"Reduced Procurement Cycle"

ABB Lummus Global B.V.

The Hague

GENERAL APPENDIX

Section: Mechanical Engineering
Specialisation: Technical Commercial Engineer
Author: Jan-Hein van den Brink, Student Number: 1127683
Supervisors: Robert Bloem, Fred Pigmans, Dick Roodenburg and Charlotte Glasmacher

Scriptie W-TCI 2005 BRIN

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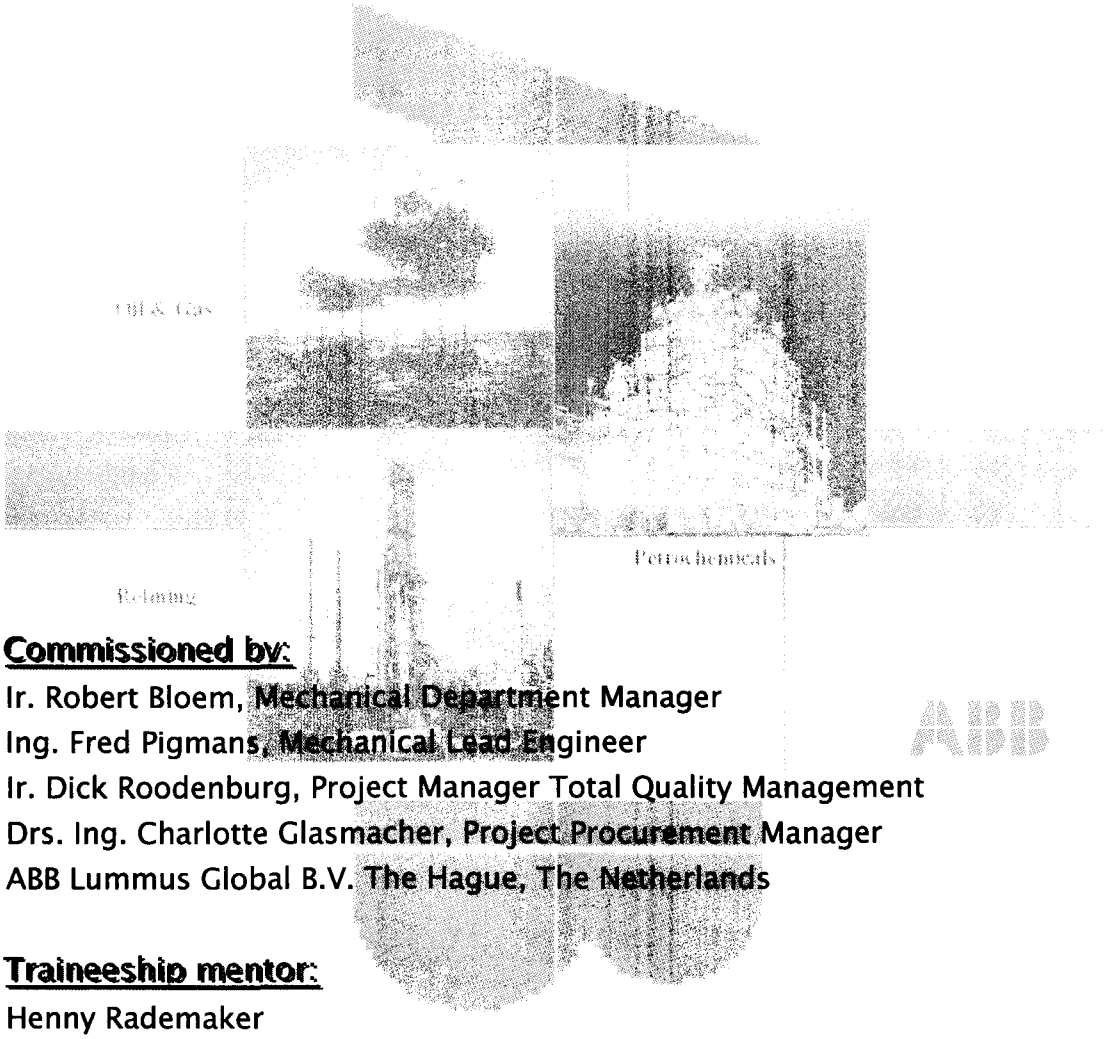


Commissioned by:
Ir. Robert Bloem, Mechanical Department Manager
Ing. Fred Pigmans, Mechanical Lead Engineer
Ir. Dick Roodenburg, Project Manager Total Quality Management
Drs. Ing. Charlotte Glasmacher, Project Procurement Manager
ABB Lummus Global B.V. The Hague, The Netherlands

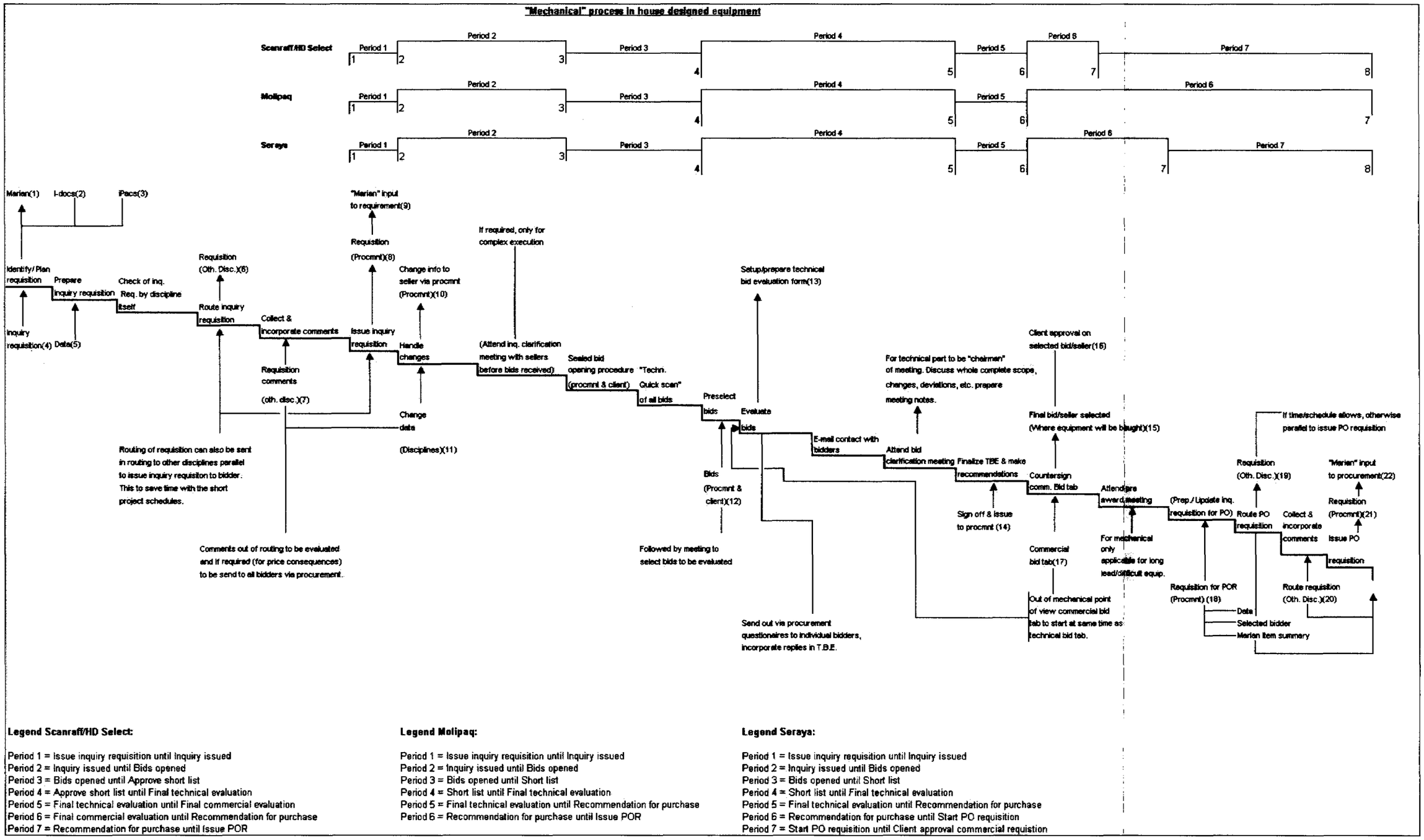
Traineeship mentor:
Henny Rademaker
Department of Industrial Technology of the "Hogeschool van Utrecht",
The Netherlands

Author:
Jan-Hein van den Brink
Department of Industrial Technology
Hogeschool van Utrecht, The Netherlands

Contents of general Appendix

Appendix:

ppendix I: Value Flow Models



Legend Scanraff/HD Select:

Period 1 = Issue inquiry requisition until Inquiry issued
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Period 4 = Approve short list until Final technical evaluation
Period 5 = Final technical evaluation until Final commercial evaluation
Period 6 = Final commercial evaluation until Recommendation for purchase
Period 7 = Recommendation for purchase until Issue POR

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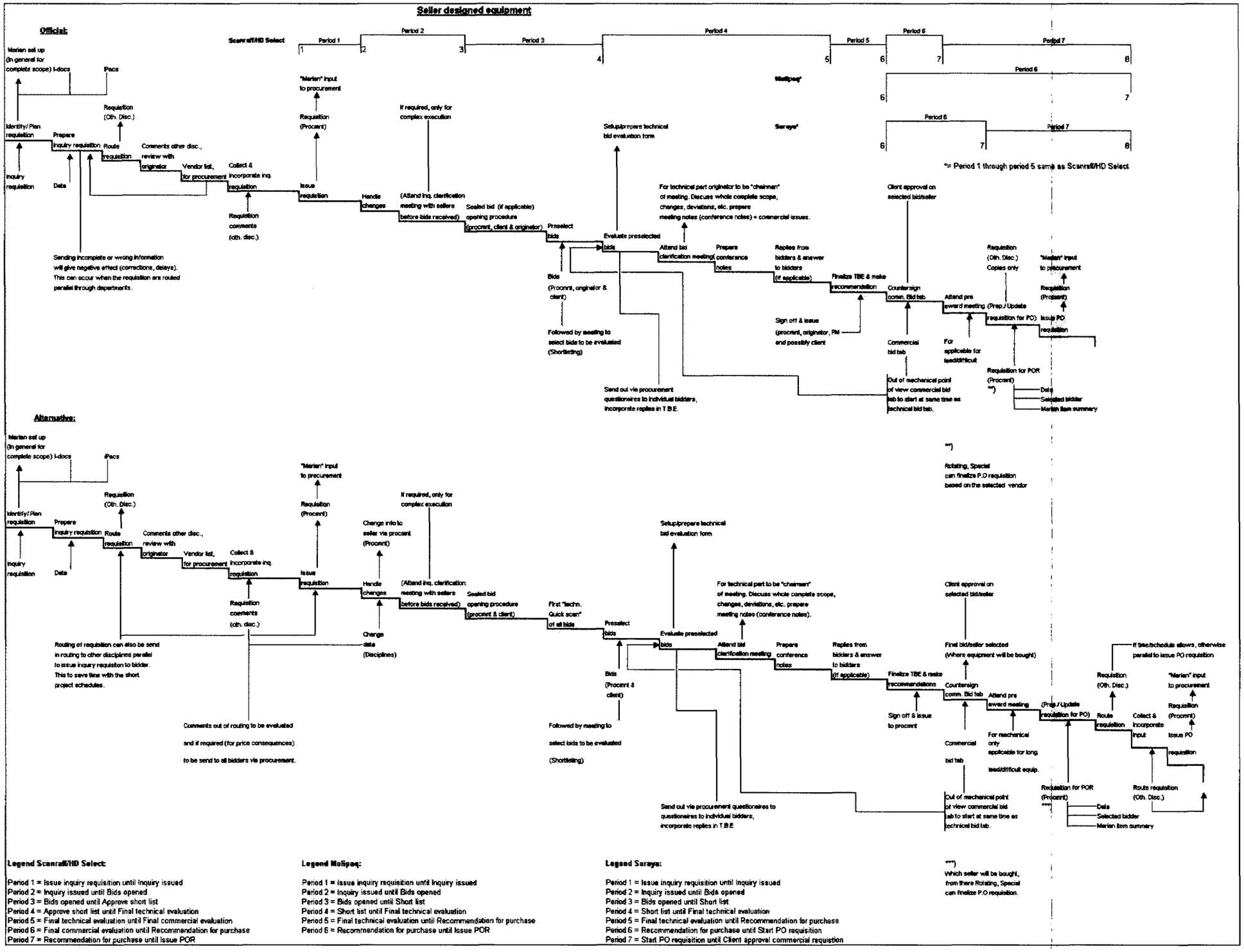
Reduced Procurement Cycle



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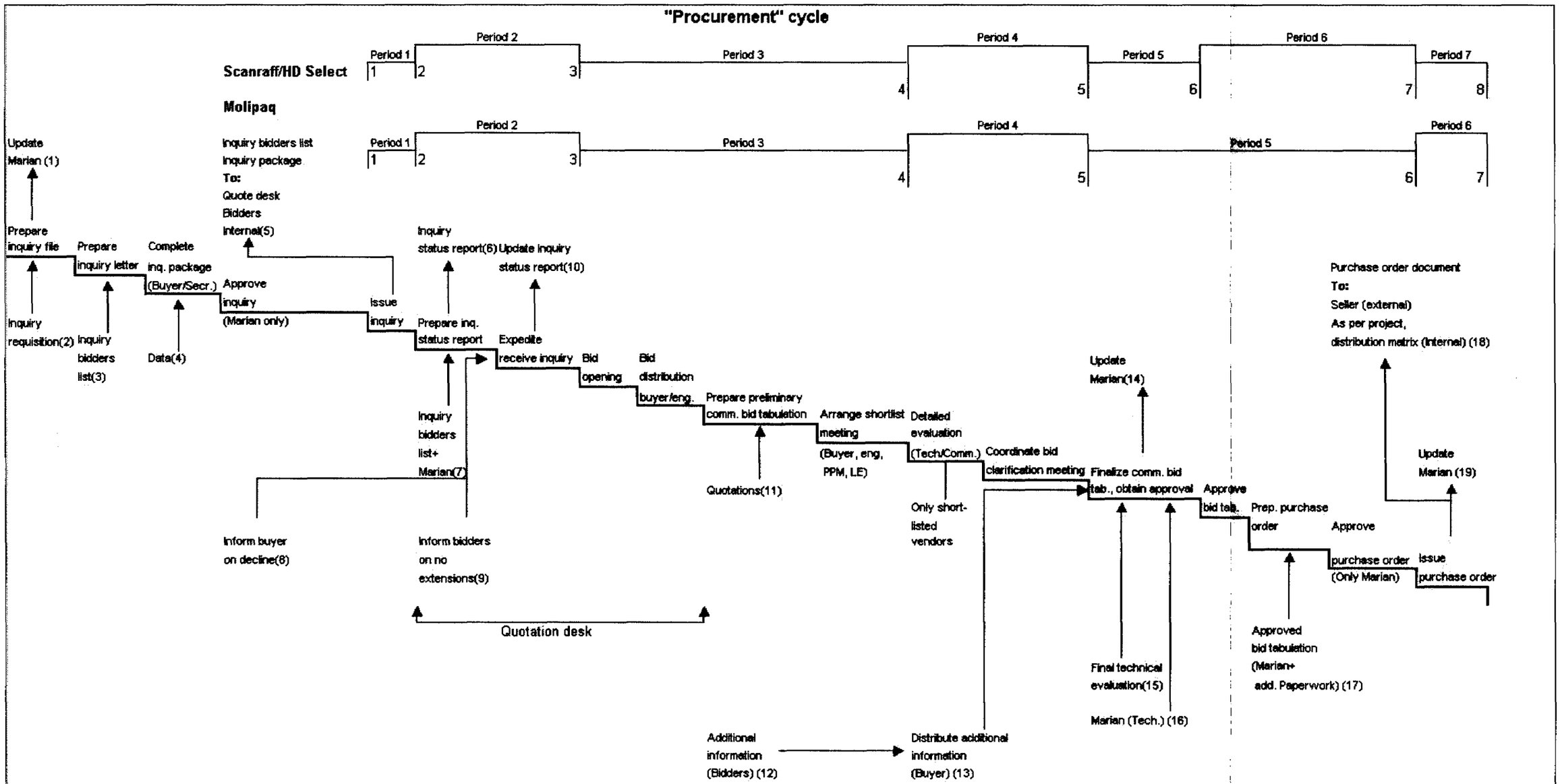

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Appendix II: Period analysis

RPSR/Man-hour analysis "Mechanical"

Scanraff gas oil project

Type	Inquiry number	Equipment	Project	Period 1	Period 2	Period 3	Period 4	Period 5	Period 6	Period 7	Total days	Inquiry requisition	Eval./PO requisition	Hours per pcs.	Pieces
				Periods								Man-hour estimate			
1	300	Columns	Scanraff	6	46	21	36	2	0	21	132	30.4	39.4	69.8	8
2	302	Reactors	Scanraff	7	34	15	328	2	-92	179	472	0	40	40	2
3	600	Compressors	Scanraff	10	23	179	71	17	29	62	391	0	50.1	50.1	6
4	100	Heaters	Scanraff	14	66	0	42	31	13	0	166	No info	No info	80	2
5	1101	Cranes	Scanraff	8	28	53	-7	7	0	9	98	No info	No info	75	1

Molipaq

Type	Inquiry number	Equipment	Project	Period 1	Period 2	Period 3	Period 4	Period 5	Period 6	Total days	Inquiry requisition	Eval./PO requisition	Hours per pcs.	Pieces
				Periods							Man-hour estimate			
1	341	Columns/vessels	Molipaq	7	39	1	13	0	0	60	No info	39	33	3
4	1601	Start-up heater	Molipaq	0	33	1	76	14	0	124	No info	40	40	2
5	1151	Crane	Molipaq	0	6	6	37	0	0	49	No info	No info	62.5	4

HD Select

Type	Inquiry number	Equipment	Project	Period 1	Period 2	Period 3	Period 4	Period 5	Period 6	Period 7	Total days	Inquiry requisition	Eval./PO requisition	Hours per pcs.	Pieces
				Periods								Man-hour estimate			
1	300	Columns	HD Select	0	28	10	67	3	3	3	112	0	39.7	39.7	4
2	330	Reactors	HD Select	14	20	29	67	3	3	3	139	0	39	39	2
3	625	Compressors	HD Select	1	24	14	122	13	0	2	176	No info	No info	195	2
4	1600	Heaters	HD Select	0	42	0	89	1	0	14	146	0	75	75	1

Seraya

Type	Inquiry number	Equipment	Project	Period 1	Period 2	Period 3	Period 4	Period 5	Period 6	Period 7	Total days	Inquiry requisition	Eval./PO requisition	Hours per pcs.	Pieces
				Periods								Man-hour estimate			
1	300	Columns	Seraya	0	32	11	98	0	0	24	167	50.1	28.9	74	28
2	330	Reactors	Seraya	19	37	11	36	0	0	24	126	37.4	23.6	61	17
3	600	Compressors	Seraya	13	36	11	36	7	2	0	105	No info	No info	No info	No info
4	100	HM Furnaces (Heaters)	Seraya	1	51	7	104	6	-1	1	169	105.3	135	226.3	1
5	1160	Hoists & cranes	Seraya	15	27	47	43	14	0	0	146	No info	No info	No info	No info

Veba oil, no useful information available

Legend:

Type 1 = Columns
Type 2 = Reactors
Type 3 = Compressors
Type 4 = Heaters
Type 5 = Cranes

Legend Scanraff/HD Select:

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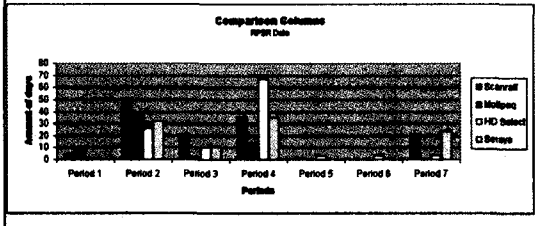
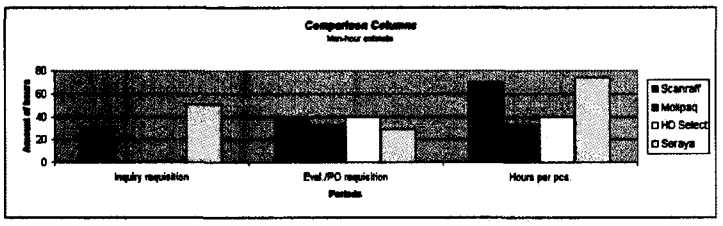
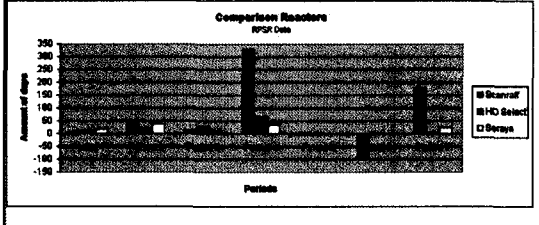
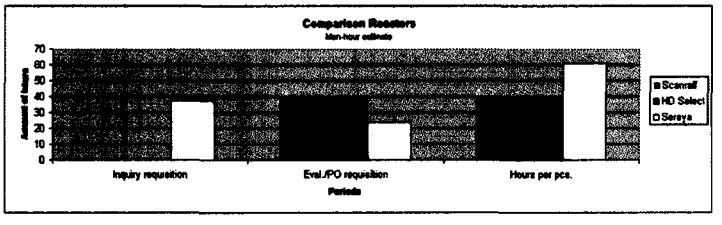
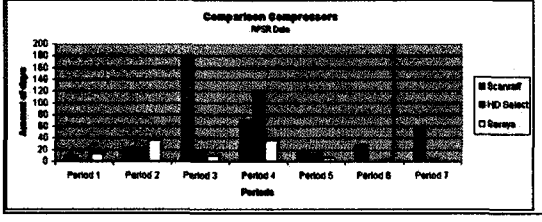
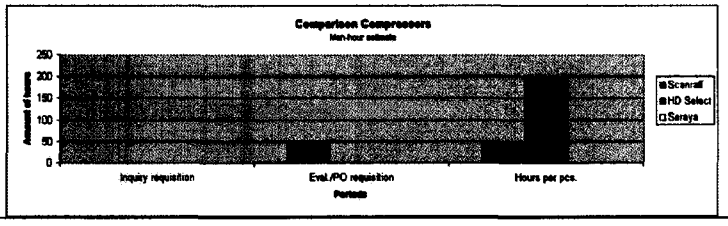




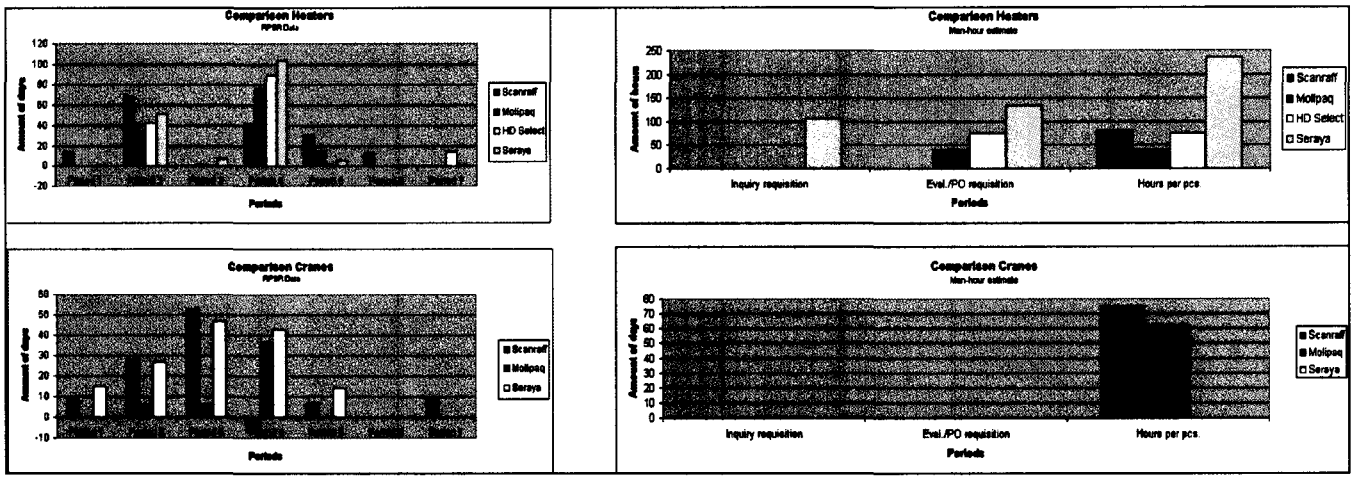








Reduced Procurement Cycle



RPSR/Man-hour analysis "Procurement"

Scanraff gas oil project

Number	Inquiry number	Equipment	Project	Periods: Period 1	Period 2	Period 3	Period 4	Period 5	Period 6	Period 7	Total days	Man-hour estimate: Inquiry requisition	Bid evaluation	Eval./PO requisition	Hours per pcs.	Pieces
1	300	Columns	Scanraff	5	46	21	36	2	0	21	131	No info	No info	No info	12.5	8
2	302	Reactors	Scanraff	7	34	15	328	2	-92	178	472	No info	No info	No info	50	2
3	800	Compressors	Scanraff	10	23	179	71	17	29	62	391	No info	No info	No info	100	4
4	100	Heaters	Scanraff	14	68	0	42	31	13	0	168	No info	No info	No info	100	2
5	1101	Cranes	Scanraff	8	28	53	-7	7	0	9	98	No info	No info	No info	40	1

Mollpaq

Number	Inquiry number	Equipment	Project	Periods: Period 1	Period 2	Period 3	Period 4	Period 5	Period 6	Total days	Man-hour estimate: Inquiry requisition	Bid evaluation	Eval./PO requisition	Hours per pcs.	Pieces
1	341	Columns/vessels	Mollpaq	7	39	1	13	0	0	60	3	40	8	51	9*
4	1801	Start-up heater	Mollpaq	0	33	1	76	14	0	124	0.3	3.3	1.3	4.9	12*
5	1151	Crane	Mollpaq	0	8	6	37	0	0	49	2	12	2	16	4

* = Amount of pieces can vary, because of other separation of inquiries

HD Select

Number	Inquiry number	Equipment	Project	Periods: Period 1	Period 2	Period 3	Period 4	Period 5	Period 6	Period 7	Total days	Man-hour estimate: Inquiry requisition	Bid evaluation	Eval./PO requisition	Hours per pcs.	Pieces
1	300	Columns	HD Select	0	26	10	67	3	3	3	112	No info	No info	No info	25.3	6
2	330	Reactors	HD Select	14	20	29	87	3	3	3	139	No info	No info	No info	Together with Columns	
3	826	Compressors	HD Select	1	24	14	122	13	0	2	176	No info	No info	No info	312.5	2
4	1800	Heaters	HD Select	0	42	0	89	1	0	14	146	No info	No info	No info	120	1

Sonaye, no information available

Vebe oil, no useful information available

Legend:

Type 1 = Columns
Type 2 = Reactors
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Legend Scanraff/HD Select:

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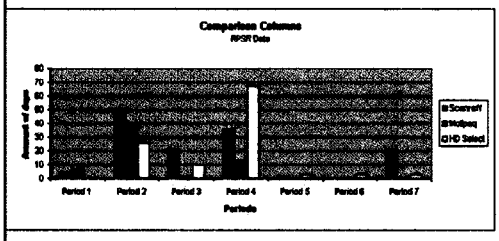

