



DECEMBER 2016

Approaches to EHS&S Data Management

How Corporate Leaders are Setting Priorities and Leveraging
Software to Advance Program Performance



Thank you to our research sponsors:

ch2mSM

enabl*on*

INTELEX

 **sphera**TM



*velocity***EHS**

Copyright © NAEM. All Rights Reserved.

Letter from the Executive Director

If NAEM's benchmarking research has taught us anything, it's that no two companies solve the same problem the same way. Even in a field where environment, health and safety, and sustainability programs often have similar elements, individual leaders need to understand how to adapt core concepts to the particularities of their own company's organizational structure, operations and culture. This is nowhere truer than in the area of EHS&S data management, where commercial software systems offer centralization and automation, as long as practitioners understand their organizations well enough to configure these systems to their needs.



And there is no one practice or approach for solving a complex problem like that.

To understand a challenge like data management, it's useful to hear from a variety of peers, to learn what worked and didn't work so well, and allow their experiences to inform your own. That is what this report is intended to do. As the latest installment in NAEM's research on EHS&S Software and Data Management, this report gives you a peek inside how a diverse group of companies use software tools to organize their EHS&S information and communicate their performance.

In reading through these case studies and interviews, I was struck by what a creative a problem-solver you need to be to find the best solution for your company. Insofar as no two companies are alike, one system does not always fit all. I was also reminded of a maxim that seems to emerge at every NAEM Software and Data Management conference we've hosted since 2001: Data Management is a long-term journey that requires vision, leadership commitment and continuous improvement.

We hope that this report helps you understand how your experiences compare to those of your peers and gives you some ideas you can use to help you refine your path forward.

Sincerely,

A handwritten signature in black ink that reads "Carol Singer Neuvelt". The signature is fluid and cursive.

Carol Singer Neuvelt
Executive Director, NAEM



About NAEM

The National Association for Environmental Management (NAEM) empowers corporate leaders to advance environmental stewardship, create safe and healthy workplaces and promote global sustainability. As the largest professional community for EHS and sustainability decision-makers, we provide peer-led educational conferences, benchmarking research and an active network for sharing solutions to today's corporate EHS and sustainability management challenges. Visit NAEM online at www.naem.org.



Thank you to Our Sponsors	3
Introduction	4
Case Studies on Data Management:	
Finding Common Ground within a Decentralized Company	7
Featuring Amphenol Group	
Using Data Visualization to Meet Compliance and Drive Internal Engagement with EHS Data	10
Featuring an energy generation company	
Transforming a Central Data Repository into a Dynamic Information Management System	13
Featuring The United States Postal Service	
Careful Management Helps a Legacy System Withstand the Test of Time	18
Featuring Abbott Laboratories	
Closing the Gaps without Breaking the Bank	21
Featuring a big box retailer	
Enforcing Corporate Standards through Centralized Data Management	25
Featuring Chevron Corp.	
Executing a Multi-year Data Management Strategy Using Internal and External Systems	27
Featuring Lam Research Corp.	
Lessons Learned	30
NAEM's Software and Data Management Offerings	33
Acknowledgments	34



Thank You to Our Sponsors

This research report was independently developed by NAEM in accordance to our objective research standards, and is available free-of-charge, thanks to the financial support of the following sponsors:





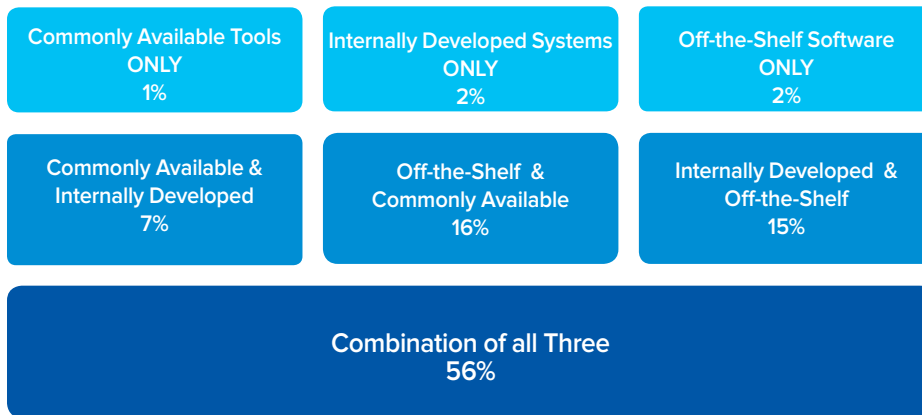
For any EHS and Sustainability leader who has had to manage vast amounts of data, it's tempting to think that there might be a software tool, or one strategy out there, somewhere, that could meet all of your needs. Unfortunately, the experience of those who have selected, implemented and managed these systems suggests this is not the case.

Indeed, a number of variables help shape a company's EHS&S data management strategy, including organizational design, internal culture, types of operational risks and the level of external scrutiny to internal operations.

It's perhaps not surprising then, that among the 165 software users NAEM surveyed about their company's data management approach, 56 percent are using a combination of commercial systems, internally developed software and commonly available tools, such as Microsoft Excel.

Current Data Management Approach

Figure 1



N=164

As the EHS&S software offerings become increasingly sophisticated, more companies are adopting commercial systems to centralize data collecting and reporting.

Common Reasons Why Companies Use More than One System

While software tools for the environmental, health and safety, and sustainability professional have rapidly matured over the past decade, more than half of those surveyed by NAEM still use a combination of commonly available tools, internally-developed software and commercial systems to manage their data. The reasons, according to research participants, may include:

- Decentralized structures may not lend themselves to a centralized reporting systems
- Diverse operations may produce a variety of data types
- Individual operations may have unique risks that require targeted solutions
- Internal culture may value decentralized decision-making
- Acquired businesses may have their own software tools
- Legacy tools may be better aligned with organizational needs



Even so, the scope of these implementations vary widely from company-to-company. A single company may use an enterprise-wide system to manage its corporate standards, for example, while its individual business units use different combination of software systems to meet their own unique needs.

This is often the case for companies that have gone through a merger or acquisition, where the new business entities bring new assets but also their own approaches to data management.

All this makes standardizing corporate processes, or adopting any single system, exceedingly difficult. But as Jason Schmitz, Director of Trinity Consultant's T3 Group points out, perfect integration and standardization may be an unattainable ideal.

"It's very easy for the human brain to say, 'We'd really like to have everything in one nice, neat, tiny bow. The fact of the matter is that these organizations are diverse; they grow; they contract; people come; people go; the organization restructures; people get new roles and responsibilities."

"It's okay to not have perfect data because you're not going to have perfect data...you've got to figure out what you can tolerate," he said.

Regardless of a company's EHS&S program maturity, business objectives or budget, software tools remain just that—a conduit for collecting information. It's how well an organization aligns around a vision and commits itself to continuous improvement that truly holds the key to success for any data management program.

