

Environmental Management System Software

EMS SOFTWARE ASSESSMENT

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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
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
ZMH² 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 2nd 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.

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) and Intellex (www.intellex.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 Intellex 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 Intellex 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 Intellex, 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 Intellex 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	GreenWare ISO 14000 Implementation Software	GreenWare ISO 14000 Software Suite	IBS America QSI System for Environmental Management	Integrum ISOft 14000	Intelix ISOsoft 14001	Prism Equation	ZMH ² EMS-EZ
Software Functionality									
1. Document Control									
a. Documentation Templates		Yes, the product includes a variety of ISO 14001 templates (procedures, policies, checklists, etc...)	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.	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.		
b. 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, 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.	Yes, relevant staff receive emails with document attachments for review and approval.	
c. 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, 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.	Yes, a complete history of documents, including all revisions and records.	
d. 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, 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.	Yes, documents are linked to various components with the ability to search, locate, use, and bookmark documents via names, descriptions, or key words.	Yes
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 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.	Yes, improvement, internal audit, and management reports and/or transfer to application programs.	
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 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.	Yes, project plan provides a project schedule. Individual employees can tailor this to apply directly to him/her.	

ISO 14001 Software Comparison Matrix - Tier 1 Products

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, each user will have an individual calendar listing tasks, activities, due dates, etc... Email notification functions must be manually inputted and are not automatic.	Yes, each user will have an individual calendar listing tasks, activities, due dates, etc... Email notification functions must be manually inputted 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. Product includes a "Manager's Dashboard" allowing an instantaneous snapshot of the entire system, with red X's where items need attention.	"Notices Area" - personal action item list with email notifications for doc approval, CAR, training, etc.. A project management tool with customizable project plan feature.	
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, 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.		
6. Gap analysis tool		No, not a specific tool, audit checklist included	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.	Project management tool with customizable project plan based upon step by step approach to ISO implementation. Project status report function.	
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, 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.		
8. Audit Tools	Yes, Audit Module organizes an audit schedule enabling the assignment of appropriate resources. Integrable with a CAR Module and an Action Module, which is connected directly to the personnel responsible.	Yes, including audit checklists	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.	Yes, audit schedule, email notifications, customizable checklist and report functions. Integrable with CAR and document control functions.	
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, 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.	Yes, training notices are sent automatically to staff and teams.	

ISO 14001 Software Comparison Matrix - Tier 1 Products

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, 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.	Reference materials with explanations of the ISO Standard.	Compliant w/ ISO 14001
11. Multi-lingual	Yes, each user can work in his/her own language				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.		
Applicability									
1. Ports	Port of Houston Authority					Yes, non-US			
2. Public Entities (general)		Universities, large government offices, railway system, and District Council	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).		
Integrated System Capability									
1. Health and Safety	Yes, as an integratable module	Yes, as an integratable module	No	No	No	Safety statistics and incident management, linked to CAR. Software complies with British, Australian, and ISO safety management standards.	Yes, via available module		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	No	No	Yes, QSI originally focused upon ISO 9000 Support and leveraged existing products.	Yes	Yes, via available module	Yes, the product was originally developed for ISO 9000 implementation	
System Architecture									
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.	EquationNET for large organizations	Yes
2. Web-enabled/Hosted by Provider (ASP)	Web-enabled, implementable in multiple sites.	Available Option, annual subscription	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	EquationASP for small/medium organizations	No
3. Database		Microsoft SQL Server 7, 2000, or Oracle 8i			Oracle, DB2, Lotus Notes, SQL Server, ODBC, etc...	Lotus Notes	Oracle and SQL, can be integrated with other existing databases.		
4. Client Operating System	Microsoft Office	Windows NT4, 2000, Me, 98, or 95; Internet Explorer 5.0 or higher	Windows 95, NT, or Higher	Windows 95, NT, or Higher	Windows	Microsoft Windows, preferably IIS Server 4 or 5;	Microsoft NT and Windows 2000 IIS Server 4 or 5; all major Web Browsers.		Windows 98/ME/XP and MS Office
5. Security	Yes	Yes	Yes	Yes	Yes	Yes, multi-level encrypted code security	Log-in name/password (multi-level access/abilities)		
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, 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	Yes, document security allowing viewing and manipulation restrictions.	
Cost									
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.									
1. Single Desktop License	Client may select requisite modules and pay only for them.		\$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.		\$617/license
2. Training		Customized training solutions delivered via the Internet	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	Intelix provides a Installation and Administration Guide and the ISOsoft User Manual. Additional training may be customized and provided for an extra cost.	Web-base training organized by modules and available anytime. Advertised as cost effective compared to instructor-led.	No