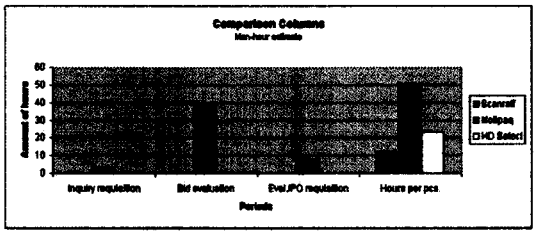

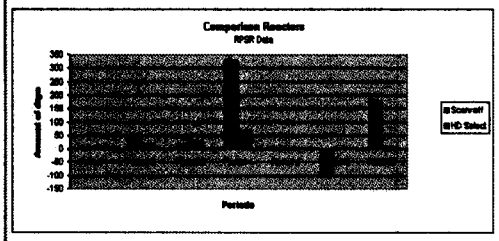

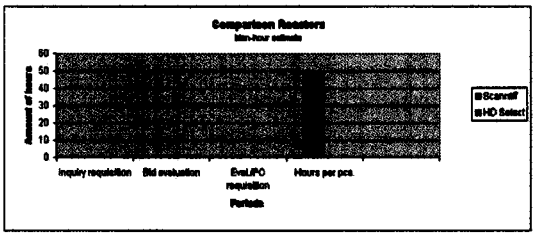

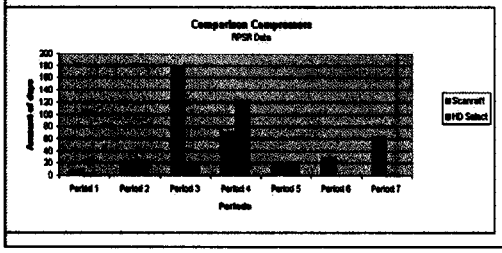

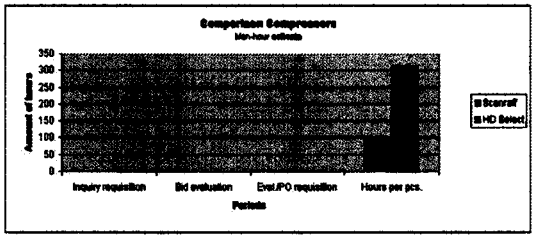

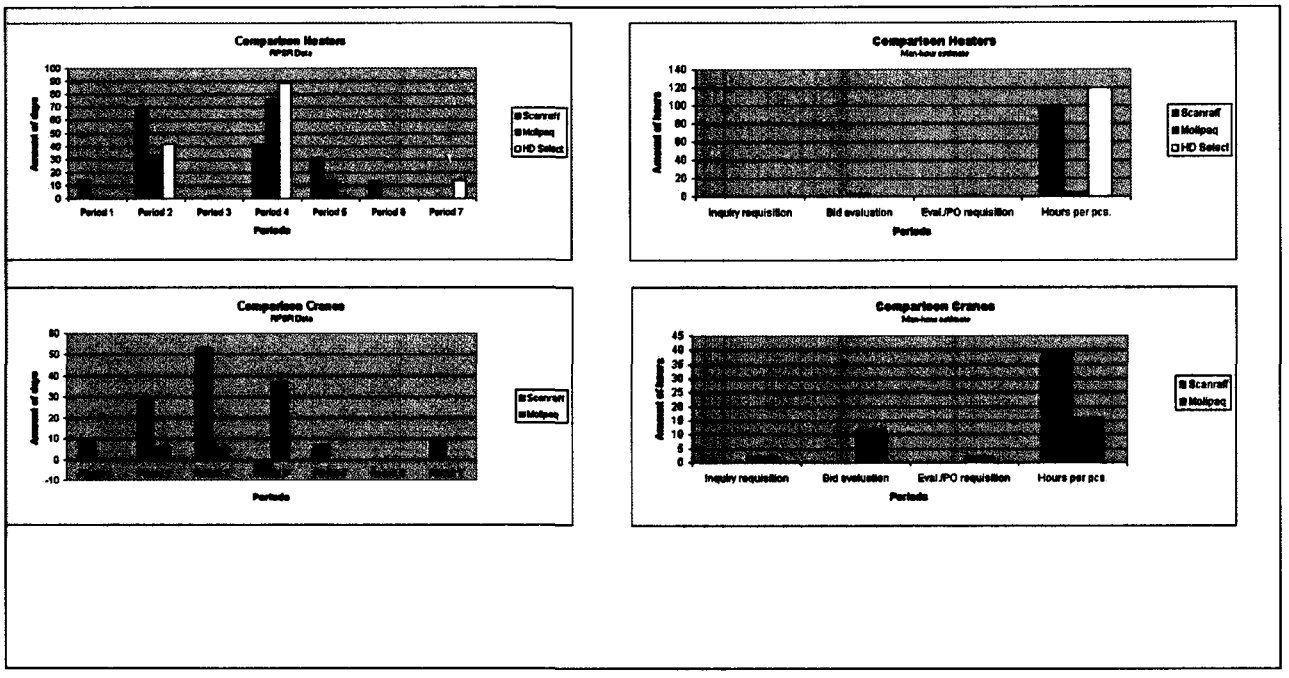
Comparison Heaters
Amount of days
Period 1
Period 2
Period 3
Period 4
Period 5
Period 6
Period 7
Periods
Scanraff
Molipeq
HD Select
Comparison Heaters
Amount of hours
Inquiry requisition
Bid evaluation
Eval./PO requisition
Hours per pcs.
Periods
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Bid evaluation
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Scanraff
Molipeq

Appendix III: Information levels

In house designed equipment

Value flow:	Explanation:	Purpose/why?:	Value (Added value, necessary action or pure waste):
Identify/Plan requisition	Identify/Plan invitation for bid.	Rubricate all equipment on the following subjects: materials, pressure and type equipment. In this way a specialist can be selected. Other advantages: cost/prize, time saving, handy and less specifications.	-
Prepare inquiry requisition	Prepare invitation to bid by means of inquiry.	Get insight in time, costs and techniques.	-
Check of inq. req. by discipline itself (on consistency)	On consistency for the whole project.	To improve the quality of the inq. req.	-
Route inq requisition to other disciplines.	When the requisition is released for the first time, it will be routed to various disciplines. These disciplines can give comments on the contents of the requisition.	Gathering the latest, up to date information from various disciplines.	-
Collect & incorporate comments	The next step is to collect and implement the changes (if agreed) gathered from the involved departments.	This is to improve the quality from the inquiry requisition.	-
Issue inquiry requisition	When the issue inquiry requisition step has been taken, it is time to deliver the requisition via procurement to bidders.	The purpose is to get quotations of bidders as a reaction on the received inquiry requisition, by potential suppliers.	-
Handle changes	When the disciplines desire to change data in case of cost and/or schedule inpact, the sellers need to be informed. This will be arranged by procurement via E-mail correspondence.	To receive quotations, with the latest up to date information.	Added Value

Attend inq. clarification meeting with sellers before bids received (if required)	In case of complex products it is possible to attend an inquiry clarification meeting with potential suppliers. This to solve problems and get an agreed technical- & commercial level, before quotations are send in.	To receive the right technical standard between seller and buyer.	Necessary Action
Sealed bid opening procedure (procurement & client)	Open the bids; this will be officially performed by procurement together with the client & technical lead engineer.	Equal opportunities for every bidder when the bids are opened together.	-
"Technical quick scan" of all bids	Now the mechanical department makes a quick technical scan from the potential suppliers.	Technical ranking of bidders in order to save some time, because unsuitable suppliers will be declined.	-
Preselect bids	After opening the bid it is possible to make a preselection of the bids. This will be done by the mechanical and procurement (price wise) department. This to go back to 2 or 3 bids to be evaluated mech. Input by means of "techn. quick scan" will be used.	The reduction of potential suppliers will direct to a lower amount of man-hours. Fewer suppliers need to be evaluated.	Necessary Action
Evaluate bids	Now the mechanical & procurement department makes a technical and commercial evaluation from the preselected bids.	Procurement and mechanical will make an agreement, to level the bids technically and commercial.	Necessary Action
Attend bid clarification meeting	For the technical part it is necessary to attend a bid clarification meeting. This to answer the last technical questions and possibly solve problems. It is also possible to start commercial discussions.	Now it is possible to select the most attractive seller. This will be done both technically and commercial.	Necessary Action

Finalize TBE & make recommendations	With the results from the clarification meeting the mechanical department will finalize the TBE and makes recommendations. This is issued to procurement. Now procurement makes the final decision.	The result is to buy the proposed equipment.	-
Countersign commercial bid tab (If required)	In this step procurement choose its preferred supplier. This will be done with the recommendations made by mechanical.	The intention is that mechanical and procurement agree on selected seller.	-
Attend pre award meeting	Now a pre award meeting will be attended to make the last arrangements.	To make sure that seller and buyer are on the same technical & commercial level.	-
Prep./Update inquiry requisition for PO	Update inquiry requisition to include all correspondence from E-mails, bid clarification meeting and possibly pre-award meeting.	To make a detailed description what equipment will be bought.	-
Route PO requisition	The requisition will be distributed to all involved departments to unveil all made arrangements.	Gathering the latest, up to date information from various disciplines.	-
Collect & incorporate comments	Possibly made comments can adjust in the documents.	This is to improve the quality from the inquiry requisition.	-
Issue PO requisition	Issue order to selected manufacturer via procurement.	Finalize the PO with the supplier.	-

Arrows (information flows):	**Purpose:**	**Nature:**	
1) Marian	Starting the creation of a computer program that streamlines and makes material control more efficient. It is accessible for all involved parties.	Output	
2) I-docs	Starting up a repository for all project documents. Accessible for all involved parties.	Output	

3) I-Pacs	A system, which measures the progress of a project. So you can compare the completed work with the allocated amount of working hours.	Output	
4) Inquiry requisition	Here the procurement process begins. In the previous stadium the inquiry requisition was made. It is the first input in the system.	Input	
5) Data	Technical (by means of receive of process datasheets) and commercial information needs to be provided to prepare inquiry requisition.	Input	
6) Requisition (Oth. disc.)	After preparing inquiry requisitioning, it will be distributed to other involved disciplines.	Output	
7) Requisition comments (Oth. disc.)	Then the comments will be brought back into the process.	Input	
8) Requisition (Procurement)	Procurement will distribute the requirement to bidders.	Output	
9) "Marian" input to requirement	Mechanical and later procurement take care of the input to requirement. Via Marian the procurement department can automatically select the required bidders.	Output	
10) Change info to seller via procurement	Procurement will provide the changed info to seller.	Output	
11) Change data (Disciplines)	Various disciplines will give their comments so changes can be made.	Input	
12) Bids (Procurement & client)	The sellers will provide bids to procurement.	Input	
13) Setup/prepare technical bid evaluation form	After evaluation of bids a technical bid evaluation form is created (See Appendix IX).	Output	
14) Sign off & issue to procurement	The mechanical bid is now finished and will be issued to procurement.	Input	
15) Final bid/seller selected	After the final bid, a seller will be selected.	Output	
16) Client approval on selected bid/seller	Client approves selected bid/bidder.	Output	

17) Commercial bid tab	Procurement provides a commercial evaluation (See Appendix VI).	Input	
18) Requisition for POR (Procurement)	After the technical and commercial evaluation, a requisition for PO will be prepared/updated with a PO document from procurement. For this, various information sources where used.	Input	
19) Requisition (Other disc)	Later on, the updated requisitions will be routed to involved disciplines. Preferably parallel to issue PO requisition.	Output	
20) Route requisition (Other Disc)	Before collecting & incorporate the input it is necessary to route the requisition to all involved disciplines.	Input	
21) Requisition (Procurement)	After issuing the PO requisition the requisition will be distributed to procurement via Marian system.	Output	
22) "Marian" input to procurement	This will be used to update Marian by procurement.	Output	

Seller designed equipment

Value flow:	**Explanation:**	**Purpose/why?:**	**Value (Added value, necessary action or pure waste):**
Identify/Plan requisition	See "In house designed equipment"	See "In house designed equipment"	-
Prepare inquiry requisition	See "In house designed equipment"	See "In house designed equipment"	-
Route inquiry requisition to other disciplines	See "In house designed equipment"	See "In house designed equipment"	-
Comments other discipline, review with originator.	The comments from the routing need to be reviewed with the originator.	To get inquiry requisitions with the latest up to date information.	-

Vendor list, for procurement.	A list with potential supplier will be made.	Announce which equipment, goes to what supplier.	-
Collect & incorporate comments	See "In house designed equipment"	See "In house designed equipment"	-
Issue inquiry requisition	See "In house designed equipment"	See "In house designed equipment"	-
Handle changes	See "In house designed equipment"	See "In house designed equipment"	Added Value
Attend inq. clarification meeting with sellers before bids received (if required)	See "In house designed equipment"	See "In house designed equipment"	Necessary Action
Sealed bid opening procedure (procurement & client)	The next step is to open the bid, procurement together with the client.	Equal opportunities for every bidder when the bids are opened together with the suppliers.	-
First "technical quick scan" of all bids (only for "Alternative")	Now the mechanical department makes a quick technical scan from the potential suppliers.	The amount of potential suppliers will be reduced to max. 2 or 3.	-
Preselect bids	After opening the bid it is possible to make a preselection from the bids. The mechanical department will do this.	The reduction of potential suppliers will direct to a lower amount of man-hours. Fewer suppliers need to be evaluated.	Necessary Action
Evaluate preselected bids	Now the mechanical department makes an evaluation from the bids.	Procurement and mechanical will make an agreement, to level the bids technically and commercial.	Necessary Action

Attend bid clarification meeting	For the technical part of the project it will be necessary to attend a bid clarification meeting. This to answer the last technical questions and possibly solve problems.	Now it is possible to select the most attractive seller. This will be done both technically and commercial.	Necessary Action
Prepare conference notes.	After the bid clarification meeting is it necessary to make conference notes. These notes are remarks from the meeting.	The results from the conference notes are recorded.	Necessary Action
Replies from bidders & answer to bidder.	Then the bidders have the chance to reply/ask questions and then the buyer answer to bidder.	The last uncertainties can be cleared.	Necessary Action
Finalize TBE & make recommendations	With the results from the clarification meeting the mechanical department will finalize the TBE and makes recommendations. From this moment the role from the mechanical department is over, now procurement makes the final decision.	The result is to buy the proposed equipment.	-
Countersign commercial bid tab (if required)	See "In house designed equipment"	See "In house designed equipment"	-
Attend pre award meeting	See "In house designed equipment"	See "In house designed equipment"	-
Prep./Update requisition for PO	See "In house designed equipment"	See "In house designed equipment"	-
Route (PO) requisition (only for "Alternative")	See "In house designed equipment"	See "In house designed equipment"	-

Collect & incorporate input (only for "Alternative")	See "In house designed equipment"	See "In house designed equipment"	-
Issue PO requisition	See "In house designed equipment"	See "In house designed equipment"	-
Arrows (*information flows*):	**Purpose:**	**Nature:**	
1) Marian	Starting the creation of a computer program that streamlines and makes material control more efficient. It is accessible for all involved parties.	Output	
2) I-docs	Starting up a repository for all project documents. Accessible for all involved parties.	Output	
3) I-Pacs	A system, which measures the progress of a project. So you can compare the completed work with the allocated amount of working hours.	Output	
4) Inquiry requisition	Here the procurement process begins. In the previous stadium the inquiry requisition was made. It is the first input in the system.	Input	
5) Data	Technical (by means of receive of process data sheets) and commercial information needs to be provided to prepare inquiry requisition.	Input	
6) Requisition (Other disc.)	After preparing inquiry requisitioning, it will be distributed to other involved disciplines.	Output	
7) Requisition comments (Other disc.)	Then the comments will be brought back into the process.	Input	
8) Requisition (Procurement)	Procurement will distribute the requirement to bidders.	Output	
9) "Marian" input to requirement	Mechanical and later procurement take care of the input to requirement. Via Marian the	Output	

	procurement department can automatically select the required bidders.		
10) Change info to seller via procurement	Procurement will provide the changed info to seller.	Output	
11) Change data (Disciplines)	Various disciplines will give their comments so changes can be made.	Input	
12) Bids (Procurement & client)	The sellers will provide bids to procurement.	Input	
13) Setup/prepare technical bid evaluation form	After evaluation of bids a technical bid evaluation form is created (See Appendix IX).	Output	
14) Sign off & issue to procurement	The mechanical bid is now finished and will be issued to procurement.	Input	
15) Final bid/seller selected	After the final bid, a seller will be selected.	Output	
16) Client approval on selected bid/seller	Client approves selected bid/bidder.	Output	
17) Commercial bid tab	Procurement provides a commercial evaluation (See Appendix VI).	Input	
18) Requisition for POR (Procurement)	After the technical and commercial evaluation, a requisition for PO will be prepared/updated with a PO document from procurement. For this, various information sources where used.	Input	
19) Requisition (Other disc.)	Later on, the updated requisitions will be routed to involved disciplines. Preferably parallel to issue PO requisition.	Output	
20) Route requisition (Other Disc.)	Before collecting & incorporate the input it is necessary to route the requisition to all involved disciplines.	Input	
21) Requisition (Procurement)	After issuing the PO requisition the requisition will be distributed to procurement via the Marian system.	Output	

22) "Marian" input to procurement	This will be used to update Marian by procurement.	Output	

Procurement

Value flow:	Explanation:	Purpose/Why?:	Value (Added value, necessary action or pure waste):
Prepare inquiry file	The inquiry file will be prepared by procurement.	Central location for filling main communication on each inquiry.	-
Prepare inquiry letter	Also the inquiry letter will be prepared. The inquiry file encloses this letter.	Inform vendor that he is selected to quote for a specific item and provide details to vendor on the work procedure.	-
Complete inq. Package (Buyer/Secr.)	The previous mentioned documents are part of the inquiry package that will be completed in this step.	Vendor gets all information in one batch.	-
Approve inquiry	As a following step the inquiry will be approved in Marian.	This releases the inquiry information to the quotation desk and informs them that the inquiry has been sent to the vendors.	-
Issue inquiry	Then the inquiry needs to be issued. Data will be send to quote desk, bidders and internal.	Inform vendors, quotation desk and project members of the issue of the inquiry.	-
Prepare inq. status report	The inq. status report is created in order to control the manufacturing time from the inquiry status.	Informs the project once a week on the status/replies of vendors on each inquiry.	Necessary Action
Expedite receive inquiry	The received inquiries will be expedited to involved departments. Also the inq. status report needs to be updated.	To assure that the quotes will be submitted by vendors to LGN before the bid due date. The quotation desk expedites the vendors on the timely submission of the quotes.	Necessary Action

Bid opening	Now it's time to open the bid.	Bid opening procedure assures that each vendor has the same opportunity and no information can be sent to competitors. No bids are accepted after the bid opening.	-
Distribution (buyer/eng.)	After the bid opening, the bids are being distributed to engineers and buyer. So they can review the contents.	Get all bids to the correct project members so that the evaluation can start.	-
Prepare preliminary comm. bid tabulation	Procurement makes a temporarily commercial bid tabulation	Get a quick overview from purchasing point of view on the quotes.	-
Arrange shortlist meeting	After the creation of the bid tabulation, the amount of potential suppliers will be reduced.	To do a quick selection at the beginning of the evaluation to limit the work for engineering and purchasing.	-
Detailed evaluation (tech./comm.)	In order to choose a suitable supplier, procurement and mechanical will arrange a meeting to discuss this topic. Only short listed vendors will compete.	Detailed evaluation assures that you are comparing apples with apples. Purpose of meeting is to assure that all details/questions have been discussed and clarified.	Necessary Action
Coordinate bid clarification meeting	Bid clarification meeting are meetings with the short listed vendors to assure that all details/questions have been discussed and that the complete scope from both side has been clarified.	To assure that at the end of the meeting the evaluation can be completed and final selection of the vendor can be made.	Necessary Action
Finalize comm. Bid tab, obtain approval	Now the commercial bid tab needs to be finalized and approved. The mechanical department is involved in the approval. They will also approve in Marian.	The final commercial bid tab gives a complete overview on the quotes of the short listed vendor; it shows the winning vendor and all departments' sign on this document to provide approval for purchase order placement.	-

Approve bid tab	See remark 14.	The main purpose of approvals of bid tab is to assure that every project discipline accepts the choice it is the project approval for this selection.	-
Prep. Purchase order	After approval the Purchase Order can be prepared.	Purpose is to complete the original purchase order incl. All relevant attachments for submission to the vendor.	-
Approve purchase order	Now the PO is prepared, it can be approved.	Purpose is to release the purchase order from the purchasing department to the expediter so that they know that the PO has been place and that they have to start working it.	-
Issue purchase order	Issue order to selected manufacturer.	Finalizing the agreements	-

Arrows (information flows):	**Purpose:**	**Nature:**	
1) Update Marian	Starting the creation of a computer program that streamlines and makes material control more efficient. It is accessible for all involved parties.	Output	
2) Inquiry requisition	Sent in an invitation for bid, necessary for preparing the inquiry file.	Input	
3) Inquiry bidders list	List of bidders, for making the inquiry letter.	Input	
4) Data	Flow of data, such as; technical and commercial documents.	Input	
5) Data	Dataflow, the inquiry bidders' list and inquiry package.	Output	
6) Inquiry status report	After procurement prepared the inquiry status report, it will be created and distributed to all involved parties.	Output	

7) Inquiry bidders list + Marian	For the creation of the status report it is necessary to have a completed inquiry bidders list. Possibly new bidders/manufacturers need to be added in Marian.	Input	
8) Inform buyer on decline	Regret letter to vendor.	Input	
9) Inform bidders on no extensions	Inform bidders that there is no time left for making a bid.	Input	
10) Update inquiry status report	Before the bid opening the inquiry state report will be updated by procurement.	Output	
11) Quotations	With the received quotations procurement makes a preliminary bid tab.	Input	
12) Additional information bidders	Before finalizing the commercial bid tabulation, this is the last chance to use new information from bidders.	Input	
13) Distribute additional information (buyer)	Same as remark 12, only now for the buyer.	Input	
14) Update Marian	After commercial bid tab approval, Marian needs to be updated.	Output	
15) Final technical evaluation	With the commercial selection made in the previous remark, the final technical evaluation shall be performed.	Input	
16) Marian (tech.)	After the selection, the mechanical department will give its go ahead in Marian.	Input	
17) Approved bid tabulation	When the bid tab is approved it is used to create a prepared purchase order.	Input	
18) Purchase order doc.	PO doc. Will be distributed to Seller and internal departments.	Output	
19) Update Marian	Now it is necessary to update Marian with the latest information.	Output	

Appendix IV: Bubble models

Scanraff

		Man-hours				RPSR Data		RPSR Data			
Inquiry number	Equipment/Project	Hours per pcs.	Pieces	Total hours	Total days	Total days	Time effectiveness in %	Period 2 in days	Period 4 in days	Time consumer period 2 in %	Time consumer period 4 in %
300	Columns Scanraff	69.8	8	558.4	69.8	133	52.5	48	36	36.1	27.1
302	Reactors Scanraff	40	2	80	10	472	2.1	34	328	7.2	69.5
600	Compressors Scanraff	50.1	6	300.6	37.6	391	9.6	23	71	5.9	18.2
100	Heaters Scanraff	80	2	160	20	168	11.9	68	42	40.5	25.0
1101	Cranes Scanraff	75	1	75	9.4	98	9.6	28	-7	28.6	-7.1

Molipaq

		Man-hours				RPSR Data		RPSR Data			
Inquiry number	Equipment/Project	Hours per pcs.	Pieces	Total hours	Total days	Total days	Time effectiveness in %	Period 2 in days	Period 4 in days	Time consumer period 2 in %	Time consumer period 4 in %
341	Columns/vessels Molipaq	33	3	99	12.4	60	20.6	39	13	65	21.7
1601	Start-up heater Molipaq	40	2	80	10.0	124	8.1	33	76	26.6	61.3
1151	Crane Molipaq	62.5	4	250	31.3	49	63.8	6	37	12.2	75.5

HD Select

		Man-hours				RPSR Data		RPSR Data			
Inquiry number	Equipment	Hours per pcs.	Pieces	Total hours	Total days	Total days	Time effectiveness in %	Period 2 in days	Period 4 in days	Time consumer period 2 in %	Time consumer period 4 in %
300	Columns HD Select	39.7	4	158.8	19.9	112	17.7	26	67	23.2	59.8
330	Reactors HD Select	39	2	78	9.8	139	7.0	20	67	14.4	48.2
625	Compressors HD Select	195	2	390	48.8	176	27.7	24	122	13.6	69.3
1600	Heaters HD Select	75	1	75	9.4	146	6.4	42	89	28.8	61.0

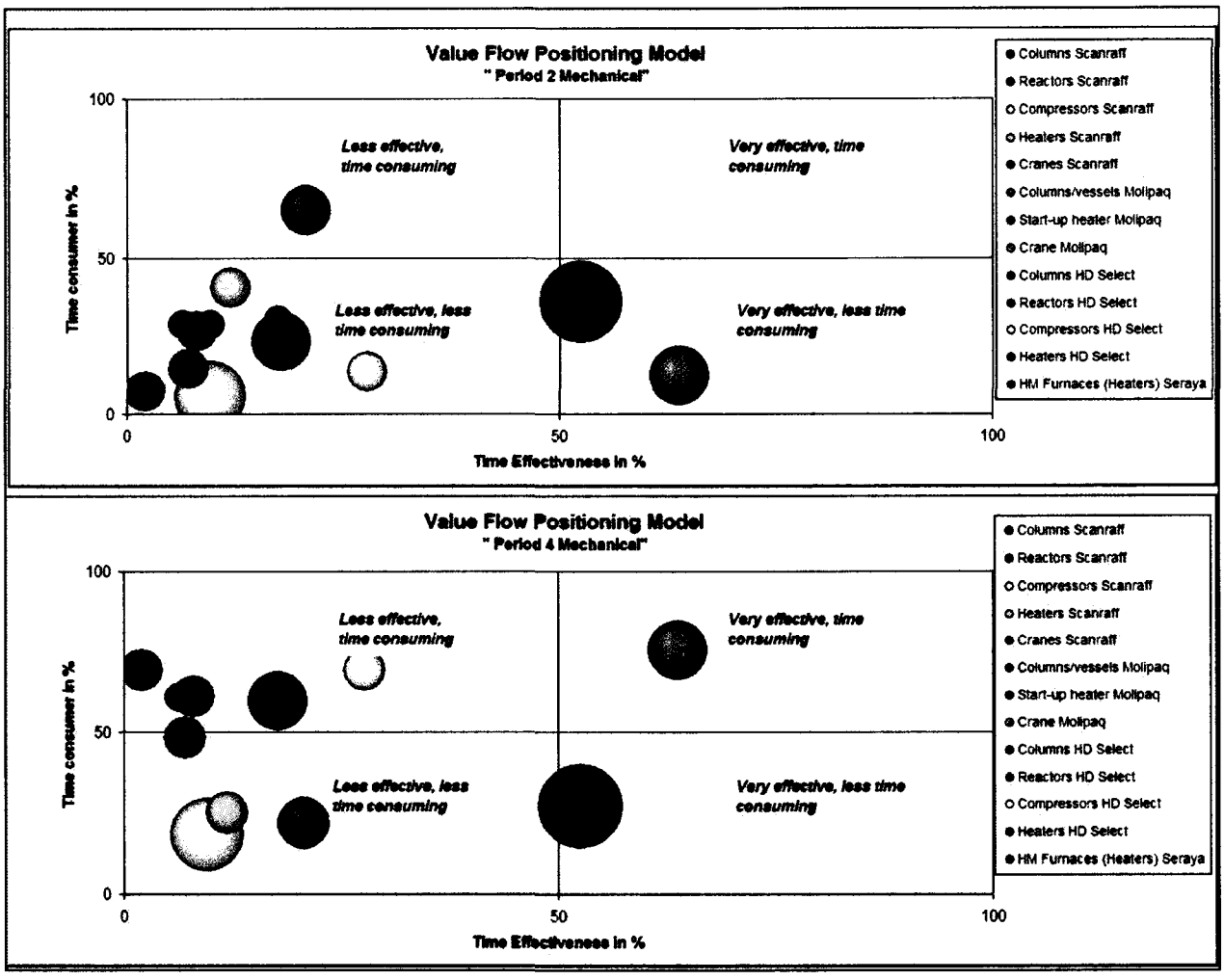
Seraya

		Man-hours				RPSR Data		RPSR Data			
Inquiry number	Equipment	Hours per pcs.	Pieces	Total hours	Total days	Total days	Time effectiveness in %	Period 2 in days	Period 4 in days	Time consumer period 2 in %	Time consumer period 4 in %
300	Columns Seraya**	74	28	2072	259	102	253.9	32	35	31.4	34.3
330	Reactors Seraya**	61	17	1037	129.6	126	102.9	37	35	29.4	27.8
600	Compressors Seraya*	No info	No info	No info	No info	105	No info	36	36	34.3	34.3
100	HM Furnaces (Heaters) Seraya	236.3	1	236.3	29.5	169	17.5	51	104	30.2	61.5
1150	Hoists & cranes Seraya*	No info	No info	No info	No info	146	No info	27	43	18.5	29.5

* = Not in graphs, no information available
** = Not in graphs, not correct recorded information

$$Time\ effectiveness\ in\ \% = \frac{Total\ days\ Man-hours}{Total\ days\ RPSR} * 100\%$$

$$Time\ consumer\ in\ \% = \frac{Period\ 2\ or\ 4\ in\ days\ RPSR}{Total\ days\ RPSR} * 100\%$$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Less effective, less time consuming
Very effective, less time consuming
Time consumer in %
Time Effectiveness in %
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Reactors Scanraff
Compressors Scanraff
Heaters Scanraff
Cranes Scanraff
Columns/vessels Molipaq
Start-up heater Molipaq
Crane Molipaq
Columns HD Select
Reactors HD Select
Compressors HD Select
Heaters HD Select
HM Furnaces (Heaters) Seraya
Value Flow Positioning Model
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Less effective, time consuming
Very effective, time consuming
Less effective, less time consuming
Very effective, less time consuming
Time consumer in %
Time Effectiveness in %
0
50
100
Columns Scanraff
Reactors Scanraff
Compressors Scanraff
Heaters Scanraff
Cranes Scanraff
Columns/vessels Molipaq
Start-up heater Molipaq
Crane Molipaq
Columns HD Select
Reactors HD Select
Compressors HD Select
Heaters HD Select
HM Furnaces (Heaters) Seraya

