

NUPIC DOCUMENT NO. 21

COMMERCIAL GRADE ITEM SURVEY CHECKLIST GUIDELINES

REVISION 4

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APPROVED:



Chairman

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NUPIC CGI SURVEY IMPLEMENTATION GUIDELINES

This guideline has been developed to assist the survey team in the utilization of the NUPIC Commercial Grade Item (CGI) Survey Checklist. The current edition of this checklist contains the philosophy and principles of EPRI/NP-5652 - "Guideline for Utilization of Commercial Grade Items in Nuclear Safety-Related Applications (NCIG-07)." Each survey team member is required to thoroughly understand and adopt the NUPIC philosophy for conducting NUPIC CGI Surveys of suppliers.

A CGI Survey examines both the technical and quality aspects of a vendor's manufacturing/service activities to assess the adequacy and effectiveness of the supplier's quality controls with respect to identified critical characteristics (CC). This review includes an analysis of the supplier's Design Control, Procurement Control, Material Control, Manufacturing/Process Control, Inspection & Test Control, Measuring & Test Equipment Control, and Quality Program Control, as applicable to the identified critical characteristics.

Included in the CGI Survey Checklist is a The Critical Characteristics Worksheet (CCW). The CCW is used to document the item/service critical characteristics and acceptance criteria. When multiple items/services with differing critical characteristics will be covered within the scope of the survey, a separate CCW shall be used for each item/service type. If multiple items/services have the same CCs, a single CCW may be used. Figure A shall be completed for each CCW. Supplier history/concerns shall be reviewed for impact on item quality and be factored into this process.

The CGI Survey Checklist delineates the activities to be examined. Section A, Critical Characteristics Verification - Figure A, is utilized to record the objective evidence reviewed. Section B, Supporting Survey Information, provides supporting information to describe how CCs are controlled. Section B also provides other information that may be useful to those using the checklist for CG dedication. Section C, Technical Specialist Evaluation, provides an overall evaluation of the supplier's control over identified CCs from the Technical Specialist's perspective. The guideline delineates how this activity should be accomplished.

Technical Specialist responsibilities are described in NUPIC Document No. 8, "NUPIC Joint Commercial Grade Survey Procedure."

The following notes apply to all sections of CGI Survey Checklists:

- Checklist items deemed as "not applicable" require documented justification, if not obvious.
- Any additional items deemed necessary for the survey can be added to the checklist prior to or during the survey by the Survey Team Leader.
- The use of the symbol "/" in this guideline or on the Survey Checklist signifies an "and/or" statement.
- The Survey Team leader is to assure that all checklist pages and figures are properly paginated to facilitate reproduction.
- Data entered on the figures is to be summarized and assessed with a description of the process controls in place.
- The sequence in which the Survey Checklist is executed may be varied and is to be determined by the Survey Team Leader.
- All figure and Summary of Investigation entries must be annotated; blanks are not acceptable.

NUPIC CGI SURVEY IMPLEMENTATION GUIDELINES

SAMPLE CRITICAL CHARACTERISTICS WORKSHEET

CRITICAL CHARACTERISTICS WORKSHEET # 1

PRODUCT/ITEM (specify): Ball Valve, P/N 12345; Check Valve, P/N ABCD

| CC NO. | CRITICAL CHARACTERISTICS (CC) TO BE EVALUATED | ACCEPTANCE CRITERIA | SAT/ UNSAT. | REFERENCE CHECKLIST FIGURE |
|--------|---|--|--|---|
| | List the CC to be evaluated | List the acceptance criteria. This may be Mfr's dwgs/specs; industry codes and standards; customer PO or spec. reqmnts; etc. | SAT. or UNSAT List any findings or recommendations. | List the Figure in Section A of the checklist |
| 1 | Part Number/Identification | Mfr's. Drawings/Specifications | SAT | A.1 |
| 2 | Configuration | Mfr's. Drawings/Specifications | SAT | A.1 |
| 3 | Dimensions | Mfr's. Drawings/Specifications | UNSAT (Finding No. 2006-01) | A.1 |
| 4 | Pressure Integrity | Mfr's. Drawings/Specifications | SATwith Rec. | A.1 |
| 5 | Valve Operability | Mfr's. Drawings/Specifications | SAT | A.1 |

CONCLUSIONS

Do Commercial Grade Quality Controls adequately control all identified critical characteristics? Yes No (Explain any No responses)

Identify any CC that was not controlled (or not fully controlled) along with any recommendation or other information useful to the user.

