Project Initiation Phase

Activity		Checklist
1.	**Process Control Strategy**	
1.1	In conjunction with SCADA engineer, process engineer, electrical engineer, SOPA representative, project specifier, project manager, project engineer, and the other stakeholders, develop an overall control strategy, including preferences for local versus central control, level of instrumentation, automation, backup control and system architecture.	☐
1.2	Define the desired data flow and level of integration of ancillary I&C systems. Consider the following systems as a minimum: • Computerized maintenance system • Data output for regulatory reporting • Archiving for historical purposes • On-line O&M manual • Flow characteristics and performance trend reporting • Alarm management • Process management reporting • Laboratory information systems, if water quality monitoring is included • Security and access control • IT needs including Internet, LAN, and WAN needs • Power supply needs • Communications requirements	☐
2.	**Deliverables**	
2.1	Technical Memorandum describing overall control philosophy and basic design criteria and considerations •	☐

Lead Engineer _____ **Date** _____

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Options Analysis

Activity			Checklist
1.	**P&IDs**		
	1.1.	In conjunction with SCADA engineer, process engineer, electrical engineer, SOPA representative, project specifier, project manager, project engineer, maintenance representative, and other stakeholders to develop alternatives to meet control philosophy.	☐
	1.2.	Develop equipment and instrument tag numbering, naming, and abbreviation conventions.	☐
2.	**Process Control Strategy**		
	2.1	Develop control system block diagram	☐
	2.2	Develop typical control descriptions for valves, pumps, and adjustable speed drives.	☐
	2.3	Select control system configuration (local control panels, PLC-based controls, and HMI) based on input from process and mechanical engineers, and DM.	☐
	2.4	Evaluate compatibility of existing controls/instrumentation with new design.	☐
	2.5	Identify field instrumentation and user group preferences/dislikes.	☐
	2.6	Establish reasonable but conservative preliminary control room sizes.	☐
	2.7	Develop alternatives	☐
	2.8	Recommend preferred alternative for design	☐
	2.9	Produce a technical report documenting analysis	☐
	2.10	Prepare Basis of Design report	☐
	2.11	Triple bottom line analysis	☐
	2.12	Coordinate with and assist the process engineer(s) to prepare a preliminary P&ID drawing for each process.	☐
3.	**Deliverables**		
	3.1	Document design approach and criteria in Basis of Design Report (BODR) per SPU Design Standards and Guidelines.	☐
		• Define or recommend control system procurement methods and software development.	☐
		• Document control system philosophy/architecture and other information needs (e.g., reports needed, integration with lab data, O&M).	☐
	3.2	Develop and publish control system block diagram.	☐
	3.3	Prepare Preliminary P&IDs (Flow Diagram)	☐
	3.4	Preliminary I&C drawing list and specification list	☐
	3.5	Preliminary Engineering Report	☐
	3.6	Project Management Plan (PMP), :	☐
	3.7	CIP Budget established	☐
	3.8	Stage Gate Approval	☐

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Design Development 30 %

Activity			Checklist
1.	**Control System Development**		
	1.1	Update the process control narrative with the process engineer and control system block diagram	☐
	1.2	Size and identify I/O locations for control system.	☐
	1.3	Prepare equipment list and data sheets.	☐
	1.4	Update equipment/instrument tag numbering, naming, and abbreviation conventions.	☐
2.	**Specifications**		
	2.1	Prepare preliminary specifications list.	☐
3.	**P&ID and Control Drawings**		
	3.1	Prepare preliminary flow sheets/P&ID drawings,.	☐
	3.2	Prepare PLC Control Panel Power Distribution Schematic, typical control diagrams/loop diagrams for each type of control scheme	☐
	3.3	Draft SCADA Network Schematic	☐
4.	**Design Coordination**		
	4.1	Review selection of instruments, including material choices and size requirements.	☐
	4.2	Provide sizing of control panels, network communications rooms control system enclosures, and uninterruptible power supplies as required.	☐
	4.3	Provide control system component heat loads to HVAC group.	☐
	4.4	Coordinate with HVAC/mechanical and electrical engineer regarding control system requirements.	☐
	4.5	Locate control panels/instruments on mechanical and electrical drawings.	☐
	4.6	Meet with electrical discipline to define power and wiring needs for I&C system equipment.	☐
	4.7	Coordinate control, communications and electrical room needs with electrical and architectural disciplines. Verify initial room sizes.	☐
5.	**Design Development (30 %) Deliverables**		
	5.1	Design Drawings identified above.	☐
	5.2	Preliminary Drawing list.	☐
	5.3	Preliminary Specifications list.	☐
	5.4	Basis of Design Report (BODR) Document revisions to the QC reviewer	☐
	5.5	P&ID Flow Diagram (ideally final at 30% design)	☐
	5.6	Equipment and IO List	☐
	5.7	Control Narrative and Operating Context	☐