"The hope is that you master one area and then you go onto the next top priority and master that," Mr. Schmitz said. "Data management is an evolution."

In the interviews and case studies that follow, we will examine how different companies evaluated unique data management challenges, and identified solutions to address their business needs. We'll also explore how they solved problems today while positioning their programs on a long-term path for growth.



Case Studies on Data Management

Finding Common Ground within a Decentralized Company



Conflict minerals reporting is a unique challenge that requires internal coordination and transparency from deep within the supply chain. In this interview, Martha Coopersmith-Gray, Director of Environmental Health and Safety, and Sustainability for Amphenol ICC, explains how Amphenol Group met the reporting requirement without radically centralizing all of its EHS&S data collection.

What do you do when your company's fiercely-held commitment to a decentralized structure is at odds with a key regulatory reporting requirement?

This is precisely the challenge that Martha Coopersmith-Gray encountered when she sought a software tool to assist with conflict minerals reporting for Amphenol Group, an electronics components manufacturer based in Wallingford, Conn.

The company had grown to eleven business units through mergers and acquisitions, gaining new types of operations, but retaining its strongly decentralized structure and culture.

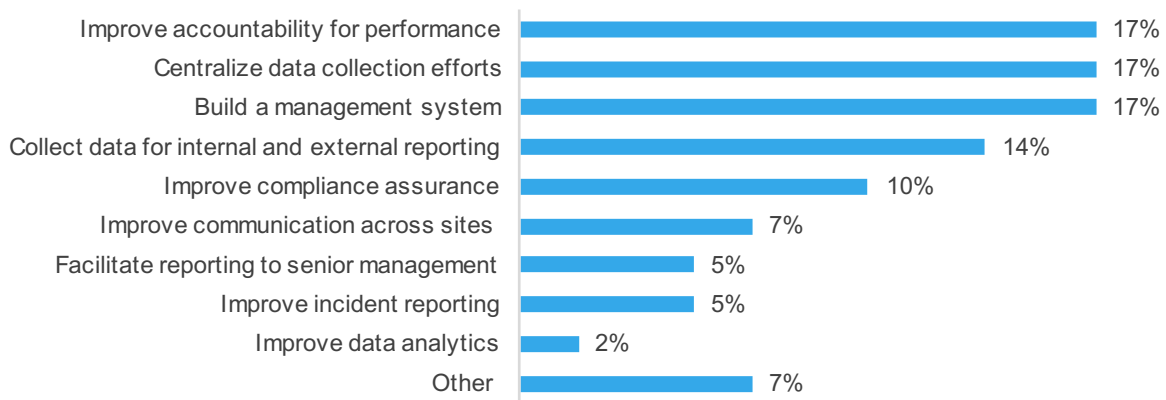


“They try to let everyone be entrepreneurial,” she said.

This commitment to operational independence is so ingrained in the culture, Ms. Coopersmith-Gray said, that the only common requirement is the accounting system. But since conflict minerals reporting is mandated by the Securities and Exchange Commission (SEC), the company is required to issue a common declaration on the origins of the tin, tantalum, tungsten and gold it uses.

Business Objectives for New Software System: Buyers

Figure 2



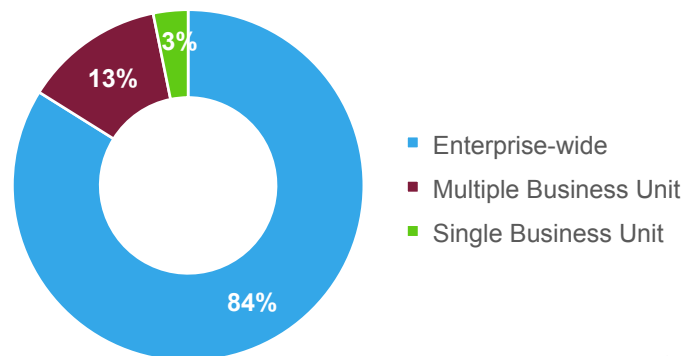
N=59

For a company with ten different approaches to EHS& sustainability data management, however, the goal of pulling that data into a common system for conflict minerals reporting sparked a lot of discussion about the potential scope of the implementation.

“Some people want to use it for just the conflict minerals, some people want to use it for conflict minerals and EHS data, some people want to use it for conflict minerals and EHS data and product stewardship,” she said.

Desired Scope of System Implementation: Buyers

Figure 3



N=31



Case Studies on Data Management

For her part as the Director of Environmental Health and Safety, and Sustainability for the Amphenol ICC division, Ms. Coopersmith-Gray would like to use one system for both conflict minerals and CDP reporting.

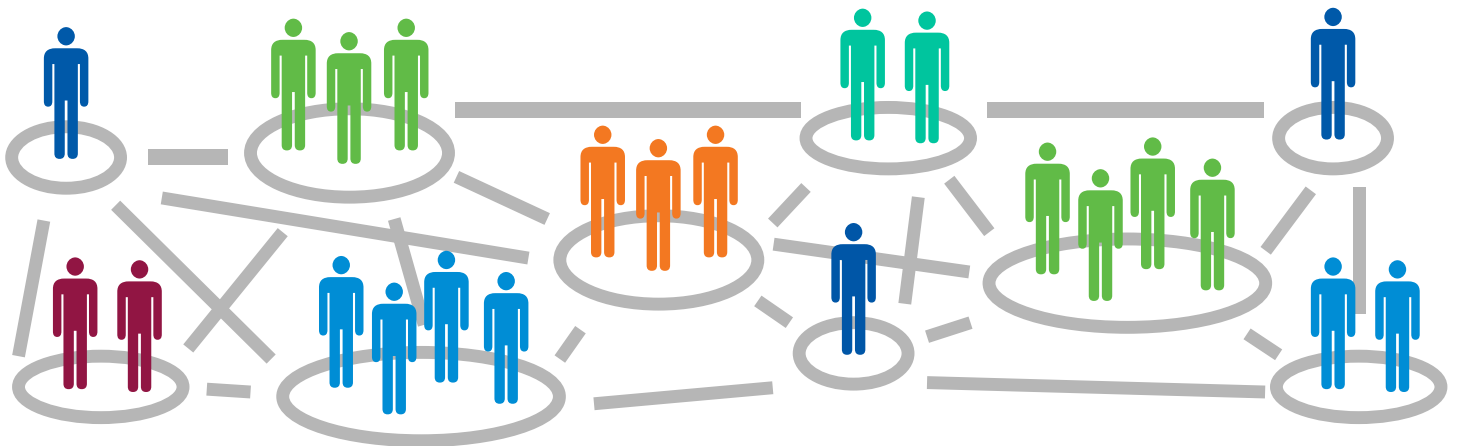
In the absence of a single, enterprise-wide system, the company assigned a designated conflict minerals representative to each business unit. This person is accountable for ensuring that its business unit is rolling up the data consistently to comply with the SEC requirement.

