

**Exhibit X**

**Submittals, Reviews and Hold Points**

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## **1. SUBMITTALS**

### **1.1 Summary**

- A. This section includes definitions, descriptions, transmittal, and review of submittals.
- B. Related Work Specified Elsewhere:
  - 1. Project meetings, schedules, and reports: Exhibit M of the Agreement.

### **1.2 General Information**

- A. Definitions:
  - 1. Select shop drawings (meaning equipment and fabrication requirements for construction, inclusive of arrangement, sub drawings etc. provided inclusive of field requirements for Owner use regarding future operations and maintenance), product data, and Samples are technical submittals prepared by Contractor, Subcontractor, manufacturer, or other Persons and submitted by Contractor to Owner as a basis for approval of the use of Equipment and Materials proposed for incorporation in the Work or needed to describe installation, operation, maintenance, or technical properties, as specified in each division of the specifications.
    - a. Shop drawings include custom prepared data of all types including drawings, diagrams, performance curves, material schedules, templates, instructions, and similar information not in standard printed form applicable to other projects.
    - b. Product data includes standard printed information on materials, products, and systems; not custom prepared for this Work, other than the designation of selections from available choices.
    - c. Samples include both fabricated and un-fabricated physical examples of materials, products, and Work; both as complete units and as smaller portions of units of Work; either for limited visual inspection or where indicated for more detailed testing and analysis. Mockups are a special form of samples which are too large to be handled in the specified manner for transmittal of sample Submittals.
  - 2. Informational submittals are those technical reports, administrative submittals, certificates and guarantees not defined as shop drawings, product data, or samples.

- a. Technical reports include laboratory reports, tests, technical procedures, technical records, and Contractor's design analysis.
  - b. Administrative submittals are those nontechnical submittals required by the Agreement or deemed necessary for administrative records. These submittals include maintenance agreements, bonds, project photographs, physical work records, statements of applicability, copies of industry standards, project record data, schedules, security/protection/safety data, and similar type submittals.
  - c. Certificates and guarantees are those submittals on Equipment and Materials where a written certificate or guarantee from the manufacturer or Contractor is called for in the Technical Specifications.
3. Refer to sections 1.3 and 1.4 of this document for detailed lists of submittals and specific requirements.

B. Quality Requirements:

1. Submittals such as drawings and data submitted shall be of suitable quality for legibility and reproduction purposes. Every line, character, and letter shall be clearly legible. Drawings such as reproductions shall be useable for further reproduction to yield legible hard copy.
2. Documents submitted that do not conform to the specified requirements shall be subject to rejection by Owner, and upon request, Contractor shall resubmit conforming documents. If conforming submittals cannot be obtained, such documents shall be retraced, redrawn, or photographically restored as may be necessary to meet such requirements. Contractor's or its Subcontractors' failure to initially satisfy the legibility quality requirements will not relieve Contractor or its Subcontractors from meeting the required schedule for submittals.

C. Language and Dimensions:

- a. All words and dimensional units shall be in the English language.
- b. Metric dimensional unit equivalents may be stated in addition to English units. However, English units of measurement shall prevail.

D. Submittal Completeness:

1. Submittals shall be complete with respect to dimensions, design criteria, materials of construction, and other information specified to enable Owner to review the information effectively.

2. Where standard drawings are furnished which cover a number of variations of the general class of equipment, each drawing shall be annotated to indicate exactly which parts of the drawing apply to the equipment being furnished. Use hatch marks to indicate variations which do not apply to the submittal. The use of "highlighting markers" will not be an acceptable means of annotating submittals. Such annotation shall also include proper identification of the submittal permanently attached to the drawing.
3. Reproduction or copies of Agreement drawings or portions thereof will not be accepted as complete fabrication or erection drawings, but will be acceptable when used by Contractor as a drawing upon which to indicate information on erection or to identify detail drawing references. Whenever the Agreement drawings are revised to show additional Contractor's information, the title block shall be replaced with Contractor's title block, and the professional seal shall be removed from the drawing.

E. Form of Submittals:

1. Submittals and other project documents shall be transmitted in electronic format as specified.
  - a. Electronic format shall include Microsoft Office formats, Adobe \*PDF format, Primavera, or AutoCAD.
  - b. Selected submittals may be provided in paper ("hardcopy") copies with advance approval of Owner, and using procedures specified herein.
  - c. Equipment instruction books and operating manuals shall be provided in paper copies in addition to specified electronic format.
2. Electronic Format using Owner's Document Management System (DMS):
  - a. Scanned submittals and documents are not acceptable. Transmit submittal and project documents in:
    - i. Adobe \*PDF files created directly from native electronic format, or
    - ii. Owner approved equal.
    - iii. Electronic Submittals in .TIF format are permitted only with specific Owner approval.
    - iv. Documents requiring review and comment shall be submitted in Adobe \*PDF and Native file formats.

- b. Each drawing shall be submitted with an electronic file name that is equivalent to the drawing number, and any resubmitted drawing shall use the same file name as the original file name each time. No spaces or periods (except in the file extension) are allowed in the file name.
  - c. Contractor submittals shall be accompanied with a completed transmittal letter. Submittals that are not accompanied with an approved transmittal letter will not be accepted and will be returned to Contractor.
  - d. All Contractor transmittal letters submitted to Owner shall be in the form supplied and shall contain as a minimum the following information:
    - i. Contractor's Name.
    - ii. Project number.
    - iii. Agreement number.
    - iv. Filename.
    - v. Description of the information contained in the specific submittal.
    - vi. Revision number.
    - vii. Submittal type.
    - viii. Date of submittal.
  - e. Nonconforming submittals are subject to rejection.
3. Owner's review comments will be provided electronically in both the Native file format and Adobe \*PDF format.
  4. Digital delivery media for transmittal of electronic documents and submittals shall be through Owner's DMS in accordance with the procedures specified herein, as addressed below. See Section 3.0 for more details.

