

# *Evaluation*



# *Report*

OFFICE OF THE INSPECTOR GENERAL

## EVALUATION OF ENVIRONMENTAL MEASURES OF MERIT

Report No. 97-118

April 7, 1997

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### **Acronyms**

|          |                                                                 |
|----------|-----------------------------------------------------------------|
| CERES    | Coalition for Environmentally Responsible Economies             |
| DESC     | Defense Environmental Security Council                          |
| DESCIM   | Defense Environmental Security Corporate Information Management |
| DSBTF    | Defense Science Board Task Force                                |
| DUSD(ES) | Deputy Under Secretary of Defense (Environmental Security)      |
| GAO      | General Accounting Office                                       |
| GEMI     | Global Environmental Management Initiative                      |
| GPRA     | Government Performance and Results Act                          |
| MOM      | Measure of Merit                                                |
| NON      | Notice of Non-Compliance                                        |
| NOV      | Notice of Violation                                             |
| ODS      | Ozone Depleting Substances                                      |
| OSD      | Office of the Secretary of Defense                              |
| PCBs     | Polychlorinated Biphenyls                                       |
| PERI     | Public Environmental Reporting Initiative                       |
| TRI      | Toxic Release Inventory                                         |
| UST      | Underground Storage Tanks                                       |



**INSPECTOR GENERAL**  
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April 7, 1997

**MEMORANDUM FOR DEPUTY UNDER SECRETARY OF DEFENSE**  
**(ENVIRONMENTAL SECURITY)**

**SUBJECT: Evaluation of Environmental Measures of Merit (Report No. 97-118 )**

We are providing this evaluation report for your information and use. We performed the evaluation in response to the Assistant Deputy Under Secretary of Defense (Environmental Quality) request.

We appreciated your comments and are pleased that you will be using the results of this evaluation report in your re-evaluation of the Clean Water Act Measures of Merit.

We also appreciate the courtesies extended to the evaluation staff. Questions on the evaluation should be directed to Mr. William C. Gallagher, Evaluation Program Director, at (703) 604-9270 (DSN 664-9270) or Maj. David G. Young, Evaluation Project Manager, at (703) 604-9407 (DSN 664-9407). See Appendix I for the report distribution. The evaluation team members are listed inside the back cover.

*David K. Steensma*

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Deputy Assistant Inspector General  
for Auditing

## Office of the Inspector General, DoD

Report No. 97-118  
(Project No. 6CB-5008)

April 7, 1997

### Evaluation of Environmental Measures of Merit

#### Executive Summary

**Introduction.** This evaluation was performed in response to the Assistant Deputy Under Secretary of Defense (Environmental Quality) request that we evaluate private sector initiatives to develop effective environmental performance measures. One purpose of environmental performance measures, more commonly called measures of merit, is to assist organizations in communicating useful environmental information to their "stakeholders" or interested public. Imparting this information to stakeholders normally serves to strengthen relationships between the organization and the stakeholders. Another purpose for measures of merit is to demonstrate how well organizations meet their environmental goals.

A report issued by the Defense Science Board Task Force on Environmental Security recommended that DoD compare the implementation of its environmental program to other agencies' and to ongoing commercial efforts. However, they found that little quantitative data was available to compare the DoD environmental program with that of other Federal agencies, or with commercial industry practices. Another task force recommendation was that DoD initiate a continuing process of setting environmental goals, defining metrics, and measuring progress toward attainment of goals.

**Evaluation Objective.** The evaluation objective was to identify leading or "best in class" commercial, corporate-level measures of merit that DoD could apply to its environmental compliance and pollution prevention programs.

**Evaluation Results.** The measures of merit used by the "best in class" companies surveyed during this evaluation are comparable to those currently used by DoD. The content and number of current DoD measures of merit for pollution prevention are comparable with those used by most corporate entities. We identified three additional compliance measures of merit used by the companies surveyed that the Department should consider adopting in its continuing efforts to improve the DoD Environmental Program. These compliance measures of merit are described in Part I of the report. Use of these additional measures of merit could demonstrate progressive environmental management, environmental stewardship, a concern for future liability, and the avoidance of unnecessary costs. In addition, their use would highlight close cooperation between DoD and the regulatory community. Appendix C includes a summary worksheet for each of the corporate measures of merit included in the comparison.

**Management Comments.** The Deputy Under Secretary of Defense (Environmental Security) was pleased that the evaluation found the DoD current environmental measures of merit comparable to the "best in class" companies that were surveyed in the report. Also, the Deputy Under Secretary states that the results of the evaluation will be used in the re-evaluation of the Clean Water Act Measures of Merit. See Part I for a discussion of management comments and Part III for the complete text of the comments.

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## **Part I - Evaluation Results**

## Evaluation Background

Successful environmental management depends, in large part, on the measurement of environmental performance. Environmental performance measures are the critical links between the strategy, goals, and effective implementation of a successful performance-based management program. Thus, performance measures, linked to precise strategic goals, are needed to determine the results of Federal environmental programs and to ensure effective and efficient management decisions. Policy-making, spending decisions, and oversight are all improved with clear goals and appropriate performance data. DoD and Congress, as well as the public, want valid indicators of progress and effectiveness to determine whether environmental investments result in measurable benefits and improvements to the environment, military readiness, and the health and safety of personnel.

**Management Efficiency and Improvement.** In 1995, the General Accounting Office reported that, along with sound financial information, ". . . reliable performance information is a prerequisite for improving the management of government programs and providing the needed accountability of program results. Consequently, agencies must have the systems, processes, and skills to generate and use this information."<sup>1</sup> Management needs are one driver for performance measurement programs, however there are a number of other drivers as well.

Other drivers for performance measurements include the Government Performance and Results Act of 1993, the National Performance Review, and the Report of the Defense Science Board Task Force on Environmental Security. Appendix F, "Major Drivers for the Development of Measures of Merit," contains more information on performance measurement drivers.

**DoD Environmental Policy.** The Assistant Deputy Under Secretary of Defense (Environmental Quality) is responsible for establishing DoD environmental compliance and pollution prevention policy. Three primary documents contain the policy for compliance and pollution prevention programs: DoD Directive 4715.1, "Environmental Security," February 24, 1996; DoD Instruction 4715.4, "Pollution Prevention," June 18, 1996, and DoD Instruction 4715.6, "Environmental Compliance," April 24, 1996. DoD Instruction 4715.6 and DoD Instruction 4715.4, for compliance and pollution prevention respectively, set the current DoD measures of merit (MOMs).

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<sup>1</sup>Managing for Results: Steps for Strengthening Federal Management, General Accounting Office, T-GGD/AIMD-95-158, May 9, 1995.

For the purpose of this evaluation, we define a MOM as a performance indicator used at the corporate level of management to demonstrate and report progress toward achieving environmental goals. See Appendix G for a breakout of the corporate level DoD measures for compliance and pollution prevention.

To be credible, DoD MOMs must represent valid indicators of environmental results for which there is high quality data. In turn, control of data quality is made easier through sound collection methodologies, quality assurance procedures, and automated data management systems. Most of the DoD environmental data is collected through the Defense Environmental Security Corporate Information Management (DESCIM) initiative.

**Defense Environmental Security Corporate Information Management.** DoD must comply with all applicable environmental laws and regulations. The 1990 Defense Authorization Act requires the Secretary of Defense to develop and maintain a comprehensive database of environmental activities performed by DoD. As part of the Defense Management Report Decision, No. 920, on DoD Environmental Management, DoD was advised to ". . . establish a Corporate Information Management (CIM) effort for environmental management information systems." The DESCIM is a joint CIM program for ensuring that the automated systems developed for all environmental programs meet the mission and inter-operability requirements established by the Department.

## **Evaluation Objective**

The objective of this evaluation was to determine whether there are environmental MOMs, developed by private industry, that DoD could use. Emphasis is on measurements that DoD can use to effectively portray actual progress in achieving environmental compliance and pollution prevention goals and objectives.

## **Environmental Measures of Merit**

The concept of environmental performance measurement is relatively new to Federal agencies. Developing the processes, systems and information needed to measure fundamental improvements in environmental performance is time- and work-intensive. However, DoD can avoid duplication of effort and save time and resources by studying how proven environmental leaders in the private sector manage performance measurement, and by adopting the "best practices" (those proven to be most effective).

**Communicating Performance Measurement.** Organizations must communicate useful environmental performance data to interested "stakeholders." An environmental stakeholder is any individual or organization that has a stake or an interest in the environment. Stakeholders include communities; concerned organizations; local, State, and Federal Government regulators; industries; and others with a stake in a healthy environment.

**Performance Data.** Useful performance data must meet four qualitative characteristics; the data must be relevant, reliable, understandable, and comparable.

- o Relevant data is information that helps assess the environmental impact of past, present, or future operations. (It is important that the level of detail be relevant for the intended purpose of the collected data).

- o Reliable data denotes information that is capable of independent verification and reasonably free from error and bias. (Some sampling techniques and estimates are more reliable than others).

- o Understandable data is information that is meaningful to the targeted stakeholders. (Unlike monetary comparisons, environmental information is usually based on scientific data and must be put into a context the target audience can readily grasp).

- o Comparable data enables the audience to identify similarities in and differences between two pieces of information. (Usually the same type of data is compared to show the differences between companies that produce similar products or the differences in the data for a single company at different times).

**Key Indicators.** An organization's measurement programs often involve multiple layers of management, from operations up through the corporate level. At the corporate level, measures are normally limited to a minimum number of "key" indicators. Key environmental indicators are carefully chosen to reflect a direct environmental measure or numerical count quantifying identifiable environmental degradation. Key indicators may refer to an absolute measure or to a relative measure of performance toward meeting the established environmental goal. Absolute measures are generally expressed using a fixed scale, such as mass or volume. An example might be the amount of solid waste generated in a year and measured in tons. Relative indicators, on the other hand, are more complex. For example, the demonstrated reduction in toxic releases for DoD compared to some previous year.

Key elements of a successful environmental program include setting measurable goals, selecting relevant and representative performance measures, and establishing performance baselines. The DoD faces many challenges in establishing effective and credible environmental programs. To be successful,

DoD must develop meaningful MOMs to support analysis of program performance and to accurately demonstrate program achievements to stakeholders.

**Environmental Stewardship in the Private Sector.** Environmental stewardship is the concept that organizations should recognize the impacts of their activities on environmental conditions and should voluntarily adopt practices that eliminate or reduce negative environmental impacts. Corporations have begun to adopt a positive environmental stewardship ethic in response to investors and other corporate stakeholders pushing for environmentally responsible business practices. Contemporary investors want reliable data on environmental performance so they can make better investment choices. Industry now focuses on being environmentally responsible because merely meeting minimum environmental standards carries a potentially adverse impact on competitiveness and profitability. Further, companies have found that an effective environmental performance measurement and reporting program can help differentiate a company from its competitors. Leading companies enhance their environmental corporate image, and thereby their competitiveness, by demonstrating an environmental commitment.

**Industry Initiatives and Standards.** Many of the companies included in this evaluation are sponsors, participants, or members of industry groups sponsoring initiatives to develop performance measurement standards or process guidelines. Some of those initiatives also include identifying specific corporate level performance indicators. A number of industry groups collect performance measurement information from member companies, analyze the data, and use it to develop standards and guidelines for effective performance measurement and environmental performance reporting. They may also identify specific measures used by the member companies. Some of the more prominent industry groups surveyed during this evaluation are the Coalition for Environmentally Responsible Economies (CERES), Global Environmental Management Initiative (GEMI), and Public Environmental Reporting Initiative (PERI).

In addition to the CERES, GEMI, and PERI initiatives, an effort is underway by the International Organization for Standardization to develop an international environmental performance evaluation standard, ISO 14031. When final, ISO 14031 will establish a "process standard" providing guidelines on how to evaluate environmental performance. Appendix H provides a brief synopsis on each environmental management initiative.

There are a number of operational and management performance measures, both quantitative and qualitative, used by leading companies to demonstrate environmental performance. Throughout this evaluation, we consistently noted characteristics common to the corporate leaders in environmental management. Many of those common characteristics are listed in the chart provided in Appendix H titled, "Industry Initiatives and Standards."

**Best Practices of Industry.** Some multi-level and multi-international corporations and industry groups are considered leaders in both environmental performance and performance measurement. As environmental performance

leaders, those organizations have mature performance measurement processes, proven management techniques, and experience in developing performance data. As a result, they have developed "best practices" that are proven to lead to superior performance. Therefore, the results of industry initiatives and industry best practices offer valuable insights for the DoD effort to improve MOMs.

By determining the best practices of top environmental performers in industry and then applying them in the management of DoD environmental programs, we can improve operating and management performance and, where applicable, increase productivity at reduced costs. Therefore, DoD could avoid duplication of effort and save time and resources by adapting industry best practices to improve DoD performance measurement programs and to meet the environmental performance requirements imposed by the public, Congress, and other DoD stakeholders.

## Comparison of MOMs

We listed the compliance and pollution prevention MOMs used by the companies selected for this evaluation and compared them to the DoD MOMs. Comparison of compliance MOMs is shown in Table 1.

**Table 1. Comparison of Compliance MOMs**

| Measures of Merit (MOM)                            | Company |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | DoD |
|----------------------------------------------------|---------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|-----|
|                                                    | A       | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q |     |
| Air emissions                                      | X       |   | X |   | X | X | X |   |   |   |   | X | X |   |   |   | X | X*  |
| Cleanups required                                  |         |   |   | X |   |   |   |   | X |   | X |   | X |   |   |   |   | X** |
| Fines and penalties                                | X       |   |   |   |   |   | X | X | X |   | X | X |   |   | X |   | X |     |
| Notices of violation and notices of non-compliance | X       |   |   | X | X | X |   | X |   |   | X |   | X | X | X | X | X | X   |
| Polychlorinated biphenyls                          | X       |   |   |   |   |   | X | X |   |   |   | X |   |   |   |   |   |     |
| Permit excursions & exceedances                    | X       | X | X |   | X |   |   |   | X | X | X |   | X |   |   |   | X |     |
| Spills & releases                                  | X       | X | X | X |   | X | X | X | X | X | X | X | X |   |   | X | X |     |
| Underground storage tanks                          | X       |   |   |   |   |   | X |   |   |   |   | X | X |   |   |   |   | X   |
| Wastewater                                         |         |   | X | X |   |   |   |   |   |   |   |   | X |   |   |   | X | X   |

\* Hazardous Air Pollutants are included in the Pollution Prevention Toxic Release Inventory (TRI) MOM

\*\* Cleanups fall under the Defense Environmental Restoration Program

Table 2 compares the pollution prevention MOMs used by both DoD and the surveyed companies. A description of each compliance and pollution prevention MOM is in Appendix E "Glossary."

