PROCESS INTEGRATION

INSTRUMENTATION AND CONTROL FOR PROCESS SYSTEMS

FEED STUDY REQUIREMENTS TO DEVELOP AN IFB PACKAGE TEMPLATE (SUCH AS DIV 40)

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Because this is a master specification *template*, it may contain information unrelated to your project. Read it thoroughly and revise it as necessary to meet project requirements.

This Specification attempts to define the baseline requirements for services to build scope for an industrial type Distributed Control System for use in process automation.

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**PART 1 GENERAL**

* 1. THE REQUIREMENT

The scope is for the services to obtain detailed information and the generation a set of documentation which will be used for a XXXXX system at the XXXXX site. This process involves three distinct events; on-site data gathering, off-site document generation, and one (1) approval cycle for defined submittals.

This data collection shall be done in accordance with the agreed-upon methods defined by the purchaser and the bidder. The generated documentation set will contain recommendations regarding specific control strategy for the scope of work with the listed equipment.

* 1. REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

To be determined during initial workshops.

Relevant standards and/or codes are to be recommended in the submitted documentation set.

* 1. SUBMITTALS

The following documentation will be submitted in electronic form to the purchaser:

1. User Requirements Specification
2. Functional Requirements Specification containing:
	1. Preliminary System Architecture
	2. Preliminary Bill of Materials
3. System Standards Document for Software Design
4. Commercial Estimation
	1. Conceptual Schedule of Implementation
	2. Recommendation of migration strategy (if applicable)
		1. Rip-replace
		2. Phased Migration
	3. Services Estimation
		1. Price estimation for system design
		2. Start-up and Commissioning estimation
			1. Hourly estimation
			2. T/E rate schedule by roles or titles
	4. Price estimation by either:
		1. Lump sum for total scope of work
		2. Price per unit/phase per the recommendation
	5. Training Requirements
	6. Deliverable/Submittal Package Requirements
	7. Testing Requirements
		1. Software Factory Acceptance Testing (SWFAT) Expectations
		2. Hardware Factory Acceptance Testing (HWFAT) Expectations
			1. Witness expectations by customer (optional)
		3. Third-party vendors requirements
			1. Skids vendors with specified platforms that will integrate into the DCS
		4. Site Acceptance Testing
	8. System Support Requirements
		1. Services
		2. Annual Support Plan Offerings

Upon submittal of the above documents the purchaser will have one (1) cycle to review the package and provide feedback or corrections within a one (1) week window. The vendor will then issue a final submittal within one (1) week.

**PART 2 PRODUCTS (NONE)**

**PART 3 EXECUTION**

* 1. THE REQUIREMENT

Bids for Front End Engineering Design (FEED) shall be solicited from vendors who have capabilities to supply system design and development engineering **and** are manufacturers of a control system. Control system technologies branded from a single manufacturer shall include, but are not limited to:

1. Process Automation System Server (HMI, Data Server, Alarm Server, System Directory)
2. Engineering Work Station Software
3. Operator Workstation Software
4. Local Electronic Operator Interface Terminals
5. Controllers & IO
6. Variable Frequency Drives, Soft starters and Electronic Overloads with EtherNet/IP Integration
7. Ethernet Switches

Bidders must be able to prove system deployment proficiency of a system offered by a ***single*** manufacturer, either through manufacturer training completion or system deployment experience.

Bids must contain at least [X]% of FEED activities from the manufacturer of the control system.

Bids must be from organizations who have a sales, distribution, pre-sales technical consultant offices within [x miles] of [County Name] County.

Bidders must have a local field service engineer office within [x miles] of [County Name] County.

Bidders must also be capable of defining & offering standard support services for any element of the system or the entire system including, but not limited to:

* 1. 24 x 7 x 365 manned remote phone support.
	2. Support center shall be able to seamlessly dispatch an on-site engineer if problem warrants (specific response times by region).
	3. 24 x 7 x 365 remote access support.
	4. 24 x 7 x 365 system parts supply access.
	5. Capable of offering support with guaranteed response times.
	6. Current software releases and reactivation codes shall be available for download from the Internet 24x7. Upon request, overnight shipment of update(s) or replacement media shall be available.
	7. Product manuals and knowledge base shall be available on the Internet.
	8. Extended parts and labor Warranty for repair labor (including local travel) and replacement parts for system control equipment and variable frequency drives for up to five additional years.
	9. Preventive maintenance Services to perform regular maintenance on system related equipment to prevent potential problems and extend component/system life
	10. Authorized local distributors for parts & warranty and / or MRO asset management programs.
	11. Manufacturer developed training for the system or any of its major system elements.
	12. Manufacturer field service engineer office within [x miles] of [County Name] County.
	13. Manufacturer recognized system integrators, listed within the public domain, of no less than XX independent service providers within [x miles] of [County Name] County.
	14. ONSITE REQUIREMENTS
		1. For Migrations - Existing System Definition Phase - Site Audit
		+ Determine System Size/Architecture
		+ Audit System Documentation (Schematics, Manuals)
		+ Audit Existing System Programs
		+ I/O Count
		+ Define Processors
		+ Identify Control Cabinets
		+ Identify remote/Field I/O Cabinets
		+ Locate and Document Networks
		+ Identify Operator Interfaces
		+ Audit Servers (HMI, Historian & Reporting)
		+ Audit Third Party Interfaces (Skids, Scales, Lvl
		1. User Requirements Workshop(s)

Needs analysis - document desired goals and outcome of the project

As-Needed

* 1. OFFSITE REQUIREMENTS

Services required to deliver submittals.

* 1. VENDOR REQUIREMENTS

Support Qualifications

* Bids shall be based upon a system that may be supported by local Systems Integrators, recognized by the vendor of the system.
* Number of local system integrators capable of supporting the system shall be no less than [XX] independent service providers within [x miles] of [County Name] County.
* The system shall have an authorized distributor within [x miles] of the [County Name] site.
* The system must have a field service engineering office within [x miles] of [County Name] County.
1. FOR REFERENCE ONLY – FINAL SYSTEM REQUIREMENTS
* Bids must be based on systems compliant with IEC 61131-3 specification for programmable controllers.
* The system must have system manufacturer issued development guideline documentation that may be used for configuration and development qualification.
* The system shall be composed of, but not limited to, the following system elements offered by a ***single*** vendor
	+ Process Automation System Server (HMI, Data Server, Alarm Server, System Directory)
	+ Engineering Work Stations
	+ Operator Workstations
	+ Controllers & IO
	+ Variable Frequency Drives, Soft starters and Electronic Overloads with EtherNet/IP Integration
	+ Ethernet Switches
* Major system revisions must be released by a single vendor of the system elements listed above.
* The system shall be capable of managing system security, including user and groups on a single unified administrative server.
* The system shall be based on hardware and software whose compatibility is managed by the manufacturer, and has public web sites to confirm compatibility of hardware & software revisions.
* All HART (**H**ighway **A**ddressable **R**emote **T**ransducer) I/O must be standard product, supplied and warranted by the systems supplier. (Present and future support must be identical to all other system components)

Modular Object Library

* The manufacturer shall provide a process library for both function blocks and their corresponding display elements Operator faceplates, compliant to ISA standards.
* The system shall include modular, configurable process objects developed by the manufacturer (controller functions and HMI templates) for operator control, maintenance & engineering functions. All process objects must have manufacturer supplied documentation and supported by the manufacturer’s standard technical support service.
* The system shall include configurable process objects developed by the manufacturer (controller functions and HMI templates) for standard procedural control, such as sequence control. All process objects must have manufacturer supplied documentation and supported by the manufacturer’s standard technical support service
* The system shall have pre-engineered device objects from the manufacturer displaying Ethernet network switch status and diagnostics.
* The system shall have pre-engineered device objects from the manufacturer displaying system controller status, HMI server status, Variable Frequency Drives control and status, soft starter control and status, and electronic overload control and status.
* The system shall have pre-engineered device objects from the manufacturer for integrated motor control with the capability to display motor control inhibits, faults, status information and preventative maintenance diagnostic information. Integrated motor control profiles must be available as a standard feature in the controller development environment.

*Alarming Capabilities*

* The PAS shall allow users to set up a complete alarm system.
* The alarm system shall have the ability to monitor any analog or digital tag for alarms. The alarm system database must allow up to 10,000 analog or digital alarm tags per PAS server.
* The alarm system shall provide a means of displaying up to 2,000 tags that are in alarm per PAS server. This alarm summary display shall be fully configurable.
* In the alarm summary display, a user can acknowledge an alarm. The alarm will then appear as acknowledged to all OWSs in the application.
* Custom alarm summary objects shall be able to be embedded on any display
* The alarm system shall allow online export of an alarm log file to ODBC format databases.
* The alarm system shall allow the operator to write a custom message to the alarm history.
* Alarms can either be polled or sent by exception from the controller.
* The alarming will support ISA 18.2 alarm management state model..

*High Availability Capabilities*

* The system shall be capable of controller redundancy.
	+ System processors shall be fully redundant and include automatic switchover to the backup controller. The user must be able to switch active controllers manually at any time.
* The system shall be capable of HMI and data server redundancy
* The system shall be capable of integrating redundant IO
* The system shall be capable of resilient device level ring networks

*Integrated Motor Control Capabilities*

* The system shall be capable of integrated motor control supplied by the same vendor as the system.
* The system shall be capable of Automatic configuration of Variable Frequency Drives parameters and Ethernet addresses in the event of Variable Frequency Drives replacement
* The manufacturer of the control system must supply device faceplates and controller profiles for control of Variable Frequency Drives, Softstarters and Electronic Overloads as well as display faults and device diagnostics.
* Variable Frequency Drives, Softstarters and Electronic Overloads shall be Ethernet/IP capable

*Virtualization Capabilities*

* System shall have been tested and vendor statement issued on VMWare compatibility

*Historical Data Capabilities*

* The system shall be capable of adding a historical data collection, based upon industry leading OSIpi database, and be a capable of browsing for system tags with a wizard, including filter of tags.
* Data collection nodes will feed the PI historian and be redundant.
* The system shall be capable of embedding historian trends and analytic tools into the HMI.
* The system shall be capable of exporting historical process data to Excel for Ad Hoc reporting with the use of Excel Add Ins.

*Process Networks Capabilities*

* The system shall be capable of integrating instruments for parameter configuration, status and diagnostics through ALL of the following protocols.
	+ EtherNet/IP (preference)
	+ HART (preference)
	+ Profibus PA
	+ Foundation Fieldbus
* All bus interface cards must be standard product, supplied and warranted by the systems supplier. (Present and future support must be identical to all other system components)

*Asset Management Capabilities*

* The system shall be capable of source revision control. The system shall be capable of providing revision control, with security profiles to limit access to electronic assets and feature access within development environments.
	+ Check-out: Writes the selected file or folder to a local working folder with read-write access and locks the selection to prevent multiple-user editing.
	+ Check-In: Reads the local working folder and updates the source control repository, creating new versions as needed.
	+ Get: Writes the selected file or folder to the local working folder with read-only access. Note: A Get can retrieve the latest or any historical version that is in the archive.
	+ Undo Check Out: Returns the selection to an unchecked out state and unlocks the selections.
* The system shall be capable of system record audit trail.
	+ Audits - Any changes on records such as:
		- Data value changes (timers, tags, instructors, etc.)
		- Create, delete or changing of rungs
		- Create, delete or changing of tags
		- User log-in/out
* The system shall be capable of system event tracking through system logs.
	+ Logging of events based on time and function.
* Reporting - Reporting of events or audits with scheduler:
	+ Weekly program file parameter report from applicable controllers
	+ Daily operator inputs from terminals
	+ Change history report for any electronic file
* Disaster Recovery
	+ Provides control system backup that is integrated with source control to provide reliable and easy access to the latest control system configuration files.
* Calibration Management
	+ Manages calibration records and files associated with the field instruments
* Process Device Configuration
	+ Ability to configure field instrumentation from the engineering work station.

*Advanced Process Control (APC) Capabilities*

* The system shall be capable of multivariable process control (MPC) within the controller layer.
* The system shall be capable of multivariable process control (MPC) at the application layer, offered by the same manufacturer as the control system.

*Third Party Software Integration*

* The system shall be capable of sharing real time data access (Site operations and historical information) for application interoperability through standard industrial telecommunications standards and specifications.
* The system shall be capable application interoperability through OPC or OpenO&M. The purpose of this is to enable the [County / Purchaser / Agency] to gain access for advanced & predictive applications such as, but not limited to process simulation, predictive maintenance.
* The [County / Purchaser / Agency] will establish the guidelines for data archiving, formatting, frequency and information stored through system (ie Historian) computers with ability to access the recovered operating information anytime independent of the system.
* Work with Purchaser's vendor to configure and customize data exchange from historical data application server.