### **1.3 Technical Submittals**

- A. Items shall include but not be limited to, the following:
  1. Manufacturer's specifications.
  2. Catalogs, or parts thereof, of manufactured equipment.

3. Shop fabrication and erection drawings.
4. General outline drawings of equipment showing overall dimensions, location of major components, weights, and location of required building openings and floor plates.
5. Detailed equipment installation drawings, showing foundation details, anchor bolt sizes and locations, base plate sizes, location of Owner's connections, grounding pads and all clearances required for erection, operation, and disassembly for maintenance.
6. Schematic diagrams for electrical items, showing external connections, terminal block numbers, internal wiring diagrams, and one-line diagrams.
7. Bills of material and spare parts list.
8. Instruction books and operating manuals.
9. Material lists or schedules.
10. Performance tests on equipment by manufacturers.
11. Samples and color charts.
12. All drawings, catalogs, or parts thereof, manufacturer's specifications and data, samples, instructions, and other information specified or necessary:
  - a. To determine that Equipment and Materials conform to the design concept and comply with intent of the Contract.
  - b. For proper erection, installation, operation, and maintenance of Equipment and Materials which will be reviewed for general content but not for basic details.
  - c. To determine what supports, anchorages, structural details, connections, and services are required for Equipment and Materials, and effects on contiguous or related structures, Equipment and Materials.

B. Schedule of Submittals:

1. Prepare a schedule for submission of all submittals specified or necessary for approval of the use of Equipment and Materials proposed for incorporation in the Work or needed for proper installation, operation, or maintenance. Submit the schedule with the Work progress schedule. Schedule submission of all submittals to permit review, fabrication, and delivery in time so as to not cause

delay in the Work of Owner or its Subcontractors or any other Person as described herein.

2. In establishing schedule for submittals, allow 20 Business days in Owner's office for reviewing original submittals and 15 Business days in Owner's office for reviewing re-submittals.
3. Submittals requiring revisions will be resubmitted within 15 Business days after receipt of Owner's review notations.
4. The schedule shall indicate anticipated dates of original submission for each item and shall be based upon at least one resubmission of each item.
5. Schedule all submittals (shop drawings, product data, and samples), not listed in section 2 below, required prior to fabrication or manufacture for submission as necessary to meet Agreement delivery requirements.
6. Resubmit submittals the number of times required to be approved. However, any need for re-submittals in excess of the number set forth in the accepted schedule, or any other delay in obtaining approval of submittals, will not be grounds for extension of the schedule.

C. Transmittal of Submittals:

1. All submittals (shop drawings, product data, and samples) for Equipment and Materials furnished by Contractor, Subcontractors, manufacturers, and other Persons shall be submitted to Owner thru the Contractor.
  - a. Reports and letters shall be 8.5"x11" unless containing drawings requiring 11"x17" for legibility.
  - b. Shop drawings shall be D size and submitted in electronic form unless otherwise agreed by Owner during the Work.
2. Transmit all Submittals to Owner as follows:
  - a. Mark each Submittal by project name and number, Agreement title and number, and applicable Technical Specification section and Article numbers. Include in the letter of transmittal the drawing number and title, sheet number (if applicable), revision letter, and electronic file name (if applicable). Unidentifiable submittals will be returned for proper identification.
  - b. Check and approve submittals of Subcontractors, other Persons, and manufacturers prior to transmitting. Contractor's submission shall constitute a representation to Owner that Contractor approves



submittals and has determined and verified all design criteria, quantities, dimensions, materials, catalog numbers, compliance with Codes and Standards, and similar data, and Contractor assumes full responsibility for doing so; and Contractor has coordinated each submittal with requirements of the Work and the Agreement.

- c. At the time of each submission, call to attention in the letter of transmittal any deviations from requirements of the Agreement.
  - d. Make all modifications noted or indicated and return the required number of revised submittals until approved. Direct specific attention in writing, or on revised submittals, to changes other than the modifications called for by on previous submittals. Previously approved submittals transmitted for final distribution will not be further reviewed and are not to be revised. If errors are discovered during manufacture or fabrication, correct the submittal and resubmit for review.
  - e. Following completion of the Work and prior to final payment, furnish record documents and approved samples and shop drawings necessary to indicate "as constructed" conditions, including field modifications, in the number of copies specified. Furnish additional copies for insertion in equipment instruction books and operating manuals as required. All such copies shall be clearly marked "PROJECT RECORD."
    - i. Submit a final record copy of the master field drawing list which shall indicate the final revision status of each drawing on the list.
    - ii. Accompany submittal with transmittal letter containing date, contract number and title, Contractor's name, address and telephone number, number and title of each record document and signature of Contractor's authorized representative.
3. Quantity Requirements:
- a. Except as otherwise specified, transmit all shop drawings in the following quantities for Owner's use. Additional copies shall also be provided to the Owner as required by the Owner:
    - i. Initial Submittal:  
  
Electronic - One copy to Owner.
    - ii. Re-submittals:  
  
Electronic - One copy to Owner.

- iii. Submittal for final distribution:
  - Electronic - One copy to Owner.
- iv. As-constructed documents:
  - Electronic - One copy to Owner.
  - Paper - One copy to Owner.
- b. Transmit Submittals of product data as follows:
  - i. Initial Submittal:
    - Electronic - One copy to Owner.
  - ii. Re-submittals:
    - Electronic - One copy to Owner.
  - iii. Submittal for final distribution:
    - Electronic - One copy to Owner.
- c. Transmit Submittals of material samples, color charts, and similar items as follows:
  - i. Initial Submittal - One to Owner.
  - ii. Re-submittal - One to Owner.
  - iii. Upon approval, no sample(s) will be returned to Contractor.
- d. Transmit submittals of equipment instruction books and operating manuals as follows:
  - i. Initial Submittal:
    - Electronic - One copy to Owner.
  - ii. Re-submittals:
    - Electronic - One copy to Owner.
  - iii. Submittal for Final Distribution - Six paper copies and one electronic copy to Owner.

