not included in Appendix C:

- Section 4. Transportation and Off\_Road Vehicles
- Section 5. Waste Treatment and Disposal – Methane
- Section 6. Agriculture – Methane and Nitrous Oxide
- Section 7. Oil and Natural Gas Systems and Coal Mining – Methane
- Section 8. Carbon Sequestration
- Section 9. Halogenated Substances
- Section 10. Other Emission Reduction Projects



### Schedule III. Entity-Level Emissions and Reductions

Name of Entity: \_\_\_\_\_

Location of Activities:  Domestic  Foreign

**Part Ia and Ib. Direct Emissions and Reductions**

Source of Emission: (Fill out a separate table for each different emission source)

Stationary Combustion

Transportation

Other Direct Sources

Gas	Unit of Measure	1987-1990	1991	1992	1993	1994	1995	1996	1997	Accuracy
		Baseline	Physical Quantity							
<b>Emissions</b>										
CO2										
NOx										
SO2										
PM10										
Hg										
Cd										
Pb										
Other										
Other										
<b>Reductions</b>										
CO2										
NOx										
SO2										
PM10										
Hg										
Cd										
Pb										
Other										
Other										

**Part IIa and IIb. Indirect Emissions and Reductions**

**Source of Emissions:** (Fill out a separate table for each different emission source)

- Power Transactions
  - Indirect Emissions from Purchased Power
  - Emissions Associated with Electricity Wholesaling
  - Net Emissions from Power Transactions
- Other Indirect Sources

Gas	Unit of Measure	1987-1990	1991	1992	1993	1994	1995	1996	1997	Accuracy
		Baseline	Physical Quantity							
<b>Emissions</b>										
CO2										
NOx										
SO2										
PM10										
Hg										
Cd										
Pb										
<b>Reductions</b>										
CO2										
NOx										
SO2										
PM10										
Hg										
Cd										
Pb										

**Part IIIa and IIIb. Total Emissions and Reductions**

Gas	Unit of Measure	1987-1990	1991	1992	1993	1994	1995	1996	1997	Accuracy
		Baseline	Physical Quantity							
<b>Emissions</b>										
CO2										
NOx										
SO2										
PM10										
Hg										
Cd										
Pb										
<b>Reductions</b>										
CO2										
NOx										
SO2										
PM10										
Hg										
Cd										
Pb										

**1. Estimation Method:** Please describe the methods used to determine your emissions and reductions.

**2. Scope of Report:** Please describe what this entity-level report covers.

**3. Supplementary Information:** Identify factors that may have contributed to year-to-year changes in entity-level emissions and reductions. Such factors might include changes in weather from year-to-year, changes in overall production levels, outsourcing of emissions, and changes in operational and maintenance procedures.



## **Supplementary Directions and Forms for Multiple Pollutant Emission Reduction Reporting Under 1605(b)**

**Extensions to the existing 1605(b) reporting forms and directions have been developed to address each of the shortcomings relative to the criteria.**

These extensions are designed to use as a supplement to the existing 1605(b) reporting forms that follow this section. Filling out the existing 1605(b) reporting form plus following the directions and filling out the forms below is designed to provide a multi pollutant emission reduction report that will support an emission reduction trading market.

### **Identified extensions to the existing 1605(b) Reporting System:**

Fill out FORM EIA-1605 Voluntary Reporting of Greenhouse Gases (Form EIA-1605 (1998) and make the following additions:

#### **1. Additional Directions for Schedule II, Part III. Greenhouse Gas Emissions and Reductions**

- a) Fill out one of these forms for each pollutant reported. Insert name of the pollutant in the two “Other Gas (Specify)” blanks in column 2 and fill out the rest of the form for that pollutant.
- b) Recommended list of pollutant reductions to report: CO<sub>2</sub>, CO, SO<sub>2</sub>, NO<sub>x</sub>, PM<sub>10</sub>, HG, Pb, Other (VOC, Cd, CH<sub>4</sub>, N<sub>2</sub>O, etc.).
- c) Electricity emission rates for each of these pollutants (Does not include CH<sub>4</sub> or N<sub>2</sub>O) for each state are included in Attachment 1 at the end of Appendix B.
- d) If you would like to report additional pollutants, please feel free to do so. Please include a description of the methodology you used for calculating the impacts of your action on this pollutant. (Note: A 1605(b) users advisory committee made up of equal numbers of reporters, State EPA’s, State Energy Offices, US EPA and US DOE representatives will periodically meet to advise the regulatory agencies on what methods to accept for calculating impacts of actions on new pollutants. The objective of this process will be to maintain uniform minimum standards for reporting each pollutant needed to receive credit for reductions that are workable for reporters, State EPA’s, State Energy Offices, US EPA and US DOE.)

#### **2. Additional Directions for Schedule II, Part IV. Project Evaluation**

##### **a) Section 2: Reports to Other Agencies**

Include here, by reference, any reporting of emission reductions for direct emitters that are reported elsewhere under a mandatory state or federal emission reduction reporting program that includes verification and public availability of the reported information. To avoid unnecessary duplication, citing an appropriate reporting program by reference here makes it unnecessary to fill out Part IV, Section 4. (The Estimation Method) found below.

##### **b) Section 4: Estimation Method**

- i. Some actions decrease some emissions while increasing others. The description of the estimation method should describe how both increases and decreases in emissions were identified and quantified including baselines calculation information.

- ii. If you would like to report emission reductions based on actions not specifically described in the forms of reporting instructions, please feel free to do so. Please include a description of the methodology you used for calculating the impacts of your action on emissions. (Note: The 1605(b) users advisory committee as described above will periodically meet to advise the regulatory agencies on what methods to accept for calculating impacts of actions on new pollutants.)
- c) Section 5: Measurement and Verification of Emission Reductions (An Added Section)**  
 In this section: provide a description of the methods used to measure and verify the emissions reduction or any underlying energy use reductions. (Note: Standards for adequate measurement and verification will be added based on results of EPA SIP/ Efficiency Working Group and other sources when these become available)
- d) Section 6: Ownership of Emission Reductions (An Added Section)**  
 In this section:
- i. Identify the owner of the premises where the emission reduction causing activity occurred. Note: The owner of the premises where the emission reduction causing action occurred is the original owner of the resulting emission reductions. (The original owner can transfer the ownership of all or part of these emission reductions to others by contract. Through such contracts the emissions reductions can be distributed to various participants in the development, implementation, financing and maintenance of projects that result in emission reductions as well as to any other parties. )
  - ii. Identify any transfers of ownership of emission reductions from original owner.

**Part IV. Project Evaluation Section 6**

**Section 6. Ownership of Emission Reductions**

- a) Original Owner: Note: The owner of the premises where the emission reduction-causing action occurred is the original owner of the resulting emission reductions.

Name of Entity: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 Name of Contact Person: \_\_\_\_\_  
 Telephone Number: \_\_\_\_\_  
 Email Address: \_\_\_\_\_

- b) Transfers of Ownership (Report partial and full transfers here)  
 Note: Update this section as often as ownership is transferred

**Ownership Transfer Table:**

<b>Entity Transferring Ownership</b> Include: Name of Entity, Address, Contact Person, Telephone Number and Email Address	<b>Entity Receiving Ownership</b> Include: Name of Entity, Address, Contact Person, Telephone Number and Email Address	<b>What Emission Reductions Were Transferred</b> Including: Name of Pollutant (or specify all affected pollutants), percent of total, and amount by weight	<b>Date of Transfer</b>

## **Attachment 1**

### **Average All Generation and Fossil Fuel-Based Electric Generation Emissions Factors for Pollutants for Each State**

Cleaner and Greener Program emission factors are now located in a separate stand-alone report that can be found on the Cleaner and Greener web site at:  
<http://www.cleanerandgreener.org/multipollutant.htm>



## **Appendix D**

### **Pilot Project Testing for Multiple Pollutant Emission Reduction Reporting**

#### **Using 1605(b) Plus the Supplementary Reporting Requirements Developed in this Project**

#### **As Specified in the Supplementary Directions And Forms in Appendix C**



**Pilot Reporting**

**Using the Multiple Pollutant Emission  
Reduction Reporting Standards**

**Vulcan Chemicals**

**Membrane Cellroom Conversion**

**Pilot Reporting Project 1**



# Multi Pollutant Emission Reduction Reporting

Modeled after the U.S. Department of Energy  
Energy Information Administration  
Voluntary Reporting of Greenhouse Gases  
Form EIA-1605

## Schedule I. Entity Information and Certification

Reporting Year 1997

### Vulcan Chemicals

#### 1. Entity Information

##### Entity Name and Address

Vulcan Chemicals  
Hwy 173 South P.O. Box 161  
Port Edwards, WI 54469-

##### Contact:

Chris Maras

Tel: (715) 887-4513

FAX: (715) 887-4513

E-Mail Address:

Chris\_Maras@vul.com

#### 2. Type of Reporter

Corporation  
Publicly traded (VulM)

#### 3. Geographic Scope of Activities

U.S. Only

#### 4. SIC Code

28 Chemicals and allied products

#### 5. Reported Line Items by Schedule Section

##### Schedule II. Project-Level Emissions and Reductions

1 Section 3. Energy End Use

##### Schedule III. Entity-Level Emissions and Reductions

##### Schedule IV. Commitments to Reduce Greenhouse Gases

#### 6. Confidentiality

This report contains confidential information

**7. Certification** *I certify that the information reported on this form is accurate to the best of my knowledge and belief.*

Certifying Official: George Gissel  
Technical Service Manager  
Tel: (715) 887-4507

Date: 9/15/98

# Multi Pollutant Emission Reduction Reporting

Modeled after the U.S. Department of Energy  
Energy Information Administration  
Voluntary Reporting of Greenhouse Gases  
Form EIA-1605

## Schedule II. Project-Level Emissions and Reductions Section 3. Energy End Use

---

Reporting Year 1997

### Vulcan Chemicals Membrane Cellroom Conversion Project

#### Part I. General Project Information

- 1. Name of Entity:** Vulcan Chemicals
- 2. Name of Project:** Membrane Cellroom Conversion Project  
**EIA Project ID:** 1
- 3. Location:**  
U.S. Only  
  
Facility Name and Address:  
Vulcan Chemicals  
Hwy 173 South P.O. Box 161  
Port Edwards, WI 54469-
- 4. Date Project Became Operational:**  
Project Not Yet Operational. This report uses 1997 as the reporting year but the actual reporting year will be the first year the project becomes operational.
- 5. Reasons for Project:**  
Voluntary
- 6. Participation in Voluntary Programs:**  
None  
**Other programs:**  
None

# Multi Pollutant Emission Reduction Reporting

Modeled after the U.S. Department of Energy  
Energy Information Administration  
Voluntary Reporting of Greenhouse Gases  
Form EIA-1605

## Schedule II. Project-Level Emissions and Reductions Section 3. Energy End Use

Reporting Year 1997

### Vulcan Chemicals Membrane Cellroom Conversion Project

#### Part II. Specific Project Information

- 1. Project Type:**  
Equipment and appliances
- 2. Load Shape Effects:**  
Energy efficiency
- 3. Sector(s) of Energy User(s) Affected by Project**  
Industrial
- 4. Project Scale:**  
Full-Scale/ Commercial
- 5. Net Change in Energy/Fuel Consumption:**

Fuel or Energy Type	Unit of Measure	Quantity						
		1991	1992	1993	1994	1995	1996	1997
Natural Gas (Pipeline)	MMBtu							362,000
Electricity	kWh							(80,000,000)

#### 6. Project Description:

Replace mercury cells with membrane cells used in the production of caustic soda, chlorine, and potassium hydroxide. The project would also increase production 60% from 220 tpd Cl<sub>2</sub> to 335 tpd Cl<sub>2</sub>.

In addition to the efficiency improvements, this project also eliminates 1247 lbs. of mercury consumption per year by switching from mercury cells to the membrane cells (See attached sheet on mercury consumption).

