EXCELLENCE BY DESIGN
INTEGRATING EHSS INTO PROJECT DESIGN REVIEW

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- Why EHSS Design Reviews
- Amgen EHSS Design Review Process
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WHY EHSS DESIGN REVIEWS?

- Designing out or eliminating EHSS Hazards
- Designing in safeguards based on hierarchy of controls
- Code Compliance
- Integrating Lessons Learned
- Integrating internal & external guidance
Prevention of Injuries and Illnesses

- Asphyxiated employee found in public restroom adjacent to mechanical compressor room
- Compressor served recreational ice rink within shopping center in Alabama
- Hazmat team found oxygen level at 16% in restroom, victim pronounced dead
  - 19-21% O₂ required for human respiration
  - Toxic levels of R22 Freon in victim’s blood
- Refrigerant leak occurred
  - Was not automatically detected by leak sensor
  - Not mechanically ventilated at an adequate rate
- OSHA citation issued to victim’s employer
  Leak sensor not functional that would actuate or was interlocked with a ventilation system capable of exhausting air from a leak at the rate specified by industry standard ASHRAE 8.13.5 / Mechanical codes
EHSS AT AMGEN IS AN INTEGRAL PART OF FRONT END PLANNING

- Identifying Hazards Early in the project
- Identifying Codes, Regulations, Long-lead items early
- Proposing coherent, consistent best practices from common knowledge-base
- Verifying all EHSS requirements are in place and built to plan (detailed checklist).
WHY EHSS DESIGN REVIEWS?

EHSS Design Review Areas of Improvement

- Eliminate or reduce EHSS impacts
- On-time and within budget project delivery
- Reduced Costs due to add-on and re-work
- Code Compliance

- Inherently Safe-Regulatory compliant equipment/facility
INTEGRATION – ENGINEERING/FINANCIAL PROCESSES

- Engineering Project Delivery (EPD)
  - Design Evolution, Design Reviews (Docs)
  - Safety Code Compliance
  - EPGN, EGN, ETL Networks

- Investment Lifecycle Management
  - Monthly project review
  - >$300K (US Dollars)
Integrates EHS Design Review in Amgen’s Engineering Project Delivery Process

Identify Hazards  Assess Risk  Control Exposure  Monitor Results
ROLES OF THE DIFFERENT ACTORS IN ALL PHASES OF PROJECT

P1 Origination
P2 Planning & Basis of Design Review
P3 Detailed Design Review
P4 Execution Operational Readiness Review
Close Out
Knowledge acquired via the experience of a group of EHS experts This is the key to the intelligence of dEHSign and what makes dEHSign unique among classic project management tools

Questions are organized into categories and sub-categories (ex: Environment, waste disposal, Natural disasters, floods; Fire safety, Architecture)

Questions are raised throughout the project lifecycle: Origination, Basis of Design, DE/Construction, ORR

Regulations, guidelines and best-practices are proposed where applicable

3000+ QUESTION KNOWLEDGE BASE
As the project moves forward, the Decisional Aid and Document Management Tool will create a project-specific EHS Project Management Plan and Design Review Comment Resolution Forms that correspond to pertinent EHS issues.
• General Info
• Project List
• Function buttons
• Notifications
• Observation
Remark
PROJECT DESCRIPTION

- General Info
- Drop downs
- Review Roles
- Upload Files
- Dates
- Lesson Learned/Gate Reopening
DEHSIGN PROJECT LIST

- Sorting
- Reporting
- On time
- Notifications
- Small Project
### Phase 1: Origination Question Set (P1 I2)

### Phase 2: Conceptual - Basis of Design (P2 I1)

### Phase 3: Detailed Engineering (P3 I1)

### Phase 4: Operational Readiness Review (P4 I1)

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<th>Category</th>
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<th>Statement</th>
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<td>ORR6010-0</td>
<td>Slip, Trip, Fall</td>
<td>Civil/Structural</td>
<td>Stairs, ladders, scaffolding, other climbing structures are installed in accordance with Amgen standards and the design.</td>
<td>✔️</td>
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EHSS TEMPLATE/BACKGROUND INFORMATION

- Question Sets for Each Gate
- Linked across Project Phase
- Project Comments Identified
- Summary Reports by Gate
DIRECT LINE OF COMMUNICATION AMONG TEAM MEMBERS

- dESHign manages all communications and discussions among the team.
- Members are notified via a custom discussion tool. This triggers the decision making process.
EHSS requirements, decisions, and resolutions are recorded and traced, thus allowing:

- Consultation of Design Reviews in Progress - Gate by Gate
- Resource Planning
- Traceability of the decision-making process
- Continuous Improvement of lessons learned into the knowledge base (e.g. API Facility)
RESULTS TO DATE

2017 ILM
Total Projects = 70
Projects On time = 60
Total 86%
Final Metric = 97%

Extracted data table of all projects removed

=319 Total Projects in process in 1 of the 4 gates
SMALL PROJECT FEATURE - SCALEABILITY

Rolled out in Q3 2017
7 customized small project types
Achieves
- Efficiency (e.g. Annual Infrastructure, AML)
- Enhanced compliance

Small Project
Total of 30 projects
Savings ~
585 Hours / 0.3 FTE
equivalent actual savings
THE FUTURE OF DEHSIGN

- Small Project
  - expansion into site change control processes
  - Add further custom question sets (PD, D&D….)

- Predictive Resources (e.g. Hazop, Travel, Consultants, etc.)
  - Pre Startup Safety Review (PSSR) Integration

- Data Entry for Guidance/Notes/Safety Alerts/Best Practices

- Field Tools (Ipad)

- Enhance Data Mining/Metrics/Cross project data mining

- Design Build (2019)
SUMMARY-KEY POINTS

✓ dEHSign reviews EHSS aspects of a project from its origination

✓ The best-practice solutions are integrated into the project at the beginning.

✓ Changes impacting EHSS results are immediately identified

✓ Documentation and examples of best practices are available through the central knowledge base

✓ All exchanges and decisions among team members are recorded and tracked

✓ Projects are delivered on-time, on-budget
FOR MORE INFORMATION ABOUT DEHSIGN

http://hse-by-design.com