For example : ABC Co. adequately controls Critical Characteristics Nos. 1, 2, and 5. Critical Characteristic No. 3 (dimensions) is normally controlled for all dimensions, however, ABC Valve Co. inspectors failed to verify the inlet and outlet dimensions per drawing and procedure requirements (see Finding 2006-01).

Critical Characteristic No. 4 (Pressure Integrity) is controlled by hydrostatic testing using a zero leakage acceptance criteria. However, hydrostatic tests are only performed to 125% of design pressure unless otherwise specified by the customer. It is recommended that utility purchase orders specify hydrostatic test pressure if a test pressure in excess of 125% is required.

NUPIC CGI SURVEY IMPLEMENTATION GUIDELINES

SAMPLE FIGURE A

SECTION A – CRITICAL CHARACTERISTICS VERIFICATION

FIGURE A - 1

PRODUCT/ITEM/SERVICE: Ball Valve, P/N 12345; Check Valve, P/N ABCD

| CRITICAL CHARACTERISTIC (CC) | METHOD OF CC CONTROL AND ASSOCIATED CHECKLIST ITEM(S) | ITEM REVIEWED AND WORK ORDER/ TRAVELER NO. | CONTROLLING PROCEDURE AND REV./DATE | PERSONNEL NAME/STAMP | ID NUMBER OF M&TE USED CALIBRATION CURRENT (Yes/No) |
|---|---|---|--|--|---|
| List the CC number and a brief description. | Record the method by which the CC is controlled and the associated checklist question(s) in Section B which describes the controls. | Record the item/ service reviewed and some unique identifier (such as a work order or traveler) reviewed along with the item/service. | Record the procedure (and revision and/or date) with which the method of control (in Column 2) was accomplished. | Record the personnel who performed the method of controlling the CC. | Record the name or unique identifier of any measuring and test equipment used and indicate whether the M&TE calibration was current at the time of the measurement or test. |
| 1 - Part Number | Visual Inspection; B.3, B.11 | Ball Valve - WO 2345 Check Valve - WO 5678 | Inspection Procedure ABC-8-01, Rev. 0 Inspection Procedure DEF-9-01, Rev. 3 | Bill Fold Joe Block | N/A N/A |
| 2 - Configuration | Visual Inspection; B.11 | Ball Valve - WO 2345 Check Valve - WO 5678 | Inspection Procedure ABC-8-01, Rev. 0 Inspection Procedure DEF-9-01, Rev. 3 | Bill Fold Joe Block | N/A N/A |
| 3 - Dimensions | Dimensional Inspection; B.11 | Ball Valve - WO 2345 Check Valve - WO 5678 | Inspection Procedure ABC-8-01, Rev. 0 Inspection Procedure DEF-9-01, Rev. 3 | Bill Fold Joe Block | MIC-011; Yes MIC-015; Yes |
| 4 - Pressure Integrity | Hydrostatic Test; B.11 | Check Valve - WO 5678 | Hydro Test Procedure HTP-002, Rev. 1 | Stamp 23 | Gage 007; Yes |
| 5 - Valve Operability | Functional Test; B.11 | Check Valve - WO 5678 | Functional Test Procedure FTP-003, Rev. 7 | Stamp 56 | Gage 014; Yes |

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CRITICAL CHARACTERISTICS WORKSHEET # 2

