

# Project System Audit

## Construction

### Table of Contents

1.	Project Construction Management .....	2
2.	Safety/Health/Welfare/ Environmental (EH&S).....	5
3.	Subcontracts Administration/Site Control .....	6
4.	Site Engineering (Field, Office, Authorities, Commissioning).....	8
5.	Quality Assurance .....	10
6.	Office Management .....	11
7.	Materials Management .....	12
8.	Materials Storage .....	14
9.	Security .....	15
10.	Field Supervision .....	15
11.	Civil.....	17
12.	Underground Piping.....	18
13.	Structural .....	19
14.	Piping (General and Shop) .....	20
15.	Mechanical Vessels (including field piping) .....	22
16.	Control Systems/Electrical.....	24
17.	Painting/Insulation .....	25
18.	(Pre)-Commissioning/Hand over .....	26
19.	Additional Questions.....	28

Attachment 1: Subcontractor Documentation Status

Checklist	Remarks	Action (X)
<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><b>1. Project Construction Management</b></p> <p><b>1.1</b> Is a copy of the Contract (with the client) available?</p> <p><b>1.2</b> Is the Construction Procedure and Execution Manual (CPEM) issued and available? Does it contain the required information?</p> <ul style="list-style-type: none"> <li>• has a field organization scheme been included?</li> <li>• are client/Company Construction practices/procedures applicable and used?</li> </ul> <p><b>1.3</b> Are job related internal instructions developed and used? How is it ensured that all group members are provided with copies and that contents are technically sound and not in conflict with other project requirements.</p> <p><b>1.4</b> If client's standards/detail/forms, etc. must be used:</p> <ul style="list-style-type: none"> <li>a. are these documents available in the group?</li> <li>b. are they technically acceptable for this type of job?</li> </ul> <p><b>1.5</b> Is the applicable scope of services defined for the various field disciplines?</p> <p><b>1.6</b> Are there any (precommissioning/start-up, etc. related) procedures required/developed?</p> <p><b>1.7</b> Have checklists been developed for plant completion and agreed with the client?</p> <p><b>1.8</b> Are international and/or local codes/norms/standards/applicable? If so, have they been listed and are copies available at the site office?</p> <p><b>1.9</b> Has a mobilization plan been established?</p>		
RB28035.doc	www.red-bag.com	SHEET 2 of 28

Checklist	Remarks	Action (X)
<p><b>1.10</b> Are the following reports prepared and issued?:</p> <ul style="list-style-type: none"> <li>• daily field labor force reports</li> <li>• weekly reports</li> <li>• monthly progress and cost reports</li> </ul> <p><b>1.11</b> Has a control budget been issued?</p> <p><b>1.12</b> Has the budget for the Construction Management Team (CMT) been defined and where?</p> <p><b>1.13</b> Did the Construction Manager review and accept the CMT budget and manpower planning?</p> <p><b>1.14</b> Has a Progress Measurement System been established and is it properly applied?</p> <p><b>1.15</b> Who specified the allocation of progress percentage for each activity?</p> <p><b>1.16</b> Does the system cover both the Construction Management Team and subcontractor activities?</p> <p><b>1.17</b> What is the current progress percentage overall?</p> <p>How does this relate to the planned progress?</p> <p><b>1.18</b> What CMT manhours amount has been spent to date?</p> <p><b>1.19</b> How do forecast CMT manhours compare with budget CMT manhours?</p> <p><b>1.20</b> Have the scheduled CMT manhours been adjusted based on the approved project variations?</p> <p><b>1.21</b> What subcontractor manhours amount have been spent to date?</p> <p><b>1.22</b> How do forecast subcontractor manhours compare with budget SC manhours?</p> <p><b>1.23</b> Are changes in the scope of work being processed in time to the SC's?</p>		
RB28035.doc	www.red-bag.com	SHEET 3 of 28

Checklist	Remarks	Action (X)
<p><b>1.24</b> How are these changes advised to SC's?</p>		
<p><b>1.25</b> Does the Construction Manager receive a copy of the weekly LDS print-out?</p>		
<p><b>1.26</b> Were any CMT manpower problems experienced in:</p> <ul style="list-style-type: none"> <li>• planning manpower requirements?</li> <li>• mobilization?</li> <li>• obtaining the right number of people?</li> <li>• obtaining the right quality of people?</li> <li>• changes in manpower due to external reasons?</li> </ul>		
<p><b>1.27</b> Are there regular coordination meetings with the CMT team, subcontractors and client?</p>		
<p><b>1.28</b> Is there evidence of good communication within the team, with subcontractors and client?</p>		
<p><b>1.29</b> To what extent and by whom are the HO planning, cost and engineering managers informed when changes and/or slippages are encountered?</p>		
<p><b>1.30</b> What is the frequency of formal communication/coordination between CMT and HO?</p>		
<p><b>1.31</b> Does the Project Construction Manager participate in Monthly Project Review meetings in the HO?</p>		
<p><b>1.32</b> What is currently the percentage of agency personnel on the job within the CMT team?</p>		
<p><b>1.33</b> What is the visibility of the Company name on site at entrance and office?</p>		
<p><b>1.34</b> What is the status of the close out report preparation?</p>		
<p>RB28035.doc</p>	<p>www.red-bag.com</p>	<p>SHEET 4 of 28</p>