ISO 14001 Software Comparison Matrix - Tier 1 Products

3. Product Support		Yes, support and upgrades. Additional price?	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.	Annual fee: includes quarterly upgrades, on-line help, customer support	No
Additional Information									
1. Website Address	http://amadeus-csi.com/solutions/eQRPEnvironment.asp	http://www.entropy-international.com/home/products/environmental-management.asp	http://greenware.ca/software/iso2.html	http://greenware.ca/software/iso2.html	http://www.qualitysys.com/website/website.nsf/0/8c66deb49e6fe7d852568c10053ea0a?OpenDocument	http://www.iso14000.com/display.asp?pageID=2	http://www.intelx.com/isosoft14001index.htm	http://www.primesolutions.com	http://incubator.research.sc.edu/
2. Available Demo	Yes, via Internet/phone combo. Regularly scheduled public demos every tue/thur.	Yes	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	
3. Location of Headquarters	Europe and Canada	UK	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	Blue Bell, PA	Columbia, SC
Special Notes									
		Based upon Plan-Do-Check-Act model with a very similar breakdown of activities as GETF's model.	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, 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.	Jeff DuTeau, GETF's EMS Program Director, assisted in the development of this product.	Created through the University of South Carolina Columbia Technology Incubator (USCTI) business incubator program.