**Table 2. Comparison of Pollution Prevention MOMs**

| Measures of Merit (MOM)          | Company |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | DoD |
|----------------------------------|---------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|-----|
|                                  | A       | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q |     |
| Alternative fueled vehicles      |         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | X   |
| Energy consumption               | X       |   |   | X |   | X | X | X |   |   | X |   |   | X | X |   | X | X*  |
| Hazardous material reduction     | X       |   | X | X |   |   |   |   |   | X |   |   | X | X |   |   |   |     |
| Hazardous waste generation       |         | X | X | X | X | X |   | X | X |   | X | X | X | X | X | X | X | X   |
| Ozone depleting substances (ODS) | X       |   |   |   |   |   | X | X | X | X | X | X |   | X |   | X | X |     |
| Recycling                        | X       | X | X | X | X | X | X | X | X | X |   |   |   | X | X | X |   | X   |
| Solid waste reduction            | X       | X |   | X |   |   |   | X | X | X | X | X |   |   | X |   | X | X   |
| Toxic release inventory (TRI)    | X       | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X   |
| Water consumption                |         |   |   | X |   | X |   |   |   |   | X |   |   | X |   |   |   |     |

\* Energy consumption falls under the responsibility of the Office of the Deputy Under Secretary of Defense (Industrial Affairs and Installations)

Tables 1 and 2 identify nine environmental compliance and eight pollution prevention MOMs that are used by the surveyed companies and one pollution prevention MOM used by DoD only. DoD currently uses five of the compliance MOMs and six of the pollution prevention MOMs. We concluded that the current DoD MOMs for pollution prevention are comparable in number and content to those used by the majority of the companies surveyed. Additionally, the five DoD compliance MOMs are very similar to the compliance MOMs of the companies surveyed. However, there are three other compliance MOMs used by the companies that DoD may want to include in the DoD program to focus the stakeholders' attention on the Department's environmental stewardship, as well as timely and appropriate funds utilization.

We categorized the environmental MOMs used to measure compliance and pollution prevention into three categories: those similar to DoD MOMs, those that are used by private industry but not by DoD, and those that are DoD unique.

## MOMs Similar to DoD MOMs

The four compliance MOMs, air emissions, notices of violation (NOV), underground storage tanks (UST), and wastewater, are listed as MOMs by many of the surveyed companies as well as DoD. A total of eight of the companies measure air emissions, 11 of the companies measure NOVs, and four measure both USTs and Wastewater as corporate MOMs. Similarly, 4 of the pollution prevention MOMs were listed by both DoD and some of the companies; 14 companies use the hazardous waste generation MOM, 13 use recycling, 10 use solid waste reduction, and all 17 use the toxic release inventory MOM.

Another pollution prevention MOM, measured by nine companies, "energy consumption," falls within the responsibility of the Office of the Deputy Under Secretary of Defense (Industrial Affairs and Installations). That office sets resource management goals, provides program guidance, and oversees the implementation of established energy policies. Another MOM that we list as a compliance MOM, "cleanups required," is managed through the Defense Environmental Restoration Program. These MOMs are not discussed further in this report because their measurement is outside the requester's area of responsibility.

Due to statutory and legal requirements, DoD and most companies with processes similar to those of DoD will measure compliance and pollution prevention efforts in like ways. Therefore, similarities in measuring performance are logical.

## MOMs Not Used By DoD

**Ozone Depleting Substances.** A pollution prevention metric measured by 10 of the companies surveyed is the use of "ozone depleting substances (ODS)." Ozone depleting substances have become a sensitive issue throughout the world and, in general, the public perceives their reduction as positive environmental stewardship. DoD rescinded its May 16, 1995, ODS MOM earlier this year because:

"... the data would not significantly add value in support of the DoD program to reduce or eliminate the use of ODS in weapon systems and at installations. It was determined that the existing ban on production of ODS as mandated by the Montreal Protocol and the Clean Air Act would sufficiently drive DoD components to reduce their use of these materials and to seek alternatives where available. Finally, it was determined that these MOMs

would require an extensive data collection effort with no value added for management."<sup>2</sup>

**Hazardous Material Reduction.** Another pollution prevention MOM, "hazardous material reduction," was used by six of the surveyed companies. The Resource Conservation and Recovery Act requires generators of hazardous waste to certify that a program is in place to reduce the volume or toxicity of hazardous waste to the extent proven economically feasible. This pollution prevention MOM demonstrates to the stakeholder that the company practices sound environmental management and that the company is taking action to minimize future liability. Currently, DoD collects some of this information at the installation level. The DESCIM Hazardous Substances Management System module, although not yet fully deployed, could collect this information in the future for corporate level review. To be meaningful, DoD guidelines would have to be developed to measure relative reduction in toxicity and volume, and an extensive data collection effort would be necessary. The use of this MOM now would be very resource-intensive for DoD.

**Polychlorinated Biphenyl and Water Consumption.** Only four of the surveyed companies measure their use of "polychlorinated biphenyls (PCBs)" and "water consumption." Likely, PCB measurement and reporting by the companies is a way of showing positive environmental stewardship through continued toxic material reductions, as well as decreasing future disposal liability. Similarly, water consumption measurements demonstrate the companies' attention to conservation and cost issues.

**Spills and Releases.** One MOM, used by 14 of the surveyed companies, not tracked at the DoD level is "spills and releases." Corporate entities track and report their spills and releases of toxic materials to the environment for a variety of reasons. Some of these reasons are:

- o to show environmental awareness,
- o to demonstrate protection of their employees,
- o to show stockholders that funds are not spent needlessly on the special handling and disposal requirements associated with spill contamination, and
- o to show a reduction in future liability and the cost incurred from remediating discharges.

The tracking of spills and releases also allows companies to determine the causes of the spills and releases and to develop approaches to minimize or eliminate these incidents.

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<sup>2</sup>DUSD(ES) Memorandum, Environmental Security Program Measures of Merit, January 1996.

**Permit Excursions and Exceedances.** Another compliance MOM, used by nine of the surveyed companies, is "permit excursions and exceedances." This metric is of interest to the corporate community in showing their stakeholders that company operations minimize adverse environmental impacts by complying with all applicable environmental laws and regulations. Also, this metric is an indicator of potential NOV's that can alert management to potential non-compliance issues. Early action to resolve these issues can avoid the payment of fines and adverse public relations.

**Fines and Penalties.** Eight of the surveyed companies have a "fines and penalties" MOM. In addition to showing their stakeholders that the company operations minimize adverse environmental impacts by complying with all applicable environmental laws and regulations, this metric also demonstrates a level of cost avoidance which is well understood by both DoD and private sector stakeholders.

**Summary.** Overall, at least eight of the companies surveyed use the three MOMs that we believe have a potential for application within DoD. All three meet the criteria for good MOMs; they are relevant to DoD operations, have reliable data that DoD already collects at the installation level, can be readily understood by the stakeholders, and are comparable from reporting period to reporting period. These three MOMs are: "spills and releases"; "fines and penalties"; and "permit excursions and exceedances."

A reduction in "spills and releases" over time would show the DoD continuing good stewardship of the environment and a reduction in future cleanup liabilities. We believe the private sector emphasizes the "fines and penalties" metric to stress the importance of avoiding large monetary fines. For DoD, a trend of reduction in this metric would showcase its emphasis on cost avoidance and enhance its standing with its stakeholders and the environmental regulatory community. While increases in "permit excursions and exceedances" may indicate operational problems, and are not normally associated with corporate level metrics, the companies report this information to their stakeholders as verification of their continuing effort to identify and solve non-compliance problems early. DoD could use it the same way. Use of any or all of these three measures by DoD could result in similar benefits to the Department. All three MOMs demonstrate, to some degree, a level of effort and cooperation between the companies and the regulatory community. More importantly however, they are an indication of proactive environmental management.

## DoD Unique MOM

As a pollution prevention MOM, DoD measures its acquisition of new non-tactical alternative fueled vehicles. The companies sometimes include this type data in their "energy conservation" or "air emission" metrics, but we seldom found it specifically broken out. Although DoD data is currently

collected manually, this MOM demonstrates positive environmental management since the use of alternative fueled vehicles can reduce air pollutants and lessen our dependence on imported oil.

## MOM Worksheets

Appendix C is a series of one page worksheets providing relevant information on each of the compliance and pollution prevention MOMs used by the companies surveyed. The upper half of each worksheet links a particular measure with established environmental goals and objectives that target key areas for management attention. Many of the surveyed companies effectively linked corporate environmental goals and objectives to the needs of identified stakeholders. Their MOMs were effective for communicating and demonstrating the companies' program achievements.

There can be more than one descriptive name for a specific environmental MOM. There are usually a variety of ways in which the concept can be quantified. For that reason, the upper part of each worksheet provides the standard as defined by the most commonly used name of the MOM. That part of the worksheet also lists the various ways the MOM might be quantified.

For example, one standard for quantifying air emissions was the amount of pollutants emitted to the air, usually in pounds or tons per year. However, variations for expressing the measure include British Thermal Units (BTUs) and kilograms. For some measures, the measurement concept could be expressed in both absolute terms (e.g., tons emitted in 1996) and relative terms (e.g., tons emitted per ton of product manufactured). Such variations derive from the particular needs and interests of the company and the community of stakeholders. Variations also stem from the fact that one description of a particular MOM may be interpreted more favorably than another description of the same data.

In the mid-section of each worksheet, we include a sample chart to show one way the measure might be presented. Some of these sample charts are actual charts used in the company reports. Depiction of performance information is important for communicating performance achievements and for identifying performance problems. Graphical analysis of this data is also an analytical tool for identifying performance trends.

The lower half of the worksheet includes information regarding availability of data and the level at which DoD collects that data. Since the key to data collection is to take advantage of existing data collection activities, we indicate whether the data for a particular measure is being collected and reported at the DoD corporate level. In several instances, data collection occurs and remains at the installation level. Finally, on the worksheet, we identify whether the measure is a current DoD MOM and briefly mention some of the strengths and weaknesses of that particular measure as it relates to use within DoD.

### Beyond Compliance

Private sector companies understand that they can achieve significant economic, social, and competitive advantages by demonstrating environmental success through meaningful measures of merit. These companies believe they can reduce their operational costs and enhance their corporate image by improving environmental performance. They have learned that going beyond regulatory compliance by implementing environmental stewardship principles can result in significant competitive advantages.

While profit is not a corporate value for DoD, cost avoidance is a continuing DoD goal. Like private corporations, DoD must substantiate to their stakeholders (Congress and the public) how much it saves, or avoids cost, as well as its focus on environmental stewardship.

Almost all of the corporate annual reports reviewed during this evaluation thoroughly detail the concern and care given to environmental issues. Environmental stewardship is stressed. Almost universally, annual reports portray companies as environmental stakeholders whose operations minimize adverse impact to the environment through their pollution prevention initiatives and through other initiatives that go beyond just meeting or maintaining compliance with laws and regulations. Efforts to minimize adverse impacts to the environment demonstrate to the company stakeholders a reduction in environmental impacts and future liability while increasing profits. Adoption by DoD of some of the corporate level MOMs used by "best in class" companies can demonstrate to DoD stakeholders that the Department is focusing on similar concerns: minimizing environmental impacts, emphasizing cost avoidance, and lessening liability.

### Summary of Results

The various MOMs used by the "best in class" companies surveyed during this evaluation are comparable to those currently used by DoD. The literature on establishing a performance based measurement program stresses the need for relevant, reliable, understandable, and comparable data. Additionally, this data must be appropriate to the level of review and readily available without requiring a significant data gathering effort. With these considerations in mind and in the DoD continuing efforts to improve the DoD Environmental Program, we conclude that DoD might be interested in three of the MOMs developed by the surveyed companies. MOMs to consider for inclusion in the DoD environmental program are: "spills and releases," "fines and penalties," and "permit excursions and exceedances." The Department's use of these MOMs would demonstrate progressive environmental management, environmental stewardship, interest in reducing future liability, and timely and appropriate use of funds. In addition, using these MOMs would highlight the high degree of cooperation between the regulatory community and the Department.

## **Management Comments**

The Deputy Under Secretary of Defense (Environmental Security) states that DoD effectively demonstrates progressive environmental management, environmental stewardship, interest in reducing future liability, and timely and appropriate use of funds. The Deputy Under Secretary was pleased to see that DoD MOMs are comparable to the "best in class" companies surveyed. The three "best in class" developed MOMs suggested for inclusion in the DoD environmental program have been or will be evaluated.

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## **Part II - Additional Information**

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## **Appendix A. Scope and Methodology**

### **Scope**

This evaluation focuses on identifying MOMs used by "best in class" companies that lead to superior environmental compliance and pollution prevention programs. We limited the scope of the evaluation to focus on measures used by the selected companies that accurately portray progress in achieving compliance and pollution prevention goals and objectives. We did not include benchmarking or an assessment of strategic goals in this evaluation. Appendix D provides a short profile of each company selected for inclusion in this evaluation.

### **Methodology**

We began the evaluation by collecting preliminary data and identifying performance management efforts by DoD and other Federal agencies. Our initial efforts also provided information for developing criteria to identify best-in-class companies comprising national and international industry groups who sponsor performance measurement initiatives. From initial data, we also determined the criteria for assessing the credibility of specific performance measures.

Our initial research was primarily a review of environmental publications, congressional records, recent laws and regulations, the GAO reports database, and an Internet search on the topic of performance measurements. From the literature review, we developed a list of private corporations and other groups active in environmental performance measures. We reduced this list by selecting only those corporations with representatives active in one or more industry groups and initiatives, especially in international efforts to develop environmental performance evaluation standards. We also included recent winners of the Malcolm Baldrige Quality Award. This award is a quality management award administered by the Secretary of Commerce and the National Institute of Standards and Technology.

After reducing the list, we researched and reviewed the annual business reports and environmental progress reports of the key corporations. From those reports, we further refined our list of candidates for on-site interviews and data gathering. Candidate selection was based on the type of organization; recommendations from industry groups and industry leaders; the uniqueness and reputation of the corporation's environmental program; the corporation's geographic location; and availability of IG resources.