Checklist	Remarks	Action (X)	
<p><b>2. Safety/Health/Welfare/ Environmental (EH&amp;S)</b></p> <p><b>2.1</b> Has a site safety committee been established?</p> <p><b>2.2</b> What EH&amp;S meetings are being conducted? What is the frequency? Who are normally attending?</p> <p><b>2.3</b> Has a site EH&amp;S plan been issued? Has it been distributed in a controlled fashion?</p> <p><b>2.4</b> Have (special) Company/client EH&amp;S requirements been defined? Where are they covered in documentation?</p> <p><b>2.5</b> What is the frequency of EH&amp;S audits? Are findings being reported?</p> <p><b>2.6</b> What is the frequency of EH&amp;S inspection tours? Are findings being reported?</p> <p><b>2.7</b> Is there a EH&amp;S Induction Program including:</p> <ul style="list-style-type: none"> <li>• video?</li> <li>• site rules/EH&amp;S booklet?</li> <li>• register?</li> </ul> <p><b>2.8</b> Does a gas/fire alarm procedure exist including an emergency/evacuation plan?</p> <p><b>2.9</b> Have the CMT and subcontractor personnel been educated about the meaning of various siren signals?</p> <p><b>2.10</b> What personal protection is obligatory on this site?</p> <p><b>2.11</b> Has a list been prepared of subcontractor EH&amp;S representatives?</p> <p><b>2.12</b> Are subcontractor EH&amp;S plans reviewed and approved? (see attachment 1)</p>			
RB28035.doc	www.red-bag.com	SHEET 5 of 28	

Checklist	Remarks	Action (X)
<p><b>2.13</b> Have tool box talks by SC's been held and recorded?</p>		
<p><b>2.14</b> Are valid certificates/inspection reports for equipment available, e.g. for cranes (Aboma)?</p>		
<p><b>2.15</b> Are cranes equipped with load-moment indicators and has availability of load-moment tabulations been verified?</p>		
<p><b>2.16</b> Who inspects scaffolding prior to release for use?</p>		
<p><b>2.17</b> Who is issuing work permits (if applicable)?</p>		
<p><b>2.18</b> Is there a safety promotion incentive program?</p>		
<p><b>2.19</b> Is site housekeeping and environmental control adequate?</p>		
<p><b>2.20</b> What medical facilities are available or what arrangements have been made?</p>		
<p><b>2.21</b> Have contacts with local services been made known to all concerned?</p> <ul style="list-style-type: none"> <li>• fire</li> <li>• hospital/ambulance</li> <li>• police</li> </ul>		
<p><b>2.22</b> Is VCA/VVA applicable on this site?</p>		
<p><b>3. Subcontracts Administration/Site Control</b></p>		
<p><b>3.1</b> Have the SC's been evaluated/assessed by Company?</p> <ul style="list-style-type: none"> <li>• for quality?</li> <li>• for safety?</li> </ul>		
<p>RB28035.doc</p>	<p>www.red-bag.com</p>	<p>SHEET 6 of 28</p>

Checklist	Remarks	Action (X)
<b>3.2</b> To what extent are manhours, cost and quantities reported by subcontractors checked for accuracy?		
<b>3.3</b> How is the cost and progress reporting at site organized?		
<b>3.4</b> How is the planning and scheduling control of the construction work organized?		
<b>3.5</b> What are the tools for productivity analysis?		
<b>3.6</b> Is a backcharge register being maintained?		
<b>3.7</b> Are PO/SC files complete including: <ul style="list-style-type: none"> <li>• inspection reports?</li> <li>• expediting reports?</li> <li>• material certification control?</li> <li>• release notes?</li> </ul>		
<b>3.8</b> Is client involved in SC negotiations at site?		
<b>3.9</b> Is actual progress in line with planned progress?		
<b>3.10</b> To what extent is planned progress updated as a result of revised quantities?		
<b>3.11</b> Is client involved in EWA's?		
<b>3.12</b> Is an EWA register being maintained?		
<b>3.13</b> Are EWA's marked for reason of work, e.g. modifications, engineering, errors, etc.?		
<b>3.14</b> How is it ensured that EWA requests are processed in a timely fashion?		
<b>3.15</b> What is currently the longest backlog request?  What is the special reason for the delay?		
<b>3.16</b> How is the HO informed about the status of EWA requests and their approval status?		
<b>3.17</b> Who are involved in the approval cycle of EWA's?		
RB28035.doc	www.red-bag.com	SHEET 7 of 28

Checklist	Remarks	Action (X)
<p><b>3.18</b> How are estimated versus final manhours/cost related to EWA's being treated and administered?</p>		
<p><b>3.19</b> Does the Home Office update quantities in accordance with site requirements?</p>		
<p><b>4. Site Engineering (Field, Office, Authorities, Commissioning)</b></p>		
<p><b>4.1</b> Are documents as received all released "certified for construction"?</p> <ul style="list-style-type: none"> <li>• GA's</li> <li>• drawings</li> <li>• isometrics</li> <li>• specifications</li> <li>• supplier prints</li> </ul>		
<p><b>4.2</b> What percentage of expected total has already been received?</p> <ul style="list-style-type: none"> <li>• GA's</li> <li>• drawings</li> <li>• isometrics</li> <li>• specifications</li> <li>• supplier prints</li> </ul>		
<p><b>4.3</b> How has the field construction file been organized and who is responsible for its maintenance?</p>		
<p><b>4.4</b> Is a take-out card system being used?</p>		
<p><b>4.5</b> Is document control satisfactory for:</p> <ul style="list-style-type: none"> <li>• procedures/specifications</li> <li>• instructions</li> <li>• drawings</li> <li>• subcontract documents</li> </ul>		
<p>RB28035.doc</p>	<p>www.red-bag.com</p>	<p>SHEET 8 of 28</p>



