ATTACHMENT C - QUALITY CLAUSES

Using a risk-based graded approach (Attachment B, of this QAPD), the end user, purchase requisitioner or Procurement buyer may identify what quality clauses they want to include in procurement documents to provide confidence that items and services from a supplier and its sub-tier suppliers will meet all of the requisite quality and technical requirements and specifications.

A1 - Supplier Work Performed Under the LBNL QAPD
Unless otherwise specified, Suppliers performing on-site work who’s Quality Assurance programs have not been reviewed by the Office of Contractor Assurance (OCA) will work under LBNL/PUB-3111, LBNL Quality Assurance Program Description (QAPD). Specify in the purchase requisition that the Supplier shall conduct all work activities/services in accordance with the LBNL QAPD. (This includes the identification of all work that will be performed in accordance with the LBNL QAPD, applicable LBNL procedures, and any additional QA Program indoctrination that may be required.) Quality Assurance personnel, where applicable, shall inspect activities via work packages or instructions, as appropriate.

A2 - Contractor Assurance Requirements for Subcontractors Performing Work on LBNL Sites
The Subcontractor, when performing work on LBNL sites, shall meet the applicable environment, safety, and health; quality assurance and integrated safety management; safeguards and security and cyber security; and emergency management requirements, in accordance with applicable LBNL programs and procedures.

A3 - Quality Program/System Requirements
The Supplier shall plan, implement, and maintain a QA program International Organization of Standards ("ISO"), Aerospace Standard ("AS") or Military Standard-equivalent quality system acceptable to Buyer for the Items (including "items" and "Work" as such terms may be used in the PO definitions) covered herein. Widely recognized Government or Industry Quality system standards shall be used as guidelines.

In addition, the QA specifications identified with this Purchase Requisition apply to the Supplier's QA program. This program may be subject to a pre-contract award survey and subsequent QA audits by LBNL. The Supplier shall require, in writing, subcontractors of all tiers to comply with all applicable quality program/system requirements. The quality system and control of "Special Processes" of the Supplier and subcontractors of all tiers shall be subject to audit by LBNL to the extent practicable at all times and places.

Upon buyer's request, Seller shall provide to Buyer documentation that describes Seller's quality system. All quality system documentation, and on-site performance of that system, is subject to review and approval by LBNL. Seller’s system shall include right of access by buyer, their customer, and regulatory authorities to all facilities involved in the order and to all applicable records.

The Supplier shall tender for acceptance only those item(s), supplies, or services that have been inspected and tested in accordance with its quality program/system and have been found to conform with contract requirements. When post-installation testing is identified as a method of acceptance, then post-installation test requirements and acceptance documentation shall be identified and agreed upon by the purchaser and supplier.

B1 - Software Quality Program
The seller shall have defined and implemented a software quality program that meets all requirements of NQA-2, Subpart 2.7 or Institute of Electrical and Electronics (IEEE) Computer Society standards prior to award of contract. This software quality program may be required to pass an on-site audit, to the requirements of NQA-2.7, subpart 2.7, or IEEE Computer Society standards, prior to award of any contract for the design, development, testing or maintenance of software.
If the seller is developing or modifying software under the LBNL QA program, they shall be developing or modifying this software physically at LBNL (or with prior written approval at a designated location), and shall adhere to all requirements of the LBNL QA program, as described in LBNL/PUB-3111, LBNL QAPD.

**B2 - Software Quality Plan**
The supplier shall have a software quality plan (SQAP) that describes the program, controls, activities, and documentation that will be used to control software quality. The supplier shall submit the SQAP for approval by LBNL (e.g. QA, cognizant organization, as applicable).

**B3 - Software Life Cycle Documentation**
The supplier shall provide the required life cycle and user documentation as specified by LBNL.