Scanraff

		Man-hours				RPSR Data		RPSR Data			
Inquiry number	Equipment/Project	Hours per pcs.	Pieces	Total hours	Total days	Total days	Time effectiveness in %	Period 2 in days	Period 4 in days	Time consumer period 2 in %	Time consumer period 4 in %
300	Columns Scanraff	12.5	8	100	12.5	133	9.4	48	36	36.1	27.1
302	Reactors Scanraff	50	2	100	12.5	472	2.6	34	328	7.2	69.5
600	Compressors Scanraff	100	6	600	75.0	391	19.2	23	71	5.9	18.2
100	Heaters Scanraff	100	2	200	25	168	14.9	68	42	40.5	25.0
1101	Cranes Scanraff	40	1	40	5.0	98	5.1	28	-7	28.6	-7.1

Molipaq*

		Man-hours				RPSR Data		RPSR Data			
Inquiry number	Equipment/Project	Hours per pcs.	Pieces	Total hours	Total days	Total days	Time effectiveness in %	Period 2 in days	Period 4 in days	Time consumer period 2 in %	Time consumer period 4 in %
341	Columns/vessels Molipaq	51	9	459	57.4	60	95.6	39	13	65	21.7
1601	Start-up heater Molipaq	4.9	12	58.8	7.4	124	5.9	33	76	26.6	61.3
1151	Crane Molipaq	16	4	64	8.0	49	16.3	6	37	12.2	75.5

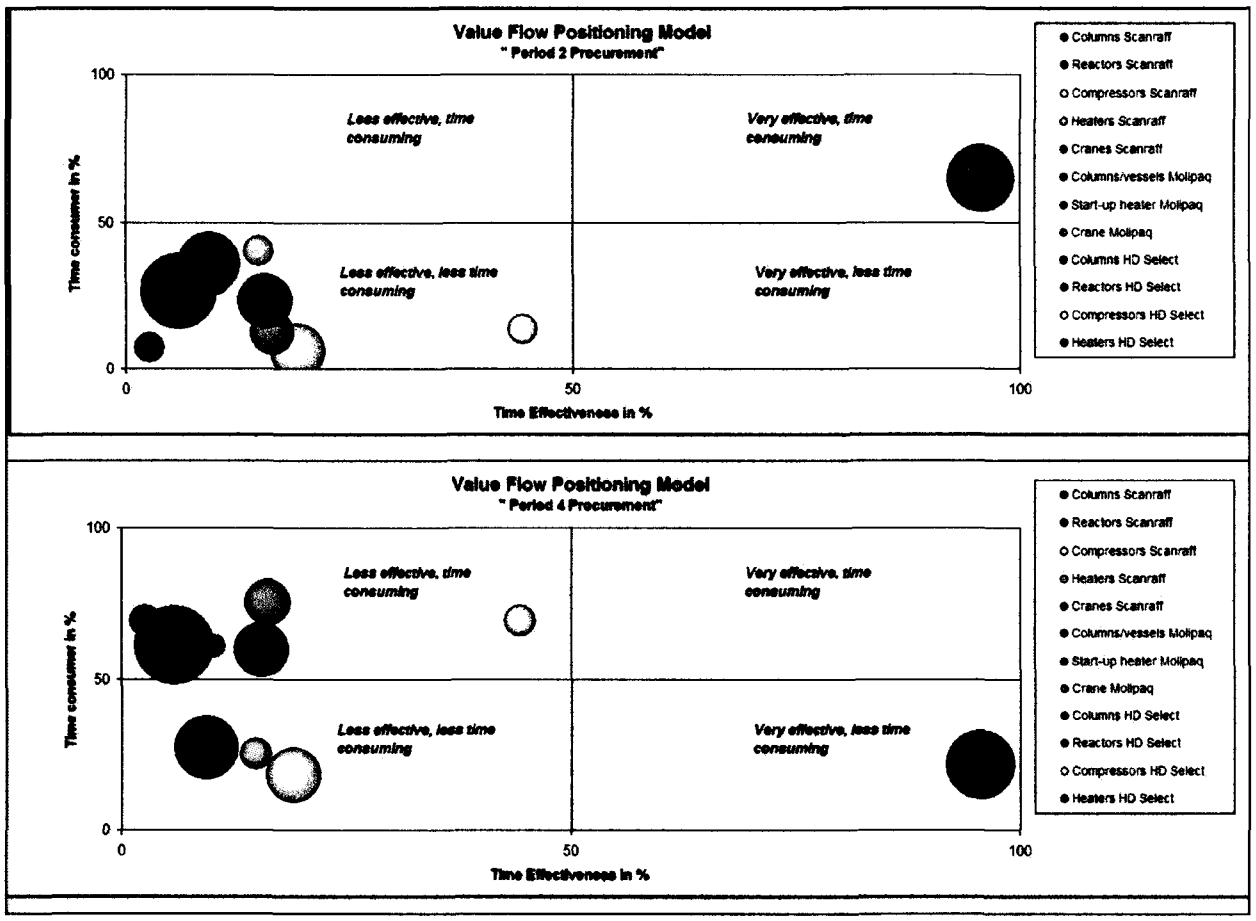
HD Select

		Man-hours				RPSR Data		RPSR Data			
Inquiry number	Equipment	Hours per pcs.	Pieces	Total hours	Total days	Total days	Time effectiveness in %	Period 2 in days	Period 4 in days	Time consumer period 2 in %	Time consumer period 4 in %
300	Columns HD Select	23.3	6	139.8	17.5	112	15.6	26	67	23.2	59.8
330	Reactors HD Select	Together with columns		No info	No info	139	No info	20	67	14.4	48.2
625	Compressors HD Select	312.5	2	625	78.1	176	44.4	24	122	13.6	69.3
1600	Heaters HD Select	120	1	120	15.0	146	10.3	42	89	28.8	61.0

* = Amount of pieces can vary, because of other seperation of inquiries

$$Time\ effectiveness\ in\ \% = \frac{Total\ days\ Man-hours}{Total\ days\ RPSR} * 100\%$$

$$Time\ consumer\ in\ \% = \frac{Period\ 2\ or\ 4\ in\ days\ RPSR}{Total\ days\ RPSR} * 100\%$$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Time Effectiveness in %
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Reactors Scanraff
Compressors Scanraff
Heaters Scanraff
Cranes Scanraff
Columns/vessels Molipaq
Start-up heater Molipaq
Crane Molipaq
Columns HD Select
Reactors HD Select
Compressors HD Select
Heaters HD Select
Value Flow Positioning Model
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Very effective, time consuming
Less effective, less time consuming
Very effective, less time consuming
Time consumed in %
Time Effectiveness in %
0
50
100
Columns Scanraff
Reactors Scanraff
Compressors Scanraff
Heaters Scanraff
Cranes Scanraff
Columns/vessels Molipaq
Start-up heater Molipaq
Crane Molipaq
Columns HD Select
Reactors HD Select
Compressors HD Select
Heaters HD Select

Scanraff (Mechanical)

		Man-hours				RPSR Data		RPSR Data			
Inquiry number	Equipment/Project	Hours per pcs.	Pieces	Total hours	Total days	Total days	Time effectiveness in %	Period 2 in days	Period 4 in days	Time consumer period 2 in %	Time consumer period 4 in %
300	Columns Scanraff "Mech"	69.8	8	558.4	69.8	133	52.5	48	36	36.1	27.1
600	Compressors Scanraff "Mech"	50.1	6	300.6	37.6	391	9.6	23	71	5.9	18.2

Molipaq (Mechanical)

		Man-hours				RPSR Data		RPSR Data			
Inquiry number	Equipment/Project	Hours per pcs.	Pieces	Total hours	Total days	Total days	Time effectiveness in %	Period 2 in days	Period 4 in days	Time consumer period 2 in %	Time consumer period 4 in %
341	Columns/vessels Molipaq "Mech"	33	3	99	12.4	60	20.6	39	13	65	21.7

HD Select (Mechanical)

		Man-hours				RPSR Data		RPSR Data			
Inquiry number	Equipment	Hours per pcs.	Pieces	Total hours	Total days	Total days	Time effectiveness in %	Period 2 in days	Period 4 in days	Time consumer period 2 in %	Time consumer period 4 in %
300	Columns HD Select "Mech"	39.7	4	158.8	19.9	112	17.7	26	67	23.2	59.8
625	Compressors HD Select "Mech"	195	2	390	48.8	176	27.7	24	122	13.6	69.3

Scanraff (Procurement)

		Man-hours				RPSR Data		RPSR Data			
Inquiry number	Equipment/Project	Hours per pcs.	Pieces	Total hours	Total days	Total days	Time effectiveness in %	Period 2 in days	Period 4 in days	Time consumer period 2 in %	Time consumer period 4 in %
300	Columns Scanraff "Proc"	12.5	8	100	12.5	133	9.4	48	36	36.1	27.1
600	Compressors Scanraff "Proc"	100	6	600	75.0	391	19.2	23	71	5.9	18.2

Molipaq (Procurement)

		Man-hours				RPSR Data		RPSR Data			
Inquiry number	Equipment/Project	Hours per pcs.	Pieces	Total hours	Total days	Total days	Time effectiveness in %	Period 2 in days	Period 4 in days	Time consumer period 2 in %	Time consumer period 4 in %
341	Columns/vessels Molipaq "Proc"	51	9	459	57.4	60	95.6	39	13	65	21.7

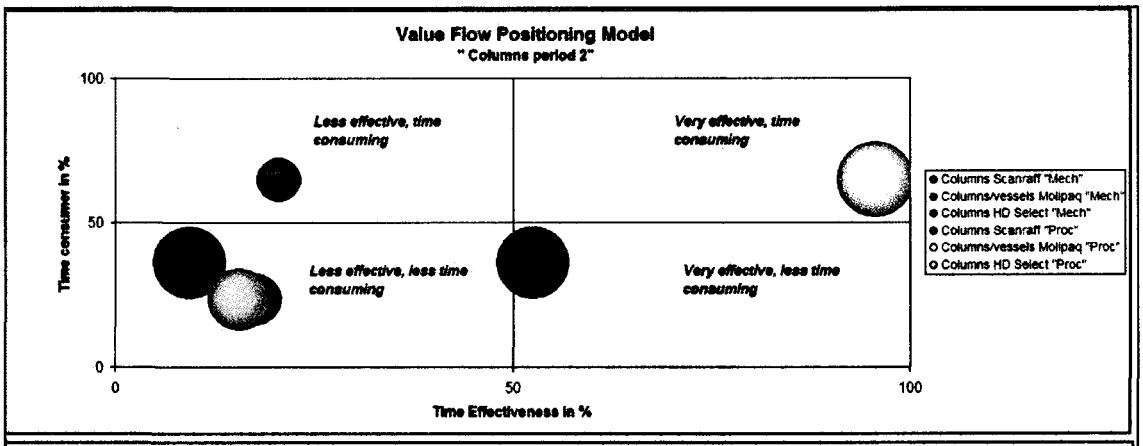
HD Select (Procurement)

		Man-hours				RPSR Data		RPSR Data			
Inquiry number	Equipment	Hours per pcs.	Pieces	Total hours	Total days	Total days	Time effectiveness in %	Period 2 in days	Period 4 in days	Time consumer period 2 in %	Time consumer period 4 in %
300	Columns HD Select "Proc"	23.3	6	139.8	17.5	112	15.6	26	67	23.2	59.8
625	Compressors HD Select "Proc"	312.5	2	625	78.1	176	44.4	24	122	13.6	69.3

* = Amount of pieces can vary, because of other seperation of inquiries

$$Time\ effectiveness\ in\ \% = \frac{Total\ days\ Man-hours}{Total\ days\ RPSR} * 100\%$$

$$Time\ consumer\ in\ \% = \frac{Period\ 2\ or\ 4\ in\ days\ RPSR}{Total\ days\ RPSR} * 100\%$$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Time Effectiveness in %
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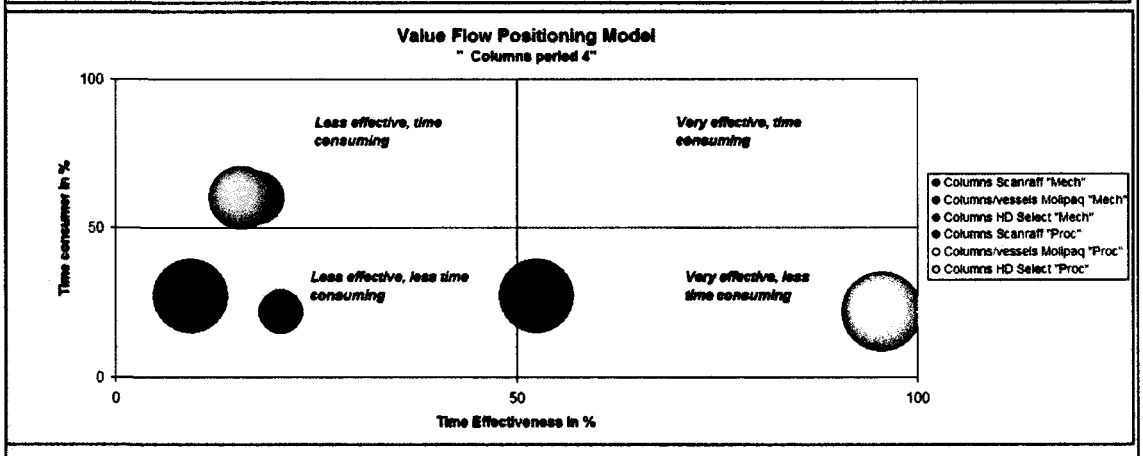
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Less effective, less time consuming
Very effective, less time consuming
Time consumer in %
Time Effectiveness in %
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50
100
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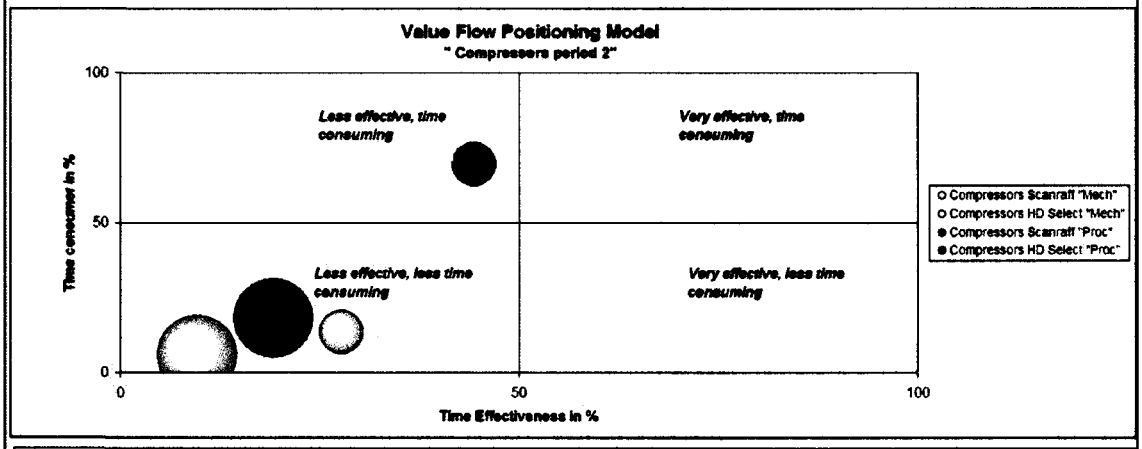
Columns/vessels Molipaq "Mech"
Columns HD Select "Mech"
Columns Scanraff "Proc"
Columns/vessels Molipaq "Proc"
Columns HD Select "Proc"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Very effective, time consuming
Less effective, less time consuming
Very effective, less time consuming
Time consumer in %
Time Effectiveness in %
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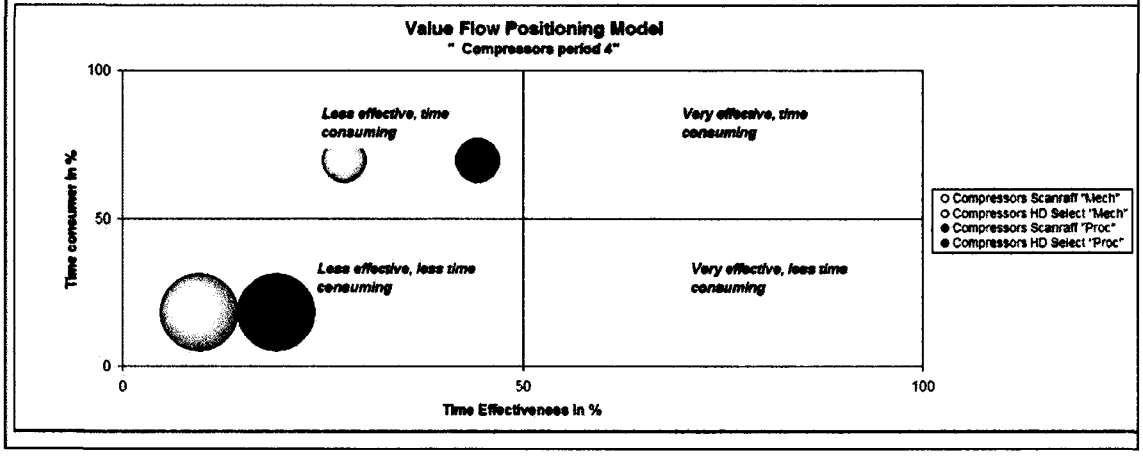
Compressors HD Select "Mech"
Compressors Scanraff "Proc"
Compressors HD Select "Proc"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Less effective, less time consuming
Very effective, less time consuming
Time consumer in %
Time Effectiveness in %
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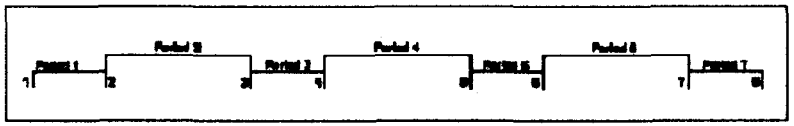
Compressors Scanraff "Mech"
Compressors HD Select "Mech"
Compressors Scanraff "Proc"
Compressors HD Select "Proc"

Appendix V: RPSR Data

Summaries of RPSR Data for each project

Scenario In house designed equipment
"Long lead equipment"



Milestone 1 = Issue inquiry requisition
Milestone 2 = Inquiry issued
Milestone 3 = Bids opened
Milestone 4 = Approve short list
Milestone 5 = Final technical evaluation
Milestone 6 = Final commercial evaluation
Milestone 7 = Recommendation for purchase
Milestone 8 = Issue POR

Mechanical

		Actual time								Man-hour estimate			
Inquiry number:	Equipment:	Period 1:	Period 2:	Period 3:	Period 4:	Period 5:	Period 6:	Period 7:	Total (days):	Inquiry requisitions	Eval./P.O. requisition	Total (hours)	Pieces
100	Heaters	14	88	0	42	31	13	0	188	No info	No info	88	2
300	Columns	5	48	21	36	2	0	21	133	30.4	39.4	69.8	8
302	Reactor	7	34	15	328	2	-92	178	472	0	40	40	2
303	H.P. Vessels	0	0	0	72	0	8	1	81	72.4	54.3	126.7	18
362	Backwash filter	7	14	0	14	3	8	2	48	13	13	26	10.2
400	H.P. Exchanger	0	0	0	3	22	13	29	67	0	31.8	31.8	5
600	Compressor	10	23	179	71	17	29	62	391				
625	Compressor	0	0	0	0	0	0	80	80				
627	Compressor	0	28	4	31	1	1	13	78	0	300.7	300.7	6
900	Aircoolers	0	40	0	38	11	0	24	113	10.1	16.9	27	23
1600	PSA Unit	0	0	0	24	1	13	-9	29	No info	No info	110	1
1602	Reformer Package	0	0	0	0	2	0	44	46	No info	No info	250	1
1101*	Cranes	8	28	53	-7	7	0	9	98	No info	No info	75	1

* = Special added for further analysis, not in previous analysis

Procurement

		Actual time								Man-hour estimate	
Inquiry number:	Equipment:	Period 1:	Period 2:	Period 3:	Period 4:	Period 5:	Period 6:	Period 7:	Total (days):	Total (hours)	Pieces
100	Heaters	14	88	0	42	31	13	0	188	188	2
300	Columns	5	48	21	36	2	0	21	133	12.5	8
302	Reactor	0	0	0	0	0	1	29	30	58	2
303	H.P. Vessels	0	0	0	72	0	8	1	81	18	18
362	Backwash filter	7	34	15	328	2	-92	178	472	Extra order	
400	H.P. Exchanger	0	0	0	3	22	13	29	67	28	5
600	Compressor	10	23	179	71	17	29	62	391	188	1
625	Compressor	0	0	0	0	0	0	80	80	33.3	3
627	Compressor	0	28	4	31	1	1	13	78	58	2
900	Aircoolers	0	40	0	38	11	0	24	113	8.7	23
1600	PSA Unit	0	0	0	24	1	13	-9	29	288	1
1602	Reformer Package	0	0	0	0	2	0	44	46	Via Scenario (extra)	
1101*	Cranes	8	28	53	-7	7	0	9	98	48	1

* = Special added for further analysis, not in previous analysis

Milestone 1 = Issue inquiry requisition
Milestone 2 = Inquiry issued
Milestone 3 = Bids opened
Milestone 4 = Short list
Milestone 5 = Final technical evaluation
Milestone 6 = Recommendation for purchase
Milestone 7 = Issue POR

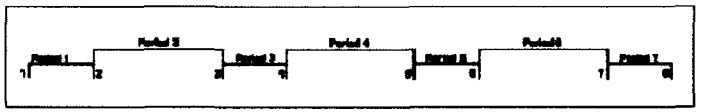
Mechanical

		Actual time							Man-hour estimate			
Inquiry number	Equipment	Period 1:	Period 2:	Period 3:	Period 4:	Period 5:	Period 6:	Total (days):	Inquiry requisitions	Bid evaluations / P.O. requisitions	Total (hours)	Phases
340	Vessels excluding internals	7	39	1	13	0	0	60	No info	40	39	4
341	Vessels including internals	7	39	1	13	0	0	60	No info	33	39	3
342	Electrostatic coalescers	14	40	2	227	0	1	284	No info	80	80	1
343	Oil pig launcher	0	0	0	24	4	7	35	No info	60	39	2
344	Filters	2	26	0	224	20	4	276	No info	60	60	1
370	Glycol storage tanks	0	24	0	62	0	2	78	No info	40	40	1
401	Shell & tube exchangers	14	51	0	193	0	1	259	No info	25	25	4
500	Centrifugal pumps	246	17	13	34	1	0	310	No info	60	33.3	3
501	Reciprocating injection pumps	2	10	1	-	-	-	13	No info	100	100	1
503	Glycol transfer & flare ko pumps	0	34	1	276	0	1	311	No info	100	40	2
760	Back-up generator	23	1	0	84	1	0	110	No info	No info	No info	1
1113	Tie in steel + install skids	2	12	0	51	1	0	66				
1123	Intercoon 2&3 steel	0	12	0	84	14	1	111				
1129	Intercoon sliding bearings	13	16	7	28	7	3	76				
1133	Module secondary & tertiary steel	0	12	0	51	4	0	67				
1134	Module crating	0	9	0	19	39	0	66				
1135	Bolts, nuts & washers	-	-	-	-	-	-	No information				
1143	Intercoon 2&3 steel	0	12	0	51	4	0	67				
1144	Intercoon crating	0	9	0	-	-	-	9				
1145	Bolts, nuts & washers intercoon	-	-	-	-	-	-	No information				
1160	Mechanical handling equipment	7	25	-	-	-	-	32	Civil/Structural dept. no analysis required			
1161	Crane	0	6	6	37	0	0	49	No info	No info	62.5	4
1200	HVAC	2	19	3	61	0	2	87	No info	7.76	7	28
1201	Glycol injection lances	-	-	-	-	-	-	No information	No info	No info	No info	No info
1260	Safety equipment	0	17	3	84	7	0	111	No info	16	16	2
1600	Glycol regeneration package	0	37	1	242	0	0	280	No info	22.5	22.5	8
1601	Start-up heater	0	33	1	76	14	0	124	No info	40	40	2
1605	Corrosion inhibitor package	0	36	1	30	1	0	70	No info	59	59	2
1800	Fire fighting equipment	0	27	5	0	0	0	32	No info	2.7	2.7	12

Procurement

		Actual time							Man-hour estimate				
Inquiry number	Equipment	Period 1:	Period 2:	Period 3:	Period 4:	Period 5:	Period 6:	Total (days):	Inquiry requisitions	Bid evaluations	P.O.	Total (hours)	Phases
340	Vessels excluding internals	7	39	1	13	0	0	60					2
341	Vessels including internals	7	39	1	13	0	0	60					3
342	Electrostatic coalescers	14	40	2	227	0	1	284					1
343	Oil pig launcher	0	0	0	24	4	7	35					2
344	Filters	2	26	0	224	20	4	276	3	40	8	94	1
370	Glycol storage tanks	0	24	0	62	0	2	78	3	24	8	65	1
401	Shell & tube exchangers	14	51	0	193	0	1	259	3	30	7.5	48.5	4
500	Centrifugal pumps	246	17	13	34	1	0	310					2
501	Reciprocating injection pumps	2	10	1	-	-	-	13					1
503	Glycol transfer & flare ko pumps	0	34	1	276	0	1	311	11.3	67.5	13.5	92.3	1
760	Back-up generator	23	1	0	84	1	0	110	8	80	8	96	1
1113	Tie in steel + install skids	2	12	0	51	1	0	66					
1123	Intercoon 2&3 steel	0	12	0	84	14	1	111					
1129	Intercoon sliding bearings	13	16	7	28	7	3	76					
1133	Module secondary & tertiary steel	0	12	0	51	4	0	67					
1134	Module crating	0	9	0	19	39	0	66					
1135	Bolts, nuts & washers	-	-	-	-	-	-	No information					
1143	Intercoon 2&3 steel	0	12	0	51	4	0	67					
1144	Intercoon crating	0	9	0	-	-	-	9					
1145	Bolts, nuts & washers intercoon	-	-	-	-	-	-	No information					
1160	Mechanical handling equipment	7	25	-	-	-	-	32	Civil/Structural dept. no analysis required				
1161	Crane	0	6	6	37	0	0	49	0.5	4	1.3	5.8	4
1200	HVAC	2	19	3	61	0	2	87	2	12	2	14	8
1201	Glycol injection lances	-	-	-	-	-	-	No information					12
1260	Safety equipment	0	17	3	84	7	0	111	3	40	16	59	No info
1600	Glycol regeneration package	0	37	1	242	0	0	280	Together with req. 1160				2
1601	Start-up heater	0	33	1	76	14	0	124					8
1605	Corrosion inhibitor package	0	36	1	30	1	0	70					2
1800	Fire fighting equipment	0	27	5	0	0	0	32	0.3	3.3	1.3	4.9	2
									0.7	3.3	0.7	4.7	12

NB select



Milestone 1 = Issue inquiry requisition
Milestone 2 = Inquiry issued
Milestone 3 = Bids opened
Milestone 4 = Approve short list
Milestone 5 = Final technical evaluation
Milestone 6 = Final commercial evaluation
Milestone 7 = Recommendation for purchase
Milestone 8 = Issue POR

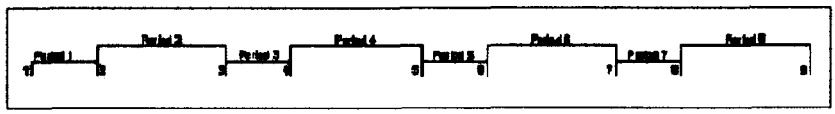
Mechanical

		Actual time								Man-hour estimate			
Inquiry number:	Equipment	Period 1:	Period 2:	Period 3:	Period 4:	Period 5:	Period 6:	Period 7:	Total (days):	Inquiry requisitions	Eval./P.O. requisition	Total (hours)	Pieces
300	Columns (Columns)	0	26	10	67	3	3	3	112	0	39.7	39.7	4
330	Reactors (Reactors)	14	20	29	67	3	3	3	139	0	39	39	2
340	Vessels (Vessels)	0	26	8	10	11	0	7	62	0	17.1	17.1	14
400	S&T heat exchangers (Heat exchangers)	0	29	8	21	11	0	7	76	15	17.3	32.3	11
501	Pumps -Horizontal Back- Pull-out (Pumps)	8	28	0	33	-364	365	1	71				
502	Pumps -Vertical closed- Coupled	7	22	0	27	5	0	6	67				
504	Horizontal diaphragm	3	27	4	28	2	0	-1	63				
560	Pumps -Horizontal Barrel- Type	9	26	0	34	2	0	14	85				
565	Seal make-up system	6	16	0	32	2	0	-1	55				
569	Seals and seal systems	3	21	0	15	4	0	-	43	No info	No info	34.1	16
625	Compressor package (Compressors)	1	24	14	122	13	0	2	176	No info	No info	195	2
900	Air coolers (Air coolers)	0	61	0	43	0	1	2	107	0	21.4	21.4	9
1250	Silencers (Miscellaneous eqm.)	4	21	0	55	4	1	-9	77				
1251	Ejectors	6	55	0	93	19	0	16	189				
1252	Desuperheater	3	36	0	101	11	1	6	157				
1253	Strainer & Filter	8	13	0	71	11	1	40	144				
1254	Sample units	6	20	0	90	2	0	12	130	4.1	3.4	7.5	22
1600	Heater (Heaters)	0	42	0	89	1	0	14	146	0	75	75	1
1601	Monitor/hydrant part (Fire fighting eqm.)	17	18	0	141	0	0	28	204	12	10	22	3

Procurement

		Actual time								Man-hour estimate	
Inquiry number:	Equipment:	Period 1:	Period 2:	Period 3:	Period 4:	Period 5:	Period 6:	Period 7:	Total (days):	Total (hours)	Pieces
300	Columns (Columns)	0	26	10	67	3	3	3	112	23.3	6
330	Reactors (Reactors)	14	20	29	67	3	3	3	139		
340	Vessels (Vessels)	0	26	8	10	11	0	7	62	4.3	14
400	S&T heat exchangers (Heat exchangers)	0	29	8	21	11	0	7	76	5.4	11
501	Pumps -Horizontal Back- Pull-out (Pumps)	8	28	0	33	-364	365	1	71	13.3	6
502	Pumps -Vertical closed- Coupled	7	22	0	27	5	0	6	67	Extra	3
504	Horizontal diaphragm	3	27	4	28	2	0	-1	63	Extra	1
560	Pumps -Horizontal Barrel- Type	9	26	0	34	2	0	14	85	20	4
565	Seal make-up system	6	16	0	32	2	0	-1	55	Extra	1
569	Seals and seal systems	3	21	0	15	4	0	-	43	Never placed	1
625	Compressor package (Compressors)	1	24	14	122	13	0	2	176	392.5	2
900	Air coolers (Air coolers)	0	61	0	43	0	1	2	107	8.9	9
1250	Silencers (Miscellaneous eqm.)	4	21	0	55	4	1	-9	77	13.3	3
1251	Ejectors	6	55	0	93	19	0	16	189	20	2
1252	Desuperheater	3	36	0	101	11	1	6	157	40	1
1253	Strainer & Filter	8	13	0	71	11	1	40	144	20	2
1254	Sample units	6	20	0	90	2	0	12	130	Extra	14
1600	Heater (Heaters)	0	42	0	89	1	0	14	146	130	1
1601	Monitor/hydrant part (Fire fighting eqm.)	17	18	0	141	0	0	28	204	Extra	3

Scope

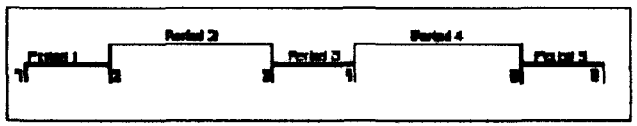


Milestone 1 = Issue inquiry requisition
Milestone 2 = Inquiry issued
Milestone 3 = Bids opened
Milestone 4 = Short list
Milestone 5 = Final technical evaluation
Milestone 6 = Recommendation for purchase
Milestone 7 = Start PO requisition
Milestone 8 = Client approval commercial requisition
Milestone 9 = Construction issued (After PO, not used in project)

		Actual time								Man-hour estimate			
Inquiry number	Equipment	Period 1:	Period 2:	Period 3:	Period 4:	Period 5:	Period 6:	Period 7:	Total (days):	Inquiry requisition	Eval./P.O. requisition	Total (hours)	Pieces
100	Hot Furnaces (Heated)	1	51	7	104	5	-1	1	168	106.3	130	236.3	1
101	Steam boilers (Boiler)	30	54	24	113	0	0	0	221	146.3	195	341.3	1
300	Large size columns (Columns)	0	32	11	35	0	0	24	102				
301	Medium size columns	23	34	9	96	0	0	7	125				
302	Small size columns	8	21	6	67	14	-15	18	100				
303	Column internals	4	27	2	33	3	6	0	77				
304	Columns	0	21	2	61	17	0	0	101				
305	Column internals	0	27	2	33	0	0	11	73				
306	EB columns	0	17	3	8	4	-15	18	36				
307	BB columns internals	0	14	6	56	6	-6	10	84				
308	Column + internals	-7	25	0	7	0	0	3	28	50.1	28.9	79	28
350	Peroxidation reactors (Reactors)	19	37	11	35	0	0	24	126				
351	BM reactors	19	35	5	89	0	0	24	133				
352	CS reactors	3	27	7	389	5	1	5	84				
353	Polymerization reactor	0	27	2	41	8	0	3	81				
354	BB reactors	13	16	0	14	4	-22	25	50	37.4	23.6	61	17
340	EB+P flasher (Vessels)	0	32	11	42	-7	0	24	102				
341	Large SS vessels	3	28	4	29	0	0	2	66				
342	Small SS vessels	5	20	3	64	-1	-33	36	94				
344	Small CS vessels	6	27	7	27	-1	-8	11	69				
345	Internal for EB+P flasher	1	31	2	27	8	2	0	71				
347	Large CS vessels	14	28	6	33	0	-4	5	82				
348	Vessels SS	3	28	2	31	0	0	2	66				
350	Small SS vessels	5	20	3	64	-1	-33	36	94				
351	Small CS vessels	6	27	7	27	-1	-8	11	69				
352	Vessels CS	14	28	15	24	1	0	0	82				
354	Vessels CS	12	14	0	4	4	-22	25	37	19.6	13.3	32.9	83
360	Filters (Filters)	21	36	7	24	8	0	2	98				
361	Filters JVS	21	36	7	24	8	0	2	98	8.4	8.4	16.8	26
398	Flare stack	7	35	26	58	7	0	2	134				
394	Monchem. Unit	5	27	0	41	1	0	3	77	"Special" dept. no information available			
400	Titanium S&T heat exchengers (Exchengers	22	44	13	54	13	0	2	148				
401	Falling film heat exchengers	4	32	13	75	0	0	3	127				
402	Reboiler	0	31	2	28	-1	0	3	69				
403	Large S&T heat exchengers	7	32	2	42	0	0	9	92				
404	Small S&T heat exchengers	5	28	6	22	0	2	0	63				
405	Spiral heat exchengers	14	23	9	89	16	-4	7	154				
406	Plate heat exchengers	4	28	2	76	4	2	4	122				
407	Titanium heat exchengers scope JVS	22	44	2	66	2	0	13	149				
408	Shell & tube HE's small	5	28	2	26	0	0	2	63				
409	Plate heat exchengers	4	28	2	76	0	0	10	127				
410	Titanium heat exchengers scope	0	24	0	4	4	-22	25	35				
411	CS shell & tube heat exchengers	0	14	6	8	4	-22	25	35				
412	Heat exchengers	0	14	6	8	4	-22	25	35				
413	Air cooled heat exchengers	0	24	0	11	6	-31	35	45				
414	Evaporator	2	18	0	7	0	0	3	30				
415	Plate exchengers	0	17	0	25	0	0	2	44				
416	S&T exchengers	0	13	0	16	0	0	2	30	29.4	15.6	44	169
600	Vertical close coupled pumps	5	30	10	15	2	4	-3	63				
601	Horizontal pumps	36	34	20	21	0	0	7	118				
604	Rotary pumps	6	24	14	14	19	-16	18	79				
606	Dosing pumps	27	29	10	21	4	13	-10	94				
607	Self-priming pumps-Rotary	1	24	14	40	20	0	6	105				
609	Large centrifugal pumps	18	31	14	40	14	5	-3	119				
610	Vertical close coupled pumps	5	23	12	20	2	4	-3	63				
611	Horizontal pumps	32	34	20	21	1	18	-10	116				
612	High speed pumps	15	31	14	21	12	0	2	95				
613	Vertical sump pumps	13	150	-111	140	3	-99	73	169				
614	Rotary pumps	15	24	14	14	19	-16	18	88				
615	Self-priming pumps (centrifugal)	8	37	0	29	12	0	5	91				
616	Dosing pumps	17	-3	14	40	4	13	-10	84				
629	Rotary pumps screw type	5	24	14	40	20	-16	21	108				
626	Vertical sump pumps	13	150	-111	140	3	-99	73	169				
630	Vertical close coupled pumps	0	10	0	18	5	-23	25	35				
631	Horizontal pumps	2	15	0	18	8	1	4	48				
636	Pump	44	26	0	77	7	0	10	164				
638	Pump	16	26	0	77	0	1	2	122				
637	Pump modifications	3	21	0	62	-5	5	17	103				
660	Multi-stage pumps	34	45	17	79	0	0	2	177				
661	Large centrifugal pumps	7	27	11	37	14	0	8	104				
662	Multi-stage pumps	8	35	21	126	34	-	-	224				
653	Sea water intake pumps	5	32	17	38	1	3	2	98				
666	Axial flow horizontal pumps	0	34	0	7	5	0	3	46				
800	Air compressor	13	36	11	36	7	2	0	105				
980	Regeneration compressor	12	24	0	26	36	-36	37	99				
726	Cogeneration unit	0	54	17	64	66	0	0	194				
771	Top entry mixer	4	30	20	71	12	-8	11	140				
775	Top entry mixer	14	30	141	12	0	0	2	199				
780	Vacuum units	8	45	33	43	1	-1	7	134				
781	Vacuum units	8	45	33	43	1	-1	7	134				
784	Vacuum units	-5	15	0	22	4	0	3	39	"Special or Rotating" dept. no information available			
900	Air-cooler	16	44	13	86	12	9	-5	144	11.3	15	26.3	16
1150	Hoists & Cranes	15	27	47	43	14	0	0	146				
1250	Static mixers	13	21	14	46	33	-33	33	126				
1251	Steam jets	21	32	0	31	11	-14	24	105				
1252	Desuperheaters	20	46	4	31	7	-7	7	108				
1253	Flame arresters	23	30	0	61	34	-34	43	157				
1254	Silencers	16	28	0	36	11	-8	11	93				
1255	Hoses and couplings	15	22	-	-	0	-	0	37				
1256	Injection nozzles	36	28	0	11	8	-8	10	85				
1257	Sampling systems	35	36	0	77	0	0	3	151				
1258	Steam jets	21	32	0	31	11	-14	24	105				
1261	Static mixers	13	21	14	46	33	-33	33	126				
1262	Static mixers	57	8	0	46	36	-36	46	157				
1601	Absorption chilling units	0	36	53	67	47	-47	49	205				
1602	Incinerator	21	57	0	72	0	1	-1	150				
1603	Air dryer package	11	21	0	95	0	0	10	137				
1604	Demineralization unit	8	34	7	80	5	14	-7	121				
1605	Deaterator	31	55	22	40	2	-3	10	157				
1607	Cooling water filter	21	22	11	64	1	0	5	123				
1800	Water spray systems	14	37	48	98	-	-	-	198				
1802	Monitors	-7	51	40	36	8	0	5	133				
1804	Fire valves	39	16	33	36	8	-8	13	137				
1805	Flapper valves	40	16	33	36	8	-8	13	138				
1809	Safety showers & eye washes	27	38	4	58	8	0	0	135	"Special or Rotating" dept. no information available			

Procurement; no information available

Volvo oil



Milestone 1 = Issue inquiry requisition
Milestone 2 = Inquiry issued
Milestone 3 = Bids opened
Milestone 4 = Final technical evaluation
Milestone 5 = Approval evaluation
Milestone 6 = Issue POR

Mechanical

		Actual time						Man-hour estimate			
Inquiry number:	Equipment:	Period 1:	Period 2:	Period 3:	Period 4:	Period 5:	Total (days):	Inquiry requisitions	Eval./P.O. requisition	Total (hours)	Pieces
370	Tanks (Site erected)	5	26	60	-	-	91	30.5	30.5	61	2
371	Tanks small	5	26	67	6	14	118	20	29	49	3
501	Centrifugal pumps Duplex SS	0	35	80	7	8	130	17	56.7	73.7	3
502	Produced water pumps	16	40	-	0	-	56	38	125	163	1
550	Centrifugal pumps Carbon Steel	0	31	32	69	4	136	26	88	114	1
576	High pressure injection pump	0	14	56	49	7	126	65	196	261	1
850	Instrument air package	3	16	127	-	-	146	10.6	31.8	42.4	8
1250	Safety shower & eyebath	1	15	116	-	0	132	6.7	10.7	17.4	3
1251	Corrosion and bio probes	2	14	29	-	-	45	30	48	-	-
1252	Anodes for tanks	1	13	52	-	-	66	0	0	0	-
1600	Dual media filter	0	12	79	36	7	134	16.7	26.7	43.4	12
1601	Launchers and receivers	1	21	56	2	8	88	17.1	27.3	44.4	11
1602	Heater treater desalter	0	42	28	35	7	112	35	56	91	5
1603	Flare	5	30	76	-	-	111	19.7	31.4	51.1	7
1604	Dosing skid packages	5	34	67	-	-	106	3.2	5.2	8.4	62
1605	Dosing pumps	6	12	38	-	-	56	50	80	-	-
1606	Chiller dual media filter package	-	-	0	0	0	0	80	80	160	1
1800	Fire fighting equipment	1	11	2	-	-	14	30	46	76	1

Procurement

		Actual time						Man-hour estimate				
Inquiry number:	Equipment:	Period 1:	Period 2:	Period 3:	Period 4:	Period 5:	Total (days):	Inquiry requisitions	Bid evaluations	P.O.	Total (hours)	Pieces
370	Tanks (Site erected)	5	26	60	-	-	91	2.4	19.2	6.4	28	2
371	Tanks small	5	26	67	6	14	118					3
501	Centrifugal pumps Duplex SS	0	35	80	7	8	130	8	106.7	16	130.7	3
502	Produced water pumps	16	40	-	0	-	56					1
550	Centrifugal pumps Carbon Steel	0	31	32	69	4	136					1
576	High pressure injection pump	0	14	56	49	7	126					1
850	Instrument air package	3	16	127	-	-	146	0.4	5.6	1	7	8
1250	Safety shower & eyebath	1	15	116	-	0	132	1	5.3	2.7	9	3
1251	Corrosion and bio probes	2	14	29	-	-	45	Extra order				-
1252	Anodes for tanks	1	13	52	-	-	66	Extra order				-
1600	Dual media filter	0	12	79	36	7	134	0.7	25.9	4.2	30.8	12
1601	Launchers and receivers	1	21	56	2	8	88	0.3	2.2	0.7	3.7	11
1602	Heater treater desalter	0	42	28	35	7	112	Together with inquiry 1600				5
1603	Flare	5	30	76	-	-	111	0.4	4.3	1.1	5.8	7
1604	Dosing skid packages	5	34	67	-	-	106	0.05	0.5	0.14	0.69	62
1605	Dosing pumps	6	12	38	-	-	56	Extra order				-
1606	Chiller dual media filter package	-	-	0	0	0	0	Extra order				1
1800	Fire fighting equipment	1	11	2	-	-	14	12	96	32	140	1

Example of general RPSR excel sheet

Project number	Discipline	Requisition	Supplement	Short description	Scheduled	ΔS	Planned	ΔP	Actual	ΔA	Department	Total proc. time
4137	MECHANICAL	370	0	ISSUEINQREQ	2003-11-11	-	2003-10-31	-	2003-10-31	-	ALL	
4137	MECHANICAL	370	0	INQISSUED	2003-11-17	6	2003-11-05	5	2003-11-05	5	ALL	
4137	MECHANICAL	370	0	BIDSOPEN	2003-12-08	21	2003-12-01	26	2003-12-01	26	ALL	
4137	MECHANICAL	370	0	FINTECHEVAL	2004-01-05	28	2004-01-30	60	2004-01-30	60	ALL	
4137	MECHANICAL	370	0	APPREVAL	2004-01-14	9	2004-02-10	11		-	ALL	
4137	MECHANICAL	370	0	ISSUEPOR	2004-01-21	7	2004-02-17	7	2004-03-12	-	ALL	91
4137	MECHANICAL	371	0	ISSUEINQREQ	2003-11-12	-	2003-10-31	-	2003-10-31	-	ALL	
4137	MECHANICAL	371	0	INQISSUED	2003-11-18	6	2003-11-05	5	2003-11-05	5	ALL	
4137	MECHANICAL	371	0	BIDSOPEN	2003-12-09	21	2003-12-01	26	2003-12-01	26	ALL	
4137	MECHANICAL	371	0	FINTECHEVAL	2004-01-06	28	2004-02-06	67	2004-02-06	67	ALL	
4137	MECHANICAL	371	0	APPREVAL	2004-01-15	9	2004-02-12	6	2004-02-12	6	ALL	
4137	MECHANICAL	371	0	ISSUEPOR	2004-01-22	7	2004-02-26	14	2004-02-26	14	ALL	118
4137	MECHANICAL	501	0	ISSUEINQREQ	2003-10-16	-	2003-10-13	-	2003-10-13	-	ALL	
4137	MECHANICAL	501	0	INQISSUED	2003-10-22	6	2003-10-13	0	2003-10-13	0	ALL	
4137	MECHANICAL	501	0	BIDSOPEN	2003-11-12	21	2003-11-17	35	2003-11-17	35	ALL	
4137	MECHANICAL	501	0	FINTECHEVAL	2003-12-10	28	2004-02-05	80	2004-02-05	80	ALL	
4137	MECHANICAL	501	0	APPREVAL	2003-12-19	9	2004-02-12	7	2004-02-12	7	ALL	
4137	MECHANICAL	501	0	ISSUEPOR	2003-12-26	7	2004-02-20	8	2004-02-20	8	ALL	130
4137	MECHANICAL	502	0	ISSUEINQREQ	2004-02-05	-	2003-12-22	-	2003-12-22	-	ALL	
4137	MECHANICAL	502	0	INQISSUED	2004-02-11	6	2004-01-07	16	2004-01-07	16	ALL	
4137	MECHANICAL	502	0	BIDSOPEN	2004-03-03	21	2004-02-16	40	2004-02-16	40	ALL	
4137	MECHANICAL	502	0	FINTECHEVAL	2004-03-31	28	2004-03-15	28		-	ALL	
4137	MECHANICAL	502	0	APPREVAL	2004-04-09	9	2004-03-24	9		0	ALL	
4137	MECHANICAL	502	0	ISSUEPOR	2004-04-16	7	2004-06-09	77	2004-06-09	-	ALL	56
4137	MECHANICAL	550	0	ISSUEINQREQ	2003-11-27	-	2003-10-03	-	2003-10-03	-	ALL	
4137	MECHANICAL	550	0	INQISSUED	2003-12-03	6	2003-10-03	0	2003-10-03	0	ALL	
4137	MECHANICAL	550	0	BIDSOPEN	2003-12-24	21	2003-11-03	31	2003-11-03	31	ALL	
4137	MECHANICAL	550	0	FINTECHEVAL	2004-01-21	28	2003-12-05	32	2003-12-05	32	ALL	
4137	MECHANICAL	550	0	APPREVAL	2004-01-30	9	2004-02-12	69	2004-02-12	69	ALL	
4137	MECHANICAL	550	0	ISSUEPOR	2004-02-06	7	2004-02-16	4	2004-02-16	4	ALL	136
4137	MECHANICAL	576	0	ISSUEINQREQ	2003-09-18	-	2003-09-26	-	2003-09-26	-	ALL	
4137	MECHANICAL	576	0	INQISSUED	2003-09-24	6	2003-09-26	0	2003-09-26	0	ALL	
4137	MECHANICAL	576	0	BIDSOPEN	2003-10-15	21	2003-10-10	14	2003-10-10	14	ALL	
4137	MECHANICAL	576	0	FINTECHEVAL	2003-11-12	28	2003-12-05	56	2003-12-05	56	ALL	
4137	MECHANICAL	576	0	APPREVAL	2003-11-21	9	2004-01-23	49	2004-01-23	49	ALL	
4137	MECHANICAL	576	0	ISSUEPOR	2003-11-28	7	2004-01-26	3	2004-01-30	7	ALL	126
4137	MECHANICAL	650	0	ISSUEINQREQ	2003-11-07	-	2003-11-28	-	2003-11-28	-	ALL	
4137	MECHANICAL	650	0	INQISSUED	2003-11-13	6	2003-12-01	3	2003-12-01	3	ALL	
4137	MECHANICAL	650	0	BIDSOPEN	2003-12-04	21	2003-12-16	15	2003-12-16	15	ALL	
4137	MECHANICAL	650	0	FINTECHEVAL	2004-01-01	28	2004-04-21	127	2004-04-21	127	ALL	
4137	MECHANICAL	650	0	APPREVAL	2004-01-12	11	2004-04-30	9		-	ALL	
4137	MECHANICAL	650	0	ISSUEPOR	2004-01-19	7	2004-05-07	7	2004-04-29	-	ALL	145
4137	MECHANICAL	1250	0	ISSUEINQREQ	2004-02-25	-	2004-05-05	-	2004-05-05	-	ALL	
4137	MECHANICAL	1250	0	INQISSUED	2004-03-02	6	2004-05-06	1	2004-05-06	1	ALL	
4137	MECHANICAL	1250	0	BIDSOPEN	2004-03-23	21	2004-05-21	15	2004-05-21	15	ALL	
4137	MECHANICAL	1250	0	FINTECHEVAL	2004-04-20	28	2004-07-26	66	2004-09-14	116	ALL	
4137	MECHANICAL	1250	0	APPREVAL	2004-04-29	9	2004-08-04	9		-	ALL	
4137	MECHANICAL	1250	0	ISSUEPOR	2004-05-06	7	2004-08-11	7		0	ALL	132

4137	MECHANICAL	1251	0	ISSUEINQREQ	2004-05-03	-	2004-04-06	-	2004-04-06	-	ALL	
4137	MECHANICAL	1251	0	INQISSUED	2004-05-07	4	2004-04-08	2	2004-04-08	2	ALL	
4137	MECHANICAL	1251	0	BIDSOPEN	2004-05-28	21	2004-04-22	14	2004-04-22	14	ALL	
4137	MECHANICAL	1251	0	FINTECHEVAL	2004-06-11	14	2004-05-21	29	2004-05-21	29	ALL	
4137	MECHANICAL	1251	0	APPREVAL	2004-06-22	11	2004-06-01	11		-	ALL	
4137	MECHANICAL	1251	0	ISSUEPOR	2004-06-29	7	2004-05-24	-8	2004-05-24	-	ALL	45
4137	MECHANICAL	1252	0	ISSUEINQREQ	2004-05-19	-	2004-04-19	-	2004-04-19	-	ALL	
4137	MECHANICAL	1252	0	INQISSUED	2004-05-25	6	2004-04-20	1	2004-04-20	1	ALL	
4137	MECHANICAL	1252	0	BIDSOPEN	2004-06-08	14	2004-05-03	13	2004-05-03	13	ALL	
4137	MECHANICAL	1252	0	FINTECHEVAL	2004-06-22	14	2004-07-02	60	2004-06-24	52	ALL	
4137	MECHANICAL	1252	0	APPREVAL	2004-07-01	9	2004-07-13	11		-	ALL	
4137	MECHANICAL	1252	0	ISSUEPOR	2004-07-08	7	2004-07-06	-7	2004-07-06	-	ALL	66
4137	MECHANICAL	1600	0	ISSUEINQREQ	2003-09-17	-	2003-09-04	-	2003-09-04	-	ALL	
4137	MECHANICAL	1600	0	INQISSUED	2003-09-23	6	2003-09-04	0	2003-09-04	0	ALL	
4137	MECHANICAL	1600	0	BIDSOPEN	2003-10-14	21	2003-09-16	12	2003-09-16	12	ALL	
4137	MECHANICAL	1600	0	FINTECHEVAL	2003-11-11	28	2003-12-04	79	2003-12-04	79	ALL	
4137	MECHANICAL	1600	0	APPREVAL	2003-11-20	9	2004-01-09	36	2004-01-09	36	ALL	
4137	MECHANICAL	1600	0	ISSUEPOR	2003-11-27	7	2004-01-16	7	2004-01-16	7	ALL	134
4137	MECHANICAL	1601	0	ISSUEINQREQ	2003-10-22	-	2003-11-24	-	2003-11-24	-	ALL	
4137	MECHANICAL	1601	0	INQISSUED	2003-10-28	6	2003-11-25	1	2003-11-25	1	ALL	
4137	MECHANICAL	1601	0	BIDSOPEN	2003-11-18	21	2003-12-16	21	2003-12-16	21	ALL	
4137	MECHANICAL	1601	0	FINTECHEVAL	2003-12-16	28	2004-02-10	56	2004-02-10	56	ALL	
4137	MECHANICAL	1601	0	APPREVAL	2003-12-25	9	2004-02-12	2	2004-02-12	2	ALL	
4137	MECHANICAL	1601	0	ISSUEPOR	2004-01-01	7	2004-02-20	8	2004-02-20	8	ALL	88
4137	MECHANICAL	1602	0	ISSUEINQREQ	2003-09-17	-	2003-09-26	-	2003-09-26	-	ALL	
4137	MECHANICAL	1602	0	INQISSUED	2003-09-23	6	2003-09-26	0	2003-09-26	0	ALL	
4137	MECHANICAL	1602	0	BIDSOPEN	2003-10-14	21	2003-11-07	42	2003-11-07	42	ALL	
4137	MECHANICAL	1602	0	FINTECHEVAL	2003-11-11	28	2003-12-05	28	2003-12-05	28	ALL	
4137	MECHANICAL	1602	0	APPREVAL	2003-11-20	9	2004-01-09	35	2004-01-09	35	ALL	
4137	MECHANICAL	1602	0	ISSUEPOR	2003-11-27	7	2004-01-16	7	2004-01-16	7	ALL	112
4137	MECHANICAL	1603	0	ISSUEINQREQ	2003-12-05	-	2003-12-12	-	2003-12-12	-	ALL	
4137	MECHANICAL	1603	0	INQISSUED	2003-12-11	6	2003-12-17	5	2003-12-17	5	ALL	
4137	MECHANICAL	1603	0	BIDSOPEN	2004-01-01	21	2004-01-16	30	2004-01-16	30	ALL	
4137	MECHANICAL	1603	0	FINTECHEVAL	2004-01-29	28	2004-04-01	76	2004-04-01	76	ALL	
4137	MECHANICAL	1603	0	APPREVAL	2004-02-09	11	2004-04-12	11		-	ALL	
4137	MECHANICAL	1603	0	ISSUEPOR	2004-02-16	7	2004-04-07	-5	2004-04-07	-	ALL	111
4137	MECHANICAL	1604	0	ISSUEINQREQ	2003-10-15	-	2003-12-11	-	2003-12-11	-	ALL	
4137	MECHANICAL	1604	0	INQISSUED	2003-10-21	6	2003-12-16	5	2003-12-16	5	ALL	
4137	MECHANICAL	1604	0	BIDSOPEN	2003-11-11	21	2004-01-19	34	2004-01-19	34	ALL	
4137	MECHANICAL	1604	0	FINTECHEVAL	2003-12-09	28	2004-03-19	60	2004-03-26	67	ALL	
4137	MECHANICAL	1604	0	APPREVAL	2003-12-18	9	2004-03-24	5		-	ALL	
4137	MECHANICAL	1604	0	ISSUEPOR	2003-12-25	7	2004-03-31	7	2004-04-19	-	ALL	106
4137	MECHANICAL	1605	0	ISSUEINQREQ	2003-12-24	-	2004-01-30	-	2004-01-30	-	ALL	
4137	MECHANICAL	1605	0	INQISSUED	2003-12-30	6	2004-02-05	6	2004-02-05	6	ALL	
4137	MECHANICAL	1605	0	BIDSOPEN	2004-01-20	21	2004-02-17	12	2004-02-17	12	ALL	
4137	MECHANICAL	1605	0	FINTECHEVAL	2004-02-17	28	2004-03-19	31	2004-03-26	38	ALL	
4137	MECHANICAL	1605	0	APPREVAL	2004-02-26	9	2004-03-24	5		-	ALL	
4137	MECHANICAL	1605	0	ISSUEPOR	2004-03-04	7	2004-03-31	7	2004-03-29	-	ALL	56

4137	MECHANICAL	1606	0	ISSUEINQREQ	2004-05-05	-	2004-05-05	-		-	ALL	
4137	MECHANICAL	1606	0	INQISSUED	2004-05-11	6	2004-09-27	145	2004-09-27	-	ALL	
4137	MECHANICAL	1606	0	BIDSOPEN	2004-06-01	21	2004-10-18	21		-	ALL	
4137	MECHANICAL	1606	0	FINTECHEVAL	2004-06-15	14	2004-11-01	14		0	ALL	
4137	MECHANICAL	1606	0	APPREVAL	2004-06-24	9	2004-11-10	9		0	ALL	
4137	MECHANICAL	1606	0	ISSUEPOR	2004-07-01	7	2004-11-17	7		0	ALL	0
4137	MECHANICAL	1800	0	ISSUEINQREQ	2004-02-11	-	2004-06-16	-	2004-06-16	-	ALL	
4137	MECHANICAL	1800	0	INQISSUED	2004-02-17	6	2004-06-17	1	2004-06-17	1	ALL	
4137	MECHANICAL	1800	0	BIDSOPEN	2004-03-09	21	2004-06-28	11	2004-06-28	11	ALL	
4137	MECHANICAL	1800	0	FINTECHEVAL	2004-04-06	28	2004-06-30	2	2004-06-30	2	ALL	
4137	MECHANICAL	1800	0	APPREVAL	2004-04-15	9	2004-07-09	9		-	ALL	
4137	MECHANICAL	1800	0	ISSUEPOR	2004-04-22	7	2004-07-05	-4	2004-07-05	-	ALL	14

