Know Your Risk Level

Unlock the Value of Your PHAs

Prioritized for Impact
PHA Recommendation Optimization
Compressor Station Case Study

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# How Safeguards Reduce Risk

![Risk Matrix Diagram]

- **Mechanical Safeguards**
- **Operators Rounds**
- **Recommendations**

## Likelihood vs. Severity Matrix

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<th>Likelihood</th>
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*Note: The matrix demonstrates how safeguards can reduce risk by lowering the likelihood and severity of potential incidents.*
**Typical PHA Output**

**Raw List of Recommendations**

![Image of PHA worksheet showing recommendations with associated Risk Levels.](image)

*Fig.* HAZOP worksheet showing recommendations with associated Risk Levels. Typical approach taken by owner/operators follows a “do all of the reds first” sequence. Risk Alive is proposing that an iterative calculation applied to recommendations based on criticality will more efficiently reduce risk in fewer number of recommendations.
Recommendation Implementation Issues

Top 3 Issues Concerning Owner/Operators

**Issue #1:**
Industry typically uses the **KPI**: “Number of Recommendations Implemented”

**Impact:**
Incentivizes **quantity** of actions taken, not the **quality** or value of actions.

**Key Question:**
How do we quantify the value or impact of a recommendation?

**Issue #2:**
“Do all the reds first” approach does not consider how risk changes over time as recommendations are implemented

**Impact:**
High and Very High Risk scenarios may not be addressed **quickly enough**. Some recommendations may be implemented which are **not required**.

**Key Question:**
How can we efficiently re-prioritize recommendations as they are implemented?

**Issue #3:**
Each layer of an organization has **differing understanding** of PHA, Risks and Process Safety

**Impact:**
Difficult to justify costs, time and effort related to recommendations. Approval conversations can be difficult and time consuming.

**Key Question:**
How do we clearly communicate the importance of specific recommendations to other groups?
Why Optimize Recommendation Implementation?

Cost Reduction
May eliminate the need to implement some recommendations based on the risk reduction provided by prior recommendations.

Risk Reduction
Reduces the amount of time spent operating a facility with identified high and very high risk scenarios still posing threats.

Improved Communication
Provides a clear picture of the priority and value of each recommendation identified in a Risk Assessment.

Implementation Quality
Through an understanding of the value of each recommendation, quality of implementation improves.
Case Study Goal:
Significantly improve risk reduction in an organization by identifying the optimal order of implementing recommendations through an iterative calculation.

Potential Impacts:
- Cost Reduction by eliminating need to implement some recommendations based on prior risk reductions
- Risk Reduction by reducing the amount of time in operation with identified high risk scenarios
- Improved Communication by providing a clear picture of the priority and value of each recommendation
- Implementation Quality through understanding of the value of each recommendation
Study Results

Compressor Station
Fig. Line graph shows the optimal sequence of recommendations which reduce the most risk with the fewest number of recommendations. Area graph shows the reduction of high and very high risk scenarios as recommendations are implemented.

**NOTE:**
- Risk Index Ratio reduced by 62% in just 2 recommendations.
- Number of High and Very High Risk Hazardous Scenarios reduced by 51% in just 5 recommendations

**Optimal Recommendation Sequence**
Actual Recommendation Sequence

Fig. Line graph shows the actual sequence of recommendations as implemented by . Area graph shows the reduction of high and very high scenarios as recommendations are implemented. Significant risk reduction and reduction of high and very high risk scenarios was not seen until the 12th recommendation was implemented (R13)
Opportunity for improved risk reduction and cost reduction through the use of Recommendation Sequencer.

Fig. Comparison of Optimal (Blue) and Actual (Orange) approach to recommendation implementation order.
Optimal vs. Actual Non-tolerable Scenarios

High and Very High Risk Scenarios (Optimal vs Actual)

NOTE:
- High and Very High Scenarios eliminated more efficiently in fewer recommendations using the Optimal sequence (blue).

Fig. Comparison of Optimal (Blue) and Actual (Orange) approach to recommendation implementation order.
Actual Recommendation Sequence by Date

NOTE:
- A seven (7) month period passed before significant reductions in Risk Index Ratio and number of non-tolerable scenarios were reduced. Use of Recommendation Sequencer would likely have reduced this period.

Fig. Actual recommendation sequence showing Risk Index Ratio (left axis) and number of non-tolerable scenarios (right axis). Graph shows 6 month period where recommendations are being implemented with little impact on Risk Index Ratio and number of non-tolerable scenarios.
Remaining Recommendations

**Fig.** Remaining recommendation order using optimal recommendation sequence calculation
Key Learnings

1. Experienced a significantly longer period of time in the presence of non-tolerable scenarios using a “do all the reds first” approach as compared to following the Optimal sequence as closely as practical. Using the Optimal sequence, very high risk scenarios could have been addressed up to 7 months earlier.

2. Recommendation Optimization would have positively impacted the speed and quality at which specific high priority recommendations were implemented. All stakeholders would have understood the risk reduction value which may have influenced the quality of the implementation, and therefore, the effectiveness of the recommendation.

3. Recommendation Optimization would have assisted in the communication and alignment of management, PSM and operations resources on the importance and sequence of recommendations.
Corporations and KPIs
Corporations and KPIs

“Organizations Becomes Their Metrics”
PRESENTATION FINISHED

ANY QUESTIONS?
Thank You

Interested in Learning more?

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