

<p>CONTRACT REPRESENTATIVE Kathleen Whelan MSIN: K9-15 Battelle Boulevard P.O. Box 999 RICHLAND, WA 99352-0999</p> <p>Tel: 509/372-6212 Fax: 509/375-3818 E-mail: Kathy.Whelan@pnl.gov</p>	<p>SHIP TO: PO #TBD Battelle for US DOE 3335 Q Avenue Richland, WA 99354 United States</p>
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THE REQUIREMENTS IDENTIFIED HEREIN WILL BE FUNDED BY THE AMERICAN RECOVERY AND REINVESTMENT ACT OF 2009 (RECOVERY ACT)

This is a request for proposal for provision of an inductively coupled plasma reactive ion etching (ICP RIE) system in accordance with the attached Technical Specification dated 7/29/09. Proposals should be initially submitted on the most favorable price and technical terms which can be offered because of the possibility that award will be made without discussion of proposal received.

Submit all offers on the form below showing unit and total prices for meeting the stated required delivery date. If unable to meet stated date, offer best delivery date.

LINE ITEMS

Line	Qty	U/M	Description	Unit	Total Price
1	1	EA	Inductively Coupled Plasma Reactive Ion Etching System		

DELIVERY

Equipment shall be delivered FOB Destination. Foreign Item Note: FOB Point shall be Richland, WA and all freight, duties, customs fees, freight forwarder fees, and other taxes shall be included door-to-door to Richland, WA in Offeror's total price.

BATTELLE CONTRACTS REPRESENTATIVE

The Battelle Contracts Representative, Kathleen Whelan, is the sole point of contact for any communications or questions regarding this acquisition.

PRICING INFORMATION

- [] A. Prices proposed herein are substantiated with enclosed copy of published price lists and/or catalog price sheets including conditions of any available discounts and are not more than those offered our most favored purchasers for similar quantities under like conditions.
- [] B. Published price list and/or catalog price sheets are not available. The prices proposed herein are not more than those offered our most favored purchasers including the United States Government for similar quantities under like conditions. If checked, include copies of recent invoices, sales slips, etc., for similar quantities of like material or services to at least two (2) other firms for verification.

Signed _____

Date _____

SUBMISSION OF PROPOSALS

Proposals should be prepared simply and economically, and provide a straightforward, concise delineation of the information required to be furnished. Emphasis should be on completeness and clarity. Elaborate brochures or other presentations are neither required nor desired.

Each proposal submitted should include:

1. A statement of acceptance of the conditions referenced in the General Provisions below.
2. Completed Commercial Representations and Certifications found at <http://www.pnl.gov/contracts/documents/forms/repscerts-ci.pdf>.
 - The NAICS code for section 2(a)(1) is 333295
 - The size standard for section 2(a)(2) is 500 EMPLOYEES
3. A price offer with all information requested herein.
4. A Technical Proposal, prepared in a manner consistent with the attached Specification dated 7/29/09. The Technical Proposal shall definitively indicate compliance, paragraph by paragraph, with the requirements outlined in the Specification and shall be supported by cross-referenced documentation as necessary.

Proposals are preferred to be electronically submitted to Kathy.Whelan@pnl.gov. Transmittals containing proposals should include "Proposal to RFP No. 104787" in the subject line. Proposals must be received by Battelle no later than 4 PM, 8/28/09.

Proposals may also be submitted via facsimile at the number above or by hard copy at the address above. Proposals submitted by overnight mail must be mailed to:

Battelle, Pacific Northwest Division
6th Street Warehouse
790 6th Street
ATTN: Kathleen Whelan, K9-15
Richland, WA 99354

GENERAL PROVISIONS

Each proposal submitted shall include a statement of acceptance of the conditions referenced below. The conditions may be viewed as at <http://www.pnl.gov/contracts/documents/generalprovisions.asp>:

- Commercial Terms and Conditions, titled FORM A-409-CI-R1 (May 8, 2009)
- General Provisions Supplement - American Recovery and Reinvestment Act of 2009 titled FORM A-409-CI-R1 (May 8, 2009)

RECOVERY ACT REQUIREMENTS

The following Recovery Act forms will be applicable to the successful Offeror and may be viewed at <http://www.pnl.gov/contracts/documents/>

- Reporting Requirements (Form A-409-ARRA-Reporting)
- Monthly Contract Cost-to-Date Estimate (Form A-409-ARRA-Accrual)

EXPLANATION TO PROSPECTIVE OFFERORS

Any prospective Offeror desiring an explanation or interpretation of the RFP must request it in writing soon enough to allow a reply to reach all prospective Offerors before the submission of their offers. Oral explanations or instruction given before the award of the contract will not be binding. Any information given to a prospective Offeror concerning the RFP will be furnished promptly to all other prospective Offerors as an amendment of the solicitation, if that information is necessary in submitting offers or if the lack of it would be prejudicial to any other prospective Offeror.