## Multi Pollutant Emission Reduction Reporting

Modeled after the U.S. Department of Energy  
 Energy Information Administration  
 Voluntary Reporting of Greenhouse Gases  
 Form EIA-1605

### Schedule II. Project-Level Emissions and Reductions Section 3. Energy End Use

Reporting Year 1997

#### Vulcan Chemicals

#### Membrane Cellroom Conversion Project

#### Part III. Greenhouse Gas Emissions and Reductions

Gas	Type	Unit of Measure	1991	1992	1993	1994	1995	1996	1997	Accuracy
			Physical Quantity							
<b>Emissions</b>										
CO2	Direct	Lbs.							42,382,960	Undetermined
NOx	Direct	Lbs.							162,900	Undetermined
SO2	Direct	Lbs.							2,172	Undetermined
PM10	Direct	Lbs.							0	Undetermined
Hg	Direct	Lbs.							0.00	Undetermined
Cd	Direct	Lbs.							0.00	Undetermined
Pb	Direct	Lbs.							0.00	Undetermined
CO2	Indirect	Lbs.							400,214,000	Undetermined
NOx	Indirect	Lbs.							1,132,400	Undetermined
SO2	Indirect	Lbs.							2,175,400	Undetermined
PM10	Indirect	Lbs.							29,800	Undetermined
Hg	Indirect	Lbs.							23.54	Undetermined
Cd	Indirect	Lbs.							0.88	Undetermined
Pb	Indirect	Lbs.							33.38	Undetermined
<b>Reductions (Reductions shown as positive numbers)</b>										
CO2	Direct	Lbs.							(42,382,960)	Undetermined
NOx	Direct	Lbs.							(162,900)	Undetermined
SO2	Direct	Lbs.							(2,172)	Undetermined
PM10	Direct	Lbs.							0	Undetermined
Hg	Direct	Lbs.							1,247	Undetermined
Cd	Direct	Lbs.							0.00	Undetermined
Pb	Direct	Lbs.							0.00	Undetermined
CO2	Indirect	Lbs.							178,400,000	Undetermined
NOx	Indirect	Lbs.							464,000	Undetermined
SO2	Indirect	Lbs.							896,000	Undetermined
PM10	Indirect	Lbs.							16,000	Undetermined
Hg	Indirect	Lbs.							8.48	Undetermined
Cd	Indirect	Lbs.							0.32	Undetermined
Pb	Indirect	Lbs.							12.00	Undetermined

**Additional Information:** The table above includes 1247 lbs. of mercury consumption per year that are eliminated by switching from mercury cells to the membrane cells (See attached sheet on the following page).



**Vulcan Chemicals  
Port Edwards, WI**

**Mercury Consumption  
(lbs. Hg / year)  
Three year baseline.**

<b>ITEM</b>	<b>END 1995</b>	<b>END 1996</b>	<b>END 1997</b>
<b>I. Contained in Product</b>			
A. NaOH	8	7	9
B. Chlorine	1	1	1
C. HCl	82	49	19
D. KOH	6	10	11
Subtotal	97	67	40
<b>II. Air Emissions</b>			
A. Cell Room Vents	1045	1048	1045
B. H2 Stack	7	11	3
C. Fume Stack	34	23	27
D. Retort Stack	20	8	9
E. Misc. Vents	8	8	8
Subtotal	1114	1098	1092
<b>III. Surface Water</b>	3	4	3
<b>IV. Landfill</b>			
A. Brine Muds	5	5	7
B. Saturator Solids	0	2	1
C. Miscellaneous	0	11	3
Subtotal	5	18	11
Total Consumption	1219	1186	1146
Misc. Wastes Shipped	44	80	66
<b>Total</b>	<b>1263</b>	<b>1266</b>	<b>1212</b>

Note: numbers by T.E. Pruss

# Multi Pollutant Emission Reduction Reporting

Modeled after the U.S. Department of Energy  
Energy Information Administration  
Voluntary Reporting of Greenhouse Gases  
Form EIA-1605

## Schedule II. Project-Level Emissions and Reductions Section 3. Energy End Use

Reporting Year 1997

### Vulcan Chemicals

#### Membrane Cellroom Conversion Project

#### Part IV. Project Evaluation

##### 1. Reference Case:

Modified

##### 2. Reports to Other Agencies:

Government Body: Wisconsin DNR  
Reference Number:

##### 3. Multiple Reporting:

This report contains information on:  
Entire Project

##### 4. Estimation Method:

To avoid unnecessary duplication, citing an appropriate reporting program by reference in Section 2: Reports to Other Agencies makes it unnecessary to fill out Part IV, Section 4. (The Estimation Method) found below.

#### Calculated Existing Power Consumption using Mercury Cells at 220 tons per day (tpd) Cl<sub>2</sub> (200 metric tons per day (Mtpd) Cl<sub>2</sub>) @ 360 days/year:

24 Mercury Cell @ 4.1Volts (V) each @ 270 KA-DC  
Rectifier efficiency = 98%  
Mercury Cell Current Efficiency = 97%

$$\begin{aligned} E_{Cl_2} &= (756 * V_{cell}) / (N_{current} * N_{rect.}) = [756 * (4.1V) / (0.97) * (0.98)] * (200Mtpd) \\ &= 652,135 \text{ a-c kWh/day} \\ &= 2.35E8 \text{ a-c kWh/year} \end{aligned}$$

### **Calculated Power Consumption using Mercury Cells at 355 tpd Cl<sub>2</sub> (322 Mtpd Cl<sub>2</sub>) @ 360 days/year:**

39 Mercury Cell @ 4.1V each @ 270 KA-DC  
Rectifier efficiency = 98%  
Mercury Cell Current Efficiency = 97%

$$\begin{aligned} E_{Cl_2} &= [756*(4.1V)/(0.97)*(0.98)]*(322Mtpd) \\ &= 1,049,939 \text{ a-c kWh/day} \\ &= 3.78E8 \text{ a-c kWh/year} \end{aligned}$$

### **Calculated Power Consumption using Membrane Cells at 355 tpd Cl<sub>2</sub> (322 Mtpd Cl<sub>2</sub>) @ 360 days/year:**

30 Membrane Cells @ 3.2V each @ 350 KA-DC  
Rectifier efficiency = 98%  
Membrane Cell Current Efficiency = 96%

$$\begin{aligned} E_{Cl_2} &= [756*(3.2V)/(0.96)*(0.98)]*(322Mtpd) \\ &= 828,000 \text{ a-c kWh/day} \\ &= 2.98E8 \text{ a-c kWh/year} \end{aligned}$$

In the three equations above, 756 is based on Faradays law and the molecular weight of chlorine.

Faraday's Law of Electrolysis states that the amount of chemical change produced is directly proportional to the amount of current which passes. One Faraday, equivalent to 96,487 coulombs or ampere-seconds, is required to produce one gram equivalent weight of the electrochemical reaction product (chlorine in the case). The gram equivalent weight for chlorine is 35.45 (or 70.9 / 2). This relationship is used to determine the energy requirement for chlorine production.

$$(96,487*1000) / (60*60*35.45) = 765 \text{ kA*h/t (kiloampere hours per ton of CL}_2\text{)}$$

Now that you have kiloampere hours per ton of product, you can calculate the power per ton of product by multiplying by the voltage (different for mercury and membrane cells) and divide by your efficiencies (cell and rectifier) as was done above.

### **Natural Gas Consumption as a Result of Switch from Mercury to Membrane Cells**

Natural Gas needed to evaporate water from caustic and potassium hydroxide produced by membrane cells (from 30% to 50%) (Mercury cells produce 50% with no evaporation needed)

$$\begin{aligned} NG_{\text{Consumption}} &= 28,800 \text{ lbs./hour Steam to evaporator} * 24 \text{ hour/day} * 1194 \text{ Btu/lb. Steam} * (1/0.82) \\ &\quad * 360 \text{ days/year} \\ &= 3.62E11 \text{ Btu/year} = 362,000 \text{ million Btu/year} \end{aligned}$$

0.82 = typical efficiency for a gas-fired boiler

**To calculate the CO<sub>2</sub> emissions from natural gas consumption:**

362,000 million Btu/year \* 117.08 lbs. CO<sub>2</sub> per million Btu = 42,382,960 lbs. CO<sub>2</sub> emissions

Note: 117.08 lbs. CO<sub>2</sub> per million Btu represents the emission factor for natural gas.

The mercury direct baseline level was calculated using a three-year average of mercury consumption data. The three years of mercury consumption data (1995 – 1997) are at lower levels than historical consumption levels have been over a longer time span. Mercury consumption levels could increase before the membrane cell project is approved and actually undertaken.

**5. Measurement and Verification of Emission Reductions:**

The changes in emissions were estimated directly from the changes in energy use caused by the project as described in the Estimation Method Section above and the emissions factors provided along with the additional forms and reporting instructions developed for the multi-pollutant emissions reduction reporting.

**6. Ownership of Emission Reductions:**

The owner of the premises where the emission reduction-causing action occurred is the original owner of the resulting emission reductions.

Vulcan Chemicals would be the owners of the emission reductions.

Name of Entity:

Vulcan Chemicals  
Hwy 173 South P.O. Box 161  
Port Edwards, WI 54469-

Contact Person:

Chris Maras  
Tel: (715) 887-4000  
FAX: (715) 887-4513

**Transfers of Ownership (Report partial and full transfers here):**

A transfer of some of the emissions reductions by the original owner to the project implementers and the others involved in the supporting the recognition of the emission reductions is likely in order to align the interests of all the participating parties. When this occurs, these transfers on ownership will be reported here.

Entity Transferring Ownership Include: Name of Entity, Address, Contact Person, Telephone Number and Email Address	Entity Receiving Ownership Include: Name of Entity, Address, Contact Person, Telephone Number and Email Address	What Emission Reductions Were Transferred Including: Name of Pollutant (or specify all affected pollutants), percent of total, and amount by weight	Date of Transfer

Note: Update this section as often as ownership is transferred

## **Pilot Reporting**

### **Using the Multiple Pollutant Emission Reduction Reporting Standards**

**Johnson & Johnson**

### **Pilot Reporting Project 2 Including the Facility-Level Report and Commitments to Reduce Emissions**



## **Johnson & Johnson Multi Pollutant Emission Reduction Pilot-Report Discussion:**

Johnson & Johnson is currently reporting their company's emission reductions through 1605(b) Voluntary Reporting of Greenhouse Gases. For the year 1997, Johnson & Johnson reported seven different project types to 1605(b) under Schedule II: Project-Level Emission and Reductions Section 3 Energy End Use. Johnson & Johnson also aggregates the emission reductions from all of their different project-level reductions and report them under Schedule III: Entity-Level Emissions and Reductions, and Schedule IV: Commitments to Reduce Greenhouse Gases. These different project-level emission reductions are in themselves an aggregation of reductions from many individual projects occurring at different facilities throughout the U.S. and Puerto Rico.

Project-level types and number of individual projects involved in each type:

301 - Green Light Upgrades	252 projects
302 - Installation of Energy Efficient Systems	NA
303 - Installation of Timer controls and Shutdowns	NA
304 - Process Improvement	Indeterminate
305 - HVAC	87 projects
306 - Equipment and Appliances	48 projects
307 - Motor and Motor Drives	33 projects
308 - Building Shell	14 projects
309 - Load Control	16 projects

As of 1995, two of these nine project types, 302 and 303, were no longer used to report project-level reductions. Johnson & Johnson no longer has records of how many projects contributed to #302 and #303.

We have upgraded all of Johnson & Johnson reports to fit the multi pollutant reporting requirements. But because of size constraints within our multi pollutant report and to avoid repetition for our readers, we have only included the project-level reporting for #304 - Process Improvements and the Schedule III: Entity-Level Emissions and Reductions, and Schedule IV: Commitments to Reduce Greenhouse Gases sections for Johnson & Johnson. The report output for all nine project types are available for those who wish to request a copy.

The process improvement projects included consumption numbers for mixed fuels of natural gas and distillate oils #2, #4 and #6. For greater accuracy, the consumption data should have been broken down by fuel type and then had emission factors applied to each type. In addition, our project only used one NOx emission factor for Johnson & Johnson fuel reductions for mixed fuel project types. NOx emissions are much more dependent upon both combustion source and technology type than other emission types. Therefore, greater accuracy would have resulted from more specific NOx emission factors. Johnson & Johnson has not reported their NOx reductions in the past for decreases in fuel consumption to 1605(b) because of this very problem.

In addition, Johnson & Johnson has been reporting emission reductions for only the project life rather than the whole life of the equipment installed. This is a very conservative way to report

emission reductions. Johnson & Johnson’s emission reduction totals would be much higher if they shift to reporting their reductions cumulatively for the whole life of the equipment installed.