**B4 - Software User Documentation**
Supplier shall provide software user documentation that includes the following:

(a) The software name and version identifier
(b) Description of functional requirements and system limitations, including hardware
(c) Explanation of the mathematical models and derivation of the numerical methods used in the software design (physical and mathematical assumptions on which the software is based shall be included, along with an explanation of the capabilities and limitations of the software)
(d) Instructions that describe user interaction with the software, user messages initiated as a result of improper input and how the user can respond, the identification and description of input and output specifications and formats, and input parameters
(e) Description of any required training necessary to use the software
(f) Information for obtaining user and maintenance support

**B5 - Software Test Documentation**
Supplier shall provide documentation of software testing.

**B6 - Reporting Software Errors or Failures**
Supplier shall report software errors or failures to LBNL.

**B7 - Supplier/Subcontractor Use and Control of Spreadsheets, Databases, Macros, Detailed Formulas, and Other Related Software Applications Developed Within Commercial Software Programs**
The supplier and its subcontractors shall apply appropriate controls to spreadsheets, databases, macros, detailed formulas, and other related software applications developed within commercial software programs. Appropriate controls shall result in the following:

(a) Completed documentation indicating that the application provides the correct results for the specified range of input parameters, including appropriate testing;
(b) Completed documentation of the approval of the software for operational use including installation/integration testing for each system that the software is installed on;
(c) A listing of the software code (i.e., a printout of the macro, spreadsheet, formulas, file/table/cell references, etc.); and
(d) Completed documentation listing the controls necessary to permit authorized, and prevent unauthorized, access to the application.

The documentation listed above shall be delivered to LBNL upon completion, and at anytime upon request during the life of the contract.

**C1 - Submittal(S) Required Before Contract Award**
When specified by LBNL in the Statement of Work, the prospective Suppliers shall submit, prior to any Pre-award Survey:
(a) a complete description of its quality program/system. Such description may consist of a copy of the Offeror's approved QA/QC Manual, a QA/QC plan, or a combination thereof, and shall specify the standard(s) upon which the system is based. Alternately, if a QA/QC manual/plan has been previously submitted, an Offeror may, provided its manual/plan has not since been revised, specify in its proposal the date and/or revision of its current QA/QC manual/plan.

(b) planning techniques and processes to be used by the Supplier in fulfilling procurement document requirements

(c) a complete description of its calibration system, which must comply with ANSI/NCSL Z540-1, ISO 10012-1, or MIL-STD-45662. The description may be extracted from the Offeror's documented quality program/system.

(d) any national or international recognized certification program (i.e. ISO9000, NAVLAP, etc.).

C2 - Submittal of Subtier Supplier Requirements
Any portion of this PO which is subcontracted, including procurement of material and parts, shall include the applicable PO specifications that affect quality or manufacturing requirements. Those portions of unpriced copies of Supplier's subcontracts reflecting these requirements shall be forwarded to LBNL concurrently with the subcontracting action.

C3 - Rights of Access
Right of access to supplier's facilities and records for inspection or audit by the purchaser, LBNL, or other designee authorized by the purchaser shall be established.

C4 - Assessment of Suppliers and Subtiers QA Activities
The Supplier shall assess the effectiveness of the control of quality by subtier suppliers at intervals consistent with the importance, complexity, and quantity of the product or service being provided pursuant to this purchase order (PO).

C5 - Certification of Personnel
Supplier personnel responsible for performing and verifying processes that require special skills, including inspectors, foam application technicians, welders, nondestructive examination (NDE) examiners (radiography, ultrasonic, magnetic particle, eddy current, liquid penetrant, leak testing, visual, foam void detection), and similar skills, shall be certified. The certification shall be in writing, and shall be the result of formalized training and proficiency testing programs. The effective period of each certification shall be specified, and each individual must be recertified at the end of such period of retesting. Personnel failing a test shall be removed from operations until recertified. Training, testing, and certification of personnel shall be in accordance with criteria described in specified and recognized codes, standards, and specifications such as SNT-TC-1A.

D1 - LBNL's Surveillance and Source Inspection
All items furnished on this PO are subject to a verification and/or inspection at the Supplier's and/or Supplier's subtier facility by a LBNL QA representative. This verification and/or inspection shall be subsequent to the Supplier's acceptance. Inspection Hold Points will be selected and identified by LBNL to the supplier. The Supplier shall notify the LBNL buyer at least five working days before the items will be at any Hold Point.