To select corporations for on-site interviews, we considered large, multi-level national and international corporations with industrial operations having environmental concerns similar to those of DoD (e.g., manufacturing, heavy maintenance, chemicals, electronics and avionics, weapons system manufacturing, aeronautics, shipbuilding, etc.). We visited those corporations having active, quality programs based on: published articles; quality award winners; participation in the International Organization for Standardization ISO 14000; member corporations of Global Environmental Management Initiative; and recommendations from people involved in performance measurement.

The team conducted over 35 interviews at 27 selected corporations and organizations. We interviewed corporate vice presidents or directors of 17 of the corporations. Besides corporations, many organizations have done work regarding environmental performance measurement. We consulted with representatives from the following organizations: ISO Technical Committee 207 on Environmental Management's U.S. Technical Advisory Group on Environmental Performance Evaluation; Canadian Standards Association; Global Environmental Management Initiative; the American National Standards Institute; International Chamber of Commerce; Chemical Manufacturing Association; Coalition of Environmentally Responsible Economies; and the Public Environmental Reporting Initiative participants.

We also gathered data from other Federal agencies during various phases of this evaluation. The Occupational Safety and Health Administration's Office of Measurements discussed with us their efforts in MOM development under the GPRA pilot program. We also contacted the National Institute of Standards and Technology's Malcolm Baldrige National Quality Award Office, who provided us with the list of recent award-winning companies. The Department of Treasury's Financial Management Service provided us a copy of their performance measurement guide. The Defense Environmental Security Corporate Information Management office provided us information on environmental data availability.

After gathering data through interviews and company reports, we screened the data to identify compliance and pollution prevention measures of merit used by the selected companies and compared them with the current DoD MOMs. Finally, we analyzed corporate MOMs used by the companies to determine their potential application in improving the DoD Environmental Quality Program. In our screening and analysis of company MOMs for their applicability to DoD, we considered whether the corporate MOMs met the characteristics of good MOMs, that is, their relevance to DoD operations, their reliability, the probability for public understanding, and whether the data was comparable from one reporting period to another. In addition, we focused our evaluation on corporate MOMs used by eight or more (approximately 50 percent) of the companies surveyed.

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## **Appendix B. Summary of Prior Audits and Other Reviews**

Inspector General, DoD, Program Evaluation Report, "Comparison of Environmental Fines and Penalties levied against the Department of Defense and Private Industry," October 25, 1993, provided a comparative analysis of the past environmental compliance performance of DoD and private industry. The evaluation determined that DoD installations received notices of violation and pay fines at higher rates than private companies. The evaluation concluded that DoD environmental data sources may not accurately reflect the environmental compliance status of the Department. The report recommended that the Deputy Under Secretary of Defense (Environmental Security), in coordination with the Military Departments, establish a DoD-wide system that accurately tracks notices of violation rates and associated fines and penalties.

Inspector General, DoD, Audit Report No. 92-011, November 8, 1991, "Environmental Compliance Assessment Programs," evaluated the effectiveness of the DoD environmental compliance assessment program. The audit concluded that the DoD environmental compliance assessment programs were not fully implemented or effective overall. The report recommended that OSD establish the environmental compliance assessment program through regulatory guidance. The report also recommended that DoD Components provide appropriate staffing to implement the program and maintain adequate program visibility and oversight. The Deputy Assistant Secretary of Defense (Environment) nonconcurred with the recommendation to issue a directive requiring environmental compliance assessment programs. Instead the Deputy Assistant Secretary of Defense (Environment) proposed issuing a directive with a policy statement and an instruction with program details. The Assistant Secretaries of the Military Departments were responsive to the intent of the recommendations regarding guidance on visibility and staffing of environmental functions.

## Appendix C. MOM Worksheets

This appendix is a series of one page worksheets modeled after the example shown in Appendix E of the November 1993 "Performance Measurement Guide", Department of the Treasury. The worksheets provide relevant information on each of the compliance and pollution prevention MOMs used by the companies surveyed for this report. Each metric is linked with its goal in the upper half of the worksheet. In the mid-section of each worksheet, there is a sample chart to show one way the measure might be presented. The lower half of the worksheet includes information regarding availability of data, whether the measure is a DoD MOM, and briefly some of the strengths and weaknesses of that particular measure.

| COMPLIANCE MEASUREMENT |                                                                                                                                                                                                                                                                           |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Air Emissions          |                                                                                                                                                                                                                                                                           |
| Goal                   | Maintain an effective program to reduce air emissions<br>(Example, reduce air emissions by 60 percent by year 2000 from base year 1987)                                                                                                                                   |
| Objective              | Reduce air emissions                                                                                                                                                                                                                                                      |
| Measurement            | Reportable emissions by pounds or tons                                                                                                                                                                                                                                    |
| Variations             | <ul style="list-style-type: none"><li>- Worldwide releases, per million pounds per year</li><li>- On-site releases per million pounds</li><li>- Coal-burning emissions in pounds/million British Thermal Units</li><li>- Volatile Organic Carbons by tons or Kg</li></ul> |

**Emissions From Coal Burning (Pounds/million BTUs)**

| Year | NOx   | SOx   |
|------|-------|-------|
| 1990 | 0.316 | 0.584 |
| 1991 | 0.321 | 0.615 |
| 1992 | 0.314 | 0.601 |
| 1993 | 0.331 | 0.609 |

■ NOx   ■ SOx

Note: NOx indicates oxides of nitrogen and SOx indicates oxides of sulfur

|                          |                                                                                                                                                                                                                                  |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Availability of DoD Data | <ul style="list-style-type: none"><li>- Data is collected at the installation level</li><li>- DESCIM is working to integrate the collection of this information into its Hazardous Substances Management System module</li></ul> |
| Current DoD MOM          | Yes; hazardous air pollutants reported under TRI                                                                                                                                                                                 |
| Strengths                | Reflects organizations' compliance with laws and regulations; represents commitment to reduce adverse environmental impact of operations                                                                                         |
| Weaknesses               | Reporting of large amounts of air emissions represents negative performance                                                                                                                                                      |

## Appendix C. MOM Worksheets

| COMPLIANCE MEASUREMENT<br>Cleanup Required                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                               |                         |                 |                |   |               |    |                |    |              |    |       |    |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|-----------------|----------------|---|---------------|----|----------------|----|--------------|----|-------|----|
| Goal                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Zero remediation sites<br>(Example, reduce remediation sites by 45 percent by 1998 from base year 1989)                                                                                                                                                                                                                                                                                                                       |                         |                 |                |   |               |    |                |    |              |    |       |    |
| Objective                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Reduce the number of remediation sites                                                                                                                                                                                                                                                                                                                                                                                        |                         |                 |                |   |               |    |                |    |              |    |       |    |
| Measurement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Number of sites remediated                                                                                                                                                                                                                                                                                                                                                                                                    |                         |                 |                |   |               |    |                |    |              |    |       |    |
| Variations                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"> <li>- Cleanup liability costs compared to industry average</li> <li>- Number of remediation sites by category of production, by current operating sites, by past operations sites, by non-company sites and by estimated dollar amounts to effect remediation</li> </ul>                                                                                                                   |                         |                 |                |   |               |    |                |    |              |    |       |    |
| <div style="text-align: center;"> <p><b>Number of Environmental Cleanup Sites<br/>by Monetary Classification</b></p> <table border="1"> <caption>Data for Number of Environmental Cleanup Sites by Monetary Classification</caption> <thead> <tr> <th>Monetary Classification</th> <th>Number of Sites</th> </tr> </thead> <tbody> <tr> <td>\$10M and Over</td> <td>8</td> </tr> <tr> <td>\$1M to \$10M</td> <td>30</td> </tr> <tr> <td>\$0.1M to \$1M</td> <td>38</td> </tr> <tr> <td>Under \$0.1M</td> <td>28</td> </tr> <tr> <td>\$TBD</td> <td>18</td> </tr> </tbody> </table> </div> |                                                                                                                                                                                                                                                                                                                                                                                                                               | Monetary Classification | Number of Sites | \$10M and Over | 8 | \$1M to \$10M | 30 | \$0.1M to \$1M | 38 | Under \$0.1M | 28 | \$TBD | 18 |
| Monetary Classification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Number of Sites                                                                                                                                                                                                                                                                                                                                                                                                               |                         |                 |                |   |               |    |                |    |              |    |       |    |
| \$10M and Over                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 8                                                                                                                                                                                                                                                                                                                                                                                                                             |                         |                 |                |   |               |    |                |    |              |    |       |    |
| \$1M to \$10M                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 30                                                                                                                                                                                                                                                                                                                                                                                                                            |                         |                 |                |   |               |    |                |    |              |    |       |    |
| \$0.1M to \$1M                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 38                                                                                                                                                                                                                                                                                                                                                                                                                            |                         |                 |                |   |               |    |                |    |              |    |       |    |
| Under \$0.1M                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 28                                                                                                                                                                                                                                                                                                                                                                                                                            |                         |                 |                |   |               |    |                |    |              |    |       |    |
| \$TBD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 18                                                                                                                                                                                                                                                                                                                                                                                                                            |                         |                 |                |   |               |    |                |    |              |    |       |    |
| Availability of DoD Data                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"> <li>- Data is captured at the installation level</li> <li>- This information falls under the Defense Environmental Restoration Program rather than the Compliance program in DoD</li> <li>- DoD is reporting the data via the "Defense Environmental Cleanup Program Annual Report"; the DESCIM Defense Site Environmental Restoration Tracking System collects the information</li> </ul> |                         |                 |                |   |               |    |                |    |              |    |       |    |
| Current DoD MOM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Yes                                                                                                                                                                                                                                                                                                                                                                                                                           |                         |                 |                |   |               |    |                |    |              |    |       |    |
| Strengths                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Reflects record of compliance with laws and regulations; represents organizations' progress in cleaning up sites                                                                                                                                                                                                                                                                                                              |                         |                 |                |   |               |    |                |    |              |    |       |    |
| Weaknesses                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Represents negative performance if a large number of sites are identified or cleanup proceeds slowly                                                                                                                                                                                                                                                                                                                          |                         |                 |                |   |               |    |                |    |              |    |       |    |

| COMPLIANCE MEASUREMENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                       |      |                             |      |     |      |     |      |     |      |     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-----------------------------|------|-----|------|-----|------|-----|------|-----|
| Fines and Penalties                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                       |      |                             |      |     |      |     |      |     |      |     |
| Goal                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Zero fines and penalties<br>(Example, full compliance; no fines or penalties)                                                                                                                                                                                                                                                                                                                                         |      |                             |      |     |      |     |      |     |      |     |
| Objective                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Maximize compliance with all environmental regulations                                                                                                                                                                                                                                                                                                                                                                |      |                             |      |     |      |     |      |     |      |     |
| Measurement                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Amount paid for environmental fines and penalties                                                                                                                                                                                                                                                                                                                                                                     |      |                             |      |     |      |     |      |     |      |     |
| Variations                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"> <li>- Environmental fines paid in thousands of dollars per year; often compared to base year</li> <li>- Environmental fines paid in millions of dollars per year, comparison of company to all industry</li> <li>- Total value paid by environmental statute by year</li> <li>- Number of penalties and penalty indices of the company compared to the industry average</li> </ul> |      |                             |      |     |      |     |      |     |      |     |
| <div style="text-align: center;"> <p><b>Fines and Penalties</b><br/>In Thousands of U.S. Dollars<br/>Per Year</p> <table border="1"> <caption>Fines and Penalties Data (in thousands of U.S. dollars)</caption> <thead> <tr> <th>Year</th> <th>Fines and Penalties (\$000)</th> </tr> </thead> <tbody> <tr> <td>1990</td> <td>250</td> </tr> <tr> <td>1991</td> <td>125</td> </tr> <tr> <td>1992</td> <td>175</td> </tr> <tr> <td>1993</td> <td>160</td> </tr> </tbody> </table> </div> |                                                                                                                                                                                                                                                                                                                                                                                                                       | Year | Fines and Penalties (\$000) | 1990 | 250 | 1991 | 125 | 1992 | 175 | 1993 | 160 |
| Year                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Fines and Penalties (\$000)                                                                                                                                                                                                                                                                                                                                                                                           |      |                             |      |     |      |     |      |     |      |     |
| 1990                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 250                                                                                                                                                                                                                                                                                                                                                                                                                   |      |                             |      |     |      |     |      |     |      |     |
| 1991                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 125                                                                                                                                                                                                                                                                                                                                                                                                                   |      |                             |      |     |      |     |      |     |      |     |
| 1992                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 175                                                                                                                                                                                                                                                                                                                                                                                                                   |      |                             |      |     |      |     |      |     |      |     |
| 1993                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 160                                                                                                                                                                                                                                                                                                                                                                                                                   |      |                             |      |     |      |     |      |     |      |     |
| Availability of DoD Data                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"> <li>- Data is collected at the installation level; data may also be available from the regulators</li> <li>- Information could be available from DESCIM Compliance Deficiency Management Module if it were fully deployed</li> </ul>                                                                                                                                               |      |                             |      |     |      |     |      |     |      |     |
| Current DoD MOM                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | No                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                             |      |     |      |     |      |     |      |     |
| Strengths                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Reflects organizations' record of compliance with laws and regulation; represents a level of an organizations' cost avoidance                                                                                                                                                                                                                                                                                         |      |                             |      |     |      |     |      |     |      |     |
| Weaknesses                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Represents negative performance; reflects regulators' level of activity; could be significant amount of time (2 years) between inspections when violation was identified and the actual payment of the negotiated fine                                                                                                                                                                                                |      |                             |      |     |      |     |      |     |      |     |