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Design Development 60 %

Activity			Checklist
1.	**Control System Development**		
	1.1	Update and finalize control system block diagram.	☐
	1.2	Update equipment/instrument tag numbering, naming, and abbreviation conventions.	☐
2.	**Specifications**		
	2.1	Draft specifications, including instrument component specs.	☐
	2.2	Prepare instrument lists, panel schedules, and loop specifications.	☐
	2.3	Develop I&C insert to be used for equipment and package control systems that defines controls, operator interfaces, instrument, and I/O requirements.	☐
	2.4	Update the process control narrative with the process engineer.	☐
3.	**P&ID and Control Drawings**		
	3.1	Finalize P&ID drawings, including loop numbers, instrumentation, and I/O.	☐
	3.2	Check P&IDs and other I&C sheets for uniformity of presentation and conformance to standards, including both graphical and technical detail.	☐
	3.3	Confirm drawing list for final design.	☐
	3.4	Update the process control narrative with the process engineer.	☐
4.	**Design Coordination**		
	4.1	Finalize selection of instruments, material choices and size requirements.	☐
	4.2	Provide sizing of control panels, network communications rooms control system enclosures, and uninterruptible power supplies as required.	☐
	4.3	Provide control system component heat loads to HVAC group.	☐
	4.4	Coordinate with HVAC engineer regarding control system requirements.	☐
	4.5	Locate control panels/instruments on mechanical and electrical drawings.	☐
	4.6	Finalize with electrical engineer power and wiring requirements for I&C system equipment.	☐
	4.7	Coordinate control, communications and electrical room needs with electrical, mechanical and architectural disciplines. Verify final room sizes.	☐
	4.8	Coordinate I&C specifications testing with the Division 1 (CSI) testing requirement. Ensure the approaches, naming conventions align.	☐
	4.9	Check for physical conflicts.	☐
5.	**Design Development (60%) Deliverables**		
	5.1	Final Drawing list.	☐
	5.2	Draft Specifications and Basis of Design Report (BODR) revisions	☐
	5.5	Final P&ID Flow Diagram (ideally final at 30% design)	☐
	5.6	Equipment List, I/O List and Control Narrative	☐

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Design Development 90 %

Activity			Checklist
1.	**Control System Development**		
	1.3	Finalize control system block diagram.	☐
	1.4	Finalize equipment/instrument tag numbering, naming, and abbreviation conventions.	☐
2.	**Specifications**		
	2.5	Finalize I&C specifications, including instrument component specs.	☐
3.	**P&ID and Control Drawings**		
	3.1	Prepare final flow sheets/P&ID drawings, including loop numbers, instrumentation, and I/O point details to reflect any project changes.	☐
	3.2	Confirm drawing list for final design.	☐
	3.3	Update the process control narrative with the process engineer.	☐
	3.4	Final PLC or PAC control panel wiring schematic	☐
4.	**Design Coordination**		
	4.1	Cross check all I&C drawings for consistency.	☐
	4.2	Check I&C drawings against equipment specifications and electrical plans to verify I/O requirements & provisions.	☐
	4.3	Coordinate with HVAC and EE engineer regarding control system requirements.	☐
	4.4	Locate control panels/instruments on mechanical and electrical drawings and check panel locations for physical conflicts and access.	☐
	4.5	Coordinate control, communications and electrical room needs with electrical and architectural disciplines. Verify final room sizes.	☐
	4.6	Coordinate I&C specifications testing with the Division 1 (CSI) testing requirement. Ensure the approaches and naming conventions align.	☐
5.	**Design Development (90%) Deliverables**		
	5.1	Final I&C Design Drawings.	☐
	5.2	Final Specifications	☐
	5.3	Final P&ID Flow Diagram (ideally final at 30% design)	☐
	5.4	Final Equipment List and IO point list	☐
	5.5	Operating Context	☐
	5.6	Control Narrative	☐

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Final Design Submittal

Activity			Checklist
1.	**Plans**		
	1.1	Finalize P&IDs and cross check all I&C drawings for consistency.	☐
	1.2	Check P&IDs and other I&C sheets for uniformity of presentation, including both graphical and technical detail. Add any remaining tag numbers.	☐
	1.3	Coordinate the I&C components and control panels specified in the equipment specifications with the loop descriptions and the P&IDs.	☐
	1.4	Finalize control/loop diagrams.	☐
	1.5	Prepare installation details. Prepare any other miscellaneous I&C drawings.	☐
	1.6	Resolve all QC comments on the 90% submittal.	☐
2.	**Specifications**		
	2.1	Finalize Division 40 specifications and incorporate review comments	☐
3.	**Design Coordination and Project Close out**		
	3.1	Purge notebooks, hard copy files and electronic files of outdated or extraneous information and calculations.	☐
	3.2	Provide input to the master specifications system based on information gained during this project. Fulfill commitments made during Project Initiation.	☐
	3.3	Incorporate accepted comments and coordinate with other affected disciplines.	☐
	3.4	Provide input to the project's lessons learned summary.	☐

Lead Engineer _____ **Date** _____

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