D2 - First-Article Inspection
A first-article inspection shall be performed or witnessed at the Supplier's facility by a designated LBNL QA representative. The first-article inspection shall be accomplished using the first deliverable item of several of the same design or same type. The process used and standards of workmanship shall be representative of all items to be produced. To assure this, the QA representative may advise the Supplier of subsequent inspections. The Supplier shall notify the LBNL buyer at least five working days before the first article is available for inspection.
D3- Product Part Approval Process
In order to assure that there is no variation between the first article and subsequent articles, the Supplier shall use the same production process for initial and subsequent design and/or manufacturing activities.

E1 - Certificate of Conformance
The Supplier shall provide a Certificate of Conformance (C of C), certifying that the purchased item or service meets specified requirements. Unless otherwise specified, the C of C shall accompany each shipment.

E2 - Supplier's Certificate of Conformance
The Supplier shall provide a Certificate of Conformance (C of C) certifying that the purchased item or service articles delivered under this contract conform to the requirements set forth in the Procurement Specification and applicable Detail Specification for the article ordered. The certification system, including the procedures to be followed in filling out a certificate and the administrative procedures for review and approval of the certificates, shall be described in the supplier's QA program.

The Contractor shall submit with each shipment, a certification as to the origin of manufacture and procurement, applicable traceability information for articles delivered, (e.g., date code/lot number), and part number. The certification shall identify any procurement requirements that have not been met, together with an explanation and the means for resolving the nonconformance(s). The certification shall be dated and bear the signature and title of an authorized representative of the Contractor supplying the article(s).

E3 - Chemical/Physical Test Reports
Suppliers shall furnish chemical and physical test reports, traceable to the heat, lot and mill-certified, Certified Material Test Report, or equivalent. Copies of the test reports containing actual results of chemical analysis or tests of the physical properties of raw materials used for this contract shall be submitted to LBNL. The tests and resulting data shall be in accordance with, and meet, the acceptance criteria of the referenced material specification. These reports shall contain the signature and title of the authorized representative of the agency performing the test; shall state that the test results meet specified material requirements; and shall bear evidence of review and acceptance by the Supplier. The test reports shall be traceable to each piece of material by identification of the lot and/or heat treat number and shall provide traceability to the material manufacturer (mill).

E4 - Material Traceability
All items purchased in fulfilling this scope of work (except as specifically noted) shall be traceable to raw materials and the raw material manufacturer. The method of identifying material, parts, and components and the Supplier's traceability procedure shall be approved by LBNL.

E5 - Calibration and Control of Measuring and Test Equipment
Tools, gauges, instruments, and other measuring and test equipment used for activities affecting quality shall be controlled and, at specified periods, calibrated with a source traceable to the National Institute of Standards and Technology (NIST) or other nationally recognized standards. The requirements of American National Standards Institute (ANSI)/NCSL Z540-1-1994, ISO 10012-1, or MIL-STD-45662 shall apply.

The Supplier's calibration system must comply with ANSI/NCSL Z540-1, ISO 10012-1, or MIL-STD-45662. All Certificates of Calibration will state, as a minimum, that all standards used are traceable to the National Institute of Standards and Technology, date of calibration, date of expiration, list those standards used, the condition of the equipment (Pass / Fail), and the technician's signature.

E6 - Process Certification
Special processes used in the manufacture or examination of items supplied on this contract, such as (but not limited to) foam application, heat treating, bending, welding, leak testing, magnetic particle inspection, penetrant inspection, ultrasonic inspection, foam void detection, radiography, surface treatment, and cleaning/cleanliness control, shall be qualified prior to use by the Suppliers. The qualification shall be documented and shall list the
applicable specifications (including revision) to which the processes conform, the name of the agency that performed them (if other than the Supplier), the date, and the authorized signature of a responsible representative of the Supplier. LBNL's QA representative or designee shall be afforded the opportunity to witness or approve special process qualification.