Checklist	Remarks	Action (X)	
<ul style="list-style-type: none"> <li>• issues of supplier prints</li> <li>• inspection records/reports and punch list per discipline.</li> </ul> <p><b>4.6</b> What is the legibility of documents?</p> <p><b>4.7</b> Is a HO drawing register (latest issue) available and used?</p> <p><b>4.8</b> Has a computerized field document distribution been established and agreed?</p> <p><b>4.9</b> Is a computerized vendor print control index available and a PO register?</p> <p><b>4.10</b> Did we deviate from normal expediting/VPC practices as defined in our design guides and procedures?</p> <p><b>4.11</b> What is the time lapse between Hague submittal and construction receipt of drawings/ documents?</p> <p><b>4.12</b> Are masterprints of documents available?</p> <p><b>4.13</b> Are previous issues of documents kept (with the discipline) and marked as such?</p> <p><b>4.14</b> Have the authority requirements been set?</p> <p>Which authorities are involved?</p> <p>Which documents have to be submitted for approval and by whom?</p> <p>Is sufficient time allowed for presentation and approval time?</p> <p><b>4.15</b> What authority contacts have been established?</p> <p><b>4.16</b> Is field engineering required?</p> <p><b>4.17</b> What is the status of the engineering queries report?</p> <p><b>4.18</b> Is there a need for winterizing on:</p> <ul style="list-style-type: none"> <li>• foundations/civil works?</li> <li>• mechanical equipment?</li> <li>• warehousing?</li> </ul>			
RB28035.doc	www.red-bag.com	SHEET 9 of 28	

Checklist	Remarks	Action (X)
<p><b>4.19</b> What work arrangement has been agreed upon between construction, precommissioning and commissioning?</p>		
<p><b>4.20</b> Are supplier representatives expected on site?</p>		
<p><b>4.21</b> Have site surveys been conducted and reported (monuments)?</p>		
<p><b>4.22</b> Have hand-over documents been agreed to with the client?</p> <p>How is it ensured that marked-up/as built document information is transferred to the originals?</p>		
<p><b>4.23</b> Is it expected that computer programs need to be developed/used to meet this project's requirement?</p>		
<p><b>4.24</b> Are these programs controlled?</p>		
<p><b>4.25</b> Is it expected that we need the services of consultants for special items?</p>		
<p><b>5. Quality Assurance</b></p>		
<p><b>5.1</b> Has subcontractors quality/inspection plan been approved by Company.</p> <p>Also for supply and erect orders? (see attachment 1)</p>		
<p><b>5.2</b> Has signing of QC documents been formalized? (Company/client/third party)</p>		
<p><b>5.3</b> Are all the SC QC forms used as per the approved SC QA/inspection plan?</p>		
<p><b>5.4</b> Are the QC forms properly being signed/initialled by all parties?</p>		
<p><b>5.5</b> Is an NC register being maintained?</p>		
<p><b>5.6</b> What is the status of outstanding NC's?</p>		
<p><b>5.7</b> Has an audit schedule been established and are audit reports issued?</p>		
<p><b>5.8</b> Have HO audits been closed out?</p>		
<p><b>5.9</b> Have NDT audits been conducted and by</p>		
<p>RB28035.doc</p>	<p>www.red-bag.com</p>	<p>SHEET 10 of 28</p>

Checklist	Remarks	Action (X)	
<p>whom?</p> <p><b>5.10</b> Who is responsible for registration of NDT tools?</p> <p><b>5.11</b> What is the percentage of weld repair/rejection after radiographic examination:</p> <ul style="list-style-type: none"> <li>• shop?</li> <li>• field?</li> </ul> <p><b>5.12</b> Is positive material identification (PMI) applicable?</p> <p><b>5.13</b> Has a handover procedure been formalized?</p> <p><b>5.14</b> Has punch list procedure been formalized and is it executed?</p> <p><b>6. Office Management</b></p> <p><b>6.1</b> How has the correspondence file been organized and who is responsible for its maintenance? Is a register being maintained for received and outgoing correspondence?</p> <p><b>6.2</b> For local purchases have bid tabs, purchase orders and MRN's been prepared?</p> <p><b>6.3</b> Have printing facilities been installed?</p> <p><b>6.4</b> Who is responsible for field procurement/RP handling?</p> <p><b>6.5</b> How is X, Y, Z account cost controlled? e.g. monthly analysis report.</p> <p><b>6.6</b> Has the site accounting procedure been prepared?</p> <p><b>6.7</b> Have financial signature authorizations been established?</p> <p><b>6.8</b> Are bank and cash documentation in order?</p> <p><b>6.9</b> Are purchase orders issued in time and are files up-to-date?</p> <p><b>6.10</b> Who will expedite site procurement if required?</p> <p><b>6.11</b> Have local permits been obtained/authority</p>			
RB28035.doc	www.red-bag.com	SHEET 11 of 28	

