Oil and Gas Production: Challenges and Opportunities
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Oil and Gas Production: Challenges and Opportunities
by Teresa Raine

The August issue takes a look at the regulatory challenges and opportunities for the midstream oil and gas sector that must coordinate local, state, and federal requirements from multiple agencies.

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EPA Research Highlights:
Onshore Crude Oil Decontamination Using a Water Security Test Bed
by Lahne Mattas-Curry
EPA researchers examine the effectiveness of water treatment and crude-oil decontamination using a water security test bed.

Etcetera:
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by Anthony B. Cavender
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EM Exclusive
Management System Maturity: An Indicator of Sustainable Production and EHS&S Goal Attainment
by Dawn Hess, Sarah Dobie, Michael McGuinness, Jr., Lindsey Rodbourn, and Alicia Ball

An examination of four automotive manufacturers’ management systems as an indicator for the sector’s potential to reach aggressive EHS&S goals and develop or maintain sustainable production systems.
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Thanks for reading our August issue of EM, focused on regulatory requirements for the oil and gas sector. As extraction techniques have changed, the specifics of maintaining compliance have also evolved. In some cases, new requirements were put in place for the industry. In other cases, existing requirements have been applied in challenging or confusing ways. I hope the following articles help you better understand the changing regulatory landscape.

Last month, I highlighted three long-term focus areas for our Association: member mentoring programs, the use of modern media for content delivery, and an “A&WMA Academy” approach to content alignment. My goal is for A&WMA to make concrete steps forward on these areas in 2018. I’ll highlight mentoring in this month’s message.

A&WMA’s Young Professionals (YP) Advisory Committee has been working to improve our mentoring program offerings for several years. For example, they have offered YP mentoring breakfasts at our Annual Conference & Exhibition (ACE). These breakfasts provide opportunities for YPs to meet with experienced professionals in their field. The connections made at these events may lead to professional growth, future job opportunities, or even lasting friendships. I believe we can increase the number of mentoring opportunities open to YPs and expand the scope of A&WMA mentoring programs beyond YPs.

I see (at least) two challenges with expanding our existing mentoring programs. The first is determining how we can make and manage useful connections. ACE provides an appropriate forum because everyone is present at the same site and interested people can opt into the program. We would need to develop a system for making and tracking potential matches as well as a program structure that would facilitate connections when people are not in the same location.

Beyond logistics, the second challenge is ensuring the program provides real value and makes appropriate use of participants’ time. I have served as an alumni mentor for engineering students at my alma mater, the University of Minnesota. The program managed logistics very well: recommendations on meeting frequency and content, model “contracts” to ensure goals were clear, special events and speakers. The key for the program was still the motivation and specific goals of the students. If they knew what they wanted to learn and were assertive in maintaining contact, the results were very good. If the students’ goals were unclear, the interactions were not valuable for either participant. For any future A&WMA program, we will need to structure the program to maximize the opportunity for success.

A mentoring program need not focus on matching people new to the field with experienced professionals. We could also match people between sectors or across specialties. As travel approvals continue to be challenging for some of our colleagues, our chances to learn about people and programs through face-to-face conversation decrease. I can envision valuable interactions on program benchmarking between state agencies or private companies, local rules and priorities between a project proposer and state agency staff, or career development ideas between professionals with common interests. Opportunities to build trust and understanding outside of specific project work can help individuals and organizations more efficiently meet their goals.

I encourage you to share elements of successful mentoring programs that we might emulate. Send me your ideas and examples. Let’s build an effective and successful program together. em
A look at the regulatory challenges and opportunities for the midstream oil and gas sector that must coordinate local, state, and federal requirements from multiple agencies.
We rely on the oil and gas sector to help give us the energy to move forward and energize us throughout the day. As the globe continues to strive to strike a balance between cleaner forms of energy, grid and infrastructure reliability, and the economics of energy, oil and gas production and operations continue to be at the forefront of the discussion balancing environmental and energy opportunities. Oil and gas producers must be mindful of maintaining compliance with environmental standards, understanding the environmental impacts of new production or technologies, and meeting the challenges and opportunities of permitting new pipeline or infrastructure to grow and meet public energy demands. The focus of this issue is the range of issues facing the oil and gas sector as it looks to continue to provide energy to meet the growing demand, while complying with complex regulations and guidelines.

In our first article, Robin Rorick and Howard Feldman provide some perspective on the general status of permitting challenges for the oil and gas sector, looking both at the regulations at the forefront of pipeline permitting and effects from the Trump Administration’s infrastructure plan on permitting current and future pipeline projects.

With production growth of the Marcellus Shale and other areas in recent years owing to technological advances in horizontal drilling and hydraulic fracturing, it has become a key part of the discussion to better understand the environmental impacts from these production activities. Natalie Pekney, Matthew Reeder, and Mumbi Mundia-Howe detail the preliminary results of an ambient air quality study conducted at the Marcellus Shale Energy and Environment Laboratory in Morgantown, WV, which focused on methane and volatile organic compound (VOC) concentrations during a variety of oil and gas production activities.

Finally, Hedrick Strickland and Bob Fraser discuss the amendments to the Refinery Maximum Achievable Control Technology (MACT) 1 Rules and fenceline monitoring used for compliance. With fenceline monitoring data becoming publicly available in 2019, this article steps beyond the technical challenges and discusses community and neighboring facility considerations beyond the fenceline as communities look to understand and interpret the available information.

I invite EM readers to consider the various, interconnected air quality and environmental issues facing the oil and gas sector today that are presented in this issue.

Teresa (Tree) Raine, Principal Consultant, ERM, Boston, MA, is the current Vice Chair of EM’s Editorial Advisory Committee. E-mail: Tree.Raine@erm.com.
Recent changes to the process for permitting pipelines, particularly for natural gas, could see needed improvements to the speed and efficiency of the permitting process. However, several challenges remain.
The iconic line from the film Field of Dreams, “If you build it, [they] will come,” might work for ghosts in cornfields, but in case of infrastructure—particularly energy infrastructure—“they” are already here. It’s no secret that America is in urgent need of new and upgraded roads, bridges, and pipelines—including those for oil, natural gas, and related products. The U.S. energy renaissance, powered by twin breakthroughs in oil and gas drilling and extraction utilizing hydraulic fracturing, has driven domestic production to record highs and energy infrastructure sprinting to keep up. “Infrastructure” has become a buzzword for policymakers, though efforts to improve the process for permitting pipelines, particularly for natural gas, have been on the regulatory radar for years. President Trump’s infrastructure plan, along with recent efforts in Congress, have made several meritorious changes that could improve the speed and efficiency of permitting sought by stakeholders and sponsors alike. Challenges remain, however, particularly when it comes to state-level environmental decisions like water quality determinations under the U.S. Clean Water Act.