**F1 - Nondestructive Examination (NDE)**
All NDEs shall be conducted in compliance with the applicable provisions of the specifications and the scope of work document. Personnel and equipment used in performance of such tests shall have been evaluated and certified for the type of tests performed. For those NDE methods for which the American Society for Nondestructive Testing (ASNT) has defined certification criteria, those criteria shall be used. Supplier shall furnish reports of such NDEs, including technique sheets where applicable. These reports shall be as specified in the applicable specifications and/or the PO and shall be identifiable to the item or material tested, including specific sections, joints, or views of the item. These reports shall contain a statement of acceptance, the signature and title of the performer, and the signature and title of the authorized contract representative of the agency performing the tests. If that agency is other than the Supplier, review and acceptance by the Supplier shall also be shown. When items are serialized, the serial numbers shall appear on the report.

**F2 - Welding Procedures and Weld Performance**
The Supplier shall prepare detailed procedures for each type of welding and each characteristically different welding point to be used in performance of this scope of work. Welding procedures are subject to audit and approval by LBNL. The Supplier shall qualify welders, welding operators, tackers, brazers, and brazing operators, the welding/brazing/tacking procedures, and equipment to be used to the specification requirements. Qualification tests shall be performed in accordance with the detailed procedure and shall be documented by the Supplier prior to actual use in fabrication. All weld procedures are to be qualified to ASME Section IX, AWS, or other recognized national standards.

Repair of welds shall be performed by weld repair procedures approved by the Supplier's QA organization. Repair of welds is defined as correction of unacceptable conditions as noted by NDE, including visual inspection. Repairs shall receive the same level and type of NDE as the original weld and shall be documented.

Supplier shall provide a record of each weld made on the items furnished on this order. Welds shall be numbered sequentially and be traceable to each item on which they were performed. Weld maps, which give a pictorial guide to the location of each weld-by-weld number, may be provided to the vendor at the discretion of the LBNL Cognizant Engineer and OCA. A weld map shall accompany each weld record. Alternatively, as agreed to by the Buyer, in place of a weld map the Seller may vibroetch the weld number adjacent to the weld, having the placement of that number verified on the weld record.

**G1 - Pressure or Leak Test Report**
Each shipment shall be represented by test reports of actual test results of pressure and leak tests performed on the equipment. Reports shall be identifiable to the acceptance criteria of the items submitted and shall meet the requirements of the approved drawings and specifications. Such reports shall contain the signature and title of the authorized representative performing the tests and, if different from the Supplier, indicate acceptance by the Supplier.

**G2 - Functional Test Plans**
Functional testing of items shall be performed in accordance with documented test plans or procedures, and reported. Test plans shall include or reference test objectives, test prerequisites, needed instrumentation, environmental conditions required, applicable drawings and specifications, and acceptance criteria. Test plans or procedures shall be submitted for LBNL review and approval prior to test performance. Results of tests shall be reported and identifiable to the acceptance criteria and the items submitted. Reports shall contain the signature and title of the authorized contract representative of the agency performing the tests, and review and acceptance by the Supplier.
G3 - Functional Test Reports
Each shipment shall be represented by reports of test results which shall be identifiable to the acceptance criteria and the items submitted, and which shall meet the requirements of the contract document and applicable drawings and specifications. These reports shall contain the signature and title of the authorized contract representative of the agency performing the tests, and review and acceptance by the Supplier.

H1 - Material Marking
Material shall be marked with manufacturer's name or trademark, specification, type and grade of material, and heat and/or control numbers in accordance with the following applicable method:
Raw Material (sheet, strip, plate, bar, pipe, angle, beam, tubing) - Ink stamp or stencil applied to each piece along its entire length with 36-in. maximum between parallel markings. For austenitic stainless steels, the ink shall not contain more than trace amounts of harmful metals or metal salts such as zinc, lead, or copper, or halides such as chlorides or fluorides. Markers approved for nuclear use are acceptable type markers. In any event, ink or markers must be traceable to certifications by lot or batch numbers. Further, the use of gummed labels and tape identification is prohibited unless analytically determined to not cause damage to the materials.

NOTE: Material less than ½ inch in diameter or width may be tagged in place of strip marking. The tag shall include the data required above, and shall be attached to the material by tying or with tape. Wire may be used for this purpose. On stainless steel, wire shall be stainless steel. Use of ink or markers is acceptable providing it does not damage material and must be traceable to certifications by lot or batch numbers. Further, the use of gummed labels and tape identification is prohibited unless analytically determined to not cause damage to the materials.