It should also be stressed that this pilot-report used different emission factors than those Johnson & Johnson has used for 1605(b) reporting. For its reports, Johnson & Johnson uses the emission factors supplied by the 1605(b) program for both emissions and emission reductions. These numbers are calculated by dividing total emissions by total generation including nuclear and hydro generation. Leonardo Academy believes that more accurate estimates of emission reductions are created if emission factors are calculated by dividing the emissions from fossil-fueled generation by electricity produced from fossil-fueled generation only.

For example, there were different CO<sub>2</sub> emission factors used between the two reports (1.50 in the 1605(b) report versus 1.96 in the pilot-report) for indirect reductions. This difference effects both Part IIb and Part IIIb reduction amounts in the J&J facility-level Pilot Report by the same exact difference.

To use 1997 as an example:

There was a total decrease in electricity consumption at Johnson & Johnson of 28,874,440 kWh.

J&J 1605(b) Report: 28,874,440 kWh \* 1.50 = 43,311,660 lbs. = 21,655 short tons

J&J Pilot Report: 28,874,440 kWh \* 1.96 = 56,593,902 lbs. = 28,287 short tons

1997 CO<sub>2</sub> Emission Reductions (short tons)

	<u>Direct</u>	<u>Indirect</u>	<u>Total</u>
J&J 1605(b) Report:	9,099	21,656	30,755 short tons
J&J Pilot Report:	9,099	28,287	37,396 short tons

The same emission factors were used for direct emission reductions for both reports. But as can be seen from the numbers above, the difference in indirect emission factors produce much different CO<sub>2</sub> emission reduction totals. Both reports also used U.S. average emission factors for the multi pollutant reductions. Regional or state emission factors would produce different but more accurate emission reductions and Johnson & Johnson is planning on moving in this direction for their future reporting.

Our project used what we think are the most accurate emission factors for electricity emissions. See Appendix C, Attachment 1 in this report for a more detailed discussion of this issue. The final decision on what are the most acceptable emission factors for reporters will rest with the US EPA and state EPAs as emission reduction reporting moves from voluntary to mandatory systems. Ultimately as each pollutant becomes regulated, the US EPA and state EPAs will need to decide what emission factors they want used.



# Multi Pollutant Emission Reduction Reporting

Modeled after the U.S. Department of Energy  
Energy Information Administration  
Voluntary Reporting of Greenhouse Gases  
Form EIA-1605

## Schedule I. Entity Information and Certification

Reporting Year 1997

### Johnson & Johnson

#### 1. Entity Information

##### Entity Name and Address

Johnson & Johnson  
1 Johnson & Johnson Plaza  
New Brunswick, NJ 08933

##### Contact:

Harry Kauffman  
Energy Director

Tel: (732) 524-3174

FAX: (732) 524-6370

E-Mail: hkauffm@corus.jnj.com

#### 2. Type of Reporter

Corporation  
Publicly Traded (JNJ)

#### 3. Geographic Scope of Activities

Report contains details of Johnson & Johnson's efforts in the U.S. and Puerto Rico.

#### 4. SIC Code

28 Chemicals and Allied Products

#### 5. Reported Line Items by Schedule Section

Schedule II. Project-Level Emissions and Reductions

9 Section 3. Energy End Use

Schedule III. Entity-Level Emissions and Reductions

	<u>Emissions</u>	<u>Reductions</u>
--	------------------	-------------------

##### Part I. Direct Emissions and Reductions

Stationary Combustion:	1	1
Transportation Related:	0	0
Other Direct:	0	0

##### Part II. Indirect Emissions and Reductions

From Power Transactions:	1	1
Other Indirect:	1	1

##### Part III: Sinks and Sequestration

Sinks and Sequestration: 0

##### Part IV: Totals

Schedule IV. Commitments to Reduce Greenhouse Gases

#### 6. Confidentiality

This report contains confidential information.

7. **Certification** *I certify that the information reported on this form is accurate to the best of my knowledge and belief.*

Certifying Official: Harry Kauffman  
Corporate Energy Director  
Tel: (732) 524-3174

Date: 10/08/98

# Multi Pollutant Emission Reduction Reporting

Modeled after the U.S. Department of Energy  
Energy Information Administration  
Voluntary Reporting of Greenhouse Gases  
Form EIA-1605

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## Schedule I. Entity Information and Certification

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Reporting Year 1997

### Johnson & Johnson

#### Supplemental Text

Question 3, Schedule I--Report contains details of Johnson & Johnson's efforts in the U.S. and Puerto Rico.

Question 4, Schedule I--The major sectors of our business include: Pharmaceutical (SIC # 2830), Professional (SIC # 3840), and Consumer (SIC # 2844).

As of 1995, the following projects were no longer used to report project-level reductions:

- 302 - Installation of Energy Efficient Systems
- 303 - Installation of Timer Controls and Shutdowns

#### NEW ITEMS 1997 SUBMISSION

In Schedule II. Project-Level Emissions and Reductions, added natural gas savings for the following projects:

- 307 - Motors & Motor Drives
- 308 - Building Shell

Natural gas reductions were realized in 1996 for both projects, but not reported in the 1996 submission. This oversight has been corrected by including the natural gas savings numbers in this report.

In Schedule III. Entity-Level Emissions and Reductions, emissions numbers were updated for the years 1990-1996 to reflect greater accuracy achieved through the implementation of a new J&J Worldwide Energy Reporting System. Although the emissions numbers were changed for these years, they do not differ significantly from those values originally reported. The following sections were changed:

- Ia. Direct Emissions
- IIa. Indirect Emissions
- IVa. Total Emissions

The entity-level reduction numbers for 1990-1996 remain unchanged in Schedule III.

# Multi Pollutant Emission Reduction Reporting

Modeled after the U.S. Department of Energy  
Energy Information Administration  
Voluntary Reporting of Greenhouse Gases  
Form EIA-1605

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## Schedule I. Entity Information and Certification

Reporting Year 1997

### Johnson & Johnson

#### NEW ITEMS 1996 SUBMISSION

In Schedule II, the following 1995 numbers have been updated to reflect projects completed in 1995, but not represented in the last reporting cycle:

Project ID #301 Green Lights Updates

II. Specific Information ---> Net change in Energy/Fuel Consumption

III. Emissions/Reductions ---> Indirect CO2 and NOx values

Project ID #306 Equipment & Appliances

III. Emissions/Reductions ---> Indirect NOx value

In Schedule III, the following numbers have been updated to reflect newly obtained information:

Emissions for 1990-1996 in the following areas:

Ia. Direct Emissions

Iia. Indirect Emissions

IVa. Total Emissions

Square footage numbers were updated in section V. Additional Information

# Multi Pollutant Emission Reduction Reporting

Modeled after the U.S. Department of Energy  
Energy Information Administration  
Voluntary Reporting of Greenhouse Gases  
Form EIA-1605

## Schedule II. Project-Level Emissions and Reductions Section 3. Energy End Use

---

Reporting Year 1997

### Johnson & Johnson Process Improvements

#### Part I. General Project Information

- 1. Name of Entity:** Johnson & Johnson
- 2. Name of Project:** Process Improvements  
EIA Project ID: 304
- 3. Location:**  
Dispersed: Various Johnson & Johnson Affiliates

Facility Name and Address:

Johnson & Johnson  
1 Johnson & Johnson Plaza  
New Brunswick, NJ 08933

- 4. Date Project Became Operational:**  
Jan 1992
- 5. Reasons for Project:**  
Voluntary
- 6. Participation in Voluntary Programs:**  
ESB - Energy Star Buildings Program  
CWP – Climate Wise Recognition Program  
**Other programs:**  
Johnson & Johnson's CFC Phase Out & Pollution Prevention Program  
**Sponsor:**  
Johnson & Johnson

# Multi Pollutant Emission Reduction Reporting

Modeled after the U.S. Department of Energy  
Energy Information Administration  
Voluntary Reporting of Greenhouse Gases  
Form EIA-1605

## Schedule II. Project-Level Emissions and Reductions Section 3. Energy End Use

Reporting Year 1997

### Johnson & Johnson Process Improvements

#### Part II. Specific Project Information

- 1. Project Type:**  
Equipment and processes improvement  
Other: Process improvements
- 2. Load Shape Effects:**  
Energy efficiency
- 3. Sector(s) of Energy User(s) Affected by Project**  
Industrial
- 4. Project Scale:**  
Full-Scale/ Commercial
- 5. Net Change in Energy/Fuel Consumption:**

Fuel or Energy Type	Unit of Measure	Quantity						
		1991	1992	1993	1994	1995	1996	1997
Various fuels	MMBtu		-26,207	-153,141	-4,788	-62,466	15,401	-117,712
Electricity	kWh		-9,046,567	-15,292,329	-2,848,582	-15,480,000	-31,262,490	-15,163,060

#### 6. Project Description:

Process improvements are based upon our yearly energy reporting system which indexes process energy to production levels.

ZZ was used for the type of fuel in Part II #5, because these improvements reduced the usage of various types of fuel: distillate oils #2, #4 and #6 and natural gas.

# Multi Pollutant Emission Reduction Reporting

Modeled after the U.S. Department of Energy  
Energy Information Administration  
Voluntary Reporting of Greenhouse Gases  
Form EIA-1605

## Schedule II. Project-Level Emissions and Reductions Section 3. Energy End Use

Reporting Year 1997

### Johnson & Johnson

### Process Improvements

#### Part III. Greenhouse Gas Reductions

Gas	Type	Unit	1991	1992	1993	1994	1995	1996	1997	Accuracy
			Physical Quantity							
<b>Reductions</b>										
CO2	Direct	Lbs.		3,668,980	21,439,740	670,320	8,745,226	(2,156,196)	16,479,680	Moderate
NOx	Direct	Lbs.		11,793	68,913	2,155	28,110	(6,931)	52,970	Moderate
SO2	Direct	Lbs.		157	919	29	375	(92)	706	Moderate
PM10	Direct	Lbs.		0	0	0	0	0	0	Moderate
Hg	Direct	Lbs.		0	0	0	0	0	0	Moderate
Cd	Direct	Lbs.		0	0	0	0	0	0	Moderate
Pb	Direct	Lbs.		0	0	0	0	0	0	Moderate
<b>Reductions</b>										
CO2	Indirect	Lbs.		17,731,271	29,972,965	5,583,221	30,340,800	61,274,480	29,719,598	Moderate
NOx	Indirect	Lbs.		73,883	124,892	23,264	126,425	255,321	123,837	Moderate
SO2	Indirect	Lbs.		132,035	223,192	41,575	225,931	456,276	221,305	Moderate
PM10	Indirect	Lbs.		2,289	3,869	721	3,916	7,909	3,836	Moderate
Hg	Indirect	Lbs.		0.64	1.08	0.20	1.09	2.20	1.07	Moderate
Cd	Indirect	Lbs.		1.15	1.94	0.36	1.97	3.97	1.93	Moderate
Pb	Indirect	Lbs.		0.06	0.10	0.02	0.10	0.20	0.10	Moderate

Note: Direct emissions increased in 1996.

#### Additional Information:

# Multi Pollutant Emission Reduction Reporting

Modeled after the U.S. Department of Energy  
Energy Information Administration  
Voluntary Reporting of Greenhouse Gases  
Form EIA-1605

## Schedule II. Project-Level Emissions and Reductions Section 3. Energy End Use

---

Reporting Year 1997

### Johnson & Johnson

#### Process Improvements

#### Part IV. Project Evaluation

##### 1. Reference Case:

Modified

##### 2. Reports to Other Agencies:

None

##### 3. Multiple Reporting:

This report contains information on:  
Entire Project

##### 4. Estimation Method:

To avoid unnecessary duplication, citing an appropriate reporting program by reference in Section 2: Reports to Other Agencies makes it unnecessary to fill out Part IV, Section 4. (The Estimation Method) found below.

For Johnson & Johnson's 1605(b) Reporting:

kWh x 1.5 = lb. CO<sub>2</sub>

kWh x .006 = lb. NO<sub>x</sub> (All Nitrous Oxide Compounds)

For Johnson & Johnson's Multi Pollutant Emission Reduction Reporting: Used emission factors from Appendix C, Attachment 1 for electricity usage.

Emission rates are EPA U.S. averages

Therm x 29.308323 = kWh

Therm x .1 = MMBtu

140 lb. CO<sub>2</sub> per MMBtu of mixed fuels (distillate oils #2, #4 and #6 and natural gas).

The reference case was the previous year in all cases of this project.