ISO 14001 Software Comparison Matrix - Tier 2 Products

Evaluation Criteria	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	Oxegen Oxegen EMS	Solution Foundry EMSolution Web	
Software Functionality								
1. Document Control	Through a phone interview and correspondence it was determined that Dakota Auditor EMS is an environmental compliance auditing tool and does not offer users guidance in implementing an EMS. Therefore the software package was dropped from further consideration.	Through research and correspondence it was determined that although the product is similar in nature, there is not enough of a North American component (English, ISO 14001 specificity, support) to make it a viable option for Ports and other public entities. Therefore the software was dropped from further consideration.	Yes, a full set of documents, 17 system procedures and 66 support documents, included (procedures, training packages, forms, aspects spreadsheet, etc.	Yes, all documents are fully written for the client w/ checklists to assist in customizing documentation	Yes, pre-written manual, procedures, and records. Record forms with example data.	Yes, pre-populated and created through user input	Yes	
a. Documentation Templates								
b. Document Creation/Integration							Yes, pre-populated and created through user input	Yes
c. Document Review Process			No			No, the product includes ISO 14001 compliant document control and records procedures, but no revision/review function.	Yes	
d. Document Archive							Yes	
e. Document Library (linked)			Yes, documents connected by an index with hyperlinks (organized by standard clause)	Yes, all documents are hyperlinked to the Implementation Guide	Yes, the "integrator" version has an external links button for files, websites, etc.	Yes, everything is linked by activity category and broken down by task/actions.	Yes	
2. Data Compilation and Report Preparation			Yes	Audit record templates, exportable to MS Word	The automatic gap analyzer graphically illustrates % performance against ISO requirements and generates an 8-page assessment report. Guide monitors your implementation across 3 phases and 24 implementation steps.	Yes, reports can be easily created for quarterly status checks, management reviews, and audits. Reports are exportable to basically any application (i.e., excel)		
3. Calendar Management			No					Implementation plan tool
4. Milestone/Task Management and Tracking			Yes, schedules to assign resources and monitor progress (spreadsheets). Does NOT include an email notification function.	No, a project management module is being planned.			Yes, everything is controlled by activity category, including tasks/actions, responsibilities, due dates, progress completion, etc..	
5. Regulatory Compliance Management (non-conformance notification)			Yes, can be supplied for different jurisdictions, not widespread use of the product in the US thus limited compliance assistance.	No, procedures, checklists, and recording templates are provided for the client to input regulatory data.	No, as an international product the company has decided it is not practical to include legislation. The guide, legislation procedure, and register explain how to identify and record applicable laws and other controls.	Customer must populate a series of screens which creates links to the applicable legislation (Oxegen and partners will maintain all legislative and regulatory information if the complete package is purchased)	Yes	
6. Gap Analysis Tool			Yes, one of 35 implementation steps (steps can be accessed in any order)			Automatic gap analysis tool and initial env. review checklist (199 questions)	Yes	
7. Aspect/Impact Analysis Tool	Yes, via an aspect worksheet.			Yes	Yes, via individual or group activity category.			
8. Audit Tools	Yes, including registration	Yes, 80 sample auditor questions			Yes, including checklists, questionnaires, status, and reports.	Awareness training presentation		
9. Training Management	Yes, train-the-trainer approach w/ PowerPoint slides. General and specific training steps.				Yes, a training link to training material, and handouts that cover all EMS requirements.	Each license includes a copy of the ISO 14001 standard		
10. Context-specific ISO Text	Yes, explanations on how each subclause of the standard is to be implemented	Yes, each in simple language		Gap Analyzer and Implementation Schedule based all 13 sections of the Standard.	Yes, the system is based on meeting ISO compliance, but is customized to avoid confusion. Therefore, a customer can request consistency w/ ISO language or have a watered down equivalent.			
11. Multi-lingual	Dutch, English, French	Possible (English, French, Spanish)		Currently the product is only offered in English. The company is considering other languages, especially Spanish.				
Applicability								
1. Ports								
2. Public Entities (general)	Advertises for public sector, including wastewater utilities	Clients include airports, transportation providers, and public utilities ranging in size from 75 employees to over 10,000, as well as Federal (Canadian) government clients.	City of Olathe Kansas, DOE, Michigan Univ., Town of Flower Mound Texas, US Coast Guard Integrated Support Command, and 7 municipalities in the UK.	Yes, municipalities, hospitals, and universities in USA, UK, and Australia. Client information is available on the website.	Yes, Oxegen has developed a small municipality version of their software through a Canadian Municipality EMS project funded by the Green Municipal Fund. Also working with Hog Farm Operations. Currently utilized at 22 US Army bases across Europe.			
Integrated System Capability								
1. Health and Safety			Yes	Yes	Yes, Oxegen H&S product	Yes		
2. Quality Control		Yes		Yes, QMS Converter features integrates the ISO 14001 with an existing QMS		Yes		
System Architecture								
1. Client Server Solution/Stand-alone PC	Yes	Yes, installed on computers	Available	Available	No, systems are managed by Oxegen, Inc	Available		
2. Web-enabled/Hosted by Provider (ASP)	No	No	Unknown	Available	Yes	Available		
3. Database								
4. Client Operating System	Windows 95/98/ME/NT/2000/XP	MS Office and Windows		Compatible with all Windows using Adobe Acrobat 5.0 w/ "export to MS Word"		MS Windows 2000 or NT. MS Internet Information Services 4.0 or higher (Web browser software required for intranet users)		
5. Security Features/Multi-level Access/Authority					Yes, controlled via User IDs			

ISO 14001 Software Comparison Matrix - Tier 2 Products

Cost						
<p>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.</p> <p>1. Single Desktop License</p> <p>2. Training</p> <p>3. Product Support</p>						
		\$5,000		\$935/user		
			\$985/single PC license	ISO 14001 Tutorial included, a series of workshop/training offerings.		
		Support and consulting are added costs.		Full product support included plus free off-site advice from IEMA-registered EMS Lead Auditors		
Additional Information						
1. Website Address	http://www.hemmis.com/products/emserver.htm	http://www.gagenviro.com/view_documents.html	http://www.isotop.net/	http://www.isys-int.com/	http://www.oxegen.com/content/template/generic.asp?PID=184&func=OX_CASE_STUDIES	http://www.solutionfoundry.com/emsolution/default.htm
2. Available Demo	Yes	Yes, via the website. Free ISO 14001 assessment offered in addition.	Yes, via website	Yes, a demo via teleconference and Internet website. Screen shots available on website.		
3. Location of Headquarters	Belgium	North America (Canada)	London	UK	US, Canada, Australia, and UK	Woodstock, GA
Special Notes						
	Based on both the ISO 14001 standard and EMAS. Modules targeted to wastewater utilities.	Aspects and impacts assessment conducted via Input/Output Diagram		Offer free off-site advice from IEMA registered EMS Lead Auditors and a free upgrade when the revised ISO 14001 standard is published.		