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Selecting the Best Process Safety Software for Your Organization

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Selecting the Best Process Safety Software for Your Organization

Overview

When evaluating software's functional reporting requirements and identifying viable vendors, the line between Process Safety Management (PSM) and Environmental, Health, and Safety (EHS) is blurred. This blurring is most evident around core process safety elements (e.g., Incident Management, Corrective and Preventive Actions [CAPA], compliance auditing). Why? Around 2000, EHS software vendors focused on a comprehensive set of functionalities targeting overall compliance management—mainly incident and emissions management—but not process safety.

There are generally three groups of non-EHS vendors who offer PSM functionality:

- Risk assessment and design-oriented vendors (i.e., fire and gas detection, relief device design, Process Hazard Analysis [PHA])
- Management system-oriented vendors (i.e., Management of Change, Incident Management, Learning Management)
- Niche vendors (i.e., Mechanical Integrity, Safety Instrumented Systems)

While analyst reports are available to characterize the PSM software market, such reports are often filled with EHS software vendors that lack some of the desired PSM functionality and, in some cases, **the reports aren't reflective of all options**. So, in a market saturated with EHS software vendors who offer limited PSM functionality, how do end-users select the best process safety software for their organization?

A successful, sustainable PSM program should begin with a digital system that covers the 14 elements of compliance outlined in OSHA 29 CFR 1910.119. The system should also maintain compliance and alignment with the best practices outlined by the Center for Chemical Process Safety (CCPS) Risk-Based Process Safety Framework (RBPS). Organizations add PSM software to streamline and improve the management of OSHA and EPA compliance, enhance safety, and reduce risks associated with hazardous processes.

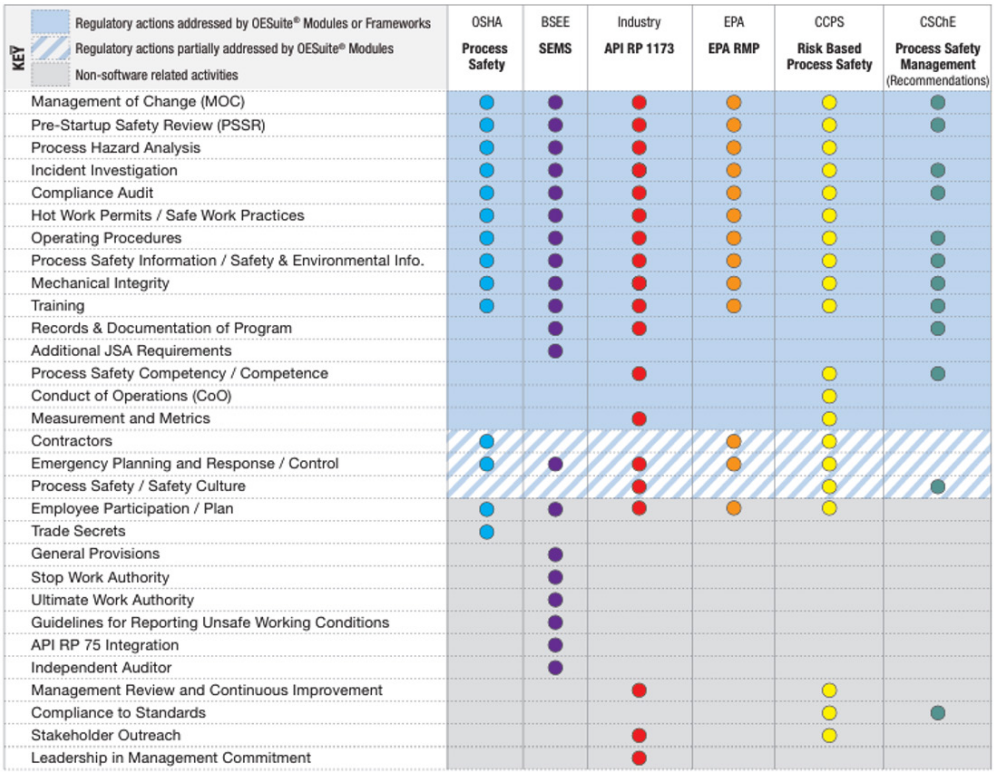

Figure 1 – Process Safety & Similar Regulations, per OESuite® PSM Regulatory Matrix

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Once you have options that meet the 14 elements, you can then use this guide as an overview of the current marketplace, business drivers for PSM software adoption, core principles to build a PSM foundation, integration considerations, reporting and analytic considerations, and tips for selecting the right vendor—including a proposed assessment approach to inform the decision for future technology investments.

