



**PDHonline Course C214 (8 PDH)**

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# **Environmental Management System**

*Instructor: Jim Newton, P.E., DEE*

**2020**

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# **Appendix B**

## **EMS Supplemental Toolbox**

- I. EMS Presentation**
- II. Communication**
- III. Gap Analysis Checklist**
- IV. EMS Software**
- V. Compliance Checklist**
- VI. Training**
- VII. EMS Internal Audit**

# EMS SUPPLEMENTAL TOOLBOX

## *EMS PRESENTATION*



*Gastonia Wastewater – EMS Implementation and Development*

*City of Gastonia*

*Wastewater Treatment Division*

**Environmental Management  
System Development and  
Implementation**

Presented By: Donald E. Carmichael, P.E.,  
Director of Public Works and Utilities

Beth Eckert, Industrial Chemist/

EMS Coordinator

# Overview of the City of Gastonia's Wastewater Treatment Division

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- Two wastewater treatment facilities
- Approximately 11.0 million gallons of wastewater treated daily
- Treatment facility staff of 51 employees
- 23 significant industrial users; 6 general permits issued

# How Gastonia Became Interested in an EMS?

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- Attended NCDPPEA - ISO 14001 seminar
- Spoke with our Industries who were seeking ISO 14001 certification
- Recognized how it could benefit our organization by helping us to:
  - Minimize and potentially eliminate noncompliance
  - Minimize our impact on the environment
  - Provide consistency over time within the operation
- Became a pilot program with the State of North Carolina

## Approval from Gastonia's City Council

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- Several members were businessmen, who were familiar with ISO standards, the consistency of application and policy it brings to an organization and recognized the benefit to the City
- Good environmental stewardship
- Above and beyond compliance with laws and regulations
- Proactive - not reactionary
- Recognized intangibles, such as improved public image

# Who will Develop the EMS?

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- Management selected the following personnel:
  - EMS Coordinator
  - EMS Team
- Staff Member from NC Div. of Pollution Prevention and Environmental Assistance assisted the City
- Ideas and suggestions were sought from all employees



# EMS Coordinator

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- EMS Coordinator was trained by an external source on ISO 14001.
- Responsibilities include:
  - Training the rest of the WWTD staff on ISO 14001 Environmental Management Systems
  - Guiding development and ensuring that progress was being made on the EMS
  - Ensuring conformance to the ISO 14001 standard

# EMS Team

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- **Responsibilities include:**
  - Being the core group of people who develop the EMS
  - Developing and reviewing aspect and impacts
  - Developing and reviewing procedures
  - Training of personnel in their respective areas

## NC DPPEA Staff Member

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- John Burke helped in every step.
- He had previous experience in EMS development, which provided the City with a starting point for each step.
- He helped with training, procedure development, form development, etc...
- He also helped to ensure that our procedures and programs conformed to the ISO 14001 standard

# Gastonia Began EMS Development

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- Kick-off meeting was held February 2, 1999.
  - ISO 14001 EMS training of the EMS Team
  - Development of a strategy and timeline for EMS implementation

# ISO 14001 EMS Policy/Objectives

EMS policy is developed, significant aspects and regulatory requirements identified, and objectives and targets established.

## ISO 14001 Elements

1) Environmental Policy; 2) Significant Environmental Aspects and Impacts; 3) Legal Requirements; 4) Objectives and Targets

## REVIEW

Upper management reviews various reports at regular intervals to determine the need for changes to policy, objectives, and/or procedures.

## ISO 14001 Elements

Management Review

## STRUCTURE/RESPONSIBILITY

To carry out the policy and objectives, employees are trained on procedures relevant to their work activities and consequences of departure from those procedures. Employees are made aware of their roles and responsibilities.

## ISO 14001 Elements

1) Roles and Responsibilities; 2) Training, Awareness, and Competence; 3) Operational Control; 4) Internal and External Communication; 5) Emergency Preparedness and Response; 6) Document Control

## CHECKING/CORRECTIVE ACTION

A monitoring program is established to evaluate environmental performance. Employees can report problems to management through corrective action reports. Audits are conducted to evaluate EMS effectiveness

## ISO 14001 Elements

1) Corrective and Preventative Action Program; 2) EMS Auditing; 3) Monitoring and Measuring Program; 4) Record Keeping

# *Policy and Objectives*



# Environmental Policy

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- An environmental policy was developed by the EMS team
- Approved by City Council on March 16, 1999.
- The policy is located on Gastonia's website at [www.cityofgastonia.com](http://www.cityofgastonia.com)

# Aspects and Impacts

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- An aspect and impact procedure and forms were developed
- Aspects and impacts were:
  - identified
  - rated high, medium, or low for severity and frequency
  - significance was determined
- The EMS Team took approximately 3 months to determine significance - done by June, 1999.



# Legal and Other Requirements

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- Identified and made a list of all legal and other requirements for the WWTD:
  - Permit effective and expiration dates
  - Compliance report due dates
  - Contract dates, etc...
- Determined a procedure for keeping them current
- C/PAR resulted in adding EMS review dates

# Objectives and Targets

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- The EMS team developed a list of objectives and targets for the division based on:
  - Significant aspects and impacts
  - Legal requirements
  - Interested third parties
  - Economical concerns
  - Technological concerns



*Structure and  
Responsibility*

# Who had Responsibilities under the EMS?

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- Successful EMS must involve every level of personnel from Trades Helper to City Council Member
- EMS Team developed a document entitled Roles and Responsibilities
  - Lists every position and their responsibilities as they pertain to the EMS

# Structure of the EMS

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- EMS manual which outlines the City's EMS
- Procedures both for the operation of the management system and the operational controls of the facilities
- Awareness and procedural training
- Development of forms and supporting documentation

# EMS Manual

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- Format based on the ISO 14001 standard to assure the EMS was structured to meet the requirements of the standard
- Written by EMS Coordinator, reviewed by the EMS team and approved by the Superintendent of the WWTD

# EMS Procedures

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- Created as a direct result of the ISO 14001 standard, like the following:
  - Document Control
  - Training
  - Aspect & Impact
  - Corrective / Preventative Action
  - EMS Auditing
  - External Communication
  - Monitoring and Measuring
- Standard only requires 3 documented procedures: monitoring and measuring, compliance audits, and operational controls

# Document Control

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- Document numbering system
  - Divisional documents have EMS numbers
  - Site specific documents are identified as such by a specific prefix
  - Procedures and forms are listed on the Document Control Matrix
- Signatures on original documents are blue
- Controlled copies
  - Green paper
  - Computer (read-only drive)
- All other documents are uncontrolled



# Document Control Matrix

Document Title	Document #	Revision	Retain	Frequency	Controlled Copy Locations
<b>ENVIRONMENTAL MANAGEMENT SYSTEM DOCUMENTS</b>					
<b><u>Procedures for Environmental Management System</u></b>					
Environment Management System Manual	EMS-0100.000	0	As Needed	As Needed	<ul style="list-style-type: none"> <li>◆ U: Drive</li> <li>1. Long Creek Operations</li> <li>2. Crowders Conf. Room</li> <li>3. PW Director's Office</li> <li>4. Pretreatment Office</li> <li>5. Superintendent's Office</li> </ul>
EMS Review Procedure	EMS-0100.001	0	As Needed	As Needed	<ul style="list-style-type: none"> <li>◆ U: Drive</li> <li>1. Long Creek Operations</li> <li>2. Crowders Conf. Room</li> <li>3. PW Director's Office</li> <li>4. Pretreatment Office</li> <li>5. Superintendent's Office</li> </ul>
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# Training

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- Training for Everyone
  - EMS policy
  - EMS awareness
  - Corrective/preventative Action
  - External Communication
- Supervisors determine who is to be trained on specific operational control procedures
- Training is documented and listed on the training matrix



# Operational Controls

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- Developed as a result of what the EMS Team determined to be significant to the Gastonia WWTD
- Developed to help achieve an Objective and Target set by the Gastonia WWTD



*Checking and  
Corrective Action*

# Checking / Corrective Action

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- The EMS is designed to continually improve itself through the following programs:
  - Monitoring and measuring
  - Corrective/Preventative Action Reports
  - Internal Audit Program
  - Management Review

# Monitoring and Measuring

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- Procedures for tracking and documenting the impacts the WWTD is having on the environment
- Measurements are taken and records are maintained for each area related to the impacts determined to be significant
  - proper calibration is required and documented of all equipment related to these measurements
- Audits are conducted and documented

# Corrective/Preventative Action Reports

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- All employees are encouraged to complete C/PARs, as the result of:
  - system failure
  - procedure deviation
  - recommendation for improvement, etc...
- C/PARs are reviewed by the management review board
  - C/PARS remain open until it is determined by the Superintendent that sufficient action was taken and completed



# Audit Program

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- Auditors trained by an external source in ISO 14001 Auditing
- Auditors from each area of the WWTD
- Each area audited biannually and audit reports generated
- Responses are received from the area supervisor
- Follow up is done to assure all findings have been corrected.

# *Management Review*

# Management Review Board

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- Monthly review of C/PARs
- Quarterly review of:
  - Status of the EMS procedures and training
  - Results of the monitoring and measuring actions
  - Progress on objectives and targets
  - Audit results

# Benefits of the EMS

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- Enhanced cooperation among staff
  - Within the WWTD as well as with other Divisions in the City
  - Consistency in applications, despite employee turnover
- Public awareness of the City's commitment to environmental excellence
- Improved relationships with State authorities
- Controlled documented procedures
- EPA accepted the EMS documentation and/or descriptions as the WWTD's portion of the MOM program

# Plans for our EMS

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- Become Certified
  - Why?
    - Third party confirmation that our EMS conforms to the standard
    - Positive recognition for the City's efforts
- Expand to other areas of the Public Works Department

# Summary

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- The City of Gastonia has taken the position that we would like to consistently go above and beyond compliance.
- We feel that ISO 14001 is a large step in that direction because:
  - Establishes a framework for an EMS
  - By design it provides for continual improvement
    - Maintain a proactive approach to compliance
    - Provides a systematic progressive solution to current and future problems

# EMS SUPPLEMENTAL TOOLBOX

## *COMMUNICATION*



*Clark County, Washington Public Works - Questions for Frontline Employees*

*City of San Diego WWC – Quarterly EMS Newsletter*

*City of Eugene WWTP – News Article*

*City of Charleston CPW EMS Policy and Commitment Statement*

*City of Charleston CPW - WCD Associate Recognition Program*

**Environmental Management System (EMS)  
Introductory Questions for the Shop Floor**

1. Are you aware of the positive environmental work being done by Equipment Services? What?
2. In your mind what are the top 3 things the shop does that can or does negatively impact the environment?
3. What is the shops greatest opportunity for environmental improvement?
4. Do any environmental regulations affect the shops? If yes, what are they and how do they apply to you?
5. If you have concerns about a product or a material where do you go for information?
6. Is the environment important to you? How or why?
7. Does this environmental policy work for you?
  - C** – Compliance with Regulations
  - C** – Continuous Improvement
  - P** – Pollution Prevention
  - W** – Working Together toward Sustainability
8. What do we need to get the buy-in from your fellow employees to make this EMS project a success?
9. Can you think of something this EMS project can do for you to make your job more rewarding?
10. What could management provide you to be a better environmental shop supporter?



# Did You Know?



Environmental Management System - ISO 14001

Wastewater Collection Division

## STANDARD OPERATING PROCEDURES (SOP):

- ❖ WWCD has currently incorporated 36 new SOPs into the MWWD/WWC Operations and Policy Manual
- ❖ Where are these located?  
*All Section Managers (GWUS, Project Manager, Senior Civil Engineer, And Senior Management Analyst) have controlled copies in their office.*
- ❖ Who is responsible for complying with these SOPs?  
*Every employee of the Wastewater Collection Division*
- ❖ Who is responsible for training on SOPs?  
*You're Immediate Supervisor*

## WHO IS YOUR ENVIRONMENTAL MANAGEMENT TEAM ( EMT)?

Jose Oropeza – Construction  
Terrell Powell – ROW  
Bert Seldura – SPSIOM  
Nabeel Qawasmi – Engineering  
Mike Whelan – CCTV  
Rick Donahue

Gary Neel - NROW  
Angela Salah - Administration  
Pashant Pandya – Maintenance Coordinators  
Kristen Ikeda – FEWD  
Johnny Mitchell

## WHO IS YOUR ENVIRONMENTAL MANAGEMENT SYSTEM STEERING COMMITTEE (EMSSC)?

Chris Toth, Deputy Director  
Rick Donahue, Environmental Management Rep.  
Alex Acosta Mathis, Senior Management Analyst  
Leroy Davis, G.W.U.S.  
Isam Hireish, Senior Civil Engineer

Bill Denhart, Assistant Deputy Director  
Johnny Mitchell, Alternate Environmental Management Rep.  
Mike Bedard, G.W.U.S.  
Kevin Gensler, G.W.U.S.  
Mike Giehl, FEWD Program Manager

## UPCOMING EVENTS:

September 8, 9, 10, 2003  
November 2, 3, 4, 2003

ISO 14001 Internal Audit  
ISO 14001 Final Assessment Audit



City of Eugene  
**CityNews**

**News from people at the City of Eugene**

**April 4, 2002**

*As part of its on-going effort to keep the community informed and involved, the City of Eugene publishes this weekly newsletter highlighting the work being done to make Eugene a better place.*

Click here to see a listing of this week's [Public Meetings Calendar](#)

[Past City News Pages](#)

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[FIRE DEPARTMENT EARNS RENEWAL OF STATE EXEMPTION](#)

[ENVIRONMENTAL MANAGEMENT SYSTEM SAVES TREES, WATER, POWER](#)

**AROUND THE CITY**

**Fire Department Earns Renewal of State Exemption**

Oregon State Fire Marshal Bob Garrison has granted the City of Eugene a renewal of its exemption from adhering solely to fire safety codes adopted by the State, and from oversight of the City's fire prevention programs by the State office. With the exemption, the City is free to adopt codes and code amendments that address specific local issues. This has been done on a number of occasions, and the option remains open to the City as an exempt jurisdiction should other issues arise.

