

Embedding Safety into Design in the Oil and Gas Projects

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Why Safety 1

The oil and gas industry has always recognized that facility design heavily influences the likelihood and consequences of major accidents.

- H₂S
- HF
- NG
- Benzine
- Kerosene
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Messed with Loss of Containment, Fire or other Process upsets can cause loss of life and long-term damage to the environment as well as massive damage to plant and property.

Why Safety 2

Oil and Gas assets have a mean lifecycle of 50 years.

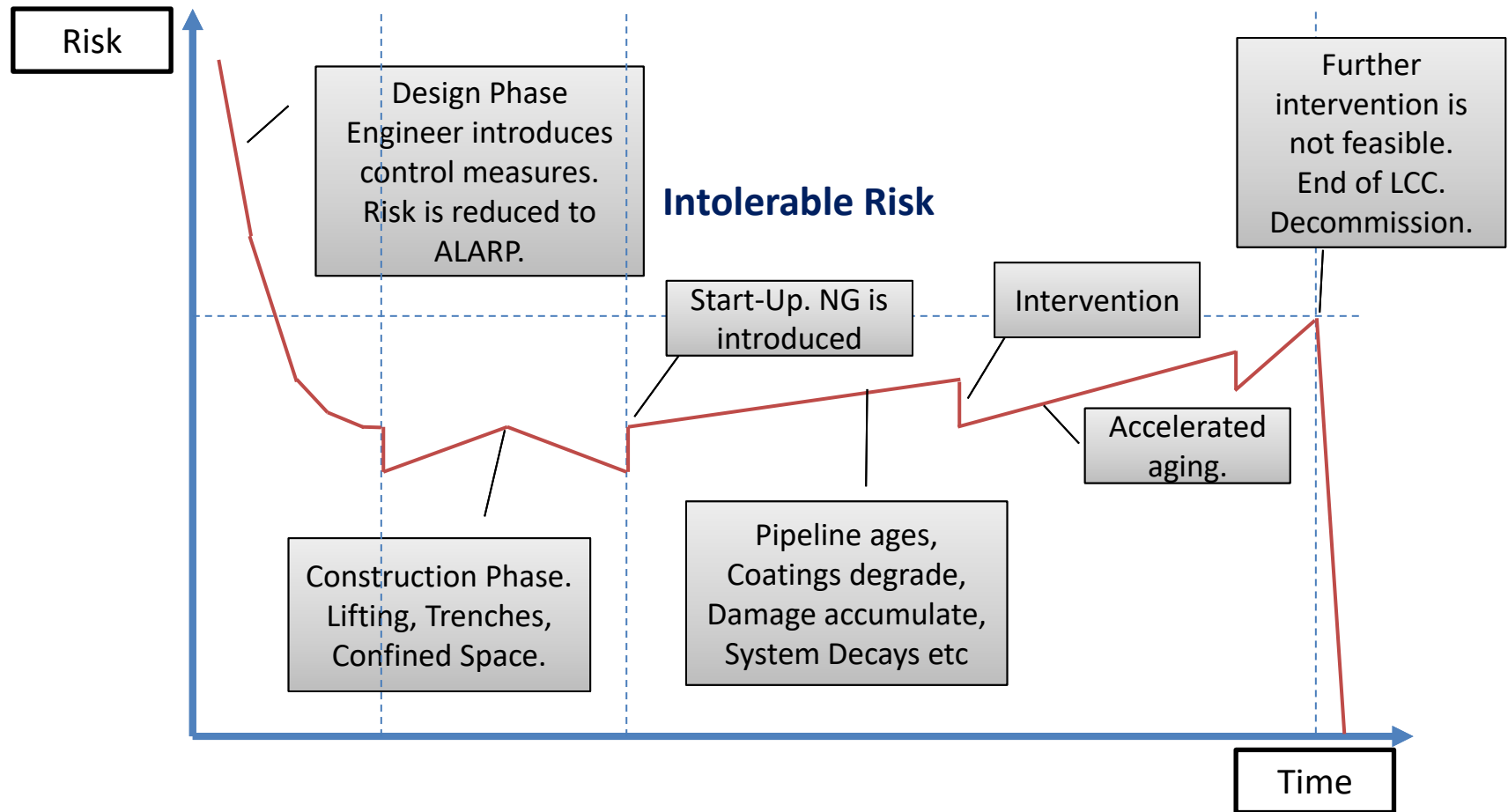
In most cases they are bounded with the country's and even the geography's political and economic strategy and continuity.

Safety -> Reliability & Availability -> Continuity

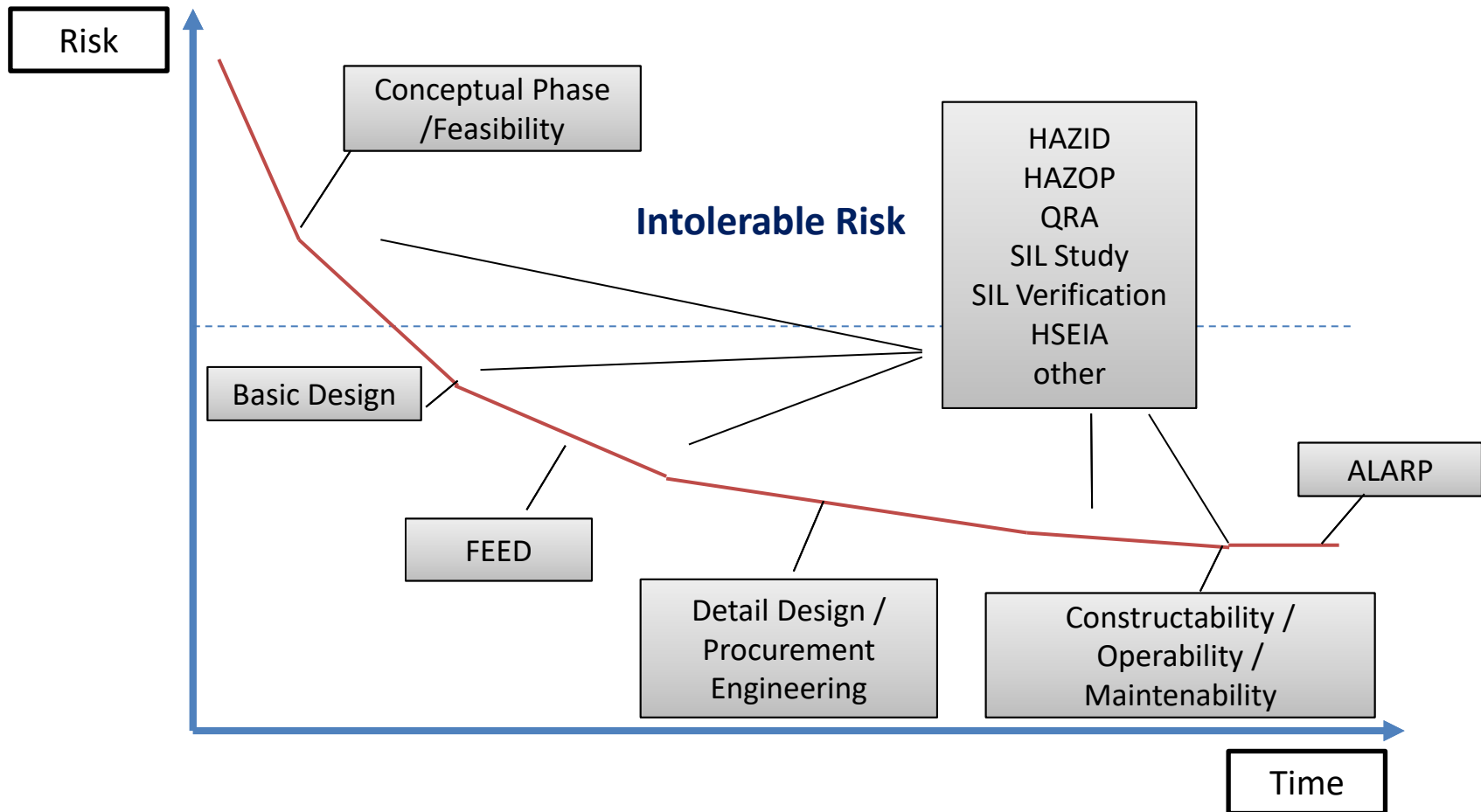
Investing in safety has a high return.

The highest return being during Design.

Pipeline Project Life Cycle



Design Phase – Break-Down



The following safety specific systems and key engineering activities shall generally be provided as part of the design: (part1)

Plant Operation (startup, normal operation, normal shutdown, emergency shutdown)	PRC	API Recommend Practices, OWNER's Specifications and on applicable International & Local Regulations
Pressure relieving and loss of containment control system	PRC, INS	API 520 & 521 for Pressure Relieving Systems, WIPRC19 Pressure Relieving & Depressuring Systems WI-INS-51: Pressure Relief Valves Design and Preparation of relevant Material Requisition, INS/S-300-03: General Specification Safety Relief Devices
Emergency Shutdown System	PRC, INS	WIPRC20 Emergency Shutdown Systems - Design Guidelines INS/S-300-08: General Specifications Safety Instrumented Systems
Fire & Gas Detection and Alarm systems	PRC, PEN, INS	WIPEN12 PREPARATION OF DESIGN DOCUMENTS FOR F&G DETECTION AND ALARM SYSTEMS FOR BUILDINGS, INS/S-300-09: General Specification F&G Detection and Alarm Systems
Ergonomics, Accessibility and Maintainability	PEN, A/UIPIP	NFPA Owner / Engineer Layout Specification
Escape, Evacuation and Rescue	PEN, A/UIPIP	WIPEN14 PREPARATION OF ESCAPE PLAN DRAWINGS FOR BUILDINGS
Vehicle and Personnel Traffic	PEN, PIP	Local / national standards are followed for the design of barriers, turnstiles, traffic lights, and the like
Plant Noise Pressure Levels	TEC	Local regulations, OSHA and EC.
Environment Protection and Minimization of Wastes	PRC, A/UIPIP	Environment Terms – Legal requirements

The following safety specific systems and key engineering activities shall generally be provided as part of the design: (part2)

Fire Fighting Systems and Equipment	PRC, PEN, A/UPIP	ASME, WIPRC21 WIPEN13 International Fire Code Institute UFC Uniform Fire Code NFPA 13 15 20 24 25 214 231 231C 1963
Gaseous Fire Extinguishing Systems	PEN	WIPEN11 WORK INSTRUCTION – PREPARATION OF DESIGN DOCUMENTS FOR GAS FIRE EXTINGUISHING SYSTEMS
Safety Equipment, e.g. Eyewashes, Safety Showers etc.	PEN, A/UPIP	WIPEN15 PREPARATION OF DESIGN DOCUMENTS FOR SAFETY SHOWERS & EYE WASH EQUIPMENT, ANSI Z358.1 American National Standard for Emergency Eyewash and Shower Equipment
Safety Signs	PEN	ISO 7010:2011, ISO 3684, DIN 4844-2:2012-12 (Europe incl. Greece), NFPA 170, ANSI Z535 outside Europe,Z535.2, ANSI Z535.3
Assessment of Chemical Hazards, flammable and / or toxic gases	PRC, PEN, INS	S-300-01 General Specifications for INS Gas Detectors
Hazardous Area classification assessment for Electrical Equipment and Instrumentation	PRC	
HAZOP/HAZID review	PRC, PEN, PIP	Oil & Gas Industry Risk Studies /ISO17776
SIL review	INS	
Procurement Engineering	ENG disciplines	Specifications – Material requisitions

Thank you

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