CWA 401 and NEPA Concerns
One of the primary state-level challenges for energy infrastructure projects is the denial of certifications under Section 401 of the Clean Water Act (CWA 401). Section 401 requires that applicants for federal licenses certify that discharges will comply with the Clean Water Act, including state-created water quality standards. This authority is extremely broad, not consistently applied across all states and its limitations have not been well-defined in law or in guidance from the U.S. Environmental Protection Agency (EPA). For example, some states interpret CWA 401 to apply to nonpoint source discharges like stormwater run-off while others do not. There is also a tremendous amount of variability in its application as staffing and resources available to state water agencies and managers also varies.

In the past two years, several federally permitted natural gas pipeline projects have been significantly delayed or effectively blocked by states refusing to issue CWA 401 certificates. In several instances, objections included non-water impacts such as a missing accounting of greenhouse gas emissions. While legitimate concerns as to water impacts should be thoroughly examined and vetted by the states, EPA, and the U.S. Army Corps of Engineers (USACE), the nature of the delegated authority, without further clarification, can become a tool for the further politicization of what should be a scientific and fact-based review.

If a project is subject to a National Environmental Policy Act (NEPA) analysis, then there will be overlap between the requirements of the NEPA process and the requirements of certain permits. For example, in the case of a NEPA review led by the Federal Energy Regulatory Commission (FERC), FERC requires placement of copies of air, wetlands, and other permits (with applications) on the publicly accessible FERC docket as part of the NEPA proceeding. FERC reviews the documents and in some cases requests the applicant take the analysis further, beyond the already-issued permits/approvals. For instance, a federal agency might provide its approval for the project of note, but FERC has the ability to review the letter, and request the permittee to provide more information, because FERC isn’t satisfied the previous federal authority that provided approval was sufficiently thorough. In another example, a proposed source may have been issued air permits from a state with an EPA-approved permitting program. FERC has required that permittees continue analysis and modeling of the proposed facility air emissions in combination with mobile air emissions (which can take several months of additional work), but offered no guidance on how to calculate mobile emissions.

While legitimate concerns as to water impacts should be thoroughly examined and vetted by the states, EPA, and the U.S. Army Corps of Engineers, the nature of the delegated authority, without further clarification, can become a tool for the further politicization of what should be a scientific and fact-based review.
If a project is subject to CWA Section 404 permitting, the USACE has authority for Section 404 permitting. To obtain the permit, however, review and consultation are required with multiple other federal agencies. In one recent Section 404 permitting effort, questions/concerns of seven federal/state agencies had to be addressed—EPA, USACE, FERC, U.S. Fish and Wildlife Service, National Marine Fisheries Service, Texas Parks and Wildlife Department, and Texas General Land—all raising issues about maintaining sufficient bird and fish habitat.

Steps Toward Improvement

Section 41 of the 2015 Fixing America’s Surface Transportation Act (FAST Act) created a new governance structure billed as a “coordinated framework for improving the Federal environmental review and authorization process.” The legislation created the Federal Permitting Improvement Steering Council (Permitting Council) comprised of senior-level officials from 14 government agencies, the Council on Environmental Quality (CEQ), and the Office of Management and Budget. The Permitting Council’s primary function is to develop a coordinated permitting plan for completing the required environmental reviews and public and tribal outreach while providing a single point of contact for the entire federal review process. The Permitting Council is also empowered to enforce the coordinated schedule and referee disputes between agencies.

Among other things, Section 41 (FAST 41):

- reduces the statute of limitations for NEPA challenges from 6 to 2 years for covered projects and limits agency review of NEPA challenges to those from parties that submitted a related comment during the project’s environmental review;
- limits the ability of opponents to challenge a project after-the-fact through temporary restraining orders or preliminary injunctions; and
- gives the Permitting Council the responsibility of developing and maintaining an online permitting dashboard to improve project tracking and to increase transparency and accountability.

While available to projects in nearly every infrastructure sector, only those that meet certain cost or complexity thresholds are eligible for consideration under the FAST 41 program. The relatively new and relatively unknown program presents a promising though unproven opportunity to enhance interagency coordination and accountability, but state agencies—where many of the biggest coordination challenges lie—are included only if they opt in.

President Trump’s Infrastructure Plan

Improving America’s infrastructure was a key message during President Trump’s campaign and his ambitious infrastructure plan includes components to increase the efficiency and speed of permitting reviews. The cornerstone of the plan is a “one agency, one decision” structure for environmental reviews. While some agencies (FERC, for example) are already designated in statute or regulations as the “lead agency” for NEPA review, this is not universal for all types of projects. Further, the role and authority of the lead agency versus cooperating agencies, is not always clearly delineated. The plan envisions limiting the end-product of environmental review to one environmental document and Record of Decision (ROD)—“one federal decision.” This could eliminate some of the duplicative work of the multiple agencies that may be participating in the review.

Among funding proposals and pilot programs, the plan contains a number of items focused on permit processing improvement that could be beneficial for energy infrastructure projects. These include:

- constraining the scope of review to areas within an agency’s authority and limiting alternatives to those that are “feasible”;
- further narrowing of the scope of agency review for Section 309 of the U.S. Clean Air Act;
- encouraging the creation and use of government-wide categorical exclusion; and
- reducing the time frame and addressing delays for Section 401 of the Clean Water Act decisions.

The plan would also direct CEQ to issue regulations and guidance for improving NEPA reviews, limit the ability of other federal agencies to intervene in FERC proceedings, and allow non-federal entities to provide funding to agencies to support environmental reviews. While many of these proposals will require Congressional action, the Trump Administration has taken the substantive step of entering into a Memorandum of Understanding (MOU) that accomplishes some of the plan’s goals. Instead of a hard 21-month deadline for reviews suggested in the President’s plan, it sets a two-year average goal. The MOU calls for the development of policies to implement a “one federal decision” framework, including concurrent agency reviews, adherence to a permitting timetable, and the determination of lead agencies.

The MOU provides a helpful clarification of the lead agency’s authorities and responsibilities. These include developing a permitting timetable based on CEQ guidance, seeking state, tribal and local participation, preparing a single environmental impact statement in coordination with cooperating agencies, identifying alternatives to be analyzed and issuing a final ROD.

While the actual fruits of this MOU are yet to be borne, this is an encouraging development that in many ways represents...
a proactive step forward. Combined with the efforts of the Permitting Council, these changes appear to shift the Administration’s position from being just an arbiter of project permitting to that of a partner and promoter of infrastructure. However beneficial these changes may turn out to be, for most energy infrastructure projects, significant hurdles remain at the state and local level, out of the reach of this process improvements.

Conclusion
The business community, including the oil and natural gas industry, relies on a cost-effective regulatory system that promotes the certainty and predictability necessary to make the massive capital investments required to bring energy and other projects to the U.S. economy. Further, the pace of production in the oil and gas industry is not expected to slow dramatically anytime soon, and growth in new areas, such as the Permian Shale play in Texas and New Mexico, will require new infrastructure to move production to market. Within the industry, there is cautious optimism that the Permitting Council and the interagency “one federal decision” MOU will help streamline permitting processes. However, there is still more that can be done. Introduction of a legislative package that includes other aspects of the President’s plan and addresses concerns like CWA 401 would significantly help increase efficiency, transparency and accountability in permitting. The need is clear and API, its members, and industry partners are willing and able to help make that field of dreams a reality.