- e. When all submittals have been updated to "as-constructed" conditions, transmit to Owner in electronic format.
  - f. Owner and Owner may copy and use for internal operations and staff training purposes any and all document submittals required by this Agreement and approved for final distribution, whether or not such documents are copyrighted, at no additional cost to Owner or Owner.
- D. Owner's Review:
- 1. Owner may review submittals for indications of Work or material deficiencies.
  - 2. Owner will respond to the Contractor on submittals which indicate there may be a Work or material deficiency.
  - 3. Contractor shall respond promptly to Owner's comments.
  - 4. Owner's review of shop drawings, product data, or samples will not relieve Contractor of responsibility for any deviation from requirements of the Agreement unless Contractor has in writing called Owner's attention to such deviation at the time of submission, and Owner has given written concurrence in and approval of the specific deviation. Approval by Owner shall not relieve Contractor from responsibility for errors or omissions in submittals.
- E. Instruction Books and Operating Manuals:
- 1. Refer to Exhibit V - Operating and Maintenance Manuals for details.
- F. Samples:
- 1. Office samples shall be of sufficient size and quantity to clearly illustrate the following:
    - a. Functional characteristics of the product, with integrally related parts and attachment devices.
    - b. Full range of color, texture, and pattern.
    - c. Material, manufacturer, pertinent catalog number, and intended use.

#### **1.4 Informational Submittals**

- A. Informational submittals are comprised of technical reports, administrative submittals, and guarantees which relate to the Work, but do not require Owner approval prior to proceeding with the Work. Informational submittals include but are not limited to:

1. Test reports.
2. Certification on materials:
3. Steel mill tests.
4. Shipping and/or packing lists.
5. Job progress schedules.
6. Equipment and Materials delivery schedules.
7. Warranties and guarantees.
8. Calculations
9. Electrical System Models (e.g. SKM Power\*Tools model)
10. Physical Design Models (e.g. Intergraph's PDS)

B. Transmittal of Informational Submittals:

1. All informational submittals furnished by Contractor, Subcontractors, manufacturers, and other Persons shall be submitted to Owner unless otherwise specified.
  - a. Identify each informational submittal by project name and number, Agreement title and number, and the Technical Specification Section and Article numbers marked thereon or in the letter of transmittal. Unidentifiable submittals will be returned for proper identification.
  - b. At the time of each submission, call to the attention of Owner in the letter of transmittal any deviations from the requirements of the Agreement.
2. Quantity Requirements:
  - a. Technical reports and administrative submittals except as otherwise specified:
    - i. Electronic: One to Owner.
3. Test Reports:

- a. The party specified responsible for testing or inspection shall in each case, unless otherwise specified, arrange for the testing laboratory or reporting agency to distribute test reports as follows:
  - i. Owner: One copy.
  - ii. Contractor: One copy.
  
- C. Owner's Review:
  - 1. Owner may review informational submittals for indications of Work or material deficiencies.
  - 2. Owner will respond to the Contractor on those informational submittals which indicate Work or material deficiency.
  - 3. Contractors shall respond promptly within ten (10) Business Days to any identified deficiencies.

## **2. SUBMITTAL SCHEDULE & TECHNICAL DOCS**

### **2.1 Submittal Schedule**

Refer to Exhibit X Table 1 (EWB-3-LI-012-0001), EPC SUBMITTAL REQUIREMENTS LIST

### **3. SPECIFICATION FOR ELECTRONIC SUBMITTAL OF CONTRACTOR DOCUMENTATION - LKE\_TL\_03.12**

LG&E / KU Specifications for Electronic Submittal of Contractor Documentation

#### **3.1 Introduction**

- A. The purpose of this document is to set forth the minimum standards for submittal of contractor documentation for equipment or package system purchases. This document would typically be provided to Equipment Contractors.
- B. LG&E / KU Generation utilizes Oracle IPM as a repository that provides secure storage, backup and recovery for all electronic files, document images, and various record types that are not likely to change. Examples: Contractor drawings, instruction manuals, correspondence, and all other contractor documentation. Drawing and document numbers are assigned by the contractor.
- C. Documents from sub-contractors shall be included and provided in a similar fashion to those of the primary contractor.
- D. Project records are to be submitted to the LG&E / KU project manager per this specification and shall include a formal transmittal.
- E. Final documentation shall include the most recent revisions and up to date information, as-built or as-delivered modifications to be submitted within 30 days of project completion.
- F. This document sets forth the basic guidelines for electronic drawing/document submittal. Since technology is constantly evolving, file formats and application versions listed in this document are subject to mutually agreeable change.
- G. In addition to these specifications LG&E / KU has other document submittal requirement as listed below:
  - LKE\_CT\_03.12 - Specifications for Electronic Submittal of Cable Tabulation Records
  - LKE\_DMS\_03.12 - Specifications for Electronic Submittal of Engineering Drawings

NOTE: Not all specifications will be applicable to all projects.

#### **3.2 Oracle IPM (formerly Stellant IBPM) – Contractor Drawings/Other Documents**

- A. This specification provides minimum requirements on how documents shall be provided electronically to LG&E / KU.

