

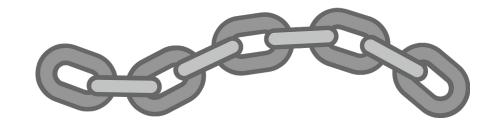
Hazard Identification and Risk Assessment for Smaller Changes

Tips and Tools for Avoiding Misses and Improving Quality

Jody E Olsen P.E.
JE Olsen Consulting LLC
jodyo@jeolsenconsulting.com



Key Points

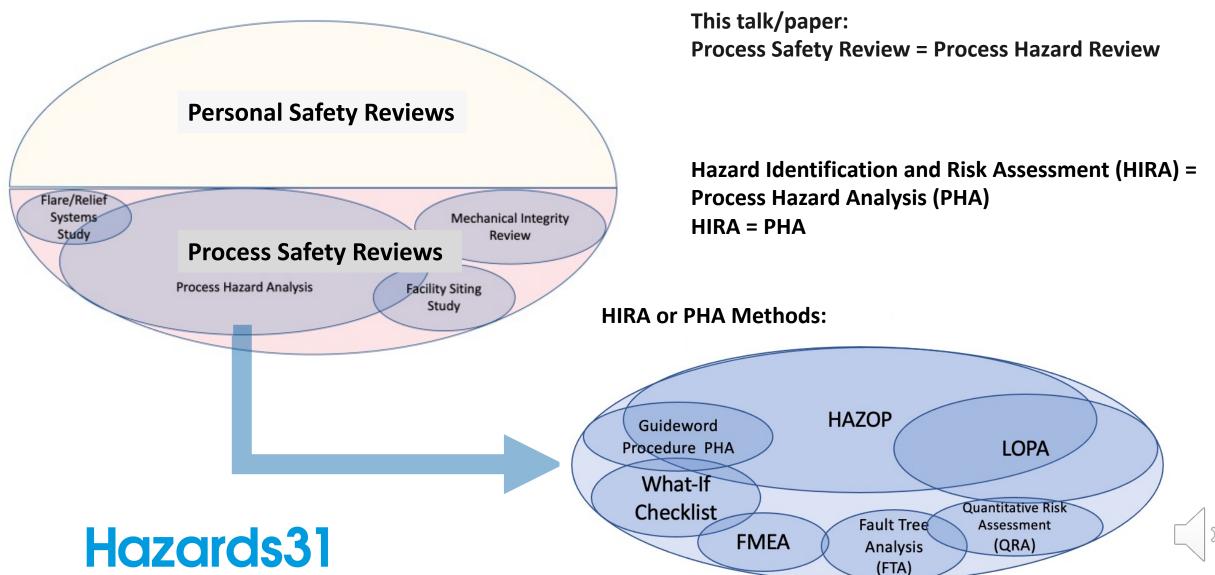


- All MoCs require process safety review
 - All changes require process hazard review screening
 - All process changes require HIRA/PHA
 - All mechanical changes require MI assessment
- Skilled, trained functional representatives must:
 - Review and approve all process safety screenings
 - Lead all process safety hazard reviews
 - Complete mechanical design and maintenance assessments
- Apply the same HIRA methodology to changes of all sizes





Terminology



Part of the Problem . . .

Regulatory and guidance language?



 Potential misperception that HIRA/PHA only applies to full plant process hazard review studies or large projects



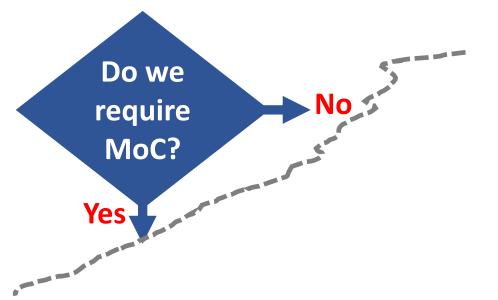




Steps

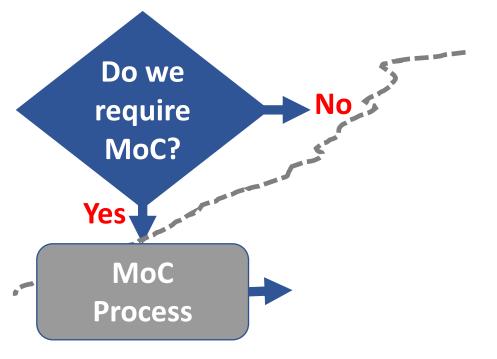










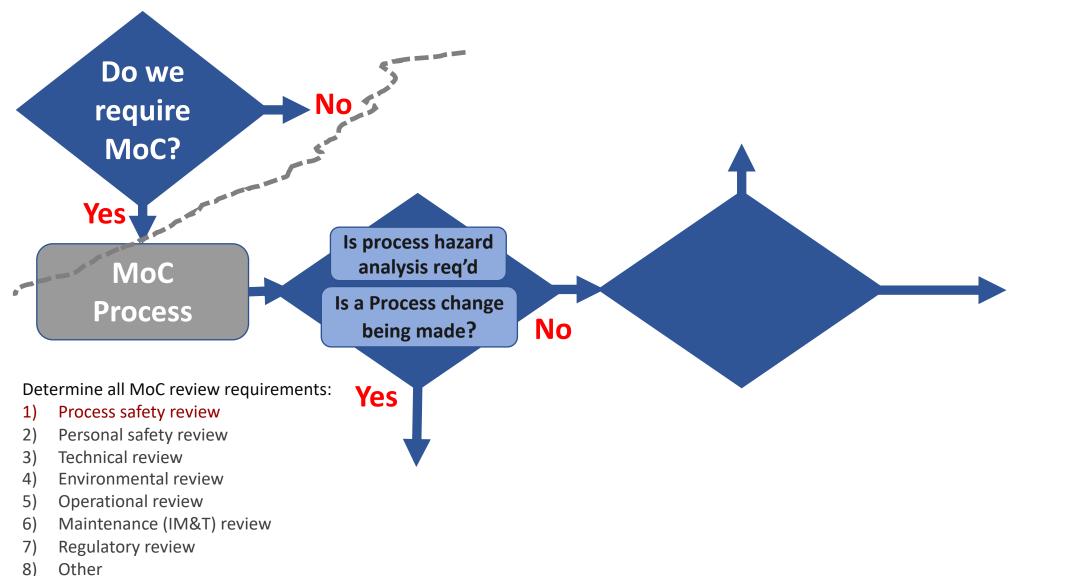


Determine all MoC review requirements:

- 1) Process safety review
- 2) Personal safety review
- 3) Technical review
- 4) Environmental review
- 5) Operational review
- 6) Maintenance (IM&T) review
- 7) Regulatory review
- 8) Other

