

SPD xxxx
PROCESS DESIGN MANUAL
HAZID/ENVID PROCEDURE

REV. : 0

DATE : 2013.07.19



SAMSUNG
ENGINEERING

	PROCESS DESIGN MANUAL HAZID/ENVID PROCEDURE	SPD
		REV. : 0
DATE : 2013.07.19		PAGE i OF i

CONTENTS

1.0	SCOPE	1
2.0	PURPOSE	1
3.0	DEFINITIONS AND ACRONYMS	1
4.0	RESPONSIBILITIES	1
4.1	HAZID/ENVID Chairman.....	2
4.2	HAZID/ENVID Secretary.....	2
4.3	Team Members	3
5.0	IMPLEMENTATION	3
5.1	Procedure	3
5.2	Documentation.....	4
6.0	REVISION HISTORY	5
7.0	ATTACHMENTS	6
	ATTACHMENT 7.1 - Guide words	6
	ATTACHMENT 7.2 - Risk Ranking Matrix.....	8
	ATTACHMENT 7.3 - HAZID/ENVID Worksheet.....	9

	PROCESS DESIGN MANUAL HAZID/ENVID PROCEDURE	SPD
		REV. : 0
DATE : 2013.07.19		PAGE 1 OF 9

1.0 SCOPE

This project procedure defines the generic objectives of Hazard Identification (HAZID) and Environmental Hazard Identification (ENVID) studies for all process plants, general facilities, storage and handling, utilities, other services and / or off-sites of project. This procedure can be implemented either at the FEED phase, detailed design phase or construction phase of the PROJECT. SECL is responsible for ensuring that the actions raised during the HAZID and ENVID are adequately addressed.

2.0 PURPOSE

HAZID (Hazard Identification) and Environmental Hazard Identification (ENVID) are a technique for early identification of potential hazards and threats. These techniques involves assessments of the significance of potential impact related to a new project , modifications or an activity affecting people, assets, and the environment or within the vicinity.

3.0 DEFINITIONS AND ACRONYMS

The following definitions are relevant to this procedure:

CONSEQUENCE	A result of a deviation
DEVIATION	A departure from the design and operating intention
GUIDE WORD	A word or phrase used to stimulate the HAZID/ENVID team to think about potential hazards and their causes
HAZARD	Materials and / or situations having the potential to cause damage, illness, injury or other form of loss
NODE	A defined section of process plant, general facilities, storage and handling, utilities, other services and off-sites to be examined
SAFEGUARD	Engineering or administrative measure that will eliminate or reduce the likelihood of a hazard occurrence and / or severity of consequence.

4.0 RESPONSIBILITIES

A HAZID/ENVID is a team review consisting of independent and project team members, of which should have sufficient experience and knowledge so that most questions can be answered on the spot. As a minimum the team shall be comprised of:

	PROCESS DESIGN MANUAL HAZID/ENVID PROCEDURE	SPD
		REV. : 0
DATE : 2013.07.19		PAGE 2 OF 9

- Team Chairman (To be provided by Client or SECL)
- Design Process Engineer (Client / SECL)
- Process Engineer (Client / SECL)
- Licensor Representative (where applicable)
- Construction/Commissioning Representative (Client / SECL)
- Operation Representative (Client / SECL)
- Secretary

Note: Other part time attendees (disciplines) can be requested to be available on demand if a particular issue is raised that requires detailed explanation..

4.1 HAZID/ENVID Chairman

Chairman shall lead the team through the HAZID/ENVID techniques.

- Prompt the brainstorming effort
- Manage the discussion without compromising the creativity of the team
- Prepare guidewords relevant to the project scope.
- Identify the key issues as they are raised by the team.
- Record the findings and ensure that the minutes fully reflect the points identified.

Chairman requires a high level of technical and managerial skills. He needs to remain independent of the discussions and it is recommended that he is not associated with the project. To recognize the HSE issues as they are raised, he needs to have wide ranging technical expertise applicable to the type at studied project.

To manage the team and the study he needs team management, time management and communication skills.

The HAZID/ENVID chairman is responsible for final editing and issuing the report.

4.2 HAZID/ENVID Secretary

It is important that clear and correct records of the HAZID/ENVID study are kept, that the report lists the hazard and environment issues identified, and that the recommended actions are clearly defined. The HAZID/ENVID Team Secretary should be familiar with HAZID/ENVID procedures, engineering terminology and the selected software. S(he) fills in the work sheets as the study proceeds as directed by the HAZID/ENVID Chairperson / Facilitator.

The HAZID/ENVID studies will be conducted in the English language and therefore the HAZID/ENVID Team Secretary is required to have a good command of the English language.

	PROCESS DESIGN MANUAL HAZID/ENVID PROCEDURE	SPD
		REV. : 0
DATE : 2013.07.19		PAGE 3 OF 9

4.3 Team Members

The remaining HAZID/ENVID team members should be suitably qualified and experienced and have a detailed knowledge of the way in which the design is intended to work.