PROPOSAL DUE DATE AND VALIDITY PERIOD

Proposals shall be delivered to Battelle on or before the proposal due date and shall be valid for a minimum of 60 days.

AMENDMENTS TO RFP

If this RFP is amended, all provisions which are not modified remain unchanged.

Offerors shall acknowledge receipt of any amendment of this RFP (a) by signing and returning the form provided for such purpose; (b) by stating in its proposal that the amendment (date and number) was received and considered in formulating the proposal; or (c) by letter or E-mail. Battelle must receive the acknowledgement by the time specified for receipt of proposals.

SUBMISSION, MODIFICATION, REVISION, AND WITHDRAWAL OF PROPOSALS (cl 605, Oct 2007)

1. Offerors are responsible for submitting proposals, and any modifications or revisions, so as to reach the Battelle office designated in the solicitation by the time specified in the solicitation. If no time is specified in the solicitation, the time for receipt is 4:00 p.m., local time, for the designated Battelle office on the date that proposal or revision is due.
2. Any proposal, modification, or revision received at the Battelle office designated in the solicitation after the exact time specified for receipt of offers is "late" and will not be

considered unless it is received before award is made, the Battelle Contracts Representative determines that accepting the late offer would not unduly delay the acquisition; and--

- A. If it was transmitted through an electronic commerce method authorized by the solicitation, it was received at the initial point of entry to the Battelle, Pacific Northwest Division, infrastructure not later than 5:00 p.m. one working day prior to the date specified for receipt of proposals; or
 - B. There is acceptable evidence to establish that it was received at the Battelle site designated for receipt of offers and was under Battelle's control prior to the time set for receipt of offers; or
 - C. It is the only proposal received.
3. However, a late modification of an otherwise successful proposal that makes its terms more favorable to the Battelle, will be considered at any time it is received and may be accepted.
- A. Acceptable evidence to establish the time of receipt at the Battelle site includes the time/date stamp of that installation on the proposal wrapper, other documentary evidence of receipt maintained by the installation, or oral testimony or statements of Battelle personnel.
 - B. If an emergency or unanticipated event interrupts normal Battelle processes so that proposals cannot be received at the office designated for receipt of proposals by the exact time specified in the solicitation, and urgent Battelle requirements preclude amendment of the solicitation, the time specified for receipt of proposals will be deemed to be extended to the same time of day specified in the solicitation on the first work day on which normal Battelle processes resume.
 - C. Proposals may be withdrawn by written notice received at any time before award. Oral proposals in response to oral solicitations may be withdrawn orally. If the solicitation authorizes facsimile proposals, proposals may be withdrawn via facsimile received at any time before award. Proposals may be withdrawn in person by an Offeror or an authorized representative, if the identity of the person requesting withdrawal is established and the person signs a receipt for the proposal before award.
 - D. Unless otherwise specified in the solicitation, the Offeror may propose to provide any item or combination of items.
 - E. Offerors shall submit proposals in response to this solicitation in English and in U.S. dollars unless otherwise permitted by the solicitation.
 - F. Offerors may submit modifications to their proposals at any time before the solicitation closing date and time, and may submit modifications in response to an amendment, or to correct a mistake at any time before award.
 - G. Offerors may submit revised proposals only if requested or allowed by the Battelle Contracts Representative.
 - H. Proposals may be withdrawn at any time before award. Withdrawals are effective upon receipt of notice by the Battelle Contracts Representative.
4. Offer expiration date. Proposals in response to this solicitation will be valid for the number of days specified on the solicitation cover sheet (unless a different period is proposed by the Offeror).

5. Restriction on disclosure and use of data. Offerors that include in their proposals data that they do not want disclosed to the public for any purpose, or used by Battelle except for evaluation purposes, shall --

- A. Mark the title page with the following legend:

This proposal includes data that shall not be disclosed outside Battelle and shall not be duplicated, used, or disclosed--in whole or in part--for any purpose other than to evaluate this proposal. If, however, a contract is awarded to this Offeror as a result of--or in connection with--the submission of this data, Battelle shall have the right to duplicate, use, or disclose the data to the extent provided in the resulting contract. This restriction does not limit Battelle's right to use information contained in this data if it is obtained from another source without restriction. The data subject to this restriction are contained in sheets [*insert numbers or other identification of sheets*]; and

- B. Mark each sheet of data it wishes to restrict with the following legend:

Use or disclosure of data contained on this sheet is subject to the restriction on the title page of this proposal.