A jurisdiction can be granted an exemption by meeting certain criteria in the area of fire prevention; that is, the local fire department must assume responsibilities including code enforcement, fire investigation, public education, juvenile firesetter counseling, and others. At this time, only nine Oregon jurisdictions including Eugene have the exemption. Mr. Garrison will come before the City Council on April 8 to present Eugene's certificate of exemption. For more information, please contact Acting Fire Marshal Reggie Augsburger at 682-5411.

**Environmental Management System Saves Trees, Water, Power**

The new Environmental Management System at the Wastewater Division helped save more than half a ton of paper in the past year using simple reduction strategies.

Wastewater's Environmental Management System established targets to reduce paper use and increase the post-consumer content of paper products that are used. The division has employed

a number of simple strategies over the past year in an effort to accomplish these goals. These strategies include reducing the default margins for printed documents, using duplex options on the division's printer, reformatting reports to use less paper, and installing cloth towel dispensers in restrooms. In addition, the division has written guidelines for the use of paper and established purchasing requirements for post-consumer content. Staff is encouraged to use electronic media for correspondence, and computers or overheads are used at meetings instead of handing out paper copies of agendas and informational materials. These efforts have been supported with reminder stickers on equipment and training for all employees on paper reduction targets and objectives.

The division's goal for last year was to reduce overall consumption of paper goods by 30%. A monitoring report shows that the actual reduction was approximately 20%, and the 30% target will be retained as next year's goal. In terms of specific reductions, the amount of paper used was cut by 0.6 tons or around 120,000 sheets of paper. The goal for using recycled paper was that 70% of the gross amount of all paper goods purchased would be made from recycled material with a minimum of 30% post-consumer content. The Wastewater Division exceeded this goal by using 97% recycled paper and will change the goal for the next year to 99%. The environmental benefits from these efforts can be stated in the following terms: ten 50-foot-tall trees saved, 12,300 gallons of water saved, 6,470 kilowatt-hours of electricity saved, and 2.6 cubic yards of landfill space that did not have to be used. Using recycled content also saves water and power since each ton of paper made with recycled fibers saves 7,000 gallons of water and 4,100 kilowatt-hours of electricity. For more information, contact Peter Ruffier, Wastewater Division Director, at 682-8606.

**COMMISSIONERS OF PUBLIC WORKS  
CITY OF CHARLESTON, SOUTH CAROLINA  
ENVIRONMENTAL MANAGEMENT SYSTEM POLICY**

**POLICY STATEMENT:**

The Charleston Commissioners of Public Works (CPW) is committed to the supply, treatment, and delivery of safe potable water and the collection, treatment, and disposal of wastewater in an environmentally sensitive and responsible manner. This policy establishes the commitment to meeting all applicable federal, state, and local laws, regulations, and statutes. In addition, it establishes the commitment, working cooperatively and openly, to meet customer and community water quality and environmental expectations. It establishes the commitment to improving cost and resource efficiencies. Further, this policy establishes the framework for setting and reviewing environmental objectives and targets with the intent of preventing pollution, protecting the environment, and continually improving environmental performance for present and future generations.

**POLICY IMPLEMENTATION:**

Recognizing that many aspects of operations carried out at CPW can impact the environment, this policy establishes the directives for all associates. This policy shall be formally communicated and explained to all CPW associates and made available to the public. It shall be centrally maintained and updated as necessary to reflect the changing needs and goals of CPW.

The CPW Environmental Management System (EMS) established by this policy, shall pursue and measure continual improvement in performance by establishing and maintaining documented environmental objectives and targets that correspond to the mission, vision, and core values adopted by CPW. In addition, CPW shall conduct its operations to:

- Emphasize environmental vigilance over CPW resources, processes, products, wastes, contamination and prevention of pollution.
- Develop management and associate commitment to the protection of the environment and prevention of pollution. Set clear environmental objectives and targets with clear assignment of accountability and responsibility and implement Environmental Improvement Programs.
- Commit to compliance with the letter and spirit of all applicable, federal, state, and local laws and regulations.
- Plan, design, develop, construct, operate, and maintain facilities to encourage resource-efficiency and the protection and improvement of the quality of the environment.
- Encourage integration of environmental planning into the strategic business plan.
- Establish a management process for achieving targeted environmental performance by routinely monitoring and reporting on significant environmental aspects.
- Implement a process of continual quality improvement for environmental management with the goal of achieving and maintaining third party certification for the EMS.
- Establish an effective environmental communication program with external environmental stakeholders such as the South Carolina Department of Health and Environmental Control (SCDHEC), community groups, and other interested parties as needed.

The Environmental Management System shall undergo review by the CPW officers on an annual basis. The effective date of this Environmental Policy is the 15th day of October, 1998.

Committed to by the associates of the Water Distribution Department for the Commissioners of Public Works of the City of Charleston, South Carolina.

Steve W. Kinard Manager	William E. Koopman, Jr. Assistant Manager	John B. Cook, P.E. Director of Engineering	Patric M. McClellan Director of Administration Services
Anderson, J.	Baker, M.	Bickerstaff, R.	Brown, F.
Brown, W.	Buncomb, E.	Carcueva, M.	Champagne, C.
Cockrum, J.	Copleston, P.	Couche, D.	Cummings, N.
Cypress, J.	Das, B.	Daniels, D.	Dombrowski, K.
Eldredge, T.	Ellis, E.	Franks, D.	Gaillard, F.
Giacomarro, M.	Green, K.	Hamilton, B.	Heyward, M.
Hill, K.	Hagland, R.	Jenkins, J.	Jenkinson, D.
LeBlanc, C.	Marks, J.	McCrady, A.	McCutchen, J.
Middleton, A.	Middleton, P.	Moore, P.	Myers, R.
Nelson, R.	Nesbitt, R.	Oberoi, K.	Prentiss, J.
Ravenel, A.	Relyea, J.	Remington, W.	Richardson, E.
Richburg, T.	Roszell, D.	Sagever, R.	Sam L E
Sanders, G.	Sanders, L.	Scott, L.	Simmons, N.
Singleton, J.	Smalls, L.	Smiley, J.	Sordelet, C.
Staggers, W.	Sullivan, K.	Watson, L.	White, L.
Whitsett, K.	Williams, B.	Williams, C.	Wright, St. J
Young, L.			

**Commissioners of Public Works  
of the City of Charleston, SC**

**Wastewater Collection Department  
Associate Recognition Program**

**Prepared By:**

**the WWCD Employee Recognition Committee**

**and the**

**Employee of the Quarter/Year Committee**

Approved by: \_\_\_\_\_  
Adrian Williams, Superintendent

Revision: 2002-0; Effective Date: September 01, 2002

**Wastewater Collection Department  
Associate Recognition Program**

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Revision: 2002-0  
Effective Date: September 1, 2002

Prepared By: Asso. Recognition Committee  
and the EOQ/EOY Committee

Approved By: Adrian Williams,  
Superintendent

**Award Program Index**

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**Committee Members:**

**WWCD Employee Recognition Committee:**

**Rick Bickerstaff  
Letty Clay  
Rodney Cromwell  
Larry Ferguson  
Ronnie Inabinet  
Robert Simmons  
W.C. Swain**

**Employee of the Quarter/Year Committee:**

**Ronnie Inabinet  
Chris Hendricks  
Jeff Tisdale  
Solomon Wade  
Earnest Washington  
Susan Roberts**

**Wastewater Collection Department  
Associate Recognition Program**

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Revision: 2002-0  
Effective Date: September 1, 2002

Prepared By: Asso. Recognition Committee  
and the EOQ/EOY Committee

Approved By: Adrian Williams,  
Superintendent

**Employee of the Quarter:**

The recommended procedure for recognizing an associate as the Employee of the Quarter (EOQ) is as follows:

Recommendation Procedure:

- The EOQ Chairperson will initiate a reminder for nominating associates for this award. Reminder will be forwarded via e-mail, interoffice memo or verbally during a scheduled department meeting.
- Any associate within the WWCD may be recommended for this award by any other associate within the department.
- Recommendation forms are available at the Ballot Box (Suggestion Box) located under the WWCD bulletin boards at the rear of the facility.
- All nominations must be placed in the Ballot Box by the time and date specified by the EOQ Chairperson.

Eligible Associates:

- All full-time departmental associates are eligible. New associates become eligible at the end of their orientation period.
- No associate who has been chosen within the past 6-month period is eligible.
- Associate(s) become ineligible if they have received a disciplinary action, i.e., written warning, days off, etc., for policy violation during the quarter.

EOQ/EOY Recognition Committee:

The Recognition Committee will be comprised of employees chosen by their peers or established through volunteering. The committee will equitably represent all sections and levels of the department.

Recognition Committee Members:

- Chairperson, chosen by the committee members, will serve a 2-year term.
- Committee members, either appointed or as volunteers, will serve a 1-year term.
- One representative from each section of the department is required.
- When possible past winners may be chosen to serve as committee members.
- Advisor(s) - as required.

At the end of a Chairperson's term, the existing committee members and new members will nominate and appoint a new Chairperson. The new Chairperson may be one of the existing committee members nearing the end of their term.

Committee members will seek their own replacement at the end of their term. A committee member's replacement should be from their current section unless otherwise approved by the Superintendent.

**Wastewater Collection Department  
Associate Recognition Program**

*Page 4 of 9*

Revision: 2002-0  
Effective Date: September 1, 2002

Prepared By: Asso. Recognition Committee  
and the EOQ/EOY Committee

Approved By: Adrian Williams,  
Superintendent

The Superintendent or Assistant Superintendent may act as an advisor to the committee, but will carry no vote.

EOQ Selection Process:

- The Recognition Committee will meet on the third week of the last month of each quarter.
- The committee members will review all nomination forms and the details included on the forms, and will discuss the following:
  - ✓ Excels in general productivity
  - ✓ Willingness to assist associates throughout the department
  - ✓ Contributes to the goals of the department
  - ✓ Commendable customer service
  - ✓ Team oriented
  - ✓ Positive attitude
- The committee will vote on the nominees, and the nominee with most votes will be awarded EOQ.
- In the case of a tie vote, the Superintendent will make the final decision.

*All associates' personnel information is to be kept confidential.*

Award Package for the "Employee of the Quarter"

- The EOQ award will be presented at the following departmental meeting.
- An "Employee of the Quarter" plaque will be presented to the associate.
- The associate's name will be engraved on a brass plate, which will be affixed to the EOQ plaque. The plaque will be displayed in the front lobby area.
- An EOQ certificate will be presented to the associate and a copy placed in the associate's personnel file.
- A letter of appreciation will be presented to the associate and a copy placed in the associate's personnel file.
- A fifty dollar (\$50) non-cash gift card to the retail store or other establishment (as available) of their choice will be issued to the associate.
- The associate will have the privilege of parking in the designated "Employee of the Quarter" parking space located at the front of the associate parking area, for the duration of the year.
- The associate will have their choice to attend lunch with their supervisor, Senior Supervisor, Assistant Superintendent, Superintendent or an Officer of the company, whomever they choose.
- The associate's name will be sent within 5 working days to Human Resources for recognition in a CPW news publication.

*Special Note: The Committee Chairperson will be responsible for coordinating the above recognition and awards.*



**Wastewater Collection Department  
Associate Recognition Program**

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Revision: 2002-0  
Effective Date: September 1, 2002

Prepared By: Asso. Recognition Committee  
and the EOQ/EOY Committee

Approved By: Adrian Williams,  
Superintendent

**Employee of the Year:**

Eligible Associates:

- All associates who were nominated as Employee of the Quarter through the duration of the year are eligible.
- Associate(s) become ineligible if involved with negligent loss or damage of equipment, or have received a disciplinary action for policy violation.

EOY Selection Process:

- Each associate in the department will be given a ballot sheet listing the eligible associates.
- Departmental associates will mark their selection on the ballot sheet. Voting will be done by secret ballot and tabulated by the EOQ/EOY Committee.
- Voting may occur during a departmental meeting.
- In case of a tie vote, the Superintendent will be asked to cast the deciding vote.

EOQ/EOY Recognition Committee:

The EOQ/EOY Committee will preside over EOQ/EOY awards. *See section on EOQ.*

Award Package for the "Employee of the Year"

- The EOY award will be presented at the following departmental meeting and/or the Safety and Service Awards luncheon held each year.
- An "Employee of the Year" plaque will be presented to the associate.
- The associate's name will be engraved on a brass plate, which will be affixed to the EOY plaque. The plaque will be displayed in the front lobby area.
- An EOY certificate will be presented to the associate and a copy placed in the associate's personnel file.
- A letter of appreciation will be presented to the associate and a copy placed in the associate's personnel file.
- A one hundred twenty-five dollar (\$125) monetary gift will be issued to the associate.
- The associate will have the privilege of parking in the designated "Employee of the Year" parking space, located at the front of the associate parking area, for the duration of the year.
- The associate will have their choice to attend lunch with their supervisor, Senior Supervisor, Assistant Superintendent, Superintendent or an Officer of the company, whomever they choose.
- The associate's name will be sent within 5 working days to Human Resources for recognition in a CPW news publication.
- An "Award Notification Form" must be forwarded to the Accounting Dept. with awards over fifty dollars (\$50). Per state and federal compensation laws the associate must be taxed on awards over fifty dollars (\$50).

*Special Note: The Committee Chairperson will be responsible for coordinating the above recognition and awards.*

**Wastewater Collection Department  
Associate Recognition Program**

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Revision: 2002-0  
Effective Date: September 1, 2002

Prepared By: Asso. Recognition Committee  
and the EOQ/EOY Committee

Approved By: Adrian Williams,  
Superintendent

**Productivity Management Program (PMP) Awards:**

This award is based on monthly cumulative PMP points for the entire department.

Eligible Associates:

All permanent associates in the department receive this award when the department's productivity points from the PMP program exceed 100%.

Part-time or temporary employees who work the entire quarter will also be eligible.

Award Package:

Each associate will receive a non-cash gift card/certificate worth eight dollars (\$8).