Although a portion of the reductions were calculated using the basic reference case, the majority were calculated using what would be considered a modified reference case.

The baseline emissions are estimated by multiplying the amount of energy (kWh, oil, natural gas, etc.) consumed by the appropriate conversion factor. The amount of energy used is most often determined by taking meter readings.

**5. Measurement and Verification of Emission Reductions:**

Direct emissions and reduction were calculated using on-site gas and fuel usage data. Indirect emissions and reductions were calculated using kWh readings from each facility. The reductions were sometimes calculated by using technical data and hours of operation of equipment and others were monitored for actual savings. Separate consumption numbers are available by project and site but were aggregated by project category for purposes of reporting.

**6. Ownership of Emission Reductions:**

The owner of the premises where the emission reduction-causing action occurred is the original owner of the resulting emission reductions.

Currently, Johnson & Johnson is the owner of all emission reductions.

Name of Entity:

Johnson & Johnson  
1 Johnson & Johnson Plaza  
New Brunswick, NJ 08933-

Contact Person:

Harry Kauffman  
Energy Director  
Tel: (732) 524-3174

**Transfers of Ownership (Report partial and full transfers here):**

Entity Transferring Ownership Include: Name of Entity, Address, Contact Person, Telephone Number and Email Address	Entity Receiving Ownership Include: Name of Entity, Address, Contact Person, Telephone Number and Email Address	What Emission Reductions Were Transferred Including: Name of Pollutant (or specify all affected pollutants), percent of total, and amount by weight	Date of Transfer

Note: Update this section as often as ownership is transferred



# Multi Pollutant Emission Reduction Reporting

Modeled after the U.S. Department of Energy  
Energy Information Administration  
Voluntary Reporting of Greenhouse Gases  
Form EIA-1605

## Schedule III. Entity-Level Emissions and Reductions

Reporting Year 1997

### Johnson & Johnson

#### Part Ia and Ib. Direct Emissions and Reductions

Source: Stationary Combustion

Gas	Unit of Measure	1990	1991	1992	1993	1994	1995	1996	1997	Accuracy
		Baseline	Physical Quantity							
<b>Emissions</b>										
CO2	Short Tons	211,188	213,694	151,554	217,278	193,608	152,845	175,068	173,460	Moderate
NOx	Short Tons		797	565	810	722	570	653	647	Moderate
SO2	Short Tons		11	8	11	10	8	9	9	Moderate
PM10	Short Tons		0	0	0	0	0	0	0	Moderate
Hg	Short Tons		0	0	0	0	0	0	0	Moderate
Cd	Short Tons		0	0	0	0	0	0	0	Moderate
Pb	Short Tons		0	0	0	0	0	0	0	Moderate
<b>Reductions</b>										
CO2	Short Tons		0	4,081	13,566	1,303	5,550	(189)	9,099	Moderate
NOx	Short Tons		0	13	44	4	19	(0.5)	30	Moderate
SO2	Short Tons		0	0.17	0.59	0.06	0.25	0.00	0.40	Moderate
PM10	Short Tons		0	0.00	0.00	0.00	0.00	0.00	0.00	Moderate
Hg	Short Tons		0.00	0.00	0.00	0.00	0.00	0.00	0.00	Moderate
Cd	Short Tons		0.00	0.00	0.00	0.00	0.00	0.00	0.00	Moderate
Pb	Short Tons		0.00	0.00	0.00	0.00	0.00	0.00	0.00	Moderate

Note: Direct emissions increased in the year 1996.

## Part IIa and IIb. Indirect Emissions and Reductions

Source: From Power Transactions: Indirect CO2 from Purchased Power and Other Indirect Sources

Gas	Unit of Measure	1990	1991	1992	1993	1994	1995	1996	1997	Accuracy
		Baseline	Physical Quantity							
<b>Emissions</b>										
CO2	Short Tons	637,573	639,514	622,633	656,669	629,806	564,912	583,138	609,502	Moderate
NOx	Short Tons	2,550	2,558	2,491	2,627	2,519	2,260	2,333	2,438	Moderate
SO2	Short Tons		3,754	3,655	3,854	3,696	3,316	3,423	3,578	Moderate
PM10	Short Tons		95	92	97	93	83	86	90	Moderate
Hg	Short Tons		0.02	0.02	0.02	0.02	0.02	0.02	0.02	Moderate
Cd	Short Tons		0.00	0.00	0.00	0.00	0.00	0.00	0.00	Moderate
Pb	Short Tons		0.04	0.04	0.04	0.04	0.03	0.03	0.03	Moderate
<b>Reductions</b>										
CO2	Short Tons		7,603	18,010	35,774	23,742	33,881	48,046	28,297	Moderate
NOx	Short Tons		32	75	149	99	141	200	118	Moderate
SO2	Short Tons		57	134	266	177	252	358	211	Moderate
PM10	Short Tons		1	2	5	3	4	6	4	Moderate
Hg	Short Tons		0.00	0.00	0.00	0.00	0.00	0.00	0.00	Moderate
Cd	Short Tons		0.00	0.00	0.00	0.00	0.00	0.00	0.00	Moderate
Pb	Short Tons		0.00	0.00	0.00	0.00	0.00	0.00	0.00	Moderate

## Part IIIa and IIIb. Total Emissions and Reductions

Gas	Unit of Measure	1990	1991	1992	1993	1994	1995	1996	1997	Accuracy
		Baseline	Physical Quantity							
<b>Emissions</b>										
CO2	Short Tons	848,761	853,209	774,187	873,947	823,414	717,757	758,206	782,962	Moderate
NOx	Short Tons	2,550	3,355	3,056	3,437	3,241	2,829	2,985	3,085	Moderate
SO2	Short Tons		3,764	3,662	3,865	3,706	3,323	3,432	3,586	Moderate
PM10	Short Tons		95	92	97	93	83	86	90	Moderate
Hg	Short Tons		0.02	0.02	0.02	0.02	0.02	0.02	0.02	Moderate
Cd	Short Tons		0.00	0.00	0.00	0.00	0.00	0.00	0.00	Moderate
Pb	Short Tons		0.04	0.04	0.04	0.04	0.03	0.03	0.03	Moderate
<b>Reductions</b>										
CO2	Short Tons		7,603	22,091	49,340	25,046	39,430	47,857	37,396	Moderate
NOx	Short Tons		32	88	193	103	160	200	148	Moderate
SO2	Short Tons		57	134	267	177	253	358	211	Moderate
PM10	Short Tons		0.98	2.32	4.62	3.06	4.37	6.20	3.65	Moderate
Hg	Short Tons		0.00	0.00	0.00	0.00	0.00	0.00	0.00	Moderate
Cd	Short Tons		0.00	0.00	0.00	0.00	0.00	0.00	0.00	Moderate
Pb	Short Tons		0.00	0.00	0.00	0.00	0.00	0.00	0.00	Moderate

**Estimation Method:**

For Johnson & Johnson’s 1605(b) Reporting:

kWh x 1.5 = lb. CO2

kWh x .006 = lb. NOx (All Nitrous Oxide Compounds)

For Johnson & Johnson’s Multi Pollutant Emission Reduction Reporting: Used emission factors from Appendix C, Attachment 1 for electricity usage.

140,000 lb. CO2 per MMBtu for Mixed Fuels

Emission reductions shown are the sums of reductions from the individual projects shown in the opening discussion.

**Scope of Report:**

All Johnson & Johnson facilities in the United States and Puerto Rico

**Supplementary Information:**

For entity level reporting, emissions reported is taken from our Energy Reporting System which contains usage and cost of electricity and various fuels. Emission reduction data is taken from the summation of project summaries submitted by various affiliate companies.

Johnson & Johnson facilities square footage has varied throughout the years reported herewith. The square footages for all reported years are as follows:

<u>Year</u>	<u>Area (sq.ft.)</u>
1990	18,186,566
1991	17,094,751
1992	17,280,724
1993	18,268,900
1994	17,677,264
1995	16,510,036
1996	17,001,375
1997	17,797,166

# Multi Pollutant Emission Reduction Reporting

Modeled after the U.S. Department of Energy  
Energy Information Administration  
Voluntary Reporting of Greenhouse Gases  
Form EIA-1605

## Schedule IV. Commitments to Reduce Greenhouse Gases

---

Reporting Year 1997

### Johnson & Johnson

#### Part V. Additional Information

Our Johnson & Johnson pollution prevention goal is to reduce our indexed energy consumption by 25% by the year 2000 (Using a base year of 1991). These projections are estimates based on usage patterns and various future energy projects at various affiliate sites.

#### Projected Reduction (Total MMBtu)

<u>Year</u>	<u>Equivalent Differences [MMBtu]</u>
1998	-214622
1999	-153031
2000	-99454

Note: Not converted to CO2 because the total number of MMBtu consists of both electric and fuel.

## **Pilot Projects Number 3 through 8**

Pilot projects 3 through 8 were guaranteed performance contracting energy efficiency projects performed by Johnson Controls, Inc. for the following customers:

- Pilot Project #3 – Batelle
- Pilot Project #4 – Calhoun Community College
- Pilot Project #5 – CMAC
- Pilot Project #6 – Los Alamos
- Pilot Project #7 – Methodist Hospital
- Pilot Project #8 – University Medical Center

These six reports are repetitive in style because they follow the prescribed format. However, they represent a large variation of different types of energy efficiency actions or measures. The projects vary from a wholesale steam boiler system replacement for a large government sector facility to typical lighting efficiency measures for an institutional sector setting. What this shows is that the Multiple Pollutant Emission Reduction Reporting System can handle the reporting of a wide range of reduction action types for all of the different sectors.



**Pilot Reporting**  
**Using the Multiple Pollutant Emission**  
**Reduction Reporting Standards**

**Batelle PC-3000**

**Pilot Reporting Project**  
**Number 3**





# Multi Pollutant Emission Reduction Reporting

Modeled after the U.S. Department of Energy  
Energy Information Administration  
Voluntary Reporting of Greenhouse Gases  
Form EIA-1605

## Schedule I. Entity Information and Certification

Reporting Year 1997

### Batelle PC-3000

#### 1. Entity Information

##### Entity Name and Address

Batelle PC-3000  
P.O. Box 999 MS K1-09  
Richland WA 99352-

##### Contact:

Rick Viaene

Tel: (509) 375-2711

FAX: (509) 375-3703

E-Mail Address:

#### 2. Type of Reporter

Government  
Federal Government

#### 3. Geographic Scope of Activities

U.S. Only

#### 4. SIC Code

99 Nonclassifiable Establishments

#### 5. Reported Line Items by Schedule Section

##### Schedule II. Project-Level Emissions and Reductions

1 Section 3. Energy End Use

##### Schedule III. Entity-Level Emissions and Reductions

##### Schedule IV. Commitments to Reduce Greenhouse Gases

#### 6. Confidentiality

This report contains confidential information.

#### 7. Certification *I certify that the information reported on this form is accurate to the best of my knowledge and belief.*

Certifying Official: Paul Von Paumgarten  
Director of Public Relations  
Tel: (414) 274-4546

Date: 9/15/98

# Multi Pollutant Emission Reduction Reporting

Modeled after the U.S. Department of Energy  
Energy Information Administration  
Voluntary Reporting of Greenhouse Gases  
Form EIA-1605

## Schedule II. Project-Level Emissions and Reductions Section 3. Energy End Use

---

Reporting Year 1997

### Batelle PC-3000 Batelle PC-3000

#### Part I. General Project Information

- 1. Name of Entity:** Batelle PC-3000
- 2. Name of Project:** Batelle PC-3000  
EIA Project ID: 1
- 3. Location:**  
U.S. Only  
  
Facility Name and Address:  
Batelle PC-3000  
P.O. Box 999 MS K1-09  
Richland WA 99352-
- 4. Date Project Became Operational:**  
Jan 1997
- 5. Reasons for Project:**  
Federal, state, or local requirement: Federal
- 5. Participation in Voluntary Programs:**  
None  
**Other programs:**  
None

# Multi Pollutant Emission Reduction Reporting

Modeled after the U.S. Department of Energy  
Energy Information Administration  
Voluntary Reporting of Greenhouse Gases  
Form EIA-1605

## Schedule II. Project-Level Emissions and Reductions Section 3. Energy End Use

Reporting Year 1997

### Batelle PC-3000 Batelle PC-3000

#### Part II. Specific Project Information

- 1. Project Type:**  
General energy use  
Lighting and lighting control
- 2. Load Shape Effects:**  
Energy efficiency
- 3. Sector(s) of Energy User(s) Affected by Project**  
Industrial
- 4. Project Scale:**  
Full-Scale/ Commercial
- 5. Energy and Fuel Consumption:**

#### Net Change in Energy/Fuel Consumption

Fuel or Energy Type	Unit of Measure	Quantity						
		1991	1992	1993	1994	1995	1996	1997
Natural Gas	MCF							(9,188)
Electricity	kWh							(4,921,986)

#### Actual Energy/Fuel Consumption

Fuel or Energy Type	Unit of Measure	Quantity						
		1991	1992	1993	1994	1995	1996	1997
Natural Gas	MCF							80,669
Electricity	kWh							22,105,624

#### 6. Project Description:

Johnson Controls Performance Contracting Project consisting of FMS Controls and Lighting Measures on Government Office and R&D Labs.

# Multi Pollutant Emission Reduction Reporting

Modeled after the U.S. Department of Energy  
 Energy Information Administration  
 Voluntary Reporting of Greenhouse Gases  
 Form EIA-1605

## Schedule II. Project-Level Emissions and Reductions Section 3. Energy End Use

Reporting Year 1997

### Batelle PC-3000

Batelle PC-3000

#### Part III. Greenhouse Gas Emissions and Reductions

Gas	Type	Unit of Measure	1991	1992	1993	1994	1995	1996	1997	Accuracy
			Physical Quantity							
<b>Emissions</b>										
CO2	Indirect	Lbs.							16,492,438	Undetermined
NOx	Indirect	Lbs.							44,022	Undetermined
SO2	Indirect	Lbs.							27,025	Undetermined
PM10	Indirect	Lbs.							710	Undetermined
Hg	Indirect	Lbs.							0.06	Undetermined
Cd	Indirect	Lbs.							0.00	Undetermined
Pb	Indirect	Lbs.							0.08	Undetermined
<b>Reductions</b>										
CO2	Indirect	Lbs.							11,887,158	Undetermined
NOx	Indirect	Lbs.							19,025	Undetermined
SO2	Indirect	Lbs.							52,230	Undetermined
PM10	Indirect	Lbs.							1,477	Undetermined
Hg	Indirect	Lbs.							0.49	Undetermined
Cd	Indirect	Lbs.							0.02	Undetermined
Pb	Indirect	Lbs.							0.68	Undetermined

#### Additional Information:

# Multi Pollutant Emission Reduction Reporting

Modeled after the U.S. Department of Energy  
Energy Information Administration  
Voluntary Reporting of Greenhouse Gases  
Form EIA-1605

## Schedule II. Project-Level Emissions and Reductions Section 3. Energy End Use

---

Reporting Year 1997

### Batelle PC-3000 Batelle PC-3000

#### Part IV. Project Evaluation

##### 1. Reference Case:

Modified:  
1995

##### 2. Reports to Other Agencies:

None

##### 3. Multiple Reporting:

This report contains information on:  
Entire Project

##### 4. Estimation Method:

To avoid unnecessary duplication, citing an appropriate reporting program by reference in Section 2: Reports to Other Agencies makes it unnecessary to fill out Part IV, Section 4. (The Estimation Method) found below.

No reports were made to other agencies.

The changes in emissions were estimated directly from the changes in energy use caused by the project using Utility Bill comparisons and the emissions factors provided along with the additional forms and reporting instructions developed for the multi pollutant emissions reduction reporting.

The changes in energy use caused by the project were estimated as follows:

- a) A baseline of weather normalized monthly energy use was established using 26 months of historical pre project energy use data. The Base Year was established using 12 consecutive months within the 26.
- b) The post project energy use are being measured and weather normalized
- c) The difference between the pre and post project weather normalized energy use is the project energy savings

The baseline was estimated by projected future energy use if the project was not installed based on the Base Year of weather normalized data. Metrix, a 3<sup>rd</sup> party software package, was the weather normalization program used to calculate the energy savings. Also, please note that the Base Year will change based on the New Equipment or Buildings added because the Actual Energy goes up when this happens but the delta stays the same.

## **5. Measurement and Verification of Emission Reductions:**

The measurement and verification used for this project followed generally accepted protocol used by the Performance Contracting Industry by Energy Service Companies (ESCO). Johnson Controls Inc. was the ESCO for this energy efficiency project. The energy savings were guaranteed to the customer (Batelle) and measured against a modified reference baseline. Johnson Controls pays financial penalties to Batelle if the guaranteed energy savings are not delivered. Because of this, annual energy consumption figures are carefully measured and calculated using utility bill comparisons based on the facility energy meters and also using local monthly weather data to weather normalize the energy use against the baseline.

The customer and the service provider contractually agreed to base the performance guarantee on this approach to measurement and verification of the performance of the project using the estimation method described above. Both sides have the same vested interest in producing accurate measurements but from opposite sides of the table. Either side could bring in a third party to verify the results at their discretion and at agreed upon responsibilities for the extra expense.

## **6. Ownership of Emission Reductions:**

The owner of the premises where the emission reduction-causing action occurred is the original owner of the resulting emission reductions.

Name of Entity:

Batelle PC-3000  
P.O. Box 999 MS K1-09  
Richland WA 99352-

Contact Person:

Rick Viaene  
Tel: (509) 375-2711  
FAX: (509) 375-3703

## **Transfers of Ownership (Report partial and full transfers here):**

Presently, there have been no transfers of emissions reductions by the original owner to the project implementers and the others involved in supporting the recognition of the emission reductions.

**Pilot Reporting**

**Using the Multiple Pollutant Emission  
Reduction Reporting Standards**

**Calhoun Community College**

**Pilot Reporting Project  
Number 4**





# Multi Pollutant Emission Reduction Reporting

Modeled after the U.S. Department of Energy  
Energy Information Administration  
Voluntary Reporting of Greenhouse Gases  
Form EIA-1605

## Schedule I. Entity Information and Certification

---

Reporting Year 1997

### Calhoun Community College

#### 1. Entity Information

##### Entity Name and Address

Calhoun Community College  
P.O. Box 2216  
Decatur, AL 35601-

##### Contact:

Richard Carpenter

Tel: (205) 305-2555

FAX: (205) 305-1379

E-Mail Address:

#### 2. Type of Reporter

Other Community College

#### 3. Geographic Scope of Activities

U.S. Only

#### 4. SIC Code

82 Educational Services

#### 5. Reported Line Items by Schedule Section

##### Schedule II. Project-Level Emissions and Reductions

1 Section 3. Energy End Use

##### Schedule III. Entity-Level Emissions and Reductions

##### Schedule IV. Commitments to Reduce Greenhouse Gases

#### 6. Confidentiality

This report contains confidential information.

---

#### 7. Certification

*I certify that the information reported on this form is accurate to the best of my knowledge and belief.*

Certifying Official: Paul Von Paumgarten  
Director of Public Relations  
Tel: (414) 274-4546

Date: 9/15/98

# Multi Pollutant Emission Reduction Reporting

Modeled after the U.S. Department of Energy  
Energy Information Administration  
Voluntary Reporting of Greenhouse Gases  
Form EIA-1605

## Schedule II. Project-Level Emissions and Reductions Section 3. Energy End Use

---

Reporting Year 1997

### Calhoun Community College Calhoun Community College

#### Part I. General Project Information

- 1. Name of Entity:** Calhoun Community College
- 2. Name of Project:** Calhoun Community College  
EIA Project ID: 1
- 3. Location:**  
U.S. Only  
  
Facility Name and Address:  
Calhoun Community College  
P.O. Box 2216  
Decatur, AL 35601-
- 4. Date Project Became Operational:**  
Feb 1995
- 5. Reasons for Project:**  
Voluntary reduction
- 6. Participation in Voluntary Programs:**  
None  
**Other programs:**  
None

# Multi Pollutant Emission Reduction Reporting

Modeled after the U.S. Department of Energy  
Energy Information Administration  
Voluntary Reporting of Greenhouse Gases  
Form EIA-1605

## Schedule II. Project-Level Emissions and Reductions Section 3. Energy End Use

Reporting Year 1997

### Calhoun Community College Calhoun Community College

#### Part II. Specific Project Information

- 1. Project Type:**  
General energy use  
Lighting and lighting control
- 2. Load Shape Effects:**  
Energy efficiency
- 3. Sector(s) of Energy User(s) Affected by Project**  
Commercial
- 4. Project Scale:**  
Full-Scale/ Commercial
- 5. Energy and Fuel Consumption:**

#### Net Change in Energy/Fuel Consumption

Fuel or Energy Type	Unit of Measure	Quantity						
		1991	1992	1993	1994	1995	1996	1997
Natural Gas	MCF						(4864)	(2,769)
Electricity	kWh						(2,121,154)	(1,914,380)

#### Actual Energy/Fuel Consumption

Fuel or Energy Type	Unit of Measure	Quantity						
		1991	1992	1993	1994	1995	1996	1997
Natural Gas	MCF						12,296	10,838
Electricity	kWh						5,575,700	5,511,753

#### 6. Project Description:

Johnson Controls Performance Contracting Project consisting of FMS Controls and Lighting Measures on a College Facility.

# Multi Pollutant Emission Reduction Reporting

Modeled after the U.S. Department of Energy  
 Energy Information Administration  
 Voluntary Reporting of Greenhouse Gases  
 Form EIA-1605

## Schedule II. Project-Level Emissions and Reductions Section 3. Energy End Use

Reporting Year 1997

### Calhoun Community College

Calhoun Community College

#### Part III. Greenhouse Gas Emissions and Reductions

Gas	Type	Unit of Measure	1991	1992	1993	1994	1995	1996	1997	Accuracy
			Physical Quantity							
<b>Emissions</b>										
CO2	Indirect	Lbs.						9,115,945	8,852,577	Undetermined
NOx	Indirect	Lbs.						39,711	38,645	Undetermined
SO2	Indirect	Lbs.						88,172	87,153	Undetermined
PM10	Indirect	Lbs.						1,673	1,654	Undetermined
Hg	Indirect	Lbs.						0.20	0.20	Undetermined
Cd	Indirect	Lbs.						0.01	0.01	Undetermined
Pb	Indirect	Lbs.						0.29	0.28	Undetermined
<b>Reductions</b>										
CO2	Indirect	Lbs.						4,934,930	4,258,401	Undetermined
NOx	Indirect	Lbs.						16,042	13,727	Undetermined
SO2	Indirect	Lbs.						35,665	32,179	Undetermined
PM10	Indirect	Lbs.						636	574	Undetermined
Hg	Indirect	Lbs.						0.12	0.11	Undetermined
Cd	Indirect	Lbs.						0.00	0.00	Undetermined
Pb	Indirect	Lbs.						0.17	0.15	Undetermined

**Additional Information:**

# Multi Pollutant Emission Reduction Reporting

Modeled after the U.S. Department of Energy  
Energy Information Administration  
Voluntary Reporting of Greenhouse Gases  
Form EIA-1605

## Schedule II. Project-Level Emissions and Reductions Section 3. Energy End Use

---

Reporting Year 1997

### Calhoun Community College Calhoun Community College

#### Part IV. Project Evaluation

##### 1. Reference Case:

Modified:  
1994

##### 2. Reports to Other Agencies:

None

##### 3. Multiple Reporting:

This report contains information on:  
Entire Project

##### 4. Estimation Method:

To avoid unnecessary duplication, citing an appropriate reporting program by reference in Section 2: Reports to Other Agencies makes it unnecessary to fill out Part IV, Section 4. (The Estimation Method) found below.

No reports were made to other agencies.

The changes in emissions were estimated directly from the changes in energy use caused by the project using Utility Bill comparisons and the emissions factors provided along with the additional forms and reporting instructions developed for the multi pollutant emissions reduction reporting.

The changes in energy use caused by the project were estimated as follows:

- a) A baseline of weather normalized monthly energy use was established using 26 months of historical pre project energy use data. The Base Year was established using 12 consecutive months within the 26.
- b) The post project energy use are being measured and weather normalized
- c) The difference between the pre and post project weather normalized energy use is the project energy savings

The baseline was estimated by projected future energy use if the project was not installed based on the Base Year of weather normalized data. Metrix, a 3<sup>rd</sup> party software package, was the weather normalization program used to calculate the energy savings. Also, please note that the Base Year will change based on the New Equipment or Buildings added because the Actual Energy goes up when this happens but the delta stays the same.