Within the Amphenol ICC business unit, the company recently implemented selected modules from a major software provider to assist with sustainability metrics and CDP reporting. The software system was already in use by one of the acquired business units, so the company benefited from preferred pricing.

This pragmatic data management solution is the kind Mr. Schmitz said he works with organizations to identify. “What you want to do is understand what the current culture is,” he said. “You might have an organization that’s perfectly ripe from a technology standpoint for standardization, but culturally, they can’t handle it.”

For organizations that are not well-suited to centralization and standardization, Mr. Schmitz suggests prioritizing issues in order of business impact and mastering them one at a time.

“You have a finite amount of time, and a finite amount of resources and a finite amount of dollars and you have to make a decision about the best way to invest those,” he said.



Using Data Visualization to Meet Compliance and Drive Internal Engagement with EHS Data



The real opportunities for EHS&S data collection are for the information to identify risks, provide insight into areas for improvement and to substantiate a company's external communications about its efforts. In this case study, an EHS Leader from the energy industry explains how a new regulatory requirement created an opportunity to better communicate the company's environmental impacts to its stakeholders.



Q: Can you briefly describe your company and the nature of your EHS risks?

A: My company operates nuclear power plants for electric generation, so our EHS risks are unique, relative to other industries. While our facilities produce negligible levels of greenhouse gases, our EHS department focuses on the management of radioactive materials that are produced as waste. Specifically, these materials appear in trace amounts in the environment and ground water surrounding the plant but have calculated dose impacts to the public.



Q: Could you please explain the data management challenge your company faced? How did this issue come up?

A: To comply with our federal, state and industry data needs for the major effluent and environmental monitoring program we needed software to reduce time and errors in collection and reporting. Specifically, for groundwater which has become contaminated we need to know the extents, the concentrations and flow. This requires lots of samples and records. We needed to get more education in hydrology at the sites, and, in turn, communicate results and findings to executive management. Understandably, this event became a significant public interest item so we also needed to be able to communicate clearly with regulators and stakeholders. Groundwater protection, therefore, became a very visual study for both regulators and investigators to find the source of leaks and correct them.

Q: What were the options or solutions you considered? What did your exploration of these options reveal?

A: Before we introduced a software solution, this process was largely manual and very time-consuming. Additionally, it was fraught with error because of manual transposition which was required from hard-copies of lab reports into an email to a contractor to develop a map (which was only done once per year due to expense).

Q: What was the solution or approach you came up with? What steps did you go through to implement that solution?

A: Our company decided to use a software-driven solution to minimize error and enhance visualization to enable clearer understanding of the extent of condition and extent of cause. Further, we had a few plants pilot a Radiological Environmental Monitoring Program (REMP) expansion which began to collect all environmental sampling (e.g. vegetation from farms, milk samples, air and water sampling, sediment samples from the river, etc.).

Location of local residents is also added to the mapping such that routine releases from plants will also permit more accurate dose assessments of a member of the public as additional assurance that the nuclear power plant's dose impact remains less than regulatory limits.



Case Studies on Data Management



What has been the impact of the solution you introduced or the decision you made? How did this information changed how you manage your programs?

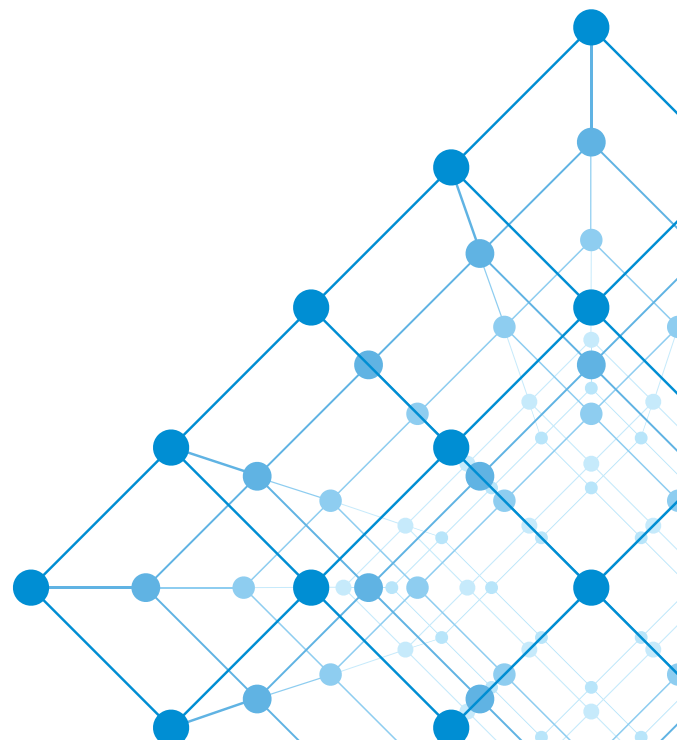


The software solution we chose was robust and could concentrate data for executive management consumption. The wide use of visualization was useful and provided lots of insight to multiple stakeholders.

With a simple addition of GPS coordinates to our REMP sampling stations, they could be shown on a map available in the program. I took this tool further by conferring with the software designers about superposition of meteorological data onto the map.

This is important because prevailing winds about a nuclear power plant can (and do) change year-over-year and decade-over-decade. The selection of sites for sampling are critical to proper management of a REMP at a nuclear power plant because NRC requires that REMP validates a licensee's effluent release model assumptions. As a result, release of gaseous radioactive waste in a known wind pattern would suggest a higher probability of collection and therefore validation of that model.

After adopting this software, another benefit became evident. Cloud-based computing, despite cyber security risks, solves a major problem that is increasing in all industries relying on software: multiple updates. With cloud-based software, while not perfect, data centers are managed professionally offsite and are therefore more reliable and require much less time to maintain, which means that my effort is more on the data review and reduction than software and IT – related work. Our company model also has our internal IT manage software products which, for my group, was usually ineffective and unhelpful. This is mostly because our internal IT organization is busy with many other projects and there are too many different software programs to manage.



Transforming a Central Data Repository into a Dynamic Information Management System



Given the breadth of its reach and the number of employees it has, the United States Postal Service may be in a category of one. In this case study, Asif Ansari, Manager of Environmental Compliance and Risk Management, explains how the organization evaluated its unique software requirements, and selected a path to best meet its needs.

Company Overview

The United States Postal Service (USPS or Postal Service) is one of the largest civilian employers, with a work force of over 400,000 employees. As a \$64 billion self-funded agency, the Postal Service runs one of the world's largest logistics operations, manages more than 30,000 buildings and operates a fleet with over 225,000 trucks.



Description of our EHS Data Management Challenges

In order to monitor environmental compliance and communicate business needs to stakeholders, we literally have to track thousands of permits and plans, and capture vast amounts of environmental data in a timely and standardized manner. This includes information on regulated equipment, environmental permits and plans, compliance deadlines, training needs and many other regulatory required activities, including inspections and sampling. Yet given limited resources and the geographical breadth of sites with environmental requirements, the environmental function must constantly prioritize compliance strategies to minimize operational disruption.