*The individual awards can be combined to finance a department-wide event, i.e., department-wide luncheon, breakfast, baseball game, etc. Each associate will vote on combining the awards prior to final approval. The majority will rule.*

**Wastewater Collection Department  
Associate Recognition Program**

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Revision: 2002-0  
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Superintendent

**Associate/Crew of the Month Award:**

Eligible Associates:

- All associates that measure their level of production through the Productivity Management Program (PMP).
- Associates that accumulate points based on a "team" approach, i.e., designated crew, will be considered one unit.
- In consideration of crewmember shifting, the crew that the associate spent the majority of their time with during the month will be the crew that they are measured with.
- Associate(s) become ineligible if they have received a disciplinary action, i.e., written warning, days off, etc., for policy violation during the month.

Selection Criteria:

- PMP points accumulated by each crew, technician, administrative personnel, etc. will be calculated to establish an average for each month.
- The PMP average for each section will be compared to determine the section winner.
- Section winners will be as follows:
  - | Administrative Section (if participating)
  - | Construction Section
  - | Maintenance Section
  - | Pump Station Section
  - | Technical Section
- For an associate/crew to win in consecutive months, the associate/crew must exceed their previous month's productivity percentage by 5%.

Award Package:

- ACMA award certificate will be given to the individual or to all associates on a crew.
- The individual or all associates on a crew will receive a ten dollar (\$10) non-cash gift card or certificate.

*Presentations shall be made monthly at a department gathering: i.e., departmental meeting, skills based training, safety training, etc.*

**Wastewater Collection Department  
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Superintendent

## **Excellent Performance Award (Spot Award):**

### Eligible Associates:

All WWCD associates are eligible.

### Selection Criteria:

- Supervisory level associates may recommend an associate or crew worthy of recognition directly to the Superintendent or Assistant Superintendent.
- Selection will be made based on the significance of a "job well done", operational improvement suggestion, safety suggestion, project or program implementation, etc.
- The award must be verbally approved by the Superintendent or the Assistant Superintendent, and an Officer of the company.

### Award Packages:

#### **Bronze Award:**

- This award is given to any associate whose suggestions or performance has impacted the WWCD in a positive manner.
- Justification for the award includes but is not limited to:
  - | Going "above the call of duty".
  - | Performing job requirements with significant productivity under abnormal circumstances.
  - | Implemented safety improvement suggestions.
  - | Implemented operational improvement suggestions.
  - | Receipt of "letters of recognition" from supervisors, associates, internal or external customers, etc.
- Monetary value range: \$10 to \$ 49
- Monetary award will consist of non-cash gift cards/certificates.
- Upon evaluation the Superintendent or Assistant Superintendent, and an Officer of the company will determine the actual award value.
- A Bronze Award certificate will be presented to the associate and a copy placed in the associate's personnel file.

#### **Silver Award:**

- This award is given to any associate whose suggestions or performance has impacted the WWCD in a highly significant manner.
- Justification for the award includes but is not limited to:
  - | Going well "over and above the call of duty".
  - | Performing job requirements with significant productivity under abnormal circumstances with a substantial outcome.

**Wastewater Collection Department  
Associate Recognition Program**

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Superintendent

- | Implemented safety improvement suggestions with significant operational effects.
- | Implemented operational improvement suggestions with a significant outcome.
- Monetary value range: \$50 to \$99
- Per state and federal compensation laws the associate must be taxed on awards over fifty dollars (\$50).
- An "Award Notification Form" must be forwarded to the Accounting Dept. with awards over fifty dollars (\$50).

**Gold Award:**

- This award is given to any associate whose suggestions or performance has impacted the WWCD in a tremendously significant manner.
- Justification for the award includes but is not limited to:
  - | Performance, actions, operational suggestions and/or improvements resulting in an extraordinarily significant outcome.
  - | Performance, actions, operational suggestions and/or improvements resulting in a significant cost-savings to the department and/or company.
- Monetary value range: \$100 to \$200
- Per state and federal compensation laws the associate must be taxed on awards over fifty dollars (\$50).
- An "Award Notification Form" must be forwarded to the Accounting Dept. with awards over fifty dollars (\$50).
- The Superintendent has the authority to alter the monetary value range as appropriate to the operational improvement.

*Special Note: An associate can receive a maximum of three hundred dollars (\$300) per year in awards.*

# **EMS SUPPLEMENTAL TOOLBOX**

## ***GAP ANALYSIS CHECKLIST***



*Global Environment & Technology Foundation – Gap Analysis Checklist*

# Gap Analysis EMS Check List

Answer the following questions. After completing the questions, review the questions for which you answered **No**. These are some of the areas you will pay special attention to when developing your Environmental Management System.

Reference – refer to the ISO 14001 Section that applies and identify and reference the procedures, policies, materials, etc. that you have at your Port that partially or fully meet the EMS (ISO) requirement.

Left to do – activities/actions (e.g., draft the procedure, update a current procedure with additional language, maintain this record, etc.) required to fully implement the EMS requirement.

Responsibility – for identifying and assigning action items to organization personnel who will assist in ensuring the EMS requirement is met.

<b>POLICY</b>	
1. Does your organization have a documented environmental policy?	Yes <input type="checkbox"/> No <input type="checkbox"/> Partial <input type="checkbox"/>
Reference:	
Notes:	
2. Does the policy include commitments to a) continual improvements, b) prevention of pollution and c) compliance to relevant laws and other requirements to which the organization subscribes?	Yes <input type="checkbox"/> No <input type="checkbox"/> Partial <input type="checkbox"/>
Reference:	
Left to do:	
Responsibility:	
Notes:	

3. Is the policy communicated to all employees and made available to the public?	Yes <input type="checkbox"/> No <input type="checkbox"/> Partial <input type="checkbox"/>
How is it made available to all employees?  How is it made available to the public?	
Reference:	
Left to do:	
Responsibility:	
Notes:	
4. Has the policy been endorsed and signed by Top Management?	Yes <input type="checkbox"/> No <input type="checkbox"/> Partial <input type="checkbox"/>
Reference:	
Left to do:	
Responsibility:	
Notes:	
<b>PLAN</b>	
1. Has a procedure to identify the significant environmental aspects of your operations been established and implemented?  Is the procedure documented?	Yes <input type="checkbox"/> No <input type="checkbox"/> Partial <input type="checkbox"/>  Yes <input type="checkbox"/> No <input type="checkbox"/> Partial <input type="checkbox"/>
Reference:	
Left to do:	



Responsibility:	
Notes:	
2. Has a procedure to identify, track and communicate (to applicable employees) applicable laws and regulations and other requirements to which the organization subscribes been documented, established and implemented?	Yes <input type="checkbox"/> No <input type="checkbox"/> Partial <input type="checkbox"/>
Reference:	
Left to do:	
Responsibility:	
Notes:	
3. Have documented environmental objectives and targets been established that:	
<ul style="list-style-type: none"> <li>• identify responsibilities, schedules and the means by which the objectives and targets will be met</li> </ul>	Yes <input type="checkbox"/> No <input type="checkbox"/> Partial <input type="checkbox"/>
<ul style="list-style-type: none"> <li>• take into account the significant environmental aspects, laws, regulations, legal and other requirements and policy commitments</li> </ul>	Yes <input type="checkbox"/> No <input type="checkbox"/> Partial <input type="checkbox"/>
<ul style="list-style-type: none"> <li>• consider the views of interested parties</li> </ul>	Yes <input type="checkbox"/> No <input type="checkbox"/> Partial <input type="checkbox"/>
Reference:	
Left to do:	
Responsibility:	
Notes:	

<b>DO</b>	
1. Have defined roles, responsibilities and authorities, including the appointment of a specific management representative in charge of the EMS been established?	Yes <input type="checkbox"/> No <input type="checkbox"/> Partial <input type="checkbox"/>
Reference:	
Left to do:	
Responsibility:	
Notes:	
2. Have sufficient financial, technical and human resources been made available to implement the EMS?	Yes <input type="checkbox"/> No <input type="checkbox"/> Partial <input type="checkbox"/>
Reference:	
Left to do:	
Responsibility:	
Notes:	
3. Are all employees and contractors aware of the requirement of the EMS, their roles in it, and potential consequences of departure from operating procedures?	Yes <input type="checkbox"/> No <input type="checkbox"/> Partial <input type="checkbox"/>
Are training records maintained?	Yes <input type="checkbox"/> No <input type="checkbox"/> Partial <input type="checkbox"/>
Reference:	
Left to do:	
Responsibility:	
Notes:	

4. Has the organization identified training needs and methods for providing general awareness of the EMS to all employees and managers?	Yes <input type="checkbox"/> No <input type="checkbox"/> Partial <input type="checkbox"/>
Reference:	
Left to do:	
Responsibility:	
Notes:	
5. Are all employees whose work involves significant environmental aspects competent by training, experience and/or education? Are training records maintained?	Yes <input type="checkbox"/> No <input type="checkbox"/> Partial <input type="checkbox"/>
Reference:	
Left to do:	
Responsibility:	
Notes:	
6. Have internal communications procedures regarding EMS issues been established and implemented?	Yes <input type="checkbox"/> No <input type="checkbox"/> Partial <input type="checkbox"/>
Reference:	
Left to do:	
Responsibility:	
Notes:	

7. Has the organization established procedures for communicating relevant requirements to suppliers and contractors regarding significant environmental aspects of services?	Yes <input type="checkbox"/> No <input type="checkbox"/> Partial <input type="checkbox"/>
Reference:	
Left to do:	
Responsibility:	
Notes:	
8. Has the organization considered procedures for external communication of its significant environmental aspects?	Yes <input type="checkbox"/> No <input type="checkbox"/> Partial <input type="checkbox"/>
Reference:	
Left to do:	
Responsibility:	
Notes:	
9. Are the core elements of the EMS documented, including all of the required procedures?	Yes <input type="checkbox"/> No <input type="checkbox"/> Partial <input type="checkbox"/>
Reference:	
Left to do:	
Responsibility:	
Notes:	

10. Is there an implemented and documented procedure for managing documents and records to ensure that it is current, accurate and readily retrievable?	Yes <input type="checkbox"/> No <input type="checkbox"/> Partial <input type="checkbox"/>
Reference:	
Left to do:	
Responsibility:	
Notes:	
11. Have documented operational controls (e.g., work instructions, maintenance manuals, etc.) for activities associated with significant environmental aspects been developed and implemented?	Yes <input type="checkbox"/> No <input type="checkbox"/> Partial <input type="checkbox"/>
Reference:	
Left to do:	
Responsibility:	
Notes:	
12. Have emergency identification, preparedness and response procedures/plans been established, implemented and tested?	Yes <input type="checkbox"/> No <input type="checkbox"/> Partial <input type="checkbox"/>
Reference:	
Left to do:	
Responsibility:	
Notes:	

## CHECK & ACT

1. Have procedures been documented and implemented that are associated with significant environmental aspects, operational controls and objectives & targets being monitored and measured?

Yes  No   
Partial

Reference:

Left to do:

Responsibility:

Notes:

2. Are operations associated with significant environmental aspects, operational controls and performance toward objectives and targets being monitored and measured (e.g., calibration, record reviews, performance observations, trend analyses, etc.)?

Yes  No   
Partial

Are relevant records maintained?

Yes  No   
Partial

Reference:

Left to do:

Responsibility:

Notes:

3. Have procedures for evaluating compliance (e.g., audits, reviews, or inspections) with legal requirements been established and are they being implemented?

Yes  No   
Partial

Reference:

Left to do:

Responsibility:

Notes:

<p>4. Are there procedures in place and being implemented for handing EMS nonconformances and corrective and preventative actions?</p> <p>Are records maintained?</p>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Partial <input type="checkbox"/></p> <p>Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Partial <input type="checkbox"/></p>
Reference:	
Left to do:	
Responsibility:	
Notes:	
<p>5. Is the information from the monitoring &amp; measuring, auditing programs and training being <u>recorded</u> and reported on a regular basis?</p>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Partial <input type="checkbox"/></p>
Reference:	
Left to do:	
Responsibility:	
Notes:	
<p>6. Is there a procedure for EMS audits and is it being implemented?</p>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Partial <input type="checkbox"/></p>
Reference:	
Left to do:	
Responsibility:	
Notes:	

## MANAGEMENT REVIEW

1. Is senior management, on a regular basis, reviewing the structure and performance of the EMS to determine the appropriateness and effectiveness of the EMS and identify potential opportunities for improvement?

Yes  No   
Partial

Reference:

Left to do:

Responsibility:

Notes:

2. Is the management review documented and are management recommendations for continual improvement documented and tracked?

Yes  No   
Partial

Reference:

Left to do:

Responsibility:

Notes:



# EMS SUPPLEMENTAL TOOLBOX

## *EMS SOFTWARE*



*Global Environment and Technology Foundation (GETF) – EMS Software Assessment*

# **Environmental Management System Software**

## **EMS SOFTWARE ASSESSMENT**

**March 15, 2004**

*Revised June 23, 2004*

**Cooperative Agreement # 82886901**



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## **EMS SOFTWARE COMPARISON**

As part of the U.S. Environmental Protection Agency (U.S. EPA) and American Association of Port Authorities (AAPA) supported Ports Environmental Management System (EMS) Assistance Project, GETF conducted a neutral analysis of “off the shelf” software products specifically designed to support an organization's development, implementation, and subsequent management of its EMS. The assessment focused primarily on managing environmental issues; however, the analysis also considered the software’s capability for integrating quality, environment, security, and safety and health into a single management system approach. An integrated management system approach may be very well suited to the complex, overlapping issues and pressures faced by Ports. While the assessment was conducted specifically with Ports in mind, the assessment may be useful to other public sector businesses and organizations considering the use of software to support their EMS. GETF was specifically selected to conduct this software assessment due to its unique synergy of in-house skills and expertise in both EMS development and technical assistance, and its knowledge of leading information technology applications.