TREATMENT OF PROPOSAL DATA

- A. Although not specifically requested by the RFP, the proposal may include technical data and other data, including trade secrets and/or privileged or confidential commercial or financial information, which the Offeror does not want disclosed to the public or used by PNNL or the Government for any purpose other than proposal evaluation. To protect such data, the Offeror will specifically identify each page including each line or paragraph thereof containing the data to be protected and mark the cover sheet of the proposal with the following notice:

NOTICE

The data contained in pages _____ of this proposal have been submitted in confidence and contain trade secrets and/or privileged or confidential commercial or financial information, and such data shall be used or disclosed only for evaluation purposes. PNNL and the Government shall have the right to use or disclose the data herein to the extent provided in the contract. This restriction does not limit PNNL's and the Government's right to use or disclose data obtained without restriction from any source, including the Offeror.

Reference to this notice on the cover sheet should be placed on each page to which the notice applies. PNNL assumes no liability for disclosure or use of unmarked data and may use or disclose such data for any purpose.

- B. Should a contract be awarded based on a proposal, it is policy, in consideration of the award, to obtain unlimited rights for the Government in technical data contained in the proposal unless the prospective contractor marks those portions of the technical information that he asserts as "proprietary data," or specifies those portions of such technical data that are not directly related to or will not be utilized in the work to be funded under this subcontract. "Proprietary data" are defined as technical data which embody trade secrets developed at private expense, such as design procedures or techniques, chemical composition of materials, or manufacturing methods, processes, or treatments, including minor modifications thereof, provided that such data: (1) are not generally known or available from other sources without obligation concerning their confidentiality; (2) have not been made available

by the owner to others without obligation concerning their confidentiality; and (3) are not already available to the Government without obligation concerning their confidentiality. An Offeror who receives a contract award shall mark the data identified as proprietary by specifying the appropriate proposal page number to be inserted in the Rights to Proposal Data clause below. Subject to the concurrence of PNNL, information unrelated to the subject may be deleted from the proposal by the Offeror. The responsibility, however, of identifying technical data as proprietary or deleting it as unrelated rests with the Offeror.

C. The following clause shall be included in any contract based on a proposal. This clause is intended to apply only to technical data and not to other data, such as privileged or confidential commercial or financial information.

RIGHTS TO PROPOSAL DATA

Except for technical data contained on pages ____ of the contractor's proposal dated _____, which are asserted by the Contractor as being proprietary data, it is agreed that as a condition of the award of this contract, notwithstanding the provisions of any notice appearing on the proposal, the Government shall have the right to use, duplicate, and disclose and have others do so for any purpose whatsoever, the technical data contained in the proposal upon which this contract is based.

BID AND PROPOSAL COSTS

Battelle is not obligated to pay any cost incurred in the preparation and submission of a proposal, nor to enter into a contract or any other arrangement with any Offeror.

ALTERNATE PROPOSALS

Battelle is inviting proposals in full accordance with the attached specifications or description. In the event that Offeror is unable to submit a proposal responsive to this requirement and Offeror believes they have an item(s) which may otherwise be acceptable, Offerors are invited to submit a proposal for Battelle's consideration, stating item by item each incidence of noncompliance. Offerors are hereby advised that Battelle shall not be obligated to evaluate this proposal, but if acceptable, this Solicitation will either be canceled and reissued or revised to incorporate any appropriate changes. In the event Offeror chooses not to submit a proposal, a short note of explanation would be appreciated.

TYPE OF CONTRACT

Battelle contemplates awarding a fixed price contract for this request.

TECHNICAL SPECIFICATIONS

The enclosed Specification dated 7/29/09 outlines the requirements for this solicitation.

PERFORMANCE SCHEDULE

Offerors shall note that any resulting contract shall include the following provision for submittal of a Performance Schedule:

“Contractor shall provide a performance schedule identifying major production milestones and deliverables to accomplish the requirements of this contract. Contractor shall submit the performance schedule to the Battelle Contracts Representative not later than ten days following contract award and provide written, electronic status reports by the 15th of each succeeding month. If at any time the Contractor has reason to believe that a production milestone or delivery date may not be met, Contractor shall immediately notify the Battelle Contracts Representative in writing, outlining the milestone or delivery date in jeopardy, the reasons, and steps the Contractor will take to recover the schedule in order to meet delivery requirements.”