## **5. Measurement and Verification of Emission Reductions:**

The measurement and verification used for this project followed generally accepted protocol used by the Performance Contracting Industry by Energy Service Companies (ESCO). Johnson Controls Inc. was the ESCO for this energy efficiency project. The energy savings were guaranteed to the customer (Calhoun Community College) and measured against a modified reference baseline. Johnson Controls pays financial penalties to Calhoun if the guaranteed energy savings are not delivered. Because of this, annual energy consumption figures are carefully measured and calculated using utility bill comparisons based on the facility energy meters and also using local monthly weather data to weather normalize the energy use against the baseline.

The customer and the service provider contractually agreed to base the performance guarantee on this approach to measurement and verification of the performance of the project using the estimation method described above. Both sides have the same vested interest in producing accurate measurements but from opposite sides of the table. Either side could bring in a third party to verify the results at their discretion and at agreed upon responsibilities for the extra expense.

## **6. Ownership of Emission Reductions:**

The owner of the premises where the emission reduction-causing action occurred is the original owner of the resulting emission reductions.

Name of Entity:

Calhoun Community College  
P.O. Box 2216  
Decatur, AL 35601-

Contact:

Richard Carpenter  
Tel: (205) 305-2555

## **Transfers of Ownership (Report partial and full transfers here):**

Presently, there have been no transfers of emissions reductions by the original owner to the project implementers and the others involved in supporting the recognition of the emission reductions.

**Pilot Reporting**  
**Using the Multiple Pollutant Emission**  
**Reduction Reporting Standards**

**CMAC of America**

**Pilot Reporting Project**  
**Number 5**





# Multi Pollutant Emission Reduction Reporting

Modeled after the U.S. Department of Energy  
Energy Information Administration  
Voluntary Reporting of Greenhouse Gases  
Form EIA-1605

## Schedule I. Entity Information and Certification

Reporting Year 1997

### CMAC of America

#### 1. Entity Information

##### Entity Name and Address

CMAC of America  
1601 Hill Avenue  
West Palm Beach, FA 33407-

##### Contact:

George Harris

Tel: (407) 881-2560

FAX: (407) 881-2342

E-Mail Address:

#### 2. Type of Reporter

Corporation  
Privately Held

#### 3. Geographic Scope of Activities

U.S. Only

#### 4. SIC Code

39 Misc. Manufacturing Industries

#### 5. Reported Line Items by Schedule Section

##### Schedule II. Project-Level Emissions and Reductions

1 Section 3. Energy End Use

##### Schedule III. Entity-Level Emissions and Reductions

##### Schedule IV. Commitments to Reduce Greenhouse Gases

#### 6. Confidentiality

This report contains confidential information

#### 7. Certification *I certify that the information reported on this form is accurate to the best of my knowledge and belief.*

Certifying Official: Paul Von Paumgarten  
Director of Public Relations

Tel: (414) 274-4546

Date: 9/15/98

# Multi Pollutant Emission Reduction Reporting

Modeled after the U.S. Department of Energy  
Energy Information Administration  
Voluntary Reporting of Greenhouse Gases  
Form EIA-1605

## Schedule II. Project-Level Emissions and Reductions Section 3. Energy End Use

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Reporting Year 1997

### CMAC of America CMAC of America

#### Part I. General Project Information

- 1. Name of Entity:** CMAC of America
- 2. Name of Project:** CMAC of America  
EIA Project ID: 1
- 3. Location:**  
U.S. Only  
  
Facility Name and Address:  
CMAC of America  
1601 Hill Avenue  
West Palm Beach, FA 33407-
- 4. Date Project Became Operational:**  
Mar 1995
- 5. Reasons for Project:**  
Voluntary reduction
- 6. Participation in Voluntary Programs:**  
None  
**Other programs:**  
None

# Multi Pollutant Emission Reduction Reporting

Modeled after the U.S. Department of Energy  
Energy Information Administration  
Voluntary Reporting of Greenhouse Gases  
Form EIA-1605

## Schedule II. Project-Level Emissions and Reductions Section 3. Energy End Use

Reporting Year 1997

### CMAC of America CMAC of America

#### Part II. Specific Project Information

- 1. Project Type:**  
General energy use  
Lighting and lighting control
- 2. Load Shape Effects:**  
Energy efficiency
- 3. Sector(s) of Energy User(s) Affected by Project**  
Industrial
- 4. Project Scale:**  
Full-Scale/ Commercial
- 5. Energy and Fuel Consumption:**

#### Net Change in Energy/Fuel Consumption

Fuel or Energy Type	Unit of Measure	Quantity						
		1991	1992	1993	1994	1995	1996	1997
Electricity	kWh					(72,124)	(1,785,998)	(2,125,345)

#### Actual Energy/Fuel Consumption

Fuel or Energy Type	Unit of Measure	Quantity						
		1991	1992	1993	1994	1995	1996	1997
Electricity	kWh					5,739,228	15,686,182	16,376,202

#### 6. Project Description:

Johnson Controls Performance Contracting Project consisting of FMS Controls and Lighting Measures on Offices and Industrial Facility.

# Multi Pollutant Emission Reduction Reporting

Modeled after the U.S. Department of Energy  
 Energy Information Administration  
 Voluntary Reporting of Greenhouse Gases  
 Form EIA-1605

## Schedule II. Project-Level Emissions and Reductions Section 3. Energy End Use

Reporting Year 1997

### CMAC of America

CMAC of America

#### Part III. Greenhouse Gas Emissions and Reductions

Gas	Type	Unit of Measure	1991	1992	1993	1994	1995	1996	1997	Accuracy
			Physical Quantity							
<b>Emissions</b>										
CO2	Indirect	Lbs.					7,426,561	20,297,920	21,190,805	Undetermined
NOx	Indirect	Lbs.					22,957	62,745	65,505	Undetermined
SO2	Indirect	Lbs.					43,044	117,646	122,822	Undetermined
PM10	Indirect	Lbs.					574	1,569	1,638	Undetermined
Hg	Indirect	Lbs.					0.11	0.30	0.32	Undetermined
Cd	Indirect	Lbs.					0.03	0.09	0.10	Undetermined
Pb	Indirect	Lbs.					0.34	0.92	0.96	Undetermined
<b>Reductions</b>										
CO2	Indirect	Lbs.					121,168	3,000,477	3,570,580	Undetermined
NOx	Indirect	Lbs.					404	10,002	11,902	Undetermined
SO2	Indirect	Lbs.					750	18,574	22,104	Undetermined
PM10	Indirect	Lbs.					14	357	425	Undetermined
Hg	Indirect	Lbs.					0.00	0.04	0.05	Undetermined
Cd	Indirect	Lbs.					0.00	0.01	0.01	Undetermined
Pb	Indirect	Lbs.					0.00	0.12	0.15	Undetermined

**Additional Information:**

# Multi Pollutant Emission Reduction Reporting

Modeled after the U.S. Department of Energy  
Energy Information Administration  
Voluntary Reporting of Greenhouse Gases  
Form EIA-1605

## Schedule II. Project-Level Emissions and Reductions Section 3. Energy End Use

---

Reporting Year 1997

### CMAC of America CMAC of America

#### Part IV. Project Evaluation

##### 1. Reference Case:

Modified:  
1994

##### 2. Reports to Other Agencies:

None

##### 3. Multiple Reporting:

This report contains information on:  
Entire Project

##### 4. Estimation Method:

To avoid unnecessary duplication, citing an appropriate reporting program by reference in Section 2: Reports to Other Agencies makes it unnecessary to fill out Part IV, Section 4. (The Estimation Method) found below.

No reports were made to other agencies.

The changes in emissions were estimated directly from the changes in energy use caused by the project using Utility Bill comparisons and the emissions factors provided along with the additional forms and reporting instructions developed for the multi pollutant emissions reduction reporting.

The changes in energy use caused by the project were estimated as follows:

- a) A baseline of weather normalized monthly energy use was established using 26 months of historical pre project energy use data. The Base Year was established using 12 consecutive months within the 26.
- b) The post project energy use are being measured and weather normalized
- c) The difference between the pre and post project weather normalized energy use is the project energy savings

The baseline was estimated by projected future energy use if the project was not installed based on the Base Year of weather normalized data. Metrix, a 3<sup>rd</sup> party software package, was the weather normalization program used to calculate the energy savings. Also, please note that the Base Year will change based on the New Equipment or Buildings added because the Actual Energy goes up when this happens but the delta stays the same.

## **5. Measurement and Verification of Emission Reductions:**

The measurement and verification used for this project followed generally accepted protocol used by the Performance Contracting Industry by Energy Service Companies (ESCO). Johnson Controls Inc. was the ESCO for this energy efficiency project. The energy savings were guaranteed to the customer (CMAC) and measured against a modified reference baseline. Johnson Controls pays financial penalties to CMAC if the guaranteed energy savings are not delivered. Because of this, annual energy consumption figures are carefully measured and calculated using utility bill comparisons based on the facility energy meters and also using local monthly weather data to weather normalize the energy use against the baseline.

The customer and the service provider contractually agreed to base the performance guarantee on this approach to measurement and verification of the performance of the project using the estimation method described above. Both sides have the same vested interest in producing accurate measurements but from opposite sides of the table. Either side could bring in a third party to verify the results at their discretion and at agreed upon responsibilities for the extra expense.

## **6. Ownership of Emission Reductions:**

The owner of the premises where the emission reduction-causing action occurred is the original owner of the resulting emission reductions.

### **Entity Name and Address**

CMAC of America  
1601 Hill Avenue  
West Palm Beach, FA 33407-

### **Contact:**

George Harris  
Tel: (407) 881-2560

## **Transfers of Ownership (Report partial and full transfers here):**

Presently, there have been no transfers of emissions reductions by the original owner to the project implementers and the others involved in supporting the recognition of the emission reductions.

**Pilot Reporting**  
**Using the Multiple Pollutant Emission**  
**Reduction Reporting Standards**

**Los Alamos**

**Pilot Reporting Project**  
**Number 6**





# Multi Pollutant Emission Reduction Reporting

Modeled after the U.S. Department of Energy  
Energy Information Administration  
Voluntary Reporting of Greenhouse Gases  
Form EIA-1605

## Schedule I. Entity Information and Certification

Reporting Year 1997

### Los Alamos

#### 1. Entity Information

##### Entity Name and Address

Los Alamos  
rpd@lanl.gov  
Los Alamos, NM 87545-

##### Contact:

Bob Patterson

Tel:           FAX:

E-Mail Address:

#### 2. Type of Reporter

Government  
Federal Government

#### 3. Geographic Scope of Activities

U.S. Only

#### 4. SIC Code

99 Nonclassifiable Establishments

#### 5. Reported Line Items by Schedule Section

##### Schedule II. Project-Level Emissions and Reductions

1 Section 3. Energy End Use

##### Schedule III. Entity-Level Emissions and Reductions

##### Schedule IV. Commitments to Reduce Greenhouse Gases

#### 6. Confidentiality

This report contains confidential information.

#### 7. Certification *I certify that the information reported on this form is accurate to the best of my knowledge and belief.*

Certifying Official: Paul Von Paumgarten  
Director of Public Relations  
Tel: (414) 274-4546

Date: 9/15/98

# Multi Pollutant Emission Reduction Reporting

Modeled after the U.S. Department of Energy  
Energy Information Administration  
Voluntary Reporting of Greenhouse Gases  
Form EIA-1605

## Schedule II. Project-Level Emissions and Reductions Section 3. Energy End Use

---

Reporting Year 1997

### Los Alamos Los Alamos

#### Part I. General Project Information

- 1. Name of Entity:** Los Alamos
- 2. Name of Project:** Los Alamos  
EIA Project ID: 1
- 3. Location:**  
U.S. Only  
  
Facility Name and Address:  
Los Alamos  
rpd@lanl.gov  
Los Alamos, NM 87545-
- 4. Date Project Became Operational:**  
Jan 1997
- 5. Reasons for Project:**  
Federal, state, or local requirement: Federal
- 6. Participation in Voluntary Programs:**  
None  
**Other programs:**  
None

# Multi Pollutant Emission Reduction Reporting

Modeled after the U.S. Department of Energy  
Energy Information Administration  
Voluntary Reporting of Greenhouse Gases  
Form EIA-1605

## Schedule II. Project-Level Emissions and Reductions Section 3. Energy End Use

Reporting Year 1997

### Los Alamos Los Alamos

#### Part II. Specific Project Information

- 1. Project Type:**  
Industrial Power Systems
- 2. Load Shape Effects:**  
Energy efficiency
- 3. Sector(s) of Energy User(s) Affected by Project**  
Industrial
- 4. Project Scale:**  
Full-Scale/ Commercial
- 5. Energy and Fuel Consumption:**

#### Net Change in Energy/Fuel Consumption

Fuel or Energy Type	Unit of Measure	Quantity						
		1991	1992	1993	1994	1995	1996	1997
Natural Gas	MCF							(160,393)

#### Actual Energy/Fuel Consumption

Fuel or Energy Type	Unit of Measure	Quantity						
		1991	1992	1993	1994	1995	1996	1997
Natural Gas	MCF							162,905

#### 6. Project Description:

Johnson Controls Performance Contracting Steam Boiler Replacement Project on Government Offices, R&D Labs & Industrial Facility.