EMS implementers are seeking tools that allow them to efficiently manage EMS implementation and maintenance tasks, such as project scheduling and management, training and training records, documentation management, and internal auditing and corrective/preventative actions. EMS software packages can offer the following key implementation management and EMS maintenance tools:

- Better communication between environmental and project staff at multiple installations
- Easy access to routine environmental and EMS documents and records
- Access to regulations and other requirements; enhanced management of permits, reporting, and compliance
- Database query, reporting, and updating
- Document repositories
- Enhanced project management
- E-mail based notification systems with escalation functions
- Calendar and EMS milestone and progress functions
- EMS report generation tools
- Information access security controls

### **Assessment Approach**

The software assessment entailed collecting factual information via interviews, product demos, message exchanges, and web research on sixteen EMS-focused software products currently available. The products were identified through working knowledge and past experience, colleague referrals, and general research. Each of the identified products were assessed against specific criteria (see evaluation criteria descriptions below) as deemed critical to implementing a viable computer-based management system. Example criteria included: ISO compliance, platform dependencies/adaptability, email notification capability, template provision, licensing requirements, access controls/security features, training, product support, and price. The products were also assessed for manageability of fundamental EMS elements, including: document control features, procedure writing, sample documentation database, environmental aspect and

risk assessment, tracking regulatory compliance, record management, corrective and preventative action, and auditing. Potential users should subsequently ensure a selected product is compatible with the organization's existing IT infrastructure prior to purchasing an EMS software system.

GETF utilized every effort to maintain a neutral disposition and to provide factual information as gathered through product marketing materials, product vendor interviews, and web-based demos. GETF did not have the ability, due to time and logistics, to demo each individual product. Based upon the information collected, GETF subjectively divided the software products into two tiers based on capabilities and specific relevance to the Port EMS Assistance Project. The following is a breakdown of the software products by tier (products are listed alphabetically):

### **Tier 1**

Amadeus Environment Expert eQRP

Entropy International Envoy

Enviance

GreenWare ISO 14000 Implementation Software

GreenWare ISO 14000 Software Suite

IBS America QSI System for Environmental Management

Integrum ISOft 14000

Intelex ISOsoft 14001

Prism Equation

ZMH<sup>2</sup> EMS-EZ (Graduate research project, included due to potential leveragability)

### **Tier 2**

Dakota Auditor EMS

EMAServer Module ISO 14001 WES

Gage EMSTutor - ISO 14001 Expert System

IsoTop GP ISO 14001 TimeSaver Software

ISYS International ISO 14001 Expert-Ease

Oxygen - Oxygen EMS

Solution Foundry EMSolution Web

## **Evaluation Criteria Descriptions**

### **Software Functionality**

**Documentation Templates:** Software includes sample document templates (i.e., procedures, policies, manual, etc.) that can be used in the development of an organization's relevant EMS-related documents and/or easily customized to fit the needs of an organization.

**Document Creation/Integration:** The degree of product flexibility for creating and/or integrating relevant EMS documents into the management system varies greatly. This element is commonly a "sticking point" with products being too prescriptive with regards to document format. Some products are based upon readymade documents/procedures that drive the overall system allowing minimal flexibility on the part of the user, whereby

other products allow a high degree of flexibility with the user able to choose between provided templates, creating documents from scratch, and/or incorporating existing external documents from varying application programs (e.g., Microsoft Word, PDF, etc...).

**Document Control/Review Functions:** Software includes a document management function, with the ability to track controlled documents, provide a review process, and archive documents. Documents are linked in some format to other relevant components of the EMS (i.e. activities, tasks, responsibilities, training, etc...).

**Document Archive/Library:** EMS documentation is maintained to accommodate adequate record control and all records and documents are indexed and easily locatable. Many providers offer a library type structure, similar to Microsoft Windows Explorer, with documents linked to relevant activities within the EMS.

**Data Compilation and Report Preparation:** Software has tools to provide environmental analysis in summaries and graphical reports to determine trends, etc...

**Calendar Management:** Software has a viewable calendar function to track upcoming EMS implementation and management tasks and deliverables. Products also may have the capability to integrate email notifications/reminders.

**Milestone/Task Management and Tracking:** Software includes a management tool that produces automatic reminders/notification to individuals and/or groups, such as reminders of projects, tasks, and permit requirements. This function may be linked to calendar management tools.

**Regulatory Compliance Management:** Compliance management tools to assist with the tracking and compliance of legal and other requirements, including permit deadline reminders, regulatory updates, roles and responsibilities, etc...

**Gap Analysis Tool:** Software includes a tool that allows an organization to assess their EMS against the ISO 14001 requirements either at the beginning of EMS implementation activities and/or at a specific time of their choosing (e.g., prior to an audit).

**Aspect/Impact Analysis Tools:** Software has an environmental aspect analysis tool to identify, rank, and prioritize a user organization's most significant environmental impacts.

**Audit Component/Tools:** Software includes information relative to audit requirements and procedures enabling internal and/or external auditors to verify and document whether the organization's EMS is in conformance with the audit criteria set out in ISO 14010 and 14011. This component may include a comprehensive set of audit procedures, tests, checklists and sample questions, as well as requisite audit documentation and reporting abilities.

**Training Management:** Software has tools to manage training requirements and training records relevant to environmental management.

**Context-specific ISO 14001 Text:** Includes ISO 14001 Standard language and direct references to the relevant elements.

## **Public Entity Clients**

**Public Entity Clients:** Software caters to public entities specifically or as a significant portion of their client base. Public entities have been identified that utilize the software.

## **Integrated System Capability**

**Integrated System Capability:** Software is designed for integration with other systems, such as quality management, safety and health, etc...

## **System Architecture**

**Client Server Solution / Stand-alone PC Version:** Software is installed directly on the user's hard-drive and/or hosted internally and purchased through individual licenses.

**Web-enabled/Hosted by Provider (ASP):** Software can be accessed via web browser, hosted by the software vendor, and does not require software to be installed on individual user's desktops. In addition, web-enabled software is Internet and Intranet capable and platform independent. Software can be linked to other applications and websites to provide up-to-date information.

**Database:** The software's back-end database and query platform (e.g., Microsoft SQL, Oracle, etc...).

**Client Operating System:** The different operating systems the software supports (e.g., Windows 98/ME/XP, MS Office, Internet Explorer 5.0 or higher, etc...).

**Security Features/Multi-level Access:** The software allows for multiple levels of user access, limited by defined roles and responsibilities. The access is determined by an individual user's log-in information. This feature serves two purposes: 1) provides security through limiting access to important information and documents; and 2) simplifies the system by only providing access to information and features (i.e., clears the clutter) necessary to the individual/group user.

## **Product Cost**

**Single Desktop License:** The software's available cost and options on licensing of their product.

**Training:** Software includes access to training, either included within the software package or available through a classroom structure. Additional costs are denoted.

**Product Support:** Technical assistance/product support offered by the software provider as part of the purchase price. Additional costs (i.e., annual support fees) and description denoted. Often this aspect is negotiated and customized at time of purchase.

### **Unique Software Needs and Characteristics of Public Sectors**

Historically, EMS software tools have targeted private sector organizations and corporations; however, several providers have recently focused significant attention on the growing pool of public entity EMS implementers. Due to the initial focus of product development on the private sector, many of the existing products do not meet public sector-specific needs and organizational characteristics (i.e., technological capabilities, scalability to small organizations, operational sectors such as wastewater, etc...). Although an organization's approach to EMS implementation may be similar (i.e., plan-do-check-act, 17 elements of the ISO 14001 Standard, etc...), there are fundamental, organizational differences between public and private sector entities. EMS implementation experience has revealed that the needs, level of requisite support, and capabilities of private versus public sector EMS implementers can vary considerably.

Research and feedback has shown that many existing products, originally created for use in the private sector, are too prescriptive in regards to the structure and implementation of an EMS for use by many public entities. Many of these products are driven by the immediate goal of "achieving ISO certification" as quickly as possible, not a goal necessarily held by public entities. Therefore, many products offer a "cookie-cutter" type approach that strives for turn-key implementation of an EMS. In addition, for an EMS to be successful in driving effective environmental management for public organizations, documents, procedures, policies, and the like must be adaptable to different educational levels and technical capabilities and specific for the site and operational sector (e.g., fleet maintenance) in question. While initially the prescriptive nature of some software is comforting and supportive, overcoming inflexibility in later stages of EMS development and implementation is often extremely time consuming, labor intensive, and counter-productive.

It should also be noted that many public entities implementing EMSs have found that a lot of EMS software packages include many more functions and capabilities than are actually utilized or necessary in practice. The needs of a particular organization can differ widely depending upon organizational size, internal capabilities and resources, and approach to EMS. The central component of a software tool for EMS implementation and maintenance is its ability to control and manage documentation and records. For many organizations this is the sole driver for purchasing an EMS software product, resulting in the organization only utilizing a portion of the software's overall capabilities. In fact, some organizations have realized that all they need is a tool to help manage the documentation and have either developed this in house or hired an external consultant to do so. Therefore, one alternative to consider, dependent upon an organization's specific needs, is to develop or purchase an EMS document management tool.

To our knowledge, the commercial market for such focused products is currently limited with most developed for internal purposes only. GETF was able to demo one such product during this

research, which was produced by the University of Massachusetts – Lowell, a participant in the U.S. EPA-supported 2<sup>nd</sup> EMS Initiative for Public Entities program. This product is currently being fine-tuned for marketability, but incorporates a very user-friendly interface and capabilities. Additional information on this product can be found at [www.uml.edu/epaems](http://www.uml.edu/epaems).

### **Public-sector Focused Software**

Currently, two EMS software providers have focused significant amounts of time and effort in customizing their products to fit the unique needs of public sector clients, having distinguished themselves, at least for the present time, from other competitors: Greenware ([www.greenware.com](http://www.greenware.com)) and Intelex ([www.intelex.com](http://www.intelex.com)). Both of these products have been procured and utilized by participants in the EMS Initiatives for Public Entities pilot projects and have secured contracts with a larger and more diverse range of public entities than similar competitors. As part of this software comparison effort, GETF participated in software demos and conducted interviews with selected users to assess the components and practical application of both software products.

Overall, both products were of similar quality and scope. Participants in the EMS Initiatives, as well as other relevant GETF clients that have utilized each of these products, have been generally satisfied that the products greatly enhance their ability to implement and manage their respective EMSs. However, a common thread throughout the user feedback has been that the Greenware product does not offer the degree of flexibility with regards to document creation and integration and significant aspect prioritization that was originally desired. Most organizations have learned to accommodate this limitation with resulting success. During the product demo, Greenware representatives expressed that their company is working diligently to increase the flexibility of their product.

Although GETF strived to maintain a neutral assessment of the available EMS software products, it was clear from research and demonstration that Intelex stands out when assessing software effectiveness strictly for public entity EMS use. Other vendors within the Tier 1 listing also offer outstanding management products; however, several expand beyond the scope of EMS, most notably the Amadeus Environment Expert eQRP product. GETF's experience and research clearly identified Intelex as a more user-friendly EMS-specific software package with a simple, straightforward user interface and direct applicability to public entity characteristics and requirements. The Manager's Dashboard, a unique feature to Intelex, was a great overall project management tool and offered a tremendous sense of comfort and control in managing the day-to-day activities of an EMS, a product capability especially valuable to public entity Environmental Management Representatives, as often they are expected to be the lone EMS expert within an organization providing leadership for implementation. In addition, the software maintains format consistency throughout every component, is exceptionally well linked throughout the management system, and offers tremendous, personalized product support. One weakness that was identified in the comparison to other products was that Intelex was among the highest in product cost.

### **Conclusion**

It has become increasingly evident that more and more public entities are interested in software products to better manage their environmental impacts, especially with the implementation and



maintenance of EMSs. This follows a similar trend to that which occurred within the private sector over the last decade. GETF has witnessed this transition firsthand through the current EMS Initiative for Public Entities project in which over half of the participants have purchased or are considering the purchase of EMS-focused software. The Ports, due to the relative complexity of operations and issues as compared to the various public entity sectors, can significantly benefit and essentially implement and maintain more robust EMSs with the assistance of software products.