Appendix VI: Commercial Bid Evaluation

ABB Lummus Global B.V. **FINAL**

FINAL COMMERCIAL TABULATION OF BIDS

CONFIDENTIAL DOCUMENT

PROJECT NAME AND LOCATION PROJECT C
INQUIRY NUMBER .....-1604
DESCRIPTION OF GOODS Filtration Package ROS-DATE : 20-APR-04 **REV: 2** **DATE:** 20-Aug-03

			BIDDER'S NAME	Vendor A	Vendor B		
			COUNTRY				
			QUOTED SYSTEM	Dry	Dry		
QUOTATION DATE				23-06-2003	28-05-2003		
QUOTATION REFERENCE							
QUOTATION CURRENCY				EUR	EUR		
ABN-AMRO EXCHANGE RATE D.D.				1.00000	1.00000		
MANUFACTURING LOCATION							
ITEM	QTY	DESCRIPTION	TAG NO.				
1	1	Filtration Package	51-581-XX-001	1,363,333	1,575,000		
2	1	Filtration Package	52-581-XX-001	1,363,333	1,575,000		
3	1	Filtration Package	53-581-XX-001	1,363,333	1,575,000		
4	3	PLC Cabinet (3 pieces)		incl.	193,000		
	6	Cake receiving drums		incl.			
5	3	Local panel (3 pieces)		incl.	6,800		
TOTAL PRICE GOODS IN REQUIRED CURRENCY			EURO	4,090,000	4,924,800		
INSPECTION/TESTING REQUIREMENTS AS PER REQUISITION				incl.	incl.		
DOCUMENTATION AS PER REQUIREMENTS FOR DOCUMENTS				incl.	incl.		
COMMISSIONING AND START UP SPARES				35,000	57,758		
SEAWORTHY PACKING / MARKING				incl.	incl.		
LIFTING BEAMS / SINGLE POINT MECH. HANDLING				incl.	incl.		
			EURO	4,125,000	4,982,558		
PROJECT DISCOUNT				-305,000			
TOTAL FCA PRICE			EURO	3,820,000	4,982,558		
IN ACCORDANCE WITH THE REQUISITION				Yes	Minor deviations		
- QUESTIONS SENT TO BIDDER?				Yes, 14-04-2003	Week 26		
- BIDDER REPLY TO OUR QUESTIONS RECEIVED?				Yes			
FIXED PRICE FOR THE DURATION OF THE ORDER				Yes	Yes		
QUOTED VALIDITY DATE				30 D	90 D		
PAYMENT TERMS				5%-15%-80%	20% - 30% - 45% - 5%		
- BANKGUARANTEES BY VENDOR				YES	No		
- REQUEST FOR SELLER BG / LETTER OF CREDIT				No	Yes, 45% LIC 14 days after PO		
QUOTED DELIVERY TIME AFTER P.O. DATE				43 weeks	11 -12 months		
DELIVERY TIME ON SITE IF PO PLACED BY WEEK							
QUOTED DELIVERY POINT (INCO TERMS 2000)				FCA	EXW		
SIZE IN CUBIC METER				1,500 m3			
WEIGHT (TONS)				120,000			
ALM TERMS AND CONDITIONS ACCEPTED				Yes	No		
GUARANTEE PERIOD ACCEPTED				Yes	12 / 24		
LATE DELIVERY CLAUSE ACCEPTED (x% / Week; Max y%)				Yes	No		
BANK GUARANTEE COST INCLUDED				Yes	No		
OPTIONAL PRICES							
2-YEAR OPERATIONAL SPARES				320,000	Excl.		
SUPERVISION AT SITE DURING CONSTRUCTION, daily rate way from office, 10hrs p/d, 6 days a week				1,000	Rates quoted, not to spec.		
SUPERVISION AT SITE DURING CONSTRUCTION, overtime rate (per hour)				150	Rates quoted, not to spec.		
SUPPLY OF PRE-COAT MEDIA (CELLULOSE) FOR 6 MONTHS OPERATION				22,000	Excl.		
SUPPLY OF ADDITIONAL VALVES / PIPES FOR MANUAL FILTRATION OF CHARCOAL FILTER BACK				19,000	Excl.		
STORAGE OF GOODS, EACH EXCEEDING WEEK (3 MONTHS INCLUDED IN BASE PRICE)				700	Excl.		
					Incl.		
PERSONNEL TRAINING AT VENDOR'S OFFICE, 1 WORKING WEEK MAX. 5 PEOPLE				6,000	Excl.		

RECOMMENDATION TO PURCHASE FROM
Vendor A

RECOMMENDED TOTAL PRICE IN EURO
3,820,000

REASON
- TECHNICALLY ACCEPTABLE
- BEST PRICE
- BETWEEN THE ACCEPTABLE BIDDERS, SHORTEST DELIVERY TIME

NOTES:
- Vendor A and Vendor B shortlisted bidders
- Other bidders did not provide quotations for Dry system

SIGNATURES

NAMES	DATE	SIGNATURES
PROJ. PROC. COORDINATOR CGL		
LEAD ENGINEER SPECIAL EQT. JIS		
COST ENGINEER VRV		
SCHEDULE ENGINEER EHVDM		
PROJECT MANAGER JK		
PROCUREMENT MANAGER CGL		
DIRECTOR PROCUREMENT AFVE		
LGN MANAGEMENT		N/A

	BUDGET	
EURO		(ORIGINAL BUDGET)
		Change Order (pending)
		Transfer
EURO		(REVISED BUDGET - HOLD)

DESCRIPTION OF GOODS		Filtration Package					REV: 2		DATE:	20-Aug-03
			BIDDER'S NAME COUNTRY	Vendor A		Vendor B				
				EUR	1.0000	EUR	1.0000			
ITEM	QTY	DESCRIPTION	TAG NO.	UNIT PRICE	TOTAL PRICE	UNIT PRICE	TOTAL PRICE			TOTAL PRICE
1	1	Filtration Package	51-581-XX-001	1,363,333	1,363,333	1,575,000	1,575,000			
2	1	Filtration Package	52-581-XX-001	1,363,333	1,363,333	1,575,000	1,575,000			
3	1	Filtration Package	53-581-XX-001	1,363,333	1,363,333	1,575,000	1,575,000			
	3	Precoat Preparation drum	51/52/53-581-VA-001		incl.		incl.			
	3	Slurry Sump (tank)	51/52/53-581-VA-012		incl.		incl.			
	6	Precoat circulation pump	51/52/53-581-PA-006 A/B		N/A		N/A			
	6	Slurry pump	51/52/53-581-PA-005 A/B		N/A		N/A			
	lot	all manual and automatic ball valves			incl.		incl.			
	lot	instrumentation, piping, structural steel			incl.		incl.			
	6	Cake receiving drums		1,200	7,200					
4	3	PLC control cabinets			incl.	64,333	193,000			#VALUE!
		Options								
5	3	Local Panel Option 1			N/A	10,133	30,400			
5	3	Local Panel Option 2			incl.	2,267	6,800			

Appendix VII: Projects

Veba Oil Development EPC

Client: MAN Ferrostaal Industrieanlagen
Location: Chani Field, Libya
Type of facility: Expansion of Sour Oil Production Plant with Water Injection
Products: 38.000 bpd of oil and 90.000 bpd of water
Total installed costs: Euro 70 Million

ABB is working with the client in an existing field to expand the oil production and install a new water injection system to maintain field pressure and production. The new 20 oil well development project includes design and routing of flow lines for all the wells over the 25 km field, inlet manifold, sour gas/oil/water separation, heater treater desalter vessel and a sour crude stripper. The water injection system includes a new central water treatment facility that collects sweet produced water form 3 locations mixes it with aquifer water, treats it and injects it into a pipeline system feeding 12 injection wells over the 25 km field.

Veba Oil site

Seraya 2 SM/PO Project EPC

Client: Basell Eastern (BASF/Shell)
Location: Jurong Island, Singapore
Type of Facility: New SMPO/EB/Polyols and existing plant revamp
Products: 565 kt/a Styrene Monomer; 250 kt/a Propylene Oxide; 640 kt/a Ethyl benzene
Total installed costs: USD 525 Million

The client initially commissioned ABB Lummus to prepare a Basic Design and Project Definition Package for use in the compilation of a 10% estimate. This work was subsequently consolidated into parallel EPC scope, which was executed by multi-discipline task forces in The Hague and Singapore.

The Seraya site

Molipaq Tie-In Project EPC

Client: Sakhalin Energy Investment Company
Location: Offshore Sakhalin Island, Russia
Type of Facility: Oil & Gas Production Platform Upgrade
Products: 190.000 bo/d
Estimated Total Installed Costs: USD 100 Million

The project is to upgrade the Molipaq platform to enable crude oil and natural gas to be delivered to Sakhalin Island by pipeline. The new facilities are centred on two new process modules housing separators, HE's, a MEG (antifreeze) regeneration package, pumps and electrical upgrade equipment. The existing platform is modified to tie in the new facilities.

The Molipaq platform

HD Select Project EPC

Client: Shell Raffinaderij B.V.
Location: Pernis, The Netherlands
Type of Facility: High Octane/ High Sulfur Cat. Cracker Gasoline
Products: 2.200 t/d Desulfurized Gasoline
Approximate Total Installed Costs: Euro 47 Million

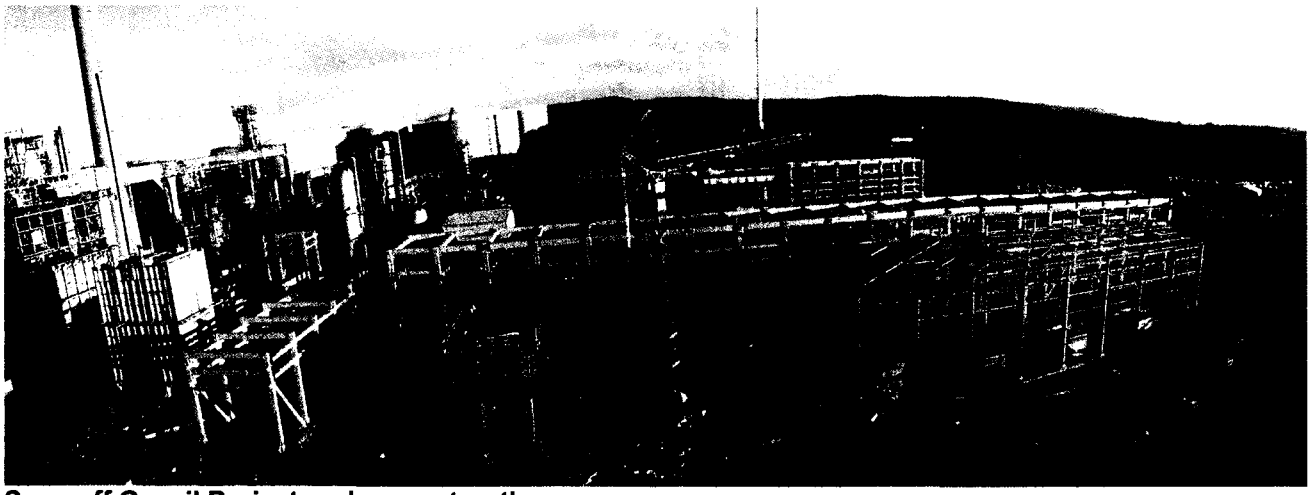
The objective of the project is to ensure compliance with new environmental standards for low sulphur gasoline. The new processing unit consists of a gasoline hydrodesulfurizer, using the CD Tech licensed technology, as well as tie-ins to existing catalytic cracker, hydro cracker and hydrogen system units. Integration with and incorporation of the additional storage and utilities facilities is also included.

Column on the HD Select site

Scanraff Gas Oil Project

Client: Scanraff (Skandinaviska Raffinaderi AB)
Location: Lysekil, Sweden
Type of Facility: Gas oil plant
Approximate Total Installed Costs: 3.500 MSEK (Euro 380 Million)

The objective of this project is to meet the new fuel specifications within the EU for low sulphur gasoline. The project includes a hydro cracker, a hydrogen production unit, an amine regeneration unit, a sour water stripper and necessary revamps of existing process units to connect and supply the new process unit with utilities. The investment means that all gas oil can be desulphurised and sold as diesel. It also means reduced sulphur content of the feedstock to the catalytic cracker unit, which results in better yield of cracked naphtha and propylene, and a reduction of the sulphur content of the cracked naphtha to meet with the new sulphur demands on gasoline.



Scanraff Gasoil Project under construction

Appendix VIII: Procedures

- Procedure LGN 06-1905, Equipment and material requisitioning
- Procedure LGN 06-4600, Purchasing of goods/ services

PROCEDURE LGN 06-1905

120 531

EQUIPMENT AND MATERIAL REQUISITIONING

ISSUED BY : Project Engineering Management

APPROVED : _____

NAME / INITIALS : F. Spanheim/FS

DATE : 2005-03-07 REV. : 7

Revision 7: Review of Requisition by Inspection added and included Inspection Responsibilities.

1. OBJECTIVE

The purpose of this procedure is to achieve effective and consistent requisitioning and follow up within the engineering disciplines and coordination with other disciplines involved.

2. SCOPE

This procedure covers the requisitioning process of the engineering disciplines only, from inquiry, evaluation, purchase order up to follow up and pre-commissioning assistance.

3. OVERVIEW

The technical and commercial activities leading to the supply of equipment and materials to the construction sites is a crucial activity in our project execution. Of these multi disciplinary activities, only the procedural part of the inquiry, evaluation, purchase order and follow-up sequence of the engineering disciplines is addressed in this procedure. All activities related to the technical content like specifications and material take offs are covered in the relevant discipline procedures. The procurement part is addressed in procedure LGN 06-4600. Other supporting functions like document control, inspection, etc. are also covered in separate procedures and are only mentioned here to the extent that the Requisition Originator is actively involved.
Special cases as described in guides LGN 02-3101-00.004 "Package units integrated workprocess" and LGN 02-3101-00.009 "Guide for concurrent equipment engineering" do not affect the principles of the requisition process. The specific execution approach described in above guides that may be chosen in case of complex multi disciplinary packages with substantial design input from the seller will be unique for each case and shall be addressed in the Project Execution Plans as such.

4. REFERENCES

CM – 0001 Company Management Manual

5. RESPONSIBILITIES

FUNCTION	RESPONSIBILITIES
Requisition Originator	Ultimately responsible for the technical integrity of the supplied equipment and materials:
	Prepares Inquiry Requisition
	Prepares Technical Bid Evaluation
	Prepares Purchase Order Requisition
	Executes follow-up activities:
	Assists in purchasing spare parts
	Reviews seller documents
	Performs/assists in inspections
	Performs/assists in pre-commissioning
	Handles changes to Purchase Order Requisition

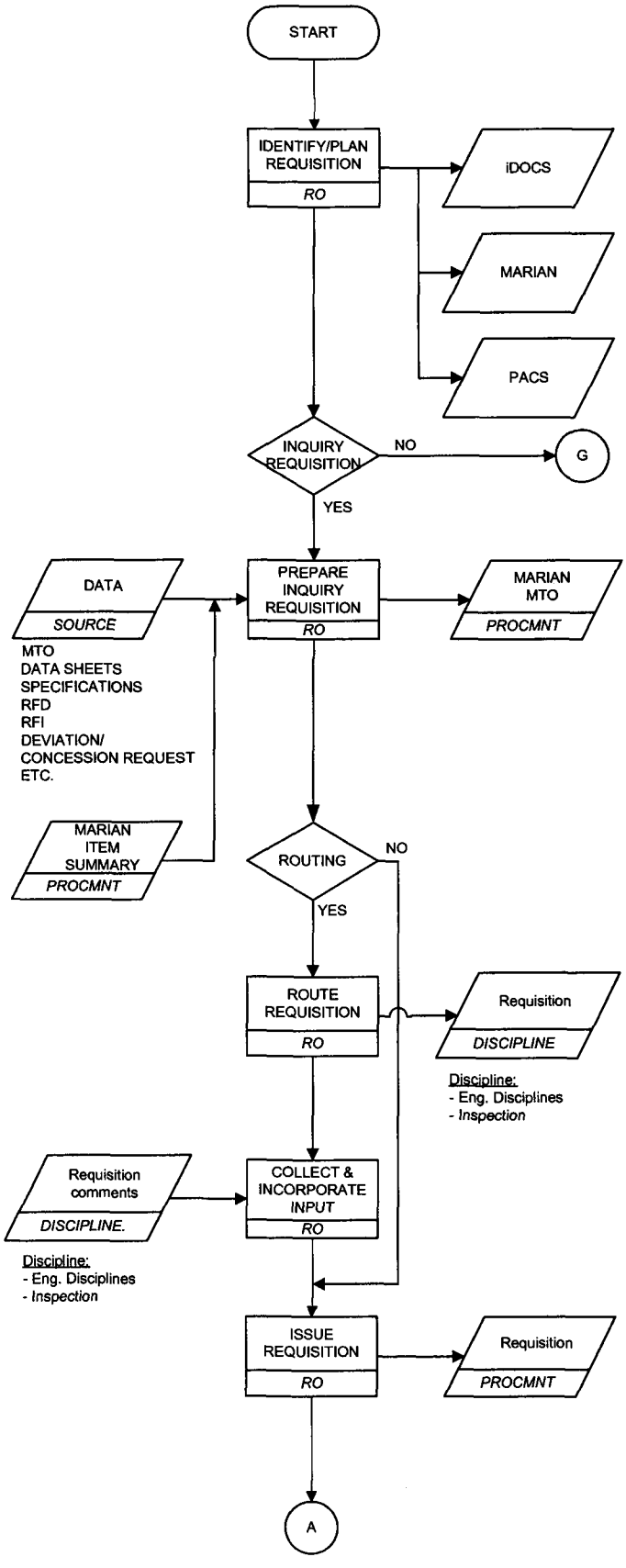
FUNCTION	RESPONSIBILITIES
Lead Engineeer	Pre selection of bids
	Check Requisition
	Check Technical Bid Evaluation
	Countersign Commercial Bid Tabulation
Procurement	All communication with the seller regarding commercial matters
	MARIAN follow-up
Project Engineering Manager	Approve Purchase Order Requisition
	Approve Requisition for Inquiry
	Approve Technical Bid Evaluation
Inspection	Review Requisition
	Initiate Pre-inspection Meeting
	Inspection of Equipment and Material
	Issue Inspection Release Notes
	Issue Nonconformance Reports/Inspection Reports

6. PROCEDURE DESCRIPTION

For flow chart, see next page onward.

Abbreviations used are:

PM	Project Manager
RO	Requisition Originator
PEM	Project Engineering Manager
PPM	Project Procurement Manager
DCI	Document Control Index
PDC	Project Document Control
PROCMNT	Procurement
MTO	Material Take Off
POR	Purchase Order Requisition
FAT	Factory Acceptance Test
TBE	Technical Bid Evaluation



Like all formal deliverables, also requistion documents need to be identified and planned in iDocs, in order to trace the document and verify its status. (see procedure LGN 05-1900). Also the physical progress of the acticvity shall be monitored in PACS as well as the logistics of the material and equipment to be ordered in MARIAN. (see procedure LGN 21-2501)

In some cases it may not be required to prepare a inquiry requisition, For example in case of repeat orders, or in case of catalogue items. This decision shall be taken in close coordination between the Lead Engineer and the PPM.

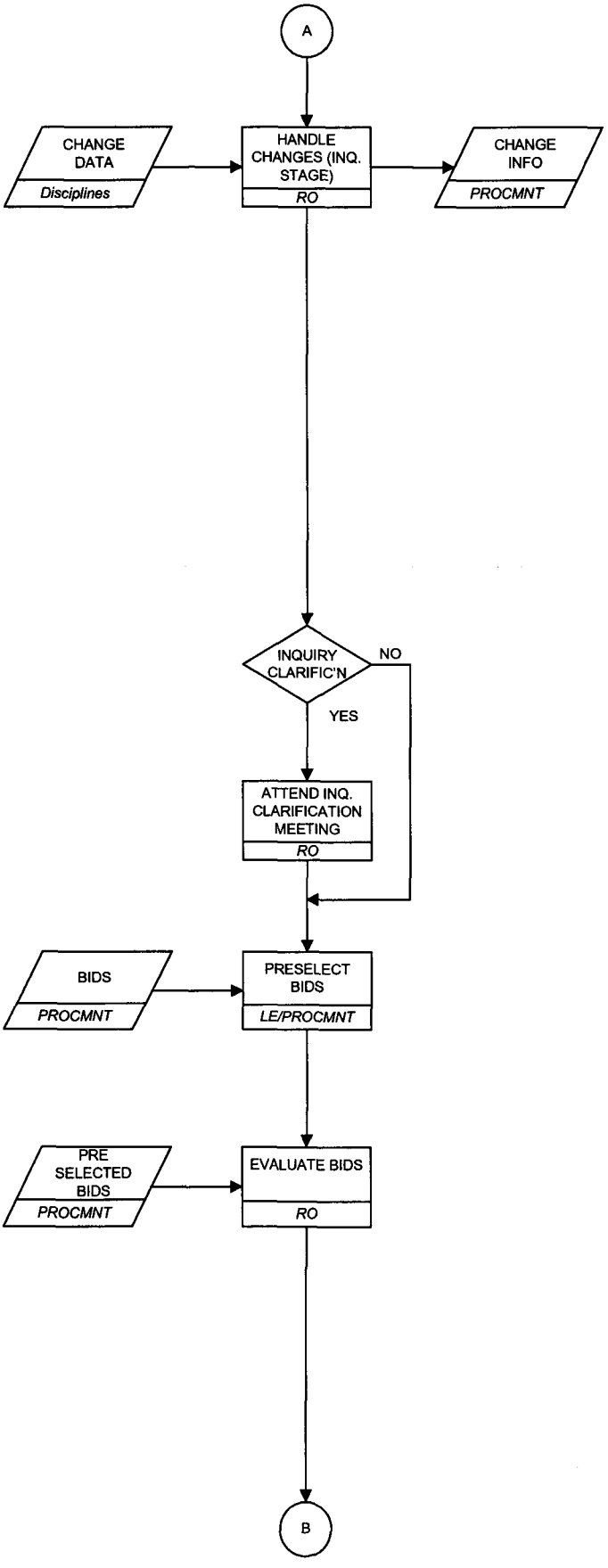
The designated RO will collect the necessary technical information for starting to prepare the inquiry requisition, like data sheets, specifications, drawings, etc
The relevant MTO shall be linked in MARIAN to the requisition as basis for procurement to proceed and to generate the item summary list for the requisition.

A judgement shall be made whether or not other disciplines need to review/contribute to the requisition. If writing is required, this shall be done in parallel to all so as to save time and allow reviewer to have sufficient time to review/comment.

If documents and information are required from other disciplines the RO must contact the discipline and request the documents and applicable information.
These documents will generally be data sheets, project standards and specific drawings originated by other disciplines. The titles and details of these have to be included in the list of attachments of the requisition.

If a requisition contains technical requirements 'owned' by other disciplines, these disciplines have to verify and concur with the requirements.

The requisition shall be duly checked by the Lead Engineer and approved by PEM (see procedure LGN 04-1901), issued to Procurement for submittal to the sellers (see procedure LGN 05-4900) and any other party as defined for the project (see procedure LGN 05-1900)



Engineering and design development may lead to changes to the requisition after it has been issued for inquiry. The RO has to collect and keep track of any of such changes relevant to requisitions assigned to him.

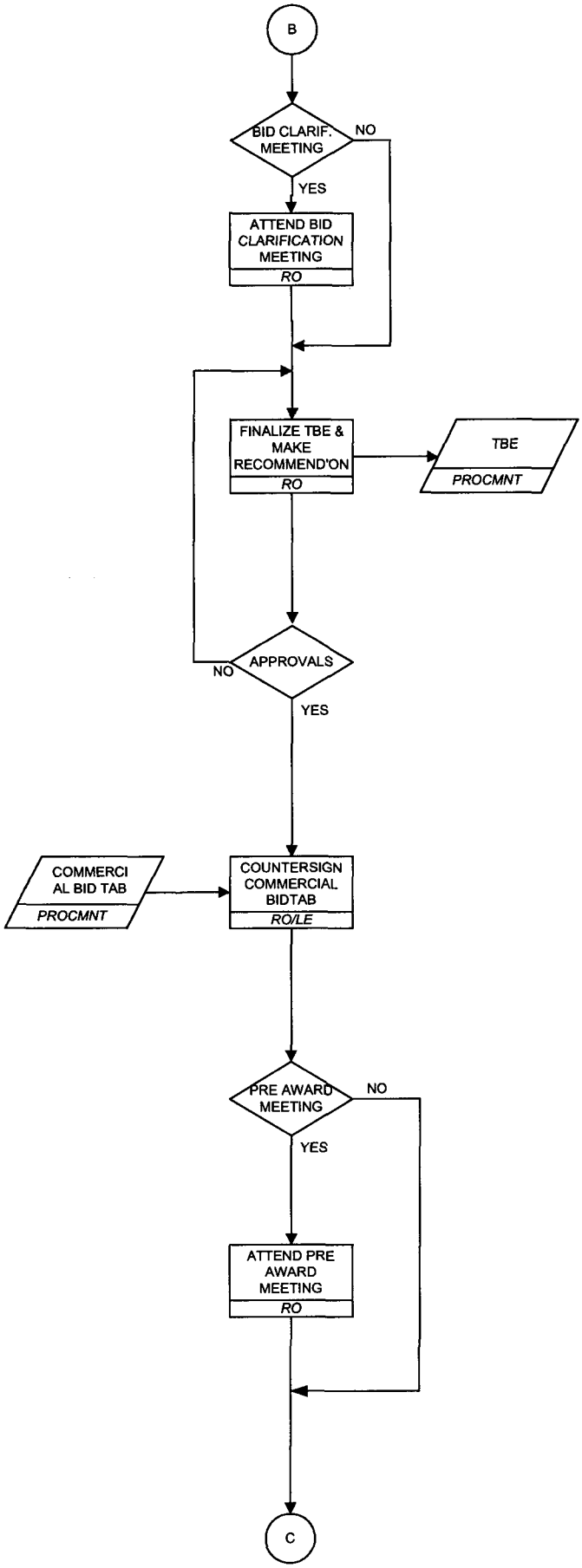
The RO, in consultation with the Lead Engineers, will determine whether or not a change is important enough to be advised to the bidders before the bids are received. This is a question of judgement, and considerations of schedule, price consequences, etc. shall be taken into account.

A judgment shall be made whether or not an inquiry clarification meeting with the sellers is required. This decision will be taken in close coordination between the PEM, the PPM,the Lead Engineer and the RO..
This is not normally required,but the technical or execution complexity may trigger the need for further clarification before the bids are received.
The RO will attend this meeting, which is conducted by Procurement.

When all bids have been received, the PPM will review the bids with the RO in order to determine which bids will be evaluated in detail. This review for preselection is a joint effort by Engineering and Procurement.

A copy of the preselected bids will be sent to the RO with a request for technical evaluation, showing the commercial ranking.

The RO will evaluate the bids using standard forms and the applicable check lists included in departmental guides. The RO may contact the sellers directly for clarification, but always followed up by written confirmation. Any written correspondence shall always be routed via Procurement.



On the basis of the number of open questions remaining after the technical bid evaluation has been made, a decision on whether or not to hold a bid clarification meeting will be made by RO, Lead Engineer and the PPM.
The meeting will be conducted by Procurement.

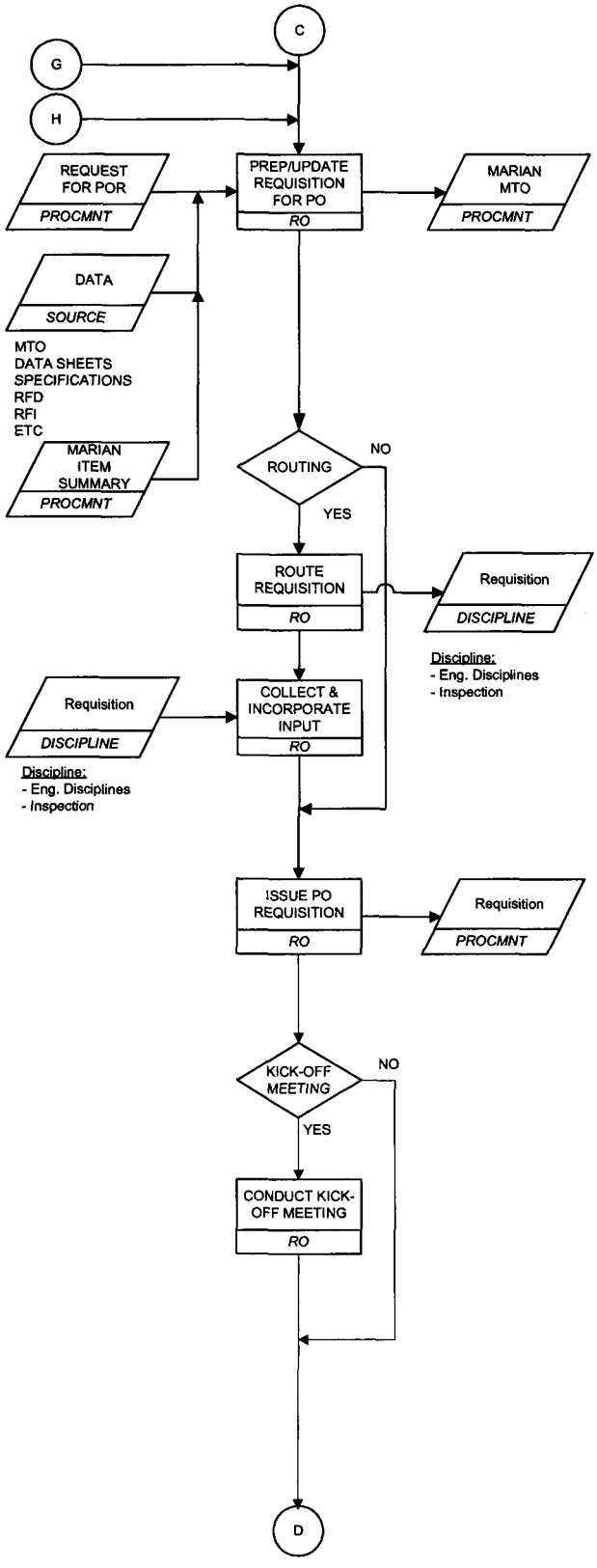
The RO will take the written replies from the sellers or the signed notes of the bid clarification meeting, and finalize the technical bid evaluation. The result of this evaluation is that one or more of the preselected sellers will be pronounced technically acceptable.
A recommendation is given, based on the optimum of commercial and technical aspects backed up with the appropriate assessments and calculations.

The Lead Engineer and PEM will respectively check and approve the technical bid evaluation and the Lead Engineer will submit the original to Procurement for further handling.

Procurement, having obtained the prices applicable to the clarified technical bid, will prepare the commercial bid tabulation. The Lead Engineer will countersign this as the indication that Engineering confirms that the technical bid evaluation has been correctly interpreted and included, and that the recommendation based on the technical and commercial bid tabulation is acceptable.

A preaward meeting is often called for complex equipment and large orders for commodities.The meeting will be conducted by Procurement.
Purpose is to come to closure of technical and commercial aspects as well as to define the delivery, schedule, communication, reporting etc.

The pre award meeting must be minuted in typed conference notes. All decisions and agreements have to be later incorporated into the requisition for purchase. The minutes should be written so that they may be used as an attachment to the purchase order for expeditious commitment in advance of the preparation of the requisition for purchase.



After receipt of a POR request from Procurement, which will be issued after internal approvals have been obtained, the RO will prepare the POR.
The requisition will be updated to reflect the latest technical information as well as subjects agreed upon during the pre award meeting.
Also the MTO in MARIAN needs to be updated.
If required, the steps of the inquiry phase needs to be repeated in case of new items.

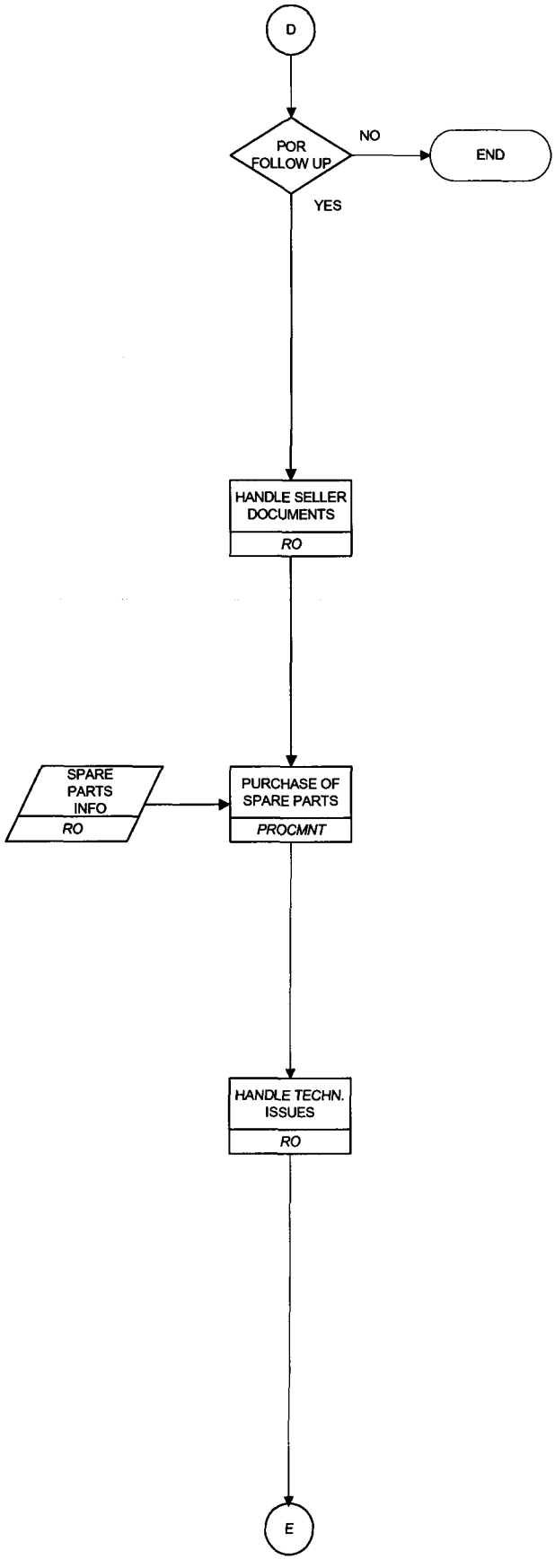
A judgement shall be made whether or not other disciplines need to review/contribute to the requisition. If writing is required, this shall be done in parallel to all so as to save time and allow reviewer to have sufficient time to review/comment.

If documents and information are required from other disciplines the RO must contact the Lead Engineer of that discipline and request the documents and applicable information.

If a requisition contains technical requirements 'owned' by other disciplines, these disciplines have to verify and concur with the requirements.

The requisition shall be duly checked and approved (see procedure LGN 04-1901), issued to Procurement for submittal to the seller (see procedure LGN 05-4900) and any other party as defined for the project (see procedure LGN 05-1900).

A judgement shall be made whether or not a kick-off meeting is required. In general this is applicable for complex equipment where considerable engineering effort and related coordination is required.
(see also guides 02-3101-00.004 and 02-3101-00.009)
NB: This meeting is a platform to discuss project execution, not commercial matters!



For certain simple requisitions the issue of the POR is the last activity by Engineering. For most requisitions there are a number of "follow-up activities" to be executed by the RO, where the discipline's expertise is required to guarantee the technical quality of the equipment ordered.
Also assistance of other disciplines may be required, e.g. for package units.
The below listed activities shall be clearly identified as being part of the disciplines scope of work!
(see also guides 02-3101-00.004 and 02-3101-00.009)

i. Handle Seller Documents

The RO is responsible for obtaining all comments from Engineering on seller documents submitted for review, and for signing off with the appropriate indication.
For handling of seller documents reference is made to procedure LGN 05-4900.

ii. Assist in the purchase of Spare Parts

The purchase of operational and maintenance spare parts is a Procurement activity. The spare parts buyer may request the RO to assist him by reviewing the recommended spare parts list proposed by the Supplier.

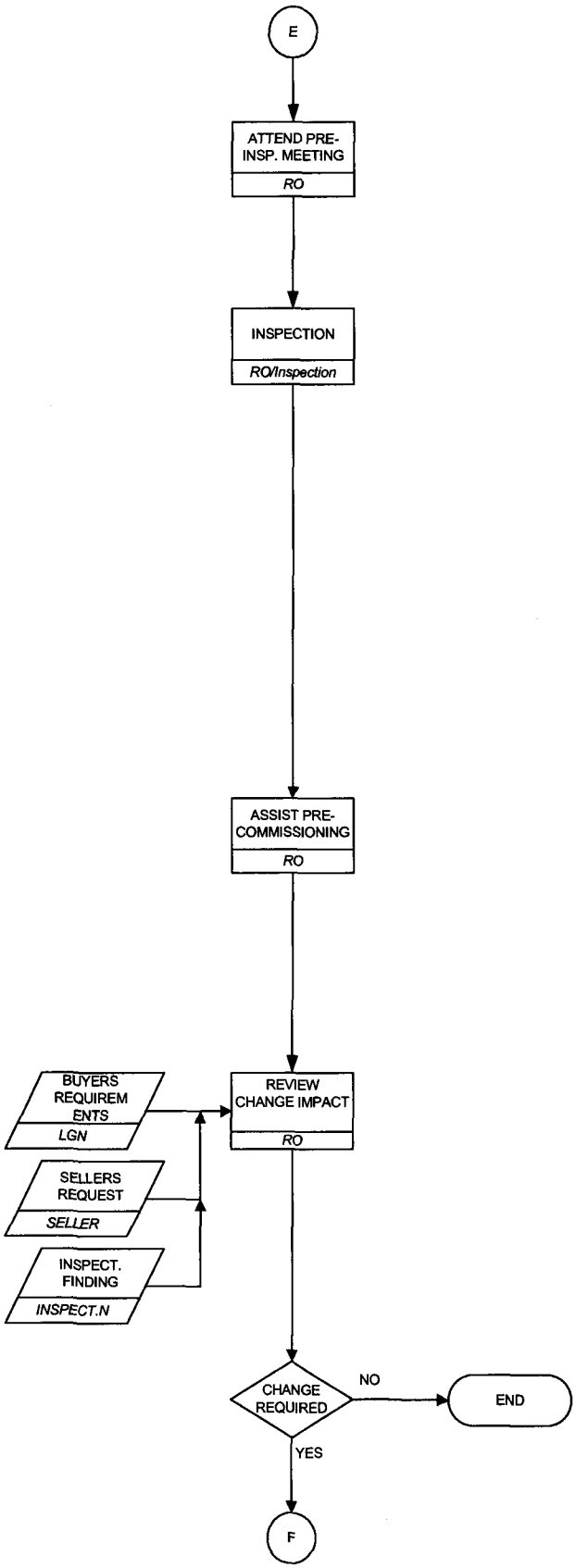
Note: Capital, construction and precommissioning spare parts should be included in the POR.

iii. Handle Technical issues and additional information

The RO is the focal point for all technical questions and information flow. When there are commercial consequences, the RO will handle these as deviations (see below)

Questions may be raised by the seller, the client, other LGN departments and third parties from the time of order upto to mechanical completion of the plant. All correspondence with sellers shall be routed via Procurement.

Additional information from own and other departments often has to be given to the seller at agreed times. Examples are nozzle loadings, supports size and location, configuration of controls, detailed interfaces - all agreed with the seller prior to award. The RO is responsible for providing these.



iv. Attend Pre-inspection Meeting.

The Pre-inspection Meeting is initiated by the Inspection Department. For certain equipment the RO will be invited to attend. (see procedure LGN 06-5230).

v. Inspection

The inspection of equipment and materials is executed by the Inspection Department.The technical integrity though, remains the responsibility of the RO.

The RO may be requested to participate in the inspection, or, for complex items to execute the inspection himself, e.g. for equipment performance testing or controlsystems FAT.

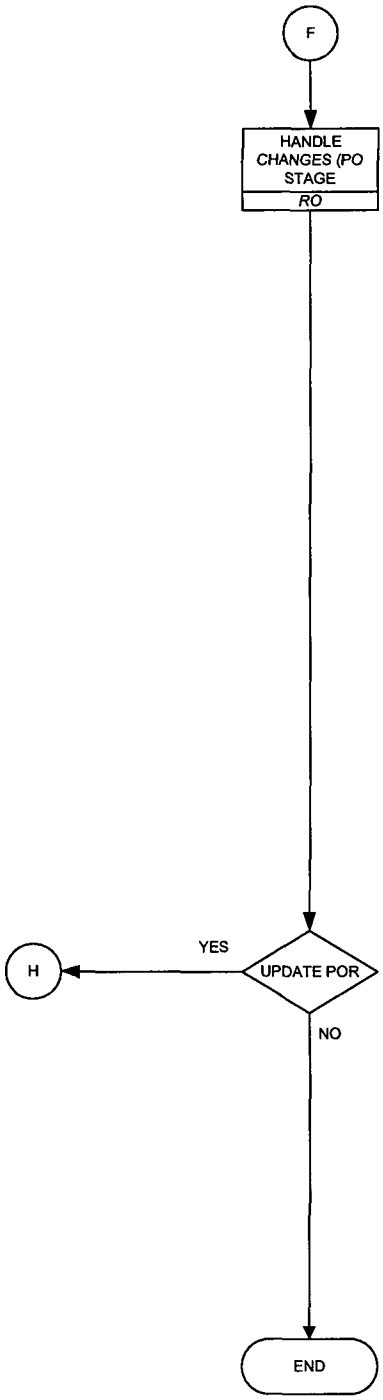
Responsibility for signing the release note is, however, with the assigned Discipline Inspector, unless otherwise agreed in writing.
(see procedure LGN 06-5230).

vii. Assist (Pre-)commissioning

The Construction Manager may request the assistance of the RO during (pre-)commissioning to perform, or assist the Supplier in performing, the (pre-)commissioning activities.

Any change after Purchase Order Placement is a change in a contract and shall be treated accordingly with proper change control and authorization. (see procedure LGN 03-2003) Any correspondence regarding a change shall be routed via Procurement.

The RO shall access the info and judge on whether a change is required.



Buyers requirements:
Changes which are initiated by LGN, our Client or Licensor. As far as the Supplier is concerned, this is a Buyer's requirement. (see procedure LGN 13-1933) When such a change is accepted and approved, then in principle the complete cycle of inquiry, bid and evaluation shall be followed, though in a short cycle.

Seller's request:
The seller may make requests for deviating from the requisition, (see procedure LGN 13-1933), When such a request is authorized, the authorized Seller Deviation/Concession Request (Permit) becomes an addendum to the POR.

Inspection finding:
If the Inspector finds a nonconformity, reports it back to the RO for a decision and the RO accepts it, then the seller shall request for a Deviation/Concession, (see procedure LGN 13-1933).When such a request is authorized, the authorized Seller Devaition/ Concession Request becomes an addendum to the POR. The authorized Seller Deviation/ Concession Request shall also be listed on the Inspection Release Report.

If the technical content of the requisition is affected by the change, a judgement shall be made by the RO whether or not the above correspondence suffices to cover the change or an update shall be made of the requisition.

7. DELIVERABLES

STANDARD NO.	DOCUMENT TITLE
SFOR 06-1905-00.025	Technical bid evaluation
SFOR 13-1933-00.001	Engineering deviation/concession request
SFOR 13-1933-00.003	Seller deviation /consession request

8. INPUT REQUIREMENTS

DESCRIPTION	REFERENCE	ORIGINATOR
Technical data and MTO's	Various	Technical disciplines
Marian item summary	Procurement	Requisition Originator
Technical bids	Procurement	Seller
Commercial bid tab.	Procurement	Procurement
Request for POR	Procurement	Procurement

9. SUPPORTING SYSTEMS AND TOOLS

- PACS
- IDocs
- MARIAN

10. APPLICABLE STANDARDS (GUIDES, MODELS, FORMS ETC.)

Applicable standards related to this procedure are as follows

SFOR 06-1905-00.013	Data Sheet
SFOR 06-1905-00.018	Requisition
SFOR 06-1905-00.021	Technical Description
SFOR 06-1905-00.023	Specification
SFOR 06-1905-00.025	Technical Bid Evaluation
SFOR 06-1905-00.028	Technical Bid Evaluation (Landscape)
SFRI 06-1905-00.036	Instructions for inspection and testing
SFOR 06-1905-00.038	Scope Description

11. RELATED PROCEDURES

For standards applicable to related procedures, reference is made to the listed procedures below.

LGN 02-3101-00.004	Package units integrated workprocess
LGN 02-3101-00.009	Guide for concurrent equipment engineering
LGN 04-1901	Document verification and approval
LGN 04-1903	Design reviews
LGN 04-3105	Mechanical specifications
LGN 04-3140	Documents and/or technical descriptions mechanical
LGN 04-3500	Requisitions piping engineering
LGN 04-3811	Electrical specifications
LGN 04-3911	Instrumentation specifications
LGN 05-1900	Project document control
LGN 05-4900	Supplier document control
LGN 05-4905	Project document distribution schedule
LGN 06-4600	Purchasing of goods/services
LGN 06-4700	Expediting of equipment and materials
LGN 06-5230	Inspection of purchased equipment and materials
LGN 13-1933	Project deviation/concession control
LGN 21-2501	Materials control procedure

12. GLOSSARY OF TERMS

Not Applicable.

13. ATTACHMENTS

Not Applicable.

PROCEDURE LGN 06-4600

PURCHASING OF GOODS/ SERVICES

ISSUED BY : Purchasing

APPROVED : _____

DATE : 2002-12-12 REV. 7

OBJECTIVE

Purchase the specified GOODS/services at the best conditions for the project.

1. Inquiry
2. Quotation Desk
3. Bid tabulation
4. Purchase Order
5. P.O. Supplements
6. Spare Parts

	ACTIVITIES INVOLVED	RESPONSIBILITY
1.	Prepare Inquiry file	Buyer.
2.	Prepare Inquiry letter.	Buyer.
3.	Complete Inquiry package	Buyer.
4.	Approve Inquiry.	As per standing Power of Attorney
5.	Issue/distribute Inquiry.	Buyer.
6.	Prepare Inquiry Status Report.	Quotation Desk.
7.	Receive, expedite and distribute quote(s) to Buyer.	Quotation Desk.
8.	Prepare Preliminary Commercial Bid Tabulation.	Buyer.
9.	Rank Bidders	Buyer
10.	Distribute quotations	Buyer
11.	Arrange shortlisting meeting	Buyer
12.	Coordinate bid clarification meeting	Buyer.
13.	Finalize Commercial Bid Tabulation, obtain approval.	Buyer.
14.	Approve Bid Tabulation.	As per standing Power of Attorney.

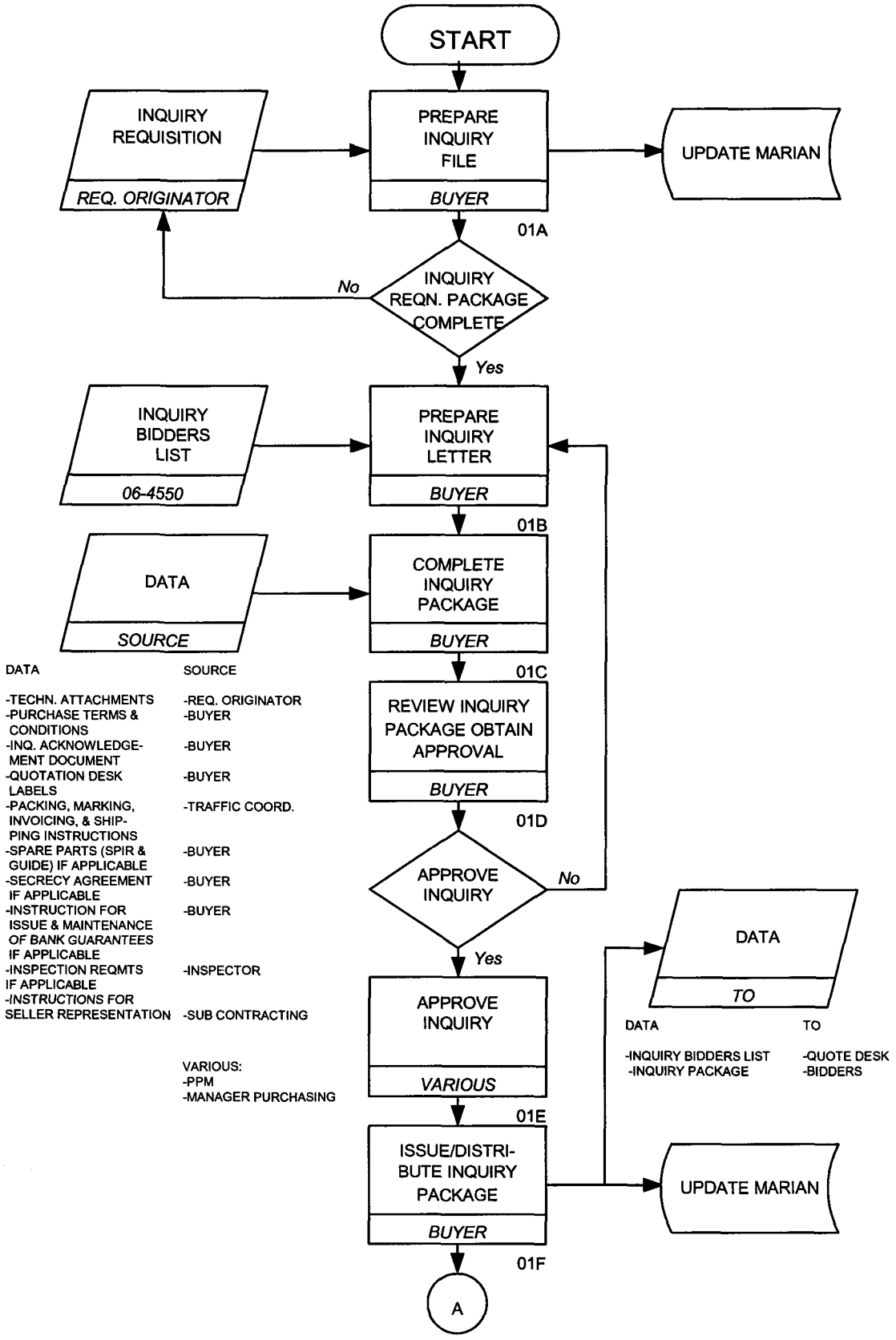
PURCHASING OF GOODS

	ACTIVITIES INVOLVED	RESPONSIBILITY
15.	Prepare Purchase Order.	Buyer.
16.	Approve Purchase Order.	As per standing Power of Attorney.
17.	Issue Purchase Order.	Buyer.
18.	Invoice verification.	Buyer.
19.	Changes to Purchase order.	Buyer.
20.	Solicit quotation from Seller for Changes.	Buyer.
21.	Finalize, negotiate and request approval prior to award.	Buyer.
22.	Prepare and issue P.O. Supplement.	Buyer.
23.	Spare Parts.	Spare Parts Buyer.

For detailed description see practices :

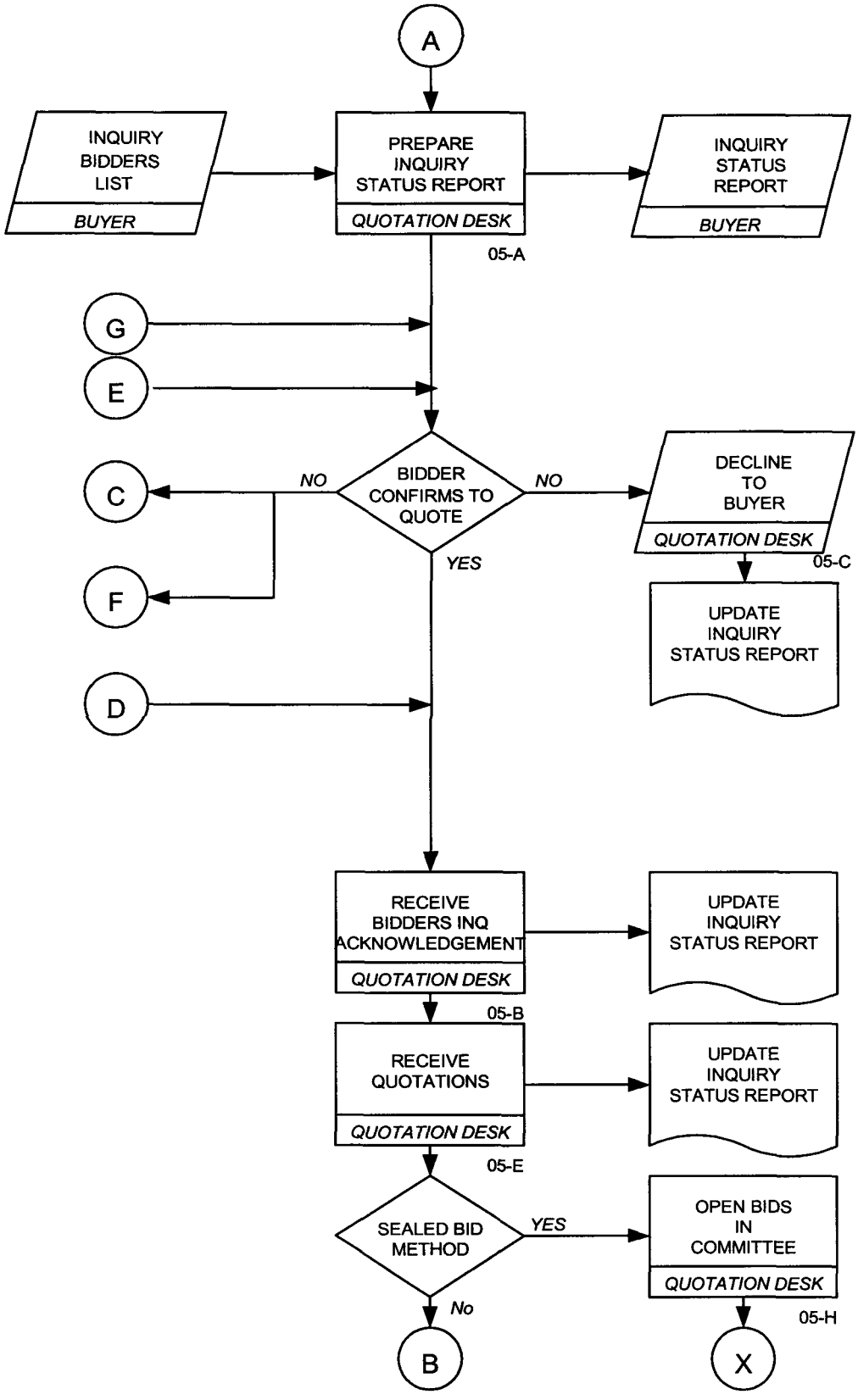
- LGN 06-4550-03 Seller Performance Evaluation Goods
- LGN 06-4600-01 Inquiry
- LGN 06-4600-02 Bid Tabulation
- LGN 06-4600-03 Purchase Order
- LGN 06-4600-04 Spare Parts
- LGN 06-4600-05 Quotation Desk

INQUIRY

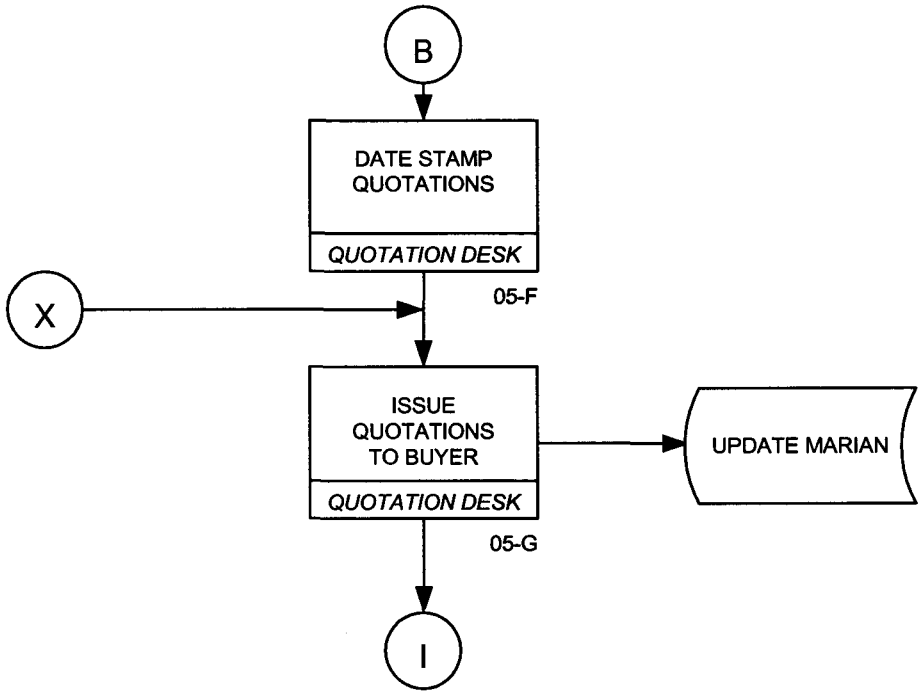


DATA	SOURCE
-TECHN. ATTACHMENTS	-REQ. ORIGINATOR
-PURCHASE TERMS & CONDITIONS	-BUYER
-INQ. ACKNOWLEDGE-MENT DOCUMENT	-BUYER
-QUOTATION DESK LABELS	-BUYER
-PACKING, MARKING, INVOICING, & SHIP-PING INSTRUCTIONS	-TRAFFIC COORD.
-SPARE PARTS (SPIR & GUIDE) IF APPLICABLE	-BUYER
-SECRECY AGREEMENT IF APPLICABLE	-BUYER
-INSTRUCTION FOR ISSUE & MAINTENANCE OF BANK GUARANTEES IF APPLICABLE	-BUYER
-INSPECTION REQMTS IF APPLICABLE	-INSPECTOR
-INSTRUCTIONS FOR SELLER REPRESENTATION	-SUB CONTRACTING
	VARIOUS: -PPM -MANAGER PURCHASING