Description of the Business Problem

Environmental Tool Kit (ETK) has been the official USPS environmental compliance information system and data warehouse for almost two decades. ETK was built and enhanced over the years in a collaborative manner between USPS and a third part vendor and contains critical site-level information on regulated equipment and permits/plans, compliance schedules, environmental audit results and corrective actions, and provides storage and access to environmental records. It also provides national and regional roll-up reports that aggregate site-level data.

Before our updates, USPS staff and contractors had different methodologies for entering data into the system. Contractors used various formats (including paper) to capture, digitize, and finally upload the information into ETK. The lag time from site visit to data upload into ETK would take a month in some cases. Not only was this approach time-consuming and inefficient, but some contractor processes were not supported by the USPS IT platform. This resulted in a loss of quality control and a significant lag in the availability of environmental information necessary for decision-making.

In addition, the system was not originally designed to serve as a direct auditing tool. Audits were performed outside of the ETK environment and compliance deficiencies and corrective actions were later uploaded to ETK. This lag time was also significant.

Simply put, ETK was not positioned to be a near real-time information management system platform and would require further enhancements to support the Postal Service into the future.

As part of continuous improvement, the Postal Service developed a strategic plan to enhance ETK. The goals include:

- improving the user interface;
- standardizing data collection and audit processes and
- allowing for “near real” time access to environmental data and audit results.



Our vision is for ETK to become a complete environmental management system platform with robust auditing features and near instant visibility to critical environmental action items. Standardizing all the various data collection processes and non-postal platforms to an internal USPS IT-supported iOS mobile application platform is critical to this outcome. Under the proposed plan, the USPS IT function will develop a mobile application platform internally. Postal Service environmental staff will utilize standardized tablets that run the mobile platform, and contractors will be required to use the same standardized USPS mobile application on their own devices.

The Options We Explored

In order to find the best solution, we went into the process with an open mind.

Option 1: Continue as is with existing ETK platform. Due to reasons listed above, we decided early on that this was not a viable solution. It would not protect the organization from the environmental compliance risks and maximize efficiencies.

Option 2: Scrap our ETK platform and go with a new third-party solution: Using NAEM's EHS & Sustainability Software Conference as a resource, we essentially reviewed all the EHS compliance software platforms in the market. This type of forum presented an ideal environment to network with peers about their data management challenges, learn about how they are addressing this issue, and finally to observe first-hand the various industry EHS platforms that are available. This process was very helpful.

We then diligently conducted "deep dive" sessions with a select group of EHS software providers to observe the functionalities in detail and make suitability determinations. There are some wonderful products out there, but we determined that they did not meet our needs, due to two main challenges: the final total cost of ownership and the IT security challenges. The Postal Service has unique needs in terms of the number of users, licensing arrangements, software ownership, and most importantly its very strict corporate IT "firewall" requirements. Due to these constraints, we decided to not pursue this option.

Option 3: Upgrade existing platform and introduce "best practices" from industry leaders and peers: The final option we considered was to learn from industry best practices and under a project/change management approach to strategically enhance ETK to be a robust information management tool. In the end, we selected this option, as it provided the most cost-effective and comprehensive solution.

How We Transformed Our Environmental Tool Kit to Meet Emerging Needs

One of the important things we learned from coming to NAEM conferences is that we needed to have our own mobile solution. Per the strategic plan discussed above, the environmental function worked closely with USPS IT function to specifically modify ETK for use on smaller screens and touch-screen capabilities of smartphones and tablets. A mobile application for ETK was developed and deployed in 2016. This application was designed on the iOS (iPad) platform because it is the official tablet approved to work on the Postal network. The Postal Service also procured iPads with Wi Fi and cellular coverage for the environmental staff as part of the strategic plan.



The 2016 release allowed for on-site evaluation and collection of ETK data fields for regulated equipment as well as environmental permits and plans. The Postal Service is now working with environmental contractors and internal staff to transition from existing data collection checklists and processes to the ETK mobile application. Moving forward, contractors and environmental staff will use the mobile applications to collect data in the field and instantly update ETK. This will allow for “near real-time” visibility of data for regulated equipment and environmental permits/plans.

The auditing feature which includes regulatory updates at Federal, State, and local level is currently not mobile enabled and resides outside of ETK. Plans are now under way to bring this auditing capability internal to ETK and to operate in a mobile environment as well. The mobile application software paired with the iPad hardware will ultimately enable ETK to be used as audit tool operating in “near real” time.

Additionally, ETK will be modified to enhance the current user interface, including site-level dashboards, to present critical environmental information and action items in an organized manner. This will improve the customer experience at multiple organizational levels and facilitate timely response actions. The site-level dashboard will include a more robust calendar features to better present a facility’s compliance actions and regulatory due dates.

The Results

ETK is being positioned to upload data and critical information to the system in a standardized manner, in real time. Once the information goes in, the dashboards will also be more user-friendly and more robust to facilitate decision-making. We anticipate several corporate benefits as the mobile platform replaces multiple existing processes:

- 1. Improved Decision Making:** Instant to near instant access to environmental compliance data for USPS management to make sound decisions and reduce potential environmental risks, liabilities and potential monetary fines;
- 2. Improved Customer Experience:** Organized and simplified presentation of critical environmental action items and information will facilitate site-level understanding of compliance obligations;
- 3. Increased Opportunities to Identify Risks:** Expansion of audit capabilities and reach for USPS compliance personnel and contractors with ability to conduct full-scale or targeted environmental compliance reviews using tablets during site visits and reduce risks by immediately identifying corrective actions;
- 4. Convenience and Efficiency:** Instant access to environmental compliance information for USPS compliance personnel and contractors in the field using a tablet;
- 5. Adaptability:** Improved flexibility to fast changing environmental regulations and requirements.



Key Takeaways

As an organization, our infrastructure and IT security concerns did not favor opening our systems to outside vendors. That was not a deal-breaker, but it made the prospect of pursuing this option very, very difficult. And when it came to the cost, we were not able to make a compelling business case that this is the IT infrastructure risk for outside sources to come in. Ultimately, investing in our existing system was a better fit for our organizational risks. Adopting any type of software system requires considerable investment of time and resources. The solution has to fit with what your organizational risks are. In our particular case, our needs and the costs to use a third-party platform would not have matched our needs from a financial standpoint.



Careful Management Helps a Legacy System Withstand the Test of Time



Two decades ago, when Abbott Laboratories first developed its internal EHS management information system there were few alternatives that could meet its needs. In this interview, Principal EHS Specialist Lisa Marx explains how the company has managed user input and invested in system upgrades to keep it relevant over the years.

When Abbott Laboratories built its internal EHS software platform more than a decade ago, it did so because the commercially-available options at the time did not meet its needs. Despite changes in the company's IT strategy over this time and new options in the marketplace, its legacy EHS system has withstood the test of time, thanks to careful application management and ongoing investments in the system.