ISO 14001 Software Comparison Matrix - Tier 1 Products

Evaluation Criteria	Amadeus Environment Expert	Entropy International Envoy	Enviance	GreenWare ISO 14000 Implementation Software	GreenWare ISO 14000 Software Suite	IBS America QSI System for Environmental Management	Integrum ISO/I 14000	Intellex ISOsoft 14001	Prism Equation	ZMH <sup>®</sup> EMS-EZ
<b>Software Functionality</b>										
<b>1. Document Control</b>										
a. Documentation Templates		Yes, the product includes a variety of ISO 14001 templates (procedures, policies, checklists, etc...)	Yes. The System includes document templates that facilitate preparation of and revisions to required documents.	No, can be purchased separate (\$250).	Yes. Procedures can be easily created from scratch, linked to templates, or linked to existing documents (i.e., Word, PDF, etc..)	Yes, the module includes all of the templates and examples needed to create procedures, work instructions, etc...; however, these components are based upon ISO 9000.	Yes, linked to relevant implementation steps of the established plan	Yes, each implementation step is linked to appropriate samples and templates	Yes, best practice templates searchable by key word/topic, including ISO explanations. Also documents can be created with any application software.	This product was developed through the University of South Carolina's Technology Incubator Program. The product was included here due to the potential ability to be modified and adapted to meet Port specific EMS needs. The product has a minimal initial costs and is currently being examined for commercial viability enhancements. The product was originally developed for the sole purpose of certifying the University to ISO 14001.
b. Document Creation/Integration	Allows you to easily access and view the latest version of each relevant document. Review, approval and distribution sequences are electronically managed. Distribution is instantaneous. Grants access only to documents linked to your duties, personal needs and preferences.	The product allows the user to link to or upload external electronic files, diagrams, and other applications. In addition, the software includes a range of templates.	Yes. The System supports an unlimited number of documents in the Document Manager. These documents may be externally created or created through the Template described above. All documents (files of any type) can be associated with specific components of the user's model.	Documents can be easily created from scratch, linked to templates, or linked to existing documents (i.e., Word, PDF, etc...). Several users have expressed that the product utilizes verbatim ISO language and is at times inflexible with document creation, resulting in longer format documents. Greenware has recently focused upon increasing flexibility.	Documents can be easily created from scratch, linked to templates, or linked to existing documents (i.e., Word, PDF, etc...). Several users have expressed that the product utilizes verbatim ISO language and is at times inflexible with document creation, resulting in longer format documents. Greenware has recently focused upon increasing flexibility.			Yes, users can take advantage of provided templates, create new documents from scratch, or incorporate existing documents in nearly any format.	Document templates are provided in off the shelf Microsoft software and can be used as is or edited appropriately. Documents can be created in any software format used and uploaded or linked to equationASP. Documents can be grouped so that related documents are stored together in folders.	
c. Document Review Process	Yes, document access controlled by user entitlement.	Automatically denotes author, creation date, issue, version number, revision date, and approver. Controlled through the user access and privileges tools	Yes. The System includes a Document Manager	Yes, customizable views for draft, final, etc. Diagnostic features that automatically evaluate completion and status, including a digital signature function and sign off/review checkbox.	Yes, customizable views for draft, final, etc. Diagnostic features that automatically evaluate completion and status, including a digital signature function and sign off/review checkbox.	Yes, revision control and automated document status updates. Includes a temporary storage function for approved but unreleased documents in order to give users the opportunity to train themselves on these documents prior to official release.	Yes, via e-mail system	Yes, document manager creates a list of reviewers, whom are sent an email with the document w/ a link to approve, reject, or edit. Only released revisions are available to general staff w/ built in controls for paper versus electronic distribution. Only document managers can access the advanced document management functions.	Documents are circulated for review and approval via notices that automatically generate emails to those who need to review the document. Reminder and escalation notices help users complete the review on-time. Parallel document approval allows multiple users to review a document at the same time. Approved and rejected votes are recorded online. System automatically remembers who approved the document from its previous version.	
d. Document Archive	Yes, utilizes a data warehouse structure ensuring that records are easily accessible.	Yes, documents are maintained and stored within a central document library.	Yes, the Document Manager function controls and archives previous versions. Documents are associated with the various components of the EMS and controlled through specific security settings.	Yes, via a record registry ensuring proper maintenance for audits.	Yes, via a record registry ensuring proper maintenance for audits.	Yes, each document contains a complete, automatically generated history and is automatically archived.	Yes	Yes, past revisions and revision information are all archived.	equationASP keeps all versions of every document uploaded. Document owners can access the archive while other user only access the current approved versions of documents. Records of approval, changes, etc. are maintained for every version.	
e. Document Library (linked)	All documents are organized in one place through a Windows Explorer-type structure and can be accessed easily and quickly. Documents are linked to keywords, references to other documents and physical locations.	Yes, documents, diagrams, audio/video, and other applications are all linked and stored within a central library, thereby ensuring adequate document control.	Yes, all documents are accessible through a set of folders with an unlimited number of subfolders allowed, with access controlled through security settings.	Yes, aspects (both sign and non-sign) are automatically linked to a relevant series of worksheets. All information entered into the worksheets are linked to the EMS manual, including operational controls and procedures. Structure closely resembles Windows Explorer.	Yes, aspects (both sign and non-sign) are automatically linked to a relevant series of worksheets. All information entered into the worksheets are linked to the EMS manual, including operational controls and procedures. Structure closely resembles Windows Explorer.	Yes, reference module of current documentation indexed via the creation of an EMS Policy Manual and Tier 1 documentation.	Yes, generated docs are linked to various components through a central library.	Yes, controlled per ISO requirement and accessible through an Intranet Index. Documents can also be accessed from outside of the system by utilizing a tool to generate a URL. Reference library linked with ISO Standard descriptions, document samples/templates, PowerPoint Training Courses, and other tools.	The equationASP document library allows users to browse the library to locate documents or search by key word, document owner, revision date, document status, and other criteria about the documents.	Yes

ISO 14001 Software Comparison Matrix - Tier 1 Products

Evaluation Criteria	Amadeus Environment Expert	Entropy International Envoy	Enviance	GreenWare ISO 14000 Implementation Software	GreenWare ISO 14000 Software Suite	IBS America QSJ System for Environmental Management	Integrum ISOtr 14000	Intellex ISOsoft 14001	Prism Equation	ZMH <sup>®</sup> EMS-EZ
2. Data Compilation and Report Preparation	Yes, a report generator for extraction, manipulation, and presentation of information related to the EMS. Graphics and statistical tool included.	Yes, users can instantly generate both standard and filtered reports for single, multiple, or all sites	Yes. The System has an ad hoc reporting tool that allows compilation, analysis and reporting of EMS components, compliance data, and records of audits, incidents, accidents, etc. including process time dependent parameters and graphical display formats.	Yes, the product has many reporting/data compilation options, including time/cost (by individual), status, training, corrective action, etc... Exportable to Microsoft Word or HTML.	Yes, the product has many reporting/data compilation options, including time/cost (by individual), status, training, corrective action, etc... Exportable to Microsoft Word or HTML.	Yes, real-time reporting and analysis	Yes, Ad Hoc Reporting tool to create reports and charts from data contained within Integrum and other data sources.	Yes, including compliance (and cost of compliance), significant aspect, monitoring and measurement activities, and general EMS progress reports.	All areas of equationASP offer automatic and customizable reports that show document, corrective action, internal audit, survey, and data collection information. Reports can be viewed on-line, printed, downloaded to Microsoft Excel, and sent to other users as notices / emails.	
3. Calendar Management	Yes, implementation schedule with target dates for activities, tasks, monitoring and measuring, etc..	Yes, create action plans and an implementation schedule, with milestones and task/completion date reminders.	Yes. The System includes a set of calendars organized by user and by EMS component w/ Email reminders of scheduled actions or milestones including a direct link to the task completion page.	Yes, the EMS Calendar provides a summary of all document due dates, tasks and actions, including key monitoring and document review dates. Automatic email responsibility notifications and links to relevant documents.	Yes, the EMS Calendar provides a summary of all document due dates, tasks and actions, including key monitoring and document review dates. Automatic email responsibility notifications and links to relevant documents.	Yes, via an email escalation function. Not clear whether the product has the ability to develop a project implementation plan.	Yes, linked to "to do" lists and responsibility (including regulatory) notification function.	Yes, including a custom implementation plan that creates a step-by-step process for implementation with progress measures and milestones.	The Project Management function provides a pre-defined EMS implementation plan that is customizable for use at the client. The Project Management system schedules all EMS implementation tasks, assigns to teams, and notifies users when action items are due.	
4. Milestone/Task Management and Tracking	Yes, tasks can be assigned to employees via an EMP tree structure, which allows you to see at a glance what stage each EMS is at along with respective objectives, targets, and tasks. Each employee accesses only the information relevant to his/her responsibilities.	Yes, individual sites can be managed with unique users, system access, and responsibilities defined. Roles and responsibilities management tools, including individual, team, and site task lists. Reminder function for completion dates and reviews, including a report function.	Yes, the System's Task Manager allows individual and/or group task assignments. Reminders and escalators are standard and are delivered via email with a link to the task completion page. Tasks are shown in calendars with completion information linked to report functions.	Yes, each user will have an individual calendar listing tasks, activities, due dates, etc... Email notification functions must be manually imputed and are not automatic.	Yes, each user will have an individual calendar listing tasks, activities, due dates, etc... Email notification functions must be manually imputed and are not automatic.	Yes, includes an escalation function to alert management of missed deadlines with message automatically generated and distributed by modules. The product maintains a record of all escalation mail messages for review.	Yes, automatic notifications and task reminders (via email), including a notification calendar and schedule.	Yes, automatic email notification with direct link to activity and relevant documents and customized "task menu" specific to each user. Notification is escalated if task is overdue or pending for a specified amount of time. Operational equipment maintenance activities may also be tracked via email notification.	The Project Management function automatically records the completion of tasks and provides a variety of project status reports that show implementation in Gantt chart form and in terms of on-time vs. late and percent complete.	
5. Regulatory Compliance Management (non-conformance notification)		Yes, compliance management tools (update capacity/assistance unknown) with automatic non-conformance plans and records. Software assists with establishing and maintaining a register of legislation and "anticipating the requirements and impacts of new legislation and standards."	Yes. The System includes automatic data warnings, tasks, follow up (missed deadline or parameter exceedance), and emails to facilitate regulatory compliance. Follow up actions allow classification of the non-conformance into predefined categories such as "Reportable", "Permit Compliance Deviation", "Exempt", etc. Regulatory tracking is also connected to report functions.	Yes, legal and other requirements are linked to relevant aspect worksheets, which is linked to a CD, website, or other source of information. Legal and Other worksheet includes links, responsibility, review date, and future review dates.	Yes, legal and other requirements are linked to relevant aspect worksheets, which is linked to a CD, website, or other source of information. Legal and Other worksheet includes links, responsibility, review date, and future review dates.	Yes, legal register which must be populated by the user with all current environmental regulatory information.	Yes, all applicable requirements must be populated and updated by the user. Software includes a hot-spot link tool for updates, allows electronic documents (i.e. permits) to be incorporated into the system, and critical dates can be entered into the calendar for personnel reminders.	Yes, complete management system ensures compliance to fed, state, and municipal regulations AND other requirements (non-regulatory), but the client is responsible for identifying all applicable regulations. Tracks and delegates action plans for permit compliance. Manages the review, update, and implementation of requirements and tracks associated reporting requirements. Compliance status is displayed through a graphical "Dashboard" by facility, division and department, or organization-wide. Ability to feed in outside update services directly into the EMS software.	equationASP offers tools and worksheets to identify, record, and track legal and other requirements related to the organization. The Improvement System offers ability to enter, administer, assign, and complete nonconformances related to the EMS and notifies all relevant functions.	
6. Gap analysis tool		No, not a specific tool, audit checklist included	Yes, the System includes a predefined report of gaps in the EMS.	Yes, clause-by-clause gap analysis	Yes, clause-by-clause gap analysis	Yes, internal assessment tools for gap analyses and/or internal audits	Yes ISO Navigator tool for users, readers, and auditors	"EMS Status" tool that provides an instant assessment of EMS conformance. Manager's Dashboard allows and instantaneous "snapshot" of the EMS with green and red checks to show status.	equationASP includes a Gap Analysis tool and worksheet to assist in conducting a baselines assessment of the organization and its current status and readiness for an EMS implementation.	

ISO 14001 Software Comparison Matrix - Tier 1 Products

Evaluation Criteria	Amadeus Environment Expert	Entropy International Envoy	Enviance	GreenWare ISO 14000 Implementation Software	GreenWare ISO 14000 Software Suite	IBS America QSI System for Environmental Management	Integrum ISO/14000	Intellex ISOsoft 14001	Prism Equation	ZMH <sup>2</sup> EMS-EZ
7. Aspect/Impact Analysis Tools	Yes, software follows the format of aspect identification via activities, O'sT's, and establishment of EMPs. Performance follow-ups and establishment of monitoring and measurement activities. Each aspect connected directly with relevant legal and other requirements, objectives, training, etc...		Yes, the System includes a means to identify, rank, prioritize and re-evaluate environmental impacts. Reporting allows	Yes, each identified aspect is manually linked (via checkbox function) to applicable ISO requirements, documents, reference links, and activities.	Yes, each identified aspect is manually linked (via checkbox function) to applicable ISO requirements, documents, reference links, and activities.	Yes, an EMS Aspects Register.		Yes, an Env. Aspects and Impacts Module steps users through the identification and ranking. The first step is identifying Activities, Products, and Services (APSS). User-defined scoring criteria. Automatic links between ASPs, aspects/impacts, and relevant management components, and subsequently O'sT's and EMPs.	equationASP includes guidance, explanation, tools, and worksheets for identifying, recording, evaluating, and scoring aspects and impacts up front and for the long term.	
8. Audit Tools	Yes, Audit Module organizes an audit schedule enabling the assignment of appropriate resources. Integratable with a CAR Module and an Action Module, which is connected directly to the personnel responsible.	Yes, including audit checklists	Yes, the System includes predefined questions that guide an audit. This pertains to both the development of the EMS and regulatory compliance audits. Audit findings are tracked to closure through automatically created and assigned tasks. Continuous improvement can be evaluated through summary reports D6	No	Yes, ISO 14000 Audit Software for internal and external auditors and ISO 14000 Audit Pro, which includes a set of fully customizable audit protocols, controls and tests, and linked audit report function. Includes graphical representation and percentage of conformance.	Yes, internal assessment tools for gap analyses and/or internal audits. The original ISO 9000-focused product includes a comprehensive audit and corrective action module, but is it unclear whether a similar structure currently exists for the ISO 14000 product.	Yes, including an archived Audit Trail.	Yes, via NCR & C/PAR forms and management tools linked with a complete Audit module.	equationASP includes an Internal Audit system to schedule all EMS audits, assign them to auditors, plan and prepare standard and customized checklists, enter audit reports, and generate corrective actions related to the audits.	
9. Training Management	Yes, ability to identify training needs and management training activities for personnel with environmentally-sensitive tasks.	Yes, training needs analysis and management	Yes, the System has a tracking function allowing training schedules, automatic attendance reminders, and training records by subject matter, location, or individual.	Yes, a training worksheet for general and specific training management. Allows a training plan to be developed for each aspect. Does not include automatic training notifications.	Yes, a training worksheet for general and specific training management. Allows a training plan to be developed for each aspect. Does not include automatic training notifications.	Yes, the product is designed to plan, track, and record the training of employees.	Yes, a training database linked to activities, projects, tasks, etc. Notifications and training records included.	Yes, via email notifications and personalized "my training" calendar. Training "work groups" to target employees with similar training requirements. The reference library includes PowerPoint Training Courses and other tools to assist with implementation.	equationASP includes web-based training courses that teach users about the EMS in introductory and intermediate levels of detail. The system automatically records those users who have taken and completed the courses. equationASP also offers the ability to send Training Notices to staff when they require training on the EMS and its documentation.	
10. Context-specific ISO Text	Not specifically based upon ISO 14001. Includes all the elements, but no reference to the standard.	The product supports all activities in the process of implementing and maintaining a management system certifiable to ISO 14001.	Yes. EMS components include ISO specific text.	Yes, interactive worksheets address each individual element of the ISO 14001 standard.	Yes, interactive worksheets address each individual element of the ISO 14001 standard.		Yes	Each step of the implementation project plan is linked to the ISOsoft reference library and includes in-depth descriptions of the ISO 14001 requirements. Summarizes conformance to all requirements through a real-time, graphical "Dashboard". Terms can be modified to fit the organization.	equationASP breaks the ISO standard into manageable chunks of information and provides easy to read and understand explanation of the requirements. The ISO standard is linked to the topics that need to be addressed throughout the EMS.	Compliant w/ ISO 14001
11. Multi-lingual	Yes, each user can work in his/her own language		System does not currently include languages other than English. Enviance has provided estimates to clients for inclusion of multiple languages in the software package.			Training and implementation services offered in English, Spanish, and French		Yes, PC-based systems are available in Portuguese, Mandarin Chinese, German, Spanish, Italian, and English. Web-based system in French and English w/ a Spanish version under development.		

