Clean Hydrogen Partnership

European Hydrogen Safety Panel (EHSP)
Webinar "Safety planning and management in EU hydrogen and fuel cell projects“, 22 April 2022

Simple template for safety plan

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Key messages for the Simple template

- Ensure that project outputs in a form of device, system, process and/or infrastructure provide an adequate level of safety and follow or even improve the state-of-the-art
- Identify and address essential for the project success knowledge gaps and technological bottlenecks if relevant
- Provide a high level of technical and organizational safety activities in the project delivery
  - Review the state-of-the-art in safety provisions of systems and processes related to the project
  - Identify system or process vulnerabilities, select incident scenarios
  - Apply available hydrogen safety engineering models and tools to assess hazards and associated risks for selected scenarios
  - Continuously update the initial safety plan during the project

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Simple template for safety plan

1. Project Brief

2. Project Safety

3. Operations Management

4. Checklists and other helpful documents

Simple template for safety plan 1/4

No	Topic	Explanation	Input
1.	**Project Brief**		
1a.	General Information	Title of project:	
		Term (duration):	_____/_____ to _____/_____
		Funding:	
		Coordinator (Person, Institution):	
1b.	Consortium	Give name list of partners and highlight those with hydrogen safety specific experience	- ... - ... -
1c.	Safety Responsible Person	Give name and contact data of person responsible for safety of the project "safety officer" (better one than many, and usually the author of this document)	
1d.	Type of Work	Describe the specific nature of the work	☐ laboratory-scale research ☐ bench-scale testing ☐ engineering development ☐ safety engineering ☐ prototype operation ☐ demonstration ☐ commercial application ☐ other: _____
1e.	Description of Work	Short summary of the Description of Activities (maybe copy the short summary of the contract)	

1f.	Project Phases (origin of change)	What is done in which phase of the project (free text input)		
1g.	Hydrogen Inventory	Type of hydrogen storage and maximum inventory of hydrogen physically stored on site(s) per storage type	☐ p < 2 bar	_____ kg
			☐ p < 20 bar	_____ kg
			☐ p <= 200 bar	_____ kg
			☐ p > 200 bar	_____ kg
			☐ liquid (cryogenic)	_____ kg
			☐ solid storage (metal hydride)	_____ kg
			☐ other (e.g. LOHC):	_____ kg
1h.	Location	Where is your activity, respectively hydrogen located (industrial, public, colocation with other technologies and hazards, etc)	☐ specially controlled area ☐ industrial environment ☐ research lab ☐ public ☐ co-located with other hazardous materials, fuels etc.: _____	

1. Project Brief

- General information
- Specific nature of work (e.g. lab-scale research, engineering development, prototype, demonstrations, …
- Short summary of the activities
- Hydrogen Inventory
- Location (e.g. industrial, public, colocation with other technologies and hazards, etc)

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Simple template for safety plan 2/4

No	Topic	Explanation	Input	Responsible, if not "safety officer"
2.	**Project Safety**			
2a.	Relevant regulation, codes, standards and safety policies	List all relevant regulation and applied codes and standards for your project	- - - -	
2b.	Hazard Identification and Risk Assessment	Provide a chronological list of hazard identification procedures and risk assessments done (or planned) and summarize key results or provide full documentation in attachments	- - - -	
2c.	Prevention and mitigation	List all prevention strategies and installed mitigation technology used (e.g. ventilation, water sprays, sensors,...). Follow the first 8 safety principles, (potential outcome of 2b)		

2. Project Safety

- List all relevant regulation and applied codes and standards for the project
- Chronological list of hazard identification procedures and risk assessments done (or planned)
- List all prevention strategies and installed mitigation technology used (e.g. ventilation, water sprays, sensors,…).

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Simple template for safety plan 3/4

No	Topic	Explanation	Input	Responsible, if not "safety officer"
3.	**Operations Management**			
3a.	Nominal and limit values of critical process parameters	Provide a list of controlled or easy to check process parameters, like filling status of a liquid, pressure and or temperature and there corresponding design and limit values (potential outcome of 2b)		
3b.	Procedures for operation	Refer to checklists for start or/ and shut-down, operation instructions (potential outcome of 2b and possibly attached in 4)		
3c.	Emergency alarm, evacuation and response plans	(maybe just attach them in 4 and indicate this here)		
3d.	Personnel education and training	Describe or list all measures where involved persons (operators, first responders,....) are participating in courses and explain how this is documented		
3e.	Monitoring and Periodic Reviews	Describe the procedures and periodicity of checking whether everything above is in place and known by all relevant people		
3f.	Reporting of safety events and lessons learned in HELLEN and HIAD	Describe plans for sharing safety critical information		

3. Operations Management

- Nominal and limit values of critical process parameters
- Refer to checklists for start or/ and shut-down, operation instructions
- Emergency alarm, evacuation and response plans
- Personnel education and training
- Monitoring and Periodic Reviews
- Reporting of safety events and lessons learned in HELLEN and HIAD

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Simple template for safety plan 4/4

No	Topic	Available?	Where (Link, Library, Room, ...)
4.	**Checklists and other helpful documents** (for EHSP highly relevant documents in **bold** font)		
	Block flow diagram (PID) or simplified process flow diagram	☐	
	ATEX zones	☐	
	Process chemistry	☐	
	Material of construction	☐	
	Material data safety sheets	☐	
	Material and energy balances	☐	
	Electrical classification	☐	
	Pressure relief system design	☐	
	Ventilations system design	☐	
	Technical documentation of further safety / mitigation equipment	☐	
	Checklists before or after start	☐	
	Results of ISV before or at project start	☐	
	Results of ISV or risk assessment before hardware installation	☐	
	Results of ISV or risk assessment before operations	☐	

3. Operations Management

- Block flow diagram or simplified flow diagram
- ATEX zones
- Material data safety sheets
- Electrical classification
- …

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Recommendations for Simple template

- Fill in all the fields
- Concise and self-explanatory answers: key messages!
- Detailed technical information in annex
- Provide state-of-the art information
- Comprehensive list of RCS
- Share hydrogen related events with HELLEN and HIAD 2.0

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Links to the documents

- SAFETY PLANNING AND MANAGEMENT IN EU HYDROGEN AND FUEL CELLS PROJECTS - GUIDANCE DOCUMENT
- TEMPLATE FOR SAFETY PLAN

Thank you

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For further information
https://www.clean-hydrogen.europa.eu/

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