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Fire Protection Program Performance Metrics

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Sandia National Laboratories is a multi-program laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.

Agenda

- 4 Step Metric Development Process
(mechanics of getting started)
- Keys to Successful Implementation (skill)

How do you create metrics?

- Do you collect metrics in response to external requests?
- Are your metrics tied to a rational framework?
- Do metrics drive decisions or is the opposite more common?

“That’s the gist of what I want to say. Now get me some metrics to base it on!”

Step 1: Define Overall Objective

- **Success Objective**
 - *Establish an effective and efficient Fire Protection Program in **support of the mission**, while protecting the worker, environment, and national security assets.*
- Key Concepts:
 - **Objective must include mission support!**
 - Measuring effectiveness & efficiency requires a comprehensive set of metrics that considers both **tactical (operations) and strategic health** success factors.
- Challenge: *How does the fire protection program **create value to the mission** so it can compete for adequate resources to achieve fire & life safety objectives?*



Step 2: Define Success Factors

- **Success factors must drive the desired outcome:**

- How will you know that you have achieved the objective?
- *"I need performance-related data to ...:"*

- Effective
&
Efficient
- 1. **Provide facilities fit for mission use (mission support)**
 - 2. **Ensure tactical health - reduce likelihood of fire and/or reduce consequences from a fire**
 - 3. **Ensure strategic health and sustainability of the program**
 - 4. **Demonstrate compliance – catch all**

- **Key Concepts:**

- Break objective into 3-4 interrelated success factors
- Metrics will be derived from these success factors
- **Take systems view**
- Over time the metrics linked to each success factor may change as the program matures but the success factors should remain relatively constant unless the overall objective changes

For Step 4, remember: 1=Mission; 2=Tactical; 3=Strategic; 4=Compliance

Step 3: Define System Framework

- **System framework includes assignment of technical leads:**
 - **Inspection, Testing & Maintenance** – **Ensure functionality** of fire protection systems: Perform ITM per NFPA & manufacturer’s specs; process equivalencies to reduce cost
 - **Emergency Response** – **Plan for Failure**: Ensure adequate ER at the site - Define BNA and measure performance; maintain pre-incident plans; aware of fire risk ops
 - **Operations** – Ensure fire safe operations: **embed control points in fire risk activities** - Conduct periodic FPAs; monitor MAQs; hot work & impairment permits
 - **Construction** - **Design-in Fire Safety**: Ensure building / fire protection designs, construction, and installation meet code: conduct plan reviews & required inspections
 - **Administration** – Flow down fire safety requirements in policy; establish **Exec Mngt role** for fire protection; perform FPE staffing baseline needs; develop qualified staff to provide an enduring capability to meet success objective;
- **Key Concepts:**
 - Define 3-4 interrelated program elements (plus Admin)
 - Include assignment of accountable leads
 - Leads provide succession planning and mentoring of staff
 - **Bolded text are minimal for success**

Step 4: Integrate Steps 2 & 3: Define **Family** of **Measures** Aligned to Success Factors

■ **Inspection, Testing & Maintenance**

- Quality (% of building preventive maintenance (PM) job plans aligned (frequency & content) with applicable requirements): 2,4 (past metric; efficient to update on new code/standard issuance)
- **Resource Utilization** (Maintenance staff weekly activity backlog): 2,3
- **Productivity** (% completion of scheduled PM completed in month scheduled): 2,4
- **Effectiveness** (CM to PM monthly index < 20%): 1,2,3
- Cost (average number of maintenance hours (PM & CM) per building per sprinkler system and average number of maintenance hours of fire alarm system maintenance (PM & CM) per protected building): 1,3

■ **Emergency Response**


- Timeliness (Site updates BNA every 3 years): 3,4
- **Timeliness & Safety** (BNA response time criteria are met 90% of the time): 1,2,4
- **Productivity** (complete updates of scheduled pre-incident plans): 2,4
- **Compliance** (Complete Annual Fire Loss Report by April 30): 4

■ **Operations**

- **Productivity** (update nuclear facility FHAs to support DSA schedules): 1,4
- **Productivity** (complete scheduled building fire protection assessments): 1,2,3
- **Safety** (complete hot work permit audits): 2,4
- Resource Utilization (FPE staff work backlog): 1,2,3

Step 4: Integrate Steps 2 & 3: Define Family of Measures Aligned to Success Factors

■ Construction

- **Quality** (A/E uses qualified designers and delivers code-compliant plans): 1,2,3,4 
- **Quality** (Construction contractor uses qualified workers and installs code-compliant fire protection systems): 1,2,3,4
- **Cost** (# of code re-inspections less than 2): 1

■ Administration

- Requirements Flow Down to the members of the workforce - External regulatory and contractual requirements flow down to internal policy, processes and procedures: 1,2,3,4 (3-yr review cycle)
- **Resource Utilization** (Perform risk-based FPE staffing analysis to identify near-term (3-5 years) shortages): 1,2,3
- **Performance** (FP Program measures are identified, tracked and trended): 1,2,3

■ Key Concepts:

- Details of **productivity, effectiveness, quality, timeliness, resource utilization, cost, safety**, etc., can change as the program matures or as needed to control risk
- Strive to address each success factor within each program element (mission support is minimal)
- Best metrics are aligned with multiple success factors
- Multiple coverage of each success factor from different perspectives supports more robust decision making

Keys to Successful Implementation (Learning the Skill)

- Caution: even experts can be fooled by biases or assumptions
- Solution: Try to identify measures from **different perspectives** to validate the data

Keys to Successful Implementation - Management

- **Management Involvement & Accountability**
 - Line management responsible for fire safety
 - Weekly FP team meetings to review metrics (Mgr-level)
 - Qtr Business Reviews with Site-Regulator & Mid-Management (Dir-level)
 - Roll-up of high-risk items to Executive Management (VP-level)
- Establishing an **Executive Management role is key to long-term success & sustainability** of the fire protection program
 - Understand how reduced staffing & qualifications levels affect corporate risk
 - Champion for establishing robust fire safety policy
- **Maintain a prioritized investment wish list** to capture end of year dollars to reduce risk

Design

- Is a **systems approach** used to identify risks and controls, with metrics defined to monitor effectiveness of controls?
- Are data collected and analyzed in appropriate ways?
 - Frequency – e.g., ITM monthly completion rates; weekly work backlog
 - Type - **measure both Process and Results**
 - Process – focus on execution of activities to produce results
 - Did the A/E use qualified staff to prepare construction documents?
 - Did the construction contractor call for code required inspections ?
 - Results – focus on the delivery of business outcomes
 - Did the A/E deliver code-compliant drawings? (quality)
 - How many re-inspections did it take to meet code? (efficiency)
- Are comparatives and benchmarks used (helps to know what's good enough when establishing business case)?
- Do the leading indicators provide enough time to take action?

Reporting

- Are metrics clear, graphical, well labeled and easy to interpret (**5-sec rule**)?
- **Do metrics help decision makers** address fire risk, key business performance, point out improvement areas, or just provide endless streams of raw data?
- Transparency? Are the metrics amenable to external audit?
 - Maintain records in Document Management System
 - Periodic review for trending

Ownership & Visibility (5 sec rule)

GOAL Manage an effective and efficient Fire Protection Program in support of the mission, while protecting the worker, environment, and national security assets.

#	OBJECTIVES & METHODS	Responsible	Target	Q1			Q2			Q3			Q4			SNL-NM Score
				Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	
1.0	OBJECTIVE: Manage Inspection Testing & Maintenance (ITM) of Fire Protection Equipment															
1.1	FP Systems Craft Activity Backlog	P. R. Smith	4-8 weeks	○		●			●				●			6.3
1.2	Scheduled FP Preventive Maintenance Completion	P. R. Smith	90%	○		●			●				●			96.9%
1.3	Corrective Maintenance Occurrence Trends	P. R. Smith	≤ 20%	○		●			●				●			7.5%
2.0	OBJECTIVE: Comply with EMERGENCY RESPONSE requirements															
2.1	KAFB Fire Department Response Times (CY2012 cumulative)	P. R. Smith T. Sanchez	1st Engine ≤6:20 min. (90% of time)							▲						86%
2.2	Pre-Incident Plans	T. Sanchez A. Muna	100%	○		●			●				●			84.8%
2.3	Annual DOE Fire Loss Report (NM, CA, TTR)	P. Smith	4/30/2012							●						
3.0	OBJECTIVE: Manage Fire Protection OPERATIONS processes															
3.1	Nuclear Facility FHAs/FPAs Updates	J. Cordero	100% Cumulative	○		●			●				●			85%
3.2	Mission Critical Facility Fire Protection Assessment (FPA) Completions (NM, CA)	J. Cordero	100% Cumulative	○		●			●				●			91%
3.3	Mission Dependent, Not Mission Critical Facility FPA Completions (NM, CA, TTR)	J. Cordero	90% Cumulative	○		●			●				▲			66%
3.4	Hot Work Permit Audits	J. Cordero	5%	○		▲			●				●			5.67%
4.0	OBJECTIVE: Manage CONSTRUCTION processes															
4.1	Construction Code Compliance	J. Harding		○		●			●				●			
5.0	OBJECTIVE: Manage ADMINISTRATION of Fire Protection Program															
5.1	Fire Protection Program Staffing (NM, CA)	P. D'Antonio	9/30/2013												○	
5.2	ES&H Policy Align with DOE Requirements (NM, CA, TTR)	L. Draelos	9/30/2013							●						
SNL-NM Fire Protection Program Health		Implementation			▲				▲				▲			
		Program			●				●				●			
		Risk			●				●				●			

Keys to Successful Implementation– Managing

- Continuous Improvement
 - Algorithm / Delphi technique used to assign risk & benefit
 - **Program element leads responsible** for implementation and improvement (**side benefit is developing staff skills on risk-management and leadership**)
 - Manager provides independent review to validate the soundness of the risk & benefit assignments (mgr/staff on same page)
- Day-to-Day FPE Interactions with mission staff
 - **Wear two hats** – compliance officer, but quick to change hats to teacher, then engineer to develop solution (**mission support and building trust**)
 - Know where the line of “good enough” is (benchmarking)
 - Use management to adjudicate gray areas

Communicating

- Do you struggle making persuasive arguments to acquire investment dollars to improve fire safety or get more resources?
 - Must be viewed as **communicating with the mission in mind**
 - Perceived as expert in regulatory/policy requirements (but not a zealot)
 - Tools to help:
 - risk-based staffing analysis
 - Decision Paper for the critical few decisions
 - Describes the issue
 - Defines the requirements
 - Identify risk to business objectives (life safety, mission, prop protection)
 - Decision options (~3) with status quo as one; life-cycle cost and remaining risk if implemented
 - Build Trust - **communicate often, especially decisions that save money!!!**

Questions?