# Multi Pollutant Emission Reduction Reporting

Modeled after the U.S. Department of Energy  
 Energy Information Administration  
 Voluntary Reporting of Greenhouse Gases  
 Form EIA-1605

## Schedule II. Project-Level Emissions and Reductions Section 3. Energy End Use

Reporting Year 1997

### Los Alamos

Los Alamos

#### Part III. Greenhouse Gas Emissions and Reductions

Gas	Type	Unit of Measure	1991	1992	1993	1994	1995	1996	1997	Accuracy
			Physical Quantity							
<b>Emissions</b>										
CO2	Indirect	Lbs.							19,645,203	Undetermined
NOx	Indirect	Lbs.							75,506	Undetermined
SO2	Indirect	Lbs.							1,007	Undetermined
PM10	Indirect	Lbs.							0	Undetermined
Hg	Indirect	Lbs.							0.00	Undetermined
Cd	Indirect	Lbs.							0.00	Undetermined
Pb	Indirect	Lbs.							0.00	Undetermined
<b>Reductions</b>										
CO2	Indirect	Lbs.							19,342,273	Undetermined
NOx	Indirect	Lbs.							74,342	Undetermined
SO2	Indirect	Lbs.							991	Undetermined
PM10	Indirect	Lbs.							0	Undetermined
Hg	Indirect	Lbs.							0.00	Undetermined
Cd	Indirect	Lbs.							0.00	Undetermined
Pb	Indirect	Lbs.							0.00	Undetermined

#### Additional Information:

# Multi Pollutant Emission Reduction Reporting

Modeled after the U.S. Department of Energy  
Energy Information Administration  
Voluntary Reporting of Greenhouse Gases  
Form EIA-1605

## Schedule II. Project-Level Emissions and Reductions Section 3. Energy End Use

---

Reporting Year 1997

**Los Alamos**  
Los Alamos

### Part IV. Project Evaluation

#### 1. Reference Case:

Modified:  
1996

#### 2. Reports to Other Agencies:

None

#### 3. Multiple Reporting:

This report contains information on:  
Entire Project

#### 4. Estimation Method:

To avoid unnecessary duplication, citing an appropriate reporting program by reference in Section 2: Reports to Other Agencies makes it unnecessary to fill out Part IV, Section 4. (The Estimation Method) found below.

No reports were made to other agencies.

The changes in emissions were estimated directly from the changes in energy use caused by the project using Utility Bill comparisons and the emissions factors provided along with the additional forms and reporting instructions developed for the multi pollutant emissions reduction reporting.

The changes in energy use caused by the project were estimated as follows:

- a) A baseline of weather normalized monthly energy use was established using 26 months of historical pre project energy use data. The Base Year was established using 12 consecutive months within the 26.
- b) The post project energy use are being measured and weather normalized
- c) The difference between the pre and post project weather normalized energy use is the project energy savings

The baseline was estimated by projected future energy use if the project was not installed based on the Base Year of weather normalized data. Metrix, a 3<sup>rd</sup> party software package, was the weather normalization program used to calculate the energy savings. Also, please note that the Base Year will change based on the New Equipment or Buildings added because the Actual Energy goes up when this happens but the delta stays the same.

#### **5. Measurement and Verification of Emission Reductions:**

The measurement and verification used for this project followed generally accepted protocol used by the Performance Contracting Industry by Energy Service Companies (ESCO). Johnson Controls Inc. was the ESCO for this energy efficiency project. The energy savings were guaranteed to the customer (Los Alamos) and measured against a modified reference baseline. Johnson Controls pays financial penalties to Los Alamos if the guaranteed energy savings are not delivered. Because of this, annual energy consumption figures are carefully measured and calculated using utility bill comparisons based on the facility energy meters and also using local monthly weather data to weather normalize the energy use against the baseline.

The customer and the service provider contractually agreed to base the performance guarantee on this approach to measurement and verification of the performance of the project using the estimation method described above. Both sides have the same vested interest in producing accurate measurements but from opposite sides of the table. Either side could bring in a third party to verify the results at their discretion and at agreed upon responsibilities for the extra expense.

#### **6. Ownership of Emission Reductions:**

The owner of the premises where the emission reduction-causing action occurred is the original owner of the resulting emission reductions.

Name of Entity:

Los Alamos  
rpd@lanl.gov  
Los Alamos, NM 87545-

Contact:

Bob Patterson

#### **Transfers of Ownership (Report partial and full transfers here):**

Presently, there have been no transfers of emissions reductions by the original owner to the project implementers and the others involved in supporting the recognition of the emission reductions.

**Pilot Reporting**

**Using the Multiple Pollutant Emission  
Reduction Reporting Standards**

**Methodist Hospital**

**Pilot Reporting Project  
Number 7**





# Multi Pollutant Emission Reduction Reporting

Modeled after the U.S. Department of Energy  
Energy Information Administration  
Voluntary Reporting of Greenhouse Gases  
Form EIA-1605

## Schedule I. Entity Information and Certification

---

Reporting Year 1997

### Methodist Hospital

#### 1. Entity Information

##### Entity Name and Address

Methodist Hospital  
5620 Read Blvd  
New Orleans, LA 70127-

##### Contact:

Randy Yeager

Tel: (504) 244-4061 FAX:

E-Mail Address:

#### 2. Type of Reporter

Corporation  
Privately Held

#### 3. Geographic Scope of Activities

U.S. Only

#### 4. SIC Code

80 Health Services

#### 5. Reported Line Items by Schedule Section

##### Schedule II. Project-Level Emissions and Reductions

1 Section 3. Energy End Use

##### Schedule III. Entity-Level Emissions and Reductions

##### Schedule IV. Commitments to Reduce Greenhouse Gases

#### 6. Confidentiality

This report contains confidential information.

---

#### 7. Certification

*I certify that the information reported on this form is accurate to the best of my knowledge and belief.*

Certifying Official: Paul Von Paumgarten  
Director of Public Relations  
Tel: (414) 274-4546

Date: 9/15/98

# Multi Pollutant Emission Reduction Reporting

Modeled after the U.S. Department of Energy  
Energy Information Administration  
Voluntary Reporting of Greenhouse Gases  
Form EIA-1605

## Schedule II. Project-Level Emissions and Reductions Section 3. Energy End Use

---

Reporting Year 1997

### Methodist Hospital Methodist Hospital

#### Part I. General Project Information

- 1. Name of Entity:** Methodist Hospital
- 2. Name of Project:** Methodist Hospital  
EIA Project ID: 1
- 3. Location:**  
U.S. Only  
  
Facility Name and Address:  
Methodist Hospital  
5620 Read Blvd  
New Orleans, LA 70127-
- 4. Date Project Became Operational:**  
Nov 1990
- 5. Reasons for Project:**  
Voluntary reduction
- 6. Participation in Voluntary Programs:**  
None  
**Other programs:**  
None

# Multi Pollutant Emission Reduction Reporting

Modeled after the U.S. Department of Energy  
Energy Information Administration  
Voluntary Reporting of Greenhouse Gases  
Form EIA-1605

## Schedule II. Project-Level Emissions and Reductions Section 3. Energy End Use

Reporting Year 1997

### Methodist Hospital Methodist Hospital

#### Part II. Specific Project Information

- 1. Project Type:**  
Fuel switching  
Lighting and lighting control  
Heating, ventilation, and air conditioning
- 2. Load Shape Effects:**  
Energy efficiency
- 3. Sector(s) of Energy User(s) Affected by Project**  
Commercial
- 4. Project Scale:**  
Full-Scale/ Commercial
- 5. Net Change in Energy/Fuel Consumption:**

#### Net Change in Energy/Fuel Consumption

Fuel or Energy Type	Unit of Measure	Quantity						
		1991	1992	1993	1994	1995	1996	1997
Natural Gas	MCF	(14,198)	(13,902)	(15,660)	(13,069)	(14,416)	(11,336)	(5,498)
Electricity	kWh	(2,356,172)	(2,622,536)	(3,186,935)	(3,290,373)	(3,517,199)	(3,804,471)	(1,324,961)

#### Actual Energy/Fuel Consumption

Fuel or Energy Type	Unit of Measure	Quantity						
		1991	1992	1993	1994	1995	1996	1997
Natural Gas	MCF	20,335	21,374	22,776	21,935	23,617	23,555	12,553
Electricity	kWh	9,506,034	9,605,147	9,248,169	9,156,815	11,572,219	13,690,258	7,041,174

#### 6. Project Description:

Johnson Controls Performance Contracting Project consisting of FMS Controls, Lighting and Chiller Measures for a Hospital's Offices and R&D Labs.

# Multi Pollutant Emission Reduction Reporting

Modeled after the U.S. Department of Energy  
Energy Information Administration  
Voluntary Reporting of Greenhouse Gases  
Form EIA-1605

## Schedule II. Project-Level Emissions and Reductions Section 3. Energy End Use

Reporting Year 1997

### Methodist Hospital

Methodist Hospital

#### Part III. Greenhouse Gas Emissions and Reductions

Gas	Type	Unit of Measure	1991	1992	1993	1994	1995	1996	1997	Accuracy
			Physical Quantity							
<b>Emissions</b>										
CO2	Indirect	Lbs.	15,646,634	15,909,499	15,583,085	15,354,867	18,910,285	21,842,646	11,286,953	Undetermined
NOx	Indirect	Lbs.	36,993	37,762	37,376	36,722	44,506	50,619	26,238	Undetermined
SO2	Indirect	Lbs.	27,693	27,987	26,960	26,690	33,705	39,847	20,497	Undetermined
PM10	Indirect	Lbs.	951	961	925	916	1,157	1,369	704	Undetermined
Hg	Indirect	Lbs.	0.14	0.15	0.14	0.14	0.18	0.21	0.11	Undetermined
Cd	Indirect	Lbs.	0.01	0.01	0.01	0.01	0.01	0.01	0.01	Undetermined
Pb	Indirect	Lbs.	0.22	0.22	0.21	0.21	0.27	0.31	0.16	Undetermined
<b>Reductions</b>										
CO2	Indirect	Lbs.	3,502,870	3,669,611	4,310,557	4,076,713	4,411,540	4,258,440	1,669,991	Undetermined
NOx	Indirect	Lbs.	17,655	18,769	22,237	21,522	23,213	23,135	8,776	Undetermined
SO2	Indirect	Lbs.	11,397	12,674	15,394	15,875	16,972	18,332	6,394	Undetermined
PM10	Indirect	Lbs.	236	262	319	329	352	380	132	Undetermined
Hg	Indirect	Lbs.	0.05	0.05	0.06	0.06	0.07	0.07	0.03	Undetermined
Cd	Indirect	Lbs.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Undetermined
Pb	Indirect	Lbs.	0.07	0.08	0.09	0.10	0.10	0.11	0.04	Undetermined

#### Additional Information:

# Multi Pollutant Emission Reduction Reporting

Modeled after the U.S. Department of Energy  
Energy Information Administration  
Voluntary Reporting of Greenhouse Gases  
Form EIA-1605

## Schedule II. Project-Level Emissions and Reductions Section 3. Energy End Use

---

Reporting Year 1997

### Methodist Hospital Methodist Hospital

#### Part IV. Project Evaluation

##### 1. Reference Case:

Modified:  
1989

##### 2. Reports to Other Agencies:

None

##### 3. Multiple Reporting:

This report contains information on:  
Entire Project

##### 4. Estimation Method:

To avoid unnecessary duplication, citing an appropriate reporting program by reference in Section 2: Reports to Other Agencies makes it unnecessary to fill out Part IV, Section 4. (The Estimation Method) found below.

