

Checklist	Remarks	Action (X)	
<p style="text-align: center;"><b>Project System Audit Plotplans</b></p> <p><b>Note:</b> Not all items of the checklist shall be checked. It depends on the status of the work and whether it is the first, second or third audit.</p> <p>⊗ = EH&amp;S related question</p> <p><b>1. Project Definition</b></p> <p><b>1.1</b> Has the project kick-off meeting (CM-PE-304) been held with the project task force and all discipline lead engineers and/or managers attending?</p> <p>Have minutes (state No. and date) been properly issued and distributed to all parties involved?</p> <p>What is the type of contract (e.g.: LSTK or reimbursable etc.).</p> <p><b>1.2</b> Are Company/client, standards/norms/ guides/practices/procedures/forms and specifications, applicable and to be used by the discipline, being listed in the PPEM?</p> <p><b>1.3</b> Have contractual milestones been specified in the PPEM for preparation of plot plans and for presentation of these to the client for comments/approval?</p> <p><b>1.4</b> Have plot plan multi-discipline reviews been scheduled?</p> <p><b>2. Engineering Technical</b></p> <p><b>2.1</b> Is an overall site plan available?</p> <p><b>2.2</b> In case of a revamp, which of the following client specifications have been specified in the PPEM as to be used on the project (between brackets : the equivalent Company specification)?</p> <ul style="list-style-type: none"> <li>• steam tracing spec (SP-C6)</li> <li>• electr. tracing spec (SP-E22)</li> <li>• instrument design spec (SP-K1)</li> </ul>			
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<ul style="list-style-type: none"> <li>• specs for various instruments</li> <li>• civil design spec (SP-J1)</li> <li>• structural design spec (SP-DS1)</li> <li>• insulation, fireproofing, etc. specs (SP-N1 through N4 and N6)</li> <li>• specs for atmospheric tankage</li> </ul> <p><b>2.3</b> What is the status and availability of the above listed (Company or client) specs for the new unit(s) to be designed and/or incorporated?</p> <p><b>2.4</b> Has all equipment shown in the equipment list been shown on the plot plan?</p> <p><b>2.5</b> Have exchanger types been correctly shown?</p> <p><b>2.6</b> Can you find or calculate for each piece of equipment the coordinates and elevations?</p> <p><b>2.7</b> Are column distances and bracing locations of pipe rack and structures shown?</p> <p><b>2.8</b> Are column numbers shown for pipe racks and structures?</p> <p><b>2.9</b> ☒ Are distances correct in respect to safety codes, maintenance, crane access and client requirements?</p> <p><b>2.10</b> ☒ Is fire fighting equipment shown?</p> <p><b>2.11</b> Are drop-out areas shown?</p> <p><b>2.12</b> Are bundle pulling areas shown?</p> <p><b>2.13</b> ☒ Are stairs and escape ladders shown?</p> <p><b>2.14</b> Is equipment correctly elevated in respect to gravity flow?  ( tower, airfin, vessel, pump etc.)</p> <p><b>2.15</b> Has sufficient space been allocated on pipe racks for spares?</p> <p><b>2.16</b> Is existing equipment shown within the matchline?</p> <p><b>2.17</b> ☒ Has constructability been reviewed with</p>			
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<p>construction? See procedure CM-PE-801.</p>		
<p><b>2.18</b> What is the status of process data sheets with respect to elevation?</p>		
<p><b>2.19</b> <input checked="" type="checkbox"/> Have codes determining the flare location and the areas to be kept free been identified?</p>		
<p><b>2.20</b> <input checked="" type="checkbox"/> Have the flare, incinerator, KO pots and vapour recovery been defined as far as applicable?</p>		
<p><b>2.21</b> <input checked="" type="checkbox"/> Have fire fighting and protection requirements been defined?</p>		
<p><b>2.22</b> Has grade elevation reference to datum been given?</p>		
<p><b>2.23</b> Have monument reference points or coordinates been established?</p>		
<p><b>2.24</b> Have Plot Limits been certified?</p>		
<p><b>2.25</b> Are north arrow and prevailing wind direction shown on the plot plan and is a distinction made between plant north and actual north?</p>		
<p><b>3. Interface with Civil and Structural Steel and Underground Groups</b></p>		
<p><b>3.1</b> Have type of foundations and differential settlements been discussed with the civil engineer?</p>		
<p><b>3.2</b> Have foundation dimensions (spreading) been checked with the civil engineer?</p>		
<p><b>3.3</b> Have decisions on concrete vs steel pipe racks/structures been made and confirmed?</p>		
<p><b>3.4</b> Have column distances and bracing locations of pipe racks/super structures been discussed and agreed with the civil/structural engineer?</p>		
<p><b>3.5</b> <input checked="" type="checkbox"/> Have codes/practices, governmental/statutory/local regulations for storage tank spacing, distances to bundwalls, bundwall height and pipeline sealing thru bundwalls been established and agreed upon with the authority concerned?</p>		
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<b>3.6</b> <input checked="" type="checkbox"/> Has a sloping site and/or gravity transport been considered?			
<b>3.7</b> Has the design philosophy been established for the buildings involved?			
<b>3.8</b> <input checked="" type="checkbox"/> Are open pits and floor openings to be fenced or provided with guard rail only?			
<b>3.9</b> Have trench routings for underground piping (storm water and process sewer systems, drain systems and fire water lines), electrical/ instrument cable been established regarding type, estimated size, routing (incl. sloping) and have they been discussed and agreed upon with electrical, civil and U/G piping?			
<b>4.      Interfaces with Process Group</b>			
<b>4.1</b> Have Process defined and listed all equipment and lines within the battery limits (BL's) of package units?			
<b>4.2</b> <input checked="" type="checkbox"/> Have process identified and listed <u>all</u> equipment and lines subject to lethal or toxic rules or requiring special attention for corrosive or erosive service and safety reasons (i.e. explosive area detection)?			
<b>4.3</b> <input checked="" type="checkbox"/> Have process identified whether there is any equipment and/or system(s) to be provided with a gas recovery and/or inert gas blanketing service for safety and/or environmental requirements?			
<b>4.4</b> <input checked="" type="checkbox"/> Have process identified <u>all</u> equipment and lines or systems requiring extreme design conditions (beyond normal code, rules and regulation requirements) as dictated by the client?			
<b>4.5</b> <input checked="" type="checkbox"/> Have process identified type (service) of flare headers which are to be utilized with their particular requirements?			
<b>4.6</b> <input checked="" type="checkbox"/> Have process identified the need for safety equipment, such as eye wash/ safety showers, breathing apparatus, etc.?			
<b>5.      General Engineering</b>			
<b>5.1</b> Have interfaces at BL's been properly			
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<p>coordinated and agreed upon with the client?</p> <p><b>5.2</b> Are PFD's, EFD's, UFD's &amp; LDT's <u>properly</u> recorded on an index (document list)?</p> <p><b>5.3</b> What is the status of the equipment list and PFD's, EFD's, UFD's with relevant LDT's for the development of the overall and unit plot plans?</p> <p><b>5.4</b> What is the present status of the overall/unit plot plans under development?</p> <p><b>5.5</b> How is ensured, during the development of the plot plan, that it is frequently discussed with and agreed upon by the lead process engineer and that it is signed off prior to issue for comments to the project manager and the HO construction department (for constructability, access and safety)?</p> <p><b>5.6</b> What is the status of client approvals on plot plans?</p> <p><b>5.7</b> ☒ Is there a clear definition of which piping systems need to be studied?  Where have these been defined?</p> <p><b>5.8</b> ☒ Have the critical process piping areas been studied, including (preliminary) stress calculations, indicating major supports required?</p> <p><b>5.9</b> ☒ Have hot-cold piping areas been studied, incl. (preliminary) stress calculations, indicating major supports required?</p> <p><b>5.10</b> What is the availability and status of information on Company designed equipment and facilities such as buildings and sheds?</p> <p><b>5.11</b> What is the availability and status of information on supplier designed equipment?</p> <p><b>5.12</b> How were space requirements for supplier designed equipment estimated pending availability of supplier documents?</p> <p><b>5.13</b> To what extent have suppliers been requested to specify maintenance space requirements early in the project?</p> <p><b>5.14</b> Has a line-shoot been made?</p>			
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<p><b>6. Job Control/Administration</b></p> <p><b>6.1</b> Are planned milestones met in time?</p> <p><b>6.2</b> Was client approval on plot plan:</p> <ul style="list-style-type: none"> <li>• formally obtained</li> <li>• properly recorded?</li> </ul> <p><b>6.3</b> Does a marked-up master copy of the plot plan exist?</p> <ul style="list-style-type: none"> <li>• is it kept up-to-date?</li> <li>• by whom?</li> <li>• how are changes documented?</li> </ul> <p><b>6.4</b> To what extent are:</p> <ul style="list-style-type: none"> <li>• plot plan changes recorded on revision lists including reasons for changes?</li> <li>• are revision lists orderly filed?</li> <li>• changes clearly indicated?</li> <li>• references made to potential changes/project deviations and recorded on Change Alerts (see CM-PE-313)?</li> </ul> <p><b>6.5</b> How is the filing of marked-up master copies organized?</p> <p><b>6.6</b> Have the various internal and external revision indications been properly indicated on the plot plans?</p> <p><b>7. Additional Questions</b></p>		
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## Product Audit Checklist