PRODUCT/ITEM (specify): Terminal Lug, P/N 12345; Check Valve, P/N ABCD

| CC NO. | CRITICAL CHARACTERISTICS (CC) TO BE EVALUATED | ACCEPTANCE CRITERIA | SAT/ UNSAT. | REFERENCE CHECKLIST FIGURE |
|--------|---|--|----------------|----------------------------|
| 1 | Marking/Identification | Mfr's. Drawings/Specifications | SAT | A.2 |
| 2 | Configuration | Mfr's. Drawings/Specifications | SAT | A.2 |
| 3 | Dimensions | Mfr's. Drawings/Specifications | SAT. | A.2 |
| 4 | Material (base & plating) | Mfr's. Drawings/Specifications | SAT | A.2 |
| 5 | Insulating Material (insulated items only) | Mfr's. Drawings/Specifications | ** SAT | A.2 |
| 6 | Dielectric Strength | Mfr's. Drawings/Specifications, UL 486, UL 310 | SAT | A.2 |
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| CONCLUSIONS |
|--|
| <p>Do Commercial Grade Quality Controls adequately control all identified critical characteristics? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> (Explain any No responses)</p> <p>ABC Co. adequately controls Critical Characteristics Nos. 1-4, and 6.</p> <p>** Critical Characteristic No. 5 (insulating materials) is controlled by material specifications and bills of materials furnished to sub-tier suppliers. Currently no material verification is performed other than certification from the sub-tier supplier which is not evaluated. Utilities requiring material qualification of insulation (e.g. for environmental qualification) may need to separately supplement ABC's controls with material verification testing.</p> |

NUPIC CGI SURVEY IMPLEMENTATION GUIDELINES

SAMPLE FIGURE A

SECTION A – CRITICAL CHARACTERISTICS VERIFICATION

FIGURE A - 2

PRODUCT/ITEM/SERVICE: Terminal Lug, P/N 56789; Splice, P/N JKLMN

| CRITICAL CHARACTERISTIC (CC) | METHOD OF CC CONTROL AND ASSOCIATED CHECKLIST ITEM(S) | ITEM REVIEWED AND WORK ORDER/ TRAVELER NO. | CONTROLLING PROCEDURE AND REV./DATE | PERSONNEL NAME/STAMP | ID NUMBER OF M&TE USED CALIBRATION CURRENT (Yes/No) |
|--|--|--|--|-----------------------------|---|
| 1- Marking/Identification | Visual Inspection; B.3, B.11 | Terminal Lug - WO 9876 Splice - WO 5432 | Inspection Procedure JKL-8-01, Rev. 0 | L. J. Silver C. Kidd | N/A N/A |
| 2 - Configuration | Visual Inspection; B.11 | Terminal Lug - WO 9876 Splice - WO 5432 | Inspection Procedure ABC-8-01, Rev. 0 Inspection Procedure DEF-9-01, Rev. 3 | B. Wayne C. Kent | N/A N/A |
| 3 - Dimensions | Dimensional Inspection; B.11 Mfg. Processes; B.10 | Terminal Lug - WO 9876 Splice - WO 5432 | Inspection Procedure ABC-8-01, Rev. 0 Inspection Procedure ABC-8-01, Rev. 0 | B. Wayne C. Kent | MIC-022; Yes MIC-025; Yes |
| 4 - Material (Base & Plating) | Material Specification / Bill of Material; B.1, B.2, B.3; Pull-Out Check; B.11 Plating Chemistry; B.11 | Terminal Lug - BOM 321 Splice - BOM 987 Silver Plating - N/A | Pull-Out Check Procedure PO-1, Rev. 1 Weekly check | C. Kent M. Curie | Tensile Machine; Yes Spectrometer; Yes |
| 5 - Insulating Material (Insulated Items Only) | Material Specification / Bill of Material; B.1, B.2, B.3 | Nuclear Grade Insulation - N/A Vinyl Insulation - N/A | N/A N/A | N/A N/A | N/A N/A |
| 6 - Dielectric Strength | Dielectric Test; B.11 | Splice - WO 5432 | Dielectric Test Procedure MNO-6, Rev. 2 | Stamp 57 | Multimeter MM1; Yes |
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NUPIC CGI SURVEY IMPLEMENTATION GUIDELINES

SECTION B – SUPPORTING SURVEY INFORMATION

COMMERCIAL GRADE QUALITY CONTROLS

B.1 Describe the supplier's controls which assure that items and services provided comply with the specifications set forth in the manufacturer's published product description. Identify source of pertinent published product description.