## Appendix C. MOM Worksheets

| COMPLIANCE MEASUREMENT<br>Notices of Violation                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                          |      |               |      |    |      |   |      |   |      |   |      |   |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|---------------|------|----|------|---|------|---|------|---|------|---|
| Goal                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Zero notices of violation and non-compliance<br>(Example, 100 percent compliance with environmental regulations)                                                                                                                                                                                                                         |      |               |      |    |      |   |      |   |      |   |      |   |
| Objective                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Full compliance with all environmental laws and regulations                                                                                                                                                                                                                                                                              |      |               |      |    |      |   |      |   |      |   |      |   |
| Measurement                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Number of notices of violation                                                                                                                                                                                                                                                                                                           |      |               |      |    |      |   |      |   |      |   |      |   |
| Variations                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"> <li>- Number of enforcement actions</li> <li>- Number of matters resolved in consent decrees or administrative orders</li> <li>- Count the number of NOV cover letters, not individual deficiencies</li> <li>- Government enforcement action reported quarterly</li> </ul>                            |      |               |      |    |      |   |      |   |      |   |      |   |
| <div style="text-align: center;"> <p><b>Number of Notices of Violation (NOV)</b><br/>per Year</p> <table border="1"> <caption>Data for Number of Notices of Violation (NOV) per Year</caption> <thead> <tr> <th>Year</th> <th>Number of NOV</th> </tr> </thead> <tbody> <tr> <td>1990</td> <td>10</td> </tr> <tr> <td>1991</td> <td>8</td> </tr> <tr> <td>1992</td> <td>5</td> </tr> <tr> <td>1993</td> <td>7</td> </tr> <tr> <td>1994</td> <td>3</td> </tr> </tbody> </table> </div> |                                                                                                                                                                                                                                                                                                                                          | Year | Number of NOV | 1990 | 10 | 1991 | 8 | 1992 | 5 | 1993 | 7 | 1994 | 3 |
| Year                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Number of NOV                                                                                                                                                                                                                                                                                                                            |      |               |      |    |      |   |      |   |      |   |      |   |
| 1990                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 10                                                                                                                                                                                                                                                                                                                                       |      |               |      |    |      |   |      |   |      |   |      |   |
| 1991                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 8                                                                                                                                                                                                                                                                                                                                        |      |               |      |    |      |   |      |   |      |   |      |   |
| 1992                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 5                                                                                                                                                                                                                                                                                                                                        |      |               |      |    |      |   |      |   |      |   |      |   |
| 1993                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 7                                                                                                                                                                                                                                                                                                                                        |      |               |      |    |      |   |      |   |      |   |      |   |
| 1994                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 3                                                                                                                                                                                                                                                                                                                                        |      |               |      |    |      |   |      |   |      |   |      |   |
| Availability of DoD Data                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"> <li>- Data collected at the installation level</li> <li>- DESCIM Compliance Deficiency Management Module tracks NOV's and other enforcement actions; however, the module is not fully deployed within DoD</li> </ul>                                                                                  |      |               |      |    |      |   |      |   |      |   |      |   |
| Current DoD MOM                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Yes                                                                                                                                                                                                                                                                                                                                      |      |               |      |    |      |   |      |   |      |   |      |   |
| Strengths                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Reflects the organizations' record of compliance with laws and regulations; precursor to potential issuance of fines; provides indication of environmental performance                                                                                                                                                                   |      |               |      |    |      |   |      |   |      |   |      |   |
| Weaknesses                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"> <li>- Represents negative performance if the number of NOV's increases</li> <li>- Reflects regulators' level of activity; NOV's (NONs) could result from administrative errors in meeting the regulatory requirements, and not an actual adverse effect on human health or the environment</li> </ul> |      |               |      |    |      |   |      |   |      |   |      |   |

| COMPLIANCE MEASUREMENT<br>Polychlorinated Biphenyl (PCB)                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                      |      |                 |      |     |      |     |      |     |      |     |      |    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-----------------|------|-----|------|-----|------|-----|------|-----|------|----|
| Goal                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Minimize the use of PCBs<br>(Example, phase out PCBs and PCB containing equipment at all facilities worldwide)                                                                                                                                       |      |                 |      |     |      |     |      |     |      |     |      |    |
| Objective                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Reduce all PCB use                                                                                                                                                                                                                                   |      |                 |      |     |      |     |      |     |      |     |      |    |
| Measurement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Reduction of PCBs                                                                                                                                                                                                                                    |      |                 |      |     |      |     |      |     |      |     |      |    |
| Variations                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>- Number and locations where the use of PCBs or PCB containing equipment are eliminated</li> <li>- Percentage of PCB waste recycled, recovered, incinerated, landfilled and treated by other means</li> </ul> |      |                 |      |     |      |     |      |     |      |     |      |    |
| <div data-bbox="479 644 1144 1029" data-label="Figure"> <p><b>Projected Number of Sites Using PCBs by Year</b></p> <table border="1"> <caption>Projected Number of Sites Using PCBs by Year</caption> <thead> <tr> <th>Year</th> <th>Number of Sites</th> </tr> </thead> <tbody> <tr> <td>1996</td> <td>750</td> </tr> <tr> <td>1997</td> <td>420</td> </tr> <tr> <td>1998</td> <td>220</td> </tr> <tr> <td>1999</td> <td>100</td> </tr> <tr> <td>2000</td> <td>50</td> </tr> </tbody> </table> </div> |                                                                                                                                                                                                                                                      | Year | Number of Sites | 1996 | 750 | 1997 | 420 | 1998 | 220 | 1999 | 100 | 2000 | 50 |
| Year                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Number of Sites                                                                                                                                                                                                                                      |      |                 |      |     |      |     |      |     |      |     |      |    |
| 1996                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 750                                                                                                                                                                                                                                                  |      |                 |      |     |      |     |      |     |      |     |      |    |
| 1997                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 420                                                                                                                                                                                                                                                  |      |                 |      |     |      |     |      |     |      |     |      |    |
| 1998                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 220                                                                                                                                                                                                                                                  |      |                 |      |     |      |     |      |     |      |     |      |    |
| 1999                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 100                                                                                                                                                                                                                                                  |      |                 |      |     |      |     |      |     |      |     |      |    |
| 2000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 50                                                                                                                                                                                                                                                   |      |                 |      |     |      |     |      |     |      |     |      |    |
| Availability of DoD Data                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Information is available at the installation level; but is not reported via a DESCIM module                                                                                                                                                          |      |                 |      |     |      |     |      |     |      |     |      |    |
| Current DoD MOM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | No                                                                                                                                                                                                                                                   |      |                 |      |     |      |     |      |     |      |     |      |    |
| Strengths                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Reflects organizations' record of compliance with laws and regulations and a commitment to reduce the use of toxic materials                                                                                                                         |      |                 |      |     |      |     |      |     |      |     |      |    |
| Weaknesses                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Data showing no reduction in use over time may give a false impression of poor environmental performance; may also represent future liability for the organization                                                                                   |      |                 |      |     |      |     |      |     |      |     |      |    |

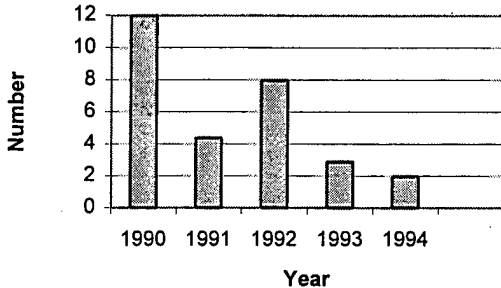
## Appendix C. MOM Worksheets

| COMPLIANCE MEASUREMENT<br>Permit Excursions and Exceedances                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                               |      |        |      |   |      |   |      |   |      |   |      |   |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|--------|------|---|------|---|------|---|------|---|------|---|
| Goal                                                                                                                                                                                                                                                                                                                                                                                                                                                    | No excursions or exceedances<br>(Example, 100 percent compliance with environmental regulations)                                                                                                                                                                                                                              |      |        |      |   |      |   |      |   |      |   |      |   |
| Objective                                                                                                                                                                                                                                                                                                                                                                                                                                               | Minimize adverse environmental impacts of operations                                                                                                                                                                                                                                                                          |      |        |      |   |      |   |      |   |      |   |      |   |
| Measurement                                                                                                                                                                                                                                                                                                                                                                                                                                             | Number of excursions and exceedances                                                                                                                                                                                                                                                                                          |      |        |      |   |      |   |      |   |      |   |      |   |
| Variations                                                                                                                                                                                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"> <li>- Total reportable excursions by sector, year, or region compared to a base year</li> <li>- Number of incidents as determined by permit</li> <li>- Wastewater discharge permit exceedances</li> <li>- Permit restrictions (indices by company compared to industry average)</li> </ul> |      |        |      |   |      |   |      |   |      |   |      |   |
| <div style="text-align: center;"> <p><b>Number of Permit Excursions per Year</b></p> <table border="1"> <caption>Data for Number of Permit Excursions per Year</caption> <thead> <tr> <th>Year</th> <th>Number</th> </tr> </thead> <tbody> <tr> <td>1990</td> <td>5</td> </tr> <tr> <td>1991</td> <td>3</td> </tr> <tr> <td>1992</td> <td>1</td> </tr> <tr> <td>1993</td> <td>0</td> </tr> <tr> <td>1994</td> <td>1</td> </tr> </tbody> </table> </div> |                                                                                                                                                                                                                                                                                                                               | Year | Number | 1990 | 5 | 1991 | 3 | 1992 | 1 | 1993 | 0 | 1994 | 1 |
| Year                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Number                                                                                                                                                                                                                                                                                                                        |      |        |      |   |      |   |      |   |      |   |      |   |
| 1990                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 5                                                                                                                                                                                                                                                                                                                             |      |        |      |   |      |   |      |   |      |   |      |   |
| 1991                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 3                                                                                                                                                                                                                                                                                                                             |      |        |      |   |      |   |      |   |      |   |      |   |
| 1992                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1                                                                                                                                                                                                                                                                                                                             |      |        |      |   |      |   |      |   |      |   |      |   |
| 1993                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 0                                                                                                                                                                                                                                                                                                                             |      |        |      |   |      |   |      |   |      |   |      |   |
| 1994                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1                                                                                                                                                                                                                                                                                                                             |      |        |      |   |      |   |      |   |      |   |      |   |
| Availability of DoD Data                                                                                                                                                                                                                                                                                                                                                                                                                                | Data is collected at the installation level in accordance with permit stipulations                                                                                                                                                                                                                                            |      |        |      |   |      |   |      |   |      |   |      |   |
| Current DoD MOM                                                                                                                                                                                                                                                                                                                                                                                                                                         | No                                                                                                                                                                                                                                                                                                                            |      |        |      |   |      |   |      |   |      |   |      |   |
| Strengths                                                                                                                                                                                                                                                                                                                                                                                                                                               | Reflects the organizations' record of compliance with laws and regulations; provides data for trend analysis of environmental performance; precursor to NOV's and NONs                                                                                                                                                        |      |        |      |   |      |   |      |   |      |   |      |   |
| Weaknesses                                                                                                                                                                                                                                                                                                                                                                                                                                              | Represents negative performance; data is difficult and costly to collect                                                                                                                                                                                                                                                      |      |        |      |   |      |   |      |   |      |   |      |   |

| COMPLIANCE MEASUREMENT<br>Spills and Releases                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |      |        |      |      |      |      |      |   |      |   |      |   |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|--------|------|------|------|------|------|---|------|---|------|---|
| Goal                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Minimize spills and releases to the environment<br>(Example, 100 percent compliance with environmental regulations)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |      |        |      |      |      |      |      |   |      |   |      |   |
| Objective                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Full compliance with all environmental laws and regulations                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |        |      |      |      |      |      |   |      |   |      |   |
| Measurement                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Number of reportable spills                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |        |      |      |      |      |      |   |      |   |      |   |
| Variations                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"> <li>- Total US reportable spills in thousands of pounds</li> <li>- Number of spills by year, sector, or region</li> <li>- Reportable spills over 100 Kg or whenever it exceeds the reportable amount for that jurisdiction; quantify on a quarterly basis</li> <li>- Environmental incidents that have off-site impact</li> <li>- Reported spills (number of pounds or gallons or with the company compared to the industry average)</li> <li>- Number and severity of releases/spills</li> <li>- Spills or releases reported to any government agency</li> </ul> |      |        |      |      |      |      |      |   |      |   |      |   |
| <div style="text-align: center;"> <p><b>Number of Spills &amp; Releases<br/>per Year</b></p> <table border="1"> <caption>Data for Number of Spills &amp; Releases per Year</caption> <thead> <tr> <th>Year</th> <th>Number</th> </tr> </thead> <tbody> <tr> <td>1990</td> <td>11.5</td> </tr> <tr> <td>1991</td> <td>10.5</td> </tr> <tr> <td>1992</td> <td>6</td> </tr> <tr> <td>1993</td> <td>7</td> </tr> <tr> <td>1994</td> <td>5</td> </tr> </tbody> </table> </div> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Year | Number | 1990 | 11.5 | 1991 | 10.5 | 1992 | 6 | 1993 | 7 | 1994 | 5 |
| Year                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Number                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |      |        |      |      |      |      |      |   |      |   |      |   |
| 1990                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 11.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |      |        |      |      |      |      |      |   |      |   |      |   |
| 1991                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 10.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |      |        |      |      |      |      |      |   |      |   |      |   |
| 1992                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |        |      |      |      |      |      |   |      |   |      |   |
| 1993                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |        |      |      |      |      |      |   |      |   |      |   |
| 1994                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |        |      |      |      |      |      |   |      |   |      |   |
| Availability of DoD Data                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"> <li>- Data collected at the installation level</li> <li>- Certain substances exceeding different threshold levels require reporting to higher headquarters or regulatory agencies</li> <li>- DoD tracks spills and releases that are over \$1 million in accordance with DoD Instruction 4715.6; Navy is tracking spills and releases of "any" size</li> </ul>                                                                                                                                                                                                    |      |        |      |      |      |      |      |   |      |   |      |   |
| Current DoD MOM                                                                                                                                                                                                                                                                                                                                                                                                                                                           | No                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |      |        |      |      |      |      |      |   |      |   |      |   |
| Strengths                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Reflects organizations' record of compliance with laws and regulations; demonstrates an organization's attempt to minimize future spills and thereby reduce potential liability                                                                                                                                                                                                                                                                                                                                                                                                                      |      |        |      |      |      |      |      |   |      |   |      |   |
| Weaknesses                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Represents negative performance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |      |        |      |      |      |      |      |   |      |   |      |   |