Note:

Any major deviation from requirements shall be tagged in the 'No' column and be elaborated on in the main report under Product Audit Findings.

Documents reviewed:

Questions	YES	NO	NA
1. Are input data available?			
2. Have they been formally issued?			
3. Have the data been qualified? (what is/is not included)			
4. Have they been screened for completeness?			
5. Have calculations been performed?			
6. Have these calculations been checked?			
7. Has the product been formally checked?			
8. Is checking evidence available?			
9. Do the issued documents contain sufficient information?			
10. Have multi-discipline input/comments been obtained?			
11. Are the issued documents checked for compliance with client, licensor and authority specifications?			
12. Have all deviations from client, licensor and authority specifications been discussed and formally agreed upon with the relevant party?			
13. Are supplier data included in the document?			
14. Have supplier data been qualified?			
15. Have all requirements of the document been covered?			
16. Have the document requirements been discussed with the internal client?			
17. Have the document requirements been discussed with the external client?			
18. Have any comments been received on earlier issues of the document?			
19. Have all comments been incorporated in later issues?			
20. If not, has agreement been reached about the implementation of comments?			
21. Have changes been clearly indicated?			
22. Has the PM or EM been involved in this discussion in case of comments from the client?			
23. Has the document been reviewed by the discipline manager or his delegate, if required?			
24. Has the document been formally approved at the proper authorization level?			