Evaluation Criteria	Amadeus Environment Expert	Entropy International Envoy	Enviance	GreenWare ISO 14000 Implementation Software	GreenWare ISO 14000 Software Suite	IBS America QSI System for Environmental Management	Integrum ISO/ 14000	Intellex ISOsoft 14001	Prism Equation	ZMH <sup>®</sup> EMS-EZ
<b>Applicability</b>										
1. Ports	Port of Houston Authority		Yes. The System addresses EMS, compliance management, reporting, auditing and training needs of ports.				Yes, non-US			
2. Public Entities (general)		Universities, large government offices, railway system, and District Council	Yes. The System addresses EMS, compliance management, reporting, auditing and training needs of various public entities. Current ly, the System is used by Universities, Federal DOE research labs, The National Institutes of health, United States Coast Guard, United States Navy, the National Institute of Standards and Technology, and a county sanitation district.	14 local gov clients listed, including cities, counties, and an airport authority, as well as 40 EPA sites.	14 local gov clients listed, including cities, counties, and an airport authority, as well as 40 EPA sites.	A couple of utilities on the client list, mostly industry/manufacturing	No public entity clients currently. Provided live demos to US Army and PA DOT which were well received, but still under evaluation.	City of Scottsdale, Waterloo Waste Management facility (1st in N.A. ISO registered), York Region Water and Wastewater departments (also 1st in N.A.), and others. City of Charlottesville and Rivanna Sewer and Water Authority (pending).	DoD including Army operations & Chemical Materials Agency, Department of Homeland Security, and others.	
<b>Integrated System</b>										
1. Health and Safety	Yes, as an integratable module	Yes, as an integratable module	Yes. The System can be integrated with Health and Safety data management systems. The System can also be configured to track safety incidents and produce safety	No	No	No	Safety statistics and incident management, linked to CAR. Software complys with British, Australian, and ISO safety management standards.	Yes, via available module	Yes	Yes, the product also integrates occupational health and safety concerns into the overall management system.
2. Quality Control	Yes, as an integratable module	Yes, as an integratable module	Yes. The System can be integrated with quality control data management systems.	No	No	Yes, QSI originally focused upon ISO 9000 Support and leveraged existing products.	Yes	Yes, via available module	Yes, including ISO 9001, ISO 17025, and others (Lean Manufacturing, Continuity of Operations Planning).	
<b>System Architecture</b>										
1. Client Server Solution/Stand-alone PC	Yes	Available Option; additional client server requirements		Available option	Available option	Available	Available	Yes, can be hosted on internal servers via a single installation.	Yes, equationNET can be licensed and installed on client servers.	Yes
2. Web-enabled/Hosted by Provider (ASP)	Web-enabled, implementable in multiple sites.	Available Option, annual subscription	Yes. The System is developed and hosted by Enviance, Inc. and can be installed behind the customer's firewall and hosted internally.	Available option, \$1000/site/unlimited users	Available option, \$1000/site/unlimited users	Available option, can include remote compliance management	Available option, annual server and software maintenance fee.	Available	Yes, equationASP hosted by Prism and accessed via internet and web browser.	No
3. Database		Microsoft SQL Server 7, 2000, or Oracle 8i	SQL 2000			Oracle, DB2, Lotus Notes, SQL Server, ODBC, et...	Lotus Notes	Oracle and SQL, can be integrated with other existing databases.	Microsoft SQL or Oracle 9i	
4. Client Operating System	Microsoft Office	Windows NT4, 2000, Me, 98, or 95; Internet Explorer 5.0 or higher	Internet Explorer. No software or hardware purchase is needed.	Windows 95, NT, or Higher	Windows 95, NT, or Higher	Windows	Microsoft Windows, preferably NT or 2000+	Microsoft NT and Windows 2000 IIS Server 4 or 5; all major Web Browsers.	Windows 95 or higher.	Windows 98/ME/XP and MS Office
5. Security	Yes	Yes	Yes. Each command and response is fully encrypted using Secure Socket Layer (SSL) 128 bit technology.	Yes	Yes	Yes	Yes, multi-level encrypted code security	Log-in name/password (multi-level access/abilities)	Firewall, VeriSign encryption, user name / password	
6. Security Features/Multi-level Access/Authority	Yes, the Document Management module grants access only to the information necessary for an individual employee or defined group.	Yes, individual user access and privilege controls	Yes. Various authorization levels are included for both users and groups. Authorizations and permissions can be set at the individual EMS component/data element level, if desired.	Yes, user right settings and controlled access to the system w/ several levels of user controls including "read only".	Yes, user right settings and controlled access to the system w/ several levels of user controls including "read only".	Yes	Yes, multi-level encrypted code security, including selective information distribution to contractors, suppliers, and the public.	Yes, including "levels of viewing authority" and customized security group settings. These functions are fully controlled and applied by the system administrator. Access and data management may be based upon an organization's structural hierarchies.	All areas of equationASP including documents, corrective actions, audits, and other data can be made accessible to all user or security can be applied to designate which users have access to different documents and functions.	

ISO 14001 Software Comparison Matrix - Tier 1 Products

Evaluation Criteria	Amadeus Environment Expert	Entropy International Envoy	Enviance	GreenWare ISO 14000 Implementation Software	GreenWare ISO 14000 Software Suite	IBS America QSI System for Environmental Management	Integrum ISOft 14000	Intelx ISOsoft 14001	Prism Equation	ZMH <sup>®</sup> EMS-EZ
<b>Cost</b>										
<b>Note: Costs are dependent upon the specific needs of individual clients, as the majority of products are scalable in several variables. This assessment has attempted to provide a "ballpark" comparison.</b>										
1. Single Desktop License	Client may select requisite modules and pay only for them.		Pricing available upon request by calling 1-866-Enviance	\$1,399 (\$700/user 2-9) (\$350/user 10+)	\$2,479 (\$1,239/user 2-9) (\$619/user 10+)	Contact was unable to provide cost information, since their systems are customized to fit the needs of individual clients.	\$995	Price varies from approx. \$2,000 up. Product is purchased by individual module with the full package (quality, safety/health, etc.) approximately \$8,000. Product is customized for client organization structure.	Typical format is annual subscription for designated number of staff / users, price starts at \$5k annually for up to 15 users and increases incrementally for additional blocks of users with the price per user going down as more users are added.	\$617/license
2. Training		Customized training solutions delivered via the Internet	First day included in license. Additional days at \$1,200/day for up to 10 participants.	1-day \$250/participant; 2-day \$350/participant	1-day \$250; 2-day \$350; Auditor training \$350 (All per participant)	Includes a EMS Advisor module that offers guidance for development, implementation, and checking of the EMS. Various training options available.	On-line training database available 24hrs/day at \$245/user	Intelx provides a Installation and Administration Guide and the ISOsoft User Manual. Additional training may be customized and provided for an extra cost.	equationASP includes web-based training courses that teach users how to use the system. Live training can be provided on-site and/or remotely via on-line meetings and phone and can be provided in daily or hourly formats. Most users only need a few hours of training to use the system effectively.	No
3. Product Support		Yes, support and upgrades. Additional price?	Yes. Included in license cost.	25%	25%	Yes, via annual maintenance contract. Telephone support M-F, access to technical website 24 hours per day.	Yes, product support (email and phone) and upgrades are included in the annual support fee.	Annual support and maintenance contract, utilizing mutually agreed upon issue severity levels.	Phone and email customer support, on-line Help system, and quarterly upgrades, are included in subscription / license fees.	No
<b>Additional Information</b>										
1. Website Address	<a href="http://amadeus-csi.com/solutions/eQRPEEnvironment.asp">http://amadeus-csi.com/solutions/eQRPEEnvironment.asp</a>	<a href="http://www.entropy-international.com/home/products/environmental-management.asp">http://www.entropy-international.com/home/products/environmental-management.asp</a>	<a href="http://www.enviance.com">www.enviance.com</a>	<a href="http://greenware.ca/software/iso2.html">http://greenware.ca/software/iso2.html</a>	<a href="http://greenware.ca/software/iso2.html">http://greenware.ca/software/iso2.html</a>	<a href="http://www.qualitysys.com/website/website.nsf/0/8c66deb4c9e6fe7d852568c10053ea0a?OpenDocument">http://www.qualitysys.com/website/website.nsf/0/8c66deb4c9e6fe7d852568c10053ea0a?OpenDocument</a>	<a href="http://www.iso14000.com/display.asp?pageID=2">http://www.iso14000.com/display.asp?pageID=2</a>	<a href="http://www.intelx.com/isoso14001index.htm">http://www.intelx.com/isoso14001index.htm</a>	<a href="http://www.prismesolutions.com">www.prismesolutions.com</a>	<a href="http://incubator.rese.arch.sc.edu/">http://incubator.rese.arch.sc.edu/</a>
2. Available Demo	Yes, via Internet/phone combo. Regularly scheduled public demos every	Yes	Yes. With teleconference and via web.	Yes, self-guided	Yes, self-guided	Available, including a free analysis of an organization's software needs.	Yes, online w/ conference call	Yes, via web conference.	Yes, on-line at <a href="http://www.prismesolutions.com">www.prismesolutions.com</a> or guided demos upon request.	
3. Location of Headquarters	Europe and Canada	UK	Carlsbad, CA	Berkeley, CA and Toronto, Ontario	Berkeley, CA and Toronto, Ontario	Lexington, MA	Australian product, Trinity Consultants is a North American (Dallas, TX) reseller	Toronto, Ontario	King of Prussia, PA 888-386-2330	Columbia, SC
<b>Special Notes</b>										
		Based upon Plan-Do-Check-Act model with a very similar breakdown of activities as GETF's model.	Cost includes product upgrades which are delivered seamlessly with no actions required by customer. Enviance is used by numerous public entities and industrial customers. Annual user conference is held.	Utilized by a Muni II participant (Tri-Met) and recently purchased by Muni III participants (Kent County and Metro Waste)	Utilized by a Muni II participant (Tri-Met) and recently purchased by Muni III participants (Kent County and Metro Waste)		The product has been used by single site operations to large corporations; however, a desktop product called ISOMate is also available with essentially the same functionality.	Utilized by a Muni I Participant (Scottsdale), very good/responsive product support. Easy to navigate, Manager's Dashboard very useful for EMR.	Call Mike Reeve at 603-763-4791 or email at <a href="mailto:mreeve@prismesolutions.com">mreeve@prismesolutions.com</a> .	Created through the University of South Carolina Columbia Technology Incubator (USCTI) business incubator program.

# EMS SUPPLEMENTAL TOOLBOX

## *COMPLIANCE CHECKLIST*



*City of Gastonia WWTP – Compliance Sampling/Evaluation Checklist*

# COMPLIANCE SAMPLING/EVALUATION INSPECTION

WWTP:

PERMIT NO.

INSPECTORS:

PERSONS INTERVIEWED:

DATE:

ENTER TIME:

## **PERMIT:**

VERIFY NAME OF PERMITTEE, ADDRESS, TITLE, PHONE NUMBER    YES     NO

COMPARE FACILITY DESCRIPTION WITH ACTUAL    YES     NO

ARE ALL PROCESS UNITS BEING OPERATED?    YES     NO

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DOES PERMIT EXPIRE SOON?    YES     NO

EXPIRATION DATE:

ORC:

IS CERTIFICATION OF ORC ADEQUATE?    YES     NO

IS ORC VISITING FACILITY AS REQUIRED?    YES     NO

WHO IS DESIGNATED BACK-UP?

## **RECORDS / REPORTS:**

ARE SELF-MONITORING RECORDS MAINTAINED ON SITE AND AVAILABLE?    YES     NO

DISCREPANCIES?    YES     NO

IS ORC LOG MAINTAINED?    YES     NO

ARE WHO, WHAT, WHERE, WHEN OF SAMPLING LISTED IN LOG?    YES     NO



ARE INSTRUMENT CALIBRATION RECORDS MAINTAINED?	YES <input type="checkbox"/>	NO <input type="checkbox"/>
ARE PH METERS CALIBRATED DAILY?	YES <input type="checkbox"/>	NO <input type="checkbox"/>
ARE 3 BUFFERS USED?	YES <input type="checkbox"/>	NO <input type="checkbox"/>
IS SLOPE LISTED?	YES <input type="checkbox"/>	NO <input type="checkbox"/>
ARE BUFFERS DATED WHEN REC'D?	YES <input type="checkbox"/>	NO <input type="checkbox"/>
ARE BUFFERS DATED WHEN OPENED?	YES <input type="checkbox"/>	NO <input type="checkbox"/>
ARE DO METERS CALIBRATED DAILY?	YES <input type="checkbox"/>	NO <input type="checkbox"/>
IS CL TITRATOR CALIBRATED DAILY?	YES <input type="checkbox"/>	NO <input type="checkbox"/>
ARE ALL THERMOMETERS AND METERS CALIBRATED BY A NIST TRACEABLE CERTIFIED THERMOMETER?		
PH METER THERMOMETER?	YES <input type="checkbox"/>	NO <input type="checkbox"/>
INFLUENT COMPOSITE SAMPLER ?	YES <input type="checkbox"/>	NO <input type="checkbox"/>
TEMPERATURE:              LAST CALIBRATION DATE:		
EFFLUENT COMPOSITE SAMPLER?	YES <input type="checkbox"/>	NO <input type="checkbox"/>
TEMPERATURE:              LAST CALIBRATION DATE:		
ARE MAINTENANCE RECORDS KEPT?	YES <input type="checkbox"/>	NO <input type="checkbox"/>

**FACILITY SITE REVIEW:**

EVALUATE PROCESS UNITS.