Current Marketplace

PSM applications began as homegrown, proprietary, and stand-alone desktop tools in the 1990s and focused on a few key PSM elements (e.g., PHA, Audit, CAPA). Today, many process industry organizations still use proprietary desktop applications to conduct PHA studies and Excel spreadsheets to conduct audits. EHS-centric software vendors lack asset-based capabilities and often have gaps in Mechanical Integrity (MI), Relief Device Management, Safety Lifecycle Management, Operator Rounds, Operator Logs, training, organizational change, competency, document management, and procedural automation.

Different software providers with more than one architecture serve the most specialized, siloed focus areas. This is partly because multiple departments have a say in different aspects of PSM. This reality also reflects a heritage of vendors acquiring point solutions without a commitment to a single architecture.

The Departmental Dilemma

Audit, Incident Investigation, Corrective & Preventative Actions (CAPA)	→	Basic EHS compliance starting point focusing on safety with EHS vendors
PHA, MOC, PSSR, Organizational Change	→	Core PSM focus
Mechanical Integrity	→	Inspection and Enterprise Asset Management (EAM) software focus area
PSI, Relief Devices	→	Engineering Content vendors
Procedural Automation	→	Boutique vendors
Training, LMS, Competency Management	→	LMS vendors
LOPA, SIS, Alarm Management	→	Safety Lifecycle vendors
Work Permitting	→	LOTO software vendors, EHS vendors

Figure 2 – Why All the PSM Data Silos?

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Business Drivers for PSM Software Adoption

Process industry organizations are driven to adopt PSM software, often to address one of the following needs:

- Addressing a recent incident or consent decree
- Enhancing compliance assurance
- Simplifying PSM reporting by streamlining and automating the overall process
- Improving digital governance and auditability
- Managing change and start-up risks
- Centralized repository for easier access and analysis
- Supporting cultural safety and Conduct of Operations (CoO)
- Better communication and collaboration across all departments and stakeholders

By adopting a digital PSM solution, organizations can experience these typical efficiency gains:

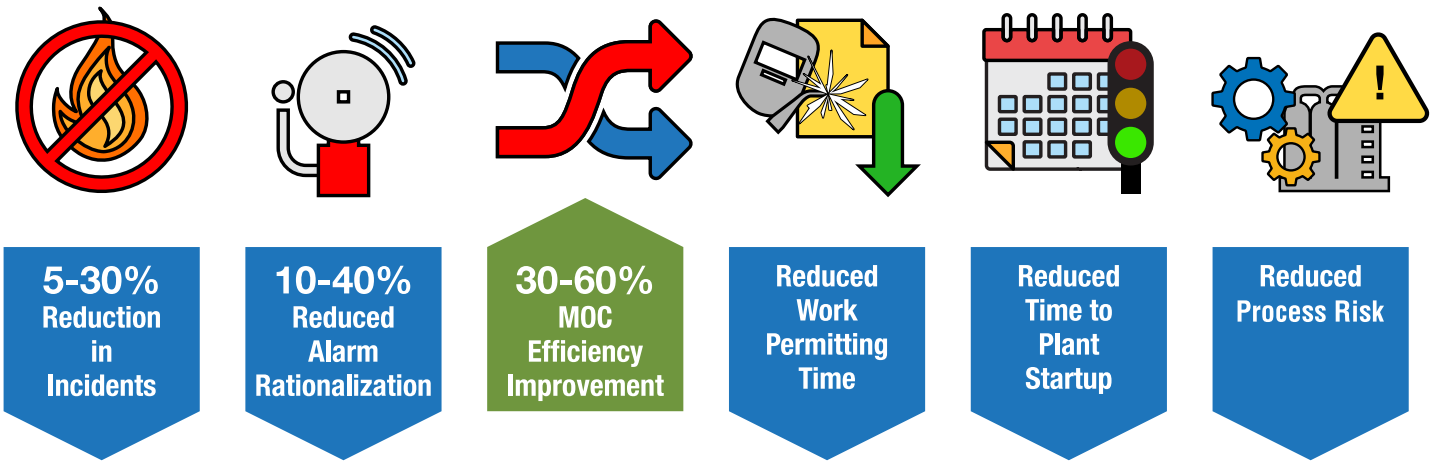

Figure 3 – Business Benefits of Digital PSM Solution

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Core Principles to Build A PSM Foundation

Developing a robust PSM digital solution depends on establishing a **Process Safety Information (PSI) foundation** to address standards, procedures, P&IDs, relief device information, maximum intended inventory, and additional key items. Having a comprehensive risk assessment capability is also germane to detecting hazards and enabling the building of a risk registry. After establishing a PSI foundation, older facilities must build a **MI Solution** (i.e., time-based inspection, risk-based inspection, integrity operating windows).

Then, incident tracking will become a priority as companies track equipment failures through their Computerized Maintenance Management System (CMMS) and try to leverage their EHS incident software—designed for slips, trips, and spills, not assets—in their new architecture. It is particularly important that an accurate asset registry be in place and that incidents pertaining to equipment are tied to the CMMS at this stage.

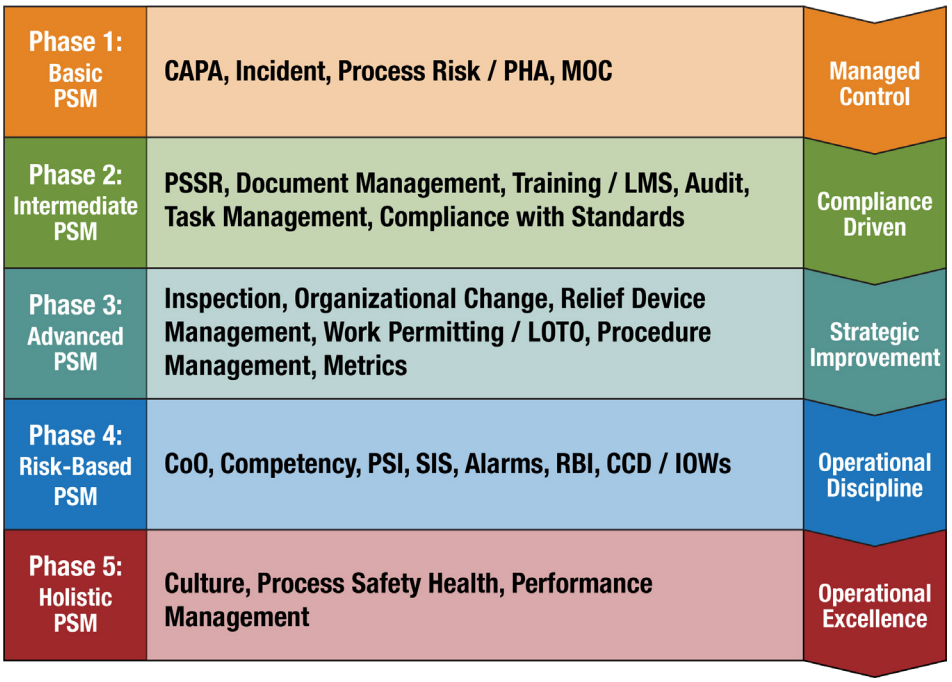

Figure 4 – Typical Phased PSM Maturity Roadmap,
Based on 14 Elements of Digitization of a New Facility Enhanced by CCPS RBPS

Overall, the objective should be a phased maturity roadmap for comprehensive process safety data management built on a single source of truth – meaning a comprehensive shared data set – with a simple to use, shared interface. That roadmap must fully account for and address the dynamic, asset-intensive nature of risk and Conduct of Operations. This will ensure operational tasks are structured in a way that is consistent with the organization's risk tolerance, so every task is performed deliberately and correctly, minimizing variations in performance.