One of those more recent updates was the development of an integrated scorecard, which captures key metrics in live time for areas such as: injuries and illnesses, significant incidents. Depending on the manufacturing site, the environmental data is reported on either a monthly or quarterly basis. The corporate team then publishes the updated EHS snapshot to senior management once a month.



“Having the data updated more frequently gives us a better view overall of how our EHS programs are doing so that we can be prepared to be sure that we’re hitting our externally communicated targets,” explained Lisa Marx, who is responsible for global corporate EHS standards and web applications.

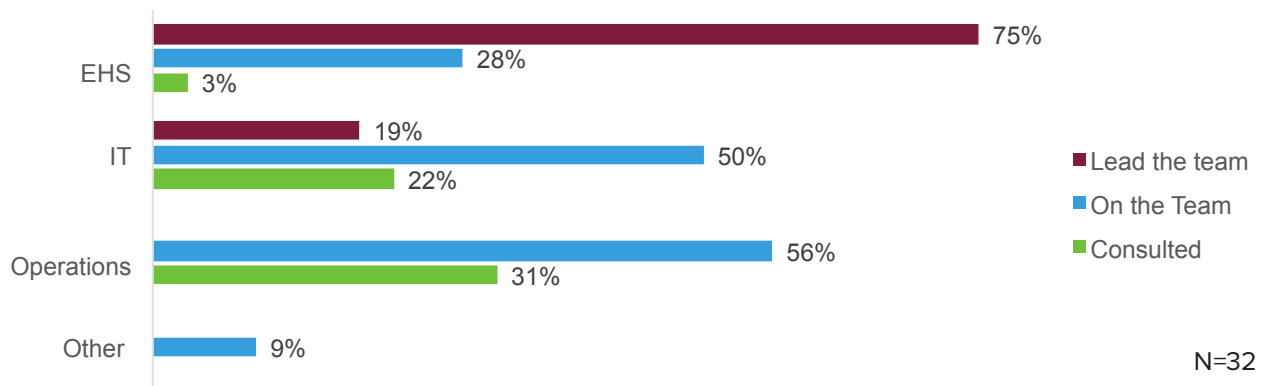
In addition to the scorecard, the team also sends out alerts for any incident that is determined to be ‘significant’ under the corporate standard.

These standards and procedures are also built into the system, a distinct advantage of having developed the software in-house, Ms. Marx said.

The software also has a function that manages the company’s organizational hierarchy from the corporate level all the way down to the department and the individual employee. With more than 1000 users logging in to complete action items or to capture data from various parts of the company’s EHS program, the company relies on its EHS leaders to ensure the information is being entered correctly.

Functions Involved with System Management

Figure 4



The first step in the quality control process is the site-level EHS manager, who reviews incidents are entered properly before it rolls up to the division-level EHS manager.

“The divisional managers don’t have to go into each record,” Ms. Marx explained, “but they’re pretty in tune with their division’s safety performance, so they can go in and review the metrics and if something looks off, they flag that.”

Then, the data is reviewed by the corporate team, where Ms. Marx is responsible for the health and safety metrics and a team of colleagues manage the metrics on the environmental side. The team validates the data every quarter, and goes through a third-party assurance audit annually.

These built-in checks are supported by the system itself.

“If there’s a greater than ten percent difference in the environmental metrics versus the prior reporting period—whether that’s an increase or a decrease—they have to add a comment to explain that in the system,” she said.

The functionality meets the company's basic reporting needs, Ms. Marx said, but like any other system, it has its detractors, too.

Her solution is to work individually with users to identify existing functionality that could meet their needs.

"We also try to provide more training on different aspects of the system. Our system has pretty good online help and definitions...but sometimes just having a conversation with someone if they're struggling [can make the difference]," she said.

For user issues where the software is not performing as intended, the IT team documents these through its 'bug tracker' and then evaluates its importance to the business.

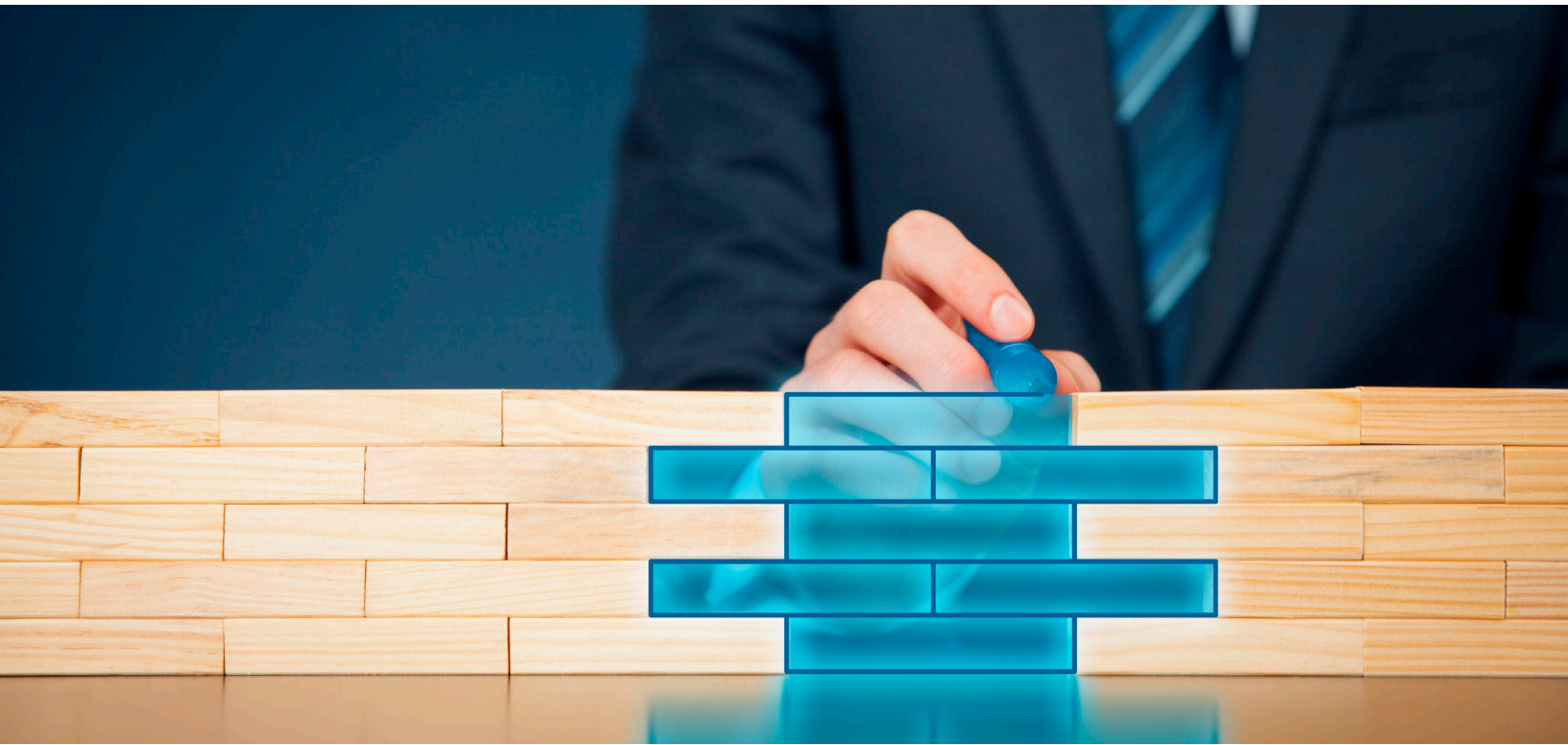
"Sometimes there's a bug that we can live with, or there's a workaround. If there's not, then we have it on the list," Ms. Marx said.