## Appendix C. MOM Worksheets

| COMPLIANCE MEASUREMENT<br>Underground Storage Tanks                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                   |      |                             |      |    |      |    |      |     |      |     |      |     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-----------------------------|------|----|------|----|------|-----|------|-----|------|-----|
| Goal                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Meet EPA 1998 compliance standards<br>(Example, upgrade all underground storage to new tank standards worldwide by 1995)                                                                                                                                                          |      |                             |      |    |      |    |      |     |      |     |      |     |
| Objective                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Full compliance with the 1998 UST standards                                                                                                                                                                                                                                       |      |                             |      |    |      |    |      |     |      |     |      |     |
| Measurement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Number of USTs meeting 1998 standards compared to base year                                                                                                                                                                                                                       |      |                             |      |    |      |    |      |     |      |     |      |     |
| Variations                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"> <li>- Percent of UST upgraded annually</li> <li>- Double-containment fuel systems installed at all new and renovated sites</li> </ul>                                                                                                          |      |                             |      |    |      |    |      |     |      |     |      |     |
| <p style="text-align: center;"><b>Number of New Double Containment Fuel Systems Installed</b></p> <table border="1"> <caption>Data for Number of New Double Containment Fuel Systems Installed</caption> <thead> <tr> <th>Year</th> <th>Number of Systems Installed</th> </tr> </thead> <tbody> <tr> <td>1990</td> <td>39</td> </tr> <tr> <td>1991</td> <td>92</td> </tr> <tr> <td>1992</td> <td>119</td> </tr> <tr> <td>1993</td> <td>127</td> </tr> <tr> <td>1994</td> <td>135</td> </tr> </tbody> </table> |                                                                                                                                                                                                                                                                                   | Year | Number of Systems Installed | 1990 | 39 | 1991 | 92 | 1992 | 119 | 1993 | 127 | 1994 | 135 |
| Year                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Number of Systems Installed                                                                                                                                                                                                                                                       |      |                             |      |    |      |    |      |     |      |     |      |     |
| 1990                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 39                                                                                                                                                                                                                                                                                |      |                             |      |    |      |    |      |     |      |     |      |     |
| 1991                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 92                                                                                                                                                                                                                                                                                |      |                             |      |    |      |    |      |     |      |     |      |     |
| 1992                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 119                                                                                                                                                                                                                                                                               |      |                             |      |    |      |    |      |     |      |     |      |     |
| 1993                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 127                                                                                                                                                                                                                                                                               |      |                             |      |    |      |    |      |     |      |     |      |     |
| 1994                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 135                                                                                                                                                                                                                                                                               |      |                             |      |    |      |    |      |     |      |     |      |     |
| Availability of DoD Data                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"> <li>- Data collected at the installation level</li> <li>- The stand-alone PC software module "Tankman," from DESCIM, tracks the physical characteristics, compliance status and the history of above and below ground storage tanks</li> </ul> |      |                             |      |    |      |    |      |     |      |     |      |     |
| Current DoD MOM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Yes                                                                                                                                                                                                                                                                               |      |                             |      |    |      |    |      |     |      |     |      |     |
| Strengths                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Reflects the organizations' compliance with laws and regulations                                                                                                                                                                                                                  |      |                             |      |    |      |    |      |     |      |     |      |     |
| Weaknesses                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Represents negative performance after the 1998 deadline                                                                                                                                                                                                                           |      |                             |      |    |      |    |      |     |      |     |      |     |

| COMPLIANCE MEASUREMENT<br>Wastewater (excludes stormwater)                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                  |      |        |      |    |      |   |      |   |      |   |      |   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|--------|------|----|------|---|------|---|------|---|------|---|
| Goal                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Full compliance with all wastewater permits                                                                                                                                                      |      |        |      |    |      |   |      |   |      |   |      |   |
| Objective                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Reduce waste water non-compliance                                                                                                                                                                |      |        |      |    |      |   |      |   |      |   |      |   |
| Measurement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Number of annual non-compliance notices                                                                                                                                                          |      |        |      |    |      |   |      |   |      |   |      |   |
| Variations                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"> <li>- Waste water excursions and reportable incidents</li> <li>- Discharge permit exceedances</li> </ul>                                                      |      |        |      |    |      |   |      |   |      |   |      |   |
| <div style="text-align: center;"> <p><b>Wastewater Incidents<br/>(Number Reportable by Year)</b></p>  <table border="1"> <caption>Wastewater Incidents Data</caption> <thead> <tr> <th>Year</th> <th>Number</th> </tr> </thead> <tbody> <tr> <td>1990</td> <td>12</td> </tr> <tr> <td>1991</td> <td>4</td> </tr> <tr> <td>1992</td> <td>8</td> </tr> <tr> <td>1993</td> <td>3</td> </tr> <tr> <td>1994</td> <td>2</td> </tr> </tbody> </table> </div> |                                                                                                                                                                                                  | Year | Number | 1990 | 12 | 1991 | 4 | 1992 | 8 | 1993 | 3 | 1994 | 2 |
| Year                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Number                                                                                                                                                                                           |      |        |      |    |      |   |      |   |      |   |      |   |
| 1990                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 12                                                                                                                                                                                               |      |        |      |    |      |   |      |   |      |   |      |   |
| 1991                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 4                                                                                                                                                                                                |      |        |      |    |      |   |      |   |      |   |      |   |
| 1992                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 8                                                                                                                                                                                                |      |        |      |    |      |   |      |   |      |   |      |   |
| 1993                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 3                                                                                                                                                                                                |      |        |      |    |      |   |      |   |      |   |      |   |
| 1994                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 2                                                                                                                                                                                                |      |        |      |    |      |   |      |   |      |   |      |   |
| Availability of DoD Data                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"> <li>- Data collected at the installation level</li> <li>- No DESCIM module currently exists; a water module is currently being developed by DESCIM</li> </ul> |      |        |      |    |      |   |      |   |      |   |      |   |
| Current DoD MOM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Yes                                                                                                                                                                                              |      |        |      |    |      |   |      |   |      |   |      |   |
| Strengths                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Reflects organizations' record of compliance with laws and regulations                                                                                                                           |      |        |      |    |      |   |      |   |      |   |      |   |
| Weaknesses                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Represents negative performance if the trend of waste water violations remains the same or increases                                                                                             |      |        |      |    |      |   |      |   |      |   |      |   |

## Appendix C. MOM Worksheets

| POLLUTION PREVENTION MEASUREMENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |      |                  |      |       |      |       |      |       |      |       |      |       |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------------------|------|-------|------|-------|------|-------|------|-------|------|-------|
| Energy Conservation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |      |                  |      |       |      |       |      |       |      |       |      |       |
| Goal                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Maintain an effective energy conservation program<br>(Example, reduce energy cost by 20 percent by end of 1995)                                                                                                                                                                                                                                                                                                                                                               |      |                  |      |       |      |       |      |       |      |       |      |       |
| Objective                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Reduce energy consumption                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |                  |      |       |      |       |      |       |      |       |      |       |
| Measurement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Energy consumption by tracking fossil fuel and electric usage                                                                                                                                                                                                                                                                                                                                                                                                                 |      |                  |      |       |      |       |      |       |      |       |      |       |
| Variations                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"> <li>- Percentage of improvement in energy efficiency per unit of production or per square foot of office space</li> <li>- Electricity by kilowatt hours and costs</li> <li>- Fuel usage in gallons/liters/Kilowatts per unit of production per year</li> <li>- Total energy use and energy/production index compared to industry average</li> <li>- Energy usage by facility size, weather conditions, and volume of production</li> </ul> |      |                  |      |       |      |       |      |       |      |       |      |       |
| <div style="text-align: center;"> <b>Energy Use</b><br/> <b>(BTUs per sq.ft. of Production Space)</b> </div> <table border="1"> <caption>Energy Use Data (BTUs per sq.ft. of Production Space)</caption> <thead> <tr> <th>Year</th> <th>BTUs per sq. ft.</th> </tr> </thead> <tbody> <tr> <td>1989</td> <td>14300</td> </tr> <tr> <td>1990</td> <td>13700</td> </tr> <tr> <td>1991</td> <td>14400</td> </tr> <tr> <td>1992</td> <td>14400</td> </tr> <tr> <td>1993</td> <td>13250</td> </tr> </tbody> </table> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Year | BTUs per sq. ft. | 1989 | 14300 | 1990 | 13700 | 1991 | 14400 | 1992 | 14400 | 1993 | 13250 |
| Year                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | BTUs per sq. ft.                                                                                                                                                                                                                                                                                                                                                                                                                                                              |      |                  |      |       |      |       |      |       |      |       |      |       |
| 1989                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 14300                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |                  |      |       |      |       |      |       |      |       |      |       |
| 1990                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 13700                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |                  |      |       |      |       |      |       |      |       |      |       |
| 1991                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 14400                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |                  |      |       |      |       |      |       |      |       |      |       |
| 1992                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 14400                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |                  |      |       |      |       |      |       |      |       |      |       |
| 1993                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 13250                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |                  |      |       |      |       |      |       |      |       |      |       |
| Availability of DoD Data                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Data collected at the installation level; monitored and reported by DUSD (Industrial Affairs and Installations)                                                                                                                                                                                                                                                                                                                                                               |      |                  |      |       |      |       |      |       |      |       |      |       |
| Current DoD MOM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |                  |      |       |      |       |      |       |      |       |      |       |
| Strengths                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Reflects organizations' environmental stewardship; reflects a level of cost savings or cost avoidance                                                                                                                                                                                                                                                                                                                                                                         |      |                  |      |       |      |       |      |       |      |       |      |       |
| Weaknesses                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Difficult to quantify the impact of energy conservation on the environment                                                                                                                                                                                                                                                                                                                                                                                                    |      |                  |      |       |      |       |      |       |      |       |      |       |

| POLLUTION PREVENTION MEASUREMENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                              |      |                   |      |    |      |    |      |    |      |    |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-------------------|------|----|------|----|------|----|------|----|
| Hazardous Material Reduction                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                              |      |                   |      |    |      |    |      |    |      |    |
| Goal                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Maintain an effective Hazardous Material Management Program                                                                                                                                                                  |      |                   |      |    |      |    |      |    |      |    |
| Objective                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Reduce the use of hazardous material                                                                                                                                                                                         |      |                   |      |    |      |    |      |    |      |    |
| Measurement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Hazardous materials reduction in millions of pounds                                                                                                                                                                          |      |                   |      |    |      |    |      |    |      |    |
| Variations                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | - Reduction in the amounts of hazardous material by percentage                                                                                                                                                               |      |                   |      |    |      |    |      |    |      |    |
| <div data-bbox="435 485 1198 987" data-label="Figure"> <p style="text-align: center;"><b>Hazardous Material Reduction</b><br/>(Percent Reduction From 1989 - Base Year)</p> <table border="1"> <caption>Hazardous Material Reduction Data</caption> <thead> <tr> <th>Year</th> <th>Percent Reduction</th> </tr> </thead> <tbody> <tr> <td>1990</td> <td>18</td> </tr> <tr> <td>1991</td> <td>25</td> </tr> <tr> <td>1992</td> <td>32</td> </tr> <tr> <td>1993</td> <td>38</td> </tr> </tbody> </table> </div> |                                                                                                                                                                                                                              | Year | Percent Reduction | 1990 | 18 | 1991 | 25 | 1992 | 32 | 1993 | 38 |
| Year                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Percent Reduction                                                                                                                                                                                                            |      |                   |      |    |      |    |      |    |      |    |
| 1990                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 18                                                                                                                                                                                                                           |      |                   |      |    |      |    |      |    |      |    |
| 1991                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 25                                                                                                                                                                                                                           |      |                   |      |    |      |    |      |    |      |    |
| 1992                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 32                                                                                                                                                                                                                           |      |                   |      |    |      |    |      |    |      |    |
| 1993                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 38                                                                                                                                                                                                                           |      |                   |      |    |      |    |      |    |      |    |
| Availability of DoD Data                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"> <li>- Data collected at the installation level</li> <li>- DESCIM Hazardous Substances Management System module collects this information; the module is not yet fully deployed</li> </ul> |      |                   |      |    |      |    |      |    |      |    |
| Current DoD MOM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | No                                                                                                                                                                                                                           |      |                   |      |    |      |    |      |    |      |    |
| Strengths                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | An upward or positive trend reflects organizations' environmental stewardship and desire to avoid future liability                                                                                                           |      |                   |      |    |      |    |      |    |      |    |
| Weaknesses                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | A negative trend could be misleading as a result of downsizing or significant mission changes                                                                                                                                |      |                   |      |    |      |    |      |    |      |    |

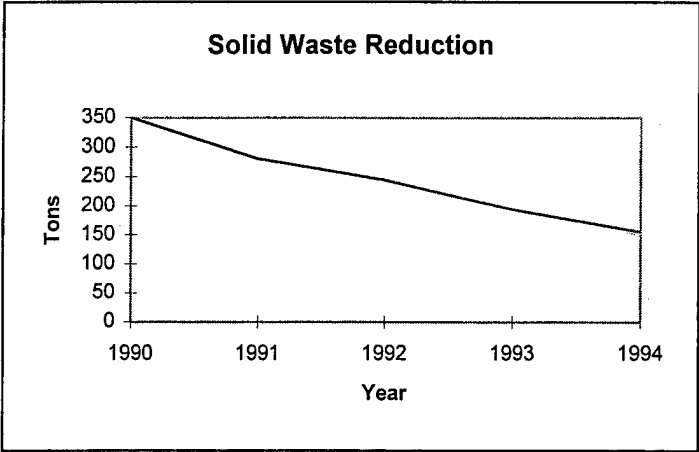
## Appendix C. MOM Worksheets

| POLLUTION PREVENTION MEASUREMENT<br>Hazardous Waste Generation                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |      |      |      |     |      |     |      |     |      |     |      |     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|------|-----|------|-----|------|-----|------|-----|------|-----|
| Goal                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Minimize the generation of hazardous waste<br>(Example, reduce hazardous waste by 70 percent by 1995 from base year 1990)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |      |      |      |     |      |     |      |     |      |     |      |     |
| Objective                                                                                                                                                                                                                                                                                                                                                                                                                                               | Reduce hazardous waste generation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |      |      |      |     |      |     |      |     |      |     |      |     |
| Measurement                                                                                                                                                                                                                                                                                                                                                                                                                                             | Hazardous waste generation in millions of pounds                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |      |      |      |     |      |     |      |     |      |     |      |     |
| Variations                                                                                                                                                                                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"> <li>- Hazardous waste generation measured: on a per-pound-of-product basis; by units of production; and per dollar of revenue</li> <li>- Hazardous waste production per hourly production worker by year; by quarter</li> <li>- Percentage of hazardous waste recycled for energy recovery versus expensive incineration and landfill</li> <li>- Hazardous waste reduction compared to a base year</li> <li>- Resource Conservation and Recovery Act (RCRA) hazardous waste generation by process annual report</li> <li>- RCRA hazardous waste sent off-site by management method</li> <li>- RCRA hazardous waste generation by process sources</li> </ul> |      |      |      |     |      |     |      |     |      |     |      |     |
| <div style="text-align: center;"> <b>Hazardous Waste Generation</b> <table border="1"> <caption>Hazardous Waste Generation Data (Estimated from Graph)</caption> <thead> <tr> <th>Year</th> <th>Tons</th> </tr> </thead> <tbody> <tr> <td>1990</td> <td>280</td> </tr> <tr> <td>1991</td> <td>180</td> </tr> <tr> <td>1992</td> <td>140</td> </tr> <tr> <td>1993</td> <td>120</td> </tr> <tr> <td>1994</td> <td>100</td> </tr> </tbody> </table> </div> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Year | Tons | 1990 | 280 | 1991 | 180 | 1992 | 140 | 1993 | 120 | 1994 | 100 |
| Year                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Tons                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |      |      |     |      |     |      |     |      |     |      |     |
| 1990                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 280                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |      |      |      |     |      |     |      |     |      |     |      |     |
| 1991                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 180                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |      |      |      |     |      |     |      |     |      |     |      |     |
| 1992                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 140                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |      |      |      |     |      |     |      |     |      |     |      |     |
| 1993                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 120                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |      |      |      |     |      |     |      |     |      |     |      |     |
| 1994                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |      |      |      |     |      |     |      |     |      |     |      |     |
| Availability of DoD Data                                                                                                                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"> <li>- Data is collected at the installation level</li> <li>- DESCIM Hazardous Substances Management System module is designed to collect this information; this module is still a few years away from being fully deployed</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                       |      |      |      |     |      |     |      |     |      |     |      |     |
| Current DoD MOM                                                                                                                                                                                                                                                                                                                                                                                                                                         | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |      |      |      |     |      |     |      |     |      |     |      |     |
| Strengths                                                                                                                                                                                                                                                                                                                                                                                                                                               | Provides data for trend analysis; shows organizations' commitment for environmental stewardship and reduction in potential liabilities                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |      |      |     |      |     |      |     |      |     |      |     |
| Weaknesses                                                                                                                                                                                                                                                                                                                                                                                                                                              | A negative trend could be misleading because downsizing or mission changes resulted in major reductions in hazardous waste generation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |      |      |     |      |     |      |     |      |     |      |     |