Checklist	Remarks	Action (X)
<p>requirements been fulfilled for:</p> <ul style="list-style-type: none"> <li>• temporary facilities?</li> <li>• temporary utilities?</li> <li>• transportation?</li> <li>• ABOMA surveillance?</li> <li>• building permit/civil?</li> <li>• pressure parts Stoomwezen?</li> <li>• electrical?</li> <li>• potable water?</li> </ul> <p><b>6.12</b> Has contact with local service been established for:</p> <ul style="list-style-type: none"> <li>• fire?</li> <li>• police?</li> <li>• hospital/ambulance?</li> </ul> <p><b>6.13</b> Are translation services required?</p> <p><b>6.14</b> Have camp and catering services been properly organized?</p> <p><b>7. Materials Management</b></p> <p><b>7.1</b> Is a proper materials control and warehouse organization in place?</p> <p><b>7.2</b> Is RMMS being used and is a connection with the HO in place?</p> <p><b>7.3</b> What measures have been taken to avoid application of nonconforming materials received?</p> <p><b>7.4</b> Are HO inspection reports/non-acceptance notice/QC memoranda available, including inspection release notes/waivers?</p> <p><b>7.5</b> How are records received from SC's maintained?</p> <p><b>7.6</b> Are material certificates and their traceability controlled? (Heat no. versus certificate no.)</p>		
RB28035.doc	www.red-bag.com	SHEET 12 of 28

Checklist	Remarks	Action (X)
<p><b>7.7</b> Are OS&amp;D reports handled as per procedure?</p>		
<p><b>7.8</b> How is the issue of materials controlled?</p> <p>Are foreman's requisitions being used?</p> <p>Are picking lists being used?</p>		
<p><b>7.9</b> If PMI for alloy material including SS instrumentation is required is this evident?</p>		
<p><b>7.10</b> How is the distinction made between inspected and not yet inspected received material?</p>		
<p><b>7.11</b> Has a quarantine area for NC items been established?</p>		
<p><b>7.12</b> Are rejected materials being marked?</p>		
<p><b>7.13</b> Are visual inspections performed upon receipt of equipment/materials?</p> <p>Is a record maintained?</p>		
<p><b>7.14</b> Is client's supplied material handled according client's/Company procedures?</p>		
<p><b>7.15</b> Is preservation during storage of materials/equipment satisfactory, e.g.:</p> <ul style="list-style-type: none"> <li>• preservation liquids?</li> <li>• sensitive instrumentation?</li> <li>• weekly rotation of mechanical rotating equipment?</li> <li>• weather protection?</li> <li>• winterizing?</li> <li>• paint quality?</li> </ul>		
<p><b>7.16</b> What arrangements have been made to administer, label and store surplus materials?</p>		
<p><b>7.17</b> What arrangements have been made to administer, label and store start-up spare parts?</p>		
<p><b>7.18</b> What measures have been taken to control scrap?</p>		
<p>RB28035.doc</p>	<p>www.red-bag.com</p>	<p>SHEET 13 of 28</p>

Checklist	Remarks	Action (X)
<p><b>7.19</b> How is scrap disposal organized?</p>		
<p><b>7.20</b> Are material certificates issued to subcontractor with the materials?</p>		
<p><b>8. Materials Storage</b></p>		
<p><b>8.1</b> Have storage locations been identified/designated for all materials?</p>		
<p><b>8.2</b> Have stored materials been tagged with PO number, item number, etc. and/or equipment number it is associated with?</p>		
<p><b>8.3</b> Has proper distinction been made as to materials to be stored inside and that which can be stored outside?</p>		
<p><b>8.4</b> For materials stored outside, are they properly stored on sleepers and/or pallets?</p>		
<p><b>8.5</b> Has pipe, stored outside, been placed with slope for water drainage and are pipe ends capped as required?</p>		
<p><b>8.6</b> Is protective coating/paint on piping maintained?</p>		
<p><b>8.7</b> Is special/alloy type piping material stored separately?</p>		
<p><b>8.8</b> Did equipment or equipment parts arrive with the preservation as described by the purchase order and/or manufacturer's standard?</p>		
<p><b>8.9</b> Are client prescribed rust preventives to be used?</p>		
<p><b>8.10</b> Is climate controlled storage space available for sensitive ( instrumentation/electrical ) materials, if applicable?</p>		
<p><b>8.11</b> Are special cables (lead sheathed, oil filled, gas filled) properly stored and controlled?</p>		
<p><b>8.12</b> If required, have flanges been cleaned and properly preserved for storage?</p>		
<p><b>8.13</b> Are control valves provided with flange caps?</p>		
<p><b>8.14</b> If stored outside, are automatic/motor operated control valves properly covered?</p>		
<p>RB28035.doc</p>	<p>www.red-bag.com</p>	<p>SHEET 14 of 28</p>