And because the application is a continuous work-in-progress, the company has benefited from the option to slowly invest in the attributes that they needed, a strategy that mitigated the impact on the budget as well.





Closing the Gaps without Breaking the Bank



Faced with a variety of data management needs, it may seem that a single, enterprise-wide solution is the best option. In this interview, however, the corporate EHS&S leader of a big box retailer explains how identifying distinct needs led to a cost-effective set of solutions.



Q: Could you briefly describe your company and the nature of its EHS risks?

A: My company is a big box retailer with thousands of employees. Our EHS risk is lower than most manufacturing industries or utilities, but the risks are broad. Our highest risk areas are ammonia refrigeration, construction storm water management, hazardous waste management, and fuel systems.



Q: What was the specific data management challenge you faced? How did this issue come up?



A: Our company did not have any type of environmental information management system in place and we were initially looking for one system to manage compliance as well as sustainability data.

Our compliance data is managed by a handful of employees, relatively few. And we had some existing enterprise systems in place. My concern was by building a larger EMIS that we just wouldn't have the resources to manage. I also didn't want to have to train on a new EMIS that they would be using infrequently. I wanted them to focus on using the new enterprise system that we had and just fill in the gaps, where needed.

Summary of Top Desired Software Capabilities: Buyers

Figure 5

Top Desired Software Capabilities	Percentage
Incident tracking	88%
Corrective action tracking	85%
Audit finding documentation	82%
Incident reporting	82%
Incident investigation	82%
Internal reporting	82%
Performance metrics/dashboards/scorecards	82%
Environmental auditing/inspections	76%
Compliance calendar	76%
Energy and carbon management/metrics	73%
Safety auditing/inspections	73%
NOV tracking	73%
Non-Conformance statistics	67%
Risk management	67%
Regulatory change tracking and monitoring	64%
Hazard identification and assessment	61%
Annual sustainability reporting	61%
GHG reporting	61%
Job hazard/Risk assessment	58%
EMS/ISO 14001 management system	58%
Document management	58%

N=33



On the sustainability side, our data were siloed around the company, whether that was waste data that were provided by our waste hauler or we have water/energy utility data that are collected and recycling data that are collected by our recycling vendors, so we had all of these disparate locations for our data so there was never really one true source. And the data that we received from our vendors was in different formats: so it was a mess.

We knew that we wanted a single true source of data, something that had a user-friendly dashboard because it would be a system that would be used by a lot of different people across the company. My criteria were to identify a product that could generate trend graphs and reduce data fairly easily and automate the receipt of the data and have a user-friendly dashboard.

The other issue we faced was financial. Because we did have enterprise systems in place that we could patch together, it was a much for difficult justification for me to spend a significant amount of money to bring in an all-encompassing integrated systems that would duplicate other things that we had in our enterprise systems.



What was the solution or approach you came up with? What steps did you go through to implement that solution?



We decided to separate the two issues, and seek two different solutions as the users and audiences were distinct.

When I would attend NAEM conferences or RILA conferences, I had an opportunity to meet with some of the vendors and see software solutions. Whenever we purchase any type of software, our IT staff goes through a project management process where they'll assess our needs, look at the IT and system issues and look into our existing IT systems, so they put together a business requirements document, which includes an overview of the process, the workflows, the systems requirements reporting, the interface requirements:

- The software had to support data collection from these existing enterprise systems (for compliance) in addition to things that would be manually uploaded.
- The application had to support data entry in a variety of units of measure.
- The application had to include details about existing store locations.
- The software had to be able to reconcile common units of measure, especially because we were looking at energy and greenhouse gas emissions, etc.
- It had to support a variety of reporting needs.
- The system had to evaluate that data and generate things like carbon footprints and energy metrics and things like that.

We had some online demonstrations from five vendors and we whittled it down to four for the RFP and one that we selected.

We decided to use in-house enterprise systems to manage compliance calendars, procedures, inspections, and audits, as users would be company-wide. We then purchased cloud-based software to provide regulatory requirements and updates, as well as audit checklists. We identified providers through conferences, conducted interviews and sole sourced our selection.

We purchased a new software system to manage our sustainability metrics. We identified providers through conferences, developed a project plan, released an RFP to pre-selected companies, conducted interviews and demonstrations with a short list and selected a provider based on meeting our project criteria.

Q: How has that performed for you? What are some of the benefits you've been able to realize from that approach and what are some of the shortcomings?

A: On the compliance side, the benefits were that this was the absolute lowest-cost way to do it. We have not had to spend internal resources on IT or on training. The data that we generate is easily accessible to others in the company. The downside is that it is a patchwork system so we do sometimes have to go to multiple systems to run through a process.

On the sustainability side, the benefits are that we finally have one true source of data that we don't have to go to multiple locations and multiple users to collect. We can now deliver metrics quarterly and produce an annual footprint report internally because the system is pretty easy to use. We've also been able to manage this all in-house, without any outside consultant support.

Q: How much did you spend?

A: For the compliance system, we spent less than \$10,000; for the sustainability system, we spent less than \$50,000.

Q: How many staff resources are required to maintain the system?

A: We've had internal IT support via the start up but minimal amount of time and maintenance afterwards. And again, because we're automating almost all of our data collection, our resources are spent evaluating data, not just collecting and managing it.

Q: How many users do you have?

A: For the compliance system, we have five users; for the sustainability system, we have eight users.

Q: Any lessons learned you'd like to share from your experiences?

A: Sure it would have been nice to pull in a slick, all-purpose system but we didn't really have to. And there's no way we could have done this any cheaper, and still received the same value.



Enforcing Corporate Standards through Centralized Data Management



Despite its geographically and operationally diverse footprint, Chevron Corp. has a strong set of corporate standards for all business units. In this interview, Senior Business Analyst Jay Roussel, shares how the company saved money and improved efficiency by streamlining its data management efforts.

For an international energy company with integrated operations across the value chain, it might seem too daunting to adopt a single, enterprise-wide software system. But according to Jay Roussel, a senior business analyst in Chevron corporate Health, Environment and Safety group (HES), it all comes down to standardization.