Fittings - Vibrating marking tool may be used if the material thickness is .083 inch or greater.

When used, physical markings shall:
(a) Be applied using materials and methods that provide a clear, permanent, and legible identification;
(b) Not be detrimental to the function or service life of the item;
(c) Be transferred to each part of an identified item when the item is subdivided; and
(d) Not be obliterated or hidden by surface treatments, coatings, or installation unless other means of identification are substituted.

I1 - Supplier Submittal of Nonconformances and Corrective Actions
Supplier's program shall include control and documentation of nonconformances and corrective actions. Nonconformances and corrective actions shall be reviewed and approved by LBNL on an Approval Request/Variation Request(s) (AR/VR) prior to corrective action being implemented. Any approved nonconformance report shall be annotated on the receive C of C for each respective shipment.

The nonconformance report shall address:
(a) The supplier-recommended disposition (for example, "use as is" or "repair") and provide technical justification for such disposition;
(b) The technical or material requirements violated;
(c) The requirement in the Supplier documents that has been approved by the Purchaser is violated;
(d) The nonconformance can NOT be corrected by continuation of the original manufacturing process or by rework;
(e) The item does NOT conform to the original requirement even though the item can be restored to a condition such that the item's capability to function is unimpaired; and
(f) The purchaser shall evaluate and approve the supplier's recommended disposition to include verification of implementation of the disposition.
I2 - Approval/Variation Request Documentation and Reporting
Supplier, complete an AR/VR to request approval prior to effecting any change in LBNL approved (1) design, (2) workmanship standards, (3) manufacturing process, (4) test requirements, or (5) other documents that are required to be submitted for LBNL information, review, or approval, or to request LBNL approval for departure from subcontract or PO requirements applying to this procurement, in accordance with purchasing administrative requirements. The approved changes shall be identified in the supplier data package in accordance with Clause 310.

J1 - Proprietary Designs and Process
Supplier shall notify LBNL prior to effecting any change in the Supplier's or subtier supplier's proprietary processing or design. A meeting between the Supplier and LBNL shall be called to determine the method by which PO requirements will be met while accommodating the Supplier's proposed change. The results of this meeting shall be reconciled with the Supplier's approved design specifications and documented in accordance with Clause 220.

J2 - Supplier-Controlled Products
Copies of applicable specifications; drawings; installation, operation and maintenance instructions; and/or catalogues shall accompany the initial shipment of material. No changes in these documents shall be made for subsequent like shipments unless approved by LBNL.

J3 - Design/Shop/As-Built Drawings
Unless otherwise directed in the contract, two copies of design, shop, or as-built drawings shall be furnished. These drawings shall be reproducible, size "E," and on electronic media. Standard ANSI Y14.5 symbols will be used.

J4 - Assembly and Parts List
Supplier shall furnish for each assembly, or other end item, a reproducible copy of an assembly parts list tabulating the part number versus the serial or lot control number, age, and environmental data or lot control number, and traceability data of each part incorporated, including any LBNL/DOE-furnished components or subassemblies.

J5 - Identification and Control of Age-Controlled Items
Supplier shall identify each item, package, or container of material or chemicals having limited shelf life with the lot or batch number traceable to the manufacturer and to certifications. Additionally, the cure date or date of manufacture, expiration date, storage temperature, humidity, and special handling conditions shall be provided. This information may be provided with written instructions or certifications traceable to the item. Material having less than 90 percent of the shelf life still available shall not be supplied to LBNL, except with the approval of LBNL.

J6 - Cleaning and Cleanliness Controls
For design contracts, the design shall take into consideration the requirements for cleaning and cleanliness controls that must be imposed before and during fabrication, shipment, and use of assemblies. For fabrication contracts, controls shall be imposed to comply with said requirements or the cleanliness controls specified by the PO. Cleaning and cleanliness control procedures shall be submitted for LBNL review and approval prior to initiation of the fabrication process.