Checklist	Remarks	Action (X)
<p><b>8.15</b> Are they inspected regularly for condition of preservation?</p> <p><b>9. Security</b></p> <p><b>9.1</b> Have security requirements been defined and implemented for:</p> <ul style="list-style-type: none"> <li>• fences and gates?</li> <li>• is there gate control and by whom?</li> <li>• during what hours is the site guarded?</li> <li>• what control has been established when the guards are absent/gate is closed?</li> <li>• dogs?</li> <li>• patrols?</li> <li>• patrol clocks?</li> <li>• badges/identification cards?</li> <li>• lighting?</li> <li>• closed circuit TV?</li> </ul> <p><b>10. Field Supervision</b></p> <p><b>10.1</b> Has adequate field discipline supervision been assigned?</p> <p><b>10.2</b> Who is responsible for checking calibration of measurement tools and testing equipment of SC's?</p> <p><b>10.3</b> Have coordination meetings with subcontractors been organized/held and documented, to include:</p> <ul style="list-style-type: none"> <li>• EH&amp;S?</li> <li>• quality?</li> <li>• progress?</li> <li>• interface with other subcontractors?</li> </ul> <p><b>10.4</b> Were subcontracts formulated and awarded as per applicable Company procedures?</p>		
RB28035.doc	www.red-bag.com	SHEET 15 of 28

Checklist	Remarks	Action (X)
<p><b>10.5</b> Was client involved in subcontracts?</p> <p><b>10.6</b> Did a SC kick-off meeting take place?</p> <p><b>10.7</b> Were EH&amp;S and Quality addressed as topics?</p> <p><b>10.8</b> Have Company's/client's/SC's site inspection records been agreed to?  Are they being maintained?</p> <p><b>10.9</b> Are SC EH&amp;S and Quality Plans in place and approved?</p> <p><b>10.10</b> Are relevant supervisors/specialists fully aware of these.</p> <p><b>10.11</b> Have quality/inspection plans/records, hold and witness points been signed by subcontractor (supplier), Company and/or third party?</p> <p><b>10.12</b> Are proper tools and construction equipment available and properly utilized?</p> <p><b>10.13</b> Are nonconformance reports being used for SC work?</p> <p><b>10.14</b> What procedure is being followed to get these reports closed-out?</p> <p><b>10.15</b> Have qualifications been recorded/controlled of:</p> <ul style="list-style-type: none"> <li>• scaffold builders?</li> <li>• instrument testers/calibrators precommissioning engineers?</li> <li>• electrical testers/ precommissioning engineers?</li> <li>• welders?</li> <li>• NDT operators?</li> <li>• PMI operators?</li> <li>• crane and other equipment operators?</li> </ul> <p><b>10.16</b> Have subcontractors/supplier's equipment/ tools been properly calibrated?  How is this evidenced?</p>		
RB28035.doc	www.red-bag.com	SHEET 16 of 28



Checklist	Remarks	Action (X)
<p><b>10.17</b> Will Engineering Support Staff be assigned to site for assistance to Construction? If yes, which disciplines are anticipated?</p>		
<p><b>10.18</b> Are punchlists being issued?</p>		
<p><b>10.19</b> Have intermediate and final acceptance certificates been signed and logged?</p>		
<p><b>11. Civil</b></p>		
<p><b>11.1</b> Is the approved SC's Quality Plan available with Company Construction Specialist?</p>		
<p><b>11.2</b> Is the approved SC's Safety Plan available with Company Construction Specialist?</p>		
<p><b>11.3</b> Have Quality/Inspection Plan hold and witness points been agreed with Company?</p>		
<p><b>11.4</b> Are inspection forms properly signed by:</p> <ul style="list-style-type: none"> <li>• SC?</li> <li>• Company Specialist?</li> <li>• client?</li> </ul>		
<p><b>11.5</b> Have pile driving blow count inspection reports been made and filed?</p>		
<p><b>11.6</b> What kind of pile testing has been applied?</p>		
<p><b>11.7</b> What is the abortive inspection/defect status of concrete work and/or piling?</p>		
<p><b>11.8</b> Are survey measurement reports issued?</p>		
<p><b>11.9</b> Did Company perform their own survey measurement?</p>		
<p><b>11.10</b> Has SC's concrete mixing plant been checked?  Is it a certified plant?</p>		
<p><b>11.11</b> Have aggregates (water/ cement/gravel/sand) been checked for compliance with specification?</p>		
<p>RB28035.doc</p>	<p>www.red-bag.com</p>	<p>SHEET 17 of 28</p>

Checklist	Remarks	Action (X)
<b>11.12</b> For ready-mix concrete are certificates available/checked?		
<b>11.13</b> Is an analysis available of water used for concrete mix?		
<b>11.14</b> Have slump tests been performed and records kept?		
<b>11.15</b> Has compression strength of concrete been investigated and reported (7 and 28 day results)?		
<b>11.16</b> Are compaction test results recorded?		
<b>11.17</b> Is rebar checked before pouring?		
<b>11.18</b> Is authority/client involvement required?		
<b>11.19</b> Are measurement records of tankpad settlement available?		
<b>11.20</b> Is winterizing/weather protection required?		
<b>11.21</b> Have water trap holes in foundations been adequately secured against frost impact?		
<b>11.22</b> Are anchor bolts installed properly preserved and protected		
<b>11.23</b> Are construction joints in concrete members/structures applied?		
<b>11.24</b> Is joined material oil resistant?		
<b>12. Underground Piping</b>		
<b>12.1</b> Is the approved SC's Quality Plan available with Company supervisor?		
<b>12.2</b> Is the approved SC's EH&S Plan available with Company supervisor?		
<b>12.3</b> Have Quality/Inspection Plans hold and witness points been agreed with Company?		
<b>12.4</b> Are inspection forms properly signed by: <ul style="list-style-type: none"> <li>• SC?</li> <li>• Company Specialist?</li> </ul>		
RB28035.doc	www.red-bag.com	SHEET 18 of 28