PROMPT PAYMENT DISCOUNTS

In addition to normal payment terms, please advise amount and details of other cash discounts or savings available to Battelle for more expeditious or favorable methods of payment or for other reasons.

BRAND NAME OR EQUAL (cl 606 - Jan 1986)

The use of brand names in this Solicitation is intended to be descriptive and to indicate the quality and characteristics of products that will be satisfactory. If the Offeror proposes to furnish an equal product, the brand name of such product shall be clearly identified in the offer. The determination as to equality of the product offered shall be the responsibility of Battelle based on information furnished by the Offeror. To ensure that sufficient information is available for evaluation, the Offeror shall furnish as a part of its offer all descriptive material (such as cuts, illustrations, drawings, or other information) necessary for Battelle to 1) determine whether the product offered meets the essential characteristics of this Solicitation and 2) establish what Battelle would be binding itself to purchase.

NOTE 1: Offers shall be considered as offering the brand name product referenced in this Solicitation unless Offeror clearly indicates that it is offering an equal product.

NOTE 2: If Offeror proposes to modify a product to make it conform to the essential characteristics of this Solicitation it shall 1) include in its offer a clear description of such proposed modifications and 2) clearly mark any descriptive material to show the proposed modifications.

AUTHORIZED NEGOTIATORS

If a negotiation meeting is held, the Offeror shall designate as its negotiator a person who is authorized to make legally binding commitments without further review or approval. If, for any reason, it is impractical for the Offeror to be represented at a negotiation meeting by other than a person fully authorized to act in its behalf, Battelle shall be notified sufficiently in advance to allow a decision to be made whether the negotiations should proceed as scheduled or be postponed. The Offeror's notice, if originally given orally, shall be confirmed in writing.

INSURANCE /PRELIMINARY HAZARDS ASSESSMENT (PHA)

As required in the referenced general provisions the Contractor must provide a valid insurance certificate and completed PHA prior to any work performed on-site.

CONTRACT AWARD

a) Battelle may evaluate proposals received in response to this solicitation without discussion. Contract award, if any, will be made to the responsive, responsible Offeror whose evaluated proposal will be

most advantageous to Battelle, considering only price and any price-related factors specified elsewhere in the solicitation, or

(b) Battelle may reject any or all proposals, and waive informalities or minor irregularities in proposals received, or

(c) Battelle may accept any item or combination of items, unless doing so is precluded by a restrictive limitation in the solicitation or the proposal, or

(d) Battelle may reject a proposal as non-responsive if the prices proposed are materially unbalanced between line items or sub-line items. A proposal is materially unbalanced when it is based on prices significantly less than prices for some items and prices which are significantly overstated in relation to prices for other items, and if there is a reasonable doubt that the proposal will result in the lowest overall price to Battelle even though it may be the low evaluated proposal, or if it is so unbalanced as to be tantamount to allowing an advance payment.

We offer to sell the above items (or alternate items as specified) at the prices indicated, on the terms and conditions stated and the referenced general provisions which will be a part of any resulting order.		F.O.B. DESTINATION	
		Delivery Date at F.O.B. Point 12/18/2009	
		Terms of Payment PNNL standard payment terms are N30 payment terms, if prompt payment discounts are available, please state	
Firm Name	Offer Date	Weight	Recommended Carrier
Dimensions	Number of Boxes	Origin Zip Code	
Telephone No.	Fax No.	Email Address	
Name/Title	Signature		

Request for Proposal 104787

Technical Specifications

Inductively Coupled Plasma Reactive Ion Etching System

July 29, 2009

Scope and Basic Description

This Specification describes the minimum technical requirements and the minimum acceptable performance standards for an inductively coupled plasma reactive ion etching (ICP RIE) system to be installed by the successful contractor at Pacific Northwest National Laboratory, Richland, WA. The ICP RIE will be placed in a multiple user facility within a Class 1000 clean room and must provide ease of use and operation and safety to those in the facility. The tool must be capable of dry etching a variety of materials including silicon, silicon dioxide, various metals and silicon nitride. The system must be computer controlled via menu-driven software and user friendly.