- B. Unless otherwise specified in the contract or purchase order, final documentation, drawings, specifications, and manuals are to be submitted in electronic format on CD or DVD. Documents shall be separated into Document Types before compiling onto CD or DVD for electronic submittal.
- C. In addition, electronic submissions may be requested via e-mail, and hard copies may be required.
- D. Letter/Legal size documents are to be submitted in Microsoft Word or Adobe \*PDF format.
- E. Drawings created by CAD software shall be submitted in AutoCAD DWG format or \*PDF images. Non-CAD drawings shall be submitted in TIFF or \*PDF formats.
- F. Each drawing submitted in CAD, \*PDF, and TIFF format shall have a unique filename unless the drawing is only intended to be submitted as a page in a larger document or manual.
- G. Photographs, aerial photos or maps etc. shall be submitted in JPG format.
- H. If the number of records being submitted exceeds 20 records, an index (as it applies per type of record being submitted) shall be provided for each contractor or sub-contractor drawing and other documentation for storage into Oracle IPM. Drawings are to be indexed individually. Other documentation, such as project files, can be batched by the Document Type and indexed as a group. The index shall be submitted electronically in Excel or Access format which includes, as a minimum, the information contained in Table 1 at the end of this section.

### **3.3 Oracle IPM - Technical Library Manuals and Reports**

- A. Technical manuals, parts catalogs and equipment specifications originating from an equipment manufacturer or distributor shall be submitted in \*PDF format.
- B. Power Plant system manuals which contain a compilation of customized technical specs or equipment manuals from various sources must be provided in a sectional format with a detailed table of contents. System manuals may be submitted in a bound hardcopy or \*PDF format. Hard copies shall be submitted with duplicate \*PDF files. The \*PDF shall closely mimic the sectional hardcopy style with a table of contents referencing each section. If the entire manual is greater than 200 pages, then each section must be provided as a separate \*PDF file.
- C. Technical and Regulatory Reports including Outage Reports must be submitted in \*PDF format, rendered from the original document when possible, otherwise PDF's containing scanned images of the report(s) are acceptable. Desktop services may be able to provide you with the necessary \*PDF print driver required to output compound \*PDF document from your software application.



- D. All manuals and reports will be provided to LG&E / KU by filling out spreadsheets provided by LG&E / KU following the format laid out in Table 2 at the end of this section.

\*PDF Format: All PDF documents submitted must be PDF/A-1a or PDF/A-1b compliant. See ISO Spec 19005-1:2005 Document Management - Electronic document file format for long term preservation - Part 1 Reference: <http://en.wikipedia.org/wiki/PDF/A>

**TABLE 1 – Typical Information for Oracle IPM Data Submission**

Field Name	Character Limit	Examples
Document ID#	20	<i>Louisville Order #, Contract #, PO #, Spec ID #, Photo #, or Plant ID #</i>
Initiative #	16	<i>LG&amp;E / KU Project #</i>
Contractor	40	Manufacturer
Contractor Document ID	30	Manufacturing Drawing #
AE Name	40	
AE Drawing #	30	
Type of Equipment Description	90	Drawing or Record Title, Description
Plant/Location	20	
Unit	20	BR3 or (Unit 0 - common systems)
Comments	50	Additional information pertaining to document
Record Type	10	Record Types: PD – for Drawings and PF – for other documentation. If PF applies then Document Type must also be supplied. Files are to be batched and labeled by Document Type.
Record Source	20	Contractor
Document Type	20	Contracts, specifications, financial, proposal/bids, correspondence, manuals, pictures and miscellaneous.
Record Description	50	Specific type of record for example : Structural Calculations Report
Volume #	10	With leading 0's ( 001, 010 or 999 )
System	50	
Equipment #	50	EID #, Serial #, Shop Order #
Date	10	MM/DD/YYYY ( Format consistency important)

**TABLE 2 – Typical information for Technical Library Manuals and Reports**

Data Entry Instructions			
Field Name	Description / Comments	Type / Length	Values / Examples
Media Label	The name of the media the document is contained on. Please make sure to uniquely identify each media volume delivered, use black permanent marker to label media.	Char / 20	Project Name – IOM-001
File Path	Enter the relative path of the file being indexed without drive a letter. (Path relative to the root of the source media, CD/DVD etc..)	Char / 50	\\dir1\dir2\filename.pdf
Record Type	Manual for all IOM Manuals, sections or chapters contained in a manual. Report for all inspection or reports on specific plant equipment and or systems that are not specifically incorporated with an IOM Manual.	Picklist	MANUAL, REPORT
Document Id	Order #, PO #, Contract #, Spec Id	Char / 20	Louisville Order #, Contract #, PO #
Project No	LG&E or KU designated project number	Char / 16	LG&E / KU Project Number
Plant	Standard 2 Character Plant ID	Picklist	BR etc.
Unit	Standard 2 digit Unit Id, 00 designates entire plant facility	Picklist	00, 01, 02, 03, etc..
System	System name from Maximo	Picklist	FUEL OIL EQUIPMENT, COAL CONVEYOR
Sub-System	Sub-system name from Maximo	Picklist	ALARM MISC INST. AND CONTROL
Manual / Report Title	Manual / Report Title is repeated for each section / chapter for all entries contained in a particular manual or report. Including tables of contents, sections/chapters appendixes and attachments	Char / 50	COAL CONVEYOR
Volume	Volume Id of Manual or Report	Numeric / 3	1, 2, 3 etc

Data Entry Instructions			
Field Name	Description / Comments	Type / Length	Values / Examples
Set (Volume Set)	Volume set Id of Manual or Report	Numeric / 3	1, 2, 3 etc
Manufacturer / Contractor	Name of manufacturer or contractor of equipment	Char / 30	General Electric
Revision Date	Document revision date	Char / 10	MM/DD/YYYY or MM/YYYY
Section / Chapter Id	Please use the following conventions for section enumeration: TOC Table of Contents, 00 Entire Manual or Report contained in a single file. Letters and/or numbers can be used. Examples: (1 = Section 1), (1.1 = Section 1 Sub-section 1), (1.1.1, 1.1.a and 1.1.1a) are all valid. Make sure that all Id's are in the proper sequential order for each Manual or Report.	Char / 10	Sequential enumeration of Section / Chapter
Section / Chapter Description	Detailed description of Section or Chapter	Char / 150	Section / Chapter level description
Comments	Data entry comments (not filed)	Char / 150	Misc. comments

## **4. SPECIFICATION FOR ELECTRONIC SUBMITTAL OF ENGINEERED DRAWINGS - LKE\_DMS\_03.12**

### **4.1 Introduction**

- A. The purpose of this document is to set forth the minimum standards for submittal of engineered drawings for all outside engineered systems or plant improvements. This document would typically be provided to Contractor. It is the responsibility of the Contractor to ensure that each of their Subcontractors who may be supplying engineering drawings receives and follow these submittal requirements.
- B. LG&E / KU Generation utilizes the Drawing Management System (DMS) which works with AutoCAD and CAD viewing software to create, edit, view, and manage CAD drawings. DMS houses drawings only that are likely to require updating and editing. Examples include: most Contractor generated drawings such as electrical schematics, wiring diagrams, P&ID, steel, concrete and piping plans/details, and general arrangement drawings. Drawing numbers are normally assigned by LG&E / KU.
- C. Engineered drawings are to be submitted to the LG&E / KU project manager per these specifications and are to include a formal transmittal.
- D. Final documentation shall include the most recent revisions and up to date information, as-built or as-delivered modifications to be submitted within 30 days of project completion.
- E. This document sets forth the basic guidelines for electronic drawing/document submittal. Since technology is constantly evolving, file formats and application versions listed in this document are subject to mutually agreeable change.
- F. In addition to these specifications LG&E / KU has other document submittal requirement as listed below:
  - LKE\_CT\_03.12 - Specifications for Electronic Submittal of Cable Tabulation Records
  - LKE\_TL\_03.12 - Specifications for Electronic Submittal of Vendor Documentation

NOTE: Not all specifications will be applicable to all projects.

### **4.2 Drawing Management System - CAD drawings**

- A. General
  - 1. This specification provides minimum requirements on how CAD drawings shall be provided to the Owner.

2. There are no defined CAD standards that the Owner requires the Contractor to follow. It is up to the Contractor to use their standards as long as it complies with the other requirements of this document.
3. Once the final copy is released to the Owner, the Owner will become the proprietor of the electronic drawing. The Owner will take full responsibility for all future modifications and subsequent liability thereof.
4. Unless otherwise specified in the contract or purchase order, only the final copy of the drawing shall be provided to the Owner for electronic storage. The final copy shall include all as-built or as-delivered modifications.
5. All new CAD drawings shall be vector based unless a copy of a waiver to this requirement for the specific drawing(s) is provided with the transmittal.
6. Unless otherwise specified in the contract or purchase order existing plant prints requiring modification shall be redlined and submitted electronically in color TIFF/JPG or \*PDF format as a sketch (SK) drawing. The drawing number shall include the letters SK and the existing plant drawing number. An SK drawing can be used to identify a drawing to be voided. LG&E/KU will be responsible for incorporating these changes into the existing drawing. Black and white TIFF or \*PDF redlined drawings may be submitted if redlined hard copies are also provided if a copy of a waiver to this requirement for the specific drawing(s) is provided with the transmittal.
7. The Owner shall provide to the Contractor an AutoCAD version of all LG&E / KU drawing title blocks as required. The Owner shall also provide hard copy, TIFF or \*PDF images of existing plant drawings for redlining unless otherwise outlined in the contract.
8. The Owner reserves the right to request sample AutoCAD drawings to test our ability to access and properly view the drawing information within our applications.
9. Upon project completion final paper copies of as-built drawings shall be provided to the project manager or designee unless a copy of a waiver to this requirement for the specific drawing(s) is provided with the transmittal. The number of paper drawing sets required shall be outlined in the contract.

\*PDF Format: All PDF documents submitted must be PDF/A-1a or PDF/A-1b compliant. See ISO Spec 19005-1:2005 Document Management - Electronic document file format for long term preservation - Part 1 Reference: <http://en.wikipedia.org/wiki/PDF/A>

### **4.3 Vector Based CAD Drawings**

- A. Drawings shall be drawn in AutoCAD 2008 version or later but must be saved and turned over to the Owner in AutoCAD 2007 file format.
- B. When using other CAD applications and performing conversions to AutoCAD the contractor shall ensure that drawing attributes, block names, line types, line weights, font styles, dimension styles, etc. are properly converted. Ultimately the converted file, when plotted, should look identical to the version created in the native CAD format. The Owner may request electronic copies of converted files to review the conversion quality from native format to AutoCAD.
- C. The drawings shall be bordered by a title block/drawing sheet provided by the Owner. Drawing sizes A thru E are available by request.
1. The drawing sheet shall be inserted as a block retaining all of the title block attributes and layers. Do not explode or modify the title block or change the title block name, layer names, or modify the attribute tag names in the Owner supplied title block.
  2. The drawing sheet shall be inserted at the 0,0 coordinate in layout 1 paper space view such that the lower left hand corner of the sheet is at 0,0.
  3. The title block attributes shall be filled out. See Table 3 for typical title block attributes and Figure 1 for a sample title block. Other LG&E / KU title blocks may be used depending on plant locations and drawing size.
  4. The Contractor shall provide their company name in the Originally Designed by attribute in the title block. In addition, they may insert their own title block, company logo, and/or PE stamp to the immediate left of the Owner's title block as a separate AutoCAD block. This information shall not stand taller than the Owner's title block. See Figure 1.
- D. All non-dimensioned drawings shall be drawn at a 1 to 1 scale. These drawings may include electrical schematics, wiring, and connection diagrams, mechanical flow diagrams, and logic diagrams.
- E. The Contractor will provide the Owner an estimated range of drawing numbers for each of the major disciplines (Arch, Civil, Structural, Mech, Elect) and by plant unit or common. The Owner will provide a range of Unit-specific LG&E / KU drawing numbers to the Contractor as required based on this information.
- F. Drawing numbers shall use the following format:

BR3-E-12345-4321 or BR3-SK-E-12345-4321

Where-

BR3 is the 3 or 4 digit plant and unit number (0=common)

SK used only if identifying a redlined existing plant drawing

E is the engineering discipline (E-Electrical, C-Civil, M-Mechanical, A-Architectural, S-Structural)

12345 is the 5-digit next available drawing number based on location AND discipline. Field must have the leading zeros padded to (5) digits such that drawing "432" would appear as "00432"

4321 is an optional Contractor-assigned 4-digit alphanumeric describing a specific page or sheet number of the drawing. This field is optional but if used it shall be padded to (4) characters.

- G. The Contractor may include their own drawing number in their title block (if included) but all internal and external drawing references shall utilize the Owner's assigned drawing number.
- H. LG&E / KU drawing number revisions shall start with the letter "A" and proceed through the alphabet skipping the letters "I" and "O". Numbers are not to be used for LG&E / KU revisions unless used for preliminary drawings for review not for final submittal.

#### **4.4 Raster (or hybrid) Based CAD Drawings**

- A. Where required, hybrid CAD techniques may be employed to modify existing plant drawings. Do not use AutoCAD's WIPEOUT command to mask raster images. The raster images shall be modified using raster editing software such as Raster Design 2008 as provided by Autodesk.
- B. Raster images shall be provided in a GP4 (CALs Group 4, Type 1) format. Other formats may be acceptable upon review with the LG&E / KU.
- C. A sample drawing (containing as a minimum both a DWG and a GP4 file) shall be provided to test LG&E / KU's ability to access the hybrid drawing information.
- D. All raster images shall be scanned at a minimum 200 DPI resolution. Higher resolutions shall be used if the drawing detail or quality warrants it.
- E. Scanning shall be by the Contractor or by the Company as outlined in the specific contract. The original raster title block shall be removed. The standard Owner's title block will be inserted as per paragraph 4.3.C.2 the scanned image shall be visible in a viewport.



- F. If specified in the contract vectorization of raster or hybrid drawings may be required prior to final submission. Contractor and Owner will agree upon drawings to be vectorized.
- G. All other items in section 4.3 apply.

#### **4.5 CAD Drawing Submittal**

- A. Final AutoCAD drawings and raster images (in the case of Hybrid drawings) shall be submitted to Owner on CD or DVD. The file names shall match the LG&E / KU drawing numbers
- B. Back-up TIFF or \*PDF images of the drawings as produced from the native CAD application shall be provided on the CD. TIFF or \*PDF images shall include the signed PE stamp if applicable.
- C. Drawings may be created using x-references and/or links to other drawings but when the final drawing is submitted to Owner, all external references shall be permanently bound into the drawing such that there is only one DWG file per drawing. Likewise if there are multiple insertions of raster images (in the case of Hybrid drawings) they shall be merged into a single raster image file with the same name as the DWG file except using the file extension of one of the approved raster formats.
- D. Each drawing shall be submitted under a different file name. For example if three drawings are created using three different paper space views of the same model space, it shall be duplicated three times and only the view representative of the individual drawing shall be saved in the final file as layout 1 in paper space. Any extraneous drawing entities in model space not pertaining to the drawing shall be deleted.
- E. Standard AutoCAD text fonts should be used. If any non-standard AutoCAD fonts, textures, dimension styles, plot styles, etc. are used within the drawing, a copy shall be provided when the drawings are submitted to Owner.
- F. If drawings are created with line weights based on Color Tables, the proper CTB file shall also be provided to the Owner. CTB filenames are to be unique and should include the contractor's initials and a date.
- G. Non-standard support files submitted according to 4.5.E and 4.5.F shall be given unique filenames containing originating company's name or initials.
- H. If drawings are created based on layer/level dependent line weights, a listing of those settings shall be provided to the Owner. (NOTE: Line weights based on CTB tables is preferred).
- I. The Contractor shall keep a backup copy of all electronic data provided to Owner for a minimum of 1 year from the date sent to Owner.

- J. All drawings and media provided to Owner shall be fully manifested. If 20 or more drawings are to be submitted an index shall be provided electronically in Excel or Access format which includes, as a minimum, the information contained in table 1 at the end of this section.

**TABLE 1 – Typical Drawing Attribute Information for DMS Submission**

Field Name	Character Limit	Examples
Project	8	As agreed upon in the contract
Drawing Number	20	As agreed upon in the contract
Alternate Drawing Number	20	Contractor's internal drawing number (optional )
Revision	1	A or B or C... (skipping I and O)
Original creation date	8	12/01/00
Latest revision date	8	12/31/00
Title	96	
Location	4	BR3 (0=common systems)
Engineering Discipline	1	E=electrical, C=civil, M=mechanical, A=architectural, S=structural
Drawing Type	Any	wiring, schematic, flow, logic, site plan, foundation, piping, details, steel, etc.
Drawing size	1	D or E, etc.
Scale	Any	1/4"=1', none, as noted, etc.
CAD Filename	Any	File name shall match the LG&E/KU drawing number and shall not contain any spaces.
Release Reason	Any	Construction, Approval, Reference, etc

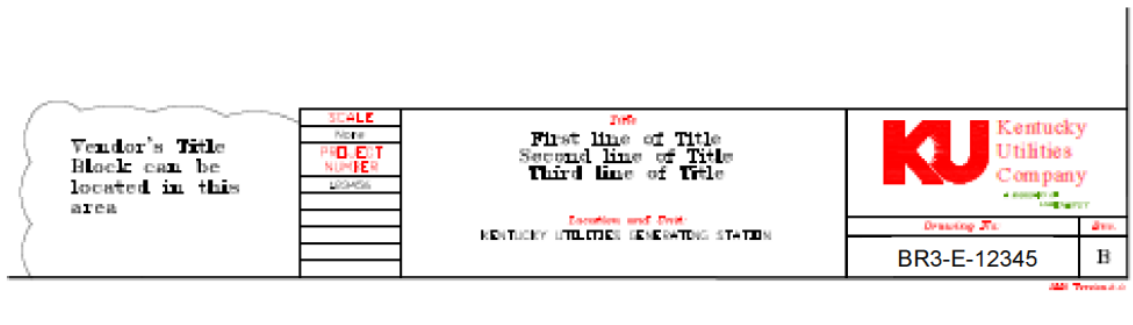


Figure 1

Sample Title Block

(other versions and formats are available)

## **5. SPECIFICATION FOR ELECTRONIC SUBMITTAL OF CABLE TABULATION RECORDS - LKE\_CT\_03.12**

### **5.1 Introduction**

- A. This data submittal would be used for custom engineered projects or systems where individual wires and cables are tracked throughout the design process. This document would typically be provided to Contractors. It is the responsibility of the Contractor to ensure that each of their Subcontractors who may be supplying cable tabulations receives and follow these submittal requirements.
- B. LG&E / KU Generation utilizes one application for electronic storage and retrieval of cable tabulation records:
- Drawing Management System (with Cable Tab Management)
- C. Project records are to be submitted to the LG&E / KU per these specifications.
- D. Final documentation shall include the most recent revisions and up to date information, including as-builts or as-delivered modifications to be submitted within 30 days of project completion.
- E. This document sets forth the basic guidelines for electronic cable tab records and document submittal. Since technology is constantly evolving, file formats and application versions listed in this document are subject to mutually agreeable change.
- F. In addition to these specifications LG&E / KU have other document submittal requirements as listed below:
- LKE\_DMS\_03.12 - Specifications for Electronic Submittal of Engineered Drawings
  - LKE\_TL\_03.12 - Specifications for Electronic Submittal of Vendor Documentation

NOTE: Not all specifications will be applicable to all projects.

### **5.2 Drawing Management System - Cable Tab Records**

- A. This specification provides minimum requirements on how information shall be provided electronically to LG&E / KU.
- B. Unless otherwise specified in the contract or purchase order final cable records are to be submitted in electronic format on CD or DVD.
- C. In addition, electronic submissions may be requested via e-mail, and hard copies may be required.

- D. Unless otherwise specified in the contract or purchase order the Owner will provide a range of LG&EIKU cable numbers to the Contractor as required for the project.

Cable numbers shall be generated using the following format:

BR3-AN-12345

Where-

**BR3** is the 3 or 4 digit plant and unit number (O=common)

**AN** is the system code (Each plant has its onset AND will be provided)

**12345** is the 5-digit next available cable number based on location AND system code. Field must have the leading zeros padded to (5) digits such that cable "432" would appear as "00432".

Cable revisions shall start with the letter "A" and proceed through the alphabet skipping the letters "I" and "O".

- E. If more than 20 records are to be submitted, the information indicated in TABLE 1 shall be provided for each cable tab number for storage into DMS. The index shall be submitted electronically in Excel or Access format.

**TABLE 1 - Typical Information for Cable Tab Record Data Submission**

Field Name	Character Limit	Examples
Cable Number	12	The actual number of the cable as listed on the cable sheet. On new cables the number can be automatically assigned Ex. BR3-SS-10000
Location Code	3	The location is the plant and generating unit for which the cable was created Ex. BR3 - Brown Unit 3
Plant System	3	An organization of similar equipment related to various portions of the plants. Ex. CH - Coal Handling
Page No.	4	The page number or tab that the

Field Name	Character Limit	Examples
		cable information is on.
Physical Status Code*	1	The physical status code indicates the cables current status in its physical state. See chart for additional information.
Service	125	This is the service or function that the cable is being used for.
Conductor Quantity	3	The number of conductor(s) in a cable.
CT From/To Equip Desc	100	The equipment name and description the cable(s) runs "to" and "from".
CT From/To Wiring Dwg	20	The wiring drawings that the cable(s) runs "to" and "from".
Cable Quantity	3	The number of individual cables ran together under a single cable number.
Cable Construction*	15	This is an abbreviated construction description of how the cable is made.
Conductor Size*	10	The physical size of the individual wirers) in a cable.
Ground Conductor Size	10	The physical size of the ground wirers) in a cable.
Cable Type	10	Is what the cable is actually being usedfor. (i.e. power, data, control)
Rated Voltage	10	The ANSI maximum voltage rating the cable(s) or individual conductor(s) can handle.
Insulation Type	10	The material used to insulate the

Field Name	Character Limit	Examples
		individual conductors(s) of a cable.
Jacket Type	10	The material used to insulate the cable and its conductor(s).
Cable Length	4	The length of the cable "to" and "from" equipment.
CT From/To Physical Dwg	20	The physical drawing that the cable(s) runs "to" and "from".
CT Sch Dwg	20	The schematic drawing that is associated with the cable (s).
Raceway Type*	10	The material used to contain and support the cable that runs in between the "to" and "from" location.
Routing	339	An overall description of how the cable is ran "to" and "from".
Raceway Size*	10	The size of the raceway type.
CT Drawing Num	20	The drawing number that is on the cable tab sheet where the cable exists.
BOM Item	35	This is the project number or what the cable was billed to or ordered under.
Comments	120	A general area for any additional information.