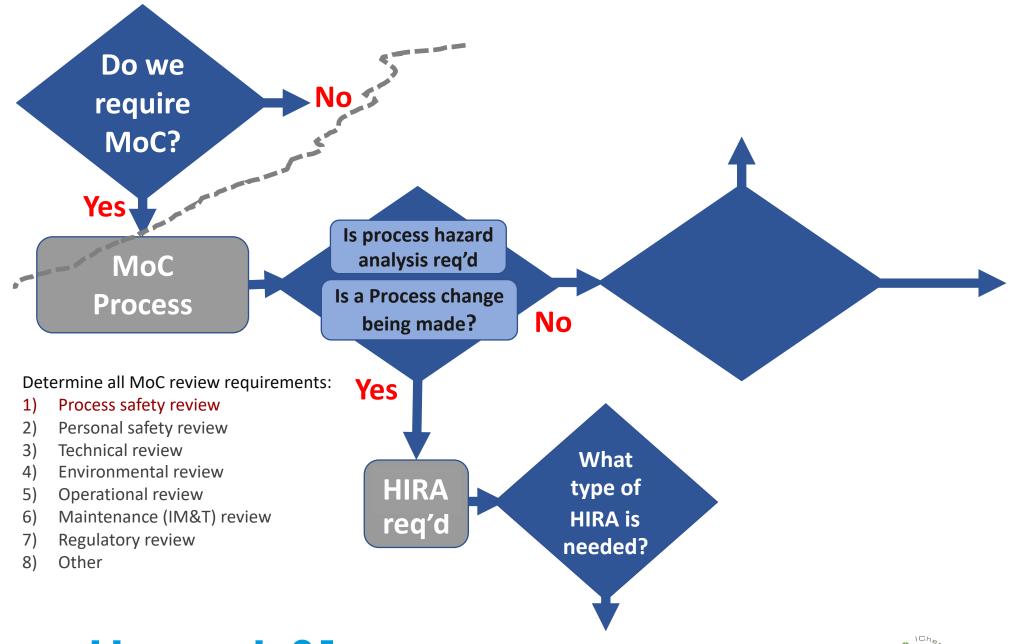






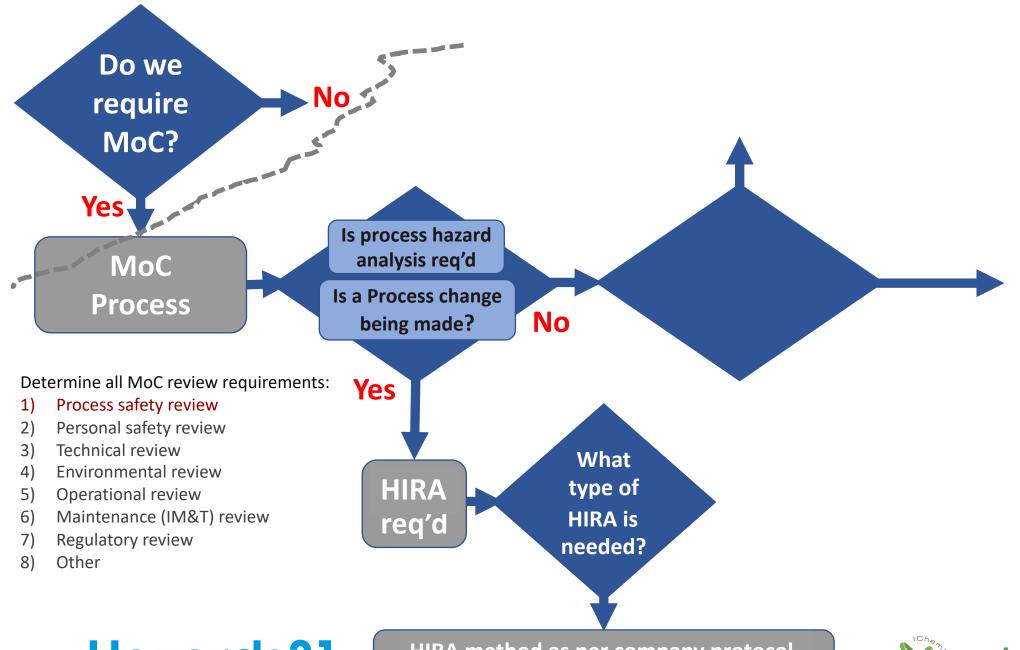












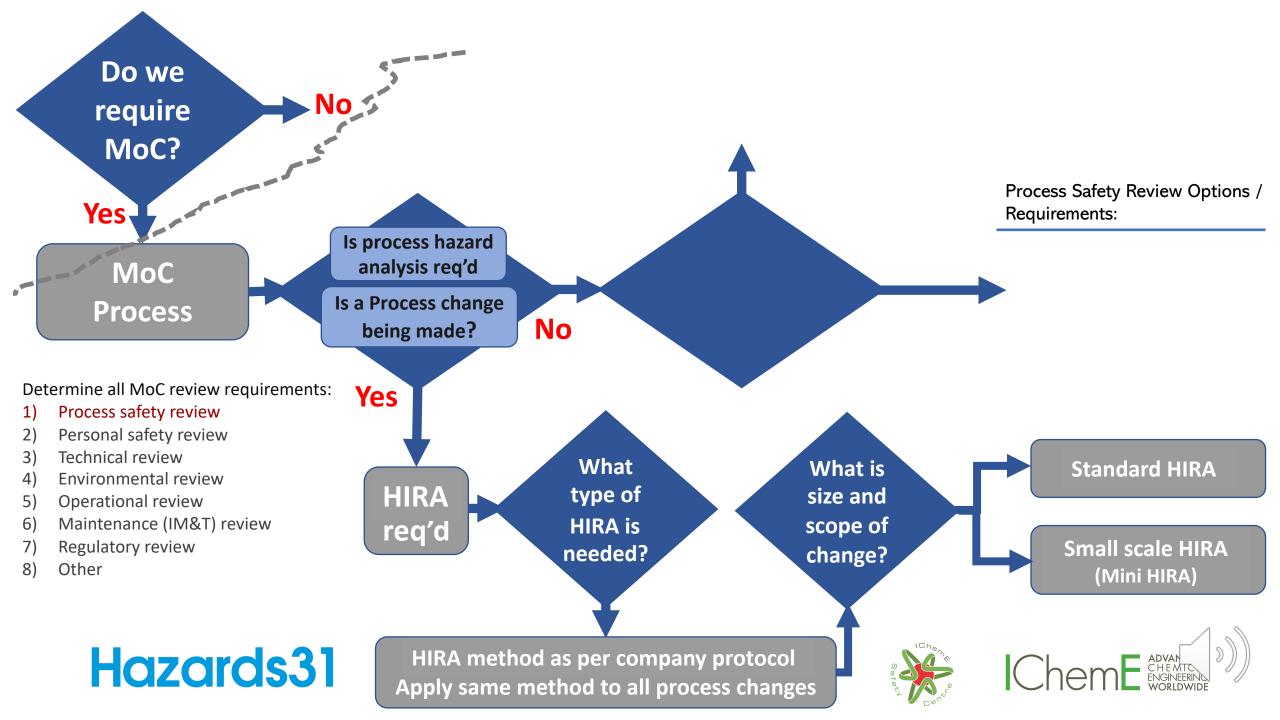
Hazards31