QUOTATION DESK



3. QUOTATION DESK



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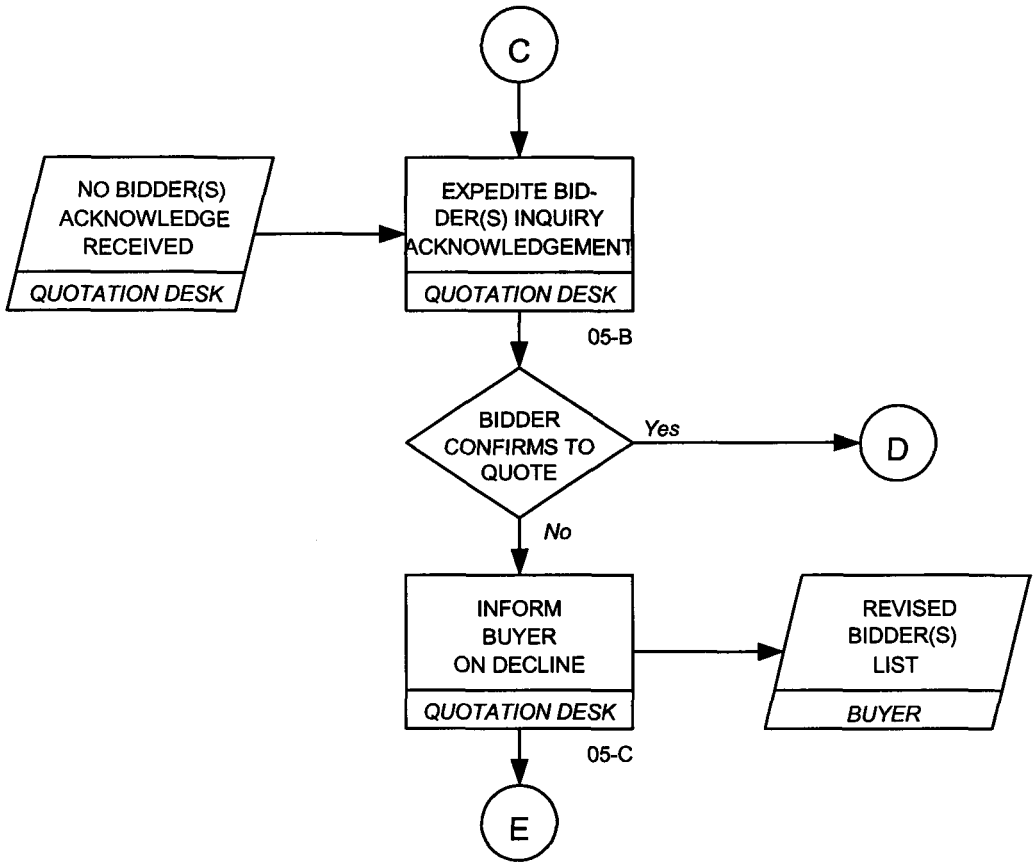

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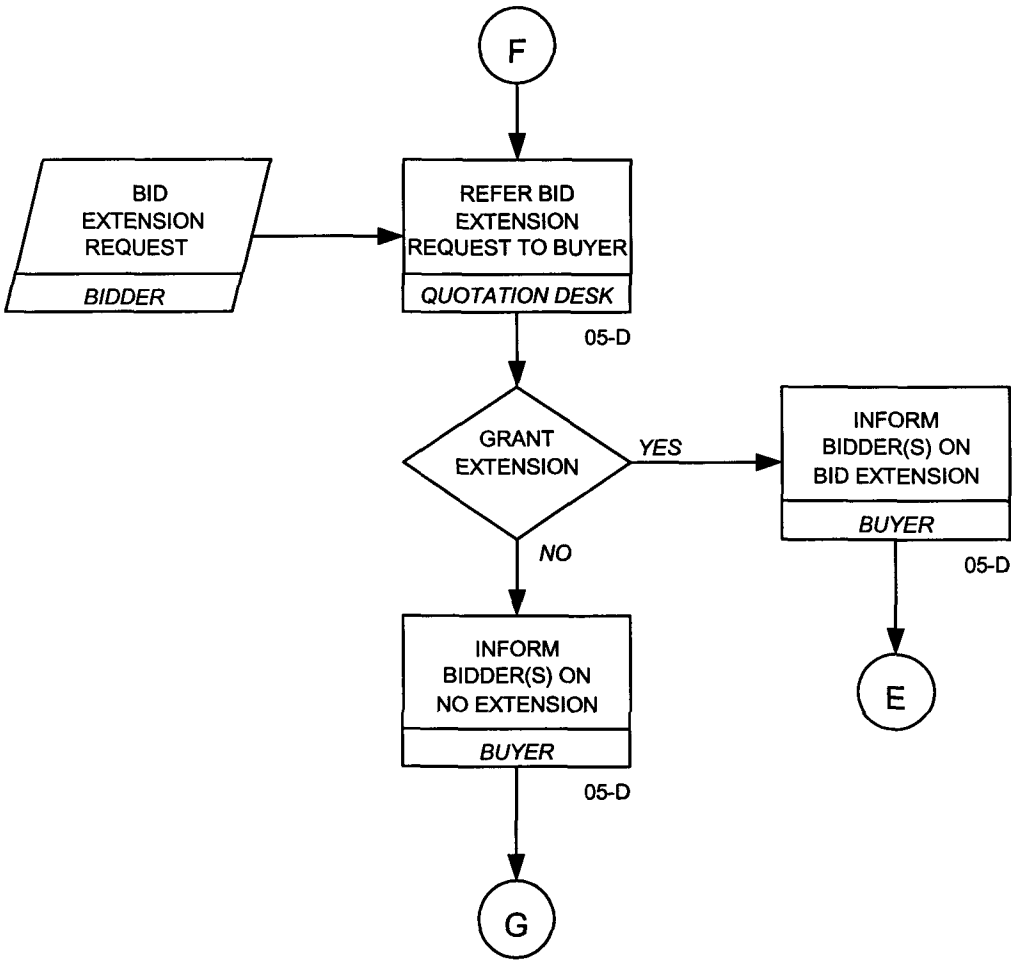
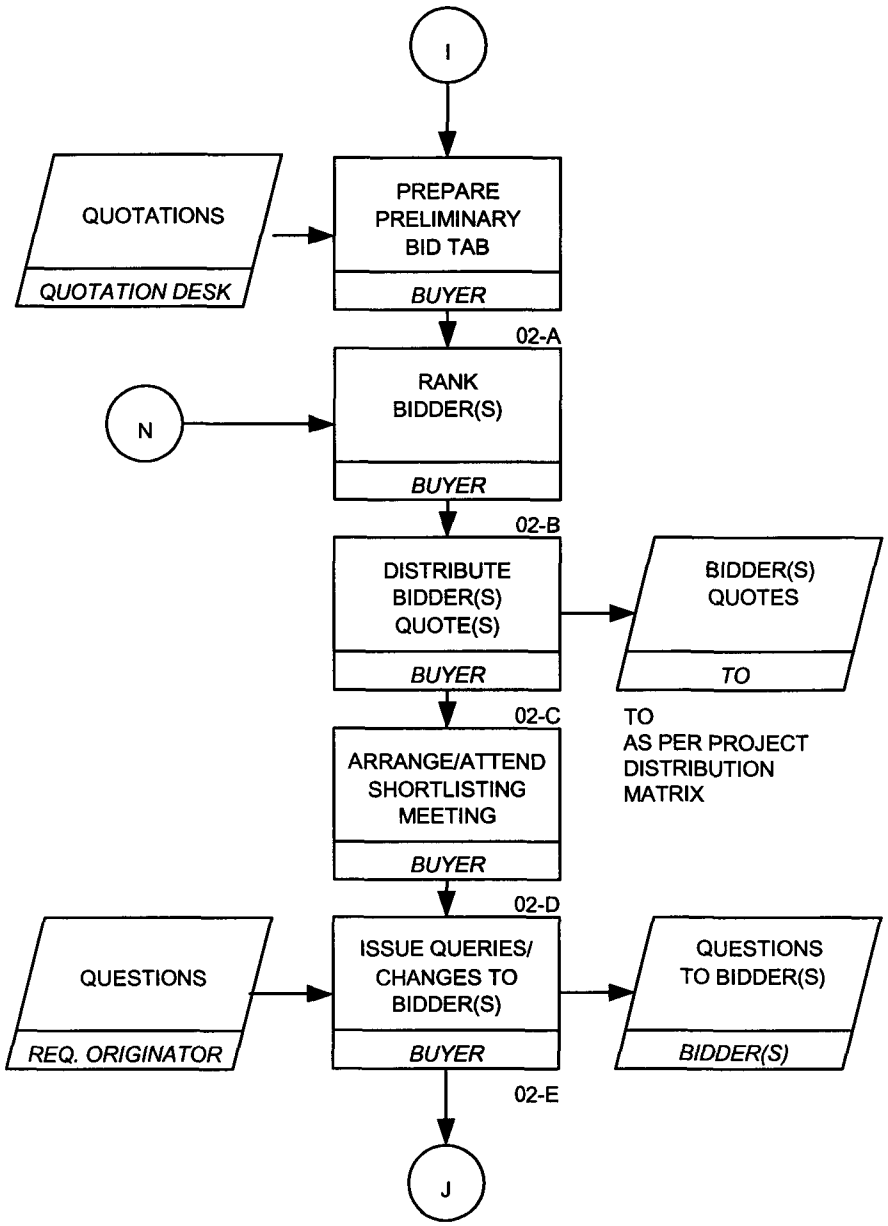