\* See TABLE 2 for valid field contents



**TABLE 2 - Valid Field Contents**

<b>Cable Construction</b>	<b>Cable Type</b>	<b>Conductor Size</b>	<b>Insulation &amp; Jacket</b>	<b>Raceway Size</b>	<b>Raceway Type</b>	<b>Rated Voltage</b>	<b>Physical Status Code</b>
C CTRL	CTRL	26 awg	EPR	1/2	EMT	45V	1 Installed
C PWR	PWR	24 awg	HYP	3/4	IMT	50V	2 Demolished
C w/gnd	INST	22 awg	N	1	RAC	150V	3 Abandoned
C w/gnd ALX	DATACOM	20 awg	PVC	1 1/2	RMC	300V	4 Spare
C w/gnd STX	ND	18 awg	SIS	1 1/4	PVC	600V	5 TBD
C ALX		16 awg	THHN	2	PVC-80	800V	
PR		14 awg	THWN	2 1/2	SBT	900V	
PR E-TC		12 awg	XLPE	3	VB	1KV	
PR J-TC		10 awg	CPE	3 1/2	LDT	2KV	
PR K-TC		9 awg	ETFE	4	CT	2.5KV	
PR CRC		8 awg	EPDM	4 1/2	TD	4KV	
TR		6 awg	FEP	5	ST	4.5KV	
C STX		4 awg	GLASS	6	ND	5KV	
SHLD		2 awg	NYLON	4" tray		8KV	
C5		1 awg	PE	6" tray		12KV	
CX		1/0 awg	PFA	9" tray		15kV	
FO		2/0 awg	PTFE	12" tray		17KV	
ND Control		3/0 awg	TFE	18" tray		18KV	
ND DataCom		4/0 awg	TPE	24" tray		22KV	
ND Power		250 MCM	ZH	30" tray		23KV	
ND		300 MCM	B-FIBER	36" tray		25KV	
Instrument		350 MCM	CEFIR	ND		27KV	
		400 MCM	SR			35KV	
		500 MCM	ND			45KV	
		600 MCM				75KV	
		750 MCM				ND	
		1000 MCM					
		1250 MCM					
		1500 MCM					
		1750 MCM					
		2000 MCM					
		2500 MCM					

- F. Any existing cables that are modified or deleted shall be included in the index and noted as such by usage of the Physical Status Code.
- G. Once the final copy is released to the Owner, the Owner will become the proprietor of the electronic record. The Owner will take full responsibility for all future modifications and their subsequent liability.

- H. The Contractor shall keep a backup copy of all electronic data provided to Owner for a minimum of 1 year from the date sent to Owner.

## **6. HOLD POINTS**

### **6.1 Introduction**

The utilization of documented Inspect and Hold Points as quality assurance inspection tools are integral to the construction process, to which the Owner retains the right to maintain surveillance of, consisting of, but not limited to the following; construction activity, element of work, trade work or providing a product section. The task can be located either at the site or another location including but not limited to manufacturer, vendor or Subcontractor facilities.

- A. Contractor will implement their own inspection and test plan, quality control.
- B. Owner may provide a third party inspection company that furnishes inspectors as needed, sometimes full time, and other times, only as needed. Testing company inspectors will be utilized to witness and sign off on Hold Points.
- C. Many items, activities, functions, testing and inspections will occur during the normal course of a day's work and test results for inspections will be documented, therefore witness or Hold Points should be reserved for construction work that requires and inspection and would become inaccessible due to subsequent activities.
- D. Actual "Hold" points should be specified sparingly, since each Hold Point can potentially introduce a delay. Delays may be in terms of hours but could result in a claim.

A suggested list of inspection points; (Witness or Hold Points, as desired):

- A. Hold, approval of critical lift plans is a Hold Point during erection.
- B. Hold, inspection required for weld prep, root pass of critical welds (if applicable to this Work).
- C. Hold for inspection; verify alignment of pipe to equipment prior to connection. All alignments to be performed with laser equipment and must have current calibrations.
- D. Hold for inspection of subgrade prior to placement of structural fill, concrete forms etc.
- E. Hold for verification of concrete strength for foundations prior to setting structural steel. This requires a certification form.
- F. Hold, verify structural steel is complete enough to erect ductwork.
- G. Hold, inspect concrete forms, rebar and embedments, including grounding and conduit, prior to concrete placement. This requires a pre-placement form.
- H. Hold, inspection of steel surface preparation prior to paint.

- I. Hold, inspection of grout pockets required prior to placement of baseplates or columns with attached plates.
- J. Hold, shipment of ductwork, verify with site that they are ready to receive the material.
- K. Hold for Owner acceptance Flow Model Review.
- L. Hold, testing company technician to be present during backfill placement and compaction testing.
- M. Hold for third party inspection of ductwork welds prior to installation of insulation on ductwork (weld inspections).
- N. Hold, verify dry film thickness of paint primer, then final coat.
- O. Hold, third party inspector to be on site and present during bearing pile installation to verify location, inspect pile prior to installation, and document blow counts. Test instrumentation for micropiles tension, compression and side load tests must be verified as having current calibration. All ground connections must be verified as having solid connections to the plant ground system.
- P. Hold, prior to final acceptance and approval of structural steel connection final bolt up, third party inspector must document and accept the installation.
- Q. Hold, for inspection of electrical devices (Transformers, Switchgear, MCC, Controls) prior to energization.
- R. Include any holds required specifically by "Clyde Bergemann".
- S. Hold, inspection and witness the testing of grounds prior to acceptance.

Any of the above items can be designated as a "witness point".