5.0 IMPLEMENTATION

5.1 Procedure

The HAZID/ENVID study meeting involves the following steps:

1. Define the study scope including defining project aspect covered in the study, location and timing of the study.
2. Select study team chairman and team members.
3. Develop a set of guidewords in the format of checklist by the Chairman.
4. Define the nodes in each facility, a node should not be too large or complicates. It should have typical boundaries and perform specific functions. Identify the hazard materials, activity, events or operations in each node for each project phase. E.g. Construction, pre-commissioning, commissioning, and operation.
5. Ensure that all team members are familiar with the study scope, HAZID/ENVID methodology. A project representative shall introduce the team to the project facility and layout, including activity description/schedule.
6. The chairman will nominate a category from the checklist application to the studied node, and then ask the team to consider each guideword.
7. In each case the team will analyze each guide word (helped by the example given in the checklist, Attachment 7.1) to identify any hazard and its potential effects which may be entered on the worksheets. Guide words to be challenged for comprehensiveness to add or remove.
8. The brainstorming process will then be used to identify all the potential threats or causes of the release of the hazard.
9. The team will analyze the appropriate controls that should be, in place to prevent or control each threat.
10. Risk Rank each Hazard and assign the HSE priority (Attachment 7.2 High, Medium, and Low).

	PROCESS DESIGN MANUAL HAZID/ENVID PROCEDURE	SPD
		REV. : 0
DATE : 2013.07.19		PAGE 4 OF 9

11. When the existing control measures are found not adequately, the team will assign an action party to develop additional control measures.

5.2 Documentation

The HAZID/ENVID worksheets can be filled in either manually or electronically. The contents of the worksheets can be dictated to the secretary by the Chairman in the meetings as each finding is identified. The report shall be issued to a distribution list specified by the project HSE Manager and Lead Design HSE engineer.

Typical Reporting Contents

Summary

- Identify the principal features of the facilities that contribute to Hazards and in particular any special design of conditions;
- Identify the number of recorded actions and highlight the number of major findings;
- Provide a summary of the major findings categories identified.

Introduction

- list the facilities reviewed and identify and facilities that were excluded ;
- Record that data of the first meeting, the duration and location;
- Contain a list of the attendees, their roles (or job titles) and their employer;
- Note any major concerns regarding the standard of the layouts and supporting documentation;
- Highlight any cross referencing that is necessary by the readers of the project;
- Give a brief description of the contents of the remaining sections.

System description

- This section should contain a simple high level description of the development and a description of the location of equipment items (e.g. process, utilities, and power generation).

HAZID/ENVID worksheets

- A brief statement of the number of actions recorded and the range of action numbers on the worksheets;
- A table of the area, section, activity number, their descriptions and the range of action numbers against each;
- Any key information needed to understand the worksheets (e.g. acronyms, initials).

A typical HAZID/ENVID worksheet is attached in Attachment 7.3.

Appendices

APPENDIX should contain reference drawings and documents in tabular form. The tables should include the drawing/document number, title and revision.

APPENDIX also should contain the list of HAZID/ENVID hazards and guidewords used in the HAZID/ENVID.

	PROCESS DESIGN MANUAL HAZID/ENVID PROCEDURE	SPD
		REV. : 0
		PAGE 5 OF 9

DATE : 2013.07.19

6.0 REVISION HISTORY

Rev	Date	Page	Revision status
0	2013.07.19	All	- Newly prepared as HAZID/ENVID Procedure - Original Dept. : Process Engineering Team - Prepared by : M.J. Yoon - Reviewd by : W.H. Cho, D.W. Kim - Approved by : S.B. Lee

	PROCESS DESIGN MANUAL HAZID/ENVID PROCEDURE	SPD
		REV. : 0
		PAGE 6 OF 9

7.0 ATTACHMENTS

ATTACHMENT 7.1 - Guide words

The checklist provided in this appendix recognizes the major hazards found by experience of previous HAZID/ENVID studies. It is not intended to be totally exhaustive and constant feedback is appreciated to check all hazards in the plant.

Hazard	Guide words
Natural Hazard	• Climate extremes • External scrub fires • Earthquakes • Lightning • Subsidence • Geo-hazards • Corrosion • Sand and dust • Previous site contamination
Security Threats	• Internal security breakdown • Terrorist activities, acts of war • Social instability, industrial relations problems
Effect on Surroundings	• Visual, noise, light, pollution • Social/economic impacts • Land Take • Water Take • Use of energy, use of other natural resources
Infrastructure	• Transportation • Accommodation • Power • Communications
Discharges	• Continuous to air: • - Flare • - Flue gas from furnaces • Continuous to water: • backflush effluent at river off-take • Construction discharge water • Continuous to land • Emergency Discharges: flare only • Disposal of waste, Waste Management Plan
Typical Layout Hazards	• Orientation with respect to prevailing winds • Segregation of process hazards from personnel • Vulnerability (to fire, smoke, missiles, blast,

	PROCESS DESIGN MANUAL HAZID/ENVID PROCEDURE	SPD
		REV. : 0
DATE : 2013.07.19		PAGE 7 OF 9

	- vehicle impacts etc) - Access for fuel delivery, maintenance, construction & future expansion - Hot surfaces and ignition sources
Fire and Explosion Hazards	- Pipelines and flow lines, hydrocarbon inventories - Flammable material (improper storage, operator error, separation, alternative products) - Sources of ignition. - Fire protection and response (active and passive) - Fire and gas detection and shutdowns - Means of escape (from fire/explosion) - Personnel protection
Utility and Non Process System Hazards	- Effects of flare radiation, HVAC (inlets/exhausts) - Methanol, diesel, chemical injections
Control/Operations	- Manning levels and Operations/ Maintenance/ Control philosophies - Access requirements - Equipment commonality, Heavy lifts, Transport - SIMOPS during
Construction Hazards	- Tie-ins (shutdown and isolation requirements) - Equipment handling - Level of prefabrication (limits to construction personnel risk exposure) - Transportation risk
Health Hazards	- Toxic Material - Asphyxiation risks (confined space working, vessel entry, smoke, exhausts) - Hazards from chemicals and hazardous atmospheres - Physical (noise, radiation, poisonous substances etc) - Working environment (extended working hours) - Working hazards (heights, hazardous equipment, hazardous surfaces, electricity) - Mosquitos & sand flies, snake & scorpion bites - construction & commissioning - Commissioning, Start up and shutdown - Emergency response, Means of escape, emergency procedures, supporting facilities and other emergency control functions

	PROCESS DESIGN MANUAL HAZID/ENVID PROCEDURE	SPD
		REV. : 0
		PAGE 8 OF 9

Contingency Planning	- Means of escape, emergency procedures - Supporting facilities and other emergency control functions - Recovery Measures
Competency, Training Requirements	Incompetent or inexperienced operators
Project Start-up	Project co-ordination and permitting issues

ATTACHMENT 7.2 - Risk Ranking Matrix

Severity	CONSEQUENCES				INCREASING LIKELIHOOD				
	People	Assets	Environment	Reputation	A	B	C	D	E
					Never heard of in industry	Heard of in industry	Incident has occurred in our Company	Happens several times per year in our Company	Happens several times per year in a location
0	No health effect/injury	No damage	No effect	No impact	Low Risk	Medium Risk	High Risk		
1	Slight health effect/injury	Slight damage	Slight effect	Slight impact					
2	Minor health effect/injury	Minor damage	Minor effect	Limited impact					
3	Major health effect/injury	Localised damage	Localised effect	Considerable impact					
4	PTD or 1 to 3 fatalities	Major damage	Major effect	National impact					
5	Multiple fatalities	Extensive damage	Massive effect	International impact					

Consequence = potential consequence of an incident
Likelihood = previous occurrence of this consequence due to this type of incident

Consequence Criteria

SEVERITY	ENVIRONMENT	ASSETS/BUSINESS/PRODUCTION LOSSES	REPUTATION	PEOPLE
0 (None)	Zero effect	Zero Damage	No Impact	No Injury or damage to health
1 (Slight)	Slight effect	Slight Damage (<6 hrs) (SR 0.3 M)	Slight Impact	Slight Injury or Health effects
2 (Minor)	Minor effect	Minor Damage (6hrs – 24 hrs) (SR 0.3 M – 1.2 M)	Limited Impact	Minor Injury or Health effects
3 (Localised)	Localised effect	Local Damage (1-7 days) (SR 1.2 – 8.4 M)	Considerable Impact	Major Injury or Health effects
4 (Major)	Major effect	Major Damage (1-4 weeks) (SR 8.4 – 33.6 M)	National Impact	Single Fatality or Permanent Total Disability
5 (Massive)	Massive effect	Extensive Damage (> 1 month) (> SR 36 M)	International Impact	Multiple Fatalities

	PROCESS DESIGN MANUAL HAZID/ENVID PROCEDURE	SPD
		REV. : 0
		PAGE 9 OF 9

Probability (Likelihood) Criteria

Probability (Likelihood)	Description
A	Never heard of in the industry
B	Incident has occurred in the industry
C	Incident has occurred in the Group
D	Incident has occurred once in Company
E	Incident has occurred more than once in Company

ATTACHMENT 7.3 - HAZID/ENVID Worksheet

Deviation	Hazards	Causes	Consequence	Safeguards	Recommendations	Responsibility	Risk Ranking		
							S	P	RR

Note

S : Severity

P : Probability (Likelihood)

RR : Risk Rating