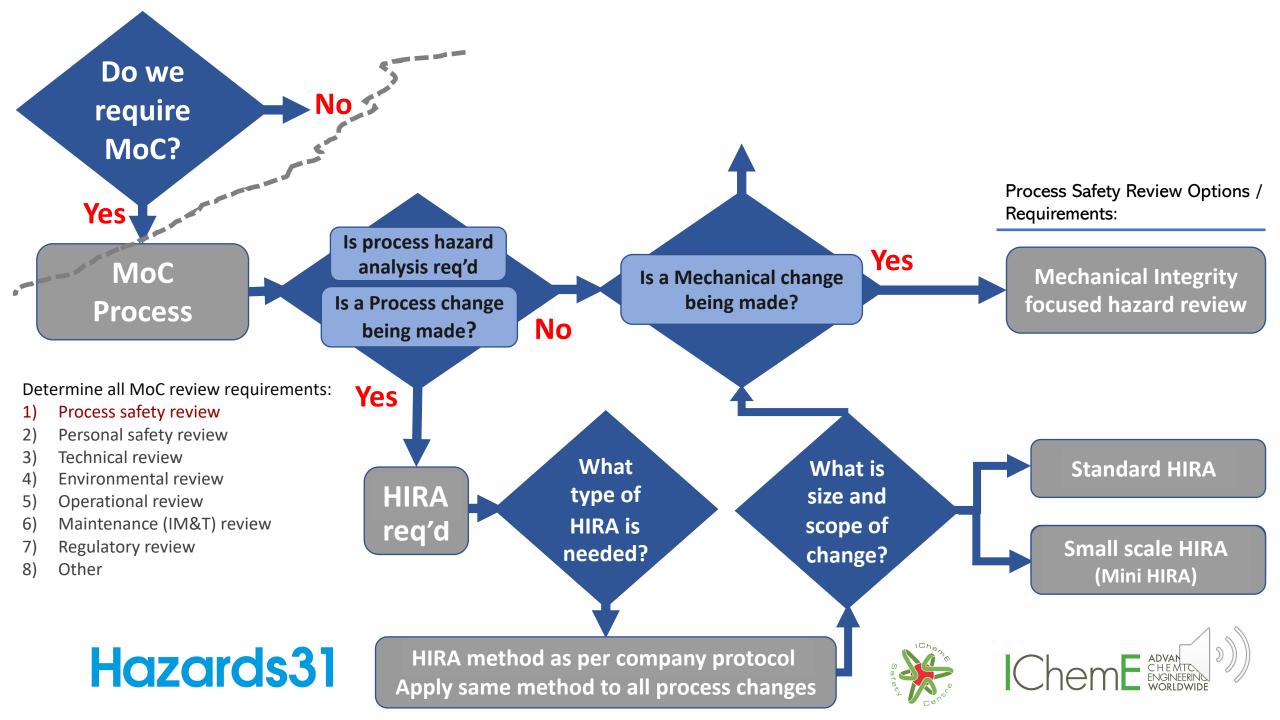
HIRA method as per company protocol

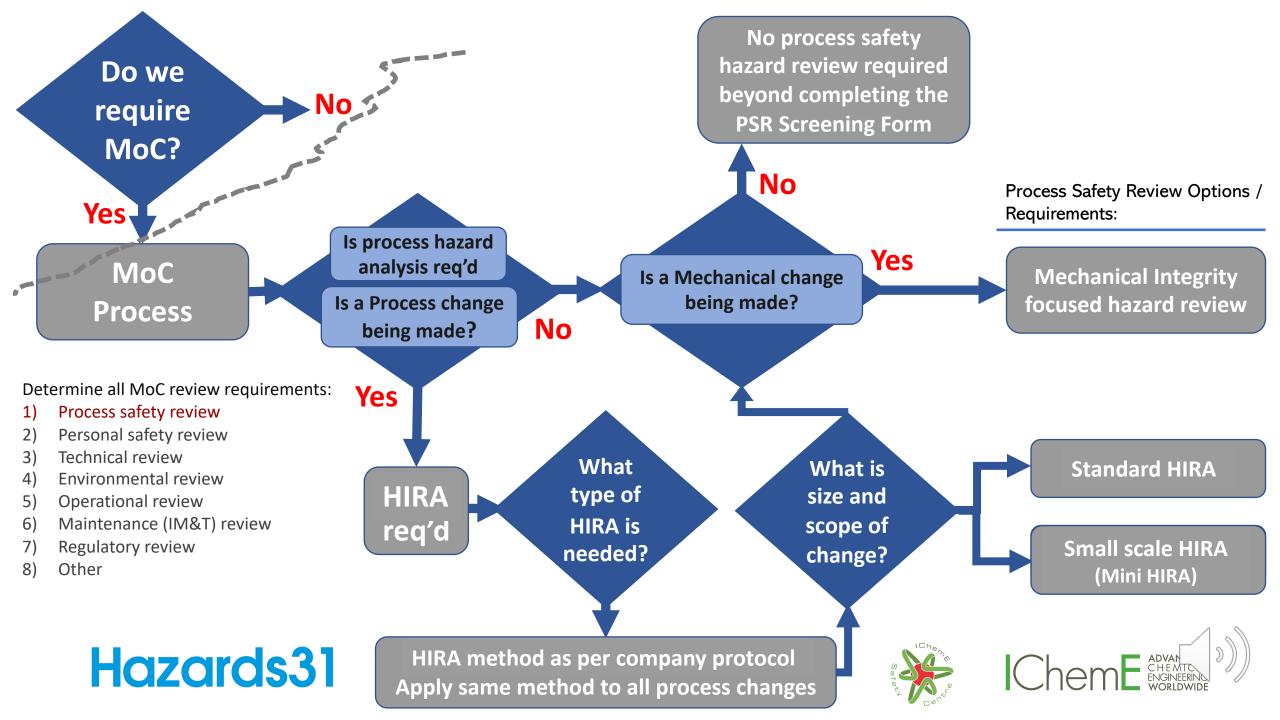
Apply same method to all process changes