ICP RIE System Features

1. Shall have Bosch (complete with license documentation), mixed gas, and cryogenic etching capability.
2. Shall have a base console to house electronic subsystems, control units, pneumatics, turbomolecular pump, and other support components.
3. Shall have a user-friendly software environment with a dedicated computer for operator interface of process control, wafer handling, real time data logging of process parameters, machine status, recipe management, etc. One additional copy of the software shall be provided for backup purposes; and a minimum of two (2) hard copies of all manuals shall be provided.
4. System shall be fully interlocked to protect the system hardware from any system failure and to protect the operator from any potential hazards, e.g., electrical shock during maintenance procedures.
5. Shall include tooling for 4" and 6" wafers.
6. The deep Si etch process is very sensitive to chamber conditions. To maintain the specifications below for deep Si etch, a spare ICP tube and chamber liners shall be included to be used only for this process. This accessory shall be installed in such a manner for easy access (ex: replacement of tube and liners shall not exceed 4 hours.)
7. Shall have at least five gas lines with appropriate mass flow controllers (MFCs) for the following process gases: C_4F_8 , SF_6 , CHF_3 , Ar, and O_2 with possibility of adding at least one additional MFC and gas line in the future. At least two of the gas lines shall be close coupled to the instrument and equipped with Unit 8100 or equivalent MFCs for Bosch processing.

8. Shall have a remote high-density plasma source providing uniformity suitable for use with wafers up to eight inches in diameter. The RF power should be at least 3 kW.
9. The ICP process chamber shall be equipped with an electrical heating kit for heating the walls to at least 60 °C to reduce condensation of process byproducts.
10. The lower electrode shall be made of aluminum and capable of heating above ambient temperature and cooling to temperatures as low as -150 °C. The lower electrode shall have an independent (at least 300 W) RF generator connected through a close-coupled automatic matching unit.
11. Rough pump(s) used to back turbomolecular pump(s) shall be dry pump(s) and hardware required for connection of the pump shall be included.
12. Shall have a load lock chamber for vacuum loading of a single wafer into the process chamber.
13. A standard one-year onsite warranty, including all parts, labor, travel, lodging and expenses, shall be provided for the system. In addition, a minimum of one maintenance service call, including all parts, labor, travel, lodging and expenses, shall be provided.
14. Upon completion of installation, Contractor shall dispatch an applications engineer to EMSL to provide on-site training to a group of at least 3 people and verify process requirements.

Minimum Process Specifications

13. Process: Cryo Deep Si Etch

- 13.1. Process Gases: SF₆, O₂
- 13.2. Etch rate: > 4 um/min
- 13.3. Selectivity: > 100:1 to photoresist, > 200:1 SiO₂
- 13.4. Uniformity: < +/- 5% on 150 mm wafer with 7 mm edge exclusion
- 13.5. Wall profile control: 90° +/- 1°
- 13.6. Minimum Achievable Aspect Ratio: 30 to 1
- 13.7. Sidewall Roughness: < 60 nm

14. Process: Bosch Deep Si Etch

- 14.1. Process gases: Octofluorocyclobutane (C₄F₈), SF₆
- 14.2. Clean gas: O₂

- 14.3. Etch rate: $>2.5 \text{ um/min}$
- 14.4. Selectivity: $>75:1$ to photoresist, $>150:1$ to SiO_2
- 14.5. Uniformity: $< \pm 5\%$ on 150 mm wafer (with 7 mm edge exclusion)
- 14.6. Reproducibility: $< \pm 3\%$ (run to run)
- 14.7. Wall profile control: $90^\circ \pm 1^\circ$
- 14.8. Minimum Achievable Aspect ratio: 30 to 1
- 14.9. Sidewall Roughness: $< 200 \text{ nm}$

15. Etching of Pyrex Glass

- 15.1. Process gases: CHF_3 , Ar
- 15.2. Etch rate: $>200 \text{ nm/min}$
- 15.3. Selectivity: $>20:1$ to Cr, Ni, or Al
- 15.4. Uniformity: $< \pm 5\%$ on 150 mm wafer (with 7 mm edge exclusion)
- 15.5. Reproducibility: $< \pm 3\%$ (run to run)
- 15.6. Wall profile control: $>80^\circ$
- 15.7. Aspect Ratio: $>5:1$
- 15.8. Depth: $>50 \text{ um}$

OPTIONS:

Battelle reserves the right to exercise either or all of the following options up to one year following any resulting contract award.

1. One additional ICP tube and associated chamber lines.
2. Year 2 warranty and maintenance (consistent with Year 1 as described above).