“If you don’t have the processes where you have a common definition and terminology for how you do things and what information you collect, and what exactly that information means, then you can’t deploy any software, much less an ‘off-the-shelf’ version,” he said.



The company began its system implementation five years ago, but Mr. Roussel said the process of documenting workflows and standards started long before that.

“We had mapped out the processes and in many cases the processes were already standardized for almost five years prior to us deciding which systems we wanted.”

The strong vision for the Chevron’s operations comes from its corporate governance team, which manages the requirements for the highest priority HES processes including: workplace safety, contractor HES management, environmental stewardship, compliance assurance and process risk analysis. Regulatory requirements supercede corporate requirements, but otherwise corporate requirements create a minimal expectation for every business unit to achieve.

The other advantage the team had when it came to creating standards was the presence of a number of legacy systems, which provided the foundation for the new system’s requirements. And because the company’s policy is to avoid customizing the code, the new system was selected based on its ability to work within the company’s existing processes—another reason why having clearly articulated workflows was so “critically important” to the project’s success.

The emphasis on standardization is tempered by the company’s active management of its own systems.

“It’s not so simple as we have standards and our workflows adhere to them,” Mr. Roussel said. “It’s a very dynamic process and a focused administration of that process to make sure that not only is the system meeting our needs but that the workflow itself is meeting our needs.”

Every three years, each process undergoes a review to evaluate its relevance and impact. In the past, this internal audit has helped the company identify requirements that were too stringent for data collection when they are working with contractors.

“We would say: ‘How well is this working? Do we want to double down and help them meet the objective? Or do we want to relax the standard because it doesn’t’ make sense in every case and it’s not a value add, and it doesn’t respond to our risk?’”

The company also still has about 150 applications, many of which are used at a single business unit alone.

“Maybe it’s required for a particular activity that might not be common across all of them, or might be tied to a regulatory requirement there,” Mr. Roussel explained.

Still, they’ve taken strides over the past couple of years to eliminate any overlap with the centralized solutions. The elimination of about 26 point solutions has saved the company about \$3 million, Mr. Roussel said.

While cost savings are certainly a benefit, the true purpose of centralizing the data was to drive HES performance improvement.

“Our information management system goes beyond just metrics reporting. It provides what we need to be a learning organization,” he said.

Executing a Multi-year Data Management Strategy Using Internal and External Systems



In the wake of a merger, Lam Research Corp. established a four-year strategy to invest in its EHS management information systems. In this case study, Corporate EHSMS Manager Thochan Nguyentan explains how the company assessed its needs, weighed the costs and identified the right combination of solutions.

Company Overview

Lam Research is a leading semiconductor company, with operations that include plasma etch and single-wafer clean equipment. In June 2012, the company merged with Novellus Systems Inc., another semiconductor company specializing in thin film deposition. The combined company now has about 8,000 employees and contractors, with facilities across North America, Asia, India and Europe.



Description of our Data Management Needs

In addition to using data to manage our EHS risks (Ergonomic, product compliance, chemical compliance, biological and environmental), we also use data to assist with maintaining internal conformance to our standards, which align with industry standards. Additionally, our company conforms to ISO 140001 for environmental management and OHSAS 18001 for health and safety.

In addition, our system help us with meet our customers' requirements. Intel is one of our top-tier customers and they have specific requirements, so our management system needs to be able to make and exceed these standards.

The Business Challenge

Before we began to invest in our systems, we had 37 different spreadsheets and databases that we were using to help us manage our information management system. Efficiency and transparency were issues. It was also very time-consuming to run performance metric reports or try to present on our data.

After the merger with Novellus, the company established a four-year roadmap to develop our EHS management information systems. Our needs included: EHS compliance management, material safety data sheets (MSDS), key performance indicator tracking and auditing.

How we solved the problem

Before we could identify the solutions we had to evaluate the current state of our systems. Both Lam (pre-merger) and Novellus had their own systems, and not all of them were scalable for the new combined company.

We've identified the pros and cons for each system based on the cost, based on ease of use, based on efficiency gain and then from a long-term standpoint. From there we would make the decision about which system would be more scalable and more consistent with our process.

For safety data sheets, for example, Lam was using a third-party vendor. We adopted this system to replace a homegrown solution that was built using Sharepoint. We now pay \$20,000 a year, but it's been a huge efficiency gain because it has eliminated the need for manual upload and classification of the different hazard types. We can also easily run reports and use it for chemical inventory management. Based on our tradeoff analysis, we decided that Novellus should migrate from the system they were using to Lam's commercial system.

When it came to tracking EHS events, on the other hand, we adopted the Novellus system. Lam did not have a system to manage incident reporting. We were using a homegrown word document to capture the incident report and then perform the root cause analysis and corrective actions. However, it's really hard to track corrective and preventive actions, and follow up to closure. And performance metrics are also a nightmare when you try to pull this data during management review.



That's why we decided in favor the Novellus system that is now scalable for the larger company. We're performing some upgrades so it's scalable for the combined company and we will continue to make enhancements but it's a homegrown system similar to some of the commercial incident investigations and reporting systems.

One of the newest systems is the EHS event tracker system, but the development has been a challenge. We might have underestimated the total effort required, so once we got deep into the development we realized that we now have to spend a lot more time and effort to design a system that would be more scalable. There were a lot of upfront challenges, but now we continue to perform enhancements to the system to make it more scalable, and more user-friendly.

The development of a performance metric report is the next phase. Each year we establish an annual operating plan for EHS to make sure that we can reach the KPI in alignment with each business unit. In the past, the business unit leaders came to us to ask for the total recordable cases, injuries and near misses for their group. Now they can generate their own business intelligence reports and measure their own performance by running these type of reports.

Results

We're now in year four of our road map, and we believe that the investments we've made will allow us to save a lot of time. Our company has grown in total headcount, so resourcing has always been an issue for EHS so we don't have the bandwidth to support individual data requests from the different business groups.

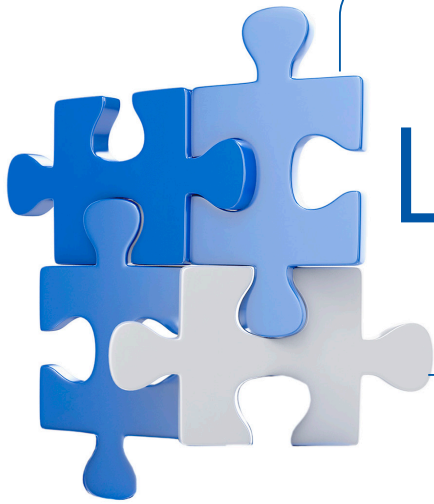
Our new systems have also improved transparency. We introduced a dashboard tool, where it can look at real-time data. That's an improvement that we are actually working toward. We also started developing different EHS dashboards right now at the corporate level and started working with the different business groups to build their own dashboards.