SUMMARY OF INVESTIGATION: Describe how (e.g. design control, inspections, tests, final review or verification) the supplier assures that items and services provided comply with the specifications set forth in the manufacturer's published product description (i.e. catalog, on-line specifications). Identify what was reviewed as the source of published product description (name of catalog and date or revision or on-line catalog web address.)

COMMERCIAL GRADE QUALITY CONTROLS

B.2 Describe the controls the supplier implements to assure that design changes, including material substitutions, are evaluated commensurate with the original design.

SUMMARY OF INVESTIGATION: Identify the procedure/instruction that describes the design change process. Describe the design change process. Select products furnished to customers and review changes to design documents to evaluate if changes have had any adverse effect on design such that the product and/or CCs are affected. Identify any affected CC and how it was affected.

COMMERCIAL GRADE QUALITY CONTROLS

B.3 Do changes in design/product parameters or component parts result in a part number change?
NOTE: If not, how can the utility obtain design change details for evaluation?

SUMMARY OF INVESTIGATION: Describe what changes (to design/product parameters or component parts, etc.) are allowed within the same part number for the products being evaluated. Describe what type of change would cause a part number change. Identify any procedure/instruction that describes this.

[NOTE: Often commercial suppliers keep the same part number if the change does not affect "form, fit or function." If this is the case, describe what the supplier considers "form, fit or function." Does this include a change in material?]

If changes do not result in a part number change, who could the customer contact for details of the change?

COMMERCIAL GRADE QUALITY CONTROLS

B.4 Describe any methods (e.g. CGI surveys, source verifications, material verification, receipt inspection) this supplier uses to control critical characteristics of items, material, and/or services provided by sub-tier suppliers.

SUMMARY OF INVESTIGATION: Describe how the supplier controls items/services from sub-tier suppliers. Describe all methods used to control CCs for items/services from sub-tier suppliers. For what products does the supplier utilize:

- CG surveys?
- Source verifications (source inspections)?
- Material verifications?
- Sub-tier supplier accreditations?
- Receipt inspections?

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SECTION B – SUPPORTING SURVEY INFORMATION

COMMERCIAL GRADE QUALITY CONTROLS

B.5 Are there satellite manufacturing locations associated with this supplier? If yes, describe the controls this facility has over the piece/parts that are obtained from the satellite location? (i.e., Controls through receipt inspection, testing, and/or internal audits?)

SUMMARY OF INVESTIGATION: Does the supplier have other manufacturing locations that provide items/services to the supplier? Identify what items/services are provided from each location. Identify how the supplier controls and/or verifies items/services from other locations. Identify controls that verify any CCs (for example: receipt inspections, testing, internal audits of other locations, etc.)

COMMERCIAL GRADE QUALITY CONTROLS

B.6 Are items drop shipped from satellite or sub-tier locations? If yes, explain.

SUMMARY OF INVESTIGATION: For the subject items/services evaluated, does the supplier ship items/services directly to the customer (utility) from a location other than the location being evaluated by this survey? If so, what items/services and from which locations? How does the supplier justify that the CCs for these items/services are controlled?

COMMERCIAL GRADE QUALITY CONTROLS

B.7 Describe the controls the supplier implements to maintain lot/material identification throughout manufacturing operations.

- (a) Describe how the supplier defines "lot" or "batch" control.
- (b) Identify any unique coding system or practices used by the supplier to identify lots/batches.

SUMMARY OF INVESTIGATION: Identify the procedure/instruction that describes lot/batch/date code control and material identification. Describe the process. Verify that this control is maintained.

- (a) Describe how the supplier defines "lot" or "batch" control.
- (b) Describe any unique coding system or practices used by the supplier to identify lots/batches. [For example: Lot 2014A18 means 2014 = year of mfr.; A = month of mfr. (A = Jan., B = Feb., etc.); 18 = 18th day of the month. **OR** Batch CH14D025 means CH = mfr'd. In Chicago location; 14 = last two digits of the year of mfr.; D = month of mfr. (A = Jan., B = Feb., etc.); 025 = day of the month]

COMMERCIAL GRADE QUALITY CONTROLS

B.8 If applicable to the product, describe the cure data/shelf life control processes that affect critical characteristics.

