

**VI. Mechanical Integrity Program**  
**Nevada Division of Environmental Protection**  
**Chemical Accident Prevention Program**  
**Element Audit Checklist**

Revision 1, 03/12/09



<b>Facility:</b>	<b>Process(es) Covered:</b>	<b>Date:</b>	
<b>A. PROCEDURE/POLICY REVIEW</b>			
<b>1) EXISTENCE, STRUCTURE AND FORMAT FOR A MECHANICAL INTEGRITY PROGRAM</b>		<b>Percentage Completion Score – Total 100%</b> (Weighting of Elements is Defined Below)	
Overall NDEP-CAPP Element Audit Checklist Score for Mechanical Integrity (as evaluated in sections 2 through 7 below)		%	
<b>Notes/Comments Pertaining to Responses to Questions under Issue 1):</b>			
<b>2) DEVELOPMENT OF MAINTENANCE PROCEDURES</b>		<b>NAC Ref.</b>	<b>Resp. Code</b>
<i>Item 2 Completion Score – Weighted 15% of Total</i>		%	
<i>In each of the following components, have procedures been developed for maintenance activities and have they been confirmed to follow generally accepted good engineering practices:</i>			
i. Pressure vessels and storage tanks		459.95421(1a) 459.95421(d)	
ii. Process piping		459.95421(1a) 459.95421(d)	
iii. Pressure relief devices		459.95421(1a) 459.95421(d)	
iv. Pressure relief systems		459.95421(1a) 459.95421(d)	
v. Scrubber systems		459.95421(1a) 459.95421(d)	
vi. Building ventilation systems (if CAPP process inside)		459.95421(1a) 459.95421(d)	

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vii. Emergency shutdown systems	459.95421(1a) 459.95421(d)	
viii. Instrumentation	459.95421(1a) 459.95421(d)	
ix. Sensors	459.95421(1a) 459.95421(d)	
x. Alarms systems	459.95421(1a) 459.95421(d)	
xi. Pumps	459.95421(1a) 459.95421(d)	
xii. Compressors	459.95421(1a) 459.95421(d)	
xiii. Other rotating equipment?	459.95421(1a) 459.95421(d)	
<b>Notes/Comments Pertaining to Responses to Questions under Issue 2):</b>		
<b>3) PM SCHEDULE: DETERMINATION OF REQUIRED MAINTENANCE FREQUENCY</b>		<b>NAC Ref.</b>
		<b>Resp. Code</b>
<i>Item 3 Completion Score – Weighted 15% of Total</i>		<b>%</b>
Has a preventative maintenance schedule been developed for the piping, equipment and instruments; and has the type and frequency of maintenance been determined to be the <b>most conservative of vendor recommendations, best engineering practices or facility experience</b> for the following components:?		
i. Pressure vessels and storage tanks	459.95421(1e)	
ii. Process piping	459.95421(1e)	
iii. Pressure relief devices	459.95421(1e)	
iv. Pressure relief systems	459.95421(1e)	

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v. Scrubber systems	459.95421(1e)	
vi. Building ventilation systems ( <i>if CAPP process inside</i> )	459.95421(1e)	
vii. Emergency shutdown systems	459.95421(1e)	
viii. Instrumentation	459.95421(1e)	
ix. Sensors	459.95421(1e)	
x. Alarms systems	459.95421(1e)	
xi. Pumps	459.95421(1e)	
xii. Compressors	459.95421(1e)	
xiii. Other rotating equipment?	459.95421(1e)	
<b>Notes/Comments Pertaining to Responses to Questions under Issue 3):</b>		
<b>4) DEVELOPMENT OF MAINTENANCE TRAINING PROGRAM</b>	<b>NAC Ref.</b>	<b>Resp. Code</b>
<i>Item 4 Completion Score – Weighted 5% of Total</i>	%	
<i>Is training required for all maintenance personnel in each of the following areas:</i>		
i. An overview of the process and the potential hazards associated with the process?	459.95421(1b1)	
ii. Training in the procedures related to the job tasks, to ensure that the employee can perform the job tasks in a safe manner?	459.95421(1b2)	
iii. Training in management of change provisions, including how to recognize a change that would prompt the need for the MOC?	459.95421(1b3)	