Key Takeaways

The solution you decide on really depends on the resources and funding. Building these homegrown systems have had certain business benefits, but for some applications and business needs, it may not be appropriate to build it internally.

For our corporate audit system, for example, I would be in favor of buying an off-the-shelf software because it would be much easier for us. Building it in-house would be a massive undertaking and we'd still need to utilize third-party regulatory updates anyway.

The full cost of using a third-party solution goes beyond the implementation, though. Annual licenses can be quite expensive, depending scale of your organization. In our case, we felt that it made sense for us to build some of our systems this internally because we had the resources and funding approved.



Lessons Learned



Lessons Learned

No matter the maturity of your data management program, there are certain lessons that seem universal to all companies. These include:

1. **Data management begins with establishing a basic set of standardized work flows:** “If you don’t have the processes where we have a common definition and terminology for how we do things and what information we collect, and what exactly that information means, you can’t deploy any software much less an off-the-shelf version.”

2. **Every EHS&S data management system will need cooperation from other functions to be effective:** “The art of organizational change management is huge for putting in new data management systems, especially if you’re relying on a network of people or upstream business processes.”

3. **A data management system is only as accurate as its users:** “If executed properly, [most business processes] produce high-quality information. The problem is that without the knowledge, the skill and the capability, people sometimes just get it wrong.”

4. **Each solution has its quirks:** “There’s no system that users say: ‘It’s so great, I really love it,’ People always have their complaints.”

5. **Data Management is a journey of continuous improvement:** “Sometimes you’ve got to put a stake in the ground and move forward and use that mark as your starting point for [further improvement]”



6.

Don't rush into a decision: "Take your time to review what is out there because an EHS software platform is a long-term commitment. It's not a project that you do for one or two years: This becomes a corporate solution."

7.

Know your Audience: Work for the target audience or customer base. Know who will be using the system and what it will be used for. Organize data or information that makes sense to the user and helps them make decisions in a timely manner and take action.

8.

A complicated problem doesn't require a complicated solution: "It is best to match your organizational requirements and assess as to what solution works for you. The solution must be cost-effective relative to the compliance risk. Don't buy "Cadillac" if the need is not there."

9.

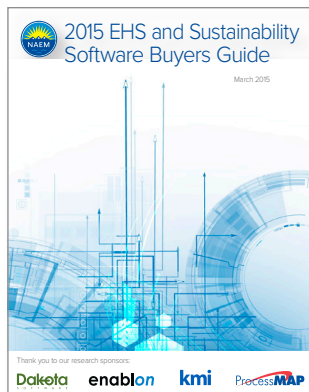
Progress is not always a straight line: "As you continually improve, you get the curveballs of change that may take you two steps forward, one step back. Whenever you're in the middle of that, it might not look so pretty but as long as you're vectoring in the right direction, I think that's the most important thing when it comes to data management."

10.

The more data, the more work: "Once you create more data for yourself, you create more problems for yourself. You never used to know about those incidents that occurred. Now that you've got that granularity, you've got a problem that you've got to deal with. The overwhelming amount of data that you're going to create might actually make your job harder, so you've got to be cognizant of that."

NAEM's Software and Data Management Offerings

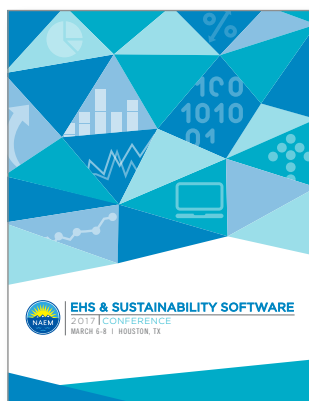
NAEM provides valuable resources for corporate EHS and sustainability leaders and IT professionals who are responsible for selecting, implementing and maintaining software systems, and who are looking to better manage and report their data.



2015 EHS&S Software Buyers Guide

This report, which includes data from 165 in-house EHS and sustainability leaders, addresses common questions from a peer perspective, including: business objectives for software purchase, the desired software capabilities, peer spending and expected maintenance costs. The detailed analysis also incorporates the perspective of past purchasers to provide shoppers with a comparison between their expectations and the experiences of those who have recently gone through the process. An update to this report will be published in March 2017.

Download Free Report: www.naem.org/?survey_2015_ehsmis



2017 EHS&S Software and Data Management Conference

Since 2001, NAEM's EHS and Sustainability Software and Data Management Conference has been the premier software event designed to meet the needs of corporate EHS and sustainability leaders. NAEM's conference is the best opportunity to meet with the leading solution providers at the same place and to hear from fellow users who utilize these systems on a daily basis.

March 6-8, 2017 | Houston, TX

For More Information: www.ehsmis.naem.org/



EHS&S Software Ratings Report

Whether you are a first-time purchaser, replacing a system, or integrating a new product with an existing system, there is a good chance that you will benefit from utilizing customer ratings to inform your decision. These software vendor ratings (launching in January 2017) will assist you in making a decision based on user feedback as well as help you to benchmark your software experiences with peers.

Rate Your Software Now: www.naem.org/page/survey_2016_swrating



Acknowledgments

Publisher

The National Association for Environmental Management (NAEM)

1612 K St., NW Suite 1002

Washington, DC 20006

(202) 986-6616

www.naem.org

Contributors

Asif Ansari

Environmental Compliance and Risk Management

The United States Postal Service

Martha Coopersmith-Gray

Director of Environmental Health and Safety and Sustainability

Amphenol TCS

Lisa Marx

Principal EHS Specialist

Abbott Labs

Thochan Nguyentan

Corporate EHS&S Manager

Lam Research Corp.

Jay Roussel

Project Manager

Chevron Corp.

Jason Schmitz

Director of T3Group

Trinity Consultants

Eric Schwartz

Report Sponsors

CH2M

Enablon

Intelex

Sphera Solutions

UL

VelocityEHS



Acknowledgments

Analyst

Elizabeth Ryan

Director of Communications, NAEM

Report Design

Ellie Diaz

Chaos Studios

Media Inquiries

For more information about this report or to request an interview with an NAEM analyst, please contact NAEM at (202) 986-6616.



www.naem.org

Read more case studies from this series:



Finding Common Ground within a Decentralized Company

Featuring Amphenol Group



Using Data Visualization to Meet Compliance and Drive Internal Engagement with EHS Data

Featuring an energy generation company



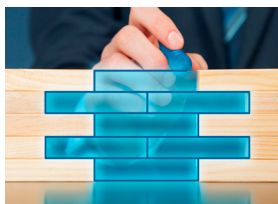
Transforming a Central Data Repository into a Dynamic Information Management System

Featuring The United States Postal Service



Careful Management Helps a Legacy System Withstand the Test of Time

Featuring Abbott Laboratories



Closing the Gaps without Breaking the Bank

Featuring a big box retailer



Enforcing Corporate Standards through Centralized Data Management

Featuring Chevron Corp.



Executing a Multi-year Data Management Strategy Using Internal and External Systems

Featuring Lam Research Corp.