| POLLUTION PREVENTION MEASUREMENT<br>Ozone Depleting Substances (ODSs)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                              |      |                |      |     |      |    |      |    |      |    |      |    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|----------------|------|-----|------|----|------|----|------|----|------|----|
| Goal                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Minimize the use of ODSs<br>(Example, eliminate the consumption of ODSs/CFCs from air conditioning, refrigeration, and fire suppression equipment by the year 2000)                                                                                          |      |                |      |     |      |    |      |    |      |    |      |    |
| Objective                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Reduce all ODS use                                                                                                                                                                                                                                           |      |                |      |     |      |    |      |    |      |    |      |    |
| Measurement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Reduction of ozone depleting substances                                                                                                                                                                                                                      |      |                |      |     |      |    |      |    |      |    |      |    |
| Variations                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>- Millions of pounds of emissions by year</li> <li>- Who uses ODSs and how much</li> <li>- Amount of ODS use (measured in cost to purchase)</li> <li>- Releases and transfers of ODSs (millions of pounds)</li> </ul> |      |                |      |     |      |    |      |    |      |    |      |    |
| <div style="text-align: center;"> <p><b>Production of ODSs/CFCs</b><br/><b>(Phase out Production by 1995)</b></p> <table border="1"> <caption>Estimated Data for Production of ODSs/CFCs</caption> <thead> <tr> <th>Year</th> <th>Production (%)</th> </tr> </thead> <tbody> <tr><td>1986</td><td>100</td></tr> <tr><td>1990</td><td>65</td></tr> <tr><td>1991</td><td>55</td></tr> <tr><td>1992</td><td>50</td></tr> <tr><td>1993</td><td>25</td></tr> </tbody> </table> <p>(base year, 1986 = 100%)</p> <p>*This company manufactured CFC's through 1995 at the request of the U.S. Government. The downward trend is strongly impacted by the ban on ODS/CFC production.</p> </div> |                                                                                                                                                                                                                                                              | Year | Production (%) | 1986 | 100 | 1990 | 65 | 1991 | 55 | 1992 | 50 | 1993 | 25 |
| Year                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Production (%)                                                                                                                                                                                                                                               |      |                |      |     |      |    |      |    |      |    |      |    |
| 1986                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 100                                                                                                                                                                                                                                                          |      |                |      |     |      |    |      |    |      |    |      |    |
| 1990                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 65                                                                                                                                                                                                                                                           |      |                |      |     |      |    |      |    |      |    |      |    |
| 1991                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 55                                                                                                                                                                                                                                                           |      |                |      |     |      |    |      |    |      |    |      |    |
| 1992                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 50                                                                                                                                                                                                                                                           |      |                |      |     |      |    |      |    |      |    |      |    |
| 1993                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 25                                                                                                                                                                                                                                                           |      |                |      |     |      |    |      |    |      |    |      |    |
| Availability of DoD Data                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Data is not collected within DoD                                                                                                                                                                                                                             |      |                |      |     |      |    |      |    |      |    |      |    |
| Current DoD MOM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | No                                                                                                                                                                                                                                                           |      |                |      |     |      |    |      |    |      |    |      |    |
| Strengths                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Reflect organizations' record of compliance with laws and regulations; exhibits environmental stewardship                                                                                                                                                    |      |                |      |     |      |    |      |    |      |    |      |    |
| Weaknesses                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Requires extensive data collection effort                                                                                                                                                                                                                    |      |                |      |     |      |    |      |    |      |    |      |    |

## Appendix C. MOM Worksheets

| POLLUTION PREVENTION MEASUREMENT                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                           |      |      |      |     |      |     |      |     |      |     |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|------|-----|------|-----|------|-----|------|-----|
| Recycling                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                           |      |      |      |     |      |     |      |     |      |     |
| Goal                                                                                                                                                                                                                                                                                                                                                                                   | Maintain a qualified recycling program<br>(Example, increase use of recycled materials by 25 percent vs. 1991/1992 levels)                                                                                                                                                                                |      |      |      |     |      |     |      |     |      |     |
| Objective                                                                                                                                                                                                                                                                                                                                                                              | Reduce releases of pollutants to the environment                                                                                                                                                                                                                                                          |      |      |      |     |      |     |      |     |      |     |
| Measurement                                                                                                                                                                                                                                                                                                                                                                            | Materials recycled in pounds or tons; by category                                                                                                                                                                                                                                                         |      |      |      |     |      |     |      |     |      |     |
| Variations                                                                                                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>- Recycled materials percentage by year</li> <li>- Solvent recovered per production unit</li> <li>- Amount of products purchased using recycled materials by costs savings and year</li> <li>- Cost avoidance in dollars for landfilling less materials</li> </ul> |      |      |      |     |      |     |      |     |      |     |
| <div style="text-align: center;"> <p><b>Recycling</b></p> <table border="1"> <caption>Recycling Data (Estimated from Graph)</caption> <thead> <tr> <th>Year</th> <th>Tons</th> </tr> </thead> <tbody> <tr> <td>1991</td> <td>175</td> </tr> <tr> <td>1992</td> <td>200</td> </tr> <tr> <td>1993</td> <td>250</td> </tr> <tr> <td>1994</td> <td>310</td> </tr> </tbody> </table> </div> |                                                                                                                                                                                                                                                                                                           | Year | Tons | 1991 | 175 | 1992 | 200 | 1993 | 250 | 1994 | 310 |
| Year                                                                                                                                                                                                                                                                                                                                                                                   | Tons                                                                                                                                                                                                                                                                                                      |      |      |      |     |      |     |      |     |      |     |
| 1991                                                                                                                                                                                                                                                                                                                                                                                   | 175                                                                                                                                                                                                                                                                                                       |      |      |      |     |      |     |      |     |      |     |
| 1992                                                                                                                                                                                                                                                                                                                                                                                   | 200                                                                                                                                                                                                                                                                                                       |      |      |      |     |      |     |      |     |      |     |
| 1993                                                                                                                                                                                                                                                                                                                                                                                   | 250                                                                                                                                                                                                                                                                                                       |      |      |      |     |      |     |      |     |      |     |
| 1994                                                                                                                                                                                                                                                                                                                                                                                   | 310                                                                                                                                                                                                                                                                                                       |      |      |      |     |      |     |      |     |      |     |
| Availability of DoD Data                                                                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"> <li>- Data is captured at the installation level</li> <li>- DESCIM Solid Waste module only captures recycling data on solid waste</li> </ul>                                                                                                                           |      |      |      |     |      |     |      |     |      |     |
| Current DoD MOM                                                                                                                                                                                                                                                                                                                                                                        | Yes                                                                                                                                                                                                                                                                                                       |      |      |      |     |      |     |      |     |      |     |
| Strengths                                                                                                                                                                                                                                                                                                                                                                              | Reflects the organizations' environmental stewardship; provides data for trend analysis                                                                                                                                                                                                                   |      |      |      |     |      |     |      |     |      |     |
| Weaknesses                                                                                                                                                                                                                                                                                                                                                                             | Data is costly and difficult to collect                                                                                                                                                                                                                                                                   |      |      |      |     |      |     |      |     |      |     |

| POLLUTION PREVENTION MEASUREMENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                     |      |      |      |     |      |     |      |     |      |     |      |     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|------|-----|------|-----|------|-----|------|-----|------|-----|
| Solid Waste Reduction                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                     |      |      |      |     |      |     |      |     |      |     |      |     |
| Goal                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Minimize generation of solid waste<br>(Example, reduce solid waste by 50 percent by 1995 from base year 1990)                                                                                                                                                                                                                       |      |      |      |     |      |     |      |     |      |     |      |     |
| Objective                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Reduce the amount of solid waste                                                                                                                                                                                                                                                                                                    |      |      |      |     |      |     |      |     |      |     |      |     |
| Measurement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Solid waste management in millions of pounds                                                                                                                                                                                                                                                                                        |      |      |      |     |      |     |      |     |      |     |      |     |
| Variations                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"> <li>- Solid waste reduction as a percentage reduction by year</li> <li>- Percentage landfilled, incinerated, and recycled</li> </ul>                                                                                                                                                             |      |      |      |     |      |     |      |     |      |     |      |     |
| <div style="text-align: center;">  <p><b>Solid Waste Reduction</b></p> <table border="1"> <caption>Data points for Solid Waste Reduction graph</caption> <thead> <tr> <th>Year</th> <th>Tons</th> </tr> </thead> <tbody> <tr> <td>1990</td> <td>350</td> </tr> <tr> <td>1991</td> <td>280</td> </tr> <tr> <td>1992</td> <td>240</td> </tr> <tr> <td>1993</td> <td>200</td> </tr> <tr> <td>1994</td> <td>150</td> </tr> </tbody> </table> </div> |                                                                                                                                                                                                                                                                                                                                     | Year | Tons | 1990 | 350 | 1991 | 280 | 1992 | 240 | 1993 | 200 | 1994 | 150 |
| Year                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Tons                                                                                                                                                                                                                                                                                                                                |      |      |      |     |      |     |      |     |      |     |      |     |
| 1990                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 350                                                                                                                                                                                                                                                                                                                                 |      |      |      |     |      |     |      |     |      |     |      |     |
| 1991                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 280                                                                                                                                                                                                                                                                                                                                 |      |      |      |     |      |     |      |     |      |     |      |     |
| 1992                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 240                                                                                                                                                                                                                                                                                                                                 |      |      |      |     |      |     |      |     |      |     |      |     |
| 1993                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 200                                                                                                                                                                                                                                                                                                                                 |      |      |      |     |      |     |      |     |      |     |      |     |
| 1994                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 150                                                                                                                                                                                                                                                                                                                                 |      |      |      |     |      |     |      |     |      |     |      |     |
| Availability of DoD Data                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"> <li>- Data collected at the installation level</li> <li>- DESCIM Environmental Media Information/Solid Waste Annual Report tracks solid waste at the installation level from generation or collection to storage and disposal; the module also provides for reporting to headquarters</li> </ul> |      |      |      |     |      |     |      |     |      |     |      |     |
| Current DoD MOM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Yes                                                                                                                                                                                                                                                                                                                                 |      |      |      |     |      |     |      |     |      |     |      |     |
| Strengths                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Reflects organizations' environmental stewardship; directly relates to dollar savings or cost avoidance                                                                                                                                                                                                                             |      |      |      |     |      |     |      |     |      |     |      |     |
| Weaknesses                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | A negative trend could result from down sizing or major mission changes                                                                                                                                                                                                                                                             |      |      |      |     |      |     |      |     |      |     |      |     |