Checklist	Remarks	Action (X)
<ul style="list-style-type: none"> <li>• client?</li> </ul> <p><b>12.5</b> Have all types of received U/G piping materials, including joint and coating materials, been tested and provided with certificates?</p> <p>Are these test and material certificates available?</p> <p><b>12.6</b> Have welding procedures been approved?</p> <p>Is a list of approved welders being maintained?</p> <p><b>12.7</b> To what extent did SC prepare full QA documentation and is this available?</p> <p><b>12.8</b> Are completed as built records available of all U/G piping systems?</p> <p>To what extent do these records clearly indicate both elevations and locations (routing)?</p>		
<p><b>13. Structural</b></p>		
<p><b>13.1</b> Is the approved SC's Quality Plan available with Company supervisor?</p>		
<p><b>13.2</b> Is the approved SC's Safety Plan available with Company supervisor?</p>		
<p><b>13.3</b> Have Quality/Inspection Plans hold and witness points been agreed with Company?</p>		
<p><b>13.4</b> Are inspection forms properly signed by:</p> <ul style="list-style-type: none"> <li>• SC?</li> <li>• Company Specialist?</li> <li>• client?</li> </ul>		
<p><b>13.5</b> Did the Company Specialist check:</p> <ul style="list-style-type: none"> <li>• the Company approval status of all construction drawings with SC?</li> <li>• availability of all construction drawings (VP's) and bolt lists?</li> </ul>		
<p><b>13.6</b> Is the painting/galvanizing adequate?</p>		
<p>RB28035.doc</p> <p>www.red-bag.com</p>	<p>SHEET</p> <p>19 of 28</p>	

Checklist	Remarks	Action (X)
<b>13.7</b> Is there a touch-up procedure for painting/galvanizing after repair?		
<b>13.8</b> Has out of plump deviation been agreed and is this inspected?		
<b>13.9</b> Are holes drilled or punched?		
<b>13.10</b> Which method is used for ensuring that high tension bolts have been torqued?		
<b>13.11</b> Has torque wrench been calibrated?		
<b>13.12</b> Are structures formally being handed-over before loading of structure?		
<b>13.13</b> Is NDT of structural steel required?		
<b>14. Piping (General and Shop)</b>		
<b>14.1</b> Is the approved SC's Quality Plan available with Company supervisor?		
<b>14.2</b> Is the approved SC's Safety Plan available with Company supervisor?		
<b>14.3</b> Have Quality/Inspection Plans hold and witness points been agreed with Company?		
<b>14.4</b> Are inspection forms properly signed by: <ul style="list-style-type: none"> <li>• SC?</li> <li>• Company Specialists?</li> <li>• client?</li> </ul>		
<b>14.5</b> Has WPS/WPQ been approved and maintained in the Company file and distributed to specialists?		
<b>14.6</b> Is a welders register being maintained including identifications?		
<b>14.7</b> Are QC records of welds being maintained for: <ul style="list-style-type: none"> <li>• NDT?</li> <li>• repair with statistics?</li> <li>• welder's ID?</li> </ul>		
RB28035.doc	www.red-bag.com	SHEET 20 of 28

Checklist	Remarks	Action (X)	
<ul style="list-style-type: none"> <li>• PWHT?</li> <li>• stoomwezen?</li> </ul> <p><b>14.8</b> How is it ensured that welding rods (drying, storage, issue and return) are properly treated? (ref. BN-G-UC001).</p> <p><b>14.9</b> Are electrodes obtained from approved suppliers?</p> <p><b>14.10</b> Are base welding consumables properly controlled?</p> <ul style="list-style-type: none"> <li>• quivers (&gt;70°C)</li> <li>• baking (300 °C for 2 hours)</li> <li>• storage (120/150 °C)</li> <li>• re(issuing) (max 3x)</li> <li>• handling</li> </ul> <p><b>14.11</b> Have radiography procedures been established?</p> <p>Do they address safety requirements?</p> <p><b>14.12</b> Is calibrated equipment used for:</p> <ul style="list-style-type: none"> <li>• baking/storage?</li> <li>• pre/post heat treatment control equipment?</li> <li>• welding equipment?</li> </ul> <p><b>14.13</b> Is PMI applicable (including welds)?</p> <p><b>14.14</b> Have pickling requirements and application (passivation of welds) been defined?</p> <p><b>14.15</b> Pipe spool fabrication</p> <ul style="list-style-type: none"> <li>• Is separation of SS vs CS materials ensured, inclusive the use of tools and temporary supports?</li> <li>• How is the transfer of color coding and heat numbers being controlled and authorized?</li> <li>• What percentage of re-work has been experienced?</li> </ul>			
RB28035.doc	www.red-bag.com	SHEET 21 of 28	

Checklist	Remarks	Action (X)
<ul style="list-style-type: none"> <li>• How is it ensured that the latest iso - issues are being used?</li> <li>• Are iso's complete with dimensions, indication of pipe support and material list?</li> <li>• Handling/storage of materials satisfactory (flange facings)?</li> <li>• How is as built information introduced on originals?</li> </ul> <p><b>14.16</b> Are iso's marked by SC?</p> <ul style="list-style-type: none"> <li>• welders ID</li> <li>• NDT requirements/references</li> <li>• authority involvement</li> <li>• as built</li> <li>• heat number</li> <li>• cutting list reference</li> </ul> <p><b>14.17</b> Is flange face protection on site adequate?</p> <p><b>15. Mechanical Vessels (including field piping)</b></p> <p><b>15.1</b> Is the approved SC's Quality Plan available with Company supervisor?</p> <p><b>15.2</b> Is the approved SC's Safety Plan available with Company supervisor?</p> <p><b>15.3</b> Have Quality/Inspection Plans hold and witness points been agreed with Company?</p> <p><b>15.4</b> Are inspection forms properly signed by:</p> <ul style="list-style-type: none"> <li>• SC?</li> <li>• Company Specialist?</li> <li>• client?</li> </ul> <p><b>15.5</b> Are field welding and NDT heavy wall piping procedures applicable?</p>		
RB28035.doc	www.red-bag.com	SHEET 22 of 28

Checklist	Remarks	Action (X)
<b>15.6</b> Has testing/flushing procedure been prepared and approved by client?		
<b>15.7</b> Is clients witnessing required during system testing/flushing?		
<b>15.8</b> Who defined pipe testing systems?		
<b>15.9</b> Have pipe testing system drawings been approved by client?		
<b>15.10</b> Have tested systems been indicated on master set of P&ID's?		
<b>15.11</b> What nozzle availability criteria have been defined prior to pipe construction?		
<b>15.12</b> Whose grouting procedure has been agreed to?		
<b>15.13</b> Have alignment tolerances been agreed upon with the client?		
<b>15.14</b> Have out of plumbness tolerances been agreed upon?		
<b>15.15</b> How is the maintenance of installed rotating equipment performed and recorded?		
<b>15.16</b> How is the removal of anticorrosion sealants and crystals ensured?		
<b>15.17</b> Are tray checks by process personnel required?  Have temporary supports/stops been removed?		
<b>15.18</b> Who is responsible for catalyst loading and installation of ceramic balls?		
<b>15.19</b> Is there a (client) permit procedure for: <ul style="list-style-type: none"> <li>• enclosed spaces?</li> <li>• x-ray?</li> <li>• hot/cold work?</li> <li>• others?</li> </ul>		
<b>15.20</b> Are lifting/transportation studies available?		
RB28035.doc	www.red-bag.com	SHEET 23 of 28

Checklist	Remarks	Action (X)
<p><b>15.21</b> Are lubricants controlled?</p>		
<p><b>15.22</b> Is equipment dressed before erection?</p>		
<p><b>15.23</b> Are field inspection reports for pipe supporting (stops, springs, teflon, dummy supports, shoes) available?</p>		
<p><b>15.24</b> Have additional supports been approved by HO?</p>		
<p><b>15.25</b> Who unlocks/adjusts spring supports and when?</p>		
<p><b>16. Control Systems/Electrical</b></p>		
<p><b>16.1</b> Is the approved SC's Quality Plan available with Company supervisor?</p>		
<p><b>16.2</b> Is the approved SC's Safety Plan available with Company supervisor?</p>		
<p><b>16.3</b> Have Quality/Inspection Plans hold and witness points been agreed with Company?</p>		
<p><b>16.4</b> Are inspection forms properly signed by:</p> <ul style="list-style-type: none"> <li>• SC?</li> <li>• Company Specialist?</li> <li>• client?</li> </ul>		
<p><b>16.5</b> How is equipment certificate control organized:</p> <ul style="list-style-type: none"> <li>• intrinsic safety?</li> <li>• explosion proof?</li> </ul>		
<p><b>16.6</b> How is the intrinsic safety of systems control established? Are authorities involved?</p>		
<p><b>16.7</b> Has intrinsic safe and EXe equipment been provided with authorized glands?</p>		
<p><b>16.8</b> Has the switch authorization been formalized?</p>		
<p><b>16.9</b> Have minimum allowable cable/wire distances between intrinsic instruments and non-intrinsic instruments been checked both in the field and in the control room?</p>		
<p>RB28035.doc</p>	<p>www.red-bag.com</p>	<p>SHEET 24 of 28</p>