K1 - Package Identification
All packaged items delivered in fulfilling this contract shall be identified by a visible, permanent method on an exterior surface of the package. Package identification shall include at least the following:
(a) Drawing and Revision Number;
(b) Part Number; and
(c) PO Number.
K2 - Packaging, Shipping and Handling
Parts shall be individually packaged and preserved to prevent damage in shipment. Boxes, crates, and other shipping containers will be of sufficient strength to prevent breakage in transit. Seller shall provide adequate inspection control of the preservation, packaging, and shipping process to assure all products are complete and all required data has been provided.

K3 - Supplier Data Package (SDP) Guidelines
Supplier shall deliver to LBNL procurement, two copies of data in the form of an SDP as required by the PO. The content and form of the package are specified on the order either as a QA clause or in the procurement specification. The size of the data package may range from a few pages consisting of a certification of conformance and nonconformance reports to a large volume of documentation including such things as inspection reports, test reports (including NDE reports), manufacturing and inspection travelers, checklists, performance data, installation procedures, operating procedures, maintenance procedures, as-built drawings, and specifications. It shall reference the contract/PO number and be mailed to:

Lawrence Berkeley National Laboratory, One Cyclotron Road, Berkeley, California 94720
Attention: “Purchasing representative’s name as it appears on the order”, LBNL Procurement Department

Such documentation shall be suitable for microfilming.

LBNL requires the submittal of SDPs for a number of reasons other than the need for QA documentation of the order. The package is retained and used to (1) revise drawings and specifications, (2) provide a history file in case of an unexpected failure, and (3) provide as-built data for future reference as required by our customers, which may be verified by audit. It is essential that SDPs be complete, accurate, legible, and submitted in a timely manner as required by the order.

The following direction is provided to assist in complying with LBNL requirements:

(a) Completeness
Advanced planning and organization are key elements in achieving a complete data package. It is suggested that a list of order requirements for submittals be made in the form of an index which references paragraph numbers in the order. The index should be used to assemble and check the data package. A copy of the index should be submitted with the data package. An independent review should be made to ensure that forms have been properly completed; drawing numbers, part numbers, and serial numbers have been included; test reports contain actual results and are signed; inspection data identifies each characteristic to the drawing; and applicable limits are identified.

(b) Accuracy
Accuracy depends upon the discipline of the personnel taking and recording the data. LBNL prefers a copy of the raw data or a computer printout to a neatly transcribed tabulation of data. Errors are not to be erased or obliterated but shall be corrected by lining out the incorrect data and entering the correct data so that the corrected data is identifiable. The use of correction fluid is not permitted. Each corrected entry shall be signed and dated by the corrector. Inspection and test data that must meet a tolerance or limit should have an independent review to ensure compliance. Any nonconformance must be identified, properly documented, and dispositioned.

(c) Legibility
Supplier data submitted to LBNL must be legible and in compliance with ANSI Y-14. Most Supplier data are reviewed by LBNL personnel upon receipt; however, in some cases, data may not be reviewed until after they have been microfilmed; therefore, the original data must be clear enough to be copied and microfilmed. Data must be reviewed to ensure that the submitted copies are legible and reproducible.
Data that are of poor quality, illegible, or not reproducible may be rejected and rework may be required by the Supplier at no added cost to LBNL.

(d) Timeliness

LBNL requires that the SDP accompany each shipment. Supplier schedule should allow sufficient time to generate the required data, assemble the data into a package, and obtain the required reviews. A final review should be performed by responsible Supplier management. Where LBNL source inspection is required, time should be allowed for LBNL QA representative review. LBNL QA representatives have instructions to withhold release for shipment until the SDP is in order.

K4 - Supplier QA Records Requirements

The Supplier shall maintain quality assurance records prepared under this purchase order for the period of time established in its LBNL Qualified Suppliers List-accepted quality assurance program or for a minimum of * ___ [time in months, years, etc.], whichever is longer. At the end of this period, and prior to making final disposition (including destruction) of these records, the Supplier shall notify the Buyer in writing and allow the Buyer the opportunity to take possession of the records. The Supplier shall also notify the Buyer in the event that the Supplier is being purchased by another entity or is going out of business, to allow the Buyer the opportunity to take possession of the quality assurance records prepared under this purchase order.

*Specify the retention time of the QA records (e.g., 6 months, 6 years, etc. ... )