## Appendix C. MOM Worksheets

| POLLUTION PREVENTION MEASUREMENT<br>Toxic Release Inventory (TRI)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                          |                                     |                                          |                                     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|-------------------------------------|------------------------------------------|-------------------------------------|------|-----|-----|-----|------|-----|-----|-----|------|-----|-----|-----|------|-----|-----|-----|------|-----|-----|-----|------|-----|-----|-----|
| Goal                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Reduce emissions of toxic chemicals<br>(Example, reduce TRI emissions by 80 percent by 1998 from base year 1987)                                                                                                                                                                                                                                                                                                                                                                                                   |                                          |                                     |                                          |                                     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |
| Objective                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Reduce TRI emissions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                          |                                     |                                          |                                     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |
| Measurement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | TRI emissions to air, land, and water by pounds                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                          |                                     |                                          |                                     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |
| Variations                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"><li>- Regulated releases to water in million pounds per year</li><li>- TRI emission reduction in tons and by year, by plant</li><li>- TRI air emissions per unit of production in tons/year</li><li>- Toxic chemical use and emissions (Kg)</li><li>- Amount, thousands of pounds, of TRI chemicals released by category: air, water, land, public sewage, treatment/disposal, on-site releases and by off-site transfers</li><li>- TRI emissions by dollar of revenue</li></ul> |                                          |                                     |                                          |                                     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |
| <div><p><b>Toxic Release Inventory (TRI) Releases to Air, Land, and Water</b></p><table><caption>Estimated data from TRI Releases to Air, Land, and Water chart</caption><thead><tr><th>Year</th><th>Air Releases (Millions of Pounds)</th><th>Land/Water Releases (Millions of Pounds)</th><th>Total Releases (Millions of Pounds)</th></tr></thead><tbody><tr><td>1987</td><td>1.5</td><td>4.5</td><td>6.0</td></tr><tr><td>1988</td><td>3.5</td><td>3.5</td><td>7.0</td></tr><tr><td>1989</td><td>1.0</td><td>3.0</td><td>4.0</td></tr><tr><td>1990</td><td>1.0</td><td>3.0</td><td>4.0</td></tr><tr><td>1991</td><td>1.0</td><td>3.0</td><td>4.0</td></tr><tr><td>1992</td><td>1.0</td><td>4.0</td><td>5.0</td></tr></tbody></table></div> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Year                                     | Air Releases (Millions of Pounds)   | Land/Water Releases (Millions of Pounds) | Total Releases (Millions of Pounds) | 1987 | 1.5 | 4.5 | 6.0 | 1988 | 3.5 | 3.5 | 7.0 | 1989 | 1.0 | 3.0 | 4.0 | 1990 | 1.0 | 3.0 | 4.0 | 1991 | 1.0 | 3.0 | 4.0 | 1992 | 1.0 | 4.0 | 5.0 |
| Year                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Air Releases (Millions of Pounds)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Land/Water Releases (Millions of Pounds) | Total Releases (Millions of Pounds) |                                          |                                     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |
| 1987                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 4.5                                      | 6.0                                 |                                          |                                     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |
| 1988                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 3.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 3.5                                      | 7.0                                 |                                          |                                     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |
| 1989                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 3.0                                      | 4.0                                 |                                          |                                     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |
| 1990                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 3.0                                      | 4.0                                 |                                          |                                     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |
| 1991                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 3.0                                      | 4.0                                 |                                          |                                     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |
| 1992                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 4.0                                      | 5.0                                 |                                          |                                     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |
| Availability of DoD Data                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <ul style="list-style-type: none"><li>- Data is collected at the installation level by contractors</li><li>- The DESCIM Hazardous Substances Management System module is available to collect this information if it is deployed at the installations</li></ul>                                                                                                                                                                                                                                                    |                                          |                                     |                                          |                                     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |
| Current DoD MOM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                          |                                     |                                          |                                     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |
| Strengths                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Reflects the organizations' impact on the environment                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                          |                                     |                                          |                                     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |
| Weaknesses                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Large amount of TRI emissions represents negative performance                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                          |                                     |                                          |                                     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |

| POLLUTION PREVENTION MEASUREMENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                             |      |                                         |      |     |      |     |      |     |      |     |      |     |      |     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-----------------------------------------|------|-----|------|-----|------|-----|------|-----|------|-----|------|-----|
| Water Consumption                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                             |      |                                         |      |     |      |     |      |     |      |     |      |     |      |     |
| Goal                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Maintain an effective water conservation program                                                                                                            |      |                                         |      |     |      |     |      |     |      |     |      |     |      |     |
| Objective                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Reduce water consumption                                                                                                                                    |      |                                         |      |     |      |     |      |     |      |     |      |     |      |     |
| Measurement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Water consumption by cost by volume                                                                                                                         |      |                                         |      |     |      |     |      |     |      |     |      |     |      |     |
| Variations                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Water consumption in gallons per unit of production                                                                                                         |      |                                         |      |     |      |     |      |     |      |     |      |     |      |     |
| <div data-bbox="451 457 1258 1018" data-label="Figure"> <p style="text-align: center;"><b>Water Consumption</b><br/>(Gallons per sq. ft. of Total Production Space)</p> <table border="1"> <caption>Water Consumption Data (Estimated)</caption> <thead> <tr> <th>Year</th> <th>Gallons per sq. ft. of Production Space</th> </tr> </thead> <tbody> <tr> <td>1988</td> <td>3.4</td> </tr> <tr> <td>1989</td> <td>3.0</td> </tr> <tr> <td>1990</td> <td>2.6</td> </tr> <tr> <td>1991</td> <td>2.7</td> </tr> <tr> <td>1992</td> <td>2.5</td> </tr> <tr> <td>1993</td> <td>2.2</td> </tr> </tbody> </table> </div> |                                                                                                                                                             | Year | Gallons per sq. ft. of Production Space | 1988 | 3.4 | 1989 | 3.0 | 1990 | 2.6 | 1991 | 2.7 | 1992 | 2.5 | 1993 | 2.2 |
| Year                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Gallons per sq. ft. of Production Space                                                                                                                     |      |                                         |      |     |      |     |      |     |      |     |      |     |      |     |
| 1988                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 3.4                                                                                                                                                         |      |                                         |      |     |      |     |      |     |      |     |      |     |      |     |
| 1989                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 3.0                                                                                                                                                         |      |                                         |      |     |      |     |      |     |      |     |      |     |      |     |
| 1990                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 2.6                                                                                                                                                         |      |                                         |      |     |      |     |      |     |      |     |      |     |      |     |
| 1991                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 2.7                                                                                                                                                         |      |                                         |      |     |      |     |      |     |      |     |      |     |      |     |
| 1992                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 2.5                                                                                                                                                         |      |                                         |      |     |      |     |      |     |      |     |      |     |      |     |
| 1993                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 2.2                                                                                                                                                         |      |                                         |      |     |      |     |      |     |      |     |      |     |      |     |
| Availability of DoD Data                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <ul style="list-style-type: none"> <li>- Data is collected at the operational level</li> <li>- Water consumption is not tracked at the DoD level</li> </ul> |      |                                         |      |     |      |     |      |     |      |     |      |     |      |     |
| Current DoD MOM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | No                                                                                                                                                          |      |                                         |      |     |      |     |      |     |      |     |      |     |      |     |
| Strengths                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Reflects organizations' environmental stewardship                                                                                                           |      |                                         |      |     |      |     |      |     |      |     |      |     |      |     |
| Weaknesses                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Savings/cost avoidance are minimal because of the relatively low cost of water and the expense of data collection at the corporate level                    |      |                                         |      |     |      |     |      |     |      |     |      |     |      |     |

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## Appendix D. Profiles of the Companies Surveyed

These profiles provide a brief outline of the companies selected for this evaluation to include the size, dollar value of sales, number of employees, geographic placement, and major product lines.

**Company A** is one of the world's leading manufacturing companies operating in over 60 countries with sales in more than 200 countries. This company employs 85,000 people and is one of the nation's leading "blue chip" companies with \$14 billion in 1993 sales. They manufacture more than 60,000 products for the industrial, commercial, consumer and health care markets.

**Company B** was the 36th-largest American industrial corporation in 1992 and the 102nd-largest in the world. The company operates in 28 countries at 200 plants and employs 87,000 employees. Their net annual sales in 1994 totaled \$12.8 billion. Principal products include: aerospace products (engines, wheels, brakes, sonar, etc.); automotive products (braking systems, safety restraints, filters, etc.); and engineered products (fibers, chemicals, plastics, and advanced materials).

**Company C** is a leading international manufacturer and marketer of intermediate chemicals and specialty products used in a broad range of consumer goods. The company is a publicly traded company with 4,450 employees worldwide and sales in more than 100 countries. The company operates in three main regions: the Americas, Europe, and Asian Pacific. There are 13 manufacturing plants and 24 sales offices with a net 1994 income of \$269 million.

**Company D** measured by 1994 sales of \$21.9 billion, is the largest aerospace firm in the US. The company is one of the nation's top exporters, and is the world's leading manufacturer of commercial jet transports. This company is a major US Government contractor, employing 117,000, with capabilities in missiles and space, electronic systems, military aircraft, helicopters, and information systems management.

**Company E** was founded in 1873 and ranks 265 on the Fortune 500 list of the largest publicly traded industrial corporations in the United States. It employs 6,300 people worldwide and had a 1994 net sales of \$1.66 billion.

**Company F** is a world leader in networked platforms and does business in more than 100 countries. They develop and manufacture products in the Americas, Europe, Asia, and the Pacific Rim. For FY 1994, their total operating revenue was \$13.4 billion. This company lists the number of regular employees at 78,000.

**Company G** is the 10th largest industrial corporation in the US and the 26th in the world, with sales of more than \$37 billion. The company has 110,000 employees with two-thirds located in the US. Almost half the company's sales

## Appendix D. Profiles of the Companies Surveyed

are outside the US. With a presence in 70 countries worldwide, this company operates facilities that include 175 chemical and specialty plants, six petroleum refineries and 32 natural gas processing plants.

**Company H** is the world's largest full-line vehicle manufacturer. They manufacture and sell cars and trucks worldwide under a variety of nameplates. This company also manufactures and sells locomotives worldwide. Their automotive operations are global with approximately 290 wholly or majority-owned research and development, and manufacturing facilities in approximately 53 countries. In 1993, this company employed an average of 711,000 people worldwide.

**Company I** is a leading manufacturer of electronic products and systems for measurement, computation, and communication. This company conducts business in 110 countries, with product development and manufacturing sites located throughout the Americas, Europe, Australia, and Asia. The company has about 98,000 employees and 1994 revenues of \$25 billion.

**Company J** manufactures intermediate computer systems with more than 400,000 systems installed worldwide. It provides employment to more than 8,100 people and is responsible for product development and U.S. manufacturing. In addition, its processes are implemented in plants located in Japan, Mexico, United Kingdom, and Italy.

**Company K** operates in more than 90 countries around the world with approximately 57,000 employees worldwide. The company reported 1994 revenues of \$8.87 billion and is one of the most broadly diversified developers of communications products, systems, and networks. It provides equipment, services, and network solutions for information, entertainment, and communications networks operated by telephone companies, corporations, governments, universities and other institutions worldwide.

**Company L** has five divisions: B-2 aircraft; commercial aircraft; data systems and services; military aircraft; and electronics and systems integration. They employ 42,000 people and had a 1994 total revenue of \$6.7 billion.

**Company M** is a Fortune 200 company. The company employs 12,800 and is a global marketer and US manufacturer of chemicals, chlor-alkali products, electronic materials, metals, defense ordinance, sporting ammunition, and aerospace products. The company has 35 manufacturing plants and generated record sales in 1994 of \$2.7 billion.

**Company N** designs, manufactures and markets, worldwide, a variety of products, primarily in instant image-recording fields. The company maintains three wholly owned manufacturing subsidiaries outside the US.

**Company O** and its subsidiaries develop, manufacture, and market a broad range of consumer goods of over 300 brands in over 140 countries, with annual sales exceeding \$30 billion; and employs nearly 97,000 people in 56 countries. They also manufacture in 55 countries with more than half their sales being outside the US. Annual sales in Europe top \$9 billion.

## Appendix D. Profiles of the Companies Surveyed

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**Company P** is a diversified US organization whose major interests include manufacturing of aircraft, residential and commercial appliances (including refrigeration, cooking, and laundry equipment), electronics (including guidance systems, guided missiles, printed circuit boards, and communications equipment), and energy/environmental services (including power, transportation, logistics support, and road building equipment).

**Company Q** is a \$20 billion corporation that provides a broad range of high-technology products and support services to customers in the aerospace, building, and automotive industries worldwide. They have 168,000 employees and more than 200 major manufacturing facilities in 27 of the 50 states and in 27 countries.

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## Appendix E. Glossary

This appendix provides a brief description of the measures of merit listed in Tables 1 and 2.

**Air Pollutant Emissions.** Normally, these include the pollutants having an ambient air quality standard. Standards are currently set for sulfur dioxide, particulates, carbon monoxide, nitrogen dioxide, ozone and lead. Also, this includes hazardous air pollutants regulated under the Clean Air Act.

**Environmental Cleanup.** Actions taken to remediate a release of a hazardous substance that could affect humans and/or the environment.

**Fines and Penalties.** Results from both civil and criminal enforcement actions. Federal agencies are subject to Federal- and state-levied fines.

**Notifications of Violation or Noncompliance.** Common administrative actions, which seek compliance outside the court system, includes notices of violation (NOV) and notices of noncompliance (NON). An NOV is an administrative enforcement action citing environmental noncompliance. States and the EPA issue an NOV as the initial written notice requiring a formal response to address a significant violation. An NON is an informal action used for minor violations. The regulatory agency may notify the installation of its noncompliance through a phone call or letter.

**Polychlorinated Biphenyls.** Polychlorinated Biphenyls (PCBs) are a widely used dielectric fluid associated with the generation, distribution, and use of electricity. They are used in transformers and capacitors.

**Permit Excursions and Exceedances.** The temporary or permanent discharge of air or water pollutants above a certain level as specified in the permit to operate a source of pollution.

**Spills and Releases.** The accidental or purposeful spilling or releasing of hazardous wastes or materials, or other pollutants onto the ground or into the water or the air.

**Underground Storage Tanks.** Underground storage tanks (UST) include any one or a combination of tanks (including underground pipes connected to the tanks) used to contain an accumulation of regulated substances, and the volume of which is ten percent or more beneath the surface of the ground. There are exemptions for tanks below certain sizes and for certain special tanks.

**Wastewater Effluent.** Wastewater effluent refers to water discharged from a waste water treatment facility requiring a National Pollutant Discharge Elimination System permit.

**Energy and Water Consumption.** The amount of energy and water used in day to day operations.

## **Appendix E. Glossary**

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**Hazardous Material Reduction.** Minimizing the volume or mass of hazardous materials used in day to day operations.

**Hazardous Waste Generation.** The process of creating, managing, and disposing of hazardous wastes.

**Ozone Depleting Substances.** Ozone depleting substances (ODS) primarily include the family of Chlorofluorocarbon chemicals and halons that were once widely used in air conditioners, refrigerators, freezers, solvents, and foam insulation.

**Recycling.** The process of changing or modifying certain materials, either physically or chemically, and reusing modified materials that have already been used for their intended purpose.

**Solid Waste Reduction.** Minimizing or reducing the amount of solid waste generated as a result of day to day operations.

**Toxic Release Inventory.** The toxic release inventory (TRI) is a report of toxic chemicals released by a company, and is required by Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986.

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## **Appendix F. Major Drivers for the Development of Measures of Merit**

### **National Performance Review**

The National Performance Review was a study of the Federal Government completed at the request of the President. Its main goal was to move the Government from a red tape mode to a results oriented mode while creating a Government that works better and costs less.

There are four key principles of successful organizations: cut red tape, put the customer first, empower employees to get results, and cut back to basics to produce more for less. This program has had an impact and is a driver in the top-down "re-engineering" of the Government.

### **Government Performance and Results Act (GPRA)**

A major driver in the search for effective performance measures is the Government Performance and Results Act of 1993 (GPRA). The GPRA requires DoD and other Federal agencies to develop a 5-year strategic plan that includes the agency's mission statement, identifies agency's goals, and describes how the agency intends to achieve those goals. This strategic plan must be developed by the end of FY 1997. Under GPRA, agency strategic plans are the starting point for agencies to set goals for programs and measure the performance of the programs in achieving those goals.