EVERYTHING OPERATING PROPERLY?	YES <input type="checkbox"/>	NO <input type="checkbox"/>
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SYMPTOMS THAT SUGGEST PROBLEMS:

SITE WELL MAINTAINED: YES  NO

GRASS MOWED, ACCESS ROAD MAINTAINED? YES  NO

DISCUSS ANY SLUDGE WASTING:

ARE CHEMICALS / OPERATING PROC. USED AS "BANDAID" SOLUTIONS OR TO ENHANCE TREATMENT? YES  NO

EXPLAIN:

ARE SCREENINGS / GRIT CONTAINED AND DISPOSED OF? YES  NO

WHERE DISPOSED?

IS ROUTINE MAINTENANCE APPARENT? YES  NO

**FLOW MEASUREMENT:**

IS MEASUREMENT METHOD CONSISTENT WITH PERMIT REQUIREMENTS? YES  NO

IS A NON-CALIBRATED FLOW MEASURING DEVICE USED? YES  NO

IF RECORDING FLOW METER IS USED, IS RECORDER WORKING? YES  NO

DETERMINE FREQUENCY OF CALIBRATION AND BY WHOM:

IS COMPOSITE SAMPLER FLOW PROPORTIONAL? YES  NO

**LABORATORY:**

ANY ANALYTICAL TEST PERFORMED REQUIRING CERTIFICATION? YES  NO

ANY PARAMETERS CONTRACTED OUT? YES  NO

LIST:

LAB CERTIFICATION NUMBERS AND EXPIRATION DATES:

SPOT CHECK INSTRUMENT / EQUIPMENT CALIBRATION AND RECORDS:

pH Meters

Thermometer Calibration

**EFFLUENT / RECEIVING WATERS:**

IMPACT OF EFFLUENT ON RECEIVING STREAM:

DOES EFFLUENT HAVE VISIBLE SOLIDS? YES  NO

FOAMY OR HIGHLY COLORED? YES  NO

IS UPSTREAM CLEAR? YES  NO

HOW FAR DOWNSTREAM DOES MIXING OCCUR?

ARE UPSTREAM AND DOWNSTREAM COLLECTIONS CORRECT? YES  NO

**COMPLIANCE SCHEDULES:**

IS FACILITY OPERATING UNDER SOC/JOC? YES  NO

WHICH PARAMETERS ARE AFFECTED BY INTERIM LIMITS?

DISCUSS VIOLATIONS OF SOC/JOC SCHEDULED ACTIVITIES:

**SELF-MONITORING PROGRAMS:**

IDENTIFY NONCOMPLIANCE WITH PERMIT/SOC/JOC LIMITS:

ANY NOVS RECEIVED? YES  NO

ARE MONITORING FREQUENCIES MAINTAINED? YES  NO

ARE DMR'S CORRECTLY COMPLETED? YES  NO

REVIEW SAMPLE COLLECTION, PRESERVATION, TRANSPORTATION:

ARE HOLDING TIMES CORRECT (6 HOUR FECAL) YES  NO

IF MONITORING IS PERFORMED AT A GREATER THAN REQUIRED FREQUENCY, IS ALL DATA REPORTED? YES  NO

**OPERATIONS AND MAINTENANCE:**

ESTABLISHED PREVENTATIVE/CORRECTIVE MAINTENANCE PROGRAM? YES  NO

IS STAFFING ADEQUATE? YES  NO

ESTABLISHED PROCESS CONTROL PROGRAM? YES  NO

ARE ALL SAMPLE JUGS AND BOTTLES CLEANED DAILY? YES  NO

ARE SAMPLES PRESERVED APPROPRIATELY? YES  NO

**SLUDGE DISPOSAL:**

INVESTIGATE SLUDGE HANDLING AND DISPOSAL, INCLUDING SITE OF ULTIMATE DISPOSAL.

- |  |                              |                             |
|--|------------------------------|-----------------------------|
| ARE ANY PERMITS REQUIRED?                | YES <input type="checkbox"/> | NO <input type="checkbox"/> |
| DO THEY HAVE THEM?                       | YES <input type="checkbox"/> | NO <input type="checkbox"/> |
| IS ANY MONITORING REQUIRED?              | YES <input type="checkbox"/> | NO <input type="checkbox"/> |
| ANNUAL REPORTS REQUIRED?                 | YES <input type="checkbox"/> | NO <input type="checkbox"/> |
| IS DIVISION RECEIVING THEM?              | YES <input type="checkbox"/> | NO <input type="checkbox"/> |
| SITE OF DISPOSAL CONSISTENT WITH PERMIT? | YES <input type="checkbox"/> | NO <input type="checkbox"/> |

**OTHER QUESTIONS / NOTES:**

# EMS SUPPLEMENTAL TOOLBOX

## *TRAINING*



*City of Gastonia WWTP – EMS Training Matrix (partial)*  
*City of San Diego WWC – EMS Training Matrix*  
*City of San Diego WWC – Safety and Training Report Template*

**Training Matrix for EMS Management Procedures**  
**Controlled Version on Computer U: Drive - All printed copies are uncontrolled**

EMS Chart #: EMS-0102.005B  
 Format Revision #: 2  
 Date Format Updated: 8/4/03  
 Date Printed: 8/20/2004

Crowders Creek Laboratory Procedures				Steve Oakley		Susan Copeland		Phil Hazelwood		Jason Hunnicutt		Sandra Herron		Rocio Bell		Stephanie Scheringer	
Document Title	Document #	Rev	Revision Date	Training	Training Sufficient	Training	Training Sufficient	Training	Training Sufficient	Training	Training Sufficient	Training	Training Sufficient	Training	Training Sufficient	Training	Training Sufficient
Chemical Hygiene Plan	WCR-0100.100	3	05/20/02	NR	NR	06/06/02	06/06/02	06/06/02	06/06/02	06/06/02	06/06/02	06/06/02	06/06/02	10/31/02	10/31/02	06/07/02	06/07/02
Quality Assurance Manual	WCR-0100.102	5	10/21/03	NR	NR	11/05/03	11/06/03	11/05/03	11/06/03	11/05/03	11/06/03	11/05/03	11/06/03	11/05/03	11/06/03	11/05/03	11/06/03
Laboratory Checks and Calibrations	WCR-0100.103	4	06/09/03	NR	NR	06/10/03	06/11/03	06/10/03	06/11/03	06/12/03	06/12/03	06/10/03	06/11/03	06/11/03	06/11/03	NR	NR
Washing and Preparation of Glassware and Bottles	WCR-0100.104	3	09/27/02	NR	NR	09/27/02	09/27/02	09/27/02	09/27/02	09/27/02	09/27/02	09/27/02	09/27/02	11/06/02	11/06/02	NR	NR
Sample Bottle Preparation & Allocation	WCR-0100.105	7	10/21/03	NR	NR	10/23/03	10/23/03	10/27/03	10/27/03	10/23/03	10/23/03	10/23/03	10/23/03	10/23/03	10/23/03	NR	NR
Data Verification	WCR-0100.106	4	03/12/04	NR	NR	10/17/03	10/17/03	10/17/03	10/17/03	10/17/03	10/17/03	10/17/03	10/17/03	10/17/03	10/17/03	10/17/03	10/17/03
Mercury Spill Clean Up Procedure	WCR-0100.108	1	02/21/01	NR	NR	03/27/01	03/27/01	03/28/01	03/28/01	03/27/01	03/27/01	03/28/01	03/28/01	11/01/02	11/01/02	03/28/01	03/28/01
Inorganic Acid & Base Spill Clean Up Procedure	WCR-0100.109	1	02/21/01	NR	NR	03/27/01	03/27/01	03/28/01	03/28/01	03/27/01	03/27/01	03/28/01	03/28/01	11/01/02	11/01/02	03/28/01	03/28/01
Laboratory Waste Chemical Storage/Disposal	WCR-0100.110	3	07/10/01	NR	NR	11/14/01	11/14/01	11/14/01	11/14/01	11/14/01	11/14/01	11/14/01	11/14/01	11/06/02	11/06/02	11/14/01	11/14/01
Sample Receiving	WCR-0100.111	6	10/21/03	NR	NR	10/23/03	10/23/03	10/27/03	10/27/03	10/23/03	10/23/03	10/23/03	10/23/03	10/23/03	10/23/03	NR	NR
Switching Temperature Control Units on Environmental Rooms at Crowders Laboratory	WCR-0100.112	5	02/12/03	NR	NR	02/14/03	02/14/03	02/13/03	02/13/03	02/14/03	02/14/03	02/13/03	02/13/03	02/18/03	02/18/03	02/14/03	02/14/03
Procedures for Changing Set-point - Room Too Warm	WCR-0100.112A	4	02/12/03	NR	NR	02/14/03	02/14/03	02/13/03	02/13/03	02/14/03	02/14/03	02/13/03	02/13/03	02/18/03	02/18/03	02/14/03	02/14/03
Procedures for Changing Set-point - Room Too Cold	WCR-0100.112B	4	02/12/03	NR	NR	02/14/03	02/14/03	02/13/03	02/13/03	02/14/03	02/14/03	02/13/03	02/13/03	02/18/03	02/18/03	02/14/03	02/14/03
Weekend Work Scheduling for Laboratory Technicians	WCR-0100.113	1	05/18/01	NR	NR	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	06/06/01	11/01/02	11/01/02	06/14/01	06/14/01
Microscopic Observation	WCR-0100.114	1	04/15/03	NR	NR												
Conductivity Analysis- Orion Conductivity Meter Model 128	WCR-0100.118	1	04/09/03	NR	NR	11/13/03	11/13/03	04/11/03	04/11/03	NR	NR					04/11/03	04/11/03
Alkalinity Analysis	WCR-0100.121	3	02/03/03	NR	NR	02/04/03	02/04/03	02/04/03	02/04/03	02/04/03	02/04/03	02/04/03	02/04/03	02/04/03	02/04/03	NR	NR
Ammonia-Nitrogen Analysis	WCR-0100.122	8	10/21/03	NR	NR	10/23/03	10/23/03	10/27/03	10/27/03	10/23/03	10/23/03	10/23/03	10/23/03	10/23/03	10/23/03	NR	NR
Ammonia-Nitrogen Analysis by Orion 720A Meter	WCR-0100.122A	3	10/21/03	NR	NR	10/23/03	10/23/03	10/27/03	10/27/03	10/23/03	10/23/03	10/23/03	10/23/03	10/23/03	10/23/03	NR	NR
Ammonia Nitrogen Distillation Method	WCR-0100.123	5	10/21/03	NR	NR	10/23/03	10/23/03	10/27/03	10/27/03			10/23/03	10/23/03	10/23/03	10/23/03	NR	NR
Automated Biochemical Oxygen Demand Analysis	WCR-0100.124A	5	09/24/03	NR	NR	09/26/03	09/26/03	10/01/03	10/01/03	09/26/03	09/26/03	09/26/03	09/26/03	09/26/03	09/26/03	NR	NR
Biochemical Oxygen Demand Analysis - Manual Method	WCR-0100.124B	2	01/22/03	NR	NR	01/24/03	01/24/03	01/24/03	01/24/03	01/24/03	01/24/03	01/24/03	01/24/03	02/21/03	02/21/03	NR	NR
Chemical Oxygen Demand Analysis	WCR-0100.125	3	05/13/03	NR	NR	05/15/03	05/15/03	05/15/03	05/15/03	05/15/03	05/15/03	05/15/03	05/15/03	01/20/04	02/13/04	NR	NR
Chemical Oxygen Demand Analysis (Using Shimadzu Spectrophotometer)	WCR-0100.125B	3	05/14/03	NR	NR	05/15/03	05/15/03	05/15/03	05/15/03	05/15/03	05/15/03	05/15/03	05/15/03	01/20/04	02/13/04	NR	NR
Total Cyanide Analysis	WCR-0100.127	0	04/07/03	NR	NR	11/05/03	12/17/03			04/21/03	04/21/03			04/07/03	04/16/03	NR	NR
Fecal Coliform Analysis	WCR-0100.128	10	02/25/04	NR	NR	03/10/04	03/10/04	03/10/04	03/10/04	NR	NR	03/10/04	03/10/04	03/10/04	03/10/04	NR	NR
Metals Analysis by ICP-MS	WCR-0100.130	5	12/05/03	NR	NR											NR	NR
Mercury Analysis - Water Bath Digestion Method	WCR-0100.131	5	02/21/03	NR	NR	NR	NR									NR	NR
Mercury Analysis - Hot Block Digestion Method	WCR-0100.131A	3	02/21/03	NR	NR	NR	NR									NR	NR

1. Shaded area indicates training is required. 2. Date is date most recent documented training on that revision was received.
3. NR indicates training is not required since the person wrote or approved the procedure.