Integration Considerations

System integration has traditionally been limited because PSM software solutions have been siloed. This is no longer the case with software solutions like OESuite®. Enterprise systems can seamlessly link software systems together through Application Programming Interfaces (API – not to be confused with American Petroleum Institute. All further references to API in this document refer to Application Programming Interfaces), also known as **connectors**.

Building an **asset-based foundation** to enable master data governance using a critical equipment list while also building MI attributes and PSI is critical—it also enables work notifications, work orders, and work packs. Building in a **"Manage As" follow-through mechanism** enables the integration of PSM-related data.

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Once companies focus on monitoring their integrity operating windows and enhance their safety lifecycle capabilities to incorporate alarms, integration into the process historian becomes relevant. And, as companies move beyond EHS / PSM incident management to production loss analysis and operator logs, data historian integration becomes desirable again.

While integrating siloed tools sounds good in theory, it's difficult because point solutions are often proprietary or lack an API. Too many **interoperability** points are necessary to orchestrate end-to-end PSM work processes across multiple software systems effectively, along with the added complexity of creating a single reporting lens. By **interoperability**, we mean all key systems and areas working together from shared data and a shared operational view. Companies must realistically evaluate any cost benefit of leveraging existing architectures against the potential efficiency and effectiveness gain through re-architecting their software structure to transform their organization.

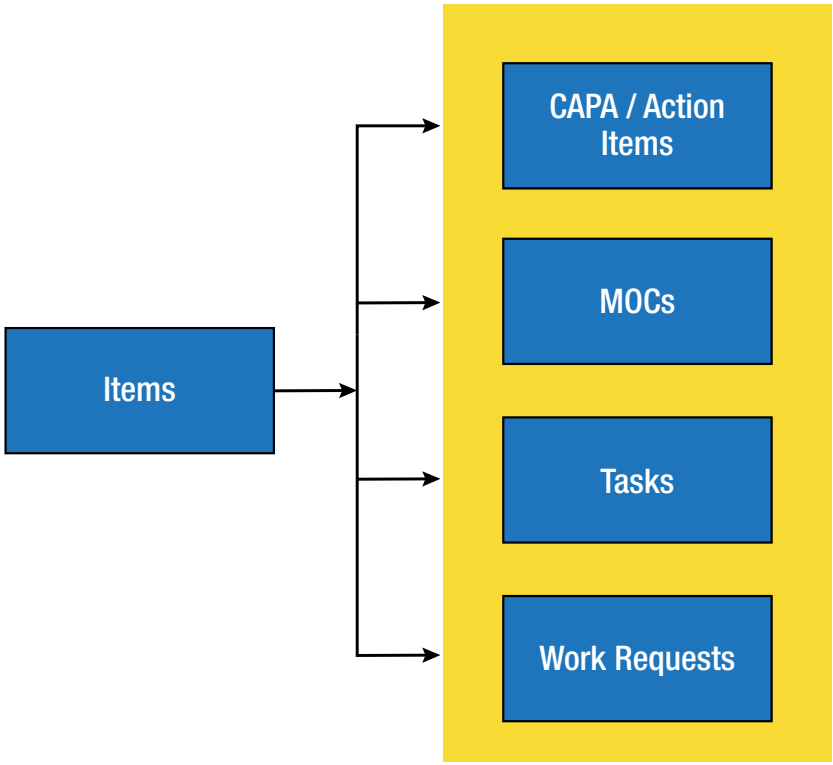

Figure 5 – Manage As Follow-through Mechanism

Reporting & Analytic Considerations

Process Safety Health (PSH) is a holistic and continuous monitoring methodology covering all process safety functional reporting areas to provide a clear picture of an organization's overall health. The purpose of PSH is to empower the plant to address real-time risks based on its processes, culture, management systems, and the organization's risk criteria. PSH is an area where newer tools such as AI integrations and powerful business intelligence analysis can have a swift impact on an organization's outcomes. Any PSM platform under consideration should be well positioned to incorporate these types of analytical tools easily and seamlessly.

Lagging indicators are heavily weighted toward findings from PSM compliance audits and facility incidents / near-misses and are historically used as the primary measure of process safety performance. Only using lagging indicators builds an incomplete picture of PSH that can provide a false sense of security because the data or metric benchmark may be based on a small cross-section of data or not completely applicable to a particular process. PSM compliance audits and incident investigations can identify issues with process safety, but PSH identifies why the issues are happening or may be about to happen. PSH can also assist the organization in identifying potential corrective actions to respond to these leading issues.

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Our model is comprised of the following basic building blocks:

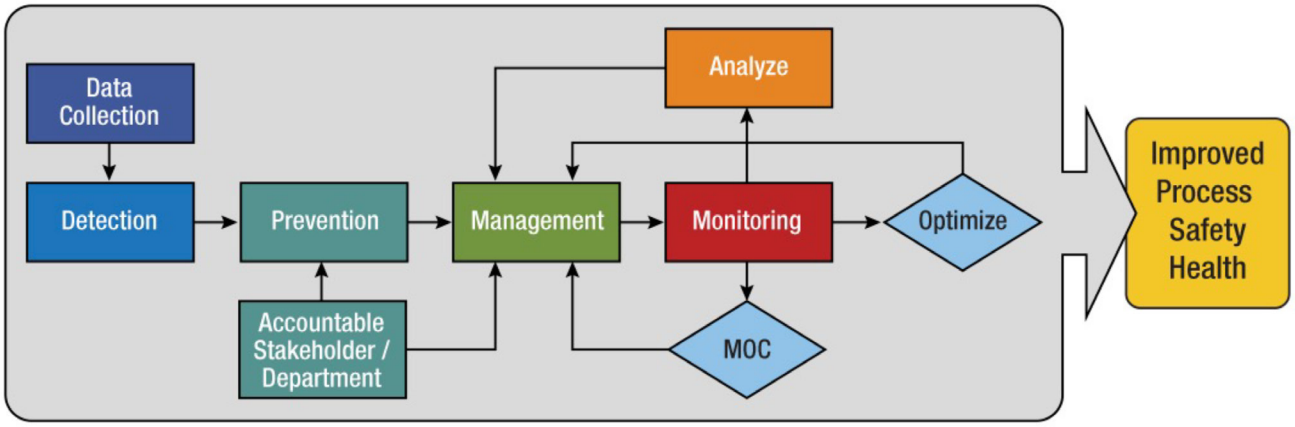

Figure 6 – OS Process Safety Health Model

Metrics should lead to actionable insights based on safe operating limit excursions, commonly referred to because of deviation. Some metrics have become industry safety or process safety standards, such as TRIR or PSE Incident Rate. These metrics establish a baseline of comparative performance normalized in some manner, such as the number of employees or unit capacity.

After implementing a process for defining, managing, and monitoring PSH metrics, companies need an IT system to enable the work processes. Organizations can choose to aggregate data using visualization, or they can start with an interoperable system that has the performance management capability to paint a picture of performance.

Interoperability is the key to enabling proactive monitoring of PSH. That interoperability leads to process simplification, visibility, and operating efficiency. Aggregating lagging indicators after the fact won't suffice. Today, most companies leverage Business Intelligence (BI) and analytics solutions from mainstream providers (i.e., Salesforce Tableau, Microsoft Power BI®). These enterprise PSM solutions should offer:

- Integration to existing systems through their API
- A view to share back performance metrics with operating companies
- Reporting capabilities in the core application

Some software solutions also offer Artificial Intelligence (AI), which generates much buzz. However, organizations should proceed cautiously when evaluating software options based on their AI capabilities. Organizations should conduct a data quality assessment to determine where the gaps are–because many don't have enough transactional data in a consistent format to detect anomalies. AI may be coming along, but small steps are necessary to solve complex problems.