SUMMARY OF INVESTIGATION: Identify any procedure/instruction that describes the cure data/shelf life control process. Describe how the cure data/shelf life control process may affect CCs.

COMMERCIAL GRADE QUALITY CONTROLS

B.9 Describe the controls the supplier implements for handling, storage and shipping.

SUMMARY OF INVESTIGATION: Identify any procedure/instruction that describes the handling, storage and shipping process. Describe how handling, storage and shipping may affect CCs.

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SECTION B – SUPPORTING SURVEY INFORMATION

COMMERCIAL GRADE QUALITY CONTROLS

B.10 Describe the manufacturing/ special processes that affect the critical characteristics. Include a description of applicable procedure, equipment and personnel certifications.

SUMMARY OF INVESTIGATION: Identify any procedure/instruction that describes the manufacturing/assembly/special processes (including welding, brazing, soldering, heat treating, painting, plating, etc.). Describe how manufacturing/assembly/special processes are controlled which may affect CCs.

COMMERCIAL GRADE QUALITY CONTROLS

B.11 Describe inspections (receipt, in-process and/or final) and tests performed which verify critical characteristics. If sampling is used, describe the sampling plan used and its technical basis.

SUMMARY OF INVESTIGATION: Identify any procedure/instruction that describes the receipt, in-process, and/or final inspections; testing; material verifications; that verify CCs. Describe how these checks verify CCs.

COMMERCIAL GRADE QUALITY CONTROLS

B.12 Describe inspection/testing processes (such as those used during receipt/in-process/final inspection or testing) for identifying suspect (including counterfeit/fraudulent) material, items or components that may not be those ordered, with indications such as:

- Altered manufacturer's name, logo, serial number, manufacturing date
- Items differing in configuration, dimensions, fit, finish, color, or other attributes from that expected
- Markings on items or documentation are missing, unusual, altered, or inconsistent with that expected
- Markings or documentation from country other than that of the sub-supplier
- Items, sold as new, exhibit evidence of prior use
- Performance inconsistent with specifications or certification or test data furnished
- Documentation that appear altered, incomplete, or lack expected traceability, UL or manufacturer's markings

SUMMARY OF INVESTIGATION: Identify any procedure/instruction that describes processes utilized to identify suspect/counterfeit/fraudulent items. Describe these processes and how they help prevent counterfeit and fraudulent items from being utilized.

COMMERCIAL GRADE QUALITY CONTROLS

B.13 Verify that the supplier's M&TE controls include provision for the following:

- (a) Labeling/identification of M&TE?
- (b) Calibration of M&TE and standards at periodic intervals?
- (c) Environmental conditions?
- (d) Adequacy of standards to assure accuracy, stability, range, and resolution required for their intended use?
- (e) Standards used traceable to recognized standards?
- (f) As Found/As Left information documented?
- (g) Evaluations of items tested/inspected by out-of-tolerance nonconforming M&TE?

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SECTION B – SUPPORTING SURVEY INFORMATION

SUMMARY OF INVESTIGATION: Identify any procedure/instruction that describes the calibration process. Describe the calibration process.

COMMERCIAL GRADE QUALITY CONTROLS

B.14 Describe the documented quality control program (instructions, procedures, and drawings, as applicable) and the program basis? (ISO, MIL STD, ANSI)

SUMMARY OF INVESTIGATION: Describe the supplier's documented program for controlling quality (quality manual, procedures, instructions, drawings). Describe the basis for the quality program (ISO 9001, ASME VIII, R.G. 1.36, R.G. 4.15, 10CFR61, ISO 17025, etc.)

COMMERCIAL GRADE QUALITY CONTROLS

B.15 Describe the supplier's controls to assure that sufficient records are available to furnish evidence of activities affecting quality.

SUMMARY OF INVESTIGATION: Identify any procedure/instruction that describes the process for maintaining records which furnish evidence that CCs are controlled. Describe the process for maintaining such records.

