

**Failure Modes and Effects Analysis (FMEA)  
for the Chemical Process of a Generic Company**

NO.	ITEM	FAILURE MODE	FAILURE CAUSE	POTENTIAL EFFECTS	DESIGN SAFETY	HAZ CAT	RECOMMENDATIONS
1A	Hydrogen Furnace Hydrogen containing equipment	Personnel Injury	Personnel injury due to contact with a hot surface	Lost time Injury / minor injury Burn	Administrative controls (PPE)	3C	None
1B					Insulation		
1E		Insulated gloves worn when changing thermocouples, backing the strip out during threading operations, or any other operations exposing operator to heated surface	Personnel injury due to asphyxiation from hydrogen exposure	Loss of life / severe injury	Lock-out tag-out procedures Leak checks on piping performed annually Hydrogen monitors installed	1D	SAR 24/25 SA-14 Incorporate the use of non-sparking tools for maintenance operations when furnace is in operation.  SAR 24/25 SA-13 Develop critical safety list and mechanical integrity program for critical safety devices with inspection and testing frequencies based on good engineering practices. (Reference NFPA 86C Appendix B)
	Initiation of explosive hydrogen gas mixture	Hydrogen pipe leak/rupture	Fire / explosion	Hydrogen monitors installed Lower Explosive Limit (LEL) meter Scheduled leak testing on pipes Use of non-sparking tools when performing maintenance operations			