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Selecting the Right Vendor

Determining your strategy is the first step in selecting the right PSM software solution. We recommend the following strategy:

1. Assess your existing PSM IT footprint
2. Identify near-term gaps
3. Establish a stakeholder group from all departments (not just EHS)
4. Determine whether to attempt integration of existing siloed systems or move to a re-architected system based on your desired outcomes
5. Develop a plan and timing for creating a single PSM architecture and migrating existing data
6. Evaluate the maturity of existing work processes against the desired future state
7. Create detailed requirements for each reporting element of PSM
8. Determine which requirements are the highest priority and which can be prioritized later
9. Identify key systems for future integration and create a detailed integration requirements document
10. Create a scorecard to use during vendor demonstration sessions
11. Leverage the scorecard to create an initial Request for Information (RFI)

Without a detailed set of requirements, organizations will find it difficult to compare different vendors. Based on requirements and relative importance, a weighted scorecard can provide a quantitative approach to evaluating different software options (see Figure 8 for example scorecard). After determining the requirements, create an implementation plan, integration design document, business case, and project charter. Then, socialize your vision to get feedback from leadership and gain internal buy-in from the right core team members (i.e., subject matter experts, IT, key users, etc.). Other things to consider when selecting a vendor include:

- Total cost of ownership for the system
- Longevity and success of the vendor's business in related industries
- Comprehensiveness of software offerings and value
- Usability and flexibility for end-users and administrators to enable self reliance vs. reliance on external resources

Engage vendors early to understand what is available in the marketplace. This will help in identifying a short list of vendors to request additional information and quotes from (ideally no more than 3-4 vendors). To assist vendors in determining the best offerings for your organization:

- Be transparent about the decision-making process, project timeline, and key drivers
- Request initial overview and high-level demos with key stakeholders

Ask for an initial overview of the company and software offering. Expect that vendors will request a Non-Disclosure Agreement (NDA) early on in the process to enable open sharing of more information by vendors about their software features, pricing, and technical content. Note that most vendors may respond to a high-level RFI without an NDA, but are likely to require one for RFPs and RFQs due to the sensitive nature of information being shared.

- Allow 2-3 weeks for responses, depending on how detailed the request is
- Set up Q&A sessions to provide feedback and answer questions with vendors so they all receive the same information

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After completing the analysis of software options, engage procurement. This may take time, so allow for this with the project schedule in mind. It isn't uncommon for contracts to take 3-6 months, depending on the procurement and legal structure and the vendor's availability to assist the business. Some companies find it advantageous to ask for a sample software contract and Master Services Agreement (MSA) during the RFP process.

Once contracts are signed and a purchase order is issued, begin implementation at a representative facility to determine an initial blueprint before seeking a comprehensive rollout across multiple sites. Remember, perfection is often the enemy of good enough—it is more important to learn where your gaps are before implementing across an organization, especially if introducing process and management system changes.

Before achieving the initial 'Go Live,' develop a long-term support plan. Important but often overlooked aspects to consider as part of that plan include:

- Onboarding new users while minimizing the burden on training staff
- Handling help desk requests
- Addressing multi-lingual and multi-cultural needs
- Mapping legacy systems and addressing new workflow needs that may create gaps
- Managing data access, system back-ups, and record retention as the system grows
- Involving external consultants or system integrators when and where necessary
- Having a governance structure for large scale projects with multiple sites and modules
- Making sure there is a corporate sponsor and key business stakeholders who are invested in the success of the software solution

About the Operational Sustainability® Process Safety Framework

Succeeding in today's complex, highly regulated industries depends on how well your company manages enterprise risk to minimize enterprise losses and enable continuous improvement without putting your privilege to operate at risk. Our industry-leading, cloud-based, highly configurable OESuite® software, supported by our world-class advisory services and technical content, enables your company to achieve and sustain Operational Excellence (OE).

The **OESuite® Process Safety Framework** employs a comprehensive, interoperable set of modules aligned with the latest best practices in safety culture and execution strategies to deliver sustainable process safety improvements. With the **OESuite® Process Safety Framework**, organizations can:

- Move their focus from safety to comprehensive risk and reduce process safety incidents by crossing departmental boundaries and breaking down silos
- Generate a single source of truth by building a unified data structure, leading to more efficient execution and actionable insights
- Lower operational risks by advancing beyond traditional process safety compliance and embracing Risk-Based Process Safety
- Make the right investments in process safety resources to protect lives and value, and move toward OE
- Leverage a library of templates, create custom procedures, relate procedures to equipment, and execute procedures in the field on a mobile device
- Create, access, review, and modify dashboards and portals to deliver actionable insights at the point of work