No reports were made to other agencies.

The changes in emissions were estimated directly from the changes in energy use caused by the project using Utility Bill comparisons and the emissions factors provided along with the additional forms and reporting instructions developed for the multi pollutant emissions reduction reporting.

The changes in energy use caused by the project were estimated as follows:

- a) A baseline of weather normalized monthly energy use was established using 26 months of historical pre project energy use data. The Base Year was established using 12 consecutive months within the 26.
- b) The post project energy use are being measured and weather normalized
- c) The difference between the pre and post project weather normalized energy use is the project energy savings

The baseline was estimated by projected future energy use if the project was not installed based on the Base Year of weather normalized data. Metrix, a 3<sup>rd</sup> party software package, was the weather normalization program used to calculate the energy savings. Also, please note that the Base Year will change based on the New Equipment or Buildings added because the Actual Energy goes up when this happens but the delta stays the same.

#### **5. Measurement and Verification of Emission Reductions:**

The measurement and verification used for this project followed generally accepted protocol used by the Performance Contracting Industry by Energy Service Companies (ESCO). Johnson Controls Inc. was the ESCO for this energy efficiency project. The energy savings were guaranteed to the customer (Methodist Hospital) and measured against a modified reference baseline. Johnson Controls pays financial penalties to Methodist Hospital if the guaranteed energy savings are not delivered. Because of this, annual energy consumption figures are carefully measured and calculated using utility bill comparisons based on the facility energy meters and also using local monthly weather data to weather normalize the energy use against the baseline.

The customer and the service provider contractually agreed to base the performance guarantee on this approach to measurement and verification of the performance of the project using the estimation method described above. Both sides have the same vested interest in producing accurate measurements but from opposite sides of the table. Either side could bring in a third party to verify the results at their discretion and at agreed upon responsibilities for the extra expense.

#### **6. Ownership of Emission Reductions:**

The owner of the premises where the emission reduction-causing action occurred is the original owner of the resulting emission reductions.

Name of Entity:

Methodist Hospital  
5620 Read Blvd  
New Orleans, LA 70127-

Contact:

Randy Yeager  
Tel: (504) 244-4061

#### **Transfers of Ownership (Report partial and full transfers here):**

Presently, there have been no transfers of emissions reductions by the original owner to the project implementers and the others involved in supporting the recognition of the emission reductions.

**Pilot Reporting**

**Using the Multiple Pollutant Emission  
Reduction Reporting Standards**

**University Medical Center**

**Pilot Reporting Project  
Number 8**





# Multi Pollutant Emission Reduction Reporting

Modeled after the U.S. Department of Energy  
Energy Information Administration  
Voluntary Reporting of Greenhouse Gases  
Form EIA-1605

## Schedule I. Entity Information and Certification

Reporting Year 1997

### University Medical Center

#### 1. Entity Information

Entity Name and Address  
University Medical Center  
2390 West Congress Street  
Lafayette, LA 70502-

Contact:  
Caffery Touchert

Tel: (318) 261-6183 FAX:  
E-Mail Address:

#### 2. Type of Reporter

Corporation  
Privately Held

#### 3. Geographic Scope of Activities

U.S. Only

#### 4. SIC Code

80 Health Services

#### 5. Reported Line Items by Schedule Section

**Schedule II. Project-Level Emissions and Reductions**

1 Section 3. Energy End Use

**Schedule III. Entity-Level Emissions and Reductions**

**Schedule IV. Commitments to Reduce Greenhouse Gases**

#### 6. Confidentiality

This report contains confidential information

#### 7. Certification *I certify that the information reported on this form is accurate to the best of my knowledge and belief.*

Certifying Official: Paul Von Paumgartten  
Director of Public Relations  
Tel: (414) 274-4546

Date: 9/15/98

# Multi Pollutant Emission Reduction Reporting

Modeled after the U.S. Department of Energy  
Energy Information Administration  
Voluntary Reporting of Greenhouse Gases  
Form EIA-1605

## Schedule II. Project-Level Emissions and Reductions Section 3. Energy End Use

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Reporting Year 1997

### University Medical Center University Medical Center

#### Part I. General Project Information

- 1. Name of Entity:** University Medical Center
- 2. Name of Project:** University Medical Center  
**EIA Project ID:** 1
- 3. Location:**  
U.S. Only  
  
Facility Name and Address:  
University Medical Center  
2390 West Congress Street  
Lafayette, LA 70505-
- 4. Date Project Became Operational:**  
Aug 1989
- 5. Reasons for Project:**  
Voluntary reduction
- 6. Participation in Voluntary Programs:**  
None  
**Other programs:**  
None

# Multi Pollutant Emission Reduction Reporting

Modeled after the U.S. Department of Energy  
Energy Information Administration  
Voluntary Reporting of Greenhouse Gases  
Form EIA-1605

## Schedule II. Project-Level Emissions and Reductions Section 3. Energy End Use

Reporting Year 1997

### University Medical Center University Medical Center

#### Part II. Specific Project Information

**1. Project Type:**

General energy use  
Lighting and lighting control  
Heating, ventilation, and air conditioning

**2. Load Shape Effects:**

Energy efficiency

**3. Sector(s) of Energy User(s) Affected by Project**

Commercial

**4. Project Scale:**

Full-Scale/ Commercial

**5. Energy and Fuel Consumption:**

**Net Change in Energy/Fuel Consumption:**

Fuel or Energy Type	Unit of Measure	Quantity						
		1991	1992	1993	1994	1995	1996	1997
Natural Gas	MCF	(100,420)	(97,853)	(90,304)	(93,495)	(98,473)	(99,300)	(98,126)
Electricity	kWh	(601,328)	(582,052)	(473,427)	(340,956)	(318,584)	(508,559)	(486,897)

**Actual Energy/Fuel Consumption:**

Fuel or Energy Type	Unit of Measure	Quantity						
		1991	1992	1993	1994	1995	1996	1997
Natural Gas	MCF	15,226	15,243	26,877	21,613	18,936	17,860	18,610
Electricity	kWh	8,238,063	8,201,847	8,394,987	8,614,708	8,681,400	8,486,831	8,488,929

**6. Project Description:**

Johnson Controls Performance Contracting Project consisting of Control, Chiller, VAV Conversion and Lighting Measures on a Medical Facility.

# Multi Pollutant Emission Reduction Reporting

Modeled after the U.S. Department of Energy  
Energy Information Administration  
Voluntary Reporting of Greenhouse Gases  
Form EIA-1605

## Schedule II. Project-Level Emissions and Reductions Section 3. Energy End Use

Reporting Year 1997

### University Medical Center

University Medical Center

#### Part III. Greenhouse Gas Emissions and Reductions

Gas	Type	Unit	1991	1992	1993	1994	1995	1996	1997
			Physical Quantity						
<b>Emissions</b>									
CO2	Indirect	Lbs.	13,270,580	13,222,363	14,893,420	14,563,591	14,333,332	13,933,512	14,026,869
NOx	Indirect	Lbs.	30,948	30,850	36,803	35,000	33,953	32,890	33,244
SO2	Indirect	Lbs.	23,984	23,880	24,512	25,116	25,293	24,722	24,733
PM10	Indirect	Lbs.	824	820	839	861	868	849	849
Hg	Indirect	Lbs.	0.13	0.12	0.13	0.13	0.13	0.13	0.13
Cd	Indirect	Lbs.	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Pb	Indirect	Lbs.	0.19	0.19	0.19	0.20	0.20	0.19	0.19
<b>Reductions</b>									
CO2	Indirect	Lbs.	12,566,958	12,242,746	11,249,835	11,533,969	12,117,278	12,361,390	12,203,350
NOx	Indirect	Lbs.	49,371	48,091	44,081	44,937	47,140	48,416	47,770
SO2	Indirect	Lbs.	3,507	3,399	2,831	2,214	2,138	3,055	2,944
PM10	Indirect	Lbs.	60	58	47	34	32	51	49
Hg	Indirect	Lbs.	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cd	Indirect	Lbs.	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pb	Indirect	Lbs.	0.02	0.02	0.01	0.01	0.01	0.01	0.01

**Accuracy:** Undetermined

**Additional Information:**

# Multi Pollutant Emission Reduction Reporting

Modeled after the U.S. Department of Energy  
Energy Information Administration  
Voluntary Reporting of Greenhouse Gases  
Form EIA-1605

## Schedule II. Project-Level Emissions and Reductions Section 3. Energy End Use

---

Reporting Year 1997

### University Medical Center University Medical Center

#### Part IV. Project Evaluation

##### 1. Reference Case:

Modified:  
1988

##### 2. Reports to Other Agencies:

None

##### 3. Multiple Reporting:

This report contains information on:  
Entire Project

##### 4. Estimation Method:

To avoid unnecessary duplication, citing an appropriate reporting program by reference in Section 2: Reports to Other Agencies makes it unnecessary to fill out Part IV, Section 4. (The Estimation Method) found below.

No reports were made to other agencies.

The changes in emissions were estimated directly from the changes in energy use caused by the project using Utility Bill comparisons and the emissions factors provided along with the additional forms and reporting instructions developed for the multi pollutant emissions reduction reporting.

The changes in energy use caused by the project were estimated as follows:

- a) A baseline of weather normalized monthly energy use was established using 26 months of historical pre project energy use data. The Base Year was established using 12 consecutive months within the 26.
- b) The post project energy use are being measured and weather normalized
- c) The difference between the pre and post project weather normalized energy use is the project energy savings

The baseline was estimated by projected future energy use if the project was not installed based on the Base Year of weather normalized data. Metrix, a 3<sup>rd</sup> party software package, was the weather normalization program used to calculate the energy savings. Also, please note that the Base Year will change based on the New Equipment or Buildings added because the Actual Energy goes up when this happens but the delta stays the same.

## **5. Measurement and Verification of Emission Reductions:**

The measurement and verification used for this project followed generally accepted protocol used by the Performance Contracting Industry by Energy Service Companies (ESCO). Johnson Controls Inc. was the ESCO for this energy efficiency project. The energy savings were guaranteed to the customer (University Medical Center) and measured against a modified reference baseline. Johnson Controls pays financial penalties to UMC if the guaranteed energy savings are not delivered. Because of this, annual energy consumption figures are carefully measured and calculated using utility bill comparisons based on the facility energy meters and also using local monthly weather data to weather normalize the energy use against the baseline.

The customer and the service provider contractually agreed to base the performance guarantee on this approach to measurement and verification of the performance of the project using the estimation method described above. Both sides have the same vested interest in producing accurate measurements but from opposite sides of the table. Either side could bring in a third party to verify the results at their discretion and at agreed upon responsibilities for the extra expense.

## **6. Ownership of Emission Reductions:**

The owner of the premises where the emission reduction-causing action occurred is the original owner of the resulting emission reductions.

Name of Entity:

University Medical Center  
2390 West Congress Street  
Lafayette. LA 70502-

Contact Person:

Caffery Touchert  
Tel: (318) 261-6183

## **Transfers of Ownership (Report partial and full transfers here):**

Presently, there have been no transfers of emissions reductions by the original owner to the project implementers and the others involved in supporting the recognition of the emission reductions.

## **Addendum A**

### **Updates to the report since publication of Multiple Pollutant Emission Reduction Reporting System Project, Version 1.0**

New environmental regulations are continually being created and existing environmental regulations are often updated. In addition, technology improvements, cleaner fuels and other research will continue to change and refine emission factors for different pollutant types for different fuels. Implementing a multiple pollutant reporting system will be done gradually. Because of this, any improvements that can be made to the multiple pollutant emission reduction reporting system will be done with the changes listed here by version number.

#### **Version 1.1 (2/26/99)**

Updated and made changes to the emission factors for natural gas in Appendix C, Table C4 to reflect better national averages. Also, emission factors were added in Appendix C for propane, butane, and distillate fuels (Tables C5, C6, and C7) based on information from EPA Document AP-42.

#### **Version 1.2 (10/23/00)**

Updated and made changes to the emission factors for NO<sub>x</sub> natural gas in Appendix C, Table C4 to reflect better national averages.

#### **Version 1.3 (1/15/03)**

Updated and made changes to the Cleaner and Greener Program emission factors and deleted them from within this report. They are now located in a separate stand-alone report that can be found on the Cleaner and Greener web site at: <http://www.cleanerandgreener.org/multipollutant.htm>