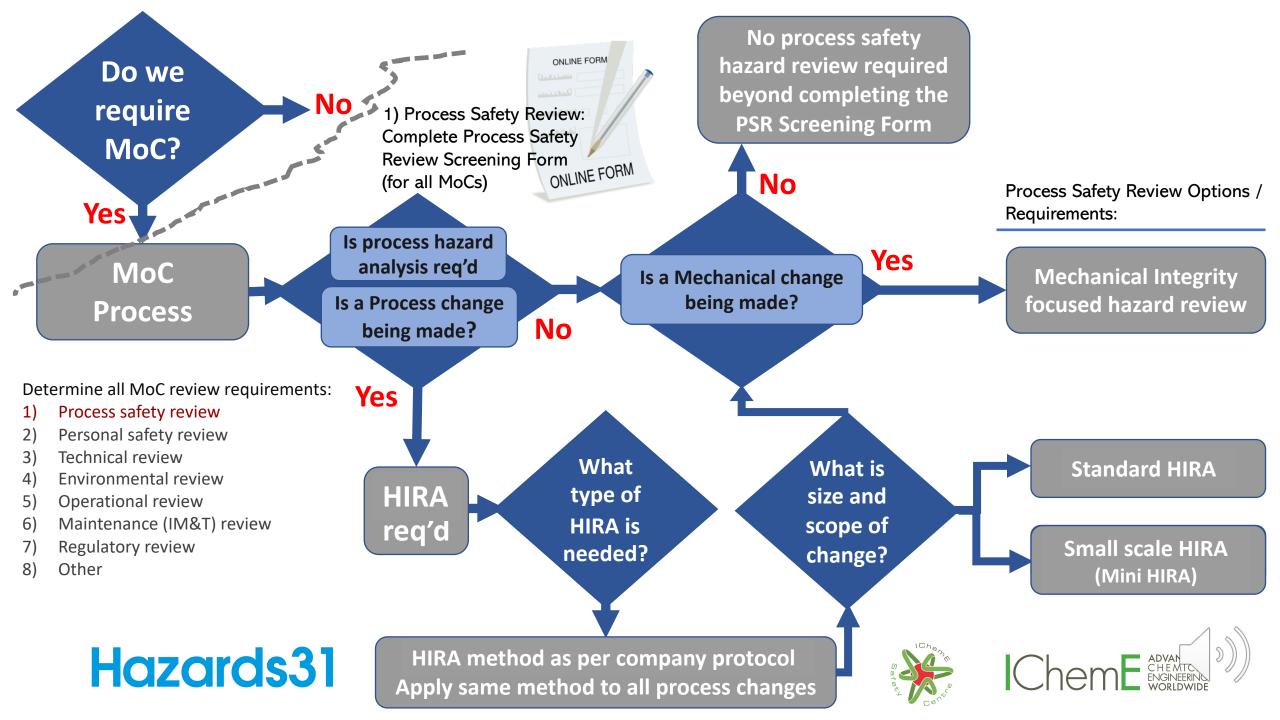












- Process Safety Screening Form example sections:
- OUTSIDE/OFFSITE/ONSITE SITING ISSUES
- HIRA SCENARIO CAUSES/CONSEQUENCES
- HIRA SAFEGUARDS/IPLs
- ☐ PROCESS CHANGES
- ☐ MECHANICAL CHANGES







Process Safety Screening Form

• Dos and Don'ts . . . PROCESS CHANGES:



Do not ask if the change is introducing a hazard or

likely to impact process safety

If Anower this or	(c) not covered by 1060, including temperary facility modifications, comb timuse for times in hection 1 thru 5 Land (honge is not covered by honge				
		arany Deburard Surarly Device Proced		under Farboquets, Method, Outcom	IN, S Approx
Critica X below					
Un		Minimum Participants	meter	Outcomes/ Experted Commons	Approval
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	change)	Project Tech Lead Engr	Facility Sting Checklot	miligating's Update PNA Tubles	
		PHR Facilitator; The Targe scale reviews, Facility		Design changes Additional	
	Are there roadways (public or non-controlled) within [] of	Siting Specialist)	PRESIDENTE	safeguards (personalise and/or	
	process equipment or a precess flowporth involved in this change.	Operations Fire Expensed	Facility litting Checklist	mingrangs types the father	
	Does the change involve process clanaris that feed or are fed by	PRETABLISHE			
	edjezni doembrum/sprincan facilities (internal or external)?	Operator boy:			
	Consider potential process changes as defined in Section 4 that	Project Noch Lead Engr		Omigr changes; Additional	
	feed downshows facilities or sovere flow pulls to floor facilities (consider shared inflatmature, controlly buneley, etc.)	Operator Rep. (Indiporty) Project Tech Lead Engr (Indip)	PER START	safeguards (persentative and/or miligating), Update PNA Tubles	
		- Series Const			
	Impuris to PRA Someris Causes / Consequences (Chemistrated)				
	Does the change add, impact/modify, or remove a cause for an	PHI Facilitator;	PHI Study or	Design changes; Additional	
	existing sematio or add, impact/modify, or remove	Operations Rep (Operator):	NISS DISK STURY	unequarts (proventative and/or	
	equipment transporents that one a cause for an existing commine? Specifie change impact an existing commin to increasing the	Project had braddings	these/modified contains setal.	Children County	
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	or does the modification change the saurce of that pressure?	Project Soch Lead Engr	inen/nodified sometim misk	mitigating's Update PIA Tubics	
	(bowering) the node design-pressure (in pressure rating of new or				
	modified components or equipment is less than the personne rating of the weakest equipment or component for the existing	PRESIDEN	PRINCIPAL OF	Orniga changes; Additional	
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	process ruling?	Project lock Lead Engr	lines/modified veneries with	miliguing), Update PNA Tables	
	then the charge ingust PMI sometic documents from by lowering				
	the maximum patential precure source that may be introduced				
	equipment or components which limit the node pressure rating.			Options Occumentation;	
	are being in being replaced, modified, and/or or-cated to a higher precious ruling. Blok is lowered due to these changes or other	PRE Facilitation; Operations Rep (Operator);	PHI Decementation spéales	Operor Pres Tables; Communication of change and	
	(similar change)	Project lock-Lead-Engr	required (emp)	lower risk to Operations	
		grant social rip	214110/2010	poeti in a common	
	Impurits to PRA Grenario Safeguards/Proteorica Layers (Mitigated Cores	opense)			
	Does the change add, modify, or remove any mechanical safety				
	device (such as pressure safety-salves (Phin), repture-discs, check, salves, etc.) or have any patredial to affect pediability of father	PHR Facilitator;	PRINT STORES AT DISTRICT PRINT STORES	Ovsign changes; Additional	
	on demand of the device (including changes to components,	Operations Rep (Operator): Project Tech Lead Engr.	(new/modified sometim sold	calleguants (percentation and/or mitigating), Update Relief	
	changes to test frequency, changes to process media, setpoints,	Posible participants; Process	Solid Dooks Debut diese	Charles Colonbellons: Emphes Park	
	eb[1	Engineer, Mechanical Engineer	Bedre	Tables.	
	Sees the charge add, woddy, or remove any hafety tridramented				
				1	
	(PF))) or have any potential to affect probability of failure on		PHI Study IV		
	demand of a component of an SF including changes to burner management spitems (SEES), changes to sensing devices, final	PRINTERIOR	Inter Mil. Study Engineering of Section Services	Design changes; Additional suffrequent (serversialise and/or	
	Imanagement spilens (Blift), changes to sensing devices, final elements, logic selvers, control logic/programming.	Operations Rep Edpended;	(new/woddled-comarks, sel); (c) (booment/cim/Geolution)	infeguent (percentative and/or initigating); Update PST CRC;	
	(hosperary, selpoints, etc.)	10% Smitramentation Engineer	Calculations Review Jas needed	Outabase: Stydute PMA Tables	
		PHI Facilitator;	PHI Study or	Design changes; Additional	
	boxs the change add, modify, or remove any condrast	Operation Fee (Operator):	INSIG PRIAL STUDY	oreports (preventative sed/or	
	independent protection layer (RE) or credited sufreguent.	Project Sect Lead Engr	their/modified sometim sold	mingalings, typica PM Tables	
	11		PRINCIPAL OF	Design changes; Additional sufreguests (preventative and/or	
	11	PREFECTIONS	DESCRIPTION OF THE PARTY.	mitigating), tipitata belief	
	11	Ownation Fee Househol-	lines/modified scenarios sold	Device Calculations, Stellar	
	Does the charge have potential to impact the design or sizing	Project Tech Lead Engr.	Relief Desire Calculations	Clare System Report, Update	
	book for the files system?	Process Engineer	Review, Flare System Brokey	mer tubes	
		PHA Facilitator;	PHIA Stody or		
	there the change add, modify, or remove any categoried (including	Operations Rep (Operator): Protest Error Tech Lead:	Intini MMI 13udy	L	
	miligating subgrands and/or subgrands not credited as independent protection beam, such as one deterring subgran. for	Project Engr Tech Lead; People perfolpanh: Engr sep	(new/modified scenarios only): Technical Review (docipline	Design changes; Additional sufreguesh (presentative and/or	
	regionalist, MAC, specifor response to dame, etc.32	from WAY, Fire & Co., 45:	(get)(fit)	configures (province) or sales	
		warmen of the contract of the		A STATE OF THE LOCAL PROPERTY OF THE PARTY O	
	Process Changes (Potential New or Modified Scenarios)	_			
	Does this change add a new rook to the existing facility PMA.	PREFedition; Operation Rep Elpendor);	PHILSTONIC OF MINI PHILSTONY	Orsign changes; Additional sufequards (preventable and/or	
	(Self-)	Project high Lead Engr	(new/modified sometim sold	collegions, systematics and or collegions), system PM, Tubber	
	1		And the same of	The same of the same of	
	11	THE CANDIDAY	Mar Study or	Chemistra Champers' Additional	
	Does the change add, modify, or remove process equipment, (in.)				



Trigger event - a modification - regulation 10(2)(d)

195 You must review and, if necessary, revise your safety report before certain modifications are made. This is aimed at modifications to establishments, processes, and the nature or quantity of dangerous substances which could have significant repercussions on the major accident hazards. Changes which either increase or decrease hazard or risk are important. It is not intended to deal with trivial changes.

196 Whether a modification has significant consequences will depend on the degree to which it introduces a new major accident hazard, or increases or decreases the risk from an existing hazard. The overall goal is to ensure that major accidents are prevented and the consequences of any that do occur are kept to a minimum. Examples of the sorts of changes which may have significant consequences include:

- (a) a change in the quantity of a dangerous substance;
- (b) changes of phase of a dangerous substance, eg a change from liquid to gaseous chlorine;
- (c) the introduction of new, or removal of existing, dangerous substances;
- (d) new processes;
- changes to storage facilities;
- (f) changes to a safety instrumented system;
 - changes to the mode of delivery or transport of dangerous substances, eg a change from daily road tanker deliveries to weekly ship deliveries;
- (h) changes to the design or location of control rooms and/or the number of people present within them;
- changes to the location of occupied buildings and/or the number of people present within them:
- changes to the original design parameters such as process operating conditions or practices, changed throughput, design life extensions or removal of safety-critical load





Process Safety Screening Form

• Dos and Don'ts . . . APPROVER:

Do assure that the PSR Screening Form is reviewed and approved by a qualified member of the process safety group/department.

Do not allow other department reps to sign off the PSR Screening Form regardless of training or background



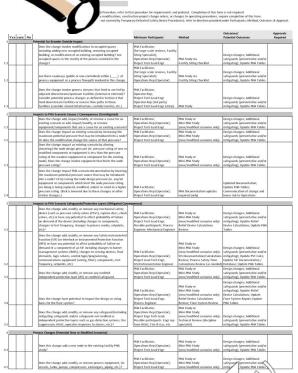




- Process Safety Screening Form
 - Dos and Don'ts . . . work group:



Do not allow other groups or functions to use other screening tools









All cha	nges	MoCs	d under Temporary Defeated Safety Device (TDSD) Procedure, refer to t) not covered by TDSD, including temporary facility modifications, constr	ruction project change orders, or ch	anges to operating procedures, re	quire completion of this form.	
			insure for Items in Section 1 thru 5 (and change is not covered by Tempo	orary Defeated Safety Device Proced	lures), refer to direction provided	under Participants; Method; Outcor	ne; & Approv
Yes s	Un-			Minimum Participants	Method	Outcomes/ Potential Outcomes	Approval Required
			Potential for Broader Outside Impact				
			Does the change involve modifications to occupied spaces including adding new occupied building, removing occupied building, or modification of an existing occupied building? Are occupied spaces in the vicinity of the process involved in the change?	PHA Facilitator; (for large scale reviews, Facility Siting Specialist); Operations Rep (Operator) Project Tech Lead Engr	PHA Study via Facility Siting Checklist	Design changes; Additional safeguards (preventative and/or mitigating); Update PHA Tables	
			Are there roadways (public or non-controlled) within (of process equipment or a process flowpath involved in this change.	PHA Facilitator; (for large scale reviews, Facility Siting Specialist); Operations Rep (Operator)	PHA Study via Facility Siting Checklist	Design changes; Additional safeguards (preventative and/or mitigating); Update PHA Tables	
			Does the change involve process streams that feed or are fed by adjacent downstream/upstream facilities (internal or external)? Consider potential process changes as defined in section 4 that feed downstream facilities or reverse flow paths to those facilities (consider shared infratructure, custody transfer, etc.)	PHA Facilitator; Operator Rep; Project Tech Lead Engr Operator Rep (3rd party) Project Tech Lead Engr (3rd p)	PHA Study	Design changes; Additional safeguards (preventative and/or mitigating); Update PHA Tables	
		- 1	mpacts to PHA Scenario Causes / Consequences (Unmitigated)				
1		4	Does the charge add, impact/modify, or remove a cause for an existing scenario or add, impact/modify, or remove equipment/components that are a cause for an existing scenario? Does the charge impact an existing scenario by increasing the maximum potential pressure that may be increduced into a node?	PHA Facilitator; Operations Rep (Operator); Project Tech Lead Engr PHA Facilitator; Operations Rep (Operator);	PHA Study or Mini-PHA Study (new/modified scenarios only) PHA Study or Mini-PHA Study	Design changes; Additional safeguards (preventative and/or mitigating); Update PNA Tables Design changes; Additional safeguards (preventative and/or	
		1	Or does the modification change the source of that pressure? Does the change impact an existing scenario by altering (lowering) the node design pressure (i.e. pressure rating of new or modified components or equipment is less than the pressure rating of the wakest equipment or component for the existing	Project Tech Lead Engr	(new/modified scenarios only) PHA Study or	mitigating); Update PHA Tables Design changes; Additional	
	-	-	node). Does the change involve equipment of the time tessing node). Does the change involve equipment that limits the node pressure rating? Does the change impact PHA scenario documentation by lowering the maximum potential pressure source that may be introduced.	Operations Rep (Operator); Project Tech Lead Engr	Mini-PHA Study (new/modified scenarios only)	safeguards (preventative and/or mitigating); Update PHA Tables	
			into a mode? Or by raising the node design pressure (ie. any/all equipment or components which limit the node pressure raising are being is being replaced, modified, and/or re-rated to a higher pressure raising. (Risk is lowered due to these changes or other similar changes.)	PHA Facilitator; Operations Rep (Operator); Project Tech Lead Engr	PHA Documentation updates required (only)	Updated Documentation; Update PHA Tables; Communication of change and lower risk to Operations	
		1	mpacts to PHA Scenario Safeguards/Protective Layers (Mitigated Conse	equences)			
			Does the change add, modify, or remove any mechanical safety device (such as pressure safety valves (PSVS), nupture discs, check valves, ect or have any potential to affect probability of failure on demand of the device (including changes to components, changes to test frequency, changes to process media, setpoints, etc.)?	PHA Facilitator; Operations Rep (Operator); Project Tech Lead Engr; Possible participants: Process Engineer; Mechanical Engineer	PHA Study or Mini-PHA Study (new/modified scenarios only) Relief Device Calculations Review	Design changes; Additional safeguards (preventative and/or mitigating); Update Relief Device Calculations; Update PHA Tables	
			Does the change add, modify, or remove any Safety Instrumented Function (19) (in Interfects for instrumented Protective Europia) (1911) or hove any potential to affect probability of failure on demand of a component of an 91 including changes to burner management systems (1916s), changes to sensing devices, final elements, logic solvers, control (applicagamining, changes of the property of the components, lest frequency, setgoines, etc)	PHA Facilitator; Operations Rep (Operator); Project Lead Tech Engr; SIS/Instrumentation Engineer PHA Facilitator;	PHA Study or Mini-PHA Study (new/modified scenarios only); SIS Documentation/Calculations Review; Process Safety Time Calculations Review (as needed PHA Study or	Update SIF Documentation / Database; Update PHA Tables Design changes; Additional	
4	4	4	Does the change add, modify, or remove any credited independent protection layer (IPL) or credited safeguard.	Operations Rep (Operator); Project Tech Lead Engr	Mini-PHA Study (new/modified scenarios only)	safeguards (preventative and/or mitigating); Update PHA Tables Design changes; Additional	
			Does the change have potential to impact the design or sizing basis for the flare system?	PHA Facilitator; Operations Rep (Operator); Project Tech Lead Engr; Process Engineer	PHA Study or Mini-PHA Study (new/modified scenarios only) Relief Device Calculations Review; Flare System Review	Design changes; Additional safeguards (preventative and/or mitigating); Update Relief Device Calculations; Update Flare System Report; Update PHA Tables	
			Does the change add, modify, or remove any safeguard (including mitigating safeguards and/or safeguards not credited as independent protective layers such as gas detection systems, fire suppression, HVAC, operator responses to alarms, etc.)?	PHA Facilitator; Operations Rep (Operator); Project Engr Yech Lead; Possible participants: Engr rep from HVAC, Fire & Gas, etc	PHA Study or Mini-PHA Study (new/modified scenarios only); Technical Review (discipline specialist)	Design changes; Additional safeguards (preventative and/or mitigating); Update PHA Tables	
_		F	Process Changes (Potential New or Modified Scenarios)				
			Does this change add a new node to the existing facility PHA study?	PHA Facilitator; Operations Rep (Operator); Project Tech Lead Engr	PHA Study or Mini-PHA Study (new/modified scenarios only)	Design changes; Additional safeguards (preventative and/or mitigating); Update PHA Tables	
			Does the change add, modify, or remove process equipment, (ie. vessels, tanks, pumps, compressors, exchangers, piping, etc.)?	PHA Facilitator; Operations Rep (Operator); Project Tech Lead Engr	PHA Study or Mini-PHA Study (new/modified scenarios only)	Design changes; Additional safeguards (preventative and/or mitigating); Update PHA Tables	