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<b>Notes/Comments Pertaining to Responses to Questions under Issue 4):</b>			
<b>5) QUALITY ASSURANCE/QUALITY CONTROL PROCEDURES</b>		<b>NAC Ref.</b>	<b>Resp. Code</b>
<i>Item 5 Completion Score – Weighted 10% of Total</i>		%	
i.	Does the mechanical integrity program provide a mechanism to ensure that new equipment, instruments and controls are checked to ensure suitability with the process?	459.95421(1h)	
ii.	Does the mechanical integrity program provide a mechanism to ensure that equipment, instruments and controls are checked to ensure that installation is per design specifications and manufacturers instructions?	459.95421(1i)	
iii.	Does the mechanical integrity program provide a mechanism to ensure that maintenance materials, spare parts, and equipment are suitable for the process for which they will be used?	459.95421(1j)	
<b>Notes/Comments Pertaining to Responses to Questions under Issue 5)</b>			
<b>6) MANAGEMENT PLAN AND DOCUMENT CONTROL</b>		<b>NAC Ref.</b>	<b>Resp. Code</b>
<i>Item #6 Completion Score – Weighted 5% of Total</i>		%	
i.	Is there a site-specific plan that addresses how the Mechanical Integrity Program requirements will be developed and maintained, including:	459.95341	
a.	Document the names of person(s) who are members of the team with overall responsibility for the development, implementation and integration of the Mechanical Integrity Program Requirements?	459.95341	
b.	How is facility program monitored for compliance with NAC 459.95421, CAPP Mechanical Integrity Program?	459.95341	
c.	Does the site-specific plan define the responsibility and method to validate facility Process Safety Information prior to developing or modifying the Mechanical Integrity program element?	459.95341	
d.	Does the site-specific plan address how the training program is developed and administered?	459.95341	

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e.	Does the site-specific plan address how preventive maintenance activities are determined?	459.95341	
f.	Does the site-specific plan address how the work order system functions?	459.95341	
ii.	Is there a site-specific policy or procedure that addresses how Mechanical Integrity Program documentation is controlled to ensure that the most current information is in circulation and use?	459.95341	
<b>Notes/Comments Pertaining to Responses to Questions under Issue 6):</b>			
<b>7) VERIFICATION OF MECHANICAL INTEGRITY PROGRAM IMPLEMENTATION</b>		<b>NAC Ref.</b>	<b>Resp. Code</b>
<i>Item 7 Completion Score – Weighted 50% of Total</i>		%	
i.	Are maintenance procedures available to maintenance personnel? <i>Refer to Part B-1</i>	459.95421(1a)	
ii.	Does a random check of records indicate that training of maintenance personnel is being conducted as required by this section? <i>Refer to Part B-2</i>	459.95421(1b)	
iii.	Does a random check of records indicate that scheduled maintenance activities are being completed and properly documented? <i>Refer to Part B-3</i>	459.95421(1c) 459.95421(1f)	
iv.	Does a random check of records indicate that any deficiencies found to be outside of acceptable limits (as defined in the PSI) during the performance of maintenance activities, were corrected before the equipment, instruments, controls were returned to service? <i>Refer to Part B-3</i>	459.95421(1f) 459.95421(1g)	
v.	Does a random check of purchasing records and installation work orders indicate that program quality control measures are being implemented? <i>Refer to B-4</i>	459.95421(1h) 459.95421(1i) 459.95421(1j)	
<b>Notes/Comments Pertaining to Responses to Questions under Issue 7):</b>			
<b>General Procedure/Policy Review Notes/Comments:</b>			

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<b>B. ON-SITE INSPECTION - RECORDS AUDIT</b>		
<b>1) VERIFY EXISTENCE AND AVAILABILITY OF MAINTENANCE PROCEDURES</b>	<b>NAC Ref.</b>	<b>Resp. Code</b>
i. Do maintenance procedures generally appear to be in place and accessible to maintenance employees as indicated on the data forms for the following components:	459.95421(1a)	
a. Heat Exchangers	459.95421(1a)	
b. Other Types of Pressure Vessels & Storage Tanks	459.95421(1a)	
c. Piping Systems	459.95421(1a)	
d. Manual Valves	459.95421(1a)	
e. Pressure relief devices	459.95421(1a)	
f. Pressure relief systems ( <i>pressure relief discharge headers and flare systems</i> )	459.95421(1a)	
g. Scrubber systems	459.95421(1a)	
h. Building ventilation systems ( <i>if CAPP process inside</i> )	459.95421(1a)	
i. Emergency shutdown systems	459.95421(1a)	
j. Instrumentation	459.95421(1a)	
k. Sensors ( <i>toxic/combustible gas, flame</i> )	459.95421(1a)	
l. Alarm systems	459.95421(1a)	
m. Pumps	459.95421(1a)	
n. Compressors	459.95421(1a)	

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o. Other rotating equipment?		459.95421(1a)	
ii. Do the safe work practices appear to be in place and accessible to maintenance employees and is there evidence of their use:		459.95421(1a)	
a. Hot Work		459.95421(1a)	
b. Lockout/Tagout		459.95421(1a)	
c. Confined Space		459.95421(1a)	
d. Process Equipment Opening / Line Breaking		459.95421(1a)	
e. Controlled Access		459.95421(1a)	
f. Other type of safe work permit?		459.95421(1a)	

**Notes/Comments Pertaining to Responses to Questions under Issue 1):**

**2) SELECT 2 TO 4 EMPLOYEE TRAINING FILES/RECORDS TO REVIEW AGAINST ACTUAL PRACTICE**

*List on the Following Table:*

#	Employee ID # or Name	Job Description or Title of Position
i		
ii		
iii		
iv		

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Inquiry/Observation		Resp. Code :			
		i	ii	iii	iv
<b>Do the records indicate the date &amp; substance of training and comprehension records for:</b>					
a. Relevant safe work practices?					
b. Job safety training?					
c. Overview of the process and its potential hazards?					
d. Management of Change program?					
<b>Notes/Comments Pertaining to Responses to Questions under Issue 2):</b>					
<p><b>3) REVIEW THE SYSTEM USED TO SCHEDULE AND TRACK MAINTENANCE ACTIVITIES. SELECT 2 TO 4 COMPONENTS FOR SPECIFIC REVIEW</b>  <i>List on the Following Table:</i></p>					
#	Component ID #	Component Description (Valve, Vessel, Pump, etc.)	Type of Activity (Scheduled PM or Repair)	Work Order Identifier	
i					
ii					
iii					
iv					

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Inquiry/Observation	Resp. Code:			
	i	ii	iii	iv
a. Is the component being maintained pursuant to the schedule?				
b. Is the maintenance activity & frequency based upon the most conservative criteria?				
c. Is the following information being provided in the maintenance record: Date of activity?				
d. Is the following information being provided in the maintenance record: Name of inspector or maintenance person?				
e. Is the following information being provided in the maintenance record: Serial number or component identifier?				
f. Is the following information being provided in the maintenance record: Description of inspection or test (or required repair activity)?				
g. Is the following information being provided in the maintenance record: Results of inspection or test?				
h. Is there a maintenance procedure associated with this activity?				
i. Are there safe work practices associated with this activity?				
j. If a repair of equipment operating outside of acceptable limits, was the deficiency corrected before returning to service?				
<b>Notes/Comments Pertaining to Responses to Questions under Issue 3):</b>				

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**4) REVIEW QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) PRACTICES**

List on the Following Table:

#	Component ID #	Component Description (Valve, Vessel, Pump, etc.)	Design Spec ID / PO #	Work Order Identifier			
i							
ii							
iii							
iv							
<b>Inquiry/Observation</b>				<b>Resp. Code:</b>			
				i	ii	iii	iv
a. Is there evidence that a purchase order for a process component is being confirmed against the design specification?							
b. Is there evidence that the receiving documentation for an item is being confirmed against the applicable purchase order?							
c. Is there evidence that checks are performed to ensure the proper component is installed and is installed properly?							
d. Is there evidence that the suitability of materials, spare parts and equipment for new and existing processes are confirmed?							
<b>Notes/Comments Pertaining to Responses to Questions under Issue 4):</b>							
<b>General On-Site Inspection and Records Audit Notes/Comments:</b>							

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**C. INTERVIEWS**

**1) SELECT TWO OR MORE PERSONNEL TO INTERVIEW REGARDING THE EFFECTIVENESS OF THE MECHANICAL INTEGRITY PROGRAM USING THE FOLLOWING QUESTION SETS**

*Responses are to be Logged on Following Pages:*

<b>Question Set</b>	<b>Questions to Consider</b>
<b>a</b>	What is your job description and associated tasks?
<b>b</b>	Do you know how maintenance tasks and frequencies were developed? Were you involved in the process where these requirements were determined? Do you think all the present maintenance activities and frequencies are adequate?
<b>c</b>	How is maintenance work scheduled and tracked? How are you assigned work? What information is provided on the work order, or in the instruction given? How do you know which procedures apply to a given maintenance activity? What kind of documentation do you generate?
<b>d</b>	Do you use procedures in performing your duties? How do you access maintenance procedures and vendor manuals? What is your role in implementing Safe Work Practices (such as Hot Work, L-O/T-O, etc)? Do you think that any additional procedures or documents are needed for you to adequately and safely perform all assigned tasks?
<b>e</b>	What are the hazards associated with this process? Do you know what the MOC process is and how it works? What kind of training have you had for this position? Is the training adequate?
<b>f</b>	How are spare parts and replacement components are specified, ordered, stocked and issued? How do you know if you have been issued the correct part? Is your work checked by anyone after it is complete? How is it checked?

**2) RECORD RESPONSES OF SELECTED PERSONNEL TO QUESTIONS FROM THE QUESTION SETS**

*Refer to Part C-1*

**Employee Profile**

<b>Job Title/Position</b>	<b>Department/Unit/Group</b>	<b>Time in Job</b>	<b>Time w/Co.</b>

**Response to Question Set \_ :**