In addition, GPRA requires DoD to submit, beginning in fiscal year 1999, an annual program performance plan to the Office of Management and Budget (OMB) and program performance reports to the President and the Congress. Program performance plans must describe how DoD will meet its program goals through daily operations and must establish target levels in objective, measurable terms capable of comparing these targets to actual achievements. The Act places emphasis on establishing a measurement focus on program results.

Under GPRA, DoD performance plans must provide information to OMB for a Federal report to be developed and submitted to Congress along with the President's budget. Although GPRA does not call for Government-wide implementation until FYs 1998 and 1999, OMB and the National Performance Review strongly endorse the GPRA reforms and have encouraged all agencies to develop their strategic and performance plans as soon as possible. Every strategic plan must be updated and revised every three years.

## Defense Science Board Task Force on Environmental Security

The Defense Science Board Task Force (DSBTF) on Environmental Security reported in April of 1995 that almost all of the premier private sector companies are providing environmental leadership and finding opportunities for cost savings through prudent environmental management. They recommend that DoD initiate a continuing process of setting environmental goals, defining metrics (MOMs), and measuring progress towards attaining the goals.

Private sector firms involve local and state stakeholders in their decisions. They do not embrace this proactive management approach for altruistic reasons. Managers within these companies know that they can reduce environmental costs in the long run, have greater flexibility in their operations thereby gaining competitive advantages.

A similar set of decisions faces DoD. If DoD takes a proactive, leadership position by working with stakeholders, pursuing new technology and pollution prevention avenues, leveraging its buying power, and pursuing the most significant risks first, it will be in a much stronger position to assure US national security interests. Public support in the communities in which the Department operates is a key to preserving operational flexibility. Moreover, there is little doubt that DoD will ultimately need to meet environmental requirements. The Task Force believed it cheaper, in the long run, for DoD to meet its requirements in a proactive fashion than to be forced to do so through protracted regulatory proceedings at the State and local levels.

The Task Force also reported that little quantitative data was available to compare DoD implementation with other Federal agencies such as the Department of Energy or, particularly, with commercial or international best practices. In each area of environmental security, goals needed to be established and implementation results measured over time. They felt that Congress needed assurance that environmental security appropriations were spent efficiently and effectively.

Some of the relevant recommendations of the task force to this evaluation were for DoD to: initiate a benchmarking effort to compare DoD implementation with that of the Environmental Protection Agency, Department of Energy, commercial industry and foreign practices; relate metrics to managers' ability to achieve them; analyze the differences between best practices and current practices, and define a continuing, DoD-wide process for: benchmarking, defining metrics, setting goals, measuring progress toward goals, and rewarding managers.

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## **Appendix G. DoD Environmental Measures of Merit**

### **Compliance Measures Of Merit**

This appendix lists the current DoD MOMs for compliance and pollution prevention. They were extracted from DoD Directive 4715.6, "Environmental Compliance," 24 April 1996 and DoD Directive 4715.4, "Pollution Prevention," 18 June 1996. The corresponding DoD goals for each MOM came from the 16 May 1995 DUSD(ES) memorandum "Environmental Security Program Measures of Merit."

MOM 1: Number of new, open, unresolved, and closed enforcement actions for applicable environmental statutes.

Goal - Reduce open enforcement actions 15 percent by the end of FY95, from a FY92 baseline

MOM 2: Compliance with the Underground Storage Tank (UST) Program as determined by the following:

1. Total number of known regulated USTs subject to the 1998 Resource Conservation and Recovery Act Subtitle I standards under 42 U.S.C. 6901-6992(k) (reference (i)).

2. Number of USTs meeting 1998 Resource Conservation and Recovery Act Subtitle I standards under 42 U.S.C. 6901-6992 (K) (reference (i)).

Goal - All USTs meet the standards by the 1998 deadline

MOM 3: Compliance with National Pollutant Discharge Elimination System (NPDES) permits under 33 U.S.C. 1251-1387 (reference (d)) for wastewater systems, as determined by the following:

1. Total number of NPDES permitted wastewater systems.

2. Number of wastewater systems meeting NPDES permit standards.

Goal - Meet all permit standards

## **Pollution Prevention Measures of Merit**

MOM 1: By the end of calendar year (CY) 1999, reduce total releases and off-site transfers of toxic chemicals 50 percent from the 1994 TRI baseline. The amount of toxic releases and off-site transfers will be measured and reported in pounds.

Goal - Reduce 50 percent by 1999 from the 1994 TRI baseline

MOM 2: By the end of CY 1999, reduce the disposal of hazardous waste 50 percent from the 1992 baseline. The amount of hazardous waste disposal will be measured and reported in pounds.

Goal - Reduce 50 percent by 1999 from a 1992 baseline

MOM 3: By the end of CY 1999, reduce the disposal of non-hazardous solid waste 50 percent from the 1992 baseline. The amount of solid waste disposal will be measured and reported in pounds.

Goal - Reduce 50 percent by 1999 from a 1992 baseline

MOM 4: By the end of CY 1999, ensure that 50 percent of non-hazardous solid waste generated will be recycled. The amount of non-hazardous solid waste recovered and sold DoD-wide for reuse measured and reported in pounds.

Goal - Recycle 50 percent by 1999 from a 1992 baseline

MOM 5: By the end of CY 1999, ensure that 75 percent of DoD acquisition of new, non-tactical vehicles are alternatively fueled vehicles.

Goals: 1996 - 25 percent of acquisitions to be alternatively fueled vehicles; 1997 - 33 percent; 1998 - 50 percent; 1999 and after - 75 percent

Note: Another pollution prevention MOM was originally established for Ozone Depleting Substances in the May 16, 1995, DUSD(ES) memorandum "Environmental Security Program Measures of Merit." It was rescinded in the January 19, 1996, DUSD(ES) memorandum titled, "Environmental Security Program Measures of Merit." The Environmental, Safety and Occupational Health Policy Board determined that the data collected would not significantly add value in support of the DoD program to reduce or eliminate the use of ozone depleting substances in weapons systems and at installations.

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## Appendix H. Industry Initiatives and Standards

The following industry groups have initiatives aimed at developing effective performance measurement processes and standards and, in some cases, specific performance measures.

**Coalition for Environmentally Responsible Economies.** The Coalition for Environmentally Responsible Economies (CERES) was formed to promote environmentally responsible corporate behavior in the US in the wake of the 1989 Exxon Valdez disaster. CERES guidelines were drawn up on behalf of the Social Investment Forum, a group of 325 "socially concerned" bankers, brokers, analysts, and others; and unveiled on US Earth Day, 1990. CERES developed a comprehensive corporate environmental reporting format to enhance reporting and help investors make informed decisions about which companies to invest in, that is companies that demonstrate both good economic and environmental performance.

**Global Environmental Management Initiative.** The Global Environmental Management Initiative (GEMI) is a group of leading companies dedicated to fostering environmental excellence by businesses worldwide. Through the collaborative efforts of its members, GEMI promotes a worldwide business ethic for environmental management and sustainable development to improve the environmental performance of business through example and leadership, and to enhance the dialogue between business and its interested publics.

**International Organization for Standardization.** The ISO 14000 Series of Standards for Environmental Management seeks to provide a common way for companies around the world to manage their environmental programs. These standards encompass a voluntary system of standards that seek accord in the areas of environmental management, auditing, performance evaluation, labeling, and life cycle analysis. However, they are not intended to replace existing controls and regulations.

The ISO 14000 series of standards is expected to be an international benchmark for conducting business in the global marketplace well into the 21st century. In as few as 4 years, U.S. producers, manufacturers, and service providers may have to be certified to environmental quality standards to do business in the European market. That belief is due to the European Union's interest in adopting ISO 14000 standards for the Eco-Management and Audit Scheme.

**Public Environmental Reporting Initiative.** Public Environmental Reporting Initiative (PERI) was established in 1993 by a group of nine international companies. PERI issued reporting guidelines to assist companies and other organizations in improving environmental reporting. The guidelines were based on this group's analysis of existing reporting initiatives and reflects what it considers to be core components for comprehensive reporting.

## **Appendix H. Industry Initiatives and Standards**

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The PERI guidelines are general to allow corporations to choose the format, style, and level of detail appropriate to their activities. Core components are often described in terms such as "describe," "detail," or "provide information," with little emphasis on quantitative data.

## Appendix H. Industry Initiatives and Standards

This chart shows a comparison of the recommended reporting guidelines for three important industry initiatives<sup>1</sup>

| Indicators                              | GEMI | PERI | CERES |
|-----------------------------------------|------|------|-------|
| Air Emissions:                          |      |      |       |
| Toxic Release Inventory                 | X    | X    | X     |
| Greenhouse Gases                        |      | X    | X     |
| Ozone-Depleting Substances              |      | X    | X     |
| Audit Information                       | X    | X    | X     |
| Charitable Contributions                |      | X    | X     |
| Company Profile                         |      | X    | X     |
| Compliance Programs                     | X    | X    | X     |
| Corporate Goals                         | X    | X    | X     |
| Corporate Policy                        | X    | X    | X     |
| Customers/Consumers Programs            |      | X    |       |
| EH&S Management Systems                 |      | X    |       |
| Emergency Response Plans                |      | X    | X     |
| Employee Education/Involvement          |      | X    | X     |
| Energy Consumption                      |      | X    | X     |
| Enforcement Actions                     | X    | X    | X     |
| Environmental Awards                    |      |      | X     |
| Environmental Staff Information         | X    | X    |       |
| Env. Impact Assessment/Risk Management  |      | X    | X     |
| Expenditures                            | X    | X    | X     |
| Habitat Protection/Management           |      | X    | X     |
| Hazardous Waste                         |      | X    | X     |
| Industry Associations                   | X    | X    | X     |
| Liabilities:                            |      |      |       |
| Superfund                               | X    |      | X     |
| Remediation                             | X    | X    |       |
| Litigation                              | X    | X    |       |
| Management Systems                      | X    | X    | X     |
| Materials Conservation/Recycling        |      | X    | X     |
| Permit Restrictions                     | X    |      | X     |
| Product Impacts                         |      | X    | X     |
| Product Stewardship                     |      | X    | X     |
| Research & Development                  | X    | X    | X     |
| Solid Waste                             |      | X    | X     |
| Spills/Incidents                        | X    | X    | X     |
| Stakeholder Involvement                 | X    | X    | X     |
| Statement by Chief Executive            |      |      |       |
| Supplier Education/Cooperative Programs |      | X    | X     |
| Third-Party Verifier's Statement        | X    |      |       |
| Water Conservation                      |      | X    | X     |
| Water Effluents                         |      | X    |       |

<sup>1</sup>This chart is modified from "Environmental Reporting in a Total Quality Management Framework - a primer", Global Environmental Management Initiative (GEMI), 1994, 2000 L. Street, N.W., Suite 710, Washington, D.C. 20036)

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## **Appendix I. Report Distribution**

### **Office of the Secretary of Defense**

Under Secretary of Defense (Comptroller)  
Deputy Chief Financial Officer  
Deputy Comptroller (Program/Budget)  
Deputy Under Secretary of Defense (Environmental Security)  
Assistant to the Secretary of Defense (Public Affairs)

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Senate Subcommittee on Defense, Committee on Appropriations  
Senate Committee on Armed Services  
Senate Committee on Environment and Public Works  
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House Committee on Appropriations  
House Subcommittee on National Security, Committee on Appropriations  
House Committee on Commerce  
House Subcommittee on Health and Environment  
House Committee on Government Reform and Oversight  
House Subcommittee on National Security, International Affairs, and Criminal Justice, Committee on Government Reform and Oversight  
House Committee on National Security  
House Committee on Science  
House Subcommittee on Energy and Environment, Committee on Science

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## **Part III - Management Comments**

# Deputy Under Secretary of Defense (Environmental Security) Comments



## OFFICE OF THE UNDER SECRETARY OF DEFENSE

3000 DEFENSE PENTAGON  
WASHINGTON DC 20301-3000

07 MAR 1997

### MEMORANDUM FOR INSPECTOR GENERAL (CONTRACT MANAGEMENT DIRECTORATE)

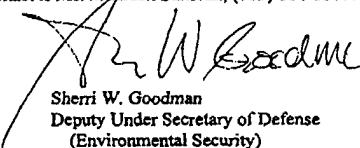
SUBJECT: Evaluation of Environmental Measures of Merit (Project No. 6CB-5008)

Thank you for providing a copy of the draft evaluation report on Environmental Measures of Merit. I am pleased with your finding that DoD's current Measures of Merits (MoMs) are comparable to the "best in class" companies you surveyed. Concerning the three additional Compliance MoMs recommended in the draft evaluation, one has already been evaluated, one is currently in use, and one is being considered for addition at this time:

- Spills - When the MoMs were being re-evaluated in 1995, the Environmental Quality staff evaluated a spill MoM as recommended in the draft evaluation. However, given the number of different DoD installations, we determined that this MoM would be of limited value compared to the cost of collecting the information. Unless there are repeat spills at a single location, which will not be shown in the MoM, there would be no indication of a pattern of a problem that needed to be corrected.
- Fines - Although there is no specific MoM for fines, the Department does have a policy of full compliance with all rules and regulations and implied goal of zero fines. The DoD Components are required to report fines and penalties, both assessed and paid, every 6 months. Although this measure does not meet the strict definition used in the draft evaluation, it meets the intent.
- Permit Excursions and Exceedences - This measure is being considered as part of the re-evaluation of the Clean Water Act MoM.

Since all of three of the recommended MoMs are in use, already evaluated, or in evaluation, the Department is already effectively demonstrating progressive environmental management, environmental stewardship, interest in reducing future liability, and timely and appropriate use of funds.

Thank you for allowing us the opportunity to review the draft evaluation. We will be using the results of this draft evaluation report in our re-evaluation of the Clean Water Act MoM. If you have any questions, my point of contact is Ms. Maureen Sullivan, (703) 604-0519.



Sherri W. Goodman  
Deputy Under Secretary of Defense  
(Environmental Security)

Environmental Security



Defending Our Future

## **Evaluation Team Members**

This report was prepared by the Contract Management Directorate, Office of the Assistant Inspector General for Auditing, DoD.

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## INTERNET DOCUMENT INFORMATION FORM

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**D. Currently Applicable Classification Level:** Unclassified

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