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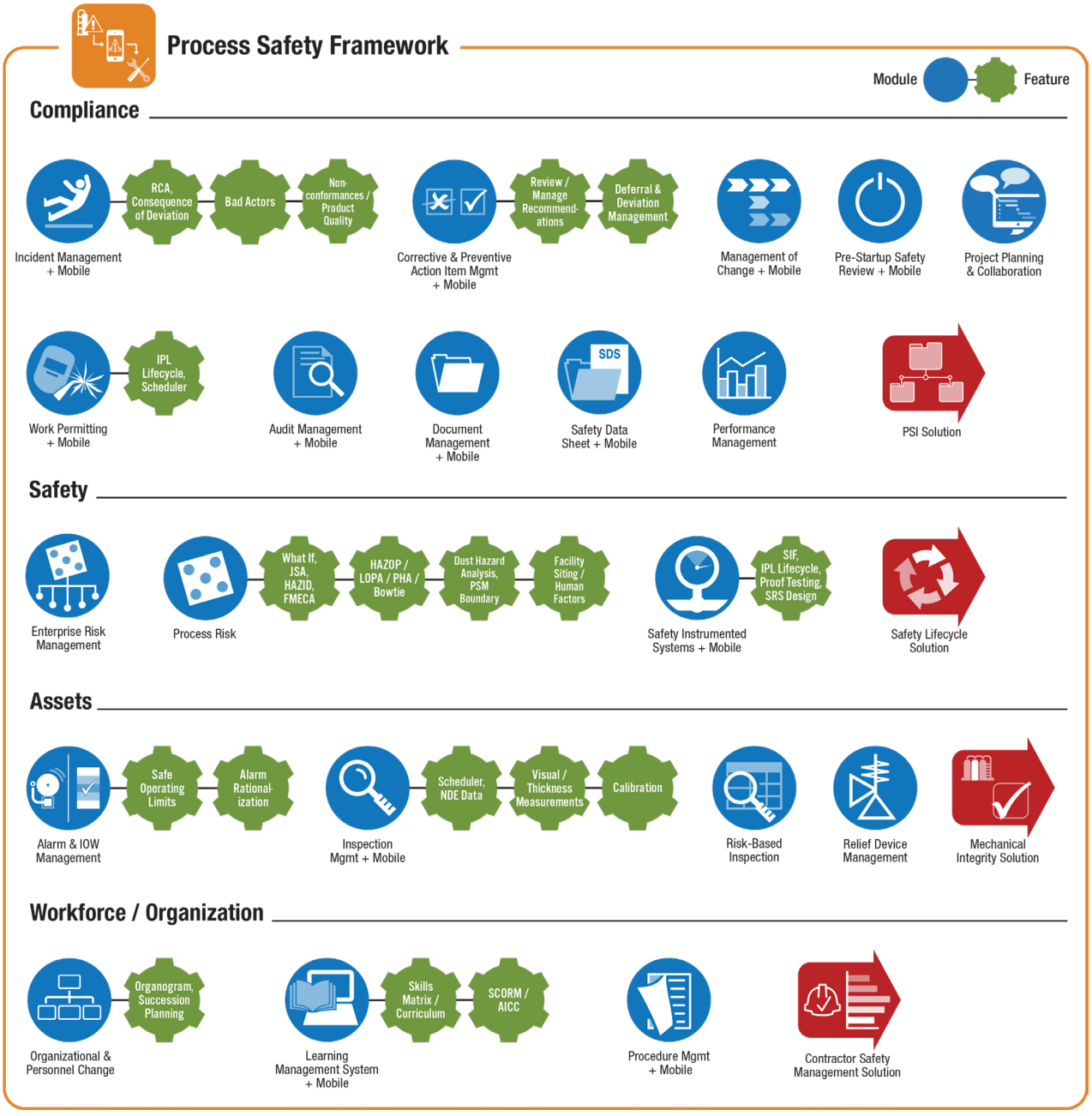

Figure 7 – OESuite® Process Safety Framework

For more information on the **OESuite® Process Safety Framework**, email us at info@drivingoe.com or call (713) 355-2900.