COMMERCIAL GRADE QUALITY CONTROLS

B.16 Describe the controls the supplier implements over contract review of a customer's P.O./Contract.

- (a) When multiple supplier manufacturing facilities are involved, are the P.O./Contract requirements being completely and correctly transmitted?
- (b) If a distributor is involved between the utility and this supplier, are the P.O./Contract requirements being completely and correctly transmitted from the distributor to the supplier?

SUMMARY OF INVESTIGATION: Identify any procedure/instruction that describes the supplier's review of customer POs/contracts. Describe the order entry process.

COMMERCIAL GRADE QUALITY CONTROLS

B.17 Describe the controls the supplier implements over the certification process (C of C and/or CMTR) for the products supplied.

NOTE: Compliance to utility P.O./Contract requirements should be documented on the certification.

SUMMARY OF INVESTIGATION: Identify any procedure/instruction that describes the certification process. Describe the certification process including what steps the individual takes to ensure compliance with PO/contract requirements prior to certifying product /services.

COMMERCIAL GRADE QUALITY CONTROLS

B.18 Describe the controls the supplier implements to identify, document, disposition (accept, reject, repair or rework), and segregate nonconforming items to prevent unauthorized use or shipment.

SUMMARY OF INVESTIGATION: Identify any procedure/instruction that describes the nonconformance process. Describe the nonconformance process and the method used to prevent the use or shipment of nonconforming items.

NUPIC CGI SURVEY IMPLEMENTATION GUIDELINES

SECTION B – SUPPORTING SURVEY INFORMATION

COMMERCIAL GRADE QUALITY CONTROLS

B.19 Review manufacturer/supplier/distributor returned goods or returned material authorization logs for significant recurring issues requiring products to be returned for evaluation. Look for any products with a high number of returns, and/or comments indicating generic problems or manufacturing defects. Document any such issues and the actions taken or being taken by the supplier to address the issue(s).

NOTE: Isolated returns do not necessarily indicate that a problem exists.

SUMMARY OF INVESTIGATION: Identify any procedure/instruction that describes the process for handling returned goods/material from customers (utilities). Describe this process and evaluate any trend of high return rates and/or generic problems/defects. Describe actions the supplier takes to address issues including utilizing a corrective action program.

COMMERCIAL GRADE QUALITY CONTROLS

B.20 Describe the supplier's indoctrination and training program for personnel performing activities affecting quality (welding, NDE, tests and inspections, etc.).

SUMMARY OF INVESTIGATION: Identify any procedure/instruction that describes the training process. Describe the training process and how personnel such as inspectors, testers, welders, NDE specialists are trained/qualified to industry standards and/or supplier's requirements.

SECTION C - TECHNICAL SPECIALIST EVALUATION

COMMERCIAL GRADE QUALITY CONTROLS

C.1 Evaluate the adequacy of design/configuration controls relative to the identified critical characteristics.

Reference Checklist Items B.1 through B.3.

SUMMARY OF INVESTIGATION: Provide an evaluation of the adequacy of the supplier's control of design, design changes, configuration, material verification, and conformance to the supplier's published product description, as applicable to the identified critical characteristics.

COMMERCIAL GRADE QUALITY CONTROLS

C.2 Evaluate the adequacy of inspection/testing/process controls the supplier performs during receipt, manufacturing and final product acceptance with regard to identified critical characteristics, including the use of specified acceptance criteria.

Reference Figure A Items and Checklist Items B.10 and B.11

SUMMARY OF INVESTIGATION: Provide an evaluation of the adequacy of the supplier's inspection, testing and/or process control

COMMERCIAL GRADE QUALITY CONTROLS

C.3 Evaluate the overall adequacy of the supplier's controls and acceptance criteria applicable to the identified critical characteristics.

NUPIC CGI SURVEY IMPLEMENTATION GUIDELINES SECTION C - TECHNICAL SPECIALIST EVALUATION

SUMMARY OF INVESTIGATION: Provide an overall evaluation of the adequacy of the supplier's controls and acceptance criteria as it applies to the identified critical characteristics.

**Technical
Specialist:**

Date: