



EXCELLENCE BY DESIGN
**INTEGRATING EHSS INTO PROJECT DESIGN
REVIEW**

JONATHAN GAST
DIRECTOR EHSS AMGEN



INTEGRATING EHSS INTO PROJECT DESIGN REVIEW



Contents

- Why EHSS Design Reviews
- Amgen EHSS Design Review Process
- dEHSign Tool
- Results to date
- The Future of dEHSign



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



WHY EHSS DESIGN REVIEWS ?

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



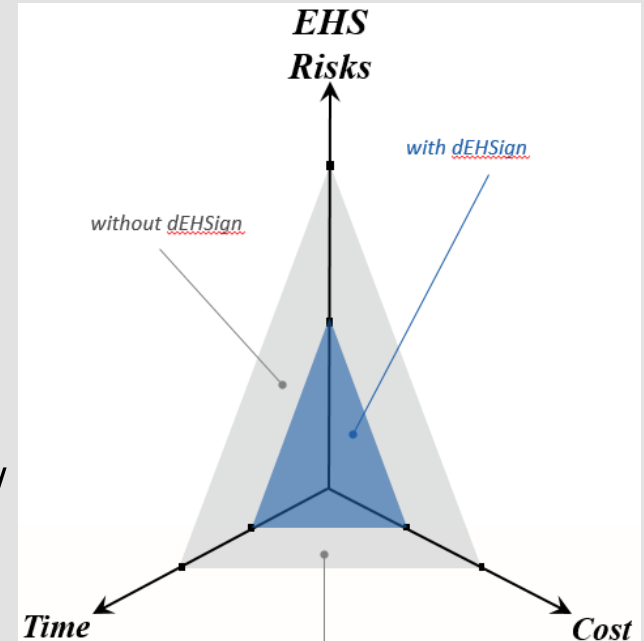
EHSS AT AMGEN IS AN INTEGRAL PART OF FRONT END PLANNING

- 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

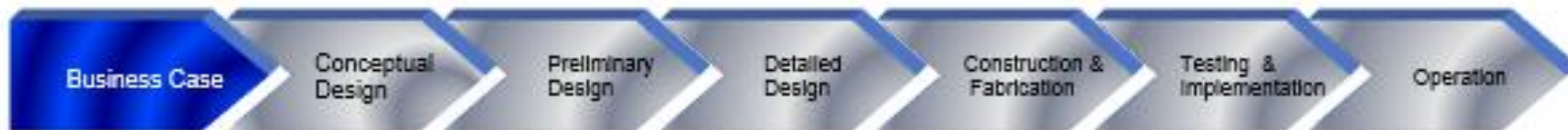
- Eliminate or reduce EHSS impacts
 - On-time and within budget project delivery
 - Reduced Costs due to add-on and re-work
 - Code Compliance
- Inherently Safe-Regulatory compliant equipment/
facility



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

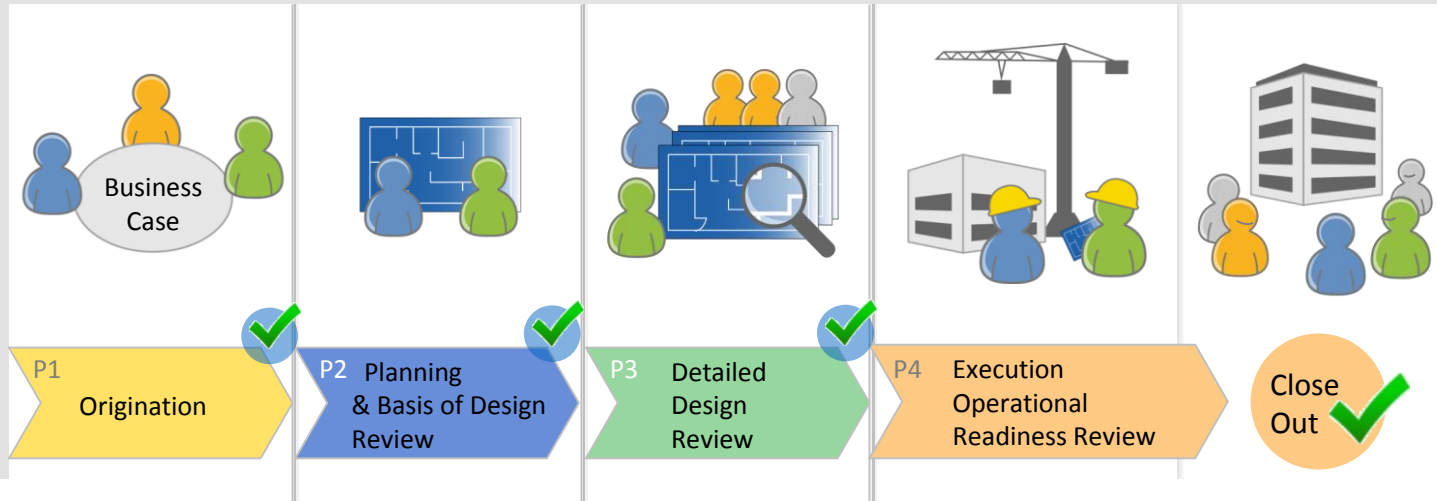
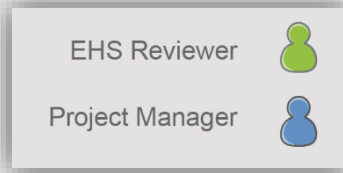
Assess Risk

Control Exposure

Monitor Results



ROLES OF THE DIFFERENT ACTORS IN ALL PHASES OF PROJECT



3000+ QUESTION KNOWLEDGE BASE

- 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

WHAT DOES THE DEHSIGN TOOL LOOK LIKE?

The screenshot displays the dEHSign web application interface. At the top left is the dEHSign logo with a plus sign and a speech bubble icon. Below the logo, the heading "The 4 phase process" is followed by a horizontal flow diagram. The diagram consists of five chevron-shaped boxes: "Intro" (white), "P1" (yellow), "P2" (blue), "P3" (green), and "P4" (orange). Above the flow diagram, the phases are labeled: "Phase 1: Origination", "Phase 2: Conceptual (BoD)", "Phase 3: Detailed Engineering", and "Phase 4: Operational Readiness Review".

To the right of the flow diagram is a section titled "Access Your Account". It contains three buttons: "Login", "Request an account", and "Request new password". Below these buttons are two input fields: "E-mail *" and "Password *". A "Log in" button is positioned below the password field.

Below the "Access Your Account" section is a section titled "Project Manager without an account:". It contains the text "Complete a dEHSign Project Origination form, save it on your computer then request an account" and a "Complete Project Origination Form" button.

At the bottom of the screenshot, there is a large, faint watermark of the dEHSign logo.

As the project moves forward, the Decision 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.

Jonathan Gast | Logout

Welcome Jonathan Gast, (Core team member)

- News & Articles 0
- User's Observations & Remarks 2
- Support

Owner	Project name	Last update
Jonathan Gast	test Notification	12/12/2017 - 17:54
Jonathan Gast	Eric project	12/12/2017 - 17:53
Jonathan Gast	A-XXX Design Development for Modular DS MoF Facility	12/12/2017 - 17:53
		12/12/2017 - 17:47
		12/12/2017 - 14:41
		12/12/2017 - 14:20

Access the project list

Create a new Project

Create Small Project

Access the Administration's page

Upload a new Project from PDF

Notifications

The project Eric project has been assigned to you. 7 days ago

- General Info
- Project List
- Function buttons
- Notifications
- Observation Remark

PROJECT DESCRIPTION

dEHSign

Project Name : test Notification | Jonathan Gast | Logout
Project ID : 18620000
Project Status : Normal | Jonathan Gast (Core team member)

P111 - Phase 1 : Project Description
test Notification

Date
12/05/2017

Project Name *
test Notification

EHS Reviewer (Project Owner)
Jonathan Gast

Project Number
1

Sponsor Name

Project Delegate
Choose some options

Site
TBD

Capital Project
N/A

Scale of Operation
- None -

Project Manager
Mike Walling

Project Description
1

Project Team
Choose some options

Files
[Add a new file](#)
Choose File | No file chosen

Lesson Learned

Inactive Project

Estimated Completion Date

Gate 1	Gate 2	Gate 3	Gate 4
12/06/2017	12/12/2017	12/18/2017	12/25/2017

Actual Completion Date

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Here you can modify Project Information

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

DEHSIGN PROJECT LIST

Project selection

Current projects only

Site Scale of operation Capital project Project status

Project manager Project number Project Name EHS Reviewer

Operations

Site	Project Name	Project Num.	EHS Reviewer	PM Name	Estimated				Actual Date of Completion				Status	Last update
					1	2	3	4	1	2	3	4		
ARBA	[REDACTED]	C01149	Jonathan Gast	[REDACTED]	08/01/2017	12/30/2017	-	-	07/11/2017	-	-	-	Normal	12/12/2017 - 18:08
ATO	[REDACTED]	C01204	Jonathan Gast	[REDACTED]	12/29/2017	01/31/2018	06/29/2018	03/29/2019	-	-	-	-	Normal	12/12/2017 - 18:07
TBD	test Notification	1	Jonathan Gast	Mike Walling	12/06/2017	12/12/2017	12/18/2017	12/25/2017	-	-	-	-	Normal	12/12/2017 - 17:54
ATO	Eric project	1	Jonathan Gast	ProjectManager S1.1	12/05/2017	-	-	-	-	-	-	-	Normal	12/12/2017 - 17:53
Other	[REDACTED]	C01148 & C00306	Jonathan Gast	[REDACTED]	02/13/2017	04/01/2017	05/31/2017	-	02/13/2017	11/17/2017	-	-	Normal	11/22/2017 - 19:44
Other	[REDACTED]		Jonathan Gast	[REDACTED]		11/30/2017	12/31/2017	03/31/2018	-	-	-	-	Normal	11/22/2017 - 17:08

- Sorting
- Reporting
- On time
- Notifications
- Small Project



EMERGENCY GENERATOR PHASE 1-4

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)

N°	+-	Category	Sub-Category	Statement	Yes	No	Partial	NA
ORR6010-0		Slip, Trip, Fall	Civil/Structural	Stairs, ladders, scaffolding, other climbing structures are installed in accordance with Amgen standards and the design.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Print Out Export to EXCEL Close Gate Comments Management Flagged Unsure QUIT PROJECT



EHSS TEMPLATE/BACKGROUND INFORMATION

- Question Sets for Each Gate
- Linked across Project Phase
- Project Comments Identified
- Summary Reports by Gate

The screenshot displays a Microsoft Excel spreadsheet titled 'City of Design Tool - working template? (Mode de compatibilité) - Microsoft Excel'. The main spreadsheet has columns for 'Category', 'Sub-Category', 'Question', 'Yes', 'No', 'Uncertain', 'Guidance', and 'Notes'. The 'Guidance' column contains references to standards like 'SARA Title III', 'Angen Global EHS Standard SS0000', and 'National Environmental Policy Act (NEPA)'. The 'Notes' column contains comments such as 'These questions are to be completed from the start of the project' and 'Note: Timeframe is 300%'. Below the main spreadsheet, there are two summary tables. The first table lists project items with columns for 'Conc. Num.', 'Conc. Sup.', 'Conc. Sub.', 'DO Num.', 'DO Sup.', 'Category', 'Sub-Category', 'Question', 'Y', 'N', and 'NA/Exc on'. The second table lists items with columns for 'ID', 'ID Num', 'DO', 'ORR', 'ORR Sep', 'Category', 'Sub-Category', 'Description', 'Yes', 'No', 'Partial', and 'Notes'. This second table includes detailed descriptions of fire pump safety measures, such as 'The fire pump has been commissioned, tested, inspected and approved by FRI and local A&L' and 'Secondary containment has been provided if a diesel fuel fire pump'.

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.



Item ID : C0060
Will the project result in any new or modified generation of any hazardous wastes ?

Angelina made a comment
5:28 PM Mar 7, 2014 [Edit](#) [Delete](#)

[@george@starproject.com](#) George, can you take a look at the response I wrote and make sure I got everything right ?

George Sure, I'll take a look right now. 5:33 PM Mar 7, 2014

discussion attachment

Adding a comment will continue this discussion... [cancel](#) [post](#)

You may contact any team member by typing "@" followed by email address (eg.: @brad@starproject.com will notify Brad of your comment)"

EHS Reviewer (Project Owner) :
Michael
Project Manager :
Angelina
Project Delegate :
Project Team :
John
Brad
Scott
George
Peter
Antonio
Emma

add a team member
online

ACCOUNTABILITY - TRACEABILITY

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

33

68

103

115

=319 Total Projects in process in 1 of the 4 gates

SMALL PROJECT FEATURE - SCALEABILITY

SP CREATE A SMALL PROJECT

Select the Small Project Type your Small Project will be based on.

Name Description keywords

Number	Name	Description	Creation Date
<input type="radio"/> 17483	SPT 005 Automation/New Server (with Infrastructure/Facility Modifications)	Small project to evaluate new or modified automation changes that also include modifications to the bldg infrastructure. If the scope of the project impacts fire protection of the room(s...	10/09/2017 - 14:20
<input type="radio"/> 15451	SPT001 - Turnkey Equipment with Chemicals/Bio/Rad	Small Project : Turnkey Equipment with Chemicals / Bio / Radiation	09/05/2017 - 01:12
<input type="radio"/> 15350	SPT002 - Turnkey Equipment without Chem/Bio/Rad	Small Project : Turnkey Equipment without Chemicals / Bio / Radiation	08/03/2017 - 12:36
<input type="radio"/> 15452	SPT003 - Small Bldg Modifications (without chemicals or equipment)	Small building/infrastructure changes. Project does not include chemicals or new equipment	09/05/2017 - 01:12
<input type="radio"/> 15450	SPT004 - Automation/NewServer (Without Facility Modifications)	Automation/NewServer (Without Facility Modifications)	09/05/2017 - 01:11
<input type="radio"/> 15454	SPT006 - Office Leases	Office Leases	09/05/2017 - 01:14
<input type="radio"/> 15453	SPT007 - Small Office or administrative spaces	Small Office or administrative spaces	09/05/2017 - 01:13

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

➤ 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>