**Training Matrix for EMS Management Procedures**  
**Controlled Version on Computer U: Drive - All printed copies are uncontrolled**

EMS Chart #: EMS-0102.005B  
 Format Revision #: 2  
 Date Format Updated: 8/4/03  
 Date Printed: 8/20/2004

Crowders Creek Laboratory Procedures				Steve Oakley		Susan Copeland		Phil Hazelwood		Jason Hunnicutt		Sandra Herron		Rocio Bell		Stephanie Scheringer	
Document Title	Document #	Rev	Revision Date	Training	Training Sufficient	Training	Training Sufficient	Training	Training Sufficient	Training	Training Sufficient	Training	Training Sufficient	Training	Training Sufficient	Training	Training Sufficient
Metals Hot Block Digestion Procedure	WCR-0100.132	2	11/13/02	NR	NR											NR	NR
Metals Microwave Digestion Procedure	WCR-0100.133	2	12/05/03	NR	NR											NR	NR
Nitrates Analysis	WCR-0100.134	3	11/06/01	NR	NR	04/23/01	04/23/01	04/23/01	04/23/01	04/19/01	04/19/01	04/23/01	04/23/01			04/24/01	04/24/01
Nitrate & Nitrite Analysis - FIAS Method	WCR-0100.136	0	11/26/02	NR	NR	11/26/02	11/26/02									NR	NR
pH Analysis	WCR-0100.137	4	12/31/02	NR	NR	01/02/03	01/03/03	01/02/03	01/03/03	01/07/03	01/07/03	01/02/03	01/03/03	01/06/03	01/06/03	NR	NR
Ortho Phosphorus	WCR-0100.138	5	02/20/03	NR	NR	08/19/02	08/19/02	08/19/02	08/19/02	08/16/02	08/16/02	08/16/02	08/16/02			12/03/02	12/03/02
Total Phosphorus Analysis	WCR-0100.139	8	02/19/03	NR	NR	01/09/03	01/09/03	NR	NR	01/09/03	01/09/03	01/09/03	01/09/03			NR	NR
Residual Chlorine Analysis	WCR-0100.140	5	02/19/03	NR	NR	02/20/03	02/20/03	02/20/03	02/20/03	02/20/03	02/20/03			02/20/03	02/20/03	02/19/03	02/19/03
40 Day Vector Attraction Analysis	WCR-0100.141	3	08/04/03	NR	NR											NR	NR
Solids - % Total Solids/% Total Volatile Solids Analysis	WCR-0100.143	6	08/04/03	NR	NR	08/04/03	08/04/03	08/04/03	08/04/03	08/04/03	08/04/03	08/04/03	08/04/03			NR	NR
Solids – Total Solids/Total Volatile Solids Analysis	WCR-0100.144	4	08/04/03	NR	NR	08/04/03	08/04/03	08/04/03	08/04/03	08/04/03	08/04/03	08/04/03	08/04/03			NR	NR
Total Suspended/Total Volatile Suspended Solids Analysis	WCR-0100.145	5	09/18/03	NR	NR	09/26/03	09/29/03	09/26/03	09/29/03	09/26/03	09/29/03	09/26/03	09/29/03	09/26/03	09/29/03	09/26/03	09/29/03
Total Kjeldahl Nitrogen Analysis	WCR-0100.146	5	12/31/03	NR	NR	01/02/04	01/02/04	01/13/04	01/13/04	01/02/04	01/02/04					NR	NR
Volatile Acids Analysis	WCR-0100.147	3	02/03/03	NR	NR	02/04/03	02/04/03	02/04/03	02/04/03	02/04/03	02/04/03	02/04/03	02/04/03	02/04/03	02/04/03	NR	NR
ADMI Color Analysis	WCR-0100.150	8	02/20/03	NR	NR	08/27/02	08/27/02	08/27/02	08/27/02	08/28/02	08/28/02	08/28/02	08/28/02	11/14/02	11/14/02	08/28/02	08/28/02
Clean Hood Operation	WCR-0100.153	3	11/14/01	NR	NR	08/19/02	08/19/02									NR	NR

1. Shaded area indicates training is required.
2. Date is date most recent documented training on that revision was received.
3. NR indicates training is not required since the person wrote or approved the procedure.



**Figure 2**  
**Wastewater Collection Occupational Categories**

ML= Mandated By law DR= Department Required		<div style="text-align: center; border: 1px solid black; padding: 5px;"> <h1 style="margin: 0;">WWC</h1> <h2 style="margin: 0;">WASTEWATER COLLECTION OCCUPATIONAL CATEGORIES</h2> <p style="margin: 0;">Revision April 2003</p> </div>				<div style="text-align: center; border: 1px solid black; padding: 2px;"> <b>MWWD Course Numbers</b> </div>									
						Emergency Preparedness	Environmentally Sensitive Lands	Hazard Communication	HAZMAT for Handlers - 8 Hrs.	Hazmat for Handlers - 4 Hr. Review	Hazmat Handlers for Supervisors	Herbicide and Pesticide Safety	Injury and Illness Prevention	ISO Awareness	Stand. Emerg. Man. System (S.E.M.S.)
		MW101266	MW800211	MW101335	ES9*HR01	ES9*HR01	ES9*SR01	MW102002	MW101134	MW14001A	MW1*SEMS	MW800200			
New TIMS Occupational Categories															
		<b>TRAINING HOURS</b>													
		1	2	1	8	4	4	2	1	1	1	1			
		<b>FREQUENCY</b>													
		0	0	0	0	1	1	1	0	1	0	0			
3	0	0	5	5	Administration - Non-Supervisory	ML	ML				ML	DR	ML	ML	
3	0	0	8	0	Administration - Supervisory	ML	ML				ML	DR	ML	ML	
3	0	1	9	0	Equipment Operation, W/O Confined Space	ML	ML				ML	DR	ML	ML	
3	0	1	9	2	Equipment Operation, W/ Confined Space	ML	ML				ML	DR	ML	ML	
3	0	1	7	5	Equipment Technician I, II, III W/Confined Space	ML	ML				ML	DR	ML	ML	
3	0	1	8	0	Equipment Technician I, II, III W/O Confined Space	ML	ML				ML	DR	ML	ML	
3	0	2	3	0	Engineering - Non-Supervisory (FEWD)	ML	ML				ML	DR	ML	ML	
3	0	2	4	0	Engineering - Supervisory (FEWD)	ML	ML				ML	DR	ML	ML	
3	0	2	1	0	Engineering - Non-Supervisory (Non-FEWD)	ML	ML				ML	DR	ML	ML	
3	0	2	2	0	Engineering - Supervisory (Non-FEWD)	ML	ML				ML	DR	ML	ML	
3	0	2	5	5	Plant Process Control Electrician W/Conf. Space	ML	ML				ML	DR	ML	ML	
3	0	2	5	0	Plant Process Contr. Electrician W/O Conf. Space	ML	ML				ML	DR	ML	ML	
3	0	3	5	0	Plant Process Control - Supervisory	ML	ML				ML	DR	ML	ML	
3	0	1	9	5	Utilities - Non-Supervisory W/ Confined Space	ML	ML				ML	DR	ML	ML	
3	0	3	0	0	Utilities - Non-Supervisory W/ Confined Space (NROW)	ML	ML			ML	ML	DR	ML	ML	
3	0	2	9	0	Utilities - Non-Supervisory W/O Confined Space	ML	ML				ML	DR	ML	ML	
3	0	2	9	5	Utilities - Non-Supervisory W/O Confined Space (NROW)	ML	ML			ML	ML	DR	ML	ML	
3	0	1	8	5	Utilities - Supervisory W/ Confined Space	ML	ML				ML	DR	ML	ML	
3	0	1	7	0	Utilities - Supervisory W/O Confined Space	ML	ML				ML	DR	ML	ML	

**Frequency**

0 = One Time Training

5 = Repeat every 5 years



# **EMS SUPPLEMENTAL TOOLBOX**

## ***EMS INTERNAL AUDIT***



***City of Gastonia WWTP – Internal EMS Audit Checklist***  
***City of Gastonia WWTP – Internal EMS Audit Plan Worksheet***  
***City of Gastonia WWTP – Internal EMS Audit Report Template***

**Public Works and Utilities Department  
Internal EMS Audit  
Checklist**

**Audited Section:** \_\_\_\_\_ **Division:** \_\_\_\_\_  
**Scheduled Audit Date:** \_\_\_\_\_ **Audit Location:** \_\_\_\_\_  
**Lead Auditor:** \_\_\_\_\_  
**Auditors:** \_\_\_\_\_  
\_\_\_\_\_  
**Auditors in Training:** \_\_\_\_\_

**Pre-Audit Planning Meeting**

**Date:** \_\_\_\_\_ **Time:** \_\_\_\_\_ **Location:** \_\_\_\_\_  
**Attendees:** \_\_\_\_\_  
**Comments:** \_\_\_\_\_

**Pre-Audit Talk with Section Supervisor**

**Supervisor:** \_\_\_\_\_  
**Date:** \_\_\_\_\_ **Time:** \_\_\_\_\_  
**Comments:** \_\_\_\_\_

**Audit**

**Start Date:** \_\_\_\_\_  
**Finish Date:** \_\_\_\_\_  
**Comments:** \_\_\_\_\_

**C/PARs Generated**

**By:** \_\_\_\_\_ **Date:** \_\_\_\_\_  
**C/PARs #s:** \_\_\_\_\_  
**Comments:** \_\_\_\_\_

**C/PARs Returned**

**Date:** \_\_\_\_\_  
**Written by:** \_\_\_\_\_  
**Comments:** \_\_\_\_\_

**Report Completed**

**Date:** \_\_\_\_\_  
**Written by:** \_\_\_\_\_  
**Comments:** \_\_\_\_\_

**Completed Audit Report given to EMS Coordinator**

**By:** \_\_\_\_\_ **Date:** \_\_\_\_\_

Internal EMS Audit  
Audit Plan Worksheet

Scheduled Audit Date:

Audit Location:

Auditors:

Primary Procedure/Document?     No     Yes (If yes, the following information is required.)

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

Owner: \_\_\_\_\_

Document ID: \_\_\_\_\_

Revision #: \_\_\_\_\_

Pre-Audit Preparation

Support Documentation Reviewed:


Follow-up Issues from previous audits:


Audit Plan

Positions to Interview:


Item/Issue: \_\_\_\_\_

Notes: \_\_\_\_\_

\_\_\_\_\_

Item/Issue: \_\_\_\_\_

Notes: \_\_\_\_\_

\_\_\_\_\_

Item/Issue: \_\_\_\_\_

Notes: \_\_\_\_\_

\_\_\_\_\_

Internal EMS Audit  
Audit Plan Worksheet  
(continued)

Scheduled Audit Date:

Audit Location:

Audit Plan

- Item/Issue: \_\_\_\_\_  
Notes: \_\_\_\_\_  
\_\_\_\_\_
- Item/Issue: \_\_\_\_\_  
Notes: \_\_\_\_\_  
\_\_\_\_\_
- Item/Issue: \_\_\_\_\_  
Notes: \_\_\_\_\_  
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- Item/Issue: \_\_\_\_\_  
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- Item/Issue: \_\_\_\_\_  
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- Item/Issue: \_\_\_\_\_  
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- Item/Issue: \_\_\_\_\_  
Notes: \_\_\_\_\_  
\_\_\_\_\_
- Item/Issue: \_\_\_\_\_  
Notes: \_\_\_\_\_  
\_\_\_\_\_

**ENVIRONMENTAL MANAGEMENT SYSTEM  
Internal Audit Report**

**Audit Date:**  
**Supervisor/Contact:**  
**Auditors:**

**Section(s) Audited:**

---

*The following is a detailed internal audit report as required and defined by procedure  
EMS-0100.0011 of the City's Environmental Management System.*

---

- I. Environmental Policy:**  In Conformance  Not in conformance  Not Audited  
Findings-C/PAR#s:  
Opportunities for Improvements:  
Comments:
- II. Environmental Aspects:**  In Conformance  Not in conformance  Not Audited  
Findings-C/PAR#s:  
Opportunities for Improvements:  
Comments:
- III. Critical Control Points:**  In Conformance  Not in conformance  Not Audited  
Findings-C/PAR#s:  
Opportunities for Improvements:  
Comments:
- IV. Legal & Other Requirements:**  In Conformance  Not in conformance  Not Audited  
Findings-C/PAR#s:  
Opportunities for Improvements:  
Comments:
- V. Objectives and Targets:**  In Conformance  Not in conformance  Not Audited  
Findings-C/PAR#s:  
Opportunities for Improvements:  
Comments:
- VI. Structure and Responsibility:**  In Conformance  Not in conformance  Not Audited  
Findings-C/PAR#s:  
Opportunities for Improvements:  
Comments:
- VII. Training, Awareness, Competence:**  In Conformance  Not in conformance  Not Audited  
Findings-C/PAR#s:  
Opportunities for Improvements:  
Comments:

## EMS-Internal Audit Report

- VIII. Communication Programs:**  In Conformance  Not in conformance  Not Audited  
Findings-C/PAR#s:  
Opportunities for Improvements:  
Comments:
- IX. Public Participation:**  In Conformance  Not in conformance  Not Audited  
Findings-C/PAR#s:  
Opportunities for Improvements:  
Comments:
- X. EMS Documentation:**  In Conformance  Not in conformance  Not Audited  
Findings-C/PAR#s:  
Opportunities for Improvements:  
Comments:
- XI. Document Control:**  In Conformance  Not in conformance  Not Audited  
Findings-C/PAR#s:  
Opportunities for Improvements:  
Comments:
- XII. Operational Control:**  In Conformance  Not in conformance  Not Audited  
Findings-C/PAR#s:  
Opportunities for Improvements:  
Comments:
- XIII. Emergency Preparedness Response:**  In Conformance  Not in conformance  Not Audited  
Findings-C/PAR#s:  
Opportunities for Improvements:  
Comments:
- XIV. Monitoring and Measurement:**  In Conformance  Not in conformance  Not Audited  
Findings-C/PAR#s:  
Opportunities for Improvements:  
Comments:
- XV. Corrective/Preventative Action Program:**  In Conformance  Not in conformance  Not Audited  
Findings-C/PAR#s:  
Opportunities for Improvements:  
Comments:
- XVI. Records:**  In Conformance  Not in conformance  Not Audited  
Findings-C/PAR#s:  
Opportunities for Improvements:  
Comments:



**EMS-Internal Audit Report**

**XVII. EMS Audit Program:**  In Conformance  Not in conformance  Not Audited  
Findings-C/PAR#s:  
Opportunities for Improvements:  
Comments:

**XVIII. Biosolids Performance Report:**  In Conformance  Not in conformance  
 Not Audited  
Findings-C/PAR#s:  
Opportunities for Improvements:  
Comments:

**XIX. Management Review – ISO 14001:**  In Conformance  Not in conformance  Not Audited  
Findings-C/PAR#s:  
Opportunities for Improvements:  
Comments:

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Auditor Signature \_\_\_\_\_ Date \_\_\_\_\_

Auditor Signature \_\_\_\_\_ Date \_\_\_\_\_

Auditor Signature \_\_\_\_\_ Date \_\_\_\_\_