1 1					
	Does the change add, modify, or remove a process flow path for				
	any process stream, auxiliary stream, or utility stream (ie., new				
	tie-in, change tie-in location relative to other flow paths, new				
	potential blocked flow or trapped pressure location; size change	PHA Facilitator;	PHA Study or	Design changes; Additional	
	(pipe, valve, or flow orifice), control valve or shut-down valve	Operations Rep (Operator);	Mini-PHA Study	safeguards (preventative and/or	
\rightarrow	action changes, changes to valve stops, locking, or resets, etc.)	Project Tech Lead Engr	(new/modified scenarios only)	mitigating); Update PHA Tables	
			PHA Study or		
			Mini-PHA Study		
	Does the change modify process variables such as pressure;		(new/modified scenarios only)		
	temperature; flowrate; velocity; fluid composition; heat/material balance; etc.) Includes primary process streams and auxiliary or	PHA Facilitator; Operations Rep (Operator);	possible PHA Documentation updates (only) if all changes are	Design changes; Additional safeguards (preventative and/or	
	balance; etc.) Includes primary process streams and auxiliary or utility process streams.	Project Tech Lead Engr	as in 2.4 above.	mitigating); Update PNA Tables	
\rightarrow	Does the change add, modify, or remove a Basic Process Control	Project Tech Lead Engr	as in 2.4 above.	mitigating); Opdate PHA Tables	
	System (BPCS) (including changes to sensing devices, final	PHA Facilitator;	PHA Study or	Design changes; Additional	
	elements, control logic/programming, communications	Operations rep (Operator);	Mini-PHA Study	safeguards (preventative and/or	
	equipment, components, test frequency, setpoints, etc)?	Project Tech Lead Engr	(new/modified scenarios only)	mitigating); Update PHA Tables	
	equipment, components, text requestry, sequints, etc)	PHA Facilitator;	(new) modified section to only	minigatings, oposite risk ratios	
		Operations Rep (Operator);	PHA Study or	Design changes; Additional	
	Does this change involve reactive chemicals? Does this change	Process Engineer:	Mini-PHA Study	safeguards (preventative and/or	
	involve chemicals or materials that may auto-ignite?	Project Tech Lead Engr	(new/modified scenarios only)	mitigating); Update PHA Tables	
		PHA Facilitator;			
	Does this change involve materials and/or process fluids that are	Operations Rep (Operator);	PHA Study or	Design changes; Additional	
	considred highly hazardous or toxic, such as H2S, or potential	Process Engineer;	Mini-PHA Study	safeguards (preventative and/or	
	asphysiants, such as nitrogen.	Project Tech Lead Engr	(new/modified scenarios only)	mitigating); Update PHA Tables	
		PHA Facilitator (specialist in			
		Dust Hazards, DHA);	PHA/DHA Study or	Design changes; Additional	
	Does the does the change involve processes where dust may be	Operations Rep (Operator);	Mini-DHA Study	safeguards (preventative and/or	
	accumulated or processed?	Project Tech Lead Engr	(new/modified scenarios only)	mitigating); Update PHA Tables	
	Other Equipment/Device Mechanical Changes				
		Discipline Engineering Group	No PHA;	Design changes. Inspection,	
		(Mechanical/Corrosion)	Technical Review (Mechanical)	Maintenance, and Testing	
	Does the change introduce a new deadleg or change an existing	Consult with Process	Technical Review (Corrosion)	(IM&T) Program updates.	
\rightarrow	deadleg?	Engineering Group	IM&T Review	Update Deadleg Register.	
	Does the change affect mechanical components,			1	
	rating/mechanical integrity of components (ie., replacement of		No PHA;	1	
	valve(s); replacement of valve components including elastomers;		Technical Review (Mechanical)		
	materials changes; corrosion resistance changes; change of pipe	Discipline Engineering Group	Technical Review (Corrosion)	Design changes. IM&T program	
\rightarrow	specification; etc).	(Mechanical/Corrosion)	IM&T Review	updates. Update PHA Tables.	
	Does the charge affect instrumentation components including		No PHA; Technical Review (Mechanical)		
	rating/mechanical integrity of instruments (ie., replacement of	Mariallas Fasinassias Com-		Device description	
	sensing device, transmitter, gauges; including elastomers;	Discipline Engineering Group (Instrumentation)	Tech Review (Instrumentation)	Design changes. IM&T program	
	materials, connections; sensing range or span; etc)	[[inserumentation]	most venen	updates. Update PHA Tables.	
	No Process Changes Identified				
	No Process changes or Mechanical Integrity related changes	Project Tech Lead Engr;	No formal or semi-formal	Statement below completed,	
	identified	Process Safety Engineer	process hazard review required	reviewed, and approved	
			,		
	Process Safety Review Method:				
	Process Safety Review Method: Method of Process Safety Review Chosen (if Required):			if none rqd and complete Section 8	Statement
		Apprvd PHA Facilitator (large s	* Indicate Not Applicable (N/A) audies) / Apprvd PHA Facilitator (sn		
	Method of Process Safety Review Chosen (if Required):	Apprvd PHA Facilitator (large s' Operator (Unit or Facility)	vidies) / Apprvd PHA Facilitator (sn Yes / No / Optional	nall studies) / Other / NR Select/Circle One	select/Circl
	Method of Process Safety Review Chosen (if Required): Process Safety Review Lead Requirements:	Operator (Unit or Facility) Operations Lead Rep	vidies) / Apprvd PHA Facilitator (sn Yes / No / Optional Yes / No / Optional	nall studies) / Other / NR Select/Circle One Select/Circle One	select/Circl
	Method of Process Safety Review Chosen (if Required): Process Safety Review Lead Requirements:	Operator (Unit or Facility)	vidies) / Apprvd PHA Facilitator (sn Yes / No / Optional	nall studies) / Other / NR Select/Circle One	select/Circ
	Method of Process Safety Review Chosen (if Required): Process Safety Review Lead Requirements:	Operator (Unit or Facility) Operations Lead Rep Project Technical Lead Engr Plant Engr / Facility Engr	udies) / Approd PHA Facilitator (sn Yes / No / Optional	nall studies) / Other / NR Select/Circle One Select/Circle One Select/Circle One Select/Circle One	select/Circ
	Method of Process Safety Review Chosen (if Required): Process Safety Review Lead Requirements:	Operator (Unit or Facility) Operations Lead Rep Project Technical Lead Engr	Ves	nall studies} / Other / NR Select/Circle One Select/Circle One Select/Circle One	select/Circ
	Method of Process Safety Review Chosen (if Required): Process Safety Review Lead Requirements:	Operator (Unit or Facility) Operations Lead Rep Project Technical Lead Engr Plant Engr / Facility Engr	udies) / Approd PHA Facilitator (sn Yes / No / Optional	nall studies) / Other / NR Select/Circle One Select/Circle One Select/Circle One Select/Circle One	select/Circ
	Method of Process Safety Review Chosen (if Required): Process Safety Review Lead Requirements:	Operator (Unit or Facility) Operations Lead Rep Project Technical Lead Engr Plant Engr / Facility Engr Process Engineer	Ves	nall studies) / Other / NR Select/Circle One Select/Circle One Select/Circle One Select/Circle One Select/Circle One	select/Circ
	Method of Process Safety Review Chosen (if Required): Process Safety Review Lead Requirements:	Operator (Unit or Facility) Operations Lead Rep Project Technical Lead Engr Plant Engr / Facility Engr Process Engineer SIS/Instrumentation Engineer Mechanical Engineer Third Party Rep	udies) / Appred PHA Facilitator (sn Yes / No / Optional	select/Circle One	select/Circ
	Method of Process Safety Review Chosen (if Required): Process Safety Review Lead Requirements:	Operator (Unit or Facility) Operations Lead Rep Project Technical Lead Engr Plant Engr / Facility Engr Process Engineer Stylnstrumentation Engineer Mechanical Engineer	University West W	select/Circle One	select/Circ
	Method of Process Safety Review Chosen (if Required): Process Safety Review Lead Requirements:	Operator (Unit or Facility) Operations Lead Rep Project Technical Lead Engr Plant Engr / Facility Engr Process Engineer SIS/Instrumentation Engineer Mecharical Engineer Third Party Rep Maintenance Rep (Technician)	udies] / Approd PHA Facilitator (sn	nall studies) / Other / NR select/Curcle One	select/Circ
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Trigger event - a modification - regulation 10(2)(d)

195 You must review and, if necessary, revise your safety report before certain modifications are made. This is aimed at modifications to establishments, processes, and the nature or quantity of dangerous substances which could have significant repercussions on the major accident hazards. Changes which either increase or decrease hazard or risk are important. It is not intended to deal with trivial changes.

196 Whether a modification has significant consequences will depend on the degree to which it introduces a new major accident hazard, or increases or decreases the risk from an existing hazard. The overall goal is to ensure that major accidents are prevented and the consequences of any that do occur are kept to a minimum. Examples of the sorts of changes which may have significant consequences include:

(a) a change in the quantity of a dangerous substance;

- (b) changes of phase of a dangerous substance, eg a change from liquid to gaseous chlorine;
- (c) the introduction of new, or removal of existing, dangerous substances;
- (d) new processes;
- (e) changes to storage facilities;
- (f) changes to a safety instrumented system;
- changes to the mode of delivery or transport of dangerous substances, eg a change from daily road tanker deliveries to weekly ship deliveries;
- (h) changes to the design or location of control rooms and/or the number of people present within them;
-) changes to the location of occupied buildings and/or the number of people present within them;
- changes to the original design parameters such as process operating conditions or practices, changed throughput, design life extensions or removal of safety-critical plant.







Better MoC Practices for Better MoC PHA





- ☐ Use an accurate, descriptive MoC titles
- ☐ Provide complete descriptions of MoC project scope
- ☐ Break down scope into each individual change
- Assess each change based on criteria in PSR screening form







Better PHA Practices for Better MoC PHA

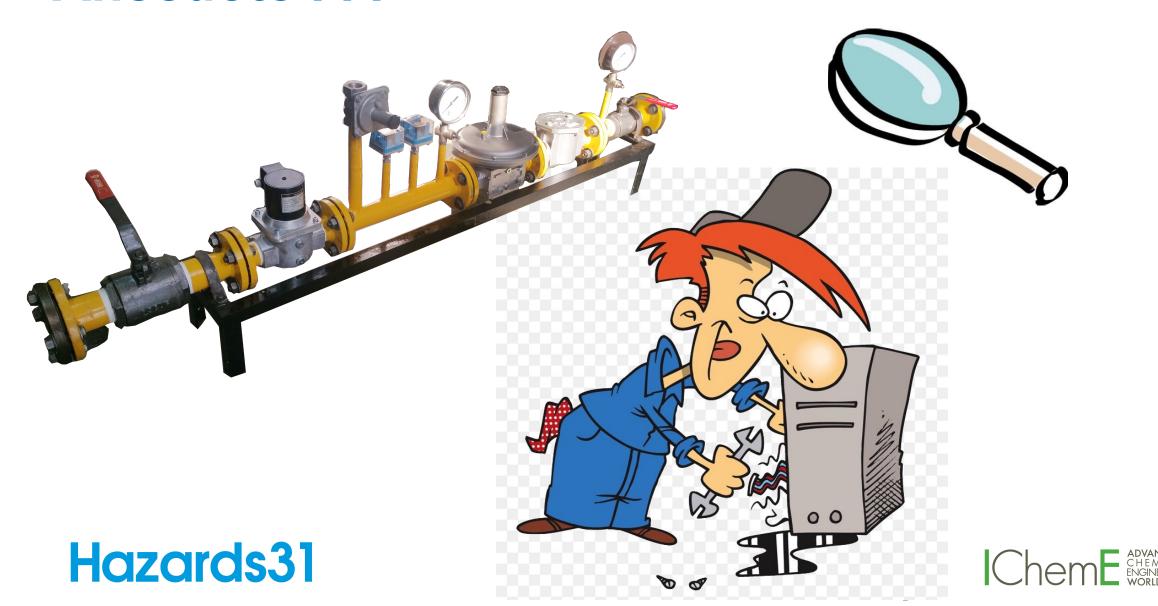
- Require the following in PHAs to support MoC PSRs:
- For each scenario, include limiting component tag and rating and include worst case deviation value and source (including tags)
- Include all components of automated functions in nomenclature describing all causes and/or safeguards
- Conduct MoC PSRs ahead of design and purchasing commitments
- Complete all follow-up items identified







Anecdote . . .



Small MoC PHA - Pitfalls

• Don't . . .

- Assume recommendations from HIRA, audits, or investigations are vetted and approved
- Assume that utility or auxiliary systems are exempt from process safety review requirements
- Presuppose the level of risk associated with a change before conducting the HIRA







Small MoC PHA - Barriers

- HIRA/PHA Software expensive, specialty
 - Use mark-ups of HIRA/PHA tables in PDF format
 - Use a simple spreadsheet, but include all deviations, criteria, and checklists per company protocol







Small MoC PHA - Barriers

- HIRA/PHA Software expensive, specialty
 - Use mark-ups of HIRA/PHA tables in PDF format
 - Use a simple spreadsheet, but include all deviations, criteria, and checklists per company protocol
- Skilled, trained HIRA/PHA leaders
 - Qualify wider pool of skilled HIRA/PHA leaders
 - Create two-tiered facilitator qualifications









Small MoC PHA - Perceived Barrier

- HIRA/PHA is often perceived is equating to:
 - Complex
 - Long duration
 - Large team; costly
- In fact, a mini-HIRA/PHA on a small change can require less than a couple hours with a couple participants





Key Points

- All MoCs require process safety review
 - All changes require process hazard review screening
 - All process changes require HIRA/PHA
 - All mechanical changes require MI assessment
- Skilled, trained functional representatives must:
 - Review and approve all process safety screenings
 - Lead all process safety hazard reviews
 - Complete mechanical design and maintenance assessments
- Apply the same HIRA methodology to changes of all sizes







Key Points

- Apply the same HIRA methodology to changes of all sizes
- A chain is only as strong as its weakest link!





Questions?

Any questions or comments?

Jody E Olsen P.E.
JE Olsen Consulting LLC
jodyo@jeolsenconsulting.com