References
3. For example, two denials issued by the State of New York were made public by the state on Earth Day.
Study: Air Measurements at a Marcellus Shale Site by Natalie Pekney, Matthew Reeder, and Mumbi Mundia-Howe

Preliminary results from ambient concentration measurements collected during an air quality study at the Marcellus Shale Energy and Environment Laboratory in Morgantown, WV.
Recent innovative technological advances in horizontal drilling and hydraulic fracturing have made recovery of large quantities of natural gas in shale formations economically feasible. Production from shale gas and associated gas from tight oil plays in the United States is the largest contributor to natural gas production growth, and is projected to account for nearly 40 percent of U.S. energy production by 2040.¹

The use of natural gas for energy emits less nitrogen dioxide, sulfur dioxide, and particulate matter (PM) than other fossil fuels. However, shale gas development activities generate measurable emissions of various compounds: nitrogen oxides (NOₓ), volatile organic compounds (VOCs), and particulate matter (PM) from engines used for drilling and hydraulic fracturing, as well as trucks used to transport supplies for hydraulic fracturing; methane, carbon dioxide (CO₂), and VOCs from venting, flaring, and fugitive emissions of natural gas; methane and VOCs from produced water handling and on-site gas processing; and suspension of PM from vehicle travel on gravel roads. Additionally, the formation of secondary pollutants (VOCs, PM, ozone) from the primary pollutants is possible.

Shale gas development operators seek to reduce emissions and fugitive releases of gas as per regulatory requirements, as well as to prevent loss of product. Because emissions characteristic of specific activities have profiles discernible from each other and from a baseline, an analysis of emissions trends can be used as a tool to infer and inform air quality risk assessments. Reported here are preliminary results from an air quality campaign conducted on site at a shale gas well pad during drilling, hydraulic fracturing, flowback, and production activities. Trends in ambient concentrations of methane and VOCs were analyzed for correlation between species, peak events during specific episodic emissions, and differences between operational phases.

Air Quality Study Location

Ambient concentration measurements were collected at the Marcellus Shale Energy and Environment Laboratory (MSEEL) in Morgantown, WV (see map on opening page of article). The MSEEL is a multi-institutional, long-term collaborative field site at an operational Marcellus Shale well pad. Integrated geoscience, engineering, and environmental research have been conducted at the site to assess environmental impacts and develop new technology to improve recovery efficiency, as well as reduce environmental footprint of shale gas operations.² ³

The MSEEL is the site of two horizontal production wells previously completed in 2011 in addition to two new horizontal dry gas production wells drilled and completed during the study in 2015 (wells 5H and 3H indicated on map). Also located within the study area were a cored vertical pilot bore-hole and a microseismic observation well. Production from the new horizontal wells began in December 2015. Dates for phases of operation are shown in Table 1. The vertical drilling was conducted using diesel engines, but the horizontal drilling made use of dual fuel (diesel and natural gas) engines. All activities at the well pad followed industry’s best management practices. Flowback is when gas, formation fluid, and frac fluid flows up the wells to the surface. A reduced emission completion (REC) was performed; gas produced during this time was captured using portable equipment brought on site that separates the gas from the liquids so that the gas can be retained as a product. On-site air monitoring from the horizontal drilling phase through production (September 2015–January 2016) was conducted using the National Energy Technology

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<th>Activity Phase</th>
<th>Well 5H</th>
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<td>July 6–16</td>
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<tr>
<td>Horizontal drilling</td>
<td>September 8–17</td>
<td>September 17–October 5</td>
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<td>October 10–November 6</td>
<td>October 11–November 16</td>
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<td>Drill out</td>
<td>November 20–22</td>
<td>November 23–26</td>
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<td>Flowback</td>
<td>December 10–14</td>
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<td>Start of production</td>
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Laboratory’s (NETL) Mobile Air Monitoring Laboratory.

**NETL’s Mobile Air Monitoring Laboratory**

Ambient concentrations of methane, VOCs, NOx, PM, ozone, and CO2 were measured at high-time resolution using instrumentation housed in NETL’s Mobile Air Monitoring Laboratory. The laboratory consists of an 18-foot trailer with ambient air sampled from inlets on the trailer roof. The laboratory was designed to operate unattended with continuous, automatic collection of data. Analytical instruments are listed in Table 2. All instruments were maintained and calibrated according to manufacturer’s recommended protocols. Further description of the laboratory can be found elsewhere. The laboratory was situated on the northeast corner of the well pad.

**Results and Discussion**

Wind direction during the study was predominantly from the southwest (see Figure 1). Therefore, for most of the study the monitoring laboratory was in the downwind direction.

Methane concentration was highest during flowback operations (see Figure 2) and was highly correlated with ethane, a component of natural gas that does not have other atmospheric sources. Isotopic signature of methane during this period was characteristic of thermal rather than biogenic production, consistent with a natural gas emissions source. Wind direction for methane concentration peak events was most frequently from the southwest in the direction of the center of the well pad, but there was also a strong contribution from the north, indicating an additional, off-site methane source.

Trends in concentrations of VOCs were analyzed during stages identified by date in Table 1 with number of samples collected during the stages in parentheses: horizontal drilling (353), hydraulic fracturing (809), drill out (120), flowback (76), and production (1,063). Compounds that were detected in less than 10 percent of the samples were eliminated from this analysis, leaving 30 compounds: hexane, cyclohexane, 2-methylhexane, 2,3-dimethylpentane, 3-methylhexane, n-heptane, methylcyclohexane, toluene, ethylbenzene, m,p-xylene, styrene, o-xylene, n-decane, 1,2,3-trimethylbenzene, m-diethylbenzene, p-diethylbenzene, n-undecane, n-dodecane, ethane, ethylene, propane, propylene, isobutane, n-butane, acetylene, 1-butene, isopentane, n-pentane, 2-methylpentane, and 3-methylpentane.

Average concentrations during all phases of operation were at trace levels (less than 15 parts per billion [ppb]). Highest average concentrations of VOCs were typically observed during flowback operations. Very few instances of highest peak or average concentrations of VOCs were observed for the

| Table 2. Instruments used in NETL’s Mobile Air Monitoring Laboratory at the MSEEL site. |
|---------------------------------|----------------|-----------------|----------------|
| **Measurement**                 | **Instrument** | **Analytical Technique** | **Time Resolution** |
| Methane and carbon isotopes in methane; CO2 and carbon isotopes in CO2 | Picarro G2201-i | Cavity Ring-Down Spectrometry | 1 sec |
| VOCs (52 compounds, U.S. EPA PAMS Spectra VOC calibration standard, Linde Specialty Gases, Stewartsville, NJ) | Perkin Elmer Ozone Precursor Analyzer | Gas Chromatograph with Flame Ionization Detection (GC-FID) and thermal desorption at sample introduction | 1 hr |
| NOx, ozone | Teledyne-API T-series gas analyzers | Chemiluminescence, UV absorption | 1 min |
| Particulate matter (PM10 and PM2.5) | Thermo Fisher TEOM 1405-DF | Microbalance | 1 hr |
| Meteorological parameters (wind speed and direction, temperature, relative humidity, barometric pressure, rainfall, and solar intensity) | Davis Instruments Vantage Pro2 Plus and R.M. Young ultrasonic anemometer | Various | 1 min |
fracking period (isobutane, n-butane, propane, hexane, and n-heptane). There was a group of compounds for which highest average and peak concentrations were observed during horizontal drilling (ethylbenzene, m,p-xylene, styrene, o-xylene, n-decane, 1,2,3-trimethylbenzene, m-diethylbenzene, p-diethylbenzene, n-undecane, n-dodecane, and 1-butene). Except for n-undecane and 1-butene, correlation for these compounds was high ($r > 0.7$) during this phase, suggesting a common emission source. Average concentrations during drill out and production were generally lowest.

Alkanes such as ethane, propane, butane, and pentane are present in trace amounts in natural gas. Therefore, atmospheric emissions from a natural gas source would have ratios of these compounds consistent with the gas composition, and correlation would be observed in the ambient data. At MSEEL, correlation varied but an analysis of scatter plots and polar plots, such as the ethane and propane plots illustrated in Figure 3, shows that there were likely two natural gas-related sources with different composition, one in the direction of the center of the well pad (southwest) and one in the north-to-north-northeast direction, impacting the measurements.

**Summary**

Preliminary analysis of methane and VOCs concentration data are presented here. Subsequent analyses will also include other measured species and their collective trends at the MSEEL site, including an analysis of wind speed and direction and meteorological conditions to determine most probable direction of emissions sources; correlation between measured species to indicate common emissions sources; diurnal patterns and effects of boundary layer height changes; and isotopic signatures for carbon dioxide and methane to differentiate between natural gas-related, vehicular and biogenic emissions as sources of peak concentrations.

The flowback period had the greatest impact to methane and VOCs concentrations at the MSEEL site. Analysis of isotopic signature and wind rose support the conclusion that peak concentrations of methane and VOCs observed during flowback are from activity on the well pad and not from other
off-site sources. However, polar and scatter plots of alkanes using data collected during the entire monitoring period provide evidence of influence of off-site natural gas emissions sources. The results of this case study will help us understand the extent of emissions from shale gas development: how they vary according to specific operational phases, leading to opportunities for mitigation and management of emissions.

Figure 3. Concentrations of ethane and propane at the MSEEL site. Polar plots of mean concentration weighted by frequency for ethane (A) and propane (B) show most probable directions of sources; scatter plot of ethane to propane concentrations is shown in (C).

References
On the Fence about Fenceline Monitoring?

This article looks at the amendments to the Refinery MACT 1 rule.
Refineries are living with new U.S. Environmental Protection Agency (EPA) Maximum Achievable Control Technology (MACT) requirements that require passive monitoring of fugitive benzene emissions around the perimeter of their facilities. Passive monitors absorb many different air pollutants and can be deployed to detect “ambient air” concentrations (defined as the other side of the fence) at relatively low cost. Their use is likely to expand beyond refineries and beyond simple compliance monitoring as communities demand more information regarding emissions from facilities in their environment and industry values low-cost but reliable and effective methods to identify problems early and demonstrate compliance and environmental stewardship. As passive monitoring proves its utility in the refinery sector and becomes mainstream, more opportunities to utilize it for “next-generation compliance” could be forthcoming for other types of facilities.

**Current Refinery Requirements**

Since January 30, 2018, amendments to Refinery MACT 1 (40 CFR part 63, subpart CC) began requiring all major source petroleum refineries to monitor fugitive benzene emissions using passive samplers.¹

Major fenceline monitoring requirements include:

- Determining optimum monitoring locations around the perimeter of the refinery, accounting for the size and geometry of the property and the location of “known sources” located within 50 meters of the monitoring perimeter;
- Installing monitoring shelters and deploy passive sampling tubes in the shelters, changing tubes every two weeks, and sending recovered tubes for benzene analysis;
- Collecting average hourly meteorological data corresponding to each sample period;
- Calculating $\Delta C$ for each sample period, which is the highest value minus the lowest value from that period, and average the 26 most recent period specific $\Delta Cs$, to develop a 12-month rolling average $\Delta C; and
- Performing root cause analysis and initiate corrective actions if the 12-month rolling average $\Delta C$ exceeds 9 µg/m³.

EPA allows two deviations from the standard approach. A site-specific monitoring plan may be approved to exclude the influence of onsite exempt sources or offsite sources. In addition, an alternative test method may be approved in lieu of some or all of the passive samplers, as long as it meets certain validation, sensitivity, frequency, coverage, and other requirements.

**Challenges to Implementation**

The goal of fenceline monitoring is to ensure facility emissions are fully characterized and to trigger action if elevated levels of benzene are observed at the fenceline. Establishing a fenceline monitoring program presents the following risks and challenges to the regulated community:

1. **Related areas**: It can be unclear whether separate but related areas should be monitored together or separately (e.g., areas under the same operating entity but separate ownership).
2. **Designing the monitoring network**: EPA offers a great deal of flexibility in determining sampler placement. By carefully considering the facility configuration, the location of known sources, proximity of neighboring facilities, and seasonal weather patterns, monitoring networks can be designed to minimize the chances of exceeding the action level, while also taking other factors into consideration, such as accessibility.
3. **Meteorological data**: Refineries must assess whether a nearby U.S. Weather Service met station within 25 miles of the refinery provides data that are representative of conditions at the refinery, based on proximity and differences in the terrain and land use around and between the refinery and the station. Alternatively, refineries must assess whether an onsite met station meets the required siting, calibration, and standardization procedures. Quality of met data is especially important.

The goal of fenceline monitoring is to ensure facility emissions are fully characterized and to trigger action if elevated levels of benzene are observed at the fenceline.
The Future of Fenceline Monitoring

Traditionally, under the U.S. Clean Air Act and amendments, air quality impacts are regulated in ambient air, starting at the facility fence line. While tall stack emissions have been highly regulated to demonstrate National Ambient Air Quality Standards (NAAQS) compliance, fugitive emissions just outside the fence line have rarely received significant regulatory attention. However, uptake rates for 17 Clean Air Act compounds besides benzene have already been established, making it possible to readily extend the breadth of fenceline monitoring to include a host of other compounds. Given new precedent in enforceable fenceline monitoring requirements at refineries, it seems plausible that similar methodology could find its way into revised or new regulations, air permits, Compliance Assurance Monitoring (CAM) Plans, other MACT Rules, and as a new regulatory enforcement tool.

Further, social media and heightened environmental concern are fueling ever more citizen stewardship of the environment, and when deemed appropriate, activism. Traditionally, air quality measurements have required access to a facility’s stacks and or operational data, and even if they were available, the measurement techniques and data interpretation has been expensive and highly technical. Watchdog groups have often been limited to offsite observations such as smoke (opacity), or anecdotal allegations such as watery eyes or coughing. With the advent of passive, low-cost monitoring methods, affected citizens could become an extension of state or federal air quality enforcement officers, both by policing publically available data or even by doing some monitoring on their own. For example, it is plausible that other regulated fugitive emissions released close to a facility fence line could be passively measured by citizen groups as potentially exceeding a regulatory or air toxics ambient concentration limit.

The risk to both industry and citizen groups with the proliferation of lower cost measurement techniques is that data can be readily generated but are not always easy to accurately interpret and convert into meaningful information. EPA created two test methods (325A and 325B) to ensure quality assurance and quality control in the application of passive sorbent tubes for fenceline monitoring. Even with these detailed methods, EPA recognizes that concentrations above the action level are not violations. Rather, they trigger investigation through a root cause analysis and corrective action framework. The use of passive tubes should be compliant with Methods 325A and 325B and the limitations associated with use of the data should be recognized. Conversely, both industry and community groups should be wary of the accuracy and interpretation of data from other low-cost sensors, which do not have formal quality assurance and quality control provisions established.

Starting in 2019, all of the refinery fenceline monitoring data will be publically available on EPA’s website, but currently there is not a lot of guidance or supplementary documentation available to help citizens better understand and interpret the data. For example, a fundamental misconception is that the 9 µg/m³ annual threshold set by EPA is a health standard and any exceedance poses a health risk to surrounding communities. Rather, the threshold was set at the highest modeled value at the property boundary of any U.S. refinery—a concentration value determined to be below risk levels that would otherwise require more controls under EPA’s MACT program. However, state, federal, and global organizations have their own screening and exposure limits, which vary widely and are sometimes below the EPA threshold. It is a real risk to facilities whose monitoring data are publically available that citizens will misinterpret the data coming from the facility or that they will misapply thresholds (i.e., over the wrong time period or by interpreting a screening standard as a health limit). EPA is actively developing “Citizen Science for Environmental Protection” guidance (https://www.epa.gov/citizen-science) to further assist, educate, and empower non-regulatory potentially affected parties to participate in a variety of local air quality monitoring and enforcement activities. In the meantime, however, many refineries are seeing the value in proactively engaging with their communities to help citizens understand and interpret the monitoring data before the data are even publically released.
Other facilities in close proximity to refineries should also be aware of the impact that refinery fenceline monitoring may have on them, even if the regulations do not directly apply. Passive monitors absorb compounds from the air, regardless of their origin. While refineries have to account for these emissions, they subtract out the lowest reading each sample period, which is thought to be the ambient benzene level (i.e., the level produced by other facilities in the vicinity or that which drifts in from other areas). Site-specific monitoring plans may attribute a more significant portion of emissions to one or more specific offsite sources and will likely have evidence to support the claims. Thus, refinery monitoring may in effect be monitoring and releasing data on neighboring facilities as well.

When applied properly, passive fenceline monitoring has proven to be a low-cost, readily available, and reliable tool for assessing emissions at refineries so the reach of these types of tools is likely to expand beyond benzene monitoring at oil refineries. Therefore, many other large industrial facilities have cause to be interested in the process and lessons learned from implementing the refinery MACT amendments.

Hedrick Strickland has been involved with ERM's fenceline monitoring projects since the rule was initially proposed in 2013. She has designed the monitoring network for more than 50 refineries and has overseen or provided technical support and guidance for more than 40 pilot or compliance programs at refineries around the United States and Canada. Involvement ranges from monitoring network design, project management and coordination, document management, monitor installation, field personnel training, data management and analysis, and coordination between refineries, laboratories, and consultants. E-mail: hedrick.strickland@erm.com.

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References
1. Federal Register Vol. 80, No. 230, Tuesday, December 1, 2015. 40 CFR Parts 60 and 63 Petroleum Refinery Sector Risk and Technology Review and New Source Performance Standards; Final Rule. § 63.658
3. Method 325B: 40 Code of Federal Regulations 63.658, Appendix A of Part 63, Method 325B-Volatile Organic Compounds from Fugitive and Area Sources: Sampler Preparation and Analysis. Table 12.1. Uptake rates quantify how quickly a specific compound is absorbed by a particular media so that the mass of the compounded measured on the media can be translated to and reported as an ambient concentration.

In Next Month’s Issue...
NAAQS Update, Part 1
The September issue will provide an update on the three National Ambient Air Quality Standards (NAAQS), both primary and secondary, for sulfur dioxide, nitrogen oxides, and particulate matter. It will address implementation of the current standards and ongoing U.S. Environmental Protection Agency (EPA) efforts to review the standards. EPA has proposed to retain the 2010 nitrogen dioxide NAAQS and is working on its review of the sulfur dioxide and particulate matter NAAQS last revised in 2010 and 2012, respectively. Part 2 will appear in December 2018.
Management System Maturity: An Indicator of Sustainable Production and EHS&S Goal Attainment

by Dawn M. Hess, Sarah Dobie, Michael McGuinness, Jr., Lindsey Rodbourn, and Alicia Ball

An examination of four automotive manufacturers’ management systems as an indicator for the sector’s potential to reach aggressive EHS&S goals and develop or maintain sustainable production systems.
Management systems are becoming increasingly common for handling the environment, health, safety, and sustainability (EHS&S) matters of an organization. However, not all management systems are created equally. More mature management systems indicate a greater ability by an organization to proactively manage EHS&S impacts, improve social justice performance, as well as develop and maintain sustainable production systems. Unfortunately, each industry sector has its own unique management system format, making measurement of, and comparison between, industry sectors difficult. This article presents a novel way to empirically measure the maturity of the EHS&S management systems of a sector by examining four automotive manufacturers’ systems as an indicator for the sector’s potential to reach aggressive EHS&S goals and develop or maintain sustainable production systems.

In order to do so, publically available EHS&S information for four major automotive companies was reviewed, and for purposes of this work, assumed to represent the automobile sector as a whole: Ford Motor Company (Ford), General Motors (GM), Honda Motor Company (Honda), and Toyota Motor Corporation (Toyota). Data reviewed included EHS&S policies, indicators for demonstration of top management commitment, activities, performance measurement and evaluation, demonstration of continuous improvement, collaboration with external organizations and degree of regulatory compliance. This information was used to identify and visually construct the relationship between the various components of the automotive sector’s EHS&S management system by adapting the EHS&S management system map developed by Schneider et al.1 The EHS&S management system map representing the automotive sector is shown in Figure 1.

![Figure 1. EHS&S Management System Map for the Automotive Sector.](image-url)
The EHS&S map is divided into three sections. Phase I is the planning phase and includes the vision and policy for the organization. It is in Phase I where the external and internal context have the ability to influence the second phase. Phase II is where the ideas from Phase I are implemented—it is the level of action. Then in Phase III, results from Phase II are checked and actions are taken to drive continual improvement. Phase III feeds back into Phase I as the process is cyclical and represents with more detail the Plan-Do-Check-Act (PDCA) cycle of continual improvement.

Construction of the management system map for the automotive sector system was the first step toward evaluating the maturity of the sector’s EHS&S management system. Next, a five-level maturity indicator framework was created specifically for the automotive industry. The framework incorporated various management system components, as well as the degree of each organization’s regulatory compliance. As a Level 1 indicator, regulatory compliance is considered a significant part of a system’s maturity. While an organization may have many components of a management system in place, if there are still major instances of non-compliance then the existing system is not effective. It is important to note that a review of the four organization’s representing the automotive sector for this research found one of the most commonly cited regulatory violations was that of the U.S. Clean Air Act.

The maturity indicator framework developed for this research was based upon a sustainable production tool developed by the Lowell Center for Sustainable Production (LCSP). The LCSP tool focuses on indicators that track performance. According to Veleva and Ellenbecker (2001), “the five levels of the framework represent the five main steps in moving toward more sophisticated indicators of sustainable production.” The laddered maturity indicator framework is shown in Figure 2.

For this research, the LCSP-based tool was then combined with an additional sustainability program qualitative and quantitative indicator methodology developed from two further management system approaches. Consequently, the resulting framework combined existing approaches for EHS&S management systems, as well as incorporated indicators specific to the automotive sector. Consisting of a combination of lagging and leading indicators, these management system components within the framework were then used as proxies for measuring the maturity of the automotive sector management system.

Maturity levels were arrived at quantitatively as each level within the framework was given a weight of one, and each indicator was given an equal weighting within each maturity level. For example, within the framework, Level 1 has 11 indicators, so each indicator within Level 1 is worth 0.09 points. Table 1 has been color-coded to visually indicate the numerical value assigned to each indicator. The highest possible point is 1 for each indicator scored. Indicators with a score of 0.75 were coded yellow, 0.5 were coded orange, and 0.25 were a darker orange with a score of zero coded red. Table 1 shows the complete indicator framework used to assess EHS&S management system maturity.

![Figure 2. Laddered EHS&S Management System Maturity Indicator.](image-url)
Table 1. EHS&S management system maturity indicator framework for the automotive sector.

<table>
<thead>
<tr>
<th>Level 1</th>
<th>Ford</th>
<th>GM</th>
<th>Honda</th>
<th>Toyota</th>
<th>Average</th>
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<tr>
<td>Policy includes focus on facility EHS compliance</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
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<tr>
<td>Top management commitment</td>
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<td>1</td>
<td>1</td>
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<td>Average $ environmental violations past 5 years</td>
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<td>0.5</td>
<td>0.25</td>
<td>0.75</td>
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</tr>
<tr>
<td>Average $ H&amp;S violations past 5 years</td>
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<td>0.5</td>
<td>0.5</td>
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<td># of violations for EHS, consumer safety, labor</td>
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<td>1</td>
<td>1</td>
<td>1</td>
<td>0.75</td>
</tr>
<tr>
<td>$ of violations for EHS, consumer safety, labor</td>
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<td>0</td>
<td>0</td>
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<tr>
<td>Injury and illness rate</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
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<tr>
<td># of near misses</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0.25</td>
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<tr>
<td>Total energy consumption</td>
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<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
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<tr>
<td>Total water consumption</td>
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<td>1</td>
<td>1</td>
<td>1</td>
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<tr>
<td>Total waste produced</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
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<tr>
<td>Total GHG emissions</td>
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<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
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<tr>
<td>Total VOC emissions</td>
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<td>0</td>
<td>0</td>
<td>0.5</td>
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<tr>
<td><strong>Weighted Average</strong></td>
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<td>0.77</td>
<td>0.67</td>
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<tr>
<td>Policy focuses on improving facility performance</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Short-term / interim goals for facility performance</td>
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<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
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<tr>
<td>Reduction in # of violations</td>
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<td>0</td>
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<td>0.25</td>
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<td>Reduction in $ of violations</td>
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<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Energy intensity</td>
<td>1</td>
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<td>0</td>
<td>1</td>
<td>0.75</td>
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<tr>
<td>% breakdown of energy sources</td>
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<td>0</td>
<td>1</td>
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<tr>
<td>Water intensity</td>
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<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
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<tr>
<td>% breakdown of water sources</td>
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<td>1</td>
<td>0</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>Waste intensity</td>
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<td>1</td>
<td>0</td>
<td>1</td>
<td>0.75</td>
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<tr>
<td>Waste diversion rate</td>
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<td>0</td>
<td>1</td>
<td>0.25</td>
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<tr>
<td>GHG intensity</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0.75</td>
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<tr>
<td>% of GHG emissions by source</td>
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<td>1</td>
<td>1</td>
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<td>0.75</td>
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<tr>
<td>VOC intensity</td>
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<tr>
<td><strong>Weighted Average</strong></td>
<td>0.46</td>
<td>0.77</td>
<td>0.31</td>
<td>0.92</td>
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<table>
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<tr>
<th>Level 3</th>
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<th>Honda</th>
<th>Toyota</th>
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<tr>
<td>Policy focuses on minimizing environmental and social Impacts of facility</td>
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<td>1</td>
<td>1</td>
<td>1</td>
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<tr>
<td>Long-term goals set for facility performance</td>
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<td>1</td>
<td>0.5</td>
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<tr>
<td>Engages in voluntary standard for EHS&amp;S</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Audit system for evaluating performance</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Reduction in energy consumption / intensity</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
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<tr>
<td>Increase in renewable energy</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0.25</td>
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<tr>
<td>Reduction in water consumption / intensity</td>
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<td>1</td>
<td>1</td>
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<tr>
<td>Increase in water reuse/recycling</td>
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<td>1</td>
<td>0</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>Decrease in waste production / intensity</td>
<td>1</td>
<td>1</td>
<td>1</td>
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<td>1</td>
</tr>
<tr>
<td>Increase in waste diversion rate</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>Decrease in GHG emissions / intensity</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>Weighted Average</strong></td>
<td>0.64</td>
<td>0.91</td>
<td>0.73</td>
<td>0.91</td>
<td>0.8</td>
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</table>
Using this framework, the maturity of the four individual automotive companies’ EHS&S management systems was evaluated and then the maturity of the sector was determined based on the average EHS&S management system maturity of the four organizations individually. The quantitative evaluation of the four major automotive companies yielded an average EHS&S management system maturity of 3.18 out of a possible total score of 5. This average represents a range of maturity scores from a low of 2.53 to a high of 3.63. Table 2 details the results of the EHS&S management system maturity analysis, while Figure 3 offers a visual representation of the total maturity levels for each organization and the average for the automotive sector.

To achieve a Level 5 score, an organization must show achievement of sustainable production systems. From this review and an average EHS&S management system maturity score of 3.16, it is clear that there is room for improvement in the management of EHS&S issues in the automotive sector. Fortunately, this review also found that the sector has demonstrated a desire to move beyond mere compliance, represented by an average score greater than 1. The highest scores were found in Level 3, represented by actions to minimize environmental and societal impacts of operations. Within Level 3, it was found that all four organizations conduct self-audits and engage in voluntary EHS&S management standards and specific activities to improve...
performance. Specifically, Toyota has expressed an interest in having a zero-emissions vehicle; however, none of the organizations reviewed have metrics to actually track progress in achieving this type of goal.

The automotive sector must continue to build upon the gains they have made in EHS&S management and sustainable practices. The demand for transportation will continue to grow and the automotive sector must accept a greater leadership role in responsible business practices that are proportionate to the impacts of their operations and products. By setting stretch goals, the automotive sector is making a public statement and moving toward leadership and acceptance of EHS&S issues. In 2017, GM reportedly spent US$7.3 billion and Toyota spent approximately US$9.3 billion in research and development. Honda states that it is striving for a “sustainable society” by increasing their sales of electric vehicles. Both Ford and GM are making efforts toward reducing the number of facility sites that send waste to landfill.

However, to achieve the aggressive EHS&S goals set by the automotive sector organizations reviewed, these organizations must fully embrace their PDCA-based management systems, as depicted in the EHS&S Management System map in Figure 1. For example, lofty goals in the planning phase are not enough to positively impact the generation of greenhouse gases and the

<table>
<thead>
<tr>
<th>EHS&amp;S Maturity Level (1.0 weighted average)</th>
<th>Ford</th>
<th>GM</th>
<th>Honda</th>
<th>Toyota</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.77</td>
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<td>2</td>
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<td>3</td>
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<td>4</td>
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<td>0.60</td>
<td>0.46</td>
<td>0.67</td>
<td>0.60</td>
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<tr>
<td>5</td>
<td>0.45</td>
<td>0.45</td>
<td>0.36</td>
<td>0.41</td>
<td>0.42</td>
</tr>
<tr>
<td><strong>Total Maturity (possible 5.00)</strong></td>
<td>2.98</td>
<td>3.50</td>
<td>2.53</td>
<td>3.63</td>
<td>3.16</td>
</tr>
</tbody>
</table>

Table 2. Summary results of EHS&S maturity analysis.
automotive sector is too important a contributor of greenhouse gases to accept this level of management system maturity performance. Automotive manufacturers must move toward Level 5 with sustainable production systems. This review of the organizations in the automotive sector found that EHS&S management systems are in place and well-structured; however, major focus, including financial support, must be directed toward Part II, Implementation, and Part III, Checking and Continual Improvement phase, where the Do-Check-Act of the PDCA cycle occurs.

Dr. Dawn M. Hess is Director of Enterprise Risk Management and Environmental, Health, and Safety at Finger Lakes Community College, Canandaigua, NY; and Adjunct Professor of Environmental Management and Safety at Rochester Institute of Technology. Sarah Dobie, Michael McGuinness Jr., Lindsey Rodbourn, and Alicia Bail are all graduate students at Rochester Institute of Technology. E-mail: dawn.hess@flcc.edu.

References

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- Take part in discussions, dialogues and debates during high-level plenary forums and thematic and special sessions focused on different stakeholder roles in the adoption of multi-sectoral, multi-pronged approaches to air pollution mitigation
- Learn about the latest advancements in air-quality science, current issues, and trends and policies that are shaping governance and business approaches
- Engage with the visionary changemakers in Sarawak who are leading Malaysia’s clean energy transition and helping guide the country towards a sustainable, clean energy future.

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Onshore crude oil production has increased in the United States over the past few years. Oil producers, specifically the North Dakota Pipeline Authority and the Bakken Shale field producers are transporting crude oil by rail and train to both the East and West Coast oil refineries. While rail tends to be one of the safer and more efficient ways of transporting crude oil, there is still a risk of a spill. Oil spills are threats to both ground and surface waters and can ultimately impact drinking water, as a result.

Decontamination of drinking water systems following crude oil contamination is critical for the effective return of the system to operation and for restoring public confidence in the safety of the water distribution system for drinking and other uses. States, tribes, and local communities need the ability to reliably and cost-effectively decontaminate miles of distribution system pipes and premise plumbing. This is a critical capability that utilities will need to ensure public safety and confidence in their drinking water following an incident.

**Water Security Test Bed**
U.S. Environmental Protection Agency (EPA) researchers recently examined the effectiveness of flushing crude oil, or Bakken oil, to remove any persistent oil fractions in the pipeline, appliances, and premise plumbing at EPA's water security test bed at the Idaho National Laboratory facility. This simulated distribution system allows researchers to test contaminants without any human health or ecological risk and inform water systems on effective methodologies tested in a real-world set-up, which improves the utility's ability to...
respond to contamination incidents. For this research, the test pipe was contaminated with the soluble fraction of Bakken crude oil that had been in contact with local river water for 12 hours. This was meant to simulate an oil spill on a body of water. Decontamination was performed by first flushing with clean water, as would typically be done by a water utility. Following, the pipes were flushed with water and the addition of a surfactant.

“Data collected during this experiment suggest that flushing with clean water is enough to decontaminate the soluble fraction of Bakken Oil from the distribution pipes,” says EPA researcher, Jeff Szabo.

**Test Results**

During the experiment, benzene spiked to a level higher than the maximum contaminant level (MCL) after contamination, but the clean water flushing quickly reduced benzene levels below the MCL to undetectable levels. No total petroleum hydrocarbons (TPH) or toluene, ethylbenzene and xylene components were detected in the water.

A surfactant was injected because the researchers assumed that oily components would persist in the water phase or on the infrastructure surfaces, but the researchers determined that adding surfactant wasn’t necessary because clean water flushing was successful. There was persistent foaming noticeable in the system after using the surfactant and that should be taken into consideration if one is used during decontamination.

Similar results were observed for Bakken crude oil components and benzene in home plumbing pipes and appliances. Decontamination of the premise plumbing included flushing the cold water tap and refrigerator water for about 20 minutes, then the researchers drained the water heater, refilling and flushing the hot water plumbing for 20 minutes and then running each of the appliances for one cycle.

As in the full drinking water distribution system, benzene spiked above the MCL after contamination but fell below the MCL to pre-injection baseline levels after flushing. However, TPH, made up of gas range organics, oil range organics, and diesel range organics, was detected in the dishwasher and refrigerator water dispenser after flushing, which indicates that the soluble oil components may persist or concentrate on some of the materials in these appliances. Toluene, ethylbenzene, and xylene were also analyzed in the premise plumbing and any residual amounts were detected well below the drinking water MCLs.

**Lahne Mattas-Curry** is a Communications Officer with the U.S. Environmental Protection Agency’s Office of Research and Development.

**Disclaimer**
The views and opinions expressed in this article are those of the author and do not represent the official views of the U.S. Environmental Protection Agency (EPA).

**More Information**

For more information about EPA’s water security test bed, or to partner and use the facility for further research, please contact Jim Goodrich at Goodrich.James@epa.gov.

Learn more about the results of the research discussed at https://cfpub.epa.gov/si/si_public_record_report.cfm?dirEntryId=340181&simpleSearch=0&showCriteria=2&searchAll=szabo&TIMSType=&dateBeginPublishedPresented=04%2F23%2F2016.

See YouTube video about the test bed at https://youtu.be/pQvsBC-U4a8.

For more general information on the research discussed in this column, contact Ann Brown, U.S. Environmental Protection Agency (EPA), Office of Research and Development, Research Triangle Park, NC; phone: 1-919-541-7818; e-mail: brown.ann@epa.gov.
On March 16, 2018, the U.S. Environmental Protection Agency (EPA) published a Notice of Proposed Rulemaking in the Federal Register (see 83 FR 11654; https://www.federal-register.gov/documents/2018/03/16/2018-05282/increasing-recycling-adding-aerosol-cans-to-the-universal-waste-regulations) to add waste aerosol cans to the list of “universal wastes” that are regulated under the rules set forth at 40 CFR Part 273. Waste aerosol cans can be designated RCRA hazardous waste because the wastes often exhibit the “ignitability” hazardous waste characteristic. This creates a management problem, especially for the thousands of retail organizations and facilities that handle aerosol cans.

EPA notes that the Consumer Specialty Products Association estimates that 3.82 billion aerosol cans were filled in the United States in 2015 for use by commercial and industrial facilities as well as by households. Consequently, the agency states that “many, but not all generators of aerosol cans identified or listed as hazardous waste are subject to the full RCRA subtitle C hazardous waste management requirements.” Admittedly, the rules contain special small quantity generator dispensations, households themselves are exempt from RCRA by virtue of the household waste exemption, and simply puncturing and draining an aerosol can is considered by EPA to be a recycling procedure that is exempt from the RCRA permitting rules. Nonetheless, the day-to-day management of these wastes can pose difficult management challenges.

As an alternative to the standard RCRA permitting and regulatory regime, EPA is suggesting that the management of used aerosol cans be regulated under the universal waste regulations that are located at 40 CFR Part 273 of the agency’s rules, which are described as alternative hazardous waste management standards. According to EPA, handlers such as “managers and transporters who generate or manage items designated as a universal waste are subject to the management standards under Part 273 rather than the full RCRA subtitle C regulations.” If adopted, this new rule promises to simplify the handling and disposal of aerosol wastes, while ensuring that aerosol cans are diverted from municipal waste streams and are recycled, treated, or disposed of in compliance with Part 273 of the RCRA rules. A final rule will be issued late in 2019.

EPA plans to revise its Municipal Solid Waste Landfills Liquid Management rules (located at 40 CFR Part 258) to provide “regulatory flexibility” in managing accelerated waste decomposition. A notice may be published in October 2018.

EPA is considering updating its “flash point method” for
making the ignitable liquids determination as required by the “characteristic” hazardous waste rules. A rulemaking notice is scheduled to be published in August 2018.

In September 2018, EPA plans to issue proposals to modify its Coal Combustion Residual Waste Rules, located at 40 CFR Part 257, which were initially promulgated in April 2015. These steps will be taken in response to ongoing litigation.

In response to a recent decision of the U.S. Court of Appeals for the DC Circuit (in the April 2017 case of Waterkeeper Alliance v. EPA), and the “FARM Act” that was included in the 2018 Consolidated Appropriations Act, EPA will be revising its current rules regarding the reporting of air emissions of hazardous substances from animal waste. A proposal should be published in the Federal Register in the next few weeks and months.

EPA plans, in October 2018, to issue new rules to revise its existing pharmaceutical waste management and disposal rules.

Finally, in the recently-decided case of American Petroleum Institute v. EPA, 883 F. 3d 918, the DC Circuit court reviewed and vacated parts of EPA’s RCRA hazardous waste recycling rules, in particular the “Verified Recycler Exclusion”, and factor 4 of the definition of “legitimate recycling”, and also reinstated the “Transfer-based Exclusion”. The agency has announced plans to promptly issue a final rule to bring these rules into compliance with the court’s decision.
Getting to Know
A&WMA's Organizational Members

On this page you will find the company profiles of a randomly selected grouping of Organizational Members. A&WMA thanks you—and all of our current Organization Members—for your continued support of this Association.

For more than a century, the people of Archer Daniels Midland Company (ADM; www.adm.com) have transformed crops into products that serve the vital needs of a growing world. Today, ADM is one of the world’s largest agricultural processors and food ingredient providers, with approximately 31,000 employees serving customers in more than 170 countries. With a global value chain that includes approximately 500 crop procurement locations, 270 ingredient manufacturing facilities, 44 innovation centers, and the world’s premier crop transportation network, ADM connects the harvest to the home, making products for food, animal feed, industrial, and energy uses.

ADM’s commitment to change and growth goes beyond its products and services. At ADM, sustainable practices and a focus on environmental responsibility aren’t separate from its primary business; they are integral to the work the company does every day to serve customers and create value for shareholders. And so as ADM’s business grows and evolves, so has its commitment to sustainability and environmental stewardship.

Davis Graham & Stubbs LLP (DGS; www.dgslaw.com) enjoys a strong national reputation for its corporate finance, natural resources, and energy law practices, with a particular focus on securities and mergers and acquisitions transactions, complex commercial litigation, and regulatory guidance. The firm is staffed with some of the best environmental attorneys in the country who work with clients to ensure compliance, minimize potential exposure to environmental liability, and win cases when litigation arises.

DGS attorneys have a wealth of knowledge and experience in handling a broad array of compliance, permitting, transactional, enforcement, and litigation matters. These often include issues pertaining to air and water quality, solid and hazardous wastes, underground storage tanks, spills and releases, remediation, brownfields, corrective action, cost recovery, and other environmental and natural resource issues.

Based in Atlanta, Georgia-Pacific (www.gp.com) is a major manufacturer and marketer of bath tissue, paper towels and napkins, tableware, paper-based packaging, office papers, cellulose, specialty fibers, nonwoven fabrics, building products, and related chemicals. The company operates more than 150 facilities in over 30 states and employs approximately 35,000 people.

Georgia-Pacific’s consumer tissue, towel, and tableware brands are found in approximately 65 percent of U.S. households. In addition, the company has long been a leading supplier of building products to lumber and building materials dealers and large do-it-yourself warehouse retailers. The company’s GP Harmon Recycling subsidiary is among the world’s largest recyclers of paper, metal, and plastics, and Georgia-Pacific annually uses about 2 million tons of recovered paper in its tissue, towel, napkin, and containerboard products.

As a company that relies on sustainable forests, Georgia-Pacific takes steps to responsibly source wood and fiber for its operations, and has a program in place to protect forests with high conservation value (including endangered forests and special areas) and maintain natural hardwood forests. In addition, Georgia-Pacific strives to minimize the environmental impact of its facilities by operating in a safe, responsible, and efficient manner.

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If you are a current Organizational Member and would like your company profile to be included in a future issue of EM, please contact Lisa Bucher, Managing Editor at lbucher@awma.org.

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