Savannah River Remediation

We do the right thing.

SRR Approach to Safety Management via Leading Indicators

Presented at the DOE 2010 ISM Champions Workshop
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Jita Morrison

SRR-ESH-2010-00127

Biography

Jita Morrison

Employment: Savannah River Remediation (SRR) in the ESH&QA Department

Education:

BS in Health Physics from the Georgia Institute of Technology in 1985

Master's Degree in Environmental Resources Management from the University of South Carolina in 2007.

Experience: Over 25 years of experience in the nuclear industry.

- As ISMS Program Lead, achieved a successful DOE-HQ ISMS Verification June 2010
- As Radiological Program Lead, developed radiological controls for startup and operation of Integrated Salt Disposition Program
- As Health Physicist, performed radiological characterization for SRS Closure Projects
- As DOE NNSA Radiological Assistance Program Team Scientist, advised the team during drills and events.

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Leader in Safety?

- Winner of numerous safety awards year after year
- Better than industry average rates for Days Away and Restricted Work Cases
- Better than industry average rates for Total Recordable Cases

As presented by Peter S. Winokur, Ph.D. at 2010 EFCOG Meeting

Leader in Safety?

Since 2005

- **Texas refinery explosion results in 15 fatalities and 180 injured workers**
- **Oil spillages in Prudhoe Bay caused by pipeline corrosion**
- **Operational issues result in cost of $10 Billion (40% of 2007 cash flow)**
- **$21.4 million in OSHA fines**
- **$160 million in pollution controls ordered by US Clean Air Act regulators**
- **20 fatalities vs. 146 for all other US refineries**

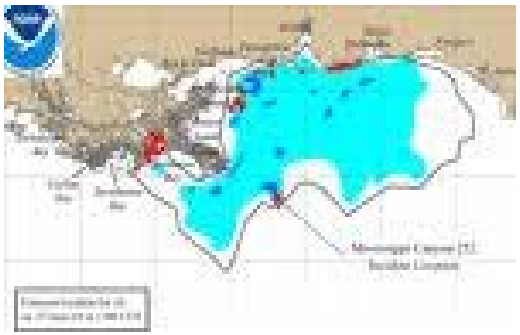
Who is this multi-national corporation that is the 4th largest company in the world?

Leader in Safety?

British Petroleum (BP)

2010 Gulf of Mexico Deepwater Horizon Oil Rig Explosion

- **11 fatalities and 17 injuries**
- **Largest oil spill in petroleum industry**
- **Largest environmental disaster in US history**
- **Largest economic impact to fishing and tourism industry**



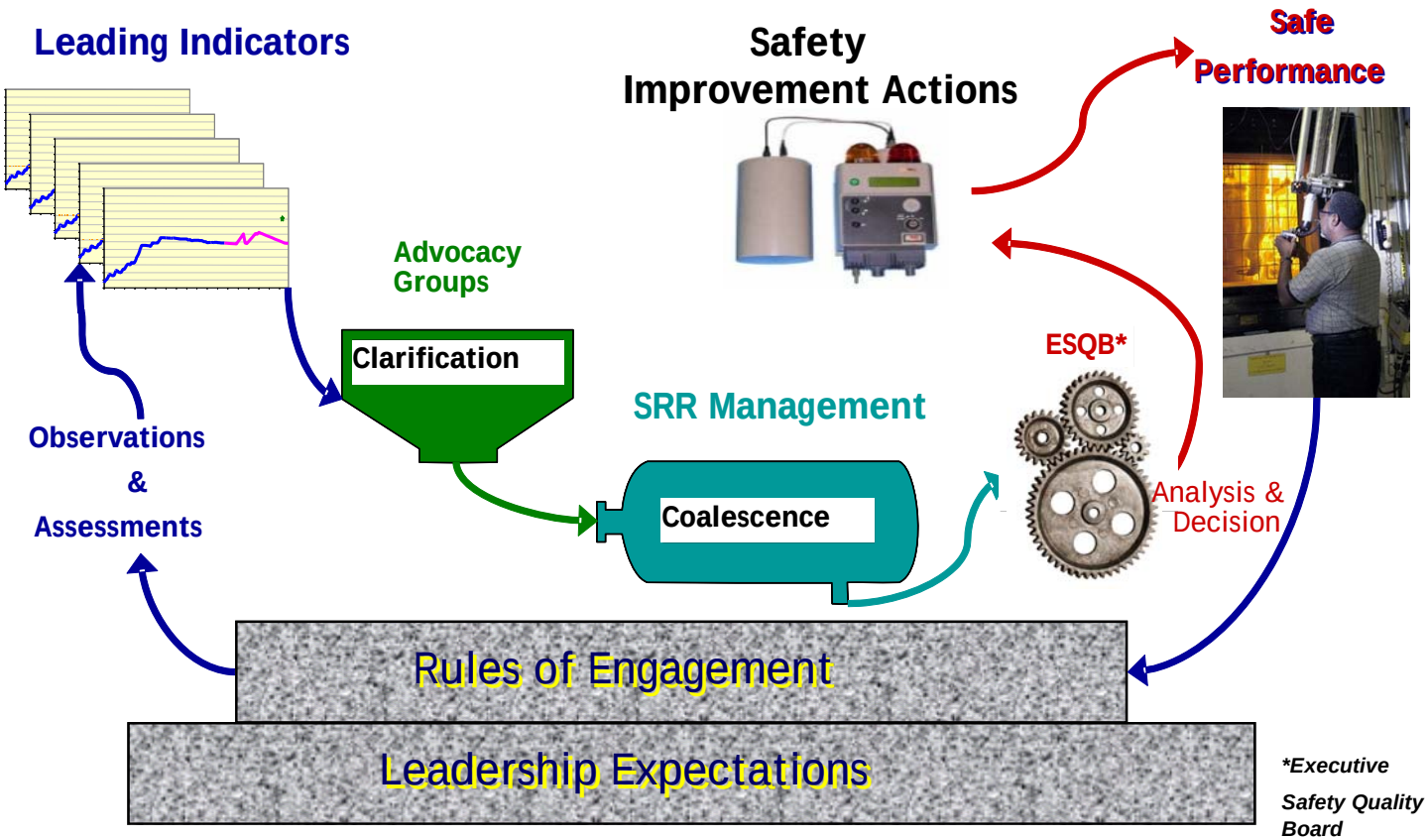
SRR Approach

- Leading Indicator – tool used to predict the likelihood of an accident in the future. Enables actions to prevent the likelihood while supporting productivity and quality.
- Based on experience in nuclear facility operations and input from Executive Safety and Quality Board (ESQB) members' experience.
- Benchmarked other industries.
- Unique to the hazards and operational complexities of a radioactive waste tank closure mission and rely heavily on analysis of trends in both safety and productivity during day to day operations.

DART/TRC trending is not the best tool for taking actions for improving safety in nuclear facility operations!

Program Overview

SRR Leading Indicator Process



*Executive Safety Quality Board

Leadership Expectations

- Oversight of the safe performance of mission
- Active mentoring & coaching of employees
- Frequent field presence by management
- Recurrent review of the “Rules of Engagement”
- Project Performance review meetings
- Monthly monitoring of corrective actions
- Management to “pull the string” on plant issues

Rules of Engagement

The rules of engagement are designed to promote involvement by the entire SRR Team which includes:

- Experienced Frontline Workforce
- Project Management
- Facility Managers and Line Managers
- Support Organizations

All play leadership roles in the achievement of consistently acceptable levels of safe and disciplined facility performance.

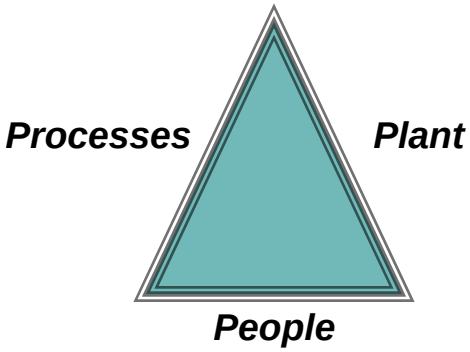
Indicator Overview

- The Project Sr. Management and ESQB utilize the set of leading indicators to:

Balance productivity and efficacy by

- Monitoring schedule and budget
- Monitoring allocation and demands on resources
- Evaluating behavior and safety issues
- Ensure that proper metrics are used that lead to actions to enhance safety while optimizing efficiency (Metrics should include production and safety indicators)

- Select leading indicator categories:
  - Processes
  - Plant Conditions
  - People



Processes

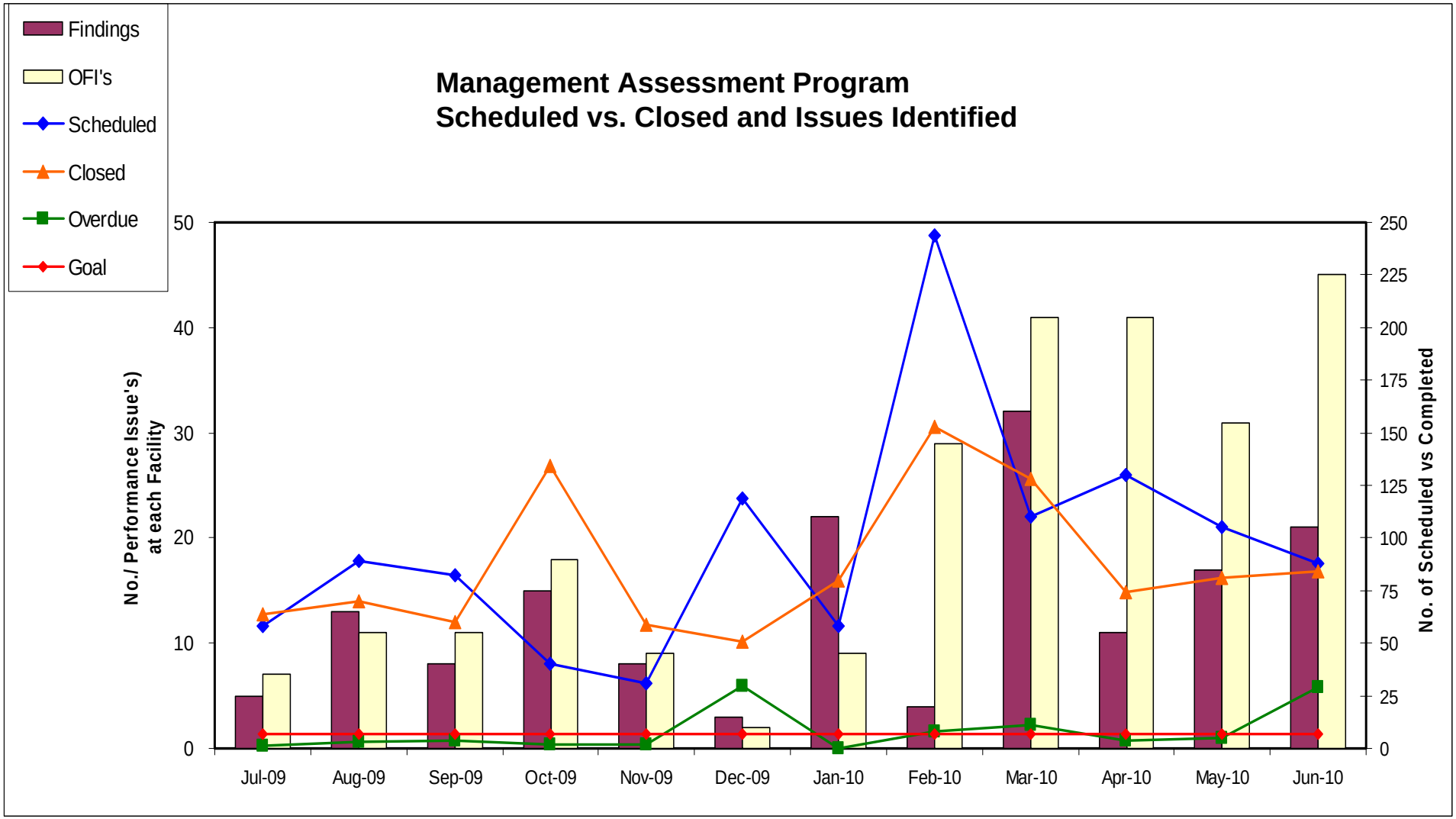
- **Purpose:** *Monitor* the stability of the workplace, and *gauge* the overall rate of change presented to the workforce influencing error rate in the field.

- **Expectation:** *Manage* the rate and meaning of change in a manner that keeps the focus on safe execution and minimize distractions

  - Number/quality of monthly Management Field Observations/Self-assessments to assure "Rules of Engagement" are being implemented.

Action taken: Emphasized the importance of being self-critical during these assessments to improve performance in field.

Processes


Findings
OFI's
Scheduled
Closed
Overdue
Goal
Management Assessment Program
Scheduled vs. Closed and Issues Identified
No./ Performance Issue's) at each Facility
No. of Scheduled vs Completed
0
10
20
30
40
50
0
25
50
75
100
125
150
175
200
225
250
Jul-09
Aug-09
Sep-09
Oct-09
Nov-09
Dec-09
Jan-10
Feb-10
Mar-10
Apr-10
May-10
Jun-10

Plant Conditions

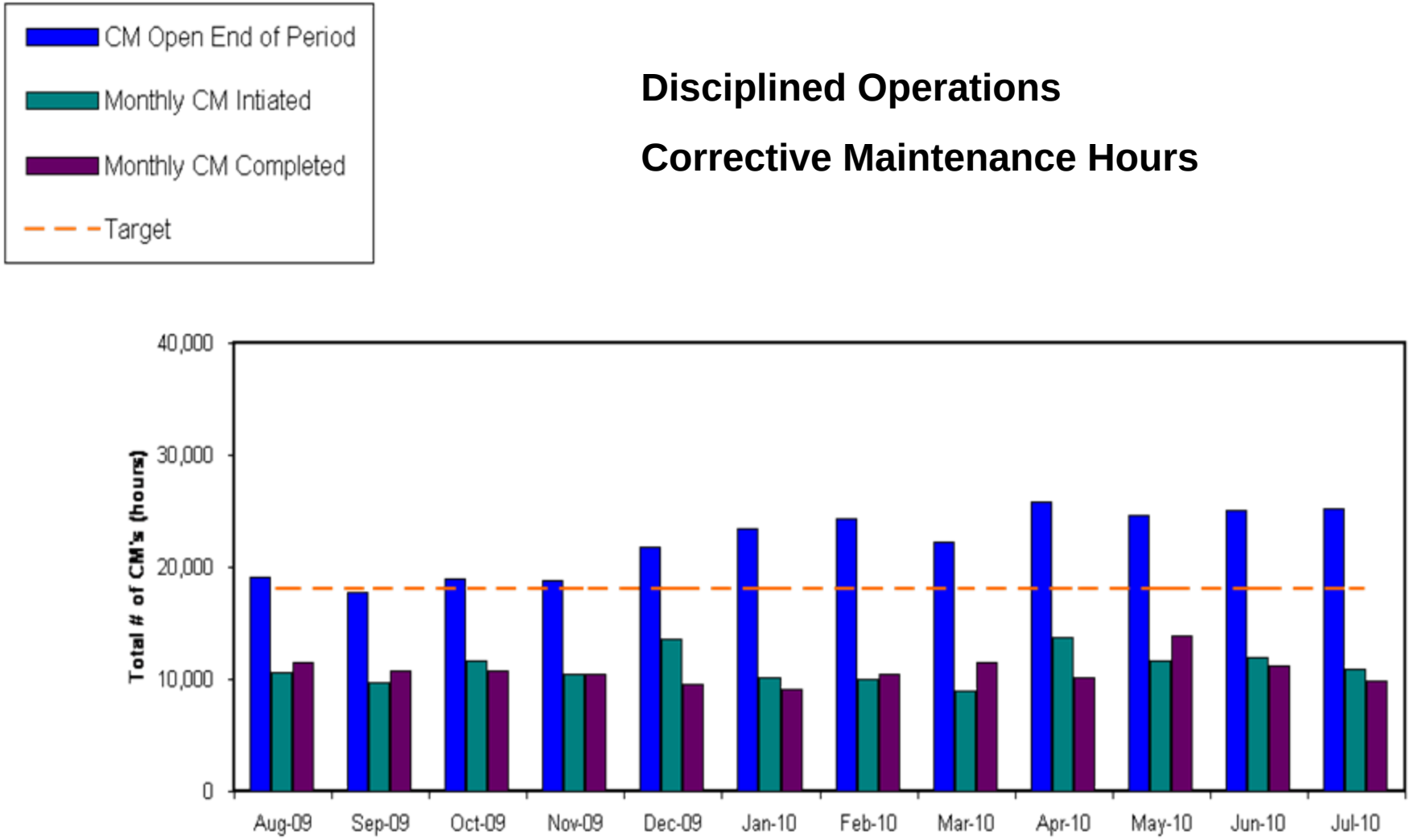
- **Purpose:** *Monitor* the health of the critical plant safety and operations systems and processes.
- **Expectation:** *Ensure* that the Workforce has functional and reliable systems (minimize "work around" mindset)
  - Man-hours of corrective maintenance backlog within an expected range based on size of work crew and number of systems.

    Action taken: Hired 80 mechanics that are in training
  - Number of systems graded as 'yellow' or 'red' indicating system deficiency
  - Number of temporary modifications and those greater than acceptable time-frame.

Plant Conditions

Disciplined Operations

Corrective Maintenance Hours

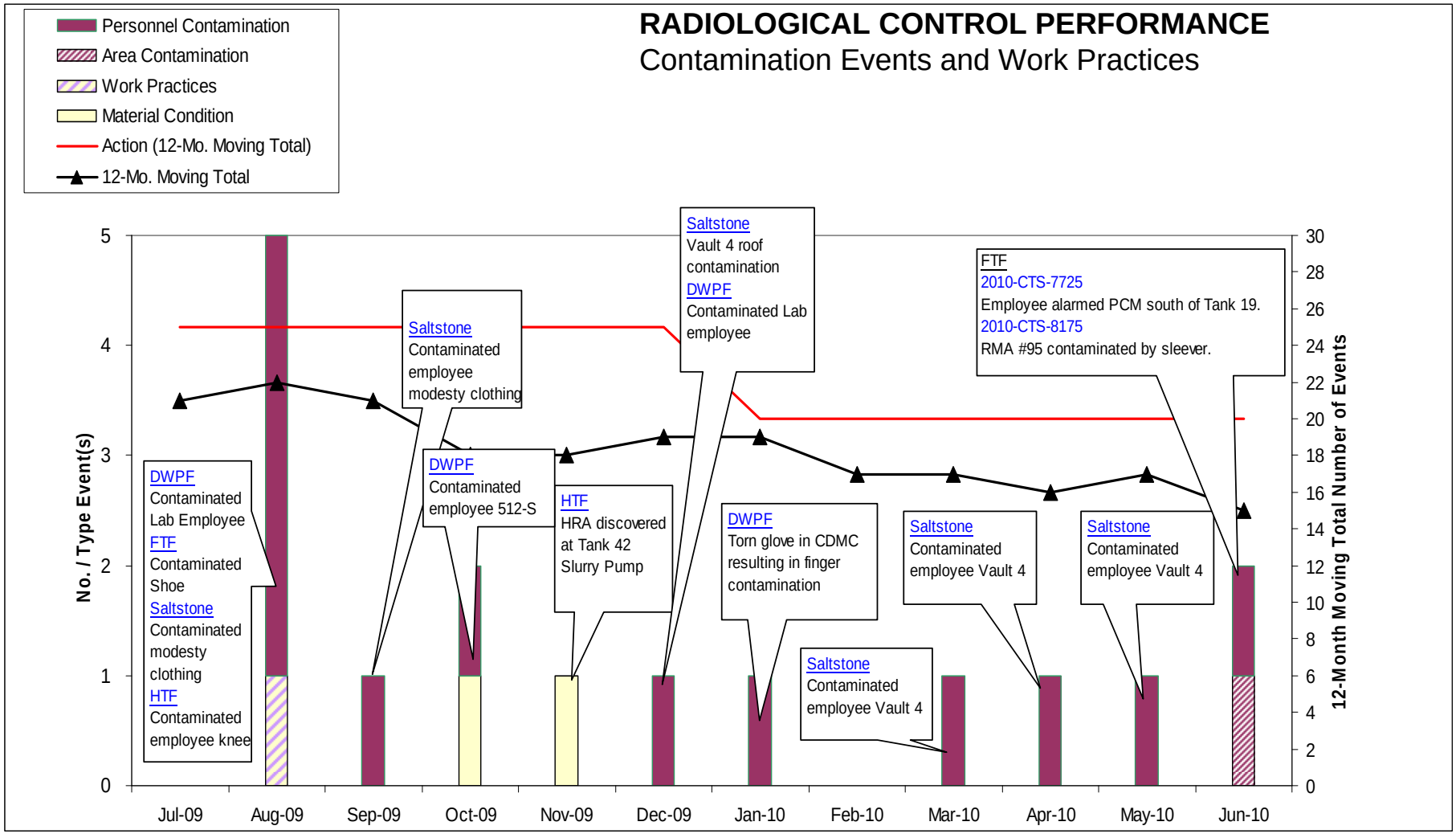


Plant Conditions

- **Purpose:** *Monitor* and *gauge* the project field performance
- **Expectation:** *Early Discovery* of adverse trend in operational performance that indicates a need for re-focus to mitigate trend.
  - Comparison of actual contamination events vs goal to minimize radiological risk during tank closure acceleration phase.

    Action taken: Strengthened key management positions to mentor/coach and emphasize leadership expectations and performed refresher training.
  - Number of actual high level waste transfers versus planned transfers (unplanned = increased risk of inadvertent transfer, spill, operations exposure, and environmental insult).

Plant Conditions



People

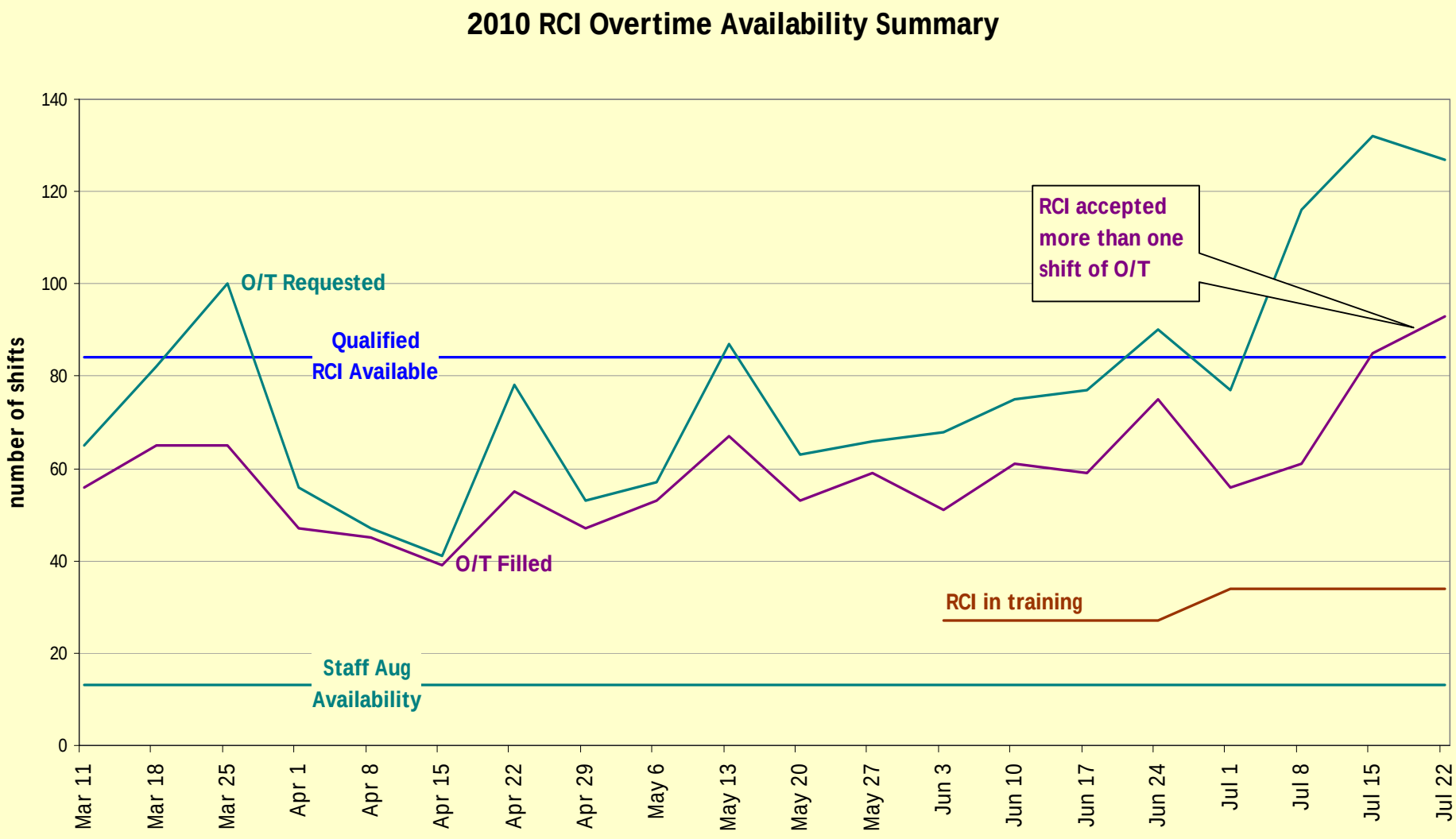
- **Purpose:** *Monitor* and gauge the availability, capability, and competency of SRR personnel to safely execute required work scope.
- **Expectation:** *Ensure competency and stability of workforce*
  - RadCon Inspector overtime shifts requested per week in LWO vs. filled per week.

    Action taken: Evaluating staffing, worker attitudes, time of year, etc. to determine reason for increase in gap and as well as increase in overtime shifts requested by facility.
  - Open positions within SRR vs. filling with staff augmentation

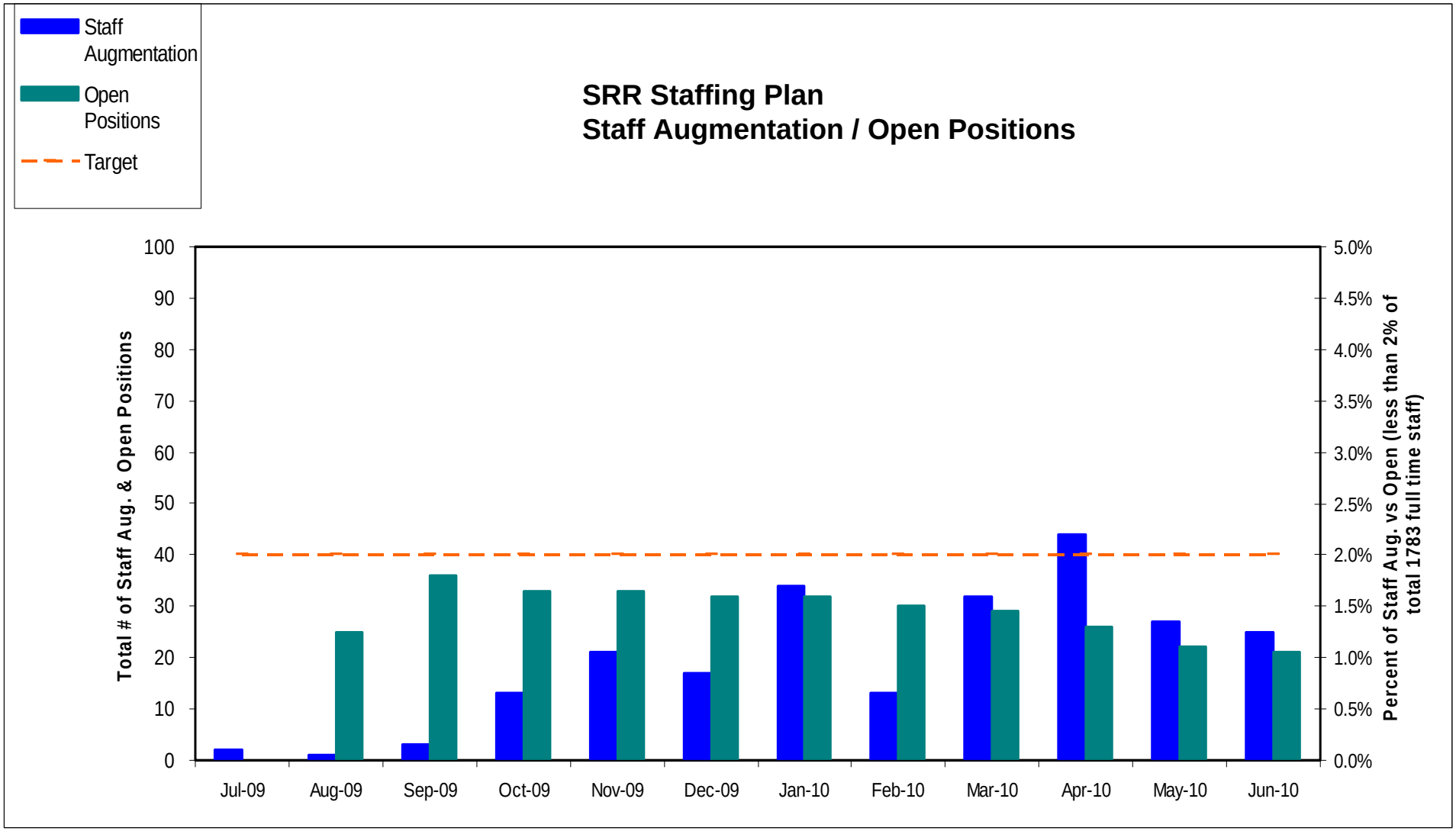
    Action taken: Evaluating staffing needs to support accelerated closure schedule and updating hiring plans to reflect growing demand for key positions.
  - Training Man-hours (per employee per month) in nuclear safety, regulatory, process, and disciplined operations

    Action taken: Evaluating new metric to trend percentage of worker time allocated for training vs. availability for work.

People


2010 RCI Overtime Availability Summary
number of shifts
140
120
100
80
60
40
20
0
Mar 11
Mar 18
Mar 25
Apr 1
Apr 8
Apr 15
Apr 22
Apr 29
May 6
May 13
May 20
May 27
Jun 3
Jun 10
Jun 17
Jun 24
Jul 1
Jul 8
Jul 15
Jul 22
O/T Requested
Qualified
RCI Available
O/T Filled
RCI accepted more than one shift of O/T
RCI in training
Staff Aug
Availability

People


Staff Augmentation
Open Positions
Target
SRR Staffing Plan
Staff Augmentation / Open Positions
Total # of Staff Aug. & Open Positions
Percent of Staff Aug. vs Open (less than 2% of total 1783 full time staff)
100
90
80
70
60
50
40
30
20
10
0
5.0%
4.5%
4.0%
3.5%
3.0%
2.5%
2.0%
1.5%
1.0%
0.5%
0.0%
Jul-09
Aug-09
Sep-09
Oct-09
Nov-09
Dec-09
Jan-10
Feb-10
Mar-10
Apr-10
May-10
Jun-10

Facility Key Leading Indicators

Plant

- **Salt Solution Processing**
  - Gallons Sent to Salt Disposal Units
    - Gallons Processed Per Run
    - Saltstone Process Shutdown Causes

People

- Disciplined Operations
  - ORPS Events
    - Assessments & Management Field Observations
    - Drill Performance

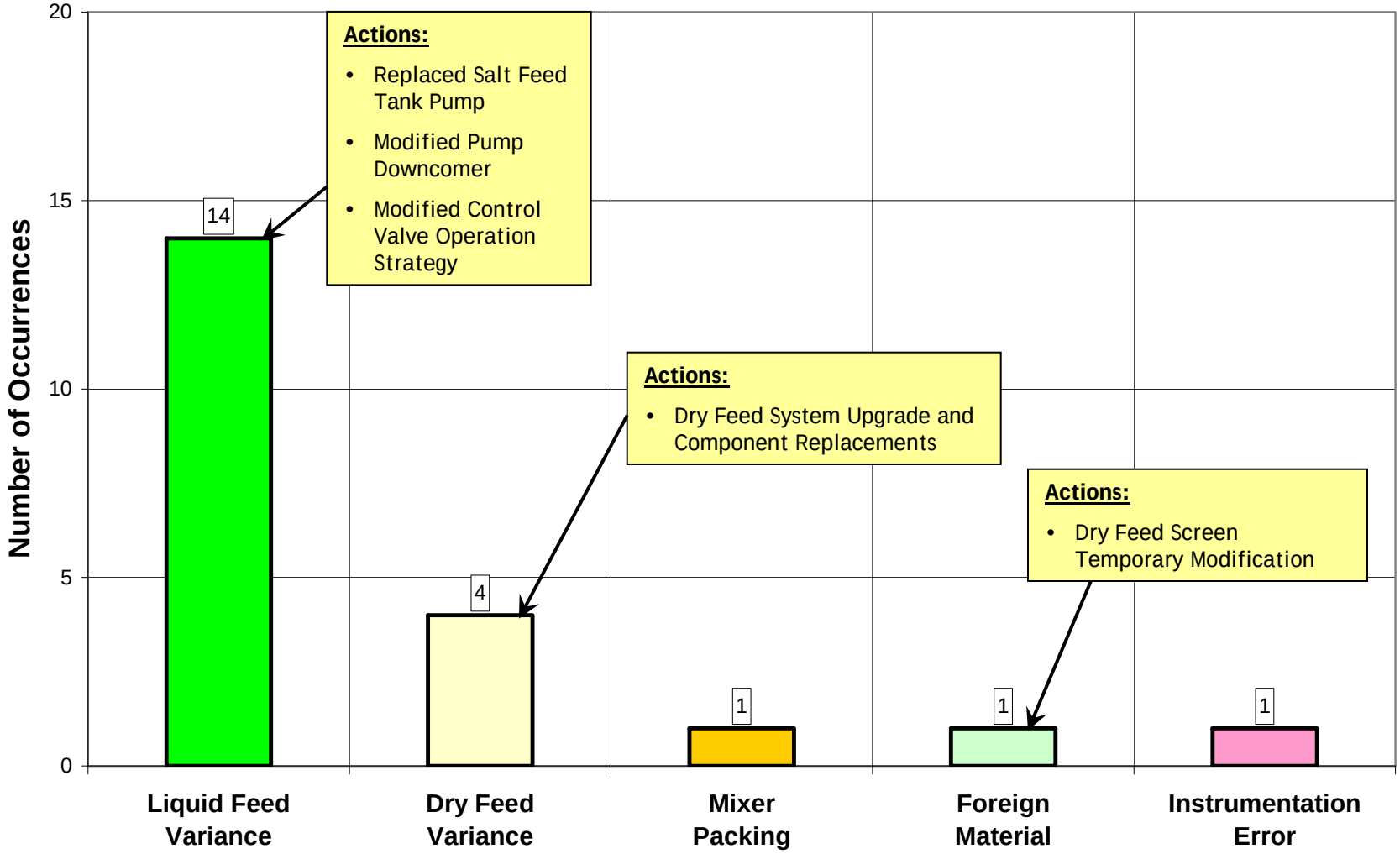
Process

- Industrial Safety
  - Injuries
    - BBS Observations
- Radiological Safety
  - Contamination Event
    - Radiological Entries w/o Issues
  - Exposure
    - Cumulative Dose vs ALARA Goal
- Environmental Protection
  - Vault Damp Spots
    - New Damp Spot Reports

Legend

- **Functional Area**
  - Mission to be achieved or Detriment to be avoided
    - Leading Indicator

Plant Conditions



Unplanned Process Shutdowns

December 2009 through July 2010

Other Data Inputs and Analysis

Performance Input from SRR Workforce:

- ✓ Job Observations
- ✓ Crew Brief/Shift Turnover
- ✓ Local Safety Improvement Team
- ✓ Team Meeting
- ✓ Review of Behavior Based Safety Observation Data

Other Data Inputs and Analysis

Performance Input from SRR Workforce:

- ✓ Senior Review Group for Technical Issues
- ✓ Performance Analysis and Appraisal Group
- ✓ Corrective Action Review Boards
- ✓ Management Review Team
- ✓ Executive Safety Quality Board

Conclusions

- Strong foundation of leading indicators enhance nuclear safety with targeted rules of engagement.
- Effective tool resulting in “actionable” conclusions.
- A ‘living’ process with frequent senior management review and ownership.

key mission functions ⟷ key safety functions

Questions and Answers

References:

SRR Approach to Safety Management via Leading Indicators, *A White Paper*, Dave Olson, February 23, 2010, SRR-DPM-2010-00005

DNFSB Perspective on Metrics and Safety Reform, Peter S. Winokur, Ph.D., Chairman DNFSB, Presentated at the EFCOG Annual Executive Council Meeting, june 24,2010.

BP Safety Record Lags Sector Peers: Could Oil Spill Disaster Change How We Value ESG Risks? http://blog.riskmetrics.com/esg/2010/04/bp-spil-safety-record.html