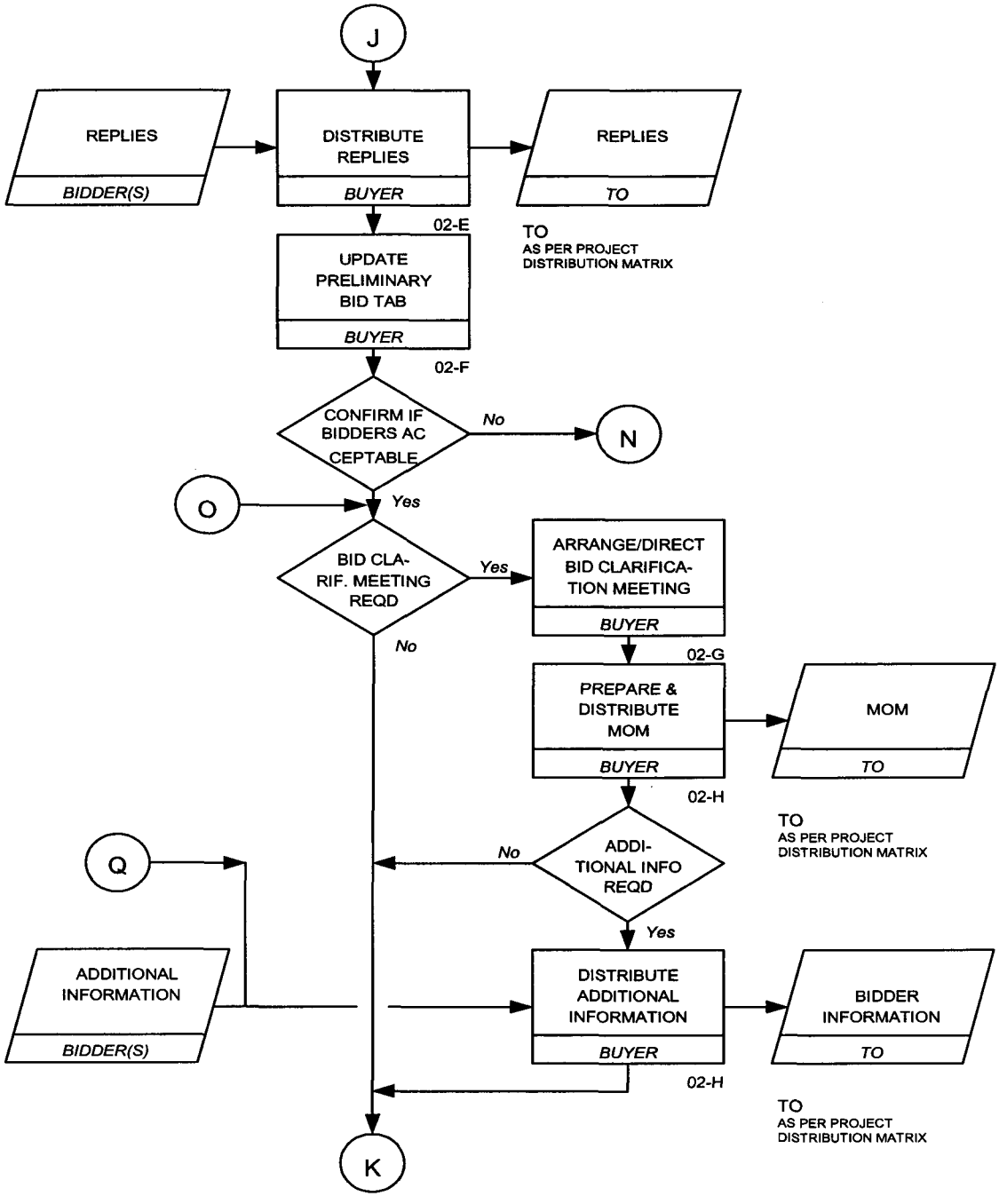
PURCHASING OF GOODS

BID TABULATION



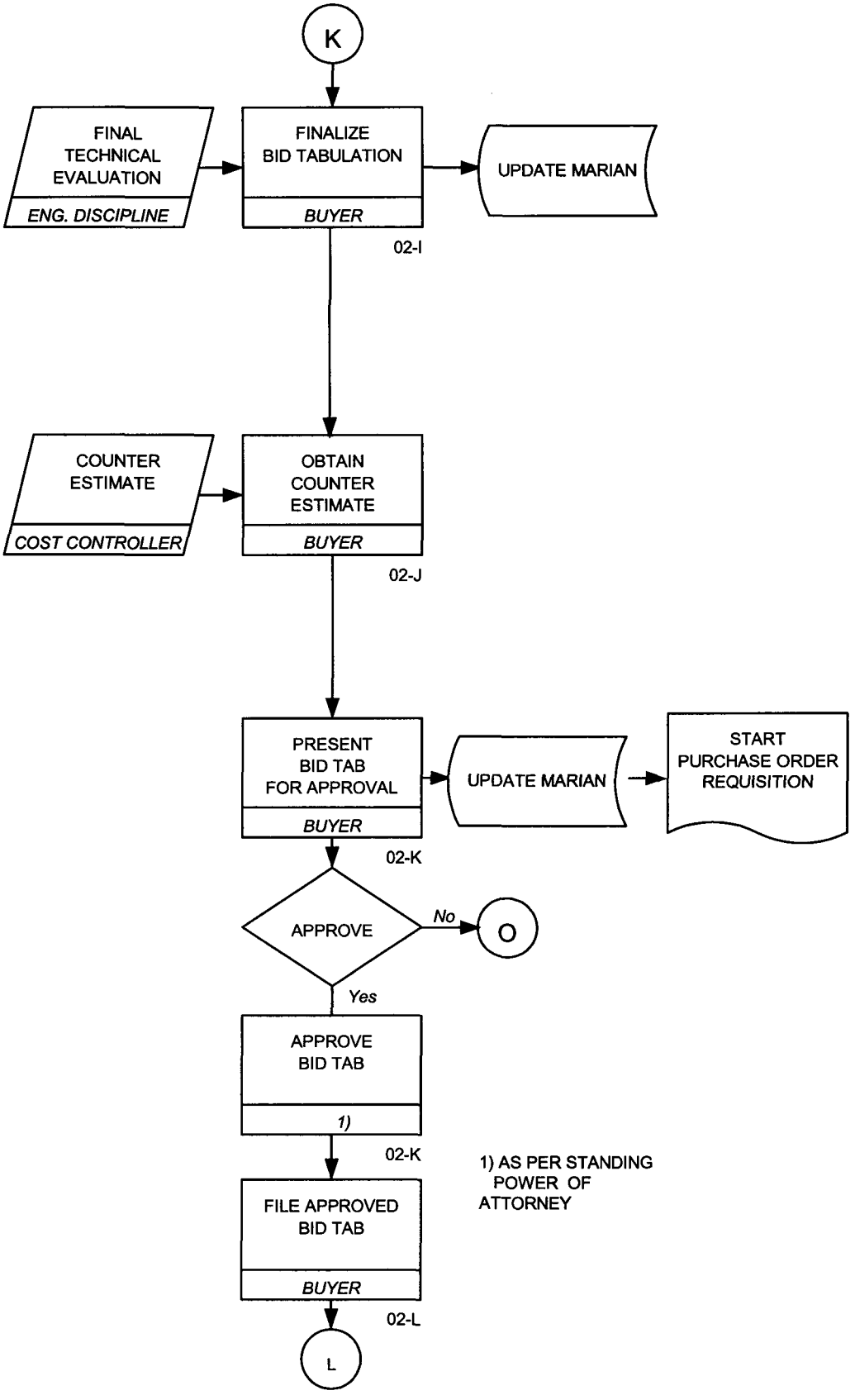
PURCHASING OF GOODS

BID TABULATION



PURCHASING OF GOODS

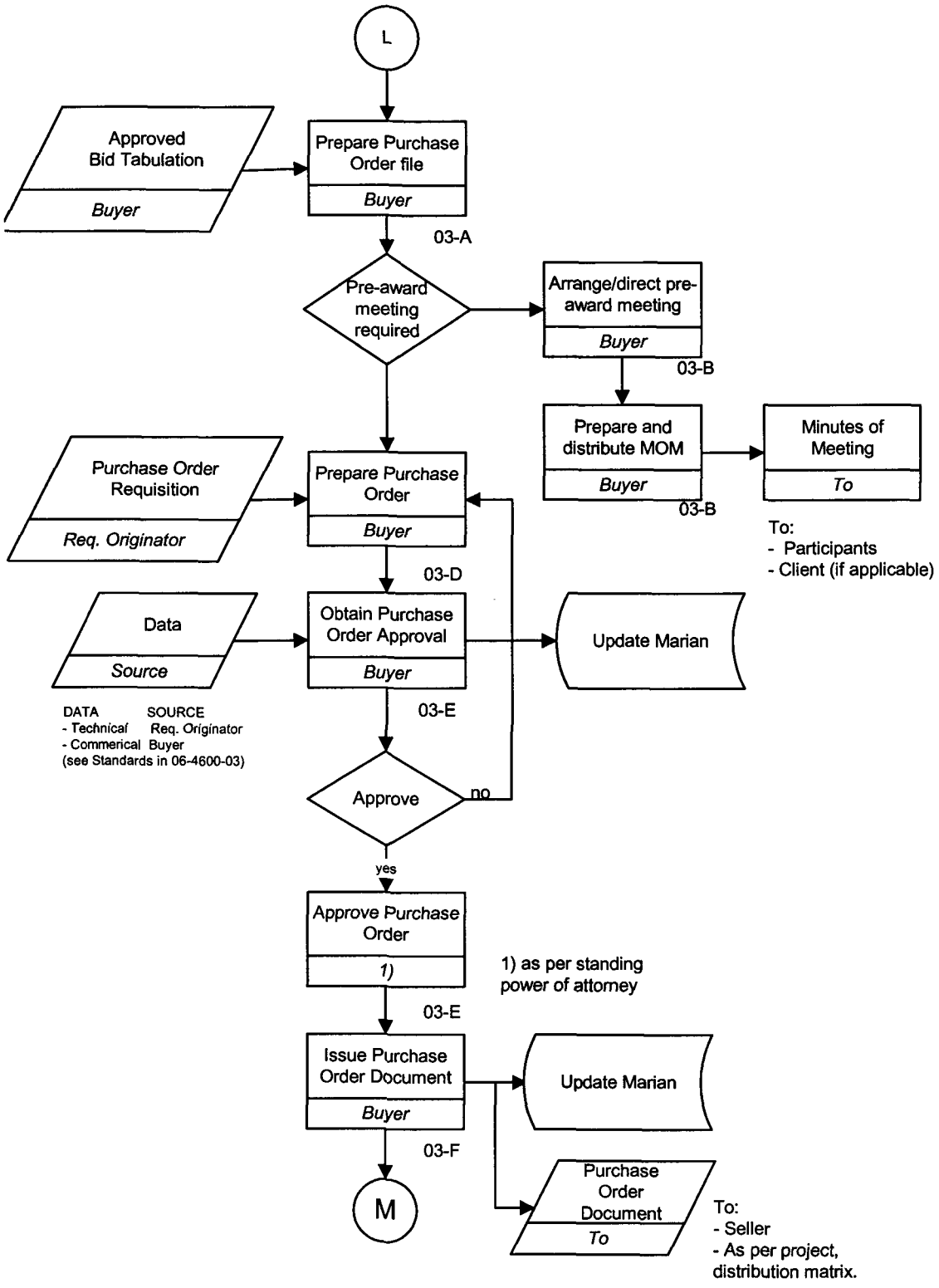
BID TABULATION



1) AS PER STANDING POWER OF ATTORNEY

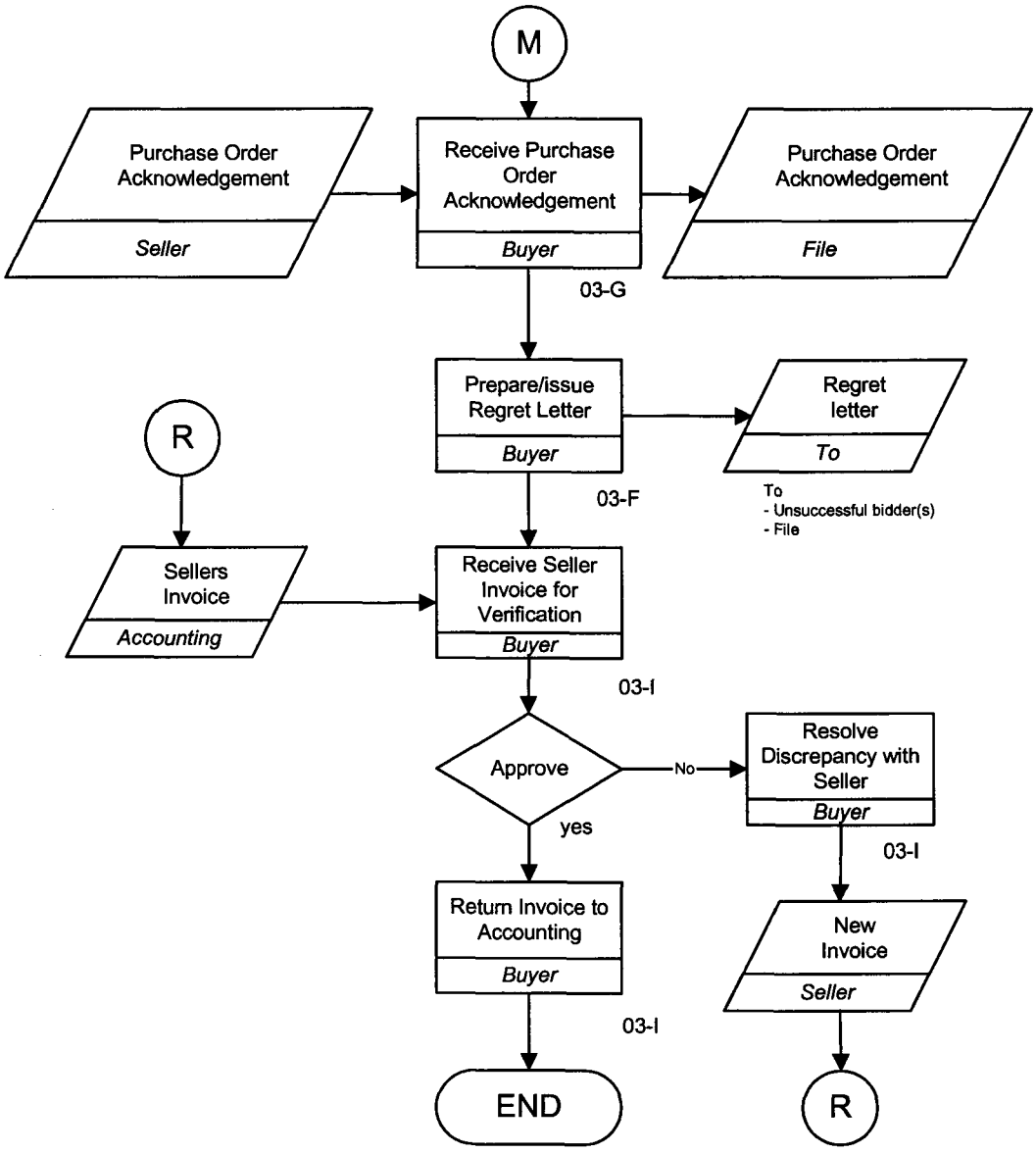
PURCHASING OF GOODS

PURCHASE ORDER



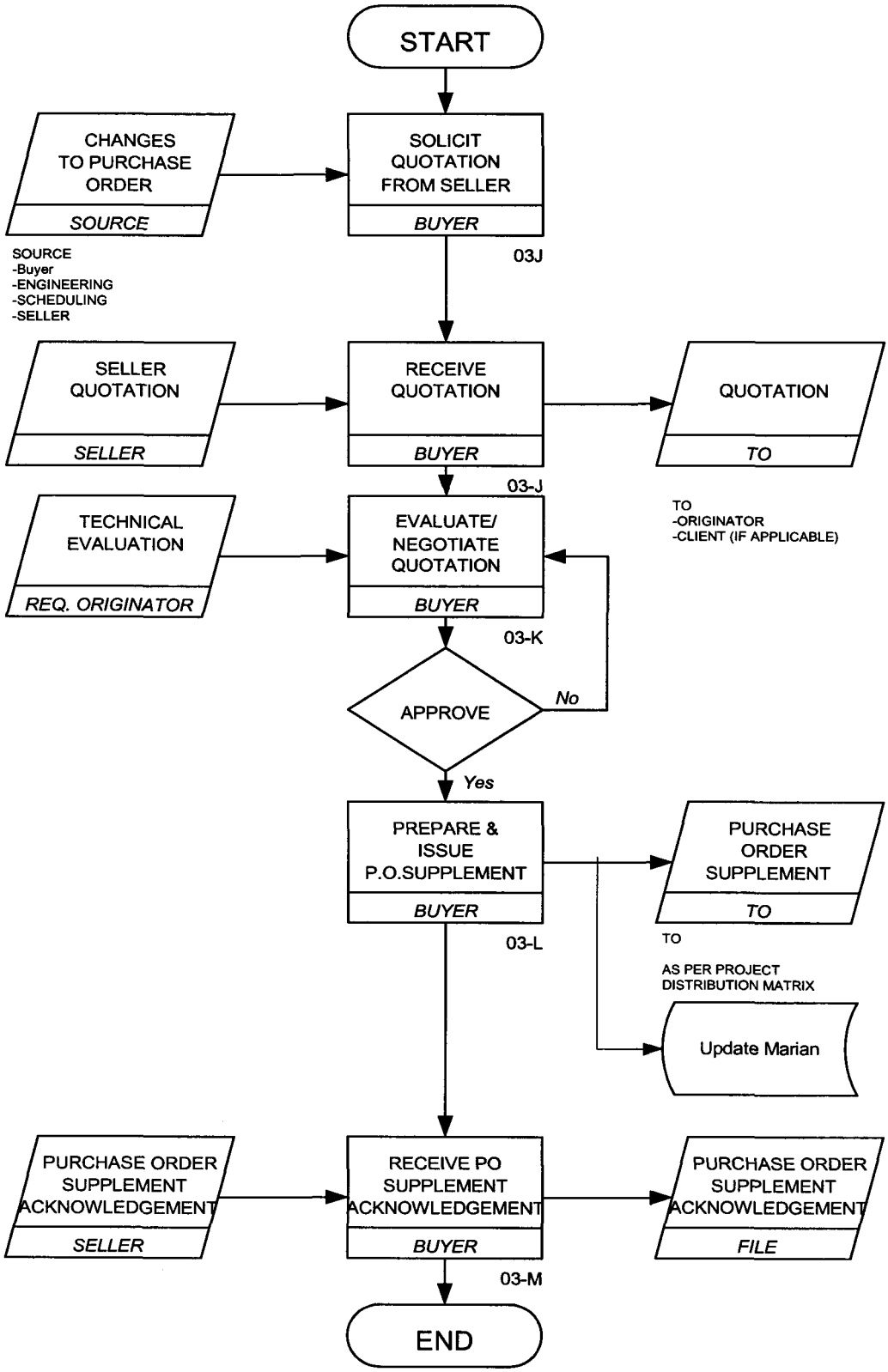
PURCHASING OF GOODS

PURCHASE ORDER

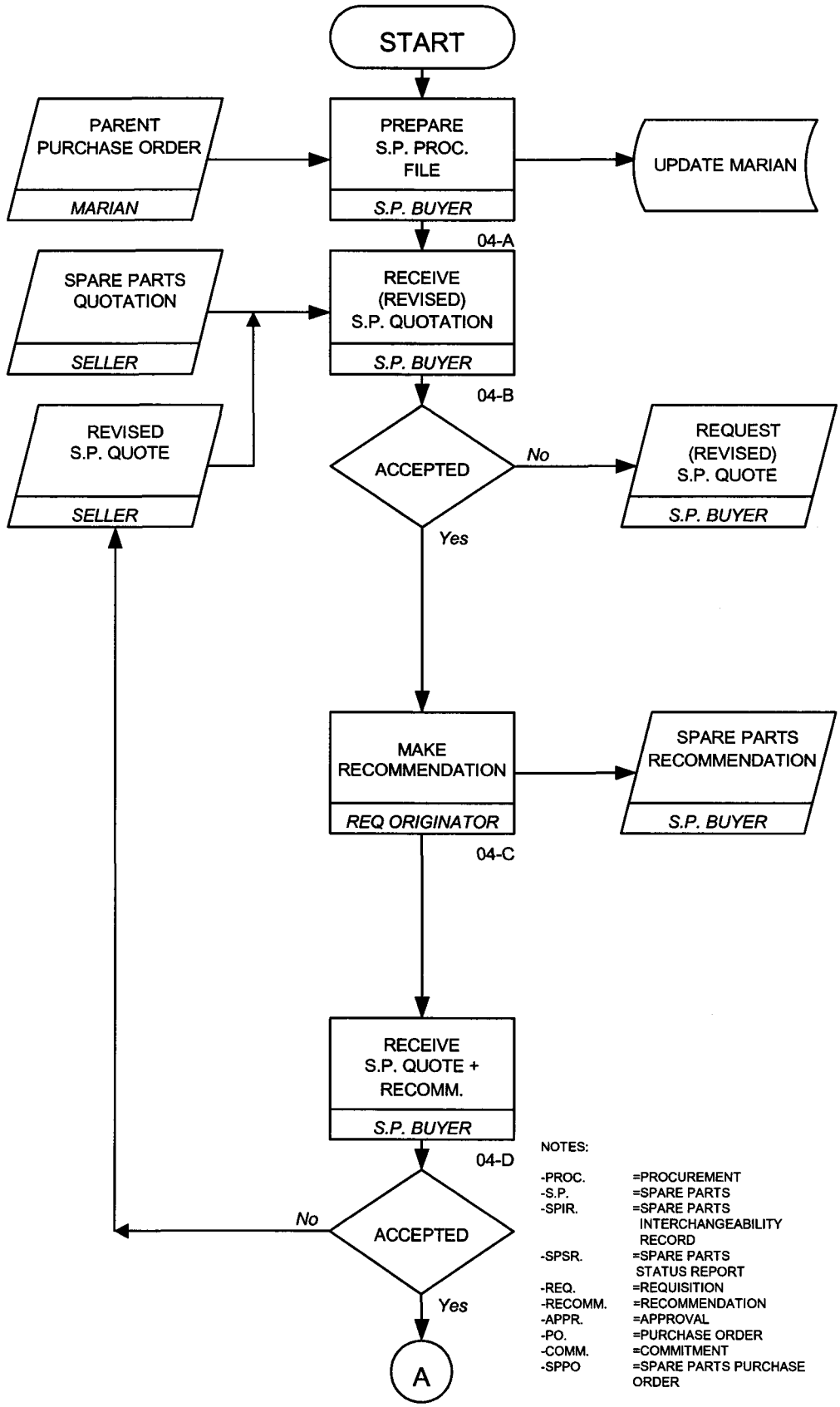


PURCHASING OF GOODS

PURCHASE ORDER SUPPLEMENTS

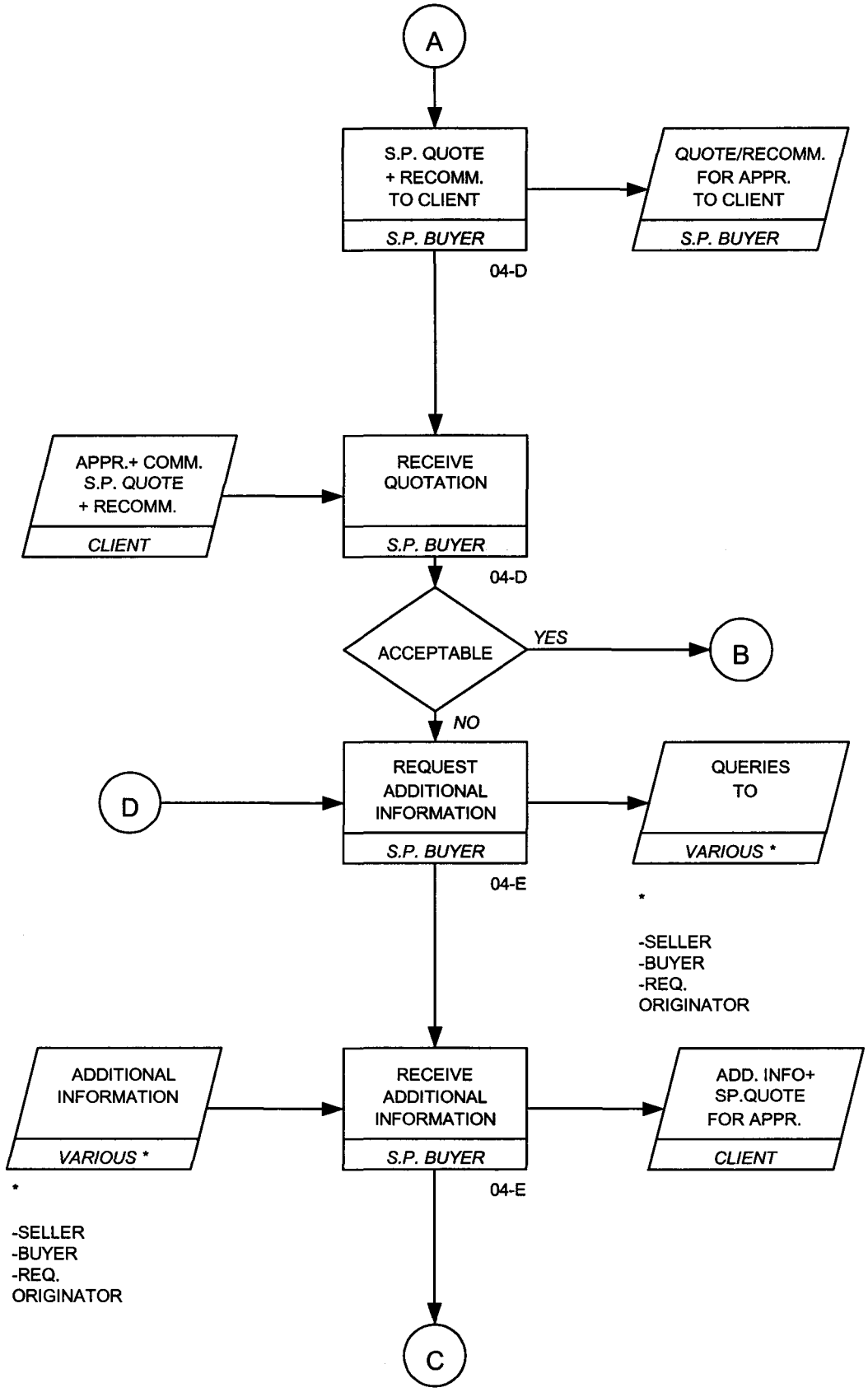


SPARE PARTS


START
PARENT PURCHASE ORDER
MARIAN
PREPARE S.P. PROC. FILE
S.P. BUYER
UPDATE MARIAN
04-A
SPARE PARTS QUOTATION
SELLER
RECEIVE (REVISED) S.P. QUOTATION
S.P. BUYER
04-B
REVISED S.P. QUOTE
SELLER
ACCEPTED
No
REQUEST (REVISED) S.P. QUOTE
S.P. BUYER
Yes
MAKE RECOMMENDATION
REQ ORIGINATOR
SPARE PARTS RECOMMENDATION
S.P. BUYER
04-C
RECEIVE S.P. QUOTE + RECOMM.
S.P. BUYER
04-D
No
ACCEPTED
Yes
A
NOTES:
-PROC. =PROCUREMENT
-S.P. =SPARE PARTS
-SPIR. =SPARE PARTS INTERCHANGEABILITY RECORD
-SPSR. =SPARE PARTS STATUS REPORT
-REQ. =REQUISITION
-RECOMM. =RECOMMENDATION
-APPR. =APPROVAL
-PO. =PURCHASE ORDER
-COMM. =COMMITMENT
-SPPO =SPARE PARTS PURCHASE ORDER

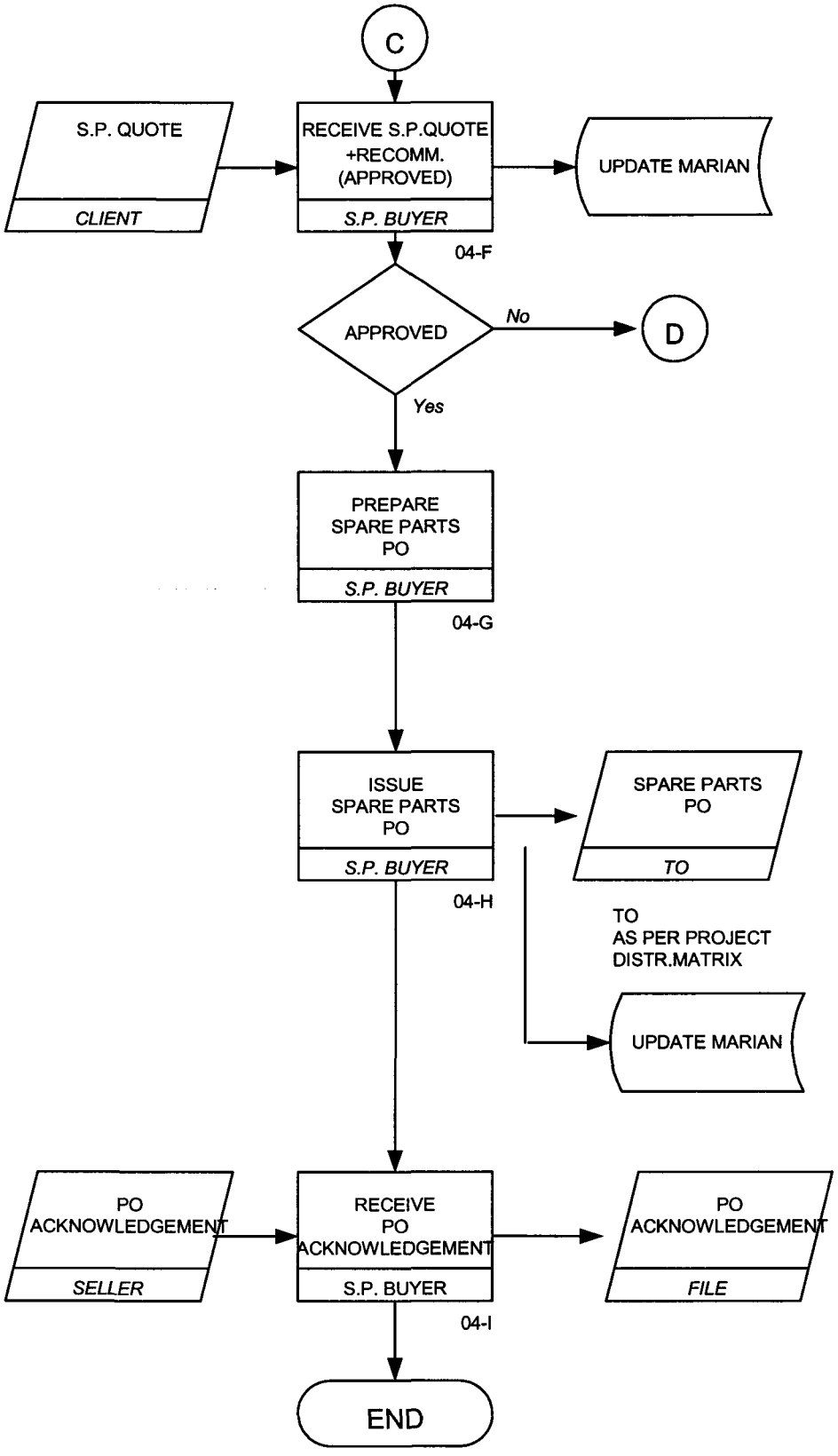
PURCHASING OF GOODS

SPARE PARTS



PURCHASING OF GOODS

SPARE PARTS



Technical Bid Tabulation - Static Equipment — **ABB LUMMUS GLOBAL B.V.**

Client: : SCANRAFF
Plant : Gas Oil Project
Location : Lysekil, Sweden

HP AMINE ABSORBER FEED K.O. DRUM (Porta-Test Whirlyscrub) V-8106

120.211	Document No.		TBE- 04046-0306
Dept./Sect.	Job		Requisition
Attachment No.:			Page 1 of 2

	Rev.	INQUIRY ITEM NR.		SELLER AXSIA HOWMAR Ltd.		
1			A - TECHNICAL REQUIREMENTS (SUMMARY) :	[redacted]		NOTES, REMARKS AND ADDITIONS AS AGREED DURING BID CLARIFICATION MEETING (on 27 Feb 2004 at ABB LGN office)
2		V-8106	- Reference to Requisition 04046-RE-0306 Rev.0 and Techn. descript. 04046-TD-0306 Rev.0	YES		Referent Documents:
3			- Statement of full compliance with requisition, techn. descript. & proj. spec's.	YES		AXSIA HOWMAR Quotation Ref. No. P23027 Rev.0 dated Dec. 2003; Responses dated: 4 Feb '04 to ABB Questionn.1; 6 Feb '04; 9 Feb '04; 11 Feb '04;
4			- Code : ASME Sect. VIII Div.1, Edition 2001 incl. latest applicable addenda, 2003.	YES		Responces dated 12 Feb '04; 18 Feb '04 ; 19 Feb '04; 23 Feb '04 and revised Quotation Technical Part, Rev.2 dated 26 Feb '04.
5			- Process and mechanical design is based on life time of 20 years.	YES		ABB LGN Inquiry Req'n No. RE-04046-0306 Rev.0 including Techn. Description, Data sheets and all applicable doc's as referr. in the Req'n+E-mails dated Jan 23,'04;
6			- Seller confirmed that No damaging vibrations will appear during the vessel life time	YES		ABB LGN Questionnaire 1 dd 26 Jan '04 & Questionn. 2 dated 9 Feb '04.; E-mails dated 12 Feb '04; 13 Feb '04 and 18 Feb '04.
7			- Seller confirmed that noise will not exceed max. sound pressure level of 80 dB (A) at 1m	YES	NOTE 9 noise insul.?	NOTES:
8			- Confirmation minimum vessel/heads thickness in acc. with code and Inquiry Requisition	YES	80 mm	1) Seller has received revised specifications as specified in ABB Questionnaire No.1 dated Jan 26, 2004.
9			- Wind Loads shall be in acc. With Swedish code BKR and BSV-97	~~T.B.C.~~	CONFIRMED	2. DISTANCE BETWEEN LEVEL CONTROL NOZZLES SHALL BE 813 mm. LOCATION OF BOTTOM NOZZLES K1B & K2B
10			**Materials and Fabrication:**			SHALL BE ON 175 mm FROM BOTTOM TANGENT LINE. (BASED ON 50mm WELD SEAM TO T.L. DISTANCE)
11			- Materials as per ASME code, Spec's D-0612, SW-612 and PED 97/23/EC	YES		LIQUID LEVELS : 275 mm LLLL
			- Materials shall meet Sour & HIC requirements as per Specification SM-622	YES		375 ~~337~~ mm LLL (CLOSE) (375 FROM PROCESS - 1 MAR '04) BIDDER CONFIRMED ON 16-MAR-04.
13			- Mill certificates as per Technical Description paragraph 2.4 / including PED 97/23/EC	YES		685 mm HLL (OPEN)
14			- Vessel shell / heads courses will be made of plate material or forged material ?	plate/forged		IF WELD SEAM TO T.L. DISTANCE IS BIGGER THAN 50mm, ELEVATIONS OF NOZZLES TO BE MODIFIED ACCORDINGLY.
15			- Skirt to shell attachment of an integral forged design or weld built-up	weld built-up		3. ONE (1) MORE INSPECTION NOZZLE N7 (4") HAS BEEN ADDED. PRICE IMPACT WILL BE CONFIRMED. SEE ALSO NOTE 13.
16			- Qualified WPS/PQR & qualified welders in accordance with ASME code	~~T.B.C.~~	CONFIRMED	4. STRAIGHT PIPE OF MATCHING INLET NOZZLE SHALL BE 10xDN. INCLUDED IN ABB LGN DESIGN.
17			- Min 3mm 308L weld overlay (undiluted) of feed area including inlet and outlet nozzle, NOTE 6	YES	~~INCLUDED~~ ABOVE listed	5. SIZE OF VAPOUR OUTLET NOZZLE N2 OF 16" SHALL BE CONFIRMED BY AXSIA, AND SIZE OF INLET NOZZLE N1 OF 12" SHALL BE CONFIRMED TOO. (BEFORE END OF WEEK No. 10/2004). CONFIRMED 8-MAR-04 18" REQ'D.
18			- NDT procedures acc. to design code, Spec. SW-0612 & D-612	YES		
19			- Post weld heat treatment in accordance with design code, Spec. SW-0612 & D-612	YES		6. CLADDED PARTS OF VESSEL ARE MARKED-UP ON ATTACHED DRAWING, MINIMUM 3mm 308L
20			- Each heat of SS material & weld mater.shall pass a corros.test - ASTM A262 practice E (Strauss Test)	T.B.C.	NOTE 11	UNDILUTED THICKNESS / CONFIRMED BY AXSIA.
21			- Materials of internals as per Licensor design and data sheets	YES		7. PAINT SYSTEM IN ACC. WITH PARA. 15.2.2 OF SDE-15 SPECIFICATION, ~~COLOURS HEREABLE NOT 1050R90B~~. CONFIRMED ON 8-03-2004, AND ON 31-03-2004.
22			- Name of vessel fabricator where the fabrication of this vessel will take place	T.B.C.	NOTE 12	
23			- Name of potential material suppliers, including suppliers of materials for internals	T.B.C.	NOTE 12	8. 2 LIFTING LUGS DESIGNED IN ACC. WITH DIN 28087 SHALL BE PROVIDED. CONFIRMED
24						9. NOISE REQUIREMENTS ARE CONFIRMED. IF DURING THE OPERATION IS DISCOVERED THAT INSULATION (NOISE) IS REQUIRED, ALL COSTS SHALL BE ON AXSIA ACCOUNT. SEE ALSO POST MEETING NOTES.
25			**Design Details:**			
26			- Detail design in acc. with all applicable Doc's as part of INQUIRY Requisition Rev.0	YES		10. IF ANY CHANGE OF MATERIALS IS INTRODUCED, ABB LGN HAS TO BE NOTIFIED.
			- All nozzles shall be of the integral (self reinforced) type	YES		11. AXSIA TO CONFIRM BEFORE END OF WEEK No. 10/2004. CONFIRMED ON 8-MAR-04.
28			- Internal attachments welded by continuous full penetration welds	YES		12. WILL BE CONFIRMED AFTER PLACING THE PURCHASE ORDER.
29			- TL to TL dimension 4078 mm and skirt height of 1.35 m confirmed. NOTE 11)	YES	to be conf. T.L.-T.L.	13. M1 HEAD HOLE IS DECREATED FROM 14" TO 8"2 NAMED NOW INSPECTION HOLE.
30			- Nozzle loads on equipment as per spec. ABB Spec.SE-651 confirmed. PD 5500 IS ALSO	YES		ONE MORE INSPECTION HOLE 4" IS ADDED.
31			ACCEPTABLE.			
32			**Scope of Supply:**			
33			- All internals shall be designed by Seller acc. to licensor (Natco Group) requirements	YES		SEE ATTACHED VESSEL SKETCH Rev. 3.
34			- 2 Lifting lugs (DIN 28087) and one tailing lug at skirt included in seller scope	YES		
35			- Top vapor outlet nozzle including LR elbow + W.N. flange	YES		
36			- Filled-in checklist Doc. No. 04046 - CL - 0306.	YES		
37			- Full compliance with checklist (excluding unit prices for clips, skirt and x-ray)	YES		
38			- Earthing connections (2 req'd)) and fireproof. attachm's outside of skirt	YES		
39			- Spare parts (bolting and gaskets) ~~incl for internals~~ as per Techn. Descript. Para 6.	YES		
40			- Clips for 1 top platform and clips for ladder are included in price.	YES		
41			- Hydrostatic test (1.5 x des. press., chlorides max. 30 ppm) and drying of equipment.	YES		
42			- Surface preparat. & painting as per the latest rev.of Spec. SDE-15 (4 years guarantee) (Rev. 60P4)	YES	NOTE 7	
43			- Protection for transport by sandblasting plus rust prevention, gaskets and bolting included	YES		
44			- Packing, protection, transport saddles suitable for oversea transport.	YES		
45						

SCANRAFF Representatives:	Signature	Date
Mr.Per Danielsson, Engineering Manager	PART TIME!	
SELLER Representatives:		
Mr. Richard Potter, Refinery Business Manager		27/2/04
Mr. Derek Cash, Sales & Marketing Director	D. Cash.	27/2/04
ABB LGN Representatives:(technical part)		
Mrs. Rose Nikolic, Mech. Engineer	PART TIME	27-02-2004
Mr. Ronald Sissingh, Process Engineer		

Technical Bid Tabulation - Static Equipment — ABB LUMMUS GLOBAL B.V.

Client: : SCANRAFF
Plant : Gas Oil Project
Location : Lysekil, Sweden

HP AMINE ABSORBER FEED K.O. DRUM (Porta-Test Whirlyscrub) V-8106

		Document No.	TBE- 04046-0306
120211	04046		0306
Dept./Sect.	Job		Requisition

Attachment No.:

	Rev.	INQUIRY ITEM NR.		SELLER AXSIA HOWMAR Ltd.		T.B.C. = To be confirmed T.B.A. = To be advised T.B.D. = To be discussed
1			B - INSPECTION / QUALITY CONTROL REQUIREMENTS			NOTES, REMARKS AND ADDITIONS AS AGREED DURING BID CLARIFICATION MEETING (on 27 Feb 2004 at ABB LGN office)
2		V-8106	- Inspection and testing as per Techn. Descr. Para. 9 & Doc.No. RFI-04046-0306	YES		
3			- Equipment supplied with CE mark in acc. with PED 97/23/EC.	YES		14. REQUIREMENTS FOR SELLER DOC'S HAVE BEEN DISCUSED. AND AGREED AS MARKED-UP ON
4			- Confirmation that obtaining Authority approvals is included in Seller scope of work & price.	YES		~~ATTACHED RFD DOCUMENT.~~ ABB LGN WILL FORWARD ELECTRON. RFD SHEET TO AXSIA FOR REVIEW DONE
5			(This includes submission of required documents, assessment of design etc as described	-		AND CONFIRMATION (BEFORE END WK10). REV. 5 OF 4 G.A. DWG SHALL BE AVAILABLE AFTER 10 WKS FROM 27-2-
6			- Seller will act as a manufacturer under PED 97/23/EC	YES		15. 1 COPY OF PAINTING SPECIFICATION SDE-15 HANDED OVER TO AXSIA. COMMITMENT P.O. '04.
7			- Seller will issue a signed Declaration of Conformity as per PED 97/23/EC & affix CE mark	YES		16. 1 COPY OF TABLE "NOZZLE STANDOUTS" HANDED OVER TO AXSIA. MIN. NOZZLE STAND OUTS
8			- Name of Notify Body for CE certification: DNV (Det Norske Veritas) or Lloyds	Lloyds Register		SHALL BE FOLLOWED. AXSIA CONFIRMED.
9			- Seller to include all additional requirements (if any) with respect to PED & Authority	YES		POST MEETING NOTES:
10			- Quality assurance manual or copy of valid ISO-9001certificate.	YES		AXSIA SUBMITTED FILLED-IN "RFD" FORM WITH DOCUMENT ISSUE SCHEDULE BASED ON
11			- Fabrication schedule included	NO	AFTER ORDER	AXSIA'S COMMITMENT DATE TO ABB LGN.
12			- Actual work load at manufacturer shop required	T.B.C.	AT ORDER	AXSIA CONFIRMED BY THE SAME E-MAIL DATED 11-MAR-04 THAT FOUNDATION LOADS/MOMENTS &
13			- Inspection plan (typical) included	YES		FORCES DUE TO WIND PRESSURE & DEAD WEIGHTS) FOR EMPTY, OPERATING & HYDROTEST CONDITION WILL
14			- In-operation inspection intervals will be minimum 4 years / Equipment must be suitable	YES		BE SHOWN ON GENERAL ARRANGEMENT DRAWING.
15			for minimum 4 years operation without inspection intervals			
16			- Risk analysis and Material Appraisal document included in scope	YES		
17			- IOM (Install., Oper.and Mainten.manual) including internals in English or Swedish	T.B.C.	in English	
18						
19						POST MEETING NOTES : (CONTINUE)
20			C - DOCUMENT REQUIREMENTS			AXSIA HOWMAR REFERENT DOCUMENTS AFTER BID CLARIFIC. MEETING (FEB 27, 2004): (E-MAILS)
21			-Seller doc's issue schedule reviewed and confirmed as marked up on RFD sheet.	to be discussed	NOTE 14	- TECH. CLARIFICATION No. 5 DATED MARCH 08, AT 10:02
22			- Documents as per Req'n Tech. Descript. Para.5, Doc.RFD-04046-0306, SDE-18B	YES		- TECH. CLARIFICATION No 5 DATED MARCH 08, AT 15:36 INCLUDING VESSEL SKETCH & REV. DATA SHEET
23			and ABB Spec's 04046-120583-000003 rev.1 and 04046-120921-000015 rev1.	YES		- TECH. CLARIFICATION No 5 DATED MARCH 11, '04 AT 11:12 INCLUDING REVISED RFD'S SHEET, INLET PIPE
24						REQUIREMENTS AND NOISE REQUIREMENTS OF 80 dB(A) AT 1m DISTANCE.
25						- TECH. CLARIFICATION No 5 DATED MARCH 11, '04 AT 14:39
26			D - SCHEDULE REQUIREMENTS			- TECH. CLARIFICATION No 5 DATED MARCH 16, '04 AT 13:17 HOUR INCL. CONFIRMATION OF PIPING ROUTING
27			- Best Delivery time	10 m's(exc.transp)		- TECH. CLARIFICATION No 5 DATED MARCH 17, '04 AT 15:35 INCLUDING FINAL VESSEL SKETCH.
28				~~8x3x2,5m~~		- FINAL TECHNICAL CLARIFICATION, E-MAIL DATED MARCH 31, '04 AT 15.53 HOUR INCLUDING CONFIRMATION OF
29			- Estimated shipping weights (Ton) and dimensions (m)	~~9 / 7x1.4x1.4m~~ *		PIPING ARRANGEMENT, PAINTING REQUIREMENTS, LR TOP 18" ELBOW & REVISED SHIPPING WEIGHTS & DIMENSIONS. *
30						
31			- Exclusions / Alternatives if any.			ABB LGN POST MEETING (E-MAILS) REFERENT DOCUMENTS:
32			- Instruments, instrument bridles, valves, platforms, ladders, anchor bolts excluded	YES		- E-MAIL DATED MARCH 11, 2004 AT 14:27
33			- Alternatives	~~T.B.C. during BOM~~	NOT APPLICABLE	- E-MAIL DATED MARCH 12, 2004 AT 10:37
34						- E-MAIL DATED MARCH 16, 2004 AT 11:48
35						
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44			Bidder proposal technically acceptable	YES		
45						

Rev. 0 Date: 26-02-2004 | Rev. Date: | Rev. Date:

DAT073