Checklist	Remarks	Action (X)
<b>16.10</b> Is blue color coding required by client/authorities?		
<b>16.11</b> Have local panels/switches been protected against weather/frost?		
<b>16.12</b> Have safety valve set points been checked in the field and/or by authorities?		
<b>16.13</b> Has independent earthing system for electronic systems been agreed with instrument supplier?		
<b>16.14</b> Have (earthing/electrical/instrumentation) cable risers been properly protected against mechanical damage? How is this done?		
<b>16.15</b> How is electrical tracing protected against damage by the insulation contractor? How has this been formalized?		
<b>16.16</b> Are tie-ins between new and existing switchgear/panels to be made in a separate shutdown?		
<b>16.17</b> Are preventative maintenance procedures available and in use?		
<b>16.18</b> Are instrument hook ups installed in accordance with an agreed model?		
<b>17. Painting/Insulation</b>		
<b>17.1</b> Is the approved SC's Quality Plan available with Company supervisor?		
<b>17.2</b> Is the approved SC's Safety Plan available with Company supervisor?		
<b>17.3</b> Have Quality/Inspection Plans hold and witness points been agreed with Company?		
<b>17.4</b> Are inspection forms properly signed by: <ul style="list-style-type: none"> <li>• SC?</li> <li>• Company Specialist?</li> <li>• client?</li> </ul>		
<b>17.5</b> Is there a shotblasting/paintshop on site?		
<small>RB28035.doc</small>	<small>www.red-bag.com</small>	<small>SHEET 25 of 28</small>

Checklist	Remarks	Action (X)
<p><b>17.6</b> Is temperature/humidity controlled in paint shop?</p>		
<p><b>17.7</b> Has the shotblasting specification (SA-2 1/2) been checked and are records being maintained?</p>		
<p><b>17.8</b> Is correct primer being used in accordance with paint spec?</p>		
<p><b>17.9</b> Is correct paint being used in accordance with paint spec?</p>		
<p><b>17.10</b> Is supplier shop paint/primer compatible with the field intermediate/final coat?</p> <p>How do you know?</p>		
<p><b>17.11</b> Is a touch-up/repair paint procedure available?</p>		
<p><b>17.12</b> To what extent is mechanical work completion to be accepted prior to application of insulation?</p>		
<p><b>17.13</b> Protection of SS lines below galvanized works?</p>		
<p><b>18. (Pre)-Commissioning/Hand over</b></p>		
<p><b>18.1</b> Is an agreed upon system and overall hand over procedure in place?</p>		
<p><b>18.2</b> Has an internal inspection procedure been established?</p>		
<p><b>18.3</b> Is a hydro test procedure in place?</p> <p>Does it specify the requirements for the system planning follow-up?</p> <p>Are the testpack numbers in line with the defined systems?</p>		
<p><b>18.4</b> Is a spading list available?</p> <p>Does it follow client's requirements?</p>		
<p><b>18.5</b> Is a punchlist procedure in place?</p> <p>Has it been issued to our subs and the client?</p>		
<p>RB28035.doc</p> <p>www.red-bag.com</p>	<p>SHEET</p> <p>26 of 28</p>	

Checklist	Remarks	Action (X)	
<p>Who is responsible for the clearing, monitoring of these punchlists?</p> <p>Will this individual stay on to resolve them after hand over of the works to the client?</p> <p><b>18.6</b> Have systems been defined for:</p> <p>civil?</p> <p>structural steel?</p> <p>electrical?</p> <p>instrumentation?</p> <p>underground systems?</p> <p><b>18.7</b> Has a system planning been established?</p> <p>Have construction supervisors committed themselves to follow this planning?</p> <p>Is it clear to all parties involved when there will be a switch from area to system planning?</p> <p><b>18.8</b> Is the Company commissioning engineer sure that subcontractors and client are aware of the system plan?</p> <p><b>18.9</b> Is the system plan in line with the subsequent commissioning and/or start-up activities of the client?</p> <p><b>18.10</b> Are all relevant precommissioning procedures in place?</p> <p>Has the client committed himself to cater for sufficient personnel during the precommissioning phase to witness all the tests and checks as specified in the various procedures?</p> <p><b>18.11</b> Is a progress tracking system in place based on the systems?</p> <p>Do we have the correct input from the home office to effectively set up this tracking system? (correct and the same information as used in the home office).</p> <p><b>18.12</b> Have witness and hold points been agreed with the client?</p> <p>Does the client have a proper manpower plan to avoid hold-ups during the various checks the client wants to witness?</p>			
RB28035.doc	www.red-bag.com	SHEET 27 of 28	

Checklist	Remarks	Action (X)
<p><b>18.13</b> Is a supplier representation schedule in place?</p> <p>Is it clear who invites the supplier and who will supervise the supplier?</p>		
<p><b>18.14</b> Is a client start-up plan and sequence plan available?</p>		
<p><b>18.15</b> Is a plan available describing the Company assistance to the client during commissioning and start-up?</p>		
<p><b>18.16</b> Does Company organize supplier assistance for the client?</p>		
<p><b>18.17</b> Who supplies:</p> <p>catalyst?</p> <p>lube oil?</p> <p>other chemicals?</p>		
<p><b>18.18</b> If Company is responsible, do we have a specialist company to perform the loading?</p>		
<p><b>18.19</b> Has a safety analysis been prepared for the loading job(s)?</p>		
<p><b>19. Additional Questions</b></p>		
<p>RB28035.doc</p> <p>www.red-bag.com</p>	<p>SHEET</p> <p>28 of 28</p>	

List Subcontractors with their sub-subs	EH&S			QA			Remarks
	EH&S Plan		Safety Representative	QA Plan		QA Engineer	
	Received	Approved		Received	Approved		