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Requirements			Client Requirement Prioritization				Adjusted Prioritization
Area	Req. No.	Business Requirement	User Priority	Regulated	Non-Regulated	Corporate	User Priority
			0 = Decline from Consideration 1 = Low Priority (good to have) 2 = Medium Priority (important but workaround is acceptable) 3 = High Priority (mandatory)				0 = Decline from Consideration 1 = Important Priority 2 = Significant Priority 3 = Critical Priority
MOC	MOC-1	Are Corrective Actions linked with the MOC system (i.e. RIK is really not-in-kind)?					
MOC	MOC-2	Can the User bypass the review process within the application?					
MOC	MOC-3	Can the User suspend the approved MOC due to economic reasons?					
MOC	MOC-4	Can you customize your email escalation content and trigger these anywhere along the workflow for different locations?					
MOC	MOC-5	Is the risk assessment portion of MOC a built for purpose workflow or leveraging a checklist to emulate the risk assessment process?					
MOC	MOC-6	Can the User track chemical reactivity MOCs (i.e. inadvertent mixing, or changing descalers in cooling towers)?					
MOC	MOC-7	Can the system leverage mobility solutions?					
MOC	MOC-8	Can the User risk rank the MOC using the User defined Severity and Likelihood for the regional operations?					
MOC	MOC-9	Can you audit your MOC process using the system? Describe how auditing will be integrated into the workflow of your system.					
MOC	MOC-10	Can the system track MOCs emanating from PHAs, Audits, Incidents, Inspections ?					
MOC	MOC-11	Do you offer your own work order system that is integrated to your MOC solution?					
MOC	MOC-12	Can you trigger a risk assessment to occur in more than one place within the MOC workflow?					
MOC	MOC-13	Can you configure your checklists (i.e. adding columns, changing the columns)?					
MOC	MOC-14	Does the system have the ability to do PSSR and Action Items offline and synch up later?					

Figure 8 – Weighted PSM Software Scorecard / Excerpt of Requirements Worksheet

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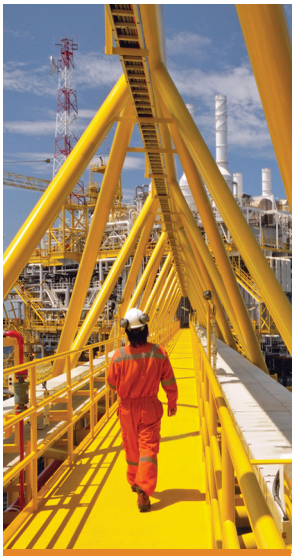
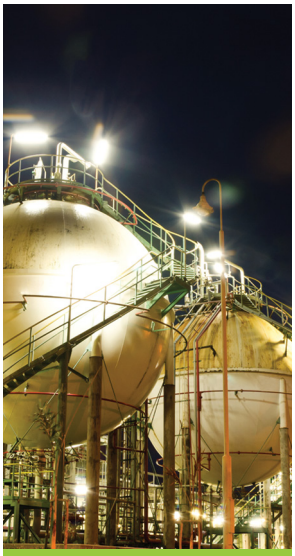
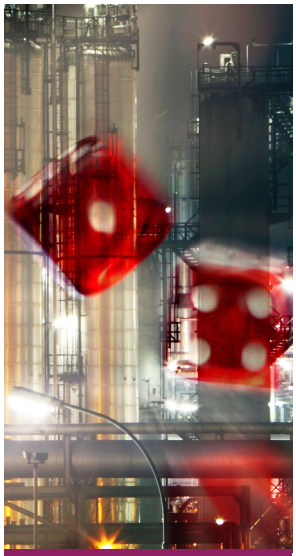

Workforce


Assets

Operations

Compliance


Risk

Operational Sustainability® makes operational excellence simple.

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Learn how Operational Sustainability® can accelerate your journey to operational excellence through our industry-leading OESuite® software platform, technical content, and our industry experts. See our full slate of free webinars, workshops, white papers, detailed module information, and scheduled workshops online at **www.DrivingOE.